锋樺科技伺服精密减速器產品

Fenghua Technology Servo Precision Reducer Products

3F FAMED 锋桦®

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锋桦传動科技（江苏）有限公司
锋桦传動設備（上海）有限公司
台灣锋桦科技有限公司

步進/伺服馬達專用 For stepper / servo motor

行星式減速機
Planetary Gearbox

台灣精品技術/精密傳動解決專家 Taiwan excellent technology/precision transmission solutions expert

3F FAMED 锋桦®

锋桦传動科技（江苏）有限公司
锋桦传動設備（上海）有限公司
台灣锋桦科技有限公司

Fenghua Transmission Technology (Jiangsu) Co.,Ltd.

3F FAMED 锋桦® 公司簡介 Company Introduction

锋桦傳動科技有限公司，由專業制造齒輪工廠開始發展，工廠同仁及研發團隊具有二十幾年齒輪制造研發及設計經驗，工廠早期和台灣行星減速器技術團隊合作，成立行星減速器事業部，合作研發行星齒輪減速機系列產品綫設計及制造工藝，所生產的系列伺服專用精密減速器具低背隙(5-8arcmin)、低噪音(60dAB)、高效率(≧95%)之三大特性。產品可以搭配任意伺服工廠所生產伺服馬達、步進馬達，高精密行星減速器具有降低轉速、高轉矩化、增加馬達轉子慣性，提高剛性、縮短啓動與停止定位時間，馬達功率小型化，同時提高慣性負載的安定性與降低振動的功能。

爲提升產品升級、適應高精度等級產品適用範疇，工廠後期產品優化升級，全系列上綫-高精度斜齒行星減速器，具有超低背隙(1~3arcmin)精度等級，新開發產品可直接替換德國和日本品牌，產品系列全部齊全,尺寸和精度和日系德系減速器完全匹配,在升級行星減速器產品同時，工廠堅持以研發創新爲企業發展方向，陸續研發推出適用于自動化不同安裝和輸出需求的（90度精密直角減速器），多關節機器人行業減速器（RV高精密擺纜針輪減速器）和美國天才發明家C.W.Musser創造發明的波動齒輪裝置原理發明（諧波減速器），及（精密齒輪齒條）產品，也可以非標定制減速器，產品廣泛運用工具機(龍門機床)，激光切割機,木工雕刻機，3C自動化，光伏設備，鋰電池等新能源設備領域，全伺服紙巾機械，精度凹凸版印刷機，精密塗布機，伺服彎管機，數控彈簧機等自動化程度較高設備等都有鋒樺減速器的使用。

工廠產品有匹配大量產品庫存，希望協同伺服電機廠家及系統集成商，扎根全球市場，立志通過優良的產品，服務于全球自動化行業和機器人領域，爲全球機器人事業和工業4.0方向服務。

Fenghua Transmission Technology Co.,Ltd. is developed from a factory which professionally manufactures the gears. All staffs of factory and R & D team have more than 20 years' gear manufacturing and designing experience. The factory cooperated with Taiwan planetary gearbox technology team in the early period, and then established business department of the planetary gearbox , and developed the design and manufacturing process of product line of planetary gearbox series. The servo exclusive-used precision gearbox series the company produced are with three features of low backlash (5~8 arcmin), low noise (60dAB) and high efficiency (≧95%). Products can be compatible with servo motors and stepper motors produced by any servo factory. High precision planetary reducers features of reducing rotating speed, increasing torque greatly, increasing inertia of the motor rotor, improving rigidity, shortening the locating time of start and stop, miniaturizing the motor power and improving the stability of the inertia load and reducing the vibration at the same time.

In order to upgrade products, and adapt to the applicable range of high precision grade products, the factory launched the whole series of high precision helical planetary gearbox in late stage. With ultra-low backlash (1-3 arcmin) precision grade, the newly developed products can directly replace the sizes of the products produced by Germany and Japan. All product series are completed, and sizes and precision can perfectly match with that of Japanese and Germany. While upgrading planetary reducer products, the factory insists on the concept of R&D as the development direction of the company. Then the factory successively developed and launched 90 degree precision right angle gearboxes which are suitable for automation with different installation and output requirements , multi-joint robot industry reducers (RV high precision pin-wheel reducers), and harmonic reducers making use of the principle of the wave gear device invented by American genius inventor C. W. Musser, and precision gear & rack products. The factory can also customize the reducer. The products are widely used in tool machines (Planning Machine Tools), laser cutting machines, woodworking engraving machines, 3C automation, photovoltaic equipment, lithium battery and other fields of new energy equipment. And Fenghua gearboxes can also be found in fully servo paper towel machines, precision concave-convex printing machines, precision coating machines, servo pipe benders, CNC spring machines and other highly automated equipment.

The company matches a large stocks of products to coordinate with servo motor manufacturers and system integration traders, rooting in the domestic market, and determined to serve the domestic automatic industry and robotic field by excellent products and serve for the Chinese robot cause and Industrial 4.0 direction.

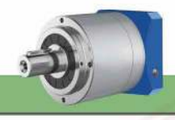
低噪音内螺旋齒輪設計
Low noise internal helical gear design

生產車間 Production workshop

產品目錄 CONTENTS

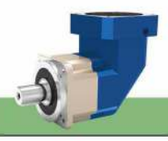
VRB
高精密型行星減速機
High Precision Planetary Gearbox
VRB series 06-09

VRL
高精密型行星減速機
High Precision Planetary Gearbox
VRL series 10-13



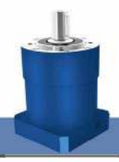
PAB
高精度高力矩行星減速機
High Precision High Torque Planetary Gearbox
PAB series 14-17

PAR
轉角型精密行星減速機
Precision Right Angle Planetary Gearbox
PAR series 18-21

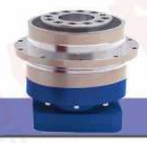


PLF
標準型行星減速機
Standard Planetary Gearbox
PLF series 22-25

PLE
標準型行星減速機
Standard Planetary Gearbox
PLE series 26-29



PAD
高精密法蘭輸出
High Precision Flange–output Gearbox
PAD series 30-34



PADR
轉角高精度法蘭輸出
High Precision Right Angle Flange–output Planetary Gearbox
PADR series 35-39

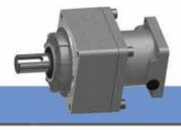
PAF
標準型行星減速機
Standard Planetary Gearbox
PAF series 40-43

VRS
高力矩高精密行星減速機
High Torque High Precision Planetary Gearbox
VRS series 44-47

PFR
轉角精密行星減速機
Precision Right Angle Planetary Gearbox
PFR series 48-51

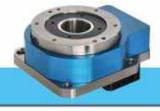
PER
轉角精密行星減速機
Precision Right Angle Planetary Gearbox
PER series 52-55

VRSF
精密行星減速機
Precision Planetary Gearbox
VRSF series 56-59



ZR
精密直角減速器
Precision Right Angle Gearbox
ZR series 60-64

ZK
中空旋轉平臺
Hollow Rotary Actuator
ZK series 65-76



DG
中空旋轉平臺
Hollow Rotary Actuator
DG series 77-80

系列 Series	定位精度 Positioning accuracy	徑向力 Radial forces	扭轉剛性 Torsional stiffness	背隙 Backlash	規格多樣性 Wide range of size	功率密度 Power density	傳動多樣性 Wide range of ratios
PAF	● ●	● ●	● ●	● ●	● ● ●	● ● ●	● ● ●
PAE	● ●	● ●	● ●	● ●	● ● ●	● ● ●	● ● ●
PAB	● ● ●	● ●	● ● ●	● ● ●	● ●	● ● ●	● ● ●
PAR	● ● ●	● ●	● ● ●	● ●	● ●	● ●	● ● ●
VRB	● ● ●	● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
VRL	● ● ●	● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
VRS	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●	● ● ●
PAD	● ● ●	● ● ●	● ● ●	● ● ●	● ●	● ● ●	● ● ●
PFR	● ● ●	● ●	● ●	● ●	●	● ●	● ●
PER	● ● ●	● ●	● ●	● ●	●	● ●	● ●
PADR	● ● ●	● ● ●	● ● ●	● ●	●	● ●	● ●
PLF	● ●	● ●	● ●	● ●	● ● ●	● ● ●	● ● ●
PLE	● ●	● ●	● ●	● ●	● ● ●	● ● ●	● ● ●
VRSF	● ● ●	● ●	● ●	● ●	●	●	● ●
ZR	● ●	● ●	● ● ●	● ●	● ● ●	●	● ● ●
ZK	● ● ●	● ●	● ●	● ●	● ●	●	● ● ●

● 標準 Standard　● ● 强 Strong　● ● ● 最高 Highest

功率等級 Power Grade

快速找到目標：程序概覽

您今後不再需要花費大量時間通過給出詳細數值進行搜索：祇需要使用我公司一目了然的搜索程序就能快速選到您所需的產品。在此概覽中您可以找到產品的重要規格特性。

Find your target quickly:

Program Overview

You will no longer need to spend much time searching in the future by giving detailed datas.
You only need to use our company's clear search program to quickly select the products you need.
In this overview, you can find the important specifications features of the products.

減速機選用參考表 Reference Table of Reducer Selection

減速機選用參考表依據伺服馬達輸出功率選擇

Selecting reducer according to the output power of servo motor

容量 Capacity	型號 Model	1/3	1/4	1/5	1/7	1/10	1/12	1/15	1/16	1/20	1/25	1/28	1/30	1/35	1/40	1/50	1/70	1/100
100w	042	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
	060	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
200w	060	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
400w	060	●	●	●	●	●	●	●	●	●	●	●	●					
	090	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
500w	090	●	●	●	●	●	●	●	●	●	●	●						
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
750w	090	●	●	●	●	●	●	●	●	●	●	●						
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.0kw	090	●	●	●	●	●												
	120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.5kw	090	●	●	●	●	●												
	120	●	●	●	●	●	●	●	●	●	●	●	●					
	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
2.0kw	120	●	●	●	●	●	●	●										
2.0kw	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
3.5kw	120	●	●	●	●	●	●	●										
3.5kw	150	●	●	●	●	●	●	●	●	●	●	●	●	●				
	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
5.0kw	120	●	●	●	●	●	●	●										
5.0kw	150	●	●	●	●	●	●	●	●	●	●	●						
	180	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
7.0kw	180	●	●	●	●	●	●	●	●	●								
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
11.0kw	180	●	●	●	●	●												
	220	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
15.0kw	220	●	●	●	●	●	●	●	●	●	●							

P.S: 此"●"記號爲可選用之減速比。

注1.三段減速比不在上表中，若需用到請告知銷售人員。

注2.慣性距較大的場合減速機型號需大一級使用。

P.S：This mark"●"means available reduction ratio.

Note 1：Three-stage speed reduction ratios are not available in the above stable. If needed, pls inform our sales person.

Note 2：Choose a bigger level of reducer to use when the inertia is bigger.

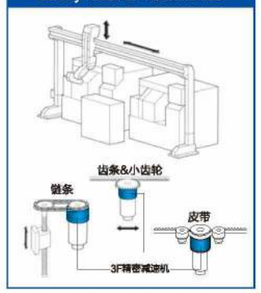
產品應用行業 Product Application Industry

半導體液晶制造設備、機器人、機床等需要精密運動控制的前沿領域得到廣泛應用

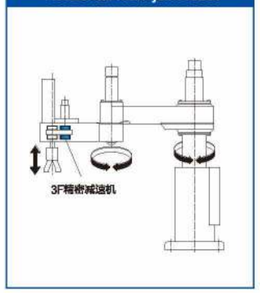
Semiconductor liquid crystal manufacturing equipment, robots, machine tools, and other frontier areas requiring precision motion control are widely used.

機器人的行走軸（齒條和小齒輪）
The walking shaft of a robot (rack and pinion)

機床的龍門機器人
Gantry robot of machine tool

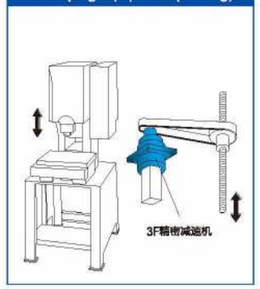


水平多關節機器人
Horizontal multi-joint robot

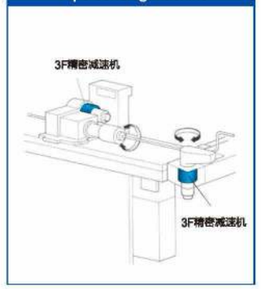


晶圓搬運機器人
Wafer handling robot

衝壓設備（鉚接）
Stamping equipment (riveting)



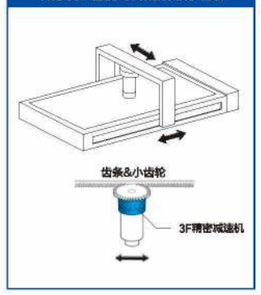
彎管機
Pipe bending machine



注塑成型取出機器人
Injection mold taken-out robot

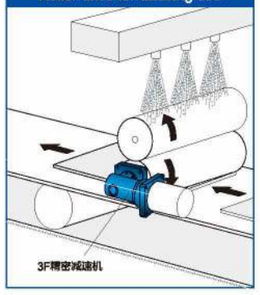
機床的轉塔刀架旋轉
Rotary tower knife frame rotation of machine tool

機床的XY軸
The XY axis of machine tool

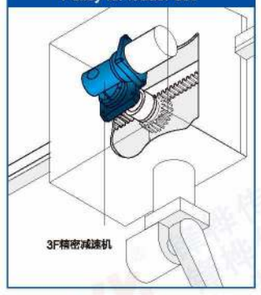


分度工作臺驅動
Indexing table drive

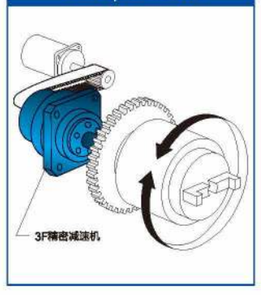
塗抹用輥驅動
Roller drive for daubing use



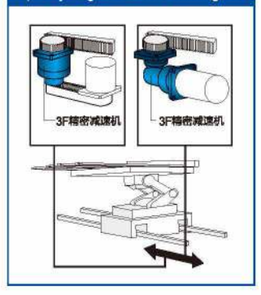
裝載機用滑車
Pulley for loader use



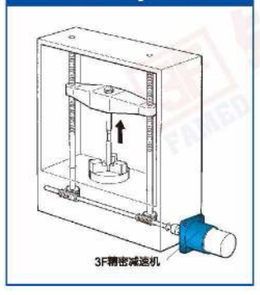
軸輸入型皮帶驅動
Shaft input belt drive



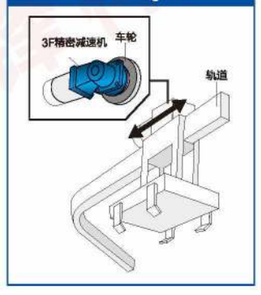
液晶玻璃基板搬運機器人
Liquid crystal glass substrate handling robot



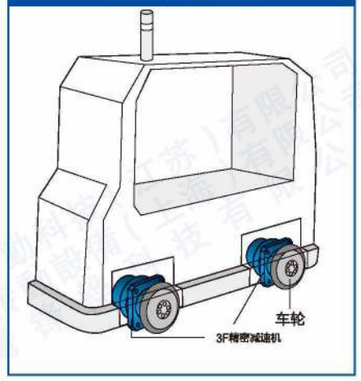
拉力試驗機
Tensile testing machine



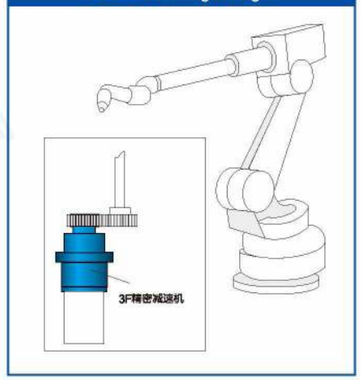
頂棚行走式搬運車
Roof walking van



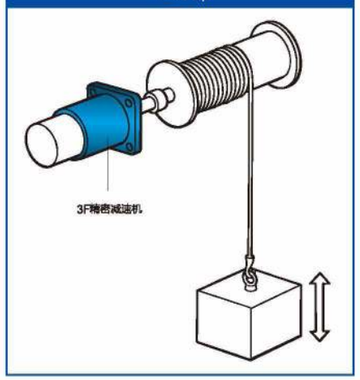
無人搬運車
Unmanned vehicle



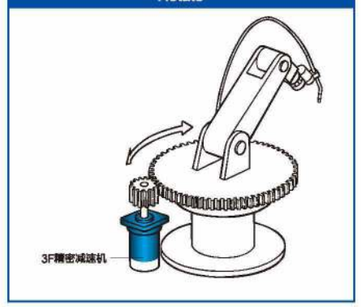
高度工作用機器人
Robot for working in height



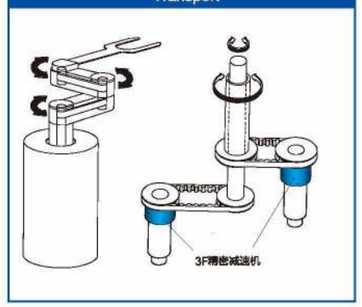
卷起
Roll up



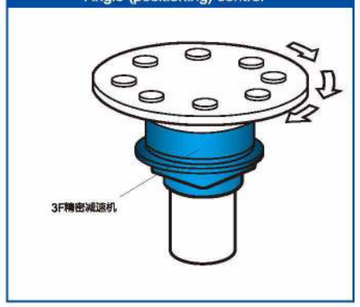
旋轉
Rotate



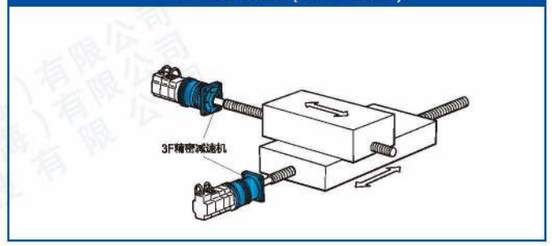
搬送
Transport



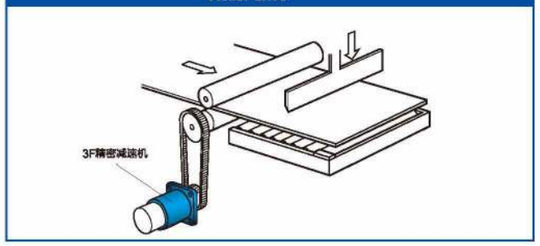
角度（定位）控制
Angle (positioning) control



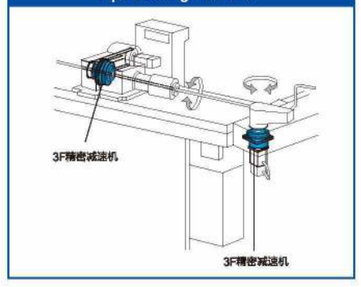
兩軸控制（XY工作臺）
Two axis control (XY workbench)



輥驅動
Roller drive



彎管機
Pipe bending machine



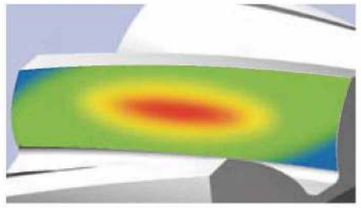
衝壓（鉚接）
Punching (riveting)

印刷電路板檢查裝置
Printed circuit board inspection device

產品技術 Product Technology

3F系列行星式減速機擁有二項多國專利之潤滑結構，運用在內螺旋齒輪結構，確保最高效率輸出。
專利1：降低行星齒輪運轉所產生的軸向推力。
專利2：增加潤滑，降低摩擦阻力與噪音。

The 3F series planetary gearbox has two multi-national patent lubricating structure, which is used in the internal spiral gear structure to ensure the highest efficient output.
Patent 1: Reducing the axial thrust of the planetary gear operation.
Patent 2: Increase the lubrication, reduce the frictional resistance and noise.



利用ANSYS技術對齒輪强度進行有限元分析，同時對齒面作齒形及導程修整，以減低齒輪嚙合的衝擊和噪音，增加齒輪系的使用壽命。

Finite element analysis of gear strength is carried out by using ANSYS technology. Tooth profile and lead trimming of tooth surface are also made to reduce the impact and noise of gear meshing, and increase the service life of gear system.

齒輪材料采用優質合金鋼，經碳–氮共滲處理，從而獲得良好的耐磨性和耐衝擊韌性。

Carbon–nitriding heat–treated high quality alloy steel is adopted in gear materials to obtain the best wear resistance and impact toughness.

輸出行星架采用一體式（雙支撐）的結構設計，前後軸承大跨距分布于箱體內，形成穩定的一體式結構，以確保較高的扭轉剛性和精度。

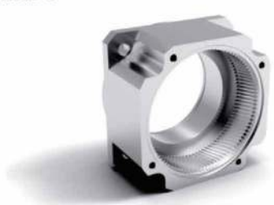
The output planet carrier adopts integral (double support) structure design. The large span of the front and rear bearings is distributed inside the box body, forming a stable integrated structure to ensure high torsion rigidity and accuracy.

齒圈與輸出殼體采用一體化設計，采用優質鋼材，經熱鍛成形，從而獲得較高的材料密度。一體化設計能保證所有幾何尺寸一次性加工完成，與其他內嵌式、夾裝式等結構相比具有更高的精度和强度。

An integrated design of the tooth ring and the output shell is adopted, and high quality steel is used to get high material density by hot forging. The integrated design can ensure that all geometric dimensions are finished in one time and have higher precision and strength compared with other embedded and clamped structures.

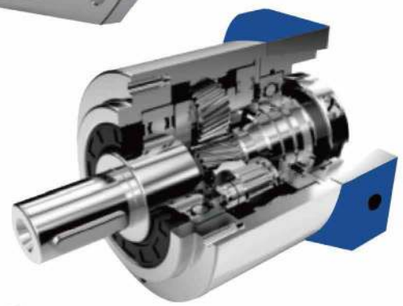
輸入軸與鎖緊裝置采用一體化設計，雙螺栓對稱分布，達到動態平衡的同時，通過雙螺栓的强力鎖死，有效防止電機軸傳動打滑，實現高精度零背隙的動力傳送。

The input shaft and locking device are designed in an integrated way. The two bolts are symmetrically distributed to achieve dynamic balance. At the same time, through the strong locking of double bolts, the motor shaft transmission is effectively prevented from slipping and the high–precision zero backlash power transmission is achieved.



PRECISION PLANETARY GEARBOX
精密行星減速機

VRB



1. 静音
使用斜齒輪實現順暢安靜的運轉

2. 高精度
背隙低于3公分、定位精確。

3. 高剛性、高扭矩
使用整體式滚珠軸承，大大提高了剛性和扭矩。

4. 法蘭、連接器方式
可以安裝到世界上任何一臺馬達上。

5. 無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂，有效防止潤滑脂泄漏。

6. 維護方便
在產品壽命期內無需更換潤滑脂，安裝更便捷。

1.Quiet operation
Helical gears are used to achieve smooth and quiet operation.
2.High precision
The backlash is less than 3 arcmin and the positioning is accurate.
3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
4.Methods of flange and connector
It can be installed on any motor in the world.
5.No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
6.Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

VRB 系列 Type

VRB090 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
VRB042，VRB060，VRB090，VRB115
VRB142，VRB180，VRB220

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1–stage：3，4，5，6，7，8，9，10
雙節 2–stage：15，20，25，30，35，40，45，50，60，70，80，90，100

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：VRB090–100–S2–P1/Panasonic MSMJ 082S1A

VRB 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	VRB042	VRB060	VRB090	VRB115	VRB142	VRB180	VRB220
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	20	55	130	208	342	588	1140
			4	19	50	140	290	542	1050	1700
			5	22	60	160	330	650	1200	2000
			6	20	55	150	310	600	1100	1900
			7	19	50	140	300	550	1100	1800
			8	17	45	120	260	500	1000	1600
			9	14	40	100	230	450	900	1500
			10	14	40	100	230	450	900	1500
		2	15	20	55	130	208	342	588	1140
			20	19	50	140	290	542	1050	1700
			25	22	60	160	330	650	1200	2000
			30	20	55	150	310	600	1100	1900
			35	19	50	140	300	550	1100	1800
			40	17	45	120	260	500	1000	1600
			45	14	40	100	230	450	900	1500
			50	22	60	160	330	650	1200	2000
			60	20	55	150	310	600	1100	1900
			70	19	50	140	300	550	1100	1800
			80	17	45	120	260	500	1000	1600
			90	14	40	100	230	450	900	1500
			100	14	40	100	230	450	900	1500
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque						
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	5000	5000	4000	4000	3000	3000	2000
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	10000	10000	8000	8000	6000	6000	4000
超精密背隙P0 / Micro Backlash P0	arcmin	1	3~10	≤2	≤2	≤2	≤2	≤2	≤2	≤2
		2	12~100	≤4	≤4	≤4	≤4	≤4	≤4	≤4
精密背隙P1 / Precision Backlash P1	arcmin	1	3~10	≤4	≤4	≤4	≤4	≤4	≤4	≤4
		2	12~100	≤6	≤6	≤6	≤6	≤6	≤6	≤6
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	3	7	14	25	50	145	225
容許徑向力F_{2rB}[2] / Max.Radial Force	N	1,2	3~100	780	1530	3250	6700	9400	14500	50000
容許軸向力F_{2aIB}[2] / Max.Axial Force	N	1,2	3~100	350	630	1300	3000	4000	6200	35000
容許軸向力F_{2aIB}[2] / Max.Axial Force	N	1,2	3~100	390	765	1625	3350	4700	7250	25000
使用壽命 / Service Life	hr	1,2	3~100	20000h						
效率 η/Efficiency	%	1	3~10	≥97%						
		2	15~100	≥94%						
重量/Weight	kg	1	3~10	0.5	1.3	3.3	7.8	15	28	52
		2	15~100	0.8	1.48	3.9	9.6	18.9	33	66
使用溫度 / Operating Temperature	℃	1,2	3~100	(-15℃ ~ +90℃)						
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂(Synthetic Grease)						
防護等級 / Protection Class		1,2	3~100	IP65						
安裝方向 / Mounting Position		1,2	3~100	任意方向(Any Direction)						
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤56	≤58	≤60	≤63	≤65	≤67	≤70

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	VRB042	VRB060	VRB090	VRB115	VRB142	VRB180	VRB220
轉動慣量J1 Rotary Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21	28.98	69.61
			4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
			9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	12-40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50-100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

1. 減速比(i=Nin/Nout)　2. 輸出轉數100rpm時，作用於輸出軸中心位置。　3. 最大加速力矩T2B=60%of T2NOT，連續運轉使用壽命爲10000hrs。
1. Ratio (i=Nin/Nout)　2. When output speed is 100rpm, acting on the output shaft center position
3. The Max. acceleration torque T2B=60% of T2NOT, continuous operation, service life is 10000hrs

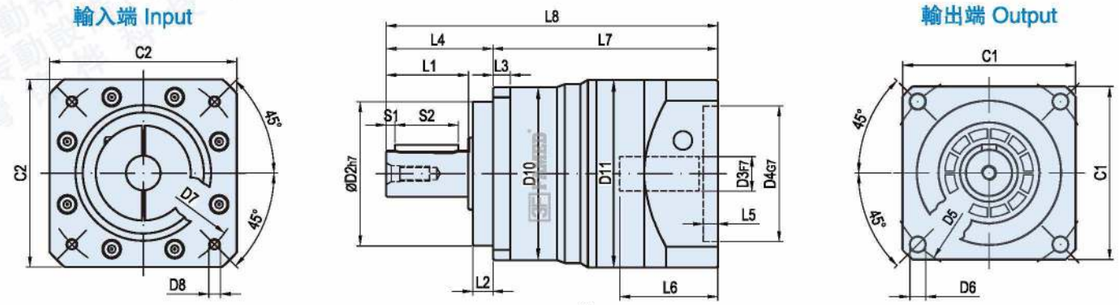
MODEL：VRB

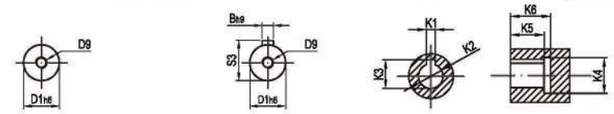
單段 1-Stage

速比 Ratio：3，4，5，6，7，8，9，10

外形尺寸圖 Dimensions：

輸入端 Input　　輸出端 Output





出力軸形式 S1
Output shaft type S1

出力軸形式 S2
Output shaft type S2

輸出孔形式 S3
Output hole type S3

Unit:mm

尺寸 Size	VRB042-L1	VRB060-L1	VRB090-L1	VRB115-L1	VRB142-L1	VRB180-L1	VRB220-L1
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8（ϕ6.35-11）	ϕ14（ϕ11-19）	ϕ19（ϕ16-24）	ϕ22（ϕ19-35）	ϕ24（ϕ22-35）	ϕ35（ϕ35-42）	ϕ42（ϕ35-55）
D4	ϕ30（ϕ30-50）	ϕ50（ϕ50-ϕ70）	ϕ70（ϕ70-ϕ110）	ϕ110（ϕ114.3）	ϕ110（ϕ114.3）	ϕ114.3（ϕ114.3-200）	ϕ180（ϕ114.3-200）
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4-ϕ3.4	4-ϕ5.5	4-ϕ7	4-ϕ9	4-ϕ11	4-ϕ13	4-ϕ17
D7	ϕ46（ϕ45-70）	ϕ70（ϕ70-ϕ90）	ϕ90（ϕ90-145）	ϕ145（ϕ145-200）	ϕ145（ϕ145-200）	ϕ200（ϕ200-235）	ϕ215（ϕ200-235）
D8	4-M4(M3-M5)	4-M5（M4-M6）	4-M6（M5-M8）	4-M8（M8-M12）	4-M8（M8-M12）	4-M12	4-M12
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2P	M20X2.5P	M20X2.5P
D10	ϕ42	ϕ60	ϕ87	ϕ114.5	ϕ142	ϕ180	ϕ218
D11	ϕ46	ϕ65	ϕ90	ϕ118	ϕ150	ϕ184	ϕ225.5
L1	19.5	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	5	5	7（7-8）	6（6-11）	8（8-11）	7（7-10）	8（8-15）
L6	27.5（≤32）	34（≤44）	44（≤60）	64.5（≤81.5）	72.5（≤82）	85（≤120）	109（≤119）
L7	65.5（65.5-70）	78（78-88）	98（98-114）	135（135-153）	154.5（154.5-164）	179（179-214）	220（220-230）
L8	91.5（91.5-96）	115（115-125）	146（146-162）	201（201-218）	251.5（251.5-261）	284（284-319）	358（358-368）
C1	42	60	90	115	142	180	220
C2	46(46-60)	65(65-80)	90（90-130）	130（130-180）	130（130-180）	180（180-220）	200（200-220）
S1	3	3	4	5	5	6	7
S2	14	22	28	40	65	70	90
S3	15	18	24.5	35	43	59	79.5
B	5	5	6	10	12	16	20
K1	3	4	6	8	10	14	18
K2	ϕ8	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	9.4	12.8	24.5	31.3	41.3	53.8	64.4
K4	ϕ13	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	15	20	27	35	43	60
K6	18	18	24	32	40	50	65

注1：（）括號內爲可選擇範圍尺寸，（）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

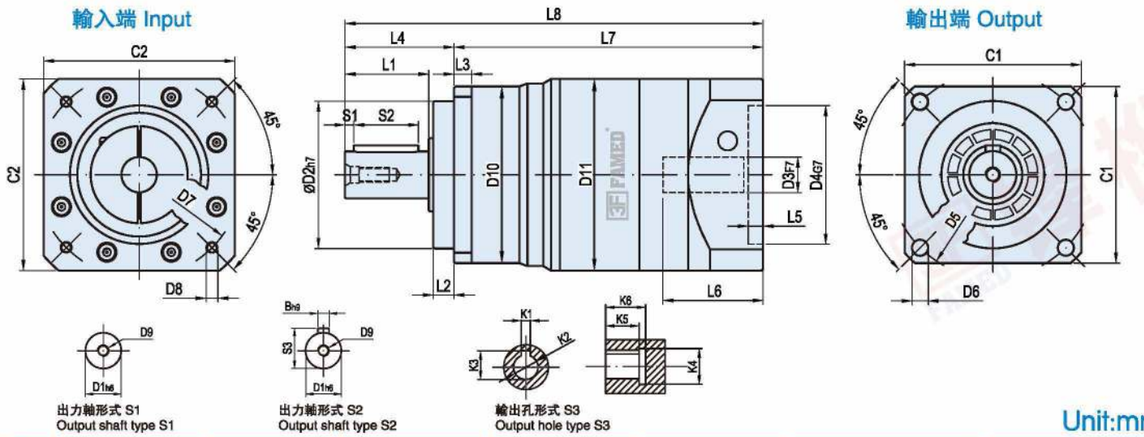
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL：VRB

雙段 2-Stage

速比 Ratio：15，20，25，30，35，40，45，50，60
70，80，90，100

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	VRB042-L2	VRB060-L2	VRB090-L2	VRB115-L2	VRB142-L2	VRB180-L2	VRB220-L2
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8（ϕ6.35-8）	ϕ14（ϕ11-14）	ϕ19（ϕ11-19）	ϕ22（ϕ16-24）	ϕ24（ϕ19-35）	ϕ35（ϕ22-35）	ϕ42（ϕ35-42）
D4	ϕ30（ϕ30-38.1）	ϕ50	ϕ70（ϕ50-ϕ80）	ϕ110（ϕ70-110）	ϕ110（ϕ114.3）	ϕ114.3（ϕ110-114.3）	ϕ180（ϕ114.3-200）
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4-ϕ3.4	4-ϕ5.5	4-ϕ7	4-ϕ9	4-ϕ11	4-ϕ13	4-ϕ17
D7	ϕ46（ϕ45-66.67）	ϕ70	ϕ90（ϕ70-100）	ϕ145（ϕ90-145）	ϕ145（ϕ145-200）	ϕ200（ϕ145-200）	ϕ215（ϕ200-235）
D8	4-M4(M3)	4-M5（M4）	4-M6（M4-M6）	4-M8（M5-M8）	4-M8（M8-M12）	4-M12（M8-M12）	4-M12
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2P	M20X2.5P	M20X2.5P
D10	ϕ42	ϕ60	ϕ87	ϕ114.5	ϕ142	ϕ180	ϕ218
D11	ϕ46	ϕ65	ϕ90	ϕ118	ϕ150	ϕ184	ϕ225.5
L1	19.5	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	5	5	5	8（7-8）	11（6-11）	8（8-11）	8（7-10）
L6	27.5	34	34（≤44）	44（≤60）	64.5（≤81.5）	72.5（≤82	85（≤120）
L7	86	105	124.5（114.5-124.5）	165.5（149.5-165.5）	206（189-206）	235（225.5-235）	269（264-299）
L8	112	142	172.5（162.5-172.5）	230.5（214.5-230.5）	303（286-303）	340（330.5-340）	407（402-437）
C1	42	60	90	115	142	180	220
C2	46（46-57）	65	65（65-86）	90（90-130）	130（130-180）	150（150-180）	200（180-220）
S1	3	3	4	5	5	6	7
S2	14	22	28	40	65	70	90
S3	15	18	24.5	35	43	59	79.5
B	5	5	6	10	12	16	20
K1	3	4	6	8	10	14	18
K2	ϕ8	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	9.4	12.8	24.5	31.3	41.3	53.8	64.4
K4	ϕ13	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	15	20	27	35	43	60
K6	18	18	24	32	40	50	65

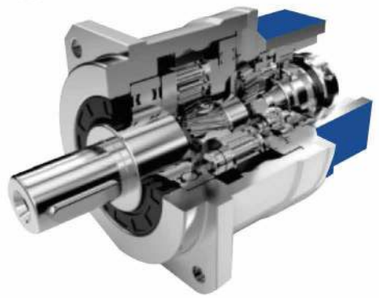
注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

精密行星減速機

VRL



1.静音
使用斜齒輪實現順暢安静的運轉

2.高精度
背隙低于3公分、定位精確。

3.高剛性、高扭矩
使用整體式滚珠軸承，大大提高了剛性和扭矩。

4.法蘭、連接器方式
可以安裝到世界上任何一臺馬達上。

5.無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂，有效防止潤滑脂泄漏。

6.維護方便
在產品壽命期内無需更換潤滑脂，安裝更便捷。

1.Quiet operation
Helical gears are used to achieve smooth and quiet operation.
2.High precision
The backlash is less than 3 arcmin and the positioning is accurate.
3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
4.Methods of flange and connector
It can be installed on any motor in the world.
5.No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
6.Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

VRL 系列 Type

VRL090 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
VRL050，VRL070，VRL090，VRL120，
VRL155，VRL205，VRL235

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1-stage：3，4，5，6，7，8，9，10
雙節 2-stage：15，20，25，30，35，40，45，50，
60，70，80，90，100

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：VRL090-100-S2-P1/Panasonic MSMJ 082S1A

VRL 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	VRL050	VRL070	VRL090	VRL120	VRL155	VRL205	VRL235
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	20	55	130	208	342	588	1140
			4	19	50	140	290	542	1050	1700
			5	22	60	160	330	650	1200	2000
			6	20	55	150	310	600	1100	1900
			7	19	50	140	300	550	1100	1800
			8	17	45	120	260	500	1000	1600
			9	14	40	100	230	450	900	1500
			10	14	40	100	230	450	900	1500
		2	15	20	55	130	208	342	588	1140
			20	19	50	140	290	542	1050	1700
			25	22	60	160	330	650	1200	2000
			30	20	55	150	310	600	1100	1900
			35	19	50	140	300	550	1100	1800
			40	17	45	120	260	500	1000	1600
			45	14	40	100	230	450	900	1500
			50	22	60	160	330	650	1200	2000
			60	20	55	150	310	600	1100	1900
			70	19	50	140	300	550	1100	1800
			80	17	45	120	260	500	1000	1600
			90	14	40	100	230	450	900	1500
			100	14	40	100	230	450	900	1500
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque						
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	5000	5000	4000	4000	3000	3000	2000
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	10000	10000	8000	8000	6000	6000	4000
超精密背隙P0 / Micro Backlash P0	arcmin	1	3~10	≤2	≤2	≤2	≤2	≤2	≤2	≤2
		2	15~100	≤4	≤4	≤4	≤4	≤4	≤4	≤4
精密背隙P1 / Precision Backlash P1	arcmin	1	3~10	≤4	≤4	≤4	≤4	≤4	≤4	≤4
		2	15~100	≤6	≤6	≤6	≤6	≤6	≤6	≤6
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	3	7	14	25	50	145	225
容許徑向力F_{2rb}[2] / Max.Radial Force	N	1,2	3~100	680	1260	2880	6000	8200	12800	27800
容許軸向力F_{2a1B}[2] / Max.Axial Force	N	1,2	3~100	330	625	1250	2400	3890	6100	15000
容許軸向力F_{2a1B}[2] / Max.Axial Force	N	1,2	3~100	370	760	1580	3360	4660	7250	18500
使用壽命 / Service Life	hr	1,2	3~100	20000h						
效率 η/Efficiency	%	1	3~10	≥97%						
		2	15~100	≥94%						
重量/Weight	kg	1	3~10	0.5	1.2	3.5	7.8	14.5	30	50
		2	15~100	0.8	1.4	4.1	9	17.5	33	63
使用溫度 / Operating Temperature	℃	1,2	3~100	(-15℃ ~ +90℃)						
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂(Synthetic Grease)						
防護等級 / Protection Class		1,2	3~100	IP65						
安裝方向 / Mounting Position		1,2	3~100	任意方向(Any Direction)						
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤56	≤58	≤60	≤63	≤65	≤67	≤70

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	VRL050	VRL070	VRL090	VRL120	VRL155	VRL205	VRL235
轉動慣量J1 Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21	28.98	69.61
			4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
			9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	12–40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50–100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

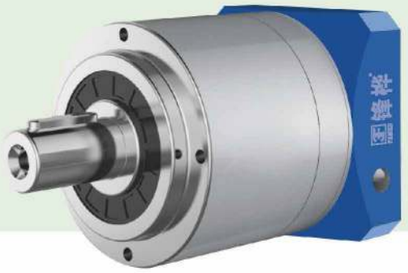
1. 減速比(i=Nin/Nout)　2. 輸出轉數100rpm時，作用於輸出軸中心位置。　3. 最大加速力矩T2B=60%of T2NOT，連續連轉使用壽命爲10000hrs。

1. Ratio (i=Nin/Nout)　2. Output revolutions 100rpm, acting on the output shaft center position.
3. The Max. acceleration torque T2B=60% of T2NOT, continuous operation, service life is 10000hrs.

MODEL：VRL

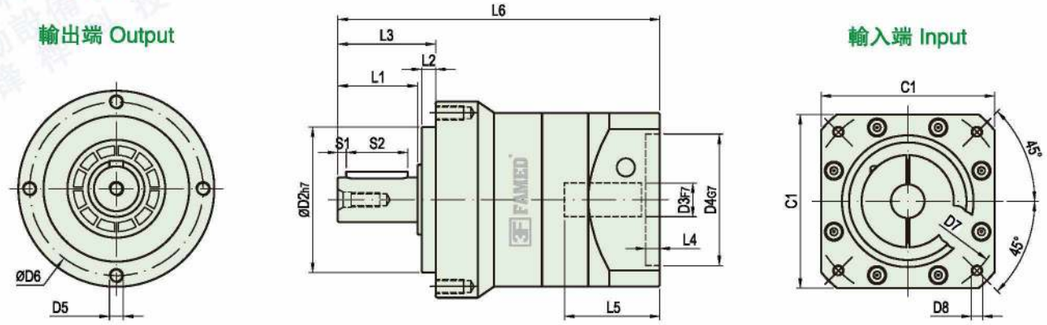
單段 1–Stage

速比 Ratio：3，4，5，6，7，8，9，10



外形尺寸圖 Dimensions：

輸出端 Output　　輸入端 Input



出力軸形式 S1
Output shaft type S1

出力軸形式 S2
Output shaft type S2

輸出孔形式 S3
Output hole type S3

Unit:mm

尺寸 Size	VRL070–L1	VRL090–L1	VRL120–L1	VRL155–L1	VRL205–L1	VRL235–L1
D1	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ52	ϕ68	ϕ90	ϕ120	ϕ160	ϕ180
D3	ϕ14（ϕ11–14）	ϕ19（ϕ16–24）	ϕ22（ϕ19–35）	ϕ24（ϕ22–35）	ϕ35（ϕ35–ϕ42）	ϕ42（ϕ35–55）
D4	ϕ50（ϕ50–70）	ϕ70（ϕ70–ϕ110）	ϕ110（ϕ114.3）	ϕ110（ϕ114.3）	ϕ114.3（ϕ114.3–200）	ϕ180（ϕ114.3~200）
D5	4–M5X10L	4–M6X12L	4–M8X16L	4–M10X20L	4–M12X22L	4–M16X28L
D6	ϕ62	ϕ80	ϕ108	ϕ140	ϕ184	ϕ210
D7	ϕ70（ϕ70–90）	ϕ90（ϕ90–145）	ϕ145（ϕ145–200）	ϕ145（ϕ145–200）	ϕ200（ϕ200–235）	ϕ215（ϕ200~235）
D8	4–M5（M4–M6）	4–M6（M5–M8）	4–M8（M8–M12）	4–M8（M8–M12）	4–M12	4–M12
D9	M5X0.8P	M8X1.25P	M12X1.75P	M16X2P	M20X2.5P	M20X2.5P
L1	28.5	36.5	51	79	82	105
L2	5	6	9	12	15	18
L3	35	44	62	94	100	126
L4	5	7~8	6~11	8~11	7~10	8~15
L5	34（≤44）	44（≤60）	64.5（≤81.5）	72.5（≤82）	85（≤120）	109（≤119）
L6	115（115–125）	146（146–162）	201（201–218）	251.5（251.5–261）	284（284–319）	358（358–368）
C1	65（65–80）	90（90–130）	130（130–180）	150（150–180）	180（180–220）	200（200–220）
S1	3	4	5	5	6	7
S2	22	28	40	65	70	90
S3	18	24.5	35	43	59	79.5
B	5	6	10	12	16	20
K1	4	6	8	10	14	18
K2	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	12.8	24.5	31.3	41.3	53.8	64.4
K4	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	20	27	35	43	60
K6	18	24	32	40	50	65

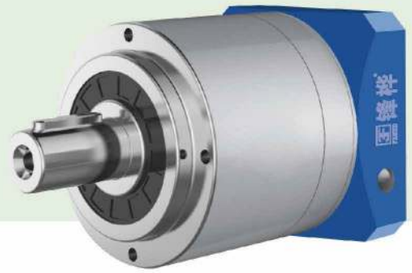
注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

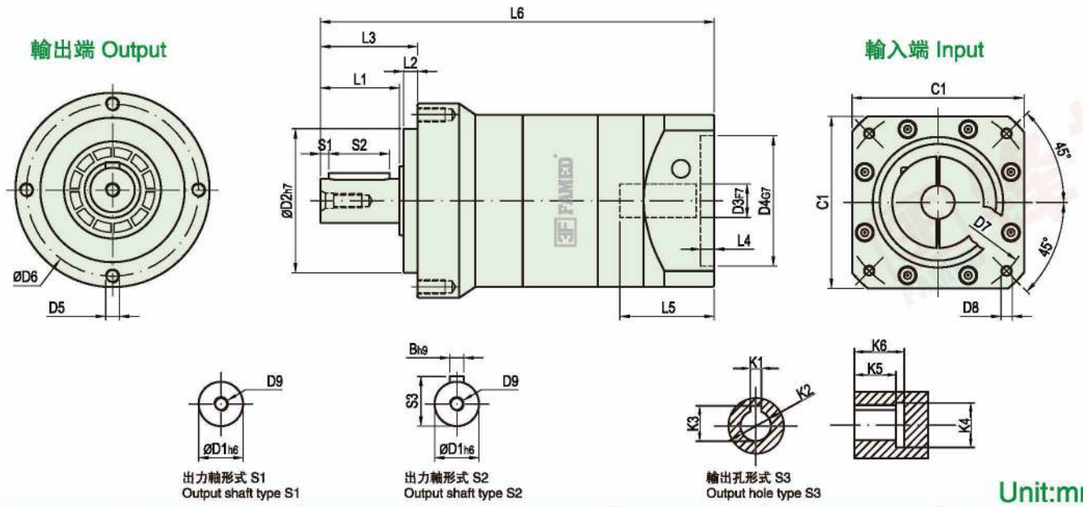
MODEL：VRL

雙段 2-Stage

速比 Ratio：15，20，25，30，35，40，45，50，60，70，80，90，100



外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	VRL070-L1	VRL090-L2	VRL120-L2	VRL155-L2	VRL205-L2	VRL235-L2
D1	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ52	ϕ68	ϕ90	ϕ120	ϕ160	ϕ180
D3	ϕ14（ϕ11-14）	ϕ19（ϕ11-19）	ϕ22（ϕ16-24）	ϕ24（ϕ19-35）	ϕ35（ϕ22-35）	ϕ42（ϕ35-42）
D4	ϕ50	ϕ70（ϕ50-ϕ80）	ϕ110（ϕ70-ϕ110）	ϕ110（ϕ114.3）	ϕ110（ϕ114.3）	ϕ180（ϕ114.3-200）
D5	4-M5X10L	4-M6X12L	4-M8X16L	4-M10X20L	4-M12X22L	4-M16X28L
D6	ϕ62	ϕ80	ϕ108	ϕ140	ϕ184	ϕ210
D7	ϕ70	ϕ90（ϕ70-100）	ϕ145（ϕ90-145）	ϕ145（ϕ145-200）	ϕ145（ϕ145-200）	ϕ215（ϕ200-235）
D8	4-M5（M4）	4-M6（M4-M6）	4-M8（M5-M8）	4-M8（M8-M12）	4-M8（M8-M12）	4-M12
D9	M5X0.8P	M8X1.25P	M12X1.75P	M16X2P	M20X2.5P	M20X2.5P
L1	28.5	36.5	51	79	82	105
L2	5	6	9	12	15	18
L3	35	44	62	94	100	126
L4	5	5	8（7-8）	11（6-11）	8（8-11）	8（7-10）
L5	34	34（≤44）	44（≤60）	64.5（≤81.5）	72.5（≤82）	85（≤120）
L6	142	172.5（162.5-172.5）	230.5（214.5-230.5）	286（286-303）	340（330.5-340）	407（402-437）
C1	65	80（65-86）	130（90-130）	130（130-180）	150（150-180）	200（180-220）
S1	3	4	5	5	6	7
S2	22	28	40	65	70	90
S3	18	24.5	35	43	59	79.5
B	5	6	10	12	16	20
K1	4	6	8	10	14	18
K2	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	12.8	24.5	31.3	41.3	53.8	64.4
K4	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	20	27	35	43	60
K6	18	24	32	40	50	65

注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

精密行星減速機

PAB

- 行星臂架與輸出軸一體式結構確保最大耐扭力剛性及穩定性
  The integral structure of the planetary wall frame and the output shaft ensures the maximum torsion rigidity and stability
- 齒輪箱表面利用無電解鎳處理，連接板采藍色陽極處理，提高環境的耐受性和抗腐蝕能力。
  The surface of the gear box is treated with electroless Nickel, and the plate is treated with blue anode to improve the tolerance and corrosion resistance of the environment.
- 最低的回程間隙 Lowest backlash
- 高效率(95%) High efficiency 95%
- 終生潤滑 Life time lubrication

減速機的選型 Model Selection of Speed Reducers

PAB 系列 Type

PAB090 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model

PAB042，PAB060，PAB090，PAB115
PAB142，PAB180，PAB220

出力軸鍵槽 Output Shaft Keyway

S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model

馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio

單節 1-stage：3，4，5，6，7，8，9，10
雙節 2-stage：12，15，16，20，25，28，30，35，40，50，70，80，100

背隙等級 Backlash Grade

P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：PAB090-100-S2-P1/Panasonic MSMJ 082S1A

PAB 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PAB042	PAB060	PAB090	PAB115	PAB142	PAB180	PAB220
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	19	56	148	280	520	1020	1550
			4	20	55	160	330	580	1280	2160
			5	21	58	159	330	580	1250	2100
			6	16	48	120	240	410	980	1350
			7	19	50	148	300	530	1030	1580
			8	13	45	130	230	450	880	1260
			9	12	40	100	220	410	880	1450
			10	15	46	125	260	475	950	1530
		2	12	18	52	155	300	530	1100	1750
			15	18	53	150	280	550	1050	1650
			16	20	53	158	320	580	1200	2050
			20	20	52	155	320	580	1200	2050
			25	19	52	158	320	580	1200	2000
			28	19	50	150	300	550	1100	1850
			30	18	49	145	390	500	1050	1600
			35	17	48	155	290	500	1020	1500
			40	18	48	150	290	530	1100	1350
			50	18	50	145	290	530	1000	1300
			70	16	50	140	280	490	1000	1200
			80	10	43	110	230	410	960	980
			100	10	43	120	260	450	950	1100
最大輸出扭矩T_{2NOT}[1]/Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque						
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	4000	4000	4000	3500	3000	2000	2000
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	6000	6000	6000	5500	4500	4500	4000
超精密背隙P0/Micro Backlash P0	arcmin	1	3~10	—	—	≤1	≤1	≤1	≤1	≤1
		2	12~100	—	—	—	≤3	≤3	≤3	≤3
精密背隙P1/Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	12~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
標準背隙P2/Standard Backlash P2	arcmin	1	3~10	≤7	≤7	≤7	≤7	≤7	≤7	≤7
		2	12~100	≤9	≤9	≤9	≤9	≤9	≤9	≤9
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	3	7	12	25	50	140	210
容許徑向力F_{2rB}[2]/Max.Radial Force	N	1,2	3~100	780	1300	3200	6750	9400	14500	50000
容許軸向力F_{2aB}[2]/Max.Axial Force	N	1,2	3~100	330	700	1580	3300	4700	7200	28000
使用壽命/Service Life	hr	1,2	3~100	21000h						
效率 η/Efficiency	%	1	3~10	≥97%						
		2	12~100	≥94%						
重量/Weight	kg	1	3~10	0.5	1.3	3.7	7.8	15	29	52
		2	12~100	0.8	1.48	4.1	9.6	18.9	33	66
使用溫度/Operating Temperature	℃	1,2	3~100	(-15℃ ~ +90℃)						
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂(Synthetic Grease)						
防護等級/Protection Class		1,2	3~100	IP65						
安裝方向/Mounting Position		1,2	3~100	任意方向(Any Direction)						
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤63	≤63	≤63	≤65	≤65	≤70	≤70

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PAB042	PAB060	PAB090	PAB115	PAB142	PAB180	PAB220
轉動慣量J1 Moment of Inertia	kg.cm²	1	3	0.03	0.16	0.61	3.25	9.21	28.98	69.61
			4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
			9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	12–40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50–100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

1. 最大加速力矩T2B=60% of T2NOT　2. 輸出轉數100rpm時，作用於輸出軸中心位置。
3. 三段大減速比不在上表中，有軸加長和加大設計，需要用到請告知銷售人員。

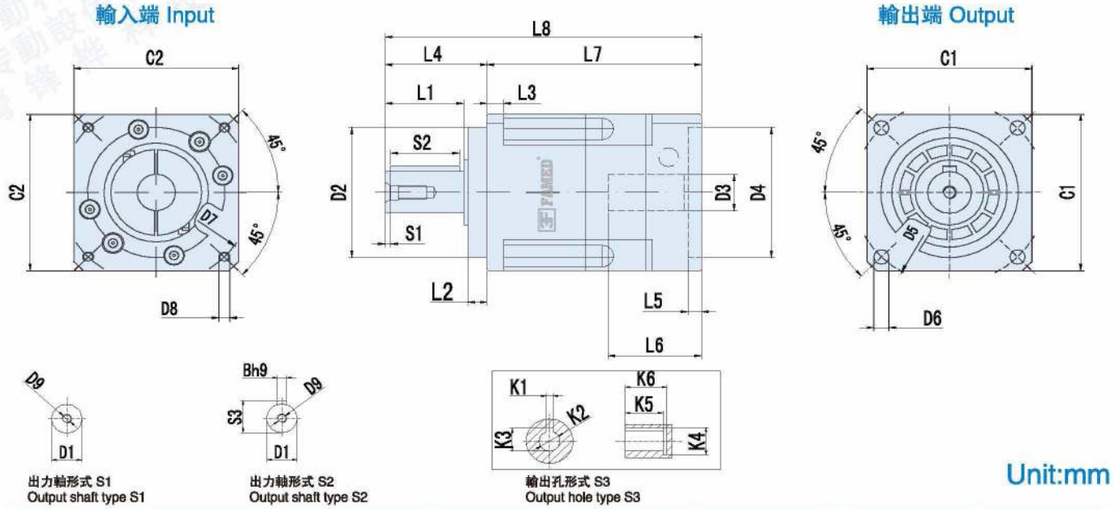
1. The Max. acceleration torque T2B=60% of T2NOT　2. When output speed is 100rpm, inertia acts on the output shaft center position.
3. 3-stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

MODEL：PAB

單段 1–Stage

速比 Ratio：3，4，5，6，7，8，9，10

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	PAB042–L1	PAB060–L1	PAB090–L1	PAB115–L1	PAB142–L1	PAB180–L1	PAB220–L1
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8(≤11)	ϕ14(≤14)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(≤42)	ϕ38(≤50)	ϕ55(≤55)
D4	ϕ30(30–50)	ϕ50(30–70)	ϕ70(50–110)	ϕ110(50–130)	ϕ114.3(95–180)	ϕ180(95–180)	ϕ215(180–255)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ6.6	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17
D7	ϕ46(22–70)	ϕ70(45–90)	ϕ90(70–145)	ϕ145(70–145)	ϕ200(90–215)	ϕ200(90–300)	ϕ235(200–300)
D8	(4–M3X8L)	(4–M5X10L)	(4–M6X12L)	(4–M8X25L)	(4–M12X30L)	(4–M12X30L)	(4–M12X30L)
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2.0P	M20X2.5P	M20X2.5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	(4)	(5)	(7)	(11)	(7)	(7)	(12.5)
L6	30	34	45	65	67.5	85	105
L7	(65.5)	(78)	(99)	(135)	(150)	(182)	(226)
L8	(91.5)	(115)	(147)	(200)	(247)	(287)	(365)
C1	□42	□60	□90	□115	□142	□180	□220
C2	(□42)	(□60)	(□90)	(□130)	(□142)	(□180)	(□220)
S1	2	2	3	5	5	5	7
S2	16	25	32	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	3	4	6	8	10	14	16
K2	ϕ8	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	9.2	12.7	25	31.3	42	53.8	64.4
K4	ϕ13	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	15	20	27	35	43	60
K6	18	18	24	32	40	50	65

注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

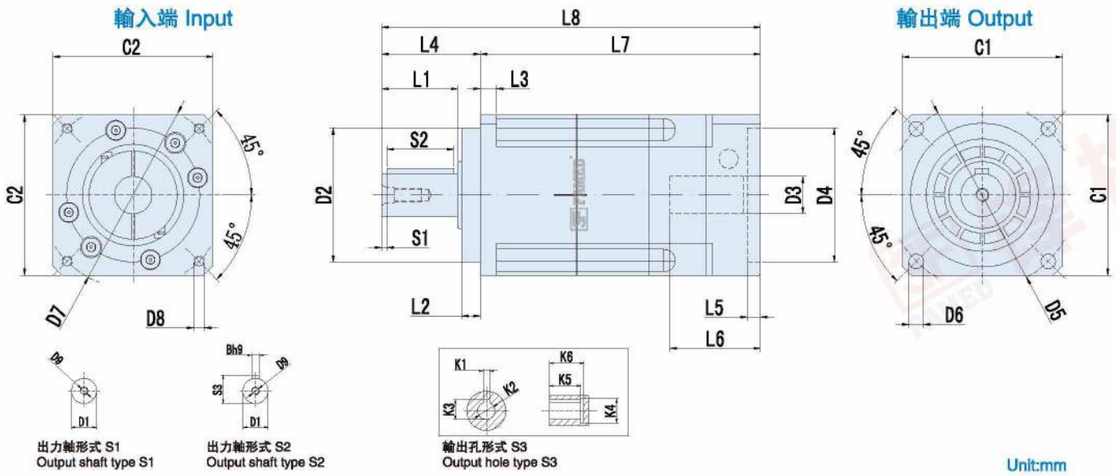
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL：PAB

雙段 2-Stage

速比 Ratio：12，15，16，20，25，28，30，35，40，50，70，80，100

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	PAB042-L2	PAB060-L2	PAB090-L2	PAB115-L2	PAB142-L2	PAB180-L2	PAB220-L2
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8(≤11)	ϕ14(≤14)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(≤42)	ϕ38(≤50)	ϕ55(≤55)
D4	ϕ30(30-50)	ϕ50(30-70)	ϕ70(50-110)	ϕ110(50-130)	ϕ114.3(95-180)	ϕ180(95-180)	ϕ215(180-255)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4-ϕ3.4	4-ϕ5.5	4-ϕ6.6	4-ϕ9	4-ϕ11	4-ϕ13	4-ϕ17
D7	ϕ46(22-70)	ϕ70(45-90)	ϕ90(70-145)	ϕ145(70-145)	ϕ200(90-215)	ϕ200(90-300)	ϕ235(200-300)
D8	(4-M3X8L)	(4-M5X10L)	(4-M6X12L)	(4-M8X25L)	(4-M12X30L)	(4-M12X30L)	(4-M12X30L)
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2.0P	M20X2.5P	M20X2.5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	(4)	(5)	(7)	(11)	(7)	(7)	(12.5)
L6	25	34	45	65	67.5	85	105
L7	(93)	(117)	(144)	(161)	(196)	(232)	(277)
L8	(114)	(154)	(192)	(226)	(293)	(337)	(415)
C1	□42	□60	□90	□115	□142	□180	□220
C2	(□42)	(□60)	(□90)	(□130)	(□142)	(□180)	(□220)
S1	2	2	3	5	5	5	7
S2	16	25	32	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	3	4	6	8	10	14	16
K2	ϕ8	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	9.2	12.7	25	31.3	42	53.8	64.4
K4	ϕ13	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	15	20	27	35	43	60
K6	18	18	24	32	40	50	65

注1：（）括號內爲可選擇範圍尺寸，（）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

精密行星減速機

PAR

1.省空間
直交型減速機使用螺旋式傘齒輪，馬達的安裝可實現90度彎曲，節省了安裝空間。

2.高剛性、高扭矩
使用整體式滾針軸承，大大提高了剛性和扭矩。

3.連接器、軸套方式
可以安裝到世界上任何一臺馬達上。

4.無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂、有效防止潤滑脂泄漏。

5.維修方便
在產品壽命期內無需更換潤滑脂，安裝更便捷。

1. Space-saving
The straight cross reducer uses spiral bevel gear. The installation of the motor can achieve 90 degree bending and save the installation space.
2. High rigidity & torqueThe use of integral needle roller bearings greatly improves the rigidity and torque.
3. Connector and shaft sleeve mode
It can be installed on any motor in the world.
4. No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
5. Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

PAR 系列 Type

PAR090 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
PAR042，PAR060，PAR090，PAR115
PAR142，PAR180，PAR220

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1-stage：3，4，5，6，7，8，9，10
雙節 2-stage：15，20，25，30，35，40，50，70，80，100，120，140，160，180，200

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：PAR090-100-S2-P1/Panasonic MSMJ 082S1A

PAR 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PAR042	PAR060	PAR090	PAR115	PAR142	PAR180	PAR220
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	13	50	150	310	550	1100	1860
			4	16	55	153	330	600	1250	1950
			5	15	53	152	325	590	1200	1900
			6	11	45	130	250	450	950	1600
			7	15	50	140	300	540	1050	1760
			8	11	45	110	260	460	960	1550
			9	9	40	100	230	450	900	1500
			10	12	48	128	280	520	1000	1120
			14	13	42	120	265	500	1020	1100
			20	10	42	115	255	500	980	1100
		2	15	13	50	150	300	530	1100	1800
			20	15	52	150	300	530	1150	1800
			25	15	53	150	325	590	1200	1800
			30	13	49	150	310	550	1100	1830
			35	13	50	140	300	540	1100	1800
			40	15	45	140	260	500	1000	1600
			50	15	50	135	230	580	1200	1670
			70	13	50	130	300	520	1100	1600
			80	11	40	100	260	500	1000	1500
			100	10	40	100	230	450	900	1500
			120	—	—	130	310	500	1100	1900
			140	—	—	130	300	530	1100	1800
			160	—	—	120	260	520	1000	1600
			180	—	—	100	230	450	900	1500
			200	—	—	100	230	450	900	1500
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	3~200	3倍額定輸出力矩/3Times of Nominal Output Torque						
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~200	3000	3000	3000	3000	2500	2000	2000
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~200	6000	6000	6000	5500	4500	4500	4000
精密背隙P1 / Precision Backlash P1	arcmin	1	3~20	≤5	≤5	≤5	≤5	≤5	≤5	≤5
		2	15~200	≤8	≤8	≤8	≤8	≤8	≤8	≤8
標準背隙P2 / Standard Backlash P2	arcmin	1	3~20	≤8	≤8	≤8	≤8	≤8	≤8	≤8
		2	15~200	≤10	≤10	≤10	≤10	≤10	≤10	≤10
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~200	3	6	14	25	56	140	220
容許徑向力F_{2rB}[2] / Max.Radial Force	N	1,2	3~200	780	1300	3200	6750	9400	14500	50000
容許軸向力F_{2a1B}[2] / Max.Axial Force	N	1,2	3~200	330	700	1580	3300	4700	7200	28000
使用壽命 / Service Life	hr	1,2	3~200	21000 h						
效率 η /Efficiency	%	1	3~20	≥93%						
		2	25~200	≥90%						
重量/Weight	kg	1	3~20	0.9	2.1	6.4	13	24.5	51	83
		2	25~200	1.2	1.5	7.8	14.2	27.5	54	95
使用溫度 / Operating Temperature	℃	1,2	3~200	(-15℃ ~ +90℃)						
潤滑/Lubrication		1,2	3~200	全合成潤滑油脂(Synthetic Grease)						
防護等級 / Protection Class		1,2	3~200	IP65						
安裝方向 / Mounting Position		1,2	3~200	任意方向(Any Direction)						
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~200	≤65	≤65	≤68	≤68	≤70	≤72	≤74

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PAR042	PAR060	PAR090	PAR115	PAR142	PAR180	PAR220
轉動慣量J1 Moment of Inertia	$kg.cm^2$	1	3~10	0.09	0.35	2.25	6.84	23.4	68.9	135.4
			14~20	0.03	0.07	1.87	6.25	21.8	65.6	119.8
		2	15~100	0.09	0.09	0.35	2.25	6.84	23.4	68.9
			120~200	—	—	0.31	1.87	6.25	21.8	65.6

1. 最大加速力矩T2B=60% of T2NOT　2. 輸出轉數100rpm時，作用於輸出軸中心位置。
3. 三段大減速比不在上表中，有軸加長和加大設計，需要用到請告知銷售人員。

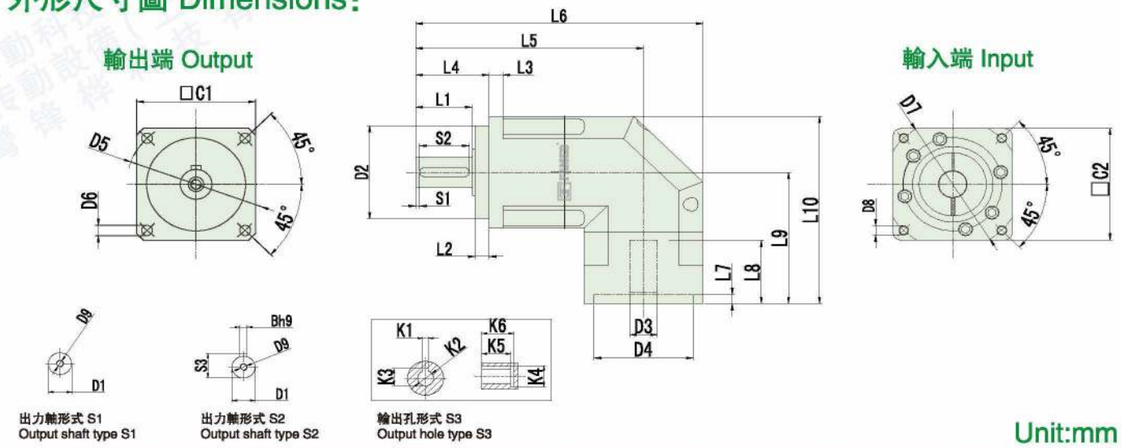
1. The Max. acceleration torque T2B=60% of T2NOT　2. When output speed is 100rpm, inertia acts on the output shaft center position.
3. 3-stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

MODEL：PAR

單段 1–Stage

速比 Ratio：3，4，5，6，7，8，9，10，14，16，20

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	PAR042–L1	PAR060–L1	PAR090–L1	PAR115–L1	PAR142–L1	PAR180–L1	PAR220–L1
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8(≤11)	ϕ14(≤14)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(≤42)	ϕ38(≤50)	ϕ55(≤55)
D4	ϕ30(30–50)	ϕ50(30–70)	ϕ70(50–110)	ϕ110(50–130)	ϕ114.3(95–180)	ϕ180(95–180)	ϕ215(180–255)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ6.6	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17
D7	ϕ46(22–70)	ϕ70(45–90)	ϕ90(70–145)	ϕ145(70–145)	ϕ200(90–215)	ϕ200(90–300)	ϕ235(200–300)
D8	(4–M3X8L)	(4–M5X10L)	(4–M6X12L)	(4–M8X25L)	(4–M12X30L)	(4–M12X30L)	(4–M12X30L)
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2.0P	M20X2.5P	M20X2.5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	(96)	(117)	(175)	(227)	(255)	(289)	(346)
L6	(122)	(154)	(223)	(292)	(352)	(394)	(484)
L7	(3.5)	(5)	(5)	(11)	(14)	(15)	(7)
L8	(30)	(34)	(44)	(60)	(81)	(85)	(85)
L9	69.5	81.5	107.5	134	165	213.5	268.5
L10	95.5	110.5	158	199	230	303.5	378.5
C1	□42	□60	□90	□115	□142	□180	□220
C2	(□42)	(□60)	(□90)	(□130)	(□142)	(□180)	(□220)
S1	2	2	2	5	5	5	7
S2	16	25	32	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	3	4	6	8	10	14	16
K2	ϕ8	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	9.2	12.7	25	31.3	42	53.8	64.4
K4	ϕ13	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	15	20	27	35	43	60
K6	18	18	24	32	40	50	65

注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

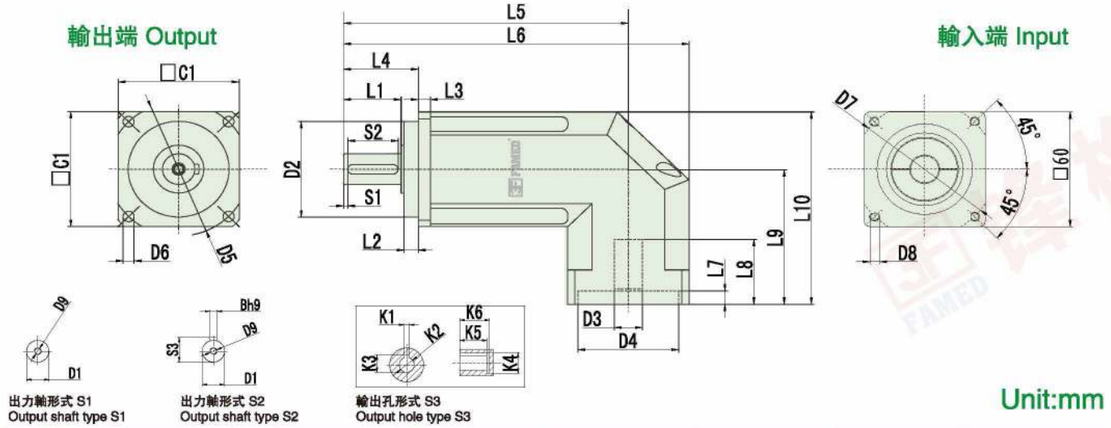
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL：PAR

雙段 2–Stage

速比 Ratio：15，20，25，30，35，40，50，70，80，
100，120，140，160，180，200

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	PAR042–L2	PAR060–L2	PAR090–L2	PAR115–L2	PAR142–L2	PAR180–L2	PAR220–L2
D1	ϕ13	ϕ16	ϕ22	ϕ32	ϕ40	ϕ55	ϕ75
D2	ϕ35	ϕ50	ϕ80	ϕ110	ϕ130	ϕ160	ϕ180
D3	ϕ8(≤11)	ϕ14(≤14)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(≤42)	ϕ38(≤50)	ϕ55(≤55)
D4	ϕ30(30–50)	ϕ50(30–70)	ϕ70(50–110)	ϕ110(50–130)	ϕ114.3(95–180)	ϕ180(95–180)	ϕ215(180–255)
D5	ϕ50	ϕ70	ϕ100	ϕ130	ϕ165	ϕ215	ϕ250
D6	4–ϕ3.4	4–ϕ5.5	4–ϕ6.6	4–ϕ9	4–ϕ11	4–ϕ13	4–ϕ17
D7	ϕ46(22–70)	ϕ70(45–90)	ϕ90(70–145)	ϕ145(70–145)	ϕ200(90–215)	ϕ200(90–300)	ϕ235(200–300)
D8	(4–M3X8L)	(4–M5X10L)	(4–M6X12L)	(4–M8X25L)	(4–M12X30L)	(4–M12X30L)	(4–M12X30L)
D9	M4X0.7P	M5X0.8P	M8X1.25P	M12X1.75P	M16X2.0P	M20X2.5P	M20X2.5P
L1	19	28.5	36.5	51	79	82	105
L2	5.5	7	10	12	15	20	30
L3	4	6	8	10	12	15	20
L4	26	37	48	65	97	105	138
L5	(113)	(134)	(157)	(224)	(282)	(322)	(383)
L6	139	171	205	(292)	(378)	(427)	(521)
L7	(3.5)	(5)	(5)	(11)	(14)	(15)	(7)
L8	(30)	(34)	(44)	(60)	(81)	(85)	(85)
L9	(69.5)	(81.5)	(107.5)	(134)	(165)	(213.5)	(268.5)
L10	(90.5)	(111.5)	(152.5)	(191.5)	(236)	(303.5)	(378.5)
C1	□42	□60	□90	□115	□142	□180	□220
C2	(□42)	(□60)	(□90)	(□130)	(□142)	(□180)	(□220)
S1	2	2	2	5	5	5	7
S2	16	25	32	40	65	70	90
S3	15	18	24.5	35	43	59	79
B	5	5	6	10	12	16	20
K1	3	4	6	8	10	14	16
K2	ϕ8	ϕ11	ϕ22	ϕ28	ϕ38	ϕ50	ϕ60
K3	9.2	12.7	25	31.3	42	53.8	64.4
K4	ϕ13	ϕ16	ϕ32	ϕ38	ϕ48	ϕ60	ϕ72
K5	15	15	20	27	35	43	60
K6	18	18	24	32	40	50	65

注1：（）括號內爲可選擇範圍尺寸，（）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

精密行星減速機

PLF

1. 静音
使用斜齒輪實現順暢安静的運轉

2. 高精度
背隙低于3公分、定位精確。

3. 高剛性、高扭矩
使用整體式滚珠軸承，大大提高了剛性和扭矩。

4. 法蘭、連接器方式
可以安裝到世界上任何一臺馬達上。

5. 無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂，有效防止潤滑脂泄漏。

6. 維護方便
在產品壽命期内無需更換潤滑脂，安裝更便捷。

1.Quiet operation
Helical gears are used to achieve smooth and quiet operation.
2.High precision
The backlash is less than 3 arcmin and the positioning is accurate.
3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
4.Methods of flange and connector
It can be installed on any motor in the world.
5.No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
6.Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

PLF 系列 Type

PLF080 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
PLF040，PLF060，PLF080
PLF120，PLF160

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1–stage：3,4,5,6,7,8,9,10
雙節 2–stage：12,15,16,20,25,28,30,35,40,50,70,80,100
雙節 3–stage：60,64,72,80,90,100,120,144,150,160,180,200,240,258,288,320,384,512,600,800,1000

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：PLF080–100–S2–P1/Panasonic MSMJ 082S1A

PLF 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PLF040	PLF060	PLF080	PLF120	PLF160
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	17	28	112	165	423
			4	15	38	110	146	364
			5	14	40	108	160	423
			7	13	35	105	149	358
			10	12	25	100	141	293
		2	15	17	28	112	165	423
			20	15	38	110	146	364
			25	14	40	108	160	423
			30	13	28	112	165	423
			35	13	35	105	149	358
			40	12	38	110	146	364
			50	14	40	108	160	423
			70	13	35	105	149	358
			100	12	25	100	141	293
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque				
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	3000	3000	3000	3000	2500
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	5000	5000	5000	5000	3600
精密背隙P1 / Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3
		2	12~100	≤5	≤5	≤5	≤5	≤5
標準背隙P2 / Standard Backlash P2	arcmin	1	3~10	≤5	≤5	≤5	≤5	≤5
		2	12~100	≤8	≤8	≤8	≤8	≤8
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
容許徑向力F_{2rB}[2] / Max.Radial Force	N	1,2	3~100	320	460	1300	3200	6520
容許軸向力F_{2a1B}[2] / Max.Axial Force	N	1,2	3~100	160	230	660	1600	3260
使用壽命 / Service Life	hr	1,2	3~100	20000 h				
效率 η/Efficiency	%	1	3~10	≥97%				
		2	15~100	≥94%				
重量/Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
使用溫度 / Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂Synthetic Grease				
防護等級 / Protection Class		1,2	3~100	IP65				
安裝方向 / Mounting Position		1,2	3~100	任意Any				
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤62	≤63	≤65	≤67	≤68

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PLF040	PLF060	PLF080	PLF120	PLF160
轉動慣量J1 Moment of Inertia	$kg.cm^2$		3	0.16	0.63	3.48	12.84	36.72
			4	0.16	0.6	3.31	12.22	34.63
		1	5	0.16	0.59	3.28	12.1	34.24
			7	0.16	0.59	3.27	12.05	34.07
			10	0.16	0.59	3.26	12.03	34.02
		2	12-40	0.16	0.59	3.26	12.03	34.02
			50-100	0.16	0.59	3.26	12.03	34.02

1. 減速比(i=Nin/Nout)　2. 輸出轉數100rpm時，作用于輸出軸中心位置。　3. *連續運轉，使用壽命爲10000hrs。

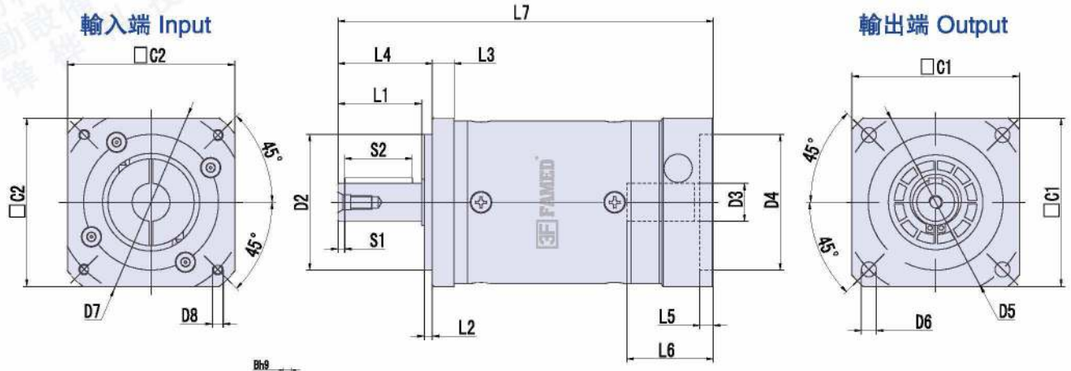
1. Ratio (i=Nin/Nout)　2. Output revolutions 100rpm, acting on the output shaft center position.
3. *Continuous operation, service life is 10000hrs.

MODEL：PLF

單段 1-Stage

速比：3，4，5，7，10，

外形尺寸圖 Dimensions：



出力軸形式 S1
Output shaft type S1

出力軸形式 S2
Output shaft type S2

輸出孔形式 S3
Output hole type S3

Unit:mm

尺寸 Size	PLF040-L1	PLF060-L1	PLF080-L1	PLF120-L1	PLF160-L1
D1	ϕ12(13)	ϕ14(16)	ϕ20(22)	ϕ25(32)	ϕ40
D2	ϕ26	ϕ50	ϕ80	ϕ110	ϕ130
D3	ϕ8(≤11)	ϕ14(≤19)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(42)
D4	ϕ30(30-50)	ϕ50(50-70)	ϕ70(50-110)	ϕ110(70-130)	ϕ114.3(110-150)
D5	(ϕ48)	(ϕ70)	(ϕ100)	(ϕ130)	ϕ185(165)
D6	4-ϕ3.4	4-ϕ5	4-ϕ6.5	4-ϕ9	4-ϕ11
D7	ϕ46(45-70)	ϕ70(70-130)	ϕ90(70-145)	ϕ145(90-165)	ϕ200(145-220)
D8	(4-M4X8L)	(4-M4X10L)	(4-M5X12L)	(4-M8X25L)	(4-M12X25L)
D9	M4X0.7P	M5X0.8P	M6X1.0P	M10X1.5P	M16X2.0P
L1	18	31	36	50	80
L2	3	3	3	4	5
L3	4	8	10	15	16
L4	22.5	35	40	55	87
L5	(5)	(5)	(5)	(8)	(7)
L6	(32)	(37)	(42)	(59)	(86)
L7	(88)	(117)	(157)	(211)	(292)
C1	□45	□62	□90	□124	□175
C2	(□50)	(□62)	(□92)	(□120)	(□176)
S1	2	2.5	4	5	8
S2	14	25	28	40	65
S3	13.5	16	22.6	28	43
B	4	5	5	8	12
K1	3	3	6	8	10
K2	ϕ8	ϕ8	ϕ18	ϕ25	ϕ35
K3	9.2	9.2	21	28	38.3
K4	ϕ11	ϕ11	ϕ24	ϕ32	ϕ42
K5	20	20	30	40	52
K6	24	24	35	48	58

注1：（）括號內爲可選擇範圍尺寸，（）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

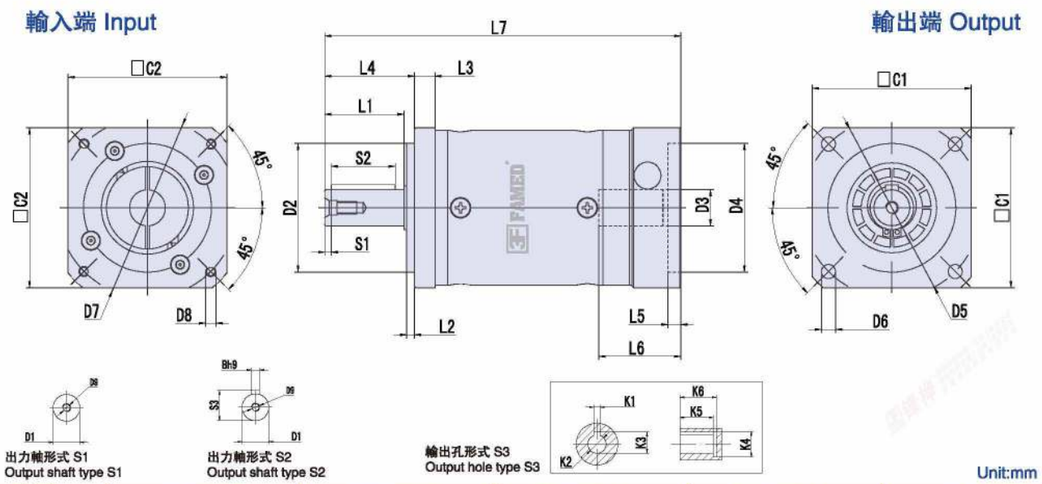
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL：PLF

雙段 2-Stage

速比 Ratio：15，20，25，30，35，40，50，70，100

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	PLF040-L2	PLF060-L2	PLF080-L2	PLF120-L2	PLF160-L2
D1	ϕ12(13)	ϕ14(16)	ϕ20(22)	ϕ25(32)	ϕ40
D2	ϕ26	ϕ50	ϕ80	ϕ110	ϕ130
D3	ϕ8(≤11)	ϕ14(≤19)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(42)
D4	ϕ30(30-50)	ϕ50(50-70)	ϕ70(50-110)	ϕ110(70-130)	ϕ114.3(110-150)
D5	ϕ48	(ϕ70)	(ϕ100)	(ϕ130)	ϕ185(165)
D6	4-ϕ3.4	4-ϕ5	4-ϕ6.5	4-ϕ9	4-ϕ11
D7	ϕ46(45-70)	ϕ70(70-130)	ϕ90(70-145)	ϕ145(90-165)	ϕ200(145-220)
D8	(4-M4X8L)	(4-M4X10L)	(4-M5X12L)	(4-M8X25L)	(4-M12X25L)
D9	M4X0.7P	M5X0.8P	M6X1.0P	M10X1.5P	M16X2.0P
L1	18	31	36	50	80
L2	3	3	3	4	5
L3	4	8	10	15	16
L4	22.5	35	40	55	87
L5	(5)	(5)	(5)	(8)	(7)
L6	(32)	(37)	(42)	(59)	(86)
L7	(105)	(138)	(160)	(224)	(295)
C1	□45	□62	□90	□124	□175
C2	(□50)	(□62)	(□92)	(□120)	(□176)
S1	2	2.5	4	5	8
S2	14	25	28	40	65
S3	13.5	16	22.6	28	43
B	4	5	5	8	12
K1	3	3	6	8	10
K2	ϕ8	ϕ8	ϕ18	ϕ25	ϕ35
K3	9.2	9.2	21	28	38.3
K4	ϕ11	ϕ11	ϕ24	ϕ32	ϕ42
K5	20	20	30	40	52
K6	24	24	35	48	58

注1：（）括號內爲可選擇範圍尺寸，（）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

精密行星減速機

PLE

1. 静音
使用斜齒輪實現順暢安静的運轉

2. 高精度
背隙低于3公分、定位精確。

3. 高剛性、高扭矩
使用整體式滚珠軸承，大大提高了剛性和扭矩。

4. 法蘭、連接器方式
可以安裝到世界上任何一臺馬達上。

5. 無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂，有效防止潤滑脂泄漏。

6. 維護方便
在產品壽命期内無需更換潤滑脂，安裝更便捷。

1.Quiet operation
Helical gears are used to achieve smooth and quiet operation.
2.High precision
The backlash is less than 3 arcmin and the positioning is accurate.
3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
4.Methods of flange and connector
It can be installed on any motor in the world.
5.No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
6.Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

PLE 系列 Type

PLE080 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
PLE040，PLE060，PLE080
PLE120，PLE160

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1-stage：3,4,5,6,7,8,9,10
雙節 2-stage：12,15,16,20,25,28,30,35,40,50,70,80,100
雙節 3-stage：60,64,72,80,90,100,120,144,150,160,180,200,240,258,288,320,384,512,600,800,1000

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：PLE080-100-S2-P1/Panasonic MSMJ 082S1A

PLE 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PLE040	PLE060	PLE080	PLE120	PLE160
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	17	28	112	165	423
			4	15	38	110	146	364
			5	14	40	108	160	423
			7	13	35	105	149	358
			10	12	25	100	141	293
		2	15	17	28	112	165	423
			20	15	38	110	146	364
			25	14	40	108	160	423
			30	13	28	112	165	423
			35	13	35	105	149	358
			40	12	38	110	146	364
			50	14	40	108	160	423
			70	13	35	105	149	358
			100	12	25	100	141	293
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque				
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	3000	3000	3000	3000	2500
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	5000	5000	5000	5000	3600
精密背隙P1 / Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3
		2	12~100	≤5	≤5	≤5	≤5	≤5
標準背隙P2 / Standard Backlash P2	arcmin	1	3~10	≤5	≤5	≤5	≤5	≤5
		2	12~100	≤8	≤8	≤8	≤8	≤8
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
容許徑向力F_{2rB}[2] / Max.Radial Force	N	1,2	3~100	320	460	1300	3200	6520
容許軸向力F_{2a1B}[2] / Max.Axial Force	N	1,2	3~100	160	230	660	1600	3260
使用壽命 / Service Life	hr	1,2	3~100	20000 h				
效率 η /Efficiency	%	1	3~10	≥97%				
		2	15~100	≥94%				
重量/Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
使用溫度 / Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂Synthetic Grease				
防護等級 / Protection Class		1,2	3~100	IP65				
安裝方向 / Mounting Position		1,2	3~100	任意方向 Any Direction				
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤62	≤63	≤65	≤67	≤68

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PLE040	PLE060	PLE080	PLE120	PLE160
轉動慣量J1 Moment of Inertia	$kg.cm^2$	1	3	0.16	0.63	3.48	12.84	36.72
			4	0.16	0.6	3.31	12.22	34.63
			5	0.16	0.59	3.28	12.1	34.24
			7	0.16	0.59	3.27	12.05	34.07
			10	0.16	0.59	3.26	12.03	34.02
		2	12–40	0.16	0.59	3.26	12.03	34.02
			50–100	0.16	0.59	3.26	12.03	34.02

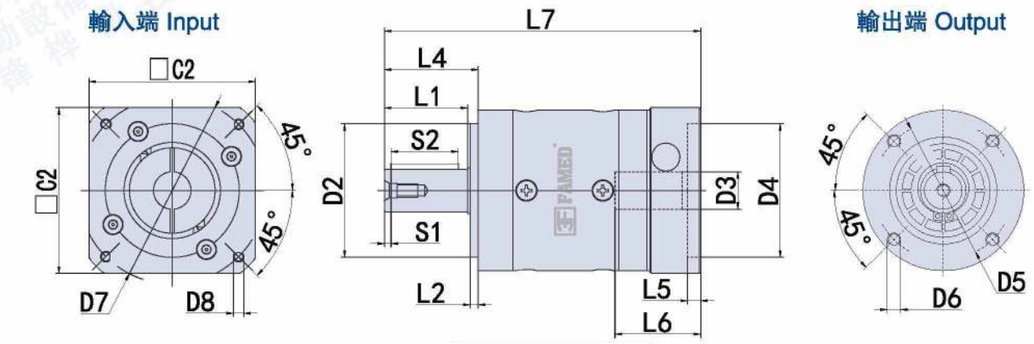
1. 減速比(i=Nin/Nout)　2. 輸出轉數100rpm時，作用于輸出軸中心位置。　3. *連續運轉，使用壽命爲10000hrs。

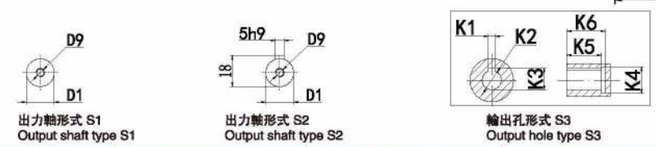
1. Ratio (i=Nin/Nout)　2. Output revolutions 100rpm, acting on the output shaft center position.
3. *Continuous operation, service life is 10000hrs.

MODEL：PLE

單段 1–Stage
速比 Ratio：3，4，5，7，10，

外形尺寸圖 Dimensions：





出力軸形式 S1
Output shaft type S1

出力軸形式 S2
Output shaft type S2

輸出孔形式 S3
Output hole type S3

Unit:mm

尺寸 Size	PLE040–L1	PLE060–L1	PLE080–L1	PLE120–L1	PLE160–L1
D1	ϕ12(13)	ϕ14(16)	ϕ20(22)	ϕ25(32)	ϕ40
D2	ϕ26	ϕ40	ϕ60	ϕ80	ϕ130
D3	ϕ8(≤11)	ϕ14(≤19)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(42)
D4	ϕ30(30–50)	ϕ50(50–70)	ϕ70(50–110)	ϕ110(70–130)	ϕ114.3(110–150
D5	ϕ34	ϕ52	ϕ70	ϕ100	ϕ145
D6	(4–M4)	(4–M5)	(4–M6)	(4–M10)	(4–M12)
D7	ϕ46(45–70)	ϕ70(70–130)	ϕ90(70–145)	ϕ145(90–165)	ϕ200(145–220)
D8	(4–M4X8L)	(4–M4X10L)	(4–M5X12L)	(4–M8X25L)	(4–M12X25L)
D9	M4X0.7P	M5X0.8P	M6X1.0P	M10X1.5P	M16X2.0P
L1	18	31	36	50	80
L2	2	3	3	4	5
L4	26	35	40	55	87
L5	(4)	(5)	(5)	(8)	(7)
L6	26	32	42	59	86
L7	88	113	148	181	282
C1	ϕ42	ϕ60	ϕ80	ϕ120	ϕ160
C2	(□50)	(□62)	(□92)	(□120)	(□176)
S1	2	2	4	5	8
S2	14	25	28	40	65
S3	13.5	16	22.5	28	43
B	4	5	6	8	12
K1	3	3	6	8	10
K2	ϕ8	ϕ8	ϕ18	ϕ25	ϕ35
K3	9.2	9.2	21	28	38.3
K4	ϕ11	ϕ11	ϕ24	ϕ32	ϕ42
K5	20	20	30	40	52
K6	24	24	35	48	58

注1：（）括號內爲可選擇範圍尺寸，（）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

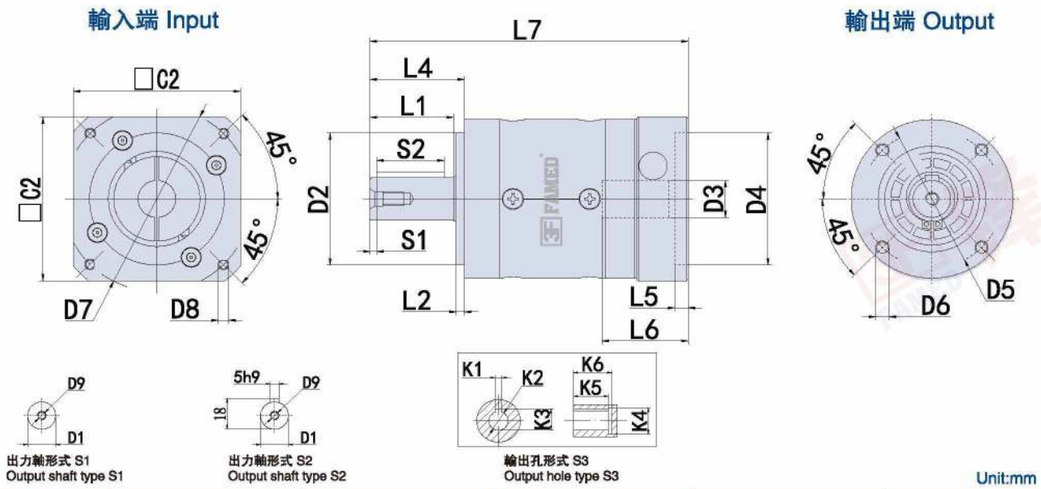
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL：PLE

雙段 2-Stage

速比 Ratio：15，20，25，30，35，40，50， 70，100

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	PLE040-L2	PLE060-L2	PLE080-L2	PLE120-L2	PLE160-L2
D1	ϕ12(13)	ϕ14(16)	ϕ20(22)	ϕ25(32)	ϕ40
D2	ϕ26	ϕ40	ϕ60	ϕ80	ϕ130
D3	ϕ8(≤11)	ϕ14(≤19)	ϕ19(≤24)	ϕ24(≤32)	ϕ35(42)
D4	ϕ30(30-50)	ϕ50(50-70)	ϕ70(50-110)	ϕ110(70-110)	ϕ114.3(110-150)
D5	ϕ34	ϕ52	ϕ70	ϕ100	ϕ145
D6	(4-M4)	(4-M5)	(4-M6)	(4-M10)	(4-M12)
D7	ϕ46(45-70)	ϕ70(70-130)	ϕ90(70-145)	ϕ145(90-165)	ϕ200(145-220)
D8	(4-M4X8L)	(4-M4X10L)	(4-M5X12L)	(4-M8X25L)	(4-M12X25L)
D9	M4X0.7P	M5X0.8P	M6X1.0P	M10X1.5P	M16X2.0P
L1	18	31	36	50	80
L2	2	3	3	4	5
L4	26	35	40	55	87
L5	(4)	(5)	(5)	(8)	(7)
L6	26	32	42	59	86
L7	104.5	133	168	221	331.5
C1	ϕ42	ϕ60	ϕ80	ϕ120	ϕ160
C2	(□50)	(□62)	(□92)	(□120)	(□176)
S1	2	2	4	5	8
S2	14	25	28	40	65
S3	13.5	16	22.5	28	43
B	4	5	6	8	12
K1	3	3	6	8	10
K2	ϕ8	ϕ8	ϕ18	ϕ25	ϕ35
K3	9.2	9.2	21	28	38.3
K4	ϕ11	ϕ11	ϕ24	ϕ32	ϕ42
K5	20	20	30	40	52
K6	24	24	35	48	58

注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

精密行星減速機

PAD

1. 静音
使用斜齒輪實現順暢安静的運轉

2. 高精度
背隙低于3公分、定位精確。

3. 高剛性、高扭矩
使用整體式滚珠軸承，大大提高了剛性和扭矩。

4. 法蘭、連接器方式
可以安裝到世界上任何一臺馬達上。

5. 無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂，有效防止潤滑脂泄漏。

6. 維護方便
在產品壽命期内無需更換潤滑脂，安裝更便捷。

1.Quiet operation
Helical gears are used to achieve smooth and quiet operation.
2.High precision
The backlash is less than 3 arcmin and the positioning is accurate.
3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
4.Methods of flange and connector
It can be installed on any motor in the world.
5.No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
6.Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

PAD 系列 Type

PAD090 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
PAD047，PAD064，PAD090，PAD110
PAD140，PAD200，PAD255

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1-stage：3，4，5，6，7，8，9，10
雙節 2-stage：12，15，16，20，25，28，30，35，40，50,70，80，100

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：PAD090-100-S2-P1/Panasonic MSMJ 082S1A

PAD 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PAD047	PAD064	PAD090	PAD110	PAD140	PAD200	PAD255
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	4	19	50	133	278	555	1050	1700
			5	22	60	160	330	650	1200	2000
			7	19	50	140	300	550	1100	1800
			10	14	40	100	230	450	900	1500
		2	20	19	50	133	278	555	1050	1700
			25	22	60	160	330	650	1200	2000
			35	19	50	140	300	550	1100	1800
			40	19	45	120	260	500	1000	1600
			50	22	60	160	330	650	1200	2000
			70	19	50	140	300	550	1100	1800
			100	14	40	100	230	450	900	1500
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	4~100	3倍額定輸出力矩/3Times of Nominal Output Torque						
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	4~100	5000	5000	4000	4000	3000	3000	2000
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	4~100	10000	10000	8000	8000	6000	6000	4000
超精密背隙P0 / Micro Backlash P0	arcmin	1	4~10	≤1	≤1	≤1	≤1	≤1	≤1	≤1
		2	12~100	≤3	≤3	≤3	≤3	≤3	≤3	≤3
精密背隙P1 / Precision Backlash P1	arcmin	1	4~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	20~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
標準背隙P2 / Standard Backlash P2	arcmin	1	4~10	≤6	≤6	≤6	≤6	≤6	≤6	≤6
		2	20~100	≤8	≤8	≤8	≤8	≤8	≤8	≤8
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	4~100	8	13	30	80	150	450	1010
最大彎曲力矩M_{2KB}[3]	N	1,2	4~100	43	125	235	430	1300	3064	5900
容許軸向力F_{2a1B}[2] / Max.Axial Force	N	1,2	4~100	990	1050	2850	2990	10590	16660	29430
使用壽命 / Service Life	hr	1,2	4~100	22000h						
效率 η /Efficiency	%	1	4~10	≥97%						
		2	20~100	≥94%						
重量/Weight	kg	1	4~10	0.7	1.3	3.2	5.8	12.3	33	57.9
		2	20~100	1	1.5	4.1	7.6	16.8	38	72.6
使用溫度 / Operating Temperature	℃	1,2	4~100	(-15℃ ~ +90℃)						
潤滑/Lubrication		1,2	4~100	全合成潤滑油脂(Synthetic Grease)						
防護等級 / Protection Class		1,2	4~100	IP65						
安裝方向 / Mounting Position		1,2	4~100	任意方向(Any Direction)						
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	4~100	≤56	≤58	≤60	≤63	≤65	≤67	≤70

減速機轉動慣量 Reducer Rotary Inertia

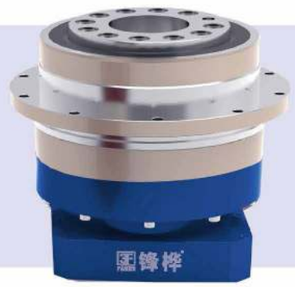
規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PAD047	PAD064	PAD090	PAD110	PAD140	PAD200	PAD255
轉動慣量J1 Moment of Inertia	$kg.cm^2$		4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
		1	5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	20–40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50–100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

1. 最大減速比(i=Nin/Nout)　2.最大加速力矩T2B=60% of T2NOT
3. 輸出轉數100rpm時，作用于輸出法蘭位置，*連續運轉，使用壽命爲15000hrs。

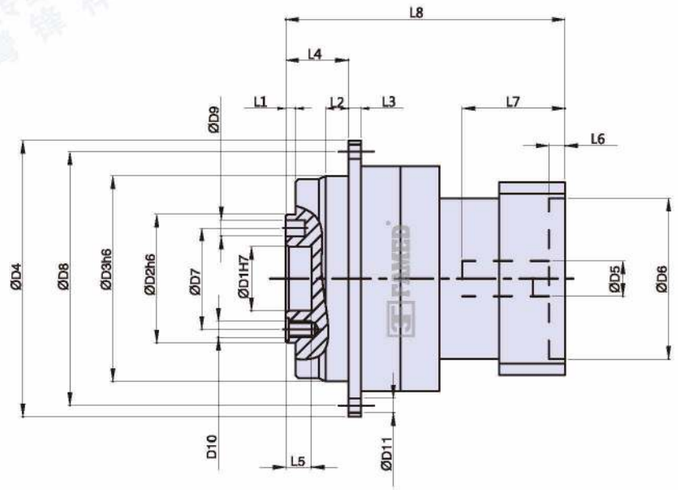
1. Max. reduction ratio(i=Nin/Nout)　2.The Max. acceleration torque T2B=60% of T2NOT
3. When output speed is 100rpm, acting on the output shaft center position，*Continuous operation, service life is 15000hrs。

MODEL：PAD

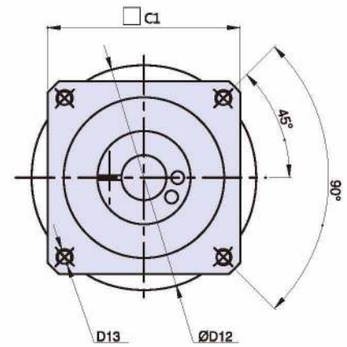
單段 1–Stage
速比 Ratio：4，5，7，10



外形尺寸圖 Dimensions：



輸入端 Input



Unit:mm

尺寸 Size	PAD047–L1	PAD064–L1	PAD090–L1	PAD110–L1	PAD140–L1	PAD200–L1	PAD255–L1
D1	12	20	31.5	40	50	80	100
D2	28	40	63	80	100	160	180
D3	47	64	90	110	140	200	255
D4	72	86	118	145	179	247	300
D5	≤11/≤12	11(8 ~ 14)	19(14 ~ 22)	24(22 ~ 28)	24(24 ~ 48)	35(35 ~ 48)	48(48 ~ 55)
D6	30	30(30 ~ 50)	50(50 ~ 110)	110	110(110 ~ 114.3)	114.3(114.3 ~ 200)	200
D7	20	31.5	50	63	80	125	140
D8	67	79	109	135	168	233	280
D9	Ø3	Ø5x深度(D)8	Ø6x深度(D)7	Ø6x深度(D)7	Ø8x深度(D)7	Ø10x深度(D)10	Ø12x深度(D)10
D10	4–M3	7–M5x深度(D)8	8–M6x深度(D)12	11–M6x深度(D)12	11–M8x深度(D)17	11–M10x深度(D)20	12–M16x深度(D)25
D11	8–Ø3.4	8–Ø4.5	8–Ø5.5	8–Ø5.5	12–Ø6.6	12–Ø9	16–Ø13.5
D12	46	45(45 ~ 70)	70(70 ~ 145)	145	145(145 ~ 200)	200(200 ~ 235)	235
D13	M4	M4 ~ M5	M5 ~ M8	M8	M8 ~ M12	M12	M12
L1	3	3	6	6	6	8	12
L2	7	7	10	10	14.5	15	21.5
L3	4	4	7	8	10	12	18
L4	19.5	19.5	30	29	38	50	66
L5	4	8	12	13	12	16	20
L6	3.5	4 ~ 5	5 ~ 10	10	6 ~ 8	6 ~ 10	10
L7	30	28(28 ~ 34)	32(32 ~ 59)	60	73(73 ~ 115)	88(88 ~ 117)	119.5
L8	70	80.5 ~ 87	97(97 ~ 120)	142	159(159 ~ 201)	196(196 ~ 229)	255
C1	48	60(40 ~ 60)	90(60 ~ 130)	130	130(130 ~ 180)	180(180 ~ 220)	220

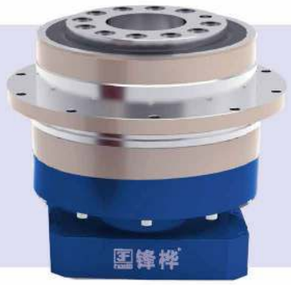
注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

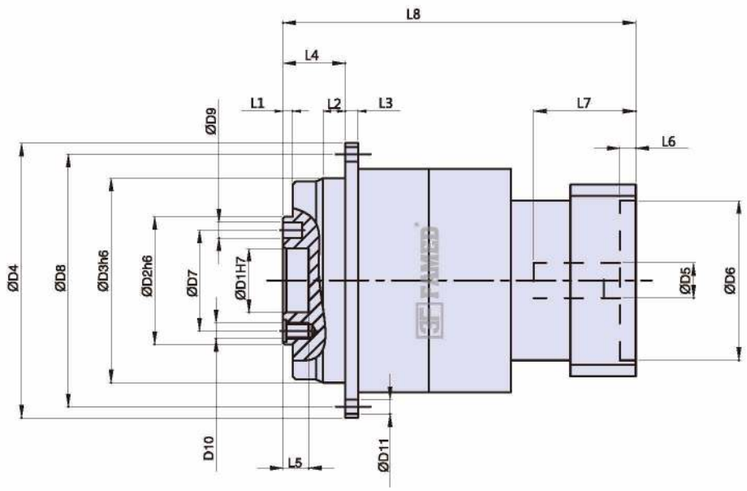
MODEL：PAD

雙段 2-Stage

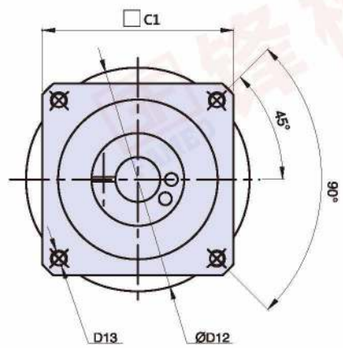
速比 Ratio：20，25，28，35，40，50，70，100



外形尺寸圖 Dimensions：



輸入端 Input



Unit:mm

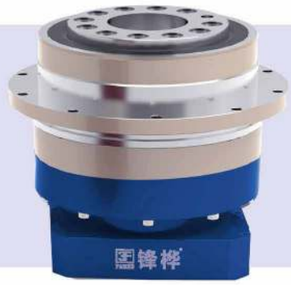
尺寸 Size	PAD047-L2	PAD064-L2	PAD090-L2	PAD110-L2	PAD140-L2	PAD200-L2	PAD255-L2
D1	12	20	31.5	40	50	80	100
D2	28	40	63	80	100	160	180
D3	47	64	90	110	140	200	255
D4	72	86	118	145	179	247	300
D5	≤11/≤12	11(8～14)	19(14～22)	19(22～28)	19(19～38)	35(24～48)	38(38～55)
D6	30	30(30～50)	50(50～110)	70(70～110)	70(70～114.3)	110(110～200)	114.3(114.3～200)
D7	20	31.5	50	63	80	125	140
D8	67	79	109	135	168	233	280
D9	Ø3	Ø5x深度(D)8	Ø6x深度(D)7	Ø6x深度(D)7	Ø8x深度(D)7	Ø10x深度(D)10	Ø12x深度(D)10
D10	4-M3	7-M5x深度(D)8	8-M6x深度(D)12	11-M6x深度(D)12	11-M8x深度(D)17	11-M10x深度(D)20	12-M16x深度(D)25
D11	8-Ø3.4	8-Ø4.5	8-Ø5.5	8-Ø5.5	12-Ø6.6	12-Ø9	16-Ø13.5
D12	46	45(45～70)	70(70～145)	90(90～145)	90(90～200)	145(145～235)	200(200～235)
D13	M4	M4～M5	M5～M8	M6～M8	M5～M12	M8～M12	M12
L1	3	3	6	6	6	8	12
L2	7	7	10	10	14.5	15	20
L3	4	4	7	8	10	12	18
L4	19.5	19.5	30	29	38	50	66
L5	4	8	12	13	12	16	20
L6	3.5	4～5	5～10	6～10	6～8	6～10	6～10
L7	30	28(28～34)	34(34～59)	43(43～60)	65(65～85)	73(73～117)	73(73～117)
L8	97.5	103(103～110)	123(123～139)	150(150～176)	195(195～211)	292(292～336)	306(306～322)
C1	48	60(40～60)	90(60～130)	90(90～130)	90(90～180)	180(130～220)	180(180～220)

注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

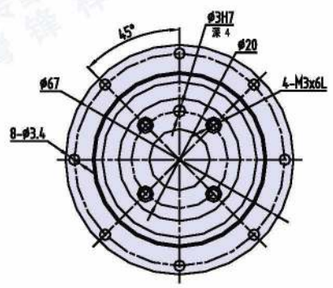
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL：PAD

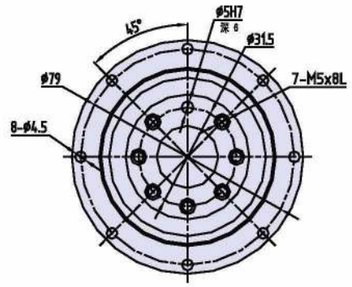
輸出端尺寸圖:Output Dimensions：



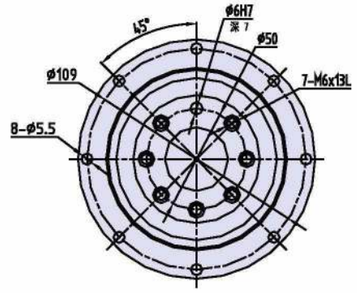
PAD047
輸出端/ OUTPUT



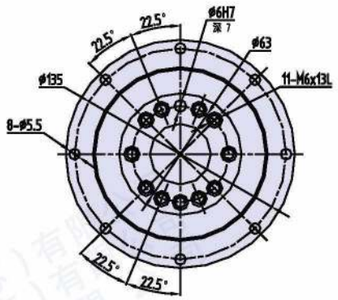
PAD064
輸出端/ OUTPUT



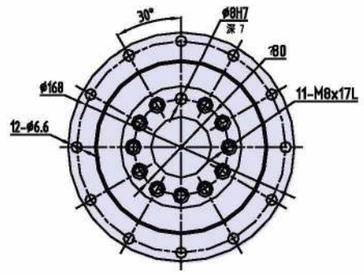
PAD090
輸出端/ OUTPUT



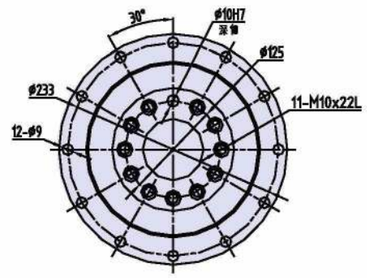
PAD110
輸出端/ OUTPUT



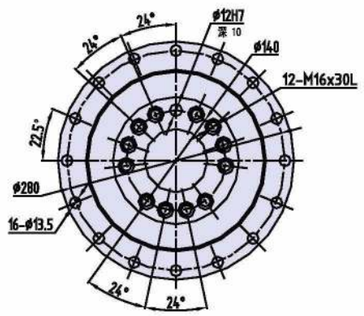
PAD140
輸出端 / OUTPUT



PAD200
輸出端 / OUTPUT



PAD255
輸出端 / OUTPUT



PRECISION PLANETARY GEARBOX

精密行星減速機

PADR

1.省空間
直交型減速機使用螺旋式傘齒輪，馬達的安裝可實現90度彎曲，節省了安裝空間。

2.高剛性、高扭矩
使用整體式滾針軸承，大大提高了剛性和扭矩。

3.連接器、軸套方式
可以安裝到世界上任何一臺馬達上。

4.無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂、有效防止潤滑脂泄漏。

5.維修方便
在產品壽命期內無需更換潤滑脂，安裝更便捷。

1. Space-saving
The straight cross reducer uses spiral bevel gear. The installation of the motor can achieve 90 degree bending and save the installation space.
2.High rigidity & torque
The use of integral needle roller bearings greatly improves the rigidity and torque.
3. Connector and shaft sleeve mode
It can be installed on any motor in the world.
4. No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
5. Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

PADR 系列 Type

PADR090 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
PADR047，PADR064，PADR090，PADR110，PADR140，PADR200，PADR255

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽 (Solid Output Shaft No Keyway)
S2：標準品，有鍵槽 Standard (Keyway)
S3：輸出爲孔 Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1-stage：3，4，5，6，7，8，9，10
雙節 2-stage：12，15，16，20，25，28，30，35，40，50，70，80，100

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：PADR090-100-S2-P1/Panasonic MSMJ 082S1A

PADR 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PADR047	PADR064	PADR090	PADR110	PADR140	PADR200	PADR255
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	4	19	50	133	278	555	1050	1700
			5	22	60	160	330	650	1200	2000
			7	19	50	140	300	550	1100	1800
			10	14	40	100	230	450	900	1500
		2	20	19	50	133	278	555	1050	1700
			25	22	60	160	330	650	1200	2000
			35	19	50	140	300	550	1100	1800
			40	19	45	120	260	500	1000	1600
			50	22	60	160	330	650	1200	2000
			70	19	50	140	300	550	1100	1800
			100	14	40	100	230	450	900	1500
最大輸出扭矩T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	4~100	3倍額定輸出力矩/3Times of Nominal Output Torque						
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	4~100	5000	5000	4000	4000	3000	3000	2000
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	4~100	10000	10000	8000	8000	6000	6000	4000
超精密背隙P0/Micro Backlash P0	arcmin	1	4~10	≤1	≤1	≤1	≤1	≤1	≤1	≤1
		2	12~100	≤3	≤3	≤3	≤3	≤3	≤3	≤3
精密背隙P1/Precision Backlash P1	arcmin	1	4~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	20~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
標準背隙P2/Standard Backlash P2	arcmin	1	4~10	≤6	≤6	≤6	≤6	≤6	≤6	≤6
		2	20~100	≤8	≤8	≤8	≤8	≤8	≤8	≤8
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	4~100	8	13	30	80	150	450	1010
最大彎曲力矩力N_{2KB}[3]	N	1,2	4~100	43	125	235	430	1300	3064	5900
容許軸向力F_{2aB}[2]/ Max.Axial Force	N	1,2	4~100	990	1050	2850	2990	10590	16660	29430
使用壽命/Service Life	hr	1,2	4~100	22000h						
效率 η/Efficiency	%	1	4~10	≥97%						
		2	20~100	≥94%						
重量/Weight	kg	1	4~10	0.7	1.3	3.2	5.8	12.3	33	57.9
		2	20~100	1	1.5	4.1	7.6	16.8	38	72.6
使用溫度/Operating Temperature	℃	1,2	4~100	(-15℃ ~ +90℃)						
潤滑/Lubrication		1,2	4~100	全合成潤滑油脂(Synthetic Grease)						
防護等級/Protection Class		1,2	4~100	IP65						
安裝方向/Mounting Position		1,2	4~100	任意方向(Any Direction)						
噪音值(n1=3000rpm，無負載)/Noise Level	dB(A)	1,2	4~100	≤58	≤59	≤62	≤65	≤68	≤69	≤70

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PADR047	PADR064	PADR090	PADR110	PADR140	PADR200	PADR255
轉動慣量J1 Moment of Inertia	$kg.cm^2$	1	4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	20-40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50-100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

1. 減速比(i=Nin/Nout)。 2.最大加速力矩T2B=60% of T2NOT。
3. 輸出轉數100rpm時，作用于輸出法蘭位置，*連續運轉使用壽命爲15000hrs。

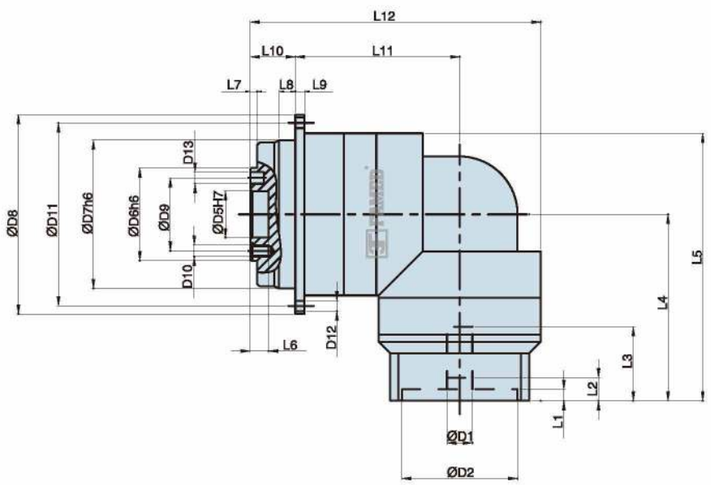
1. Ratio (i=Nin/Nout) . 2. 2.The Max. acceleration torque T2B=60% of T2NOT.
3. When output speed is 100rpm, acting on the output shaft center position *Continuous operation, service life is 15000hrs.

MODEL：PADR

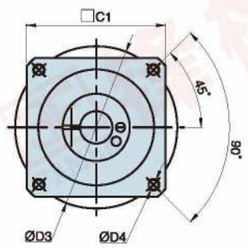
單段 1–Stage

速比 Ratio：3，4，5，7，10

外形尺寸圖 Dimensions：



輸入端 Input



Unit:mm

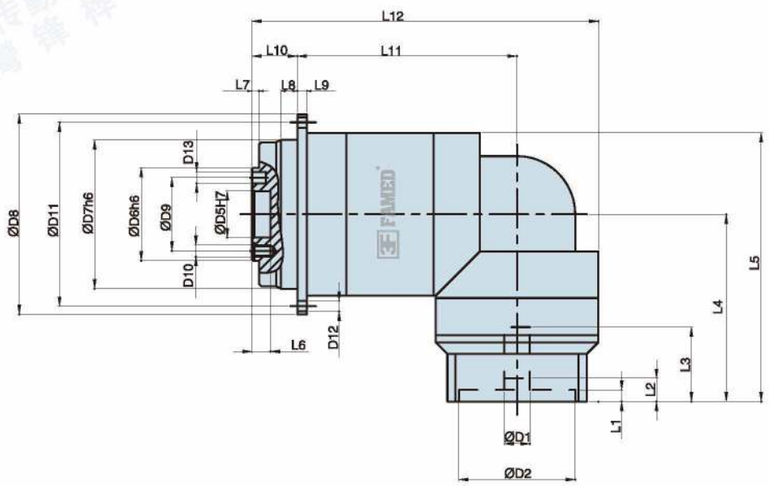
尺寸 Size	PADR047–L1	PADR064–L1	PADR090–L1	PADR110–L1	PADR140–L1	PADR200–L1	PADR255–L1
D1	≤11/≤12	11(11～14)	19(19～24)	24(22～32)	32(24～35)	≤48	≤55
D2	30	50	70(70～110)	110(110～130)	110(110～114.3)	85	116
D3	46	70	90(90～145)	145(145～165)	145(145～200)	215	235
D4	M4	M4	M8	M8～M10	M8～M12	M12	M12
D5	12	20	31.5	40	50	80	100
D6	28	40	63	80	100	160	180
D7	47	64	90	110	140	200	255
D8	72	86	118	145	179	247	300
D9	20	31.5	50	63	80	125	140
D10	4–M3	7–M5x深度(D)8	8–M6x深度(D)12	11–M6x深度(D)12	11–M8x深度(D)17	11–M10x深度(D)20	12–M16x深度(D)25
D11	67	79	109	135	168	233	280
D12	8–Ø3.4	8–Ø4.5	8–Ø5.5	8–Ø5.5	12–Ø6.6	12–Ø9	16–Ø13.5
D13	Ø3	Ø5x深度(D)8	Ø6x深度(D)7	Ø6x深度(D)7	Ø8x深度(D)7	Ø10x深度(D)10	Ø12x深度(D)10
L1	3.5	5	12	10	8	6	6
L2	8	10	13	19	17	20	24
L3	30	32	42～47	57～60	67～77	85	116
L4	74	80.5	107～112	134～147.5	166.5～167	213.5	268.5
L5	104	115.5	152～157	195～208.5	217.5～241.5	316	398.5
L6	6.5	8	12	13	12	22.5	30.5
L7	3	3	6	6	6	8	12
L8	7	7	10	11	15	15	20
L9	4	4	7	8	10	12	18
L10	19.5	19.5	25	29	38	50	66
L11	60	71	102	130	142.5	189	216
L12	107.5	125.5	172	220	255.5	334.5	392
C1	48	60	90(90～130)	130～160	130(130～220)	190	220

MODEL：PADR

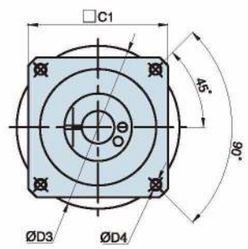
雙段 2–Stage

速比 Ratio：15，20，25，30，35，40，50，70，100

外形尺寸圖 Dimensions：



輸入端 Input



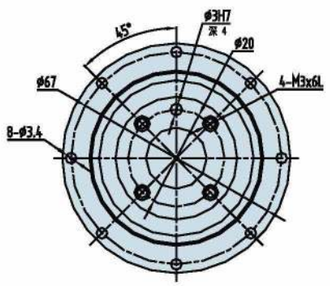
Unit:mm

尺寸 Size	PADR047–L2	PADR064–L2	PADR090–L2	PADR110–L2	PADR140–L2	PADR200–L2	PADR255–L2
D1	≤11/≤12	11(11～14)	19(19～24)	24(22～32)	32(24～35)	≤48	≤55
D2	30	50	70(70～110)	110(110～130)	110(110～114.3)	85	116
D3	46	70	90(90～145)	145(145～165)	145(145～200)	215	235
D4	M4	M4	M8	M8～M10	M8～M12	M12	M12
D5	12	20	31.5	40	50	80	100
D6	28	40	63	80	100	160	180
D7	47	64	90	110	140	200	255
D8	72	86	118	145	179	247	300
D9	20	31.5	50	63	80	125	140
D10	4–M3	7–M5x深度(D)8	8–M6x深度(D)12	11–M6x深度(D)12	11–M8x深度(D)17	11–M10x深度(D)20	12–M16x深度(D)25
D11	67	79	109	135	168	233	280
D12	8–Ø3.4	8–Ø4.5	8–Ø5.5	8–Ø5.5	12–Ø6.6	12–Ø9	16–Ø13.5
D13	Ø3	Ø5x深度(D)8	Ø6x深度(D)7	Ø6x深度(D)7	Ø8x深度(D)7	Ø10x深度(D)10	Ø12x深度(D)10
L1	3.5	5	12	10	8	6	6
L2	8	10	13	19	17	20	24
L3	30	32	42～47	57～60	67～77	85	116
L4	74	80.5	107～112	134～147.5	166.5～167	213.5	268.5
L5	103	115.5	152～157	195～208.5	217.5～241.5	269.5	340
L6	4	8	12	13	12	22.5	30.5
L7	3	3	6	6	6	8	12
L8	7	7	10	11	15	15	20
L9	4	4	7	8	10	12	18
L10	19.5	19.5	30	29	38	50	66
L11	79	94.5	117	163.5	187	243	270
L12	122	149	187	253.5	300	382	403
C1	48	60	90(90～130)	130～160	130(130～220)	190	220

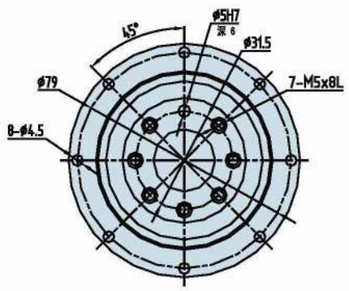
MODEL：PADR

輸出端尺寸圖 Output Dimensions

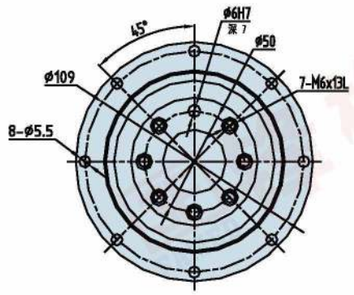
PADR047
輸出端/ OUTPUT



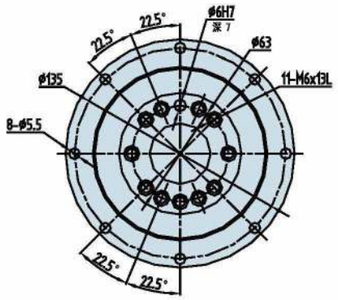
PADR064
輸出端/ OUTPUT



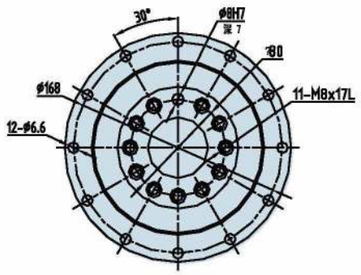
PADR090
輸出端/ OUTPUT



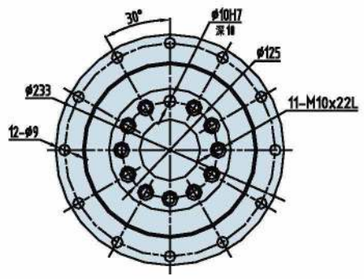
PADR110
輸出端/ OUTPUT



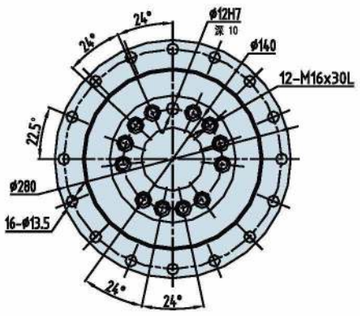
PADR140
輸出端 / OUTPUT



PADR200
輸出端 / OUTPUT



PADR255
輸出端 / OUTPUT



PRECISION PLANETARY GEARBOX

精密行星減速機

PAF

- 行星臂架與輸出軸一體式結構確保最大耐扭力剛性及穩定性
  The integral structure of the planetary wall frame and the output shaft ensures the maximum torsion rigidity and stability
- 齒輪箱表面利用無電解鎳處理，連接板采藍色陽極處理，提高環境的耐受性和抗腐蝕能力。
  The surface of the gear box is treated with electroless Nickel, and the plate is treated with blue anode to improve the tolerance and corrosion resistance of the environment.
- 最低的回程間隙 Lowest backlash
- 高效率(95%) High efficiency 95%
- 終生潤滑 Life time lubrication

減速機的選型 Model Selection of Speed Reducers

PAF 系列 Type

PAF090 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
PAF042，PAF060，PAF090，PAF120
PAF150，PAF180，PAF220

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1-stage：3，4，5，6，7，8，9，10
雙節 2-stage：12，15，16，20，25，28，30，35，40，50，70，80，100

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：PAF090-100-S2-P1/Panasonic MSMJ 082S1A

PAF 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PAF042	PAF060	PAF090	PAF120	PAF150	PAF180	PAF220
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	15	46	145	280	520	1020	1550
			4	17	48	155	300	550	1280	2160
			5	17	48	158	310	530	1250	2100
			6	12	42	120	240	410	980	1350
			7	13	47	143	290	500	1030	1580
			8	12	39	108	230	420	880	1260
			9	10	38	100	220	410	880	1450
			10	12	42	120	260	475	950	1530
		2	12	15	48	155	300	530	1100	1750
			15	15	48	150	280	520	1050	1650
			16	17	47	158	300	530	1200	2050
			20	17	48	155	300	530	1200	2050
			25	17	47	158	310	520	1200	2000
			28	16	46	150	300	520	1100	1850
			30	15	46	145	280	500	1050	1600
			35	16	46	155	290	500	1020	1500
			40	17	46	150	290	410	1100	1350
			50	15	45	145	290	490	1000	1300
			70	13	45	140	280	490	1000	1200
			80	10	38	110	230	410	960	980
			100	10	39	120	260	450	950	1100
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque						
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	3000	3000	3000	3000	2500	2000	2000
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	6000	6000	6000	5500	4500	4500	4000
精密背隙P1 / Precision Backlash P1	arcmin	1	3~10	≤5	≤5	≤5	≤5	≤5	≤5	≤5
		2	12~100	≤7	≤7	≤7	≤7	≤7	≤7	≤7
標準背隙P2 / Standard Backlash P2	arcmin	1	3~10	≤8	≤8	≤8	≤8	≤8	≤8	≤8
		2	12~100	≤10	≤10	≤10	≤10	≤10	≤10	≤10
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	3	7	12	25	50	140	210
容許徑向力F_{2rB}[2] / Max.Radial Force	N	1,2	3~100	750	1130	3000	6700	9150	14500	48500
容許軸向力F_{2a1B}[2] / Max.Axial Force	N	1,2	3~100	310	600	1500	3220	4550	7100	24000
使用壽命 / Service Life	hr	1,2	3~100	20000h						
效率 η/Efficiency	%	1	3~10	≥97%						
		2	12~100	≥94%						
重量/Weight	kg	1	3~10	0.5	1.1	2.9	7.8	15	28	52
		2	12~100	0.8	1.39	3.9	9.6	18.9	35	66
使用溫度 / Operating Temperature	℃	1,2	3~100	(-15℃ ~ +90℃)						
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂(Synthetic Grease)						
防護等級 / Protection Class		1,2	3~100	IP65						
安裝方向 / Mounting Position		1,2	3~100	任意方向(Any Direction)						
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤63	≤63	≤63	≤65	≤65	≤67	≤70

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PAF042	PAF060	PAF090	PAF120	PAF150	PAF180	PAF220
轉動慣量J1 Moment of Inertia	$kg.cm^2$	1	3	0.03	0.16	0.61	3.25	9.21	28.98	69.61
			4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
			5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
			6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
			7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
			8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
			9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
			10	0.03	0.13	0.44	2.57	7.03	22.51	50.56
		2	12–40	0.03	0.03	0.13	0.47	2.71	7.42	23.29
			50–100	0.03	0.03	0.13	0.44	2.57	7.03	22.51

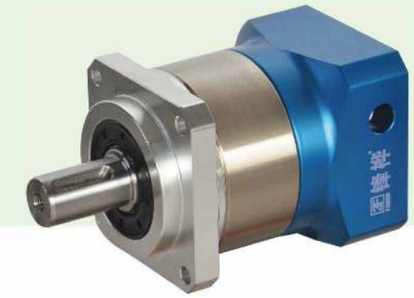
1. 最大加速力矩T2B=60% of T2NOT　2.輸出轉數100rpm時，作用于輸出軸中心位置。
3. 三段大減速比不在上表中，有軸加長和加大設計，需要用到請告知銷售人員。

1. The Max. acceleration torque T2B=60%　2.When output speed is 100rpm, acting on the output shaft center position.
3. 3–stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

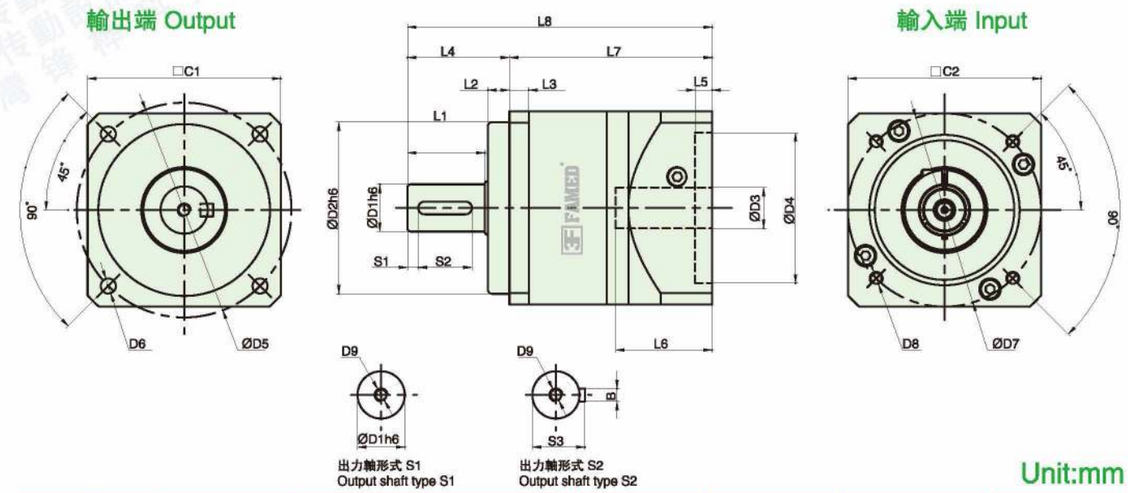
MODEL：PAF

單段 1–Stage

速比 Ratio：3，4，5，6，7，8，9，10



外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	PAF042–L1	PAF60–L1	PAF90–L1	PAF120–L1	PAF150–L1	PAF180–L1	PAF220–L1
D1	13	16	22	32	40	55	75
D2	35	50	80	110	130	160	180
D3	8(≤11)	14(≤14)	19(≤24)	24（≤32)	35(≤42)	38(≤50)	55(≤55)
D4	30(30～50)	50(30～70)	70(50～110)	110（50～130)	130(95～180)	180(95～180)	200(180～250)
D5	50	70	100	130	165	215	250
D6	4–Ø4.2	4–Ø5.5	4–Ø7	4–Ø9	4–Ø11	4–Ø13	4–Ø17
D7	46(22～70)	70(45～90)	90(70～145)	145（70～145)	145(90～215)	200(145～300)	235(200～300)
D8	M3～M5	M3～M6	M4～M10	M6～M10	M8～M13	M10～M13	M10～M13
D9	M4×0.7P	M5×0.8P	M6×1.0P	M8×1.25P	M12×1.75P	M12×1.75P	M20×2.5P
L1	20	28	36	50	74	82	105
L2	5.5	7	10	12	15	20	30
L3	7	8	9	12	15	16	20
L4	27	36	47.5	65	92	106	138
L5	4(2～7)	5(2～10)	8(4～10)	10（4～10)	10(4～10)	12.5(4～12.5)	12.5(4～12.5)
L6	26	32(30～42)	45(25～60)	65（50～80)	84(50～90)	105(50～130)	105(60～130)
L7	56	79	94.5	126.8	155.8	177	279
L8	83	115	142	191.8	247.8	283	417
C1	42	62	90	120	150	180	220
C2	42(42～70)	62(62～90)	90(90～165)	120（115～130）	150(142～200）	182(182～220)	220
S1	3	3	5	5	5	6	7
S2	15	20	25	40	60	70	90
S3	15	18	24.5	35	43	59	79.5
B	5	5	6	10	12	16	20

注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

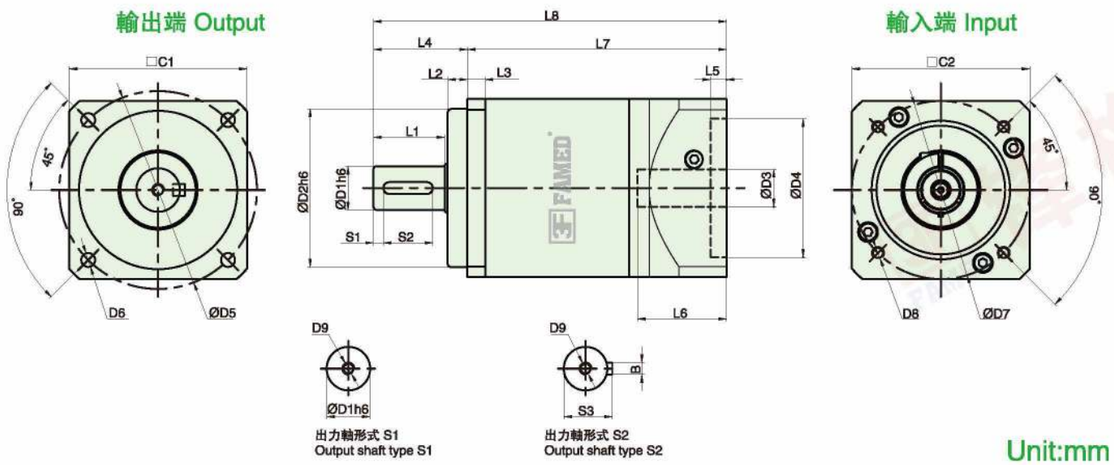
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL：PAF

雙段 2–Stage

速比 Ratio：12，15，16，20，25，28，30，35，40，50，70，80，100

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	PAF042–L2	PAF60–L2	PAF90–L2	PAF120–L2	PAF150–L2	PAF180–L2	PAF220–L2
D1	13	16	22	32	40	55	75
D2	35	50	80	110	130	160	180
D3	8(≤11)	14(≤14)	19(≤24)	24(≤32)	35(≤42)	38(≤50)	55(≤55)
D4	30(30～50)	50(30～70)	70(50～110)	110(50～130)	130(95～180)	180(95～180)	200(180～250)
D5	50	70	100	130	165	215	250
D6	4–Ø4.2	4–Ø5.5	4–Ø7	4–Ø9	4–Ø11	4–Ø13	4–Ø17
D7	46(22～70)	70(45～90)	90(70～145)	145(70～145)	145(90～215)	200(145～300)	235(200～300)
D8	M3～M5	M3～M6	M4～M10	M6～M10	M8～M13	M10～M13	M10～M13
D9	M4×0.7P	M5×0.8P	M6×1.0P	M8×1.25P	M12×1.75P	M12×1.75P	M20×2.5P
L1	20	28	36	50	74	82	105
L2	5.5	7	10	12	15	20	30
L3	7	8	9	12	15	16	20
L4	27	36	47.5	65	92	106	138
L5	4(2～7)	5(2～10)	8(4～10)	10(4～10)	10(4～10)	12.5(4～12.5)	12.5(4～12.5)
L6	26	32(30～42)	45(25～60)	65(50～80)	84(50～90)	105(50～130)	105(60～130)
L7	72	111.5	131	175.3	213.3	257	328
L8	99	147.5	178.5	240.3	305.3	363	466
C1	42	62	90	120	150	180	220
C2	42(42～70)	62(62～90)	90(90～165)	120(115～130)	150(142～200)	182（182～220)	220
S1	3	3	5	5	5	6	7
S2	15	20	25	40	60	70	90
S3	15	18	24.5	35	43	59	79.5
B	5	5	6	10	12	16	20

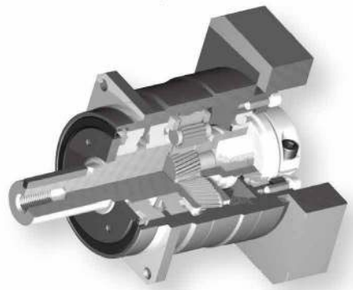
注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

精密行星減速機

VRS



1.高精度
背隙低于3公分、定位精確。

2.高剛性、高扭矩
使用整體式滚珠軸承，大大提高了剛性和扭矩。

3.高負載容量
主軸承采用錐形滚針軸承，大大提高了剛性和扭矩

4.法蘭、連接器方式
可以安裝到世界上任何一臺馬達上。

5.無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂，有效防止潤滑脂泄漏。

6.維護方便
在產品壽命期内無需更換潤滑脂，安裝更便捷。

1.High precision
The backlash is less than 3 arcmin and the positioning is accurate.
2.High rigidity & torque
The use of integral ball bearings greatly improves the rigidity and torque.
3.High load capacity
The main output shaft adopts taper roller bearing to greater increase the radial and axial force.
4.Methods of flange and connector
It can be installed on any motor in the world.
5. No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
6.Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

VRS 系列 Type

VRS060 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
VRS060，VRS075，VRS100，VRS140，VRS180，VRS210，VRS240

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1–stage：3，4，5，6，7，8，9，10
雙節 2–stage：15，16，20，25，28，30，35，40，50，70，100

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：VRS180–100–S2–P1/Panasonic MSMJ 082S1A

VRS 減速機性能資料　Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	VRS060	VRS075	VRS100	VRS140	VRS180	VRS210	VRS240
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	55	130	208	342	588	1140	1500
			4	50	140	290	542	1050	1700	2500
			5	60	160	330	650	1200	2000	2500
			6	55	150	310	600	1100	1900	2260
			7	50	140	300	550	1100	1800	2300
			8	45	120	260	500	1000	1600	2100
			9	40	100	230	450	900	1500	1800
			10	40	100	230	450	900	1500	1800
		2	15	55	130	208	342	588	1140	2300
			16	55	130	208	342	588	1140	2300
			20	50	140	290	542	1050	1700	2500
			25	60	160	330	650	1200	2000	2500
			28	60	160	330	650	1200	2000	2500
			30	55	150	310	600	1100	1900	2300
			35	50	140	300	550	1100	1800	2200
			40	45	120	260	500	1000	1600	2350
			50	60	160	330	650	1200	2000	2200
			70	50	140	300	550	1100	1800	2200
			100	40	100	230	450	900	1500	1800
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque						
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	5000	4000	4000	3000	3000	2000	1000
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	10000	8000	8000	6000	6000	4000	2500
超精密背隙P0 / Micro Backlash P0	arcmin	1	3~10	≤1	≤1	≤1	≤1	≤1	≤1	≤1
		2	12~100	≤3	≤3	≤3	≤3	≤3	≤3	≤3
精密背隙P1 / Precision Backlash P1	arcmin	1	3~10	≤3	≤3	≤3	≤3	≤3	≤3	≤3
		2	15~100	≤5	≤5	≤5	≤5	≤5	≤5	≤5
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	7	14	25	50	145	225	260
容許徑向力F_{2rB}[2] / Max.Radial Force	N	1,2	3~100	2750	4100	6400	9880	15000	20000	27500
容許軸向力F_{2aB}[2] / Max.Axial Force	N	1,2	3~100	2350	3200	5360	9690	14200	28000	30000
使用壽命 / Service Life	hr	1,2	3~100	20000h						
效率 η /Efficiency	%	1	3~10	≥96%						
		2	15~100	≥93%						
重量/Weight	kg	1	3~10	1.8	3.8	7.2	16.8	32	49	65
		2	15~100	2.1	4.1	8.1	17.5	35	53	70
使用溫度 / Operating Temperature	℃	1,2	3~100	(-15℃ ~ +90℃)						
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂(Synthetic Grease)						
防護等級 / Protection Class		1,2	3~100	IP65						
安裝方向 / Mounting Position		1,2	3~100	任意方向(Any Direction)						
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤62	≤62	≤65	≤68	≤68	≤70	≤70

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	VRS060	VRS075	VRS100	VRS140	VRS180	VRS210	VRS240
轉動慣量J1 Moment of Inertia	$kg.cm^2$	1	3	0.16	0.61	3.25	9.21	28.98	69.61	82.16
			4	0.14	0.48	2.74	7.54	23.67	54.37	75.58
			5	0.13	0.47	2.71	7.42	23.29	53.27	75.29
			6	0.13	0.45	2.65	7.25	22.75	51.72	72.35
			7	0.13	0.45	2.62	7.14	22.48	50.97	69.13
			8	0.13	0.44	2.58	7.07	22.59	50.84	69.22
			9	0.13	0.44	2.57	7.04	22.53	50.63	66.23
			10	0.13	0.44	2.57	7.03	22.51	50.56	66.23
		2	15–40	0.03	0.13	0.47	2.71	7.42	23.29	48.23
			50–100	0.03	0.13	0.44	2.57	7.03	22.51	45.58

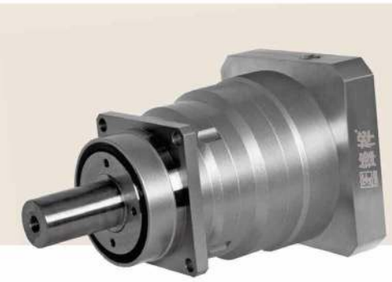
1. 減速比(i=Nin/Nout)　2. 輸出轉數100rpm時，作用于輸出軸中心位置。　3. *連續速轉，使用壽命爲10000hrs。

1. Ratio (i=Nin/Nout)　2. When output speed is 100rpm, acting on the output shaft center position
3. *Continuous operation, service life is 10000hrs

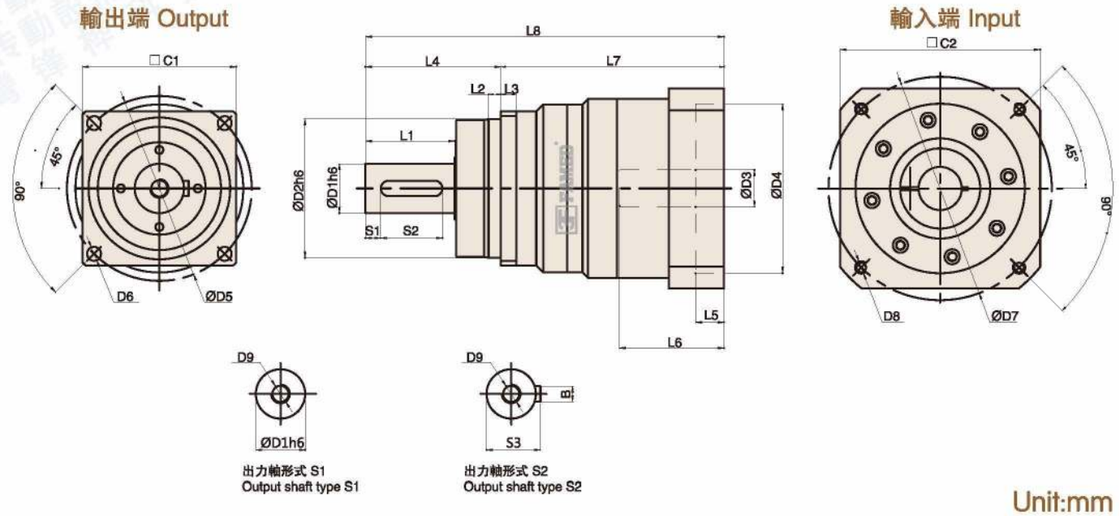
MODEL：VRS

單段 1–Stage

速比 Ratio：3，4，5，6，7，8，9，10



外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	VRS060–L1	VRS075–L1	VRS100–L1	VRS140–L1	VRS180–L1	VRS210–L1	VRS240–L1
D1	16	22	32	40	55	75	85
D2	60	70	90	130	160	180	200
D3	8(8 ~ 19)	14(14 ~ 24)	19(19 ~ 35)	24(24 ~ 48)	38(38 ~ 48)	48(48 ~ 55)	60
D4	30(30 ~ 70)	50(50 ~ 110)	70(70 ~ 114.3)	110(110 ~ 114.3)	114.3(114.3 ~ 200)	200	220
D5	68	85	120	165	215	250	290
D6	4–Ø5.5	4–Ø6.6	4–Ø9	4–Ø11	4–Ø13.5	4–Ø17	4–Ø17
D7	46(45 ~ 90)	70(70 ~ 145)	90(90 ~ 200)	145(145 ~ 200)	200(200 ~ 235)	235	240
D8	M3 ~ M5	M4 ~ M8	M5 ~ M12	M8 ~ M12	M12	M12	M16
D9	M5	M8	M12	M16	M20	M20	M20
L1	28	36	58	82	82	105	130
L2	5	6	8	10	12	15	20
L3	6	7	10	12	15	17	20
L4	48	56	88	112	112	143	170
L5	7.5 ~ 9	10.5 ~ 16	12 ~ 36.5	8	10	10	12
L6	42 ~ 43.5	50.5 ~ 66	62 ~ 82	69 ~ 115	83 ~ 117	116	55
L7	94.5 ~ 96	117.5 ~ 133	139 ~ 153	170 ~ 216	210 ~ 244	257	295
L8	142.5 ~ 144	173.5 ~ 189	227 ~ 247	282 ~ 328	322 ~ 356	400	465
C1	60	75	100	140	182	215	240
C2	40(40 ~ 80)	60(60 ~ 130)	80(80 ~ 180)	130(130 ~ 180)	180(180 ~ 220)	220	250
S1	2	3	10	5	6	7	3
S2	22	28	40	70	70	90	105
S3	18	24.5	35	43	59	79.5	90
B	5	6	10	12	16	20	22

注1：（ ）括號内爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

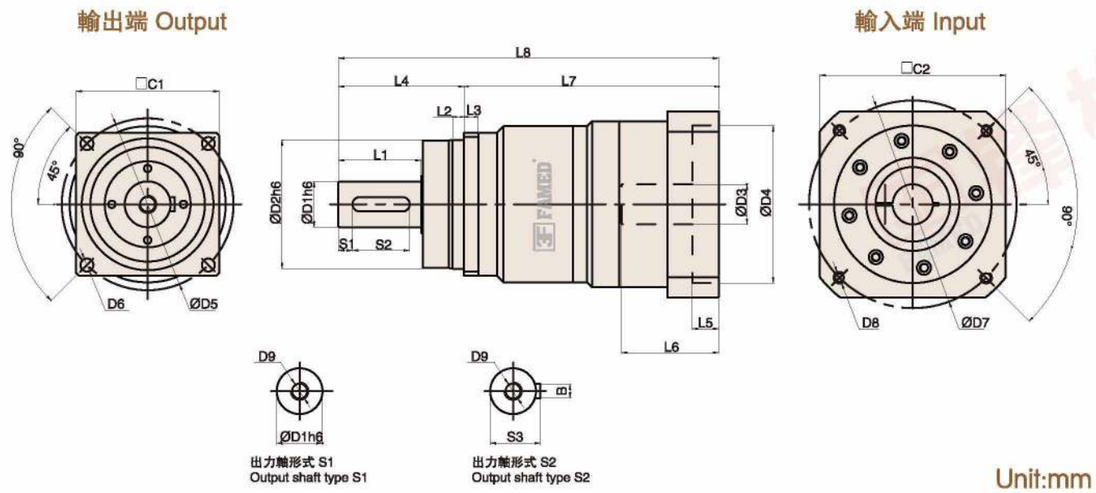
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL：VRS

雙段 2–Stage

速比 Ratio：15，16，20，25，28，30，35，40，50，70，100

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	VRS060–L2	VRS075–L2	VRS100–L2	VRS140–L2	VRS180–L2	VRS210–L2	VRS240–L2
D1	16	22	32	40	55	75	85
D2	60	70	90	130	160	180	200
D3	8(8 ~ 14)	14(14 ~ 24)	19(19 ~ 28)	24(24 ~ 38)	38(24 ~ 42)	48(48 ~ 55)	48
D4	30(30 ~ 50)	50(50 ~ 110)	50(50 ~ 110)	110(110 ~ 114.3)	114.3(110 ~ 114.3)	200	220
D5	68	85	120	165	215	250	290
D6	4–Ø5.5	4–Ø6.6	4–Ø9	4–Ø11	4–Ø13.5	4–Ø17	4–Ø17
D7	46(45 ~ 70)	70(70 ~ 145)	70(70 ~ 145)	145(145 ~ 200)	200(145 ~ 200)	235	240
D8	M3 ~ M5	M4 ~ M8	M5 ~ M8	M8 ~ M12	M8 ~ M12	M12	M16
D9	M5	M8	M12	M16	M20	M20	M20
L1	28	36	58	82	82	105	130
L2	5	6	8	10	12	15	20
L3	6	7	10	12	15	17	20
L4	48	56	88	112	112	143	170
L5	8 ~ 9	10.5 ~ 16	12 ~ 18.5	6 ~ 8	6 ~ 10	10	12
L6	42.5 ~ 43.5	50.5 ~ 66	61 ~ 68	69 ~ 81	69 ~ 117	116	55
L7	116.5 ~ 117.5	143 ~ 158.5	172 ~ 178	210 ~ 222	236.5 ~ 293.5	257	346
L8	164.5 ~ 165.5	199 ~ 214.5	260 ~ 266	322 ~ 334	348.5 ~ 406.5	400	516
C1	60	75	100	140	182	215	240
C2	40(40 ~ 65)	60(60 ~ 130)	60(60 ~ 130)	130(130 ~ 180)	130(130 ~ 180)	220	250
S1	2	3	10	5	6	7	3
S2	22	28	40	70	70	90	105
S3	18	24.5	35	43	59	79.5	90
B	5	6	10	12	16	20	22

注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

PRECISION PLANETARY GEARBOX

精密行星減速機

PFR

1.省空間
直交型減速機使用螺旋式傘齒輪，馬達的安裝可實現90度彎曲，節省了安裝空間

2.高剛性、高扭矩
使用整體式滾珠軸承，大大提高了剛性和扭矩。

3.連接器，軸套方式
可以安裝到世界上任何一臺馬達上。

4.無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂，有效防止潤滑脂泄漏。

5.維護方便
在產品壽命期內無需更換潤滑脂，安裝更便捷。

1. Space–saving
The straight cross reducer uses spiral bevel gear. The installation of the motor can achieve 90 degree bending and save the installation space.
2.High rigidity & torque
The use of integral ball bearings greatly improves the rigidity and torque.
3. Connector and shaft sleeve mode
It can be installed on any motor in the world.
4. No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
5.Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

PFR 系列 Type

PFR080 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
PFR040，PFR060，PFR080，PFR120，PFR160

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1–stage：3,4,5,6,7,8,9,10
雙節 2–stage：12,15,16,20,25,28,30,35,40,50,70,80,100
叁節 3–stage：60,64,72,80,90,100,120,144,150,160,180,200,240,258,288,320,384,512,600,800,1000

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：PFR080–100–S2–P1/Panasonic MSMJ 082S1A

PFR 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PFR040	PFR060	PFR080	PFR120	PFR160
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	17	28	112	165	423
			4	15	38	110	146	364
			5	14	40	108	160	423
			7	13	35	105	149	358
			10	12	25	100	141	293
		2	15	17	28	112	165	423
			20	15	38	110	146	364
			25	14	40	108	160	423
			30	13	28	112	165	423
			35	13	35	105	149	358
			40	12	38	110	146	364
			50	14	40	108	160	423
			70	13	35	105	149	358
			100	12	25	100	141	293
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque				
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	3000	3000	3000	3000	2500
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	5000	5000	5000	5000	3600
精密背隙P1 / Precision Backlash P1	arcmin	1	3~10	≤8	≤8	≤8	≤8	≤8
		2	12~100	≤10	≤10	≤10	≤10	≤10
標準背隙P2 / Standard Backlash P2	arcmin	1	3~10	≤11	≤11	≤11	≤11	≤11
		2	12~100	≤13	≤13	≤13	≤13	≤13
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
容許徑向力F_{2rB}[2] / Max.Radial Force	N	1,2	3~100	320	460	1300	3200	6520
容許軸向力F_{2a1B}[2] / Max.Axial Force	N	1,2	3~100	160	230	660	1600	3260
使用壽命 / Service Life	hr	1,2	3~100	20000 h				
效率 η/Efficiency	%	1	3~10	≥97%				
		2	15~100	≥94%				
重量/Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
使用溫度 / Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂Synthetic Grease				
防護等級 / Protection Class		1,2	3~100	IP65				
安裝方向 / Mounting Position		1,2	3~100	任意方向 Any Direction				
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤62	≤63	≤65	≤67	≤68

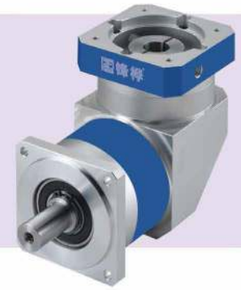
減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PFR040	PFR060	PFR080	PFR120	PFR160
轉動慣量J1 Moment of Inertia	$kg.cm^2$		3	0.16	0.63	3.48	12.84	36.72
			4	0.16	0.6	3.31	12.22	34.63
		1	5	0.16	0.59	3.28	12.1	34.24
			7	0.16	0.59	3.27	12.05	34.07
			10	0.16	0.59	3.26	12.03	34.02
		2	12-40	0.16	0.59	3.26	12.03	34.02
			50-100	0.16	0.59	3.26	12.03	34.02

1. 最大加速力矩T2B=60% of T2NOT　2.輸出轉數100rpm時，作用于輸出軸中心位置。
3. 三段大減速比不在上表中，有軸加長和加大設計，需要用到請告知銷售人員。
1. The Max. acceleration torque T2B=60%　2.When output speed is 100rpm, acting on the output shaft center position
3. 3-stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

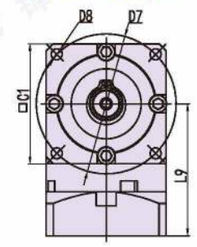
MODEL：PFR

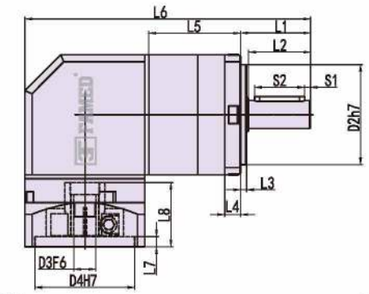
單段 1-Stage
速比 Ratio：3，4，5，6，7，8，9，10，14，20



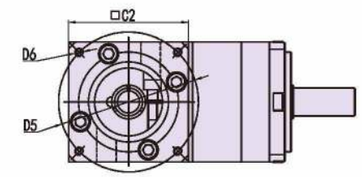
外形尺寸圖 Dimensions：

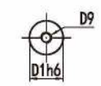
輸出端 Output



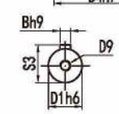


輸入端 Input

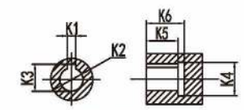




出力軸形式 S1
Output shaft type S1



出力軸形式 S2
Output shaft type S2



輸出孔形式 S3
Output hole type S3

Unit:mm

尺寸 Size	PFR060-L1	PFR080-L1	PFR120-L1	PFR160-L1
D1	ϕ14(16)	ϕ20（22）	ϕ25（32）	ϕ40
D2	ϕ50	ϕ80	ϕ110	ϕ130
D3	ϕ14（ϕ6.35-19）	ϕ19（ϕ11-24）	ϕ22（ϕ16-24）	ϕ35（ϕ22-38）
D4	ϕ50（ϕ30-70）	ϕ70（ϕ50-110）	ϕ110（ϕ55.5-110）	ϕ114.3（ϕ110-114.3）
D5	ϕ70（ϕ45-90）	ϕ90（ϕ70-145）	ϕ145（ϕ90-155）	ϕ200（ϕ145-200）
D6	4-M4（M3-M6）	4-M5（M4-M8）	4-M8（M6-M12）	4-M12（M8-M12）
D7	ϕ70	ϕ100	ϕ130	ϕ185
D8	4-ϕ5.5	4-ϕ6.5	4-ϕ8.5	4-ϕ11
D9	M5X0.8P	M8X1.25P	M10X1.5P	M16X2P
L1	35	40	55	87
L2	31	35	49	78
L3	3	3	4	5
L4	8	12	15	20
L5	46	55	80	111
L6	143	190	273	295
L7	5(4-6)	8(5-8)	8(5-8)	5（5-7）
L8	32(32-44)	42(42-60)	70（59-70）	86（62-86）
L9	66(66-88)	95.5(95.5-113.5)	130（119-130）	165.5（165.5-189.5）
C1	60	90	120	160
C2	60(60-90)	90(90-130)	130（120）	175（142）
S1	3	3	5	5
S2	25	30	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	ϕ11	ϕ22	ϕ28	ϕ38
K3	12.8	24.5	31.3	41.3
K4	ϕ16	ϕ32	ϕ38	ϕ48
K5	15	20	27	35
K6	18	24	32	40

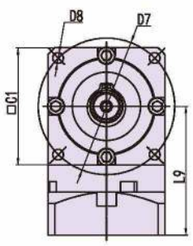
MODEL：PFR

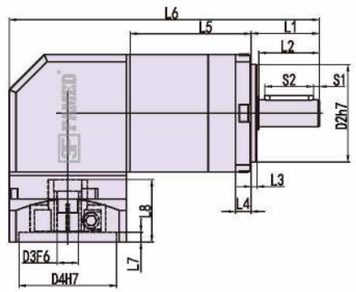
雙段 2-Stage

速比 Ratio：15，20，25，30，35，40，50，70，80，
100，120，140，160，180，200

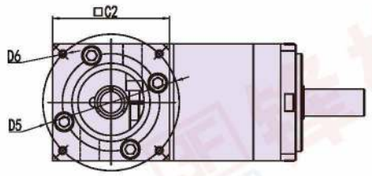
外形尺寸圖 Dimensions：

輸出端 Output

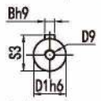




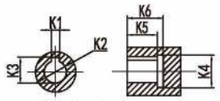
輸入端 Input



出力軸形式 S1
Output shaft type S1



出力軸形式 S2
Output shaft type S2



輸出孔形式 S3
Output hole type S3

Unit:mm

尺寸 Size	PFR060-L2	PFR080-L2	PFR120-L2	PFR160-L2
D1	ϕ14(16)	ϕ20（22）	ϕ25（32）	ϕ40
D2	ϕ50	ϕ80	ϕ110	ϕ130
D3	ϕ14（ϕ6.35-19）	ϕ19（ϕ11-24）	ϕ22（ϕ16-24）	ϕ35（ϕ22-38）
D4	ϕ50（ϕ30-70）	ϕ70（ϕ50-110）	ϕ110（ϕ55.5-110）	ϕ114.3（ϕ110-114.3）
D5	ϕ70（ϕ45-90）	ϕ90（ϕ70-145）	ϕ145（ϕ90-155）	ϕ200（ϕ145-200）
D6	4-M4（M3-M6）	4-M5（M4-M8）	4-M8（M6-M12）	4-M12（M8-M12）
D7	ϕ70	ϕ100	ϕ130	ϕ185
D8	4-ϕ5.5	4-ϕ6.5	4-ϕ8.5	4-ϕ11
D9	M5X0.8P	M8X1.25P	M10X1.5P	M16X2P
L1	35	40	55	87
L2	31	35	49	78
L3	3	3	4	5
L4	8	12	15	20
L5	62	78.5	110	149
L6	159	213.5	303	333
L7	5(4-6)	8(5-8)	8(5-8)	5（5-7）
L8	32(32-44)	42(42-60)	70（59-70）	86（62-86）
L9	66(66-88)	95.5(95.5-113.5)	130（119-130）	165.5（165.5-189.5）
C1	60	90	120	160
C2	60(60-90)	90(90-130)	130（120）	175（142）
S1	3	3	5	5
S2	25	30	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	ϕ11	ϕ22	ϕ28	ϕ38
K3	12.8	24.5	31.3	41.3
K4	ϕ16	ϕ32	ϕ38	ϕ48
K5	15	20	27	35
K6	18	24	32	40

PRECISION PLANETARY GEARBOX

精密行星減速機

PER

1.省空間

直交型減速機使用螺旋式傘齒輪，馬達的安裝可實現90度彎曲，節省了安裝空間

2.高剛性、高扭矩

使用整體式滾珠軸承，大大提高了剛性和扭矩。

3.連接器，軸套方式

可以安裝到世界上任何一臺馬達上。

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使用高粘度、不易分離的潤滑脂，有效防止潤滑脂泄漏。

5.維護方便

在產品壽命期內無需更換潤滑脂，安裝更便捷。

1. Space-saving
The straight cross reducer uses spiral bevel gear. The installation of the motor can achieve 90 degree bending and save the installation space.
2.High rigidity & torque
The use of integral ball bearings greatly improves the rigidity and torque.
3. Connector and shaft sleeve mode
It can be installed on any motor in the world.
4. No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
5.Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

PER 系列 Type

PER080 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model

PER040，PER060，PER080
PER120，PER160

出力軸鍵槽 Output Shaft Keyway

S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model

馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio

單節 1-stage：3,4,5,6,7,8,9,10
雙節 2-stage：12,15,16,20,25,28,30,35,40,50,70,80,100
叁節 3-stage：60,64,72,80,90,100,120,144,150,160,180,200,
240,258,288,320,384,512,600,800,1000

背隙等級 Backlash Grade

P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：PER080-100-S2-P1/Panasonic MSMJ 082S1A

PER 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PER040	PER060	PER080	PER120	PER160
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	17	28	112	165	423
			4	15	38	110	146	364
			5	14	40	108	160	423
			7	13	35	105	149	358
			10	12	25	100	141	293
		2	15	17	28	112	165	423
			20	15	38	110	146	364
			25	14	40	108	160	423
			30	13	28	112	165	423
			35	13	35	105	149	358
			40	12	38	110	146	364
			50	14	40	108	160	423
			70	13	35	105	149	358
			100	12	25	100	141	293
最大輸出扭矩 T_{2NOT}[1] / Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque				
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	3000	3000	3000	3000	2500
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	5000	5000	5000	5000	3600
精密背隙P1 / Precision Backlash P1	arcmin	1	3~10	≤8	≤8	≤8	≤8	≤8
		2	12~100	≤10	≤10	≤10	≤10	≤10
標準背隙P2 / Standard Backlash P2	arcmin	1	3~10	≤11	≤11	≤11	≤11	≤11
		2	12~100	≤13	≤13	≤13	≤13	≤13
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	3	6	12	22	50
容許徑向力F_{2rB}[2] / Max.Radial Force	N	1,2	3~100	320	460	1300	3200	6520
容許軸向力F_{2aB}[2] / Max.Axial Force	N	1,2	3~100	160	230	660	1600	3260
使用壽命 / Service Life	hr	1,2	3~100	20000 h				
效率 η/Efficiency	%	1	3~10	≥97%				
		2	15~100	≥94%				
重量/Weight	kg	1	3~10	0.73	0.99	2.1	4.98	18.2
		2	15~100	1.05	1.46	3.2	6.92	24.9
使用溫度 / Operating Temperature	℃	1,2	3~100	-25℃~+90℃				
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂Synthetic Grease				
防護等級 / Protection Class		1,2	3~100	IP65				
安裝方向 / Mounting Position		1,2	3~100	任意方向 Any Direction				
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤62	≤63	≤65	≤67	≤68

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	PER040	PER060	PER080	PER120	PER160
轉動慣量J1 Moment of Inertia	$kg.cm^2$	1	3	0.16	0.63	3.48	12.84	36.72
			4	0.16	0.6	3.31	12.22	34.63
			5	0.16	0.59	3.28	12.1	34.24
			7	0.16	0.59	3.27	12.05	34.07
			10	0.16	0.59	3.26	12.03	34.02
		2	12–40	0.16	0.59	3.26	12.03	34.02
			50–100	0.16	0.59	3.26	12.03	34.02

1. 最大加速力矩T2B=60% of T2NOT。 2. 輸出轉數100rpm時，作用于輸出軸中心位置。
3. 三段大減速比不在上表中，有軸加長和加大設計，需要用到請告知銷售人員。

1. The Max. acceleration torque T2B=60% of T2NOT 2. When output speed is 100rpm, acting on the output shaft center position.
3. 3–stage big ratios are not in the above table. There is shaft lengthening and enlarging design. Please tell sales person if you need it.

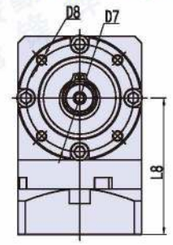
MODEL：PER

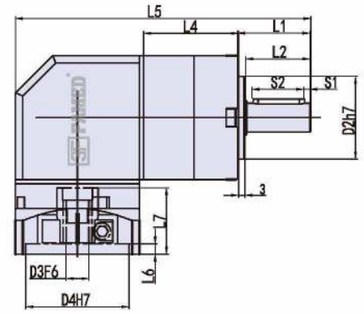
單段 1–Stage

速比 Ratio：3，4，5，6，7，8，9，10，14，20

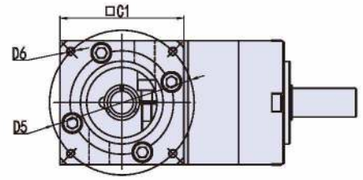
外形尺寸圖 Dimensions：

輸出端 Output

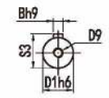




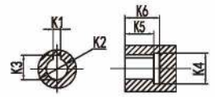
輸入端 Input



出力軸形式 S1
Output shaft type S1



出力軸形式 S2
Output shaft type S2



輸出孔形式 S3
Output hole type S3

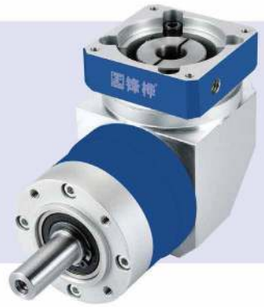
Unit:mm

尺寸 Size	PER060–L1	PER080–L1	PER120–L1	PER160–L1
D1	ϕ14(16)	ϕ20（22）	ϕ25（32）	ϕ40
D2	ϕ40	ϕ60	ϕ80	ϕ130
D3	ϕ14（ϕ6.35–19）	ϕ19（ϕ11–24）	ϕ22（ϕ16–24）	ϕ35（ϕ22–38）
D4	ϕ50（ϕ30–70）	ϕ70（ϕ50–110）	ϕ110（ϕ55.5–110）	ϕ114.3（ϕ110–114.3）
D5	ϕ70（ϕ45–90）	ϕ90（ϕ70–145）	ϕ145（ϕ90–155）	ϕ200（ϕ145–200）
D6	4–M4（M3–M6）	4–M5（M4–M8）	4–M8（M6–M12）	4–M12（M8–M12）
D7	ϕ52	ϕ70	ϕ100	ϕ145
D8	4–M5X10L	4–M6X12L	4–M10X20L	4–M12X24L
D9	M5X0.8P	M8X1.25P	M10X1.5P	M16X2P
L1	35	40	55	87
L2	31	35	49	80
L3	3	3	4	5
L4	46	55	80	111
L5	143	190	273	295
L6	5(4–6)	8(5–8)	8(5–8)	5（5–7）
L7	32(32–44)	42(42–60)	70（59–70）	86（62–86）
L8	66(66–88)	95.5(95.5–113.5)	130（119–130）	165.5（165.5–189.5）
C1	60(60–90)	90(90–130)	130（120）	175（142）
S1	3	3	5	5
S2	25	30	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	ϕ11	ϕ22	ϕ28	ϕ38
K3	12.8	24.5	31.3	41.3
K4	ϕ16	ϕ32	ϕ38	ϕ48
K5	15	20	27	35
K6	18	24	32	40

MODEL：PER

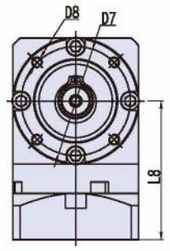
雙段 2-Stage

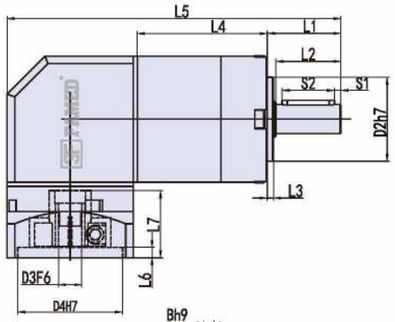
速比 Ratio：15，20，25，30，35，40，50，70，80，
100，120，140，160，180，200



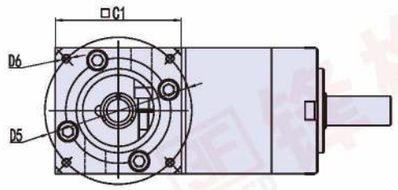
外形尺寸圖 Dimensions：

輸出端 Output

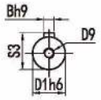




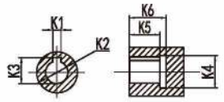
輸入端 Input



出力軸形式 S1
Output shaft type S1



出力軸形式 S2
Output shaft type S2



輸出孔形式 S3
Output hole type S3

Unit:mm

尺寸 Size	PER060-L2	PER080-L2	PER120-L2	PER160-L2
D1	ϕ14(16)	ϕ20（22）	ϕ25（32）	ϕ40
D2	ϕ40	ϕ60	ϕ80	ϕ130
D3	ϕ14（ϕ6.35-19）	ϕ19（ϕ11-24）	ϕ22（ϕ16-24）	ϕ35（ϕ22-38）
D4	ϕ50（ϕ30-70）	ϕ70（ϕ50-110）	ϕ110（ϕ55.5-110）	ϕ114.3（ϕ110-114.3）
D5	ϕ70（ϕ45-90）	ϕ90（ϕ70-145）	ϕ145（ϕ90-155）	ϕ200（ϕ145-200）
D6	4-M4（M3-M6）	4-M5（M4-M8）	4-M8（M6-M12）	4-M12（M8-M12）
D7	ϕ52	ϕ70	ϕ100	ϕ145
D8	4-M5X10L	4-M6X12L	4-M10X20L	4-M12X24L
D9	M5X0.8P	M8X1.25P	M10X1.5P	M16X2P
L1	35	40	55	87
L2	31	35	49	80
L3	3	3	4	5
L4	62	78.5	110	149
L5	159	213.5	303	333
L6	5(4-6)	8(5-8)	8(5-8)	5（5-7）
L7	32(32-44)	42(42-60)	70（59-70）	86（62-86）
L8	66(66-88)	95.5(95.5-113.5)	130（119-130）	165.5（165.5-189.5）
C1	60(60-90)	90(90-130)	130（120）	175（142）
S1	3	3	5	5
S2	25	30	40	70
S3	16	22.5	28	43
B	5	6	8	12
K1	4	6	8	10
K2	ϕ11	ϕ22	ϕ28	ϕ38
K3	12.8	24.5	31.3	41.3
K4	ϕ16	ϕ32	ϕ38	ϕ48
K5	15	20	27	35
K6	18	24	32	40

PRECISION PLANETARY GEARBOX

精密行星減速機

VRSF

1. 静音
使用斜齿輪實現順暢安静的運轉

2. 高精度
背隙低于3公分、定位精確。

3. 高剛性、高扭矩
使用整體式滚珠軸承，大大提高了剛性和扭矩。

4. 法蘭、連接器方式
可以安裝到世界上任何一臺馬達上。

5. 無潤滑脂泄漏
使用高粘度、不易分離的潤滑脂，有效防止潤滑脂泄漏。

6. 維護方便
在產品壽命期内無需更換潤滑脂，安裝更便捷。

1.Quiet operation
Helical gears are used to achieve smooth and quiet operation.
2.High precision
The backlash is less than 3 arcmin and the positioning is accurate.
3.High rigidity & torqueThe use of integral ball bearings greatly improves the rigidity and torque.
4.Methods of flange and connector
It can be installed on any motor in the world.
5.No grease leakage
The use of grease with high viscosity which is not easy to separate effectively prevents the grease leakage.
6.Convenient maintenance
No need to replace the grease in the product life period , and the installation is more convenient.

減速機的選型 Model Selection of Speed Reducers

VRSF 系列 Type

VRSF 080 – 10 – S1 – P1 / 馬達

減速機型式 Reducer Model
VRSF060，VRSF080
VRSF100，VRSF125

出力軸鍵槽 Output Shaft Keyway
S1：實心軸，無鍵槽
(Solid Output Shaft No Keyway)
S2：標準品，有鍵槽
Standard (Keyway)
S3：輸出爲孔
Output for holes

馬達型號 Motor Model
馬達制造商及型號
Motor Manufacturer & Model

減速比 Ratio
單節 1-stage：3，4，5，7，10
雙節 2-stage：15，20，25，30，35，40，50，70，100

背隙等級 Backlash Grade
P0：高精密背隙 High precision backlash
P1：精密背隙 Precision backlash
P2：標準背隙 Standard backlash

型號範圍 Model Example：VRSF080-100-S2-P1/Panasonic MSMJ 082S1A

VRSF 減速機性能資料 Reducer Specifications

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	VRSF060	VRSF080	VRSF100	VRSF125
額定輸出力矩T_{2N} Rated Output Torque	Nm	1	3	54	112	165	286
			4	48	110	146	255
			5	45	108	160	264
			7	41	105	149	245
			10	40	100	141	234
		2	15	54	112	165	286
			20	48	110	146	255
			25	45	108	160	264
			30	41	112	165	286
			35	41	105	149	245
			40	39	110	146	255
			50	45	108	160	264
			70	41	105	149	245
			100	40	100	141	234
最大輸出扭矩 T_{2NOT}[1]/ Max.Output Torque	Nm	1,2	3~100	3倍額定輸出力矩/3Times of Nominal Output Torque			
額定輸入轉速n_{1N}/Rated Input Speed	rpm	1,2	3~100	3000	3000	3000	3000
最大輸入轉速n_{1B}/Max.Input Speed	rpm	1,2	3~100	5000	5000	5000	5000
精密背隙P1 / Precision Backlash P1	arcmin	1	3~10	≤5	≤5	≤5	≤5
		2	12~100	≤7	≤7	≤7	≤7
標準背隙P2 / Standard Backlash P2	arcmin	1	3~10	≤8	≤8	≤8	≤8
		2	12~100	≤10	≤10	≤10	≤10
扭轉剛性/Torsional Rigidity	Nm/arcmin	1,2	3~100	5	12	14	23
最大彎曲力矩力N_{2KB}[3]	N	1,2	3~100	800	1200	3200	5220
容許轉向力F_{2a1B}[2] / Max.Axial Force	N	1,2	3~100	400	600	1600	2600
使用壽命 / Service Life	hr	1,2	3~100	21000 h			
效率 η /Efficiency	%	1	3~10	≥97%			
		2	15~100	≥94%			
重量/Weight	kg	1	3~10	1.2	1.6	3.76	7.43
		2	15~100	2.1	2.8	5.92	10.3
使用溫度 / Operating Temperature	℃	1,2	3~100	-25℃~+90℃			
潤滑/Lubrication		1,2	3~100	全合成潤滑油脂Synthetic Grease			
防護等級 / Protection Class		1,2	3~100	IP65			
安裝方向 / Mounting Position		1,2	3~100	任意方向 Any Direction			
噪音值(n1=3000rpm，無負載)/ Noise Level	dB(A)	1,2	3~100	≤60	≤62	≤65	≤67

減速機轉動慣量 Reducer Rotary Inertia

規格 Specs	單位 Unit	節數 Stage	減速比 Ratio	VRSF060	VRSF080	VRSF100	VRSF125
轉動慣量J1 Moment of Inertia	$kg.cm^2$	1	3	0.16	0.61	3.25	8.21
			4	0.14	0.48	2.74	7.54
			5	0.13	0.47	2.71	7.42
			6	0.13	0.45	2.65	7.25
			7	0.13	0.45	2.62	7.14
			8	0.13	0.44	2.58	7.07
			9	0.13	0.44	2.57	7.04
			10	0.13	0.44	2.57	7.03
		2	12–40	0.03	0.13	0.47	2.71
			50–100	0.03	0.13	0.44	2.57

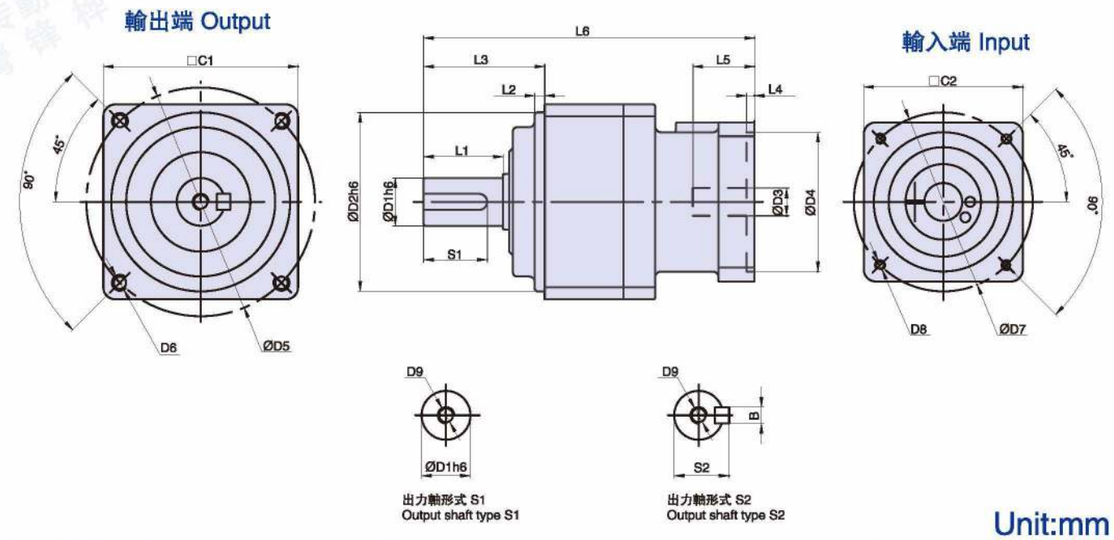
1. 減速比(i=Nin/Nout)。 2.最大輸出力矩T2B=60% of T2NOT。
3. 輸出轉數100rpm時，作用于輸出法蘭位置，*連續運轉使用壽命爲15000hrs。

1. Ratio (i=Nin/Nout) 2. The Max. acceleration torque T2B=60% of T2NOT
3. When output speed is 100rpm, inertia acts on the output shaft center position.continuous operation, service life is 15000hrs.

MODEL： VRSF

單段 1–Stage
速比 Ratio：3，4，5，7，10

外形尺寸圖 Dimensions



Unit:mm

尺寸 Size	VRSF060–L1	VRSF080–L1	VRSF100–L1	VRSF125–L1
D1	12	19	24	32
D2	50	70	90	110
D3	8(8 ~ 14)	14(14 ~ 19)	19	22(22 ~ 24)
D4	30(30 ~ 50)	50(50 ~ 70)	70	110
D5	60	90	115	135
D6	M5	M6	M8	M10
D7	45(45 ~ 70)	70(70 ~ 90)	90	145
D8	M4 ~ M5	M4 ~ M5	M6	M8
D9	M4	M6	M8	M12
L1	20	30	40	55
L2	3	3	5	5
L3	32	50	61	75
L4	4	4	4	8
L5	27 ~ 32	32	38	65.5
L6	109	143.5 ~ 148.5	177	215.5
C1	52	78	98	125
C2	40(40 ~ 52)	60(60 ~ 80)	90	125(125 ~ 130)
S1	18	22	32	52
S2	13.5	21.5	27	35
B	4	6	6	10

注1：（ ）括號内爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

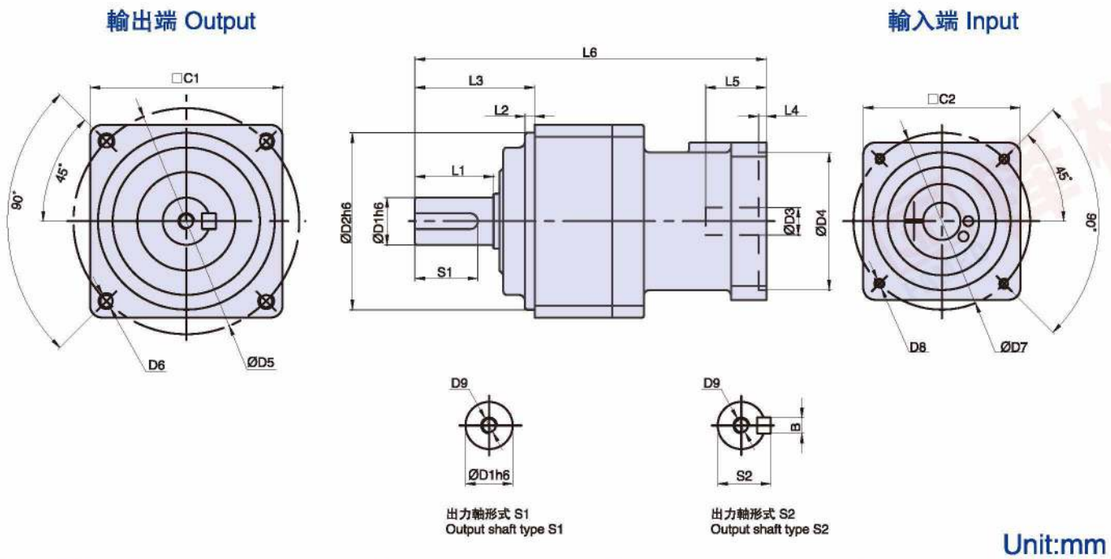
Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

MODEL： VRSF

雙段 2–Stage

速比 Ratio：15，20，25，30，35，40，50，70，100

外形尺寸圖 Dimensions：



Unit:mm

尺寸 Size	VRSF060–L2	VRSF080–L2	VRSF100–L2	VRSF125–L2
D1	12	19	24	32
D2	50	70	90	110
D3	11(11 ~ 14)	14(14 ~ 19)	14 ~ 19	22(22 ~ 24)
D4	50	50(50 ~ 70)	50(50 ~ 70)	110
D5	60	90	115	135
D6	M5	M6	M8	M10
D7	45(45 ~ 70)	70(70 ~ 90)	70 ~ 90	145
D8	M4 ~ M5	M4 ~ M5	M4 ~ M5	M8
D9	M4	M6	M8	M12
L1	20	30	40	55
L2	3	3	5	5
L3	32	50	61	75
L4	4	4	4	8
L5	32	32	38	65.5
L6	109	150 ~ 155	165 ~ 179	250.5
C1	52	78	98	125
C2	52	60(60 ~ 80)	60(60 ~ 80)	125(125 ~ 130)
S1	18	22	32	52
S2	13.5	21.5	27	35
B	4	6	8	10

注1：（ ）括號內爲可選擇範圍尺寸，（ ）括號外爲標準尺寸。
注2：減速機出力軸可以爲客户定制大小和長短。
注3：輸入尺寸依據各品牌伺服馬達或步進馬達可以有所變動。

Note 1：Inside of () is the optional range of sizes, outside of () is the standard sizes.
Note 2: The reducer output shaft size and length can be customized for customers.
Note 3: The input size can be changed according to the servomotor or stepper motor of each brand.

RIGHT ANGLE GEARBOX

直角減速器

ZR

角度旋轉低背隙小于10秒

- 采用先進六軸精密機械加工，一次裝夾同時加工完成，確保最佳幾何精度。
- 傳動齒輪經精密研制，運轉低背隙、高精度。
- 精密傳動、寂靜、穩定、順暢、流程；達到精密傳動，低噪音、高剛性等高品質要求。

（THD）
實心軸 Solid shaft

（THK）
空心軸 Hollow shaft

（THS）
雙出力軸
Double output shaft

Low rotating backlash less than 10 seconds

- The right angle reducer is processed using a high precision six axial machine. It is clamped and and finished all in one process.
- Transmission gears can achieve low rotating backlash and high accuracy through precision grinding.
- Precision transmission and quiet, stable operation can realize low noise, high rigidity and other requirements.

特性：Features

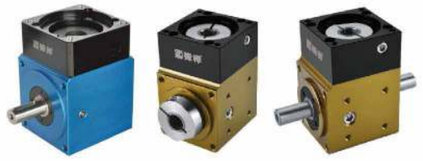
- 本體結構紮實、體積小，有效節省安裝空間。
- 雖然體積小、重量輕。但具有高扭矩輸出及低背隙的優異特性。
- 訂購時請告知馬達法蘭及心軸尺寸。

- The reducer body with a compact structure and small volume to save the mounting space.
- Although the reducer is small in volume and light in weight, and it features of high torque output and low backlash.
- When ordering, please inform the sizes of motor flange and shaft.

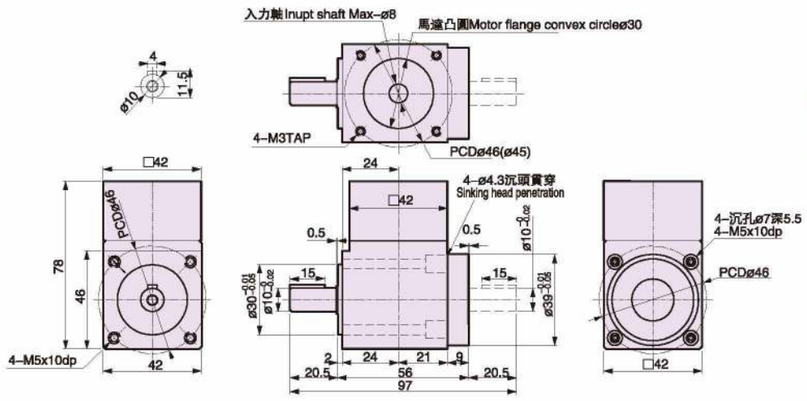
型號識別:Model Identification

ZR — 42 — 3 — V2

ZR	42	3	V2
直角減速機系列 Right Angle Reducer	規格 Specifications	減速比 Ratio	馬達類型 Motor



V1:伺服 Servo Ø8 PCD45,M3 V2:伺服 Servo Ø8 PCD46,M4	T1:步進 Stepper Ø5 PCD43.8,M3 T2:步進 Stepper Ø6 PCD43.8,M3
各廠牌100W AC 伺服馬達 100W AC servo motor for each brand	各廠牌42型步進馬達 42 stepper motor for each brand



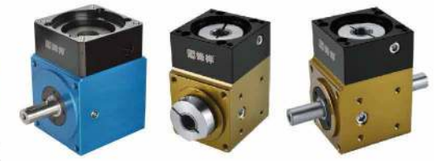
型號 Model No. / 說明Description	ZR42
容許最大轉矩(kgf.m/N.m) Allowable Max Torque	1.5/15
破壞力矩值(kgf.m/N.m) Breaking Torque	4/40
容許馬達轉速(rpm/min) Allowable Max Speed	2500
背隙(min-arc) Backlash	0.5
重量(kg) Weight	0.5

型號識別:Model Identification

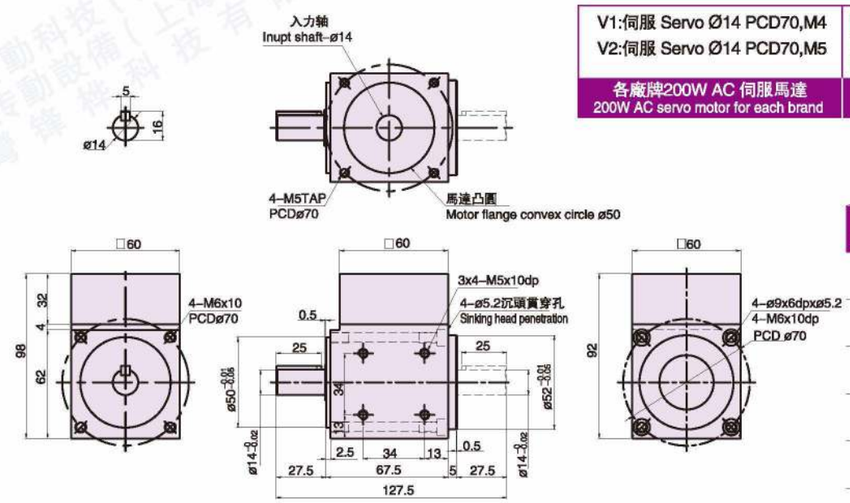
ZR — 60 — 2 — V2

ZR	60	2	V2
直角減速機系列 Right Angle Reducer	規格 Specifications	減速比 Ratio	馬達類型 Motor

2



V1:伺服 Servo Ø14 PCD70,M4 V2:伺服 Servo Ø14 PCD70,M5	T1:步進 Stepper Ø8 PCD66.67,M4 T2:步進 Stepper Ø8 PCD70,M4 T3:步進 Stepper Ø10 PCD70,M4
各廠牌200W AC 伺服馬達 200W AC servo motor for each brand	各廠牌60型步進馬達 60 stepper motor for each brand



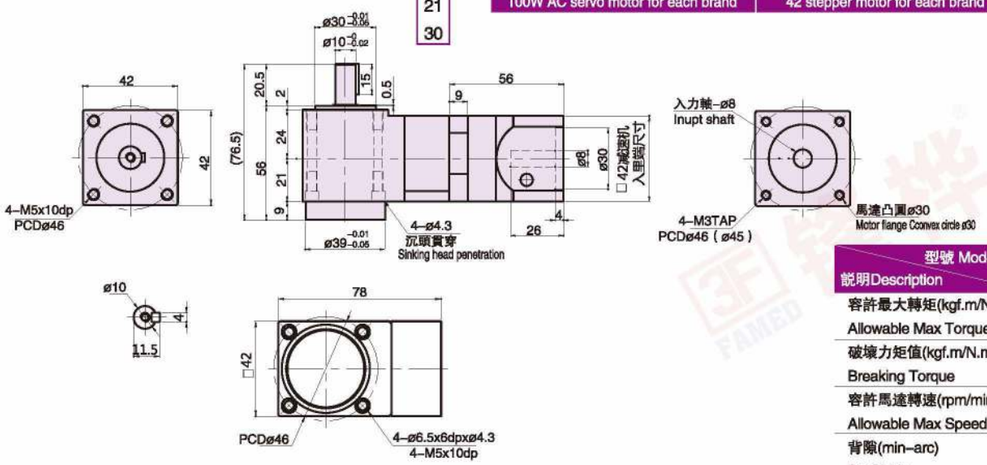
型號 Model No. / 說明Description	ZR60
容許最大轉矩(kgf.m/N.m) Allowable Max Torque	4.5/45
破壞力矩值(kgf.m/N.m) Breaking Torque	12/120
容許馬達轉速(rpm/min) Allowable Max Speed	2500
背隙(min-arc) Backlash	0.5
重量(kg) Weight	1.2

ZR — 42S — 9 — V2

ZR	42S	9	V2
直角減速機系列 Right Angle Reducer	規格 Specifications	減速比 Ratio	馬達類型 Motor

9
12
15
21
30

V1:伺服 Servo Ø8 PCD45,M3 V2:伺服 Servo Ø8 PCD46,M4	T1:步進 Stepper Ø5 PCD43.8,M3 T1:步進 Stepper Ø6 PCD43.8,M3
各廠牌100W AC 伺服馬達 100W AC servo motor for each brand	各廠牌42型步進馬達 42 stepper motor for each brand



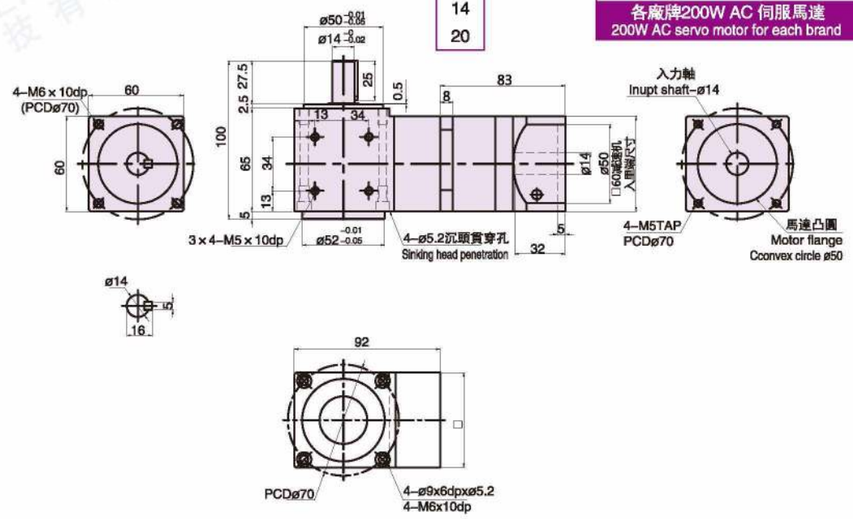
型號 Model No. / 說明Description	ZR42S
容許最大轉矩(kgf.m/N.m) Allowable Max Torque	1.5/15
破壞力矩值(kgf.m/N.m) Breaking Torque	4/40
容許馬達轉速(rpm/min) Allowable Max Speed	2500
背隙(min-arc) Backlash	2
重量(kg) Weight	0.9

ZR — 60S — 6 — V2

ZR	60S	6	V2
直角減速機系列 Right Angle Reducer	規格 Specifications	減速比 Ratio	馬達類型 Motor

6
8
10
14
20

V1:伺服 Servo Ø14 PCD70,M4 V2:伺服 Servo Ø14 PCD70,M5	T1:步進 Stepper Ø8 PCD66.67,M4 T2:步進 Stepper Ø8 PCD70,M4 T3:步進 Stepper Ø10 PCD70,M4
各廠牌200W AC 伺服馬達 200W AC servo motor for each brand	各廠牌60型步進馬達 60 stepper motor for each brand



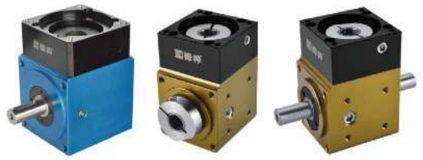
型號 Model No. / 說明Description	ZR60S
容許最大轉矩(kgf.m/N.m) Allowable Max Torque	4.5/45
破壞力矩值(kgf.m/N.m) Breaking Torque	12/120
容許馬達轉速(rpm/min) Allowable Max Speed	2500
背隙(min-arc) Backlash	2
重量(kg) Weight	2

锋桦传動科技（江苏）有限公司
锋桦传動設備（上海）有限公司
台灣 锋桦 科技 有限公司
FAMED

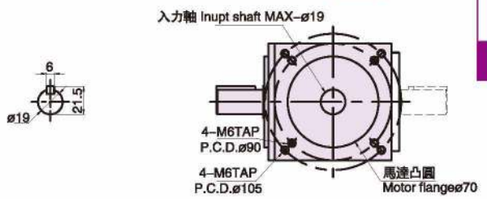
型號識別:Model Identification

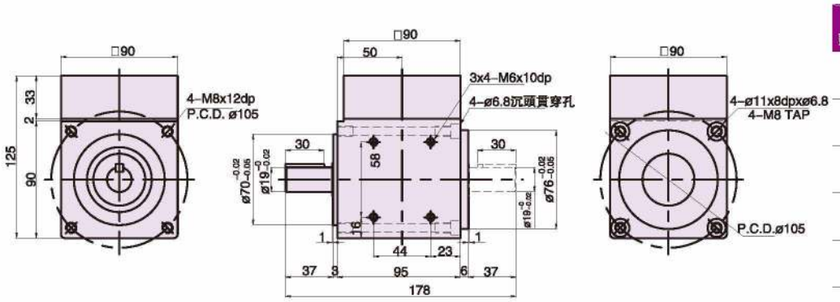
ZR — 90 — 2 — V2

直角減速機系列 Right Angle Reducer	規格 Specifications	減速比 Ratio	馬達類型 Motor
		2	



V1:伺服 Servo Ø19 PCD90,M5 V2:伺服 Servo Ø19 PCD90,M6	T1:步進 Stepper Ø14 PCD98.4,M5 T2:步進 Stepper Ø6 PCD43.8,M3
各廠牌75W AC 伺服馬達 75W AC servo motor for each brand	各廠牌86型步進馬達 86 stepper motor for each brand



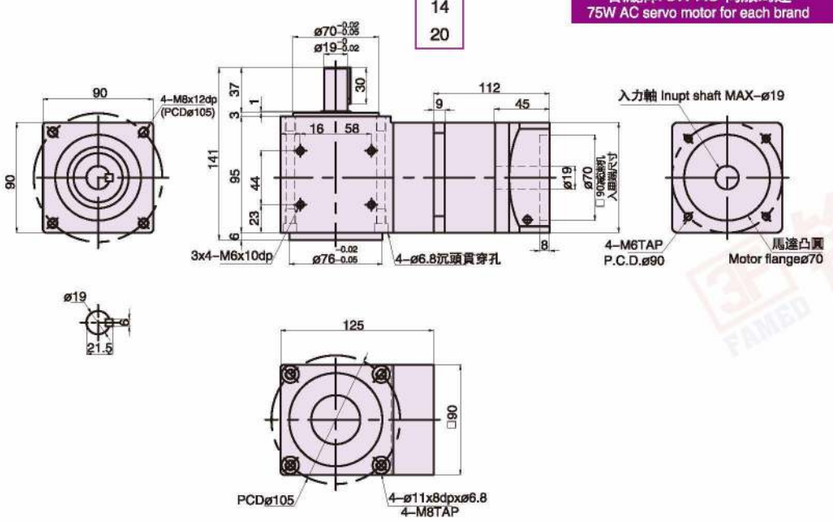


型號 Model No. / 說明Description	ZR90
容許最大轉矩(kgf.m/N.m) Allowable Max. Torque	12/120
破壞力矩值(kgf.m/N.m) Damage Torque value	32/320
容許馬達轉速(rpm/min) Allowable Motor Speed	2500
背隙Backlash(min–arc)	0.5
重量Weight(kg)	3.6

ZR — 90S — 6 — V2

直角減速機系列 Right Angle Reducer	規格 Specifications	減速比 Ratio	馬達類型 Motor
		6 8 10 14 20	

V1:伺服 Servo Ø19 PCD90,M5 V2:伺服 Servo Ø19 PCD90,M6	T1:步進 Stepper Ø14 PCD98.4,M5
各廠牌75W AC 伺服馬達 75W AC servo motor for each brand	各廠牌86型步進馬達 86 stepper motor for each brand

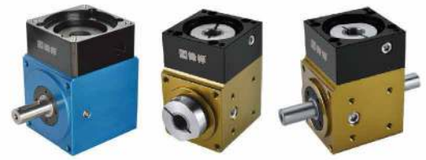


型號 Model No. / 說明Description	ZR90S
容許最大轉矩(kgf.m/N.m) Allowable Max. Torque	12/120
破壞力矩值(kgf.m/N.m) Damage Torque value	32/320
容許馬達轉速(rpm/min) Allowable Motor Speed	2500
背隙Backlash(min–arc)	2
重量Weight(kg)	6.5

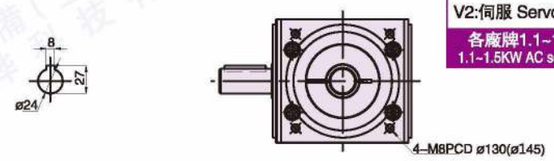
型號識別:Model Identification

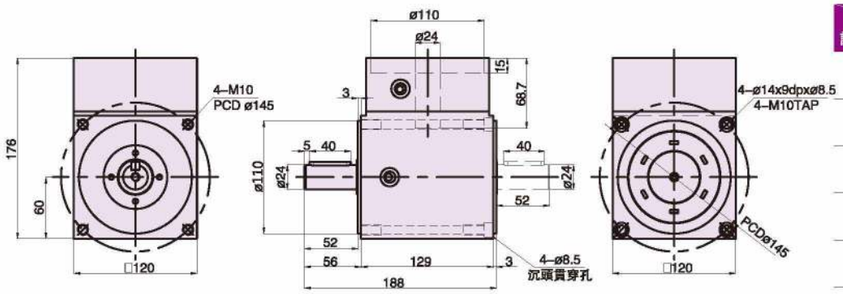
ZR — 120 — 2 — V2

直角減速機系列 Right Angle Reducer	規格 Specifications	減速比 Ratio	馬達類型 Motor
		2	



V1:伺服 Servo Ø24 PCD145,M10 V2:伺服 Servo Ø24 PCD145,M10	T1:步進 Stepper 19 PCD98.4,M5
各廠牌1.1~1.5KW AC 伺服馬達 1.1~1.5KW AC servo motor for each brand	各廠牌86型步進馬達 86 stepper motor for each brand



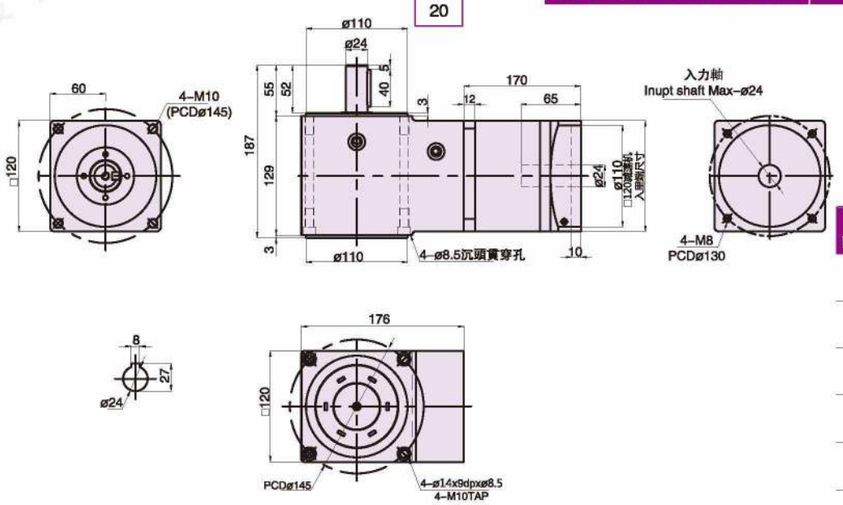


型號 Model No. / 說明Description	ZR120
容許最大轉矩(kgf.m/N.m) Allowable Max. Torque	16/160
破壞力矩值(kgf.m/N.m) Damage Torque value	45/450
容許馬達轉速(rpm/min) Allowable Motor Speed	2500
背隙Backlash(min–arc)	0.5
重量Weight(kg)	8

ZR — 120S — 6 — V2

直角減速機系列 Right Angle Reducer	規格 Specifications	減速比 Ratio	馬達類型 Motor
		6 8 10 14 20	

V1:伺服 Servo Ø24 PCD145,M10 V2:伺服 Servo Ø24 PCD145,M10	T1:步進 Stepper 19 PCD98.4,M5
各廠牌1.1~1.5KW AC 伺服馬達 1.1~1.5KW AC servo motor for each brand	各廠牌86型步進馬達 86 stepper motor for each brand



型號 Model No. / 說明Description	ZR120S
容許最大轉矩(kgf.m/N.m) Allowable Max. Torque	16/160
破壞力矩值(kgf.m/N.m) Damage Torque value	45/450
容許馬達轉速(rpm/min) Allowable Motor Speed	2500
背隙Backlash(min–arc)	2
重量Weight(kg)	15.5

HOLLOW ROTARY ACTUATORS

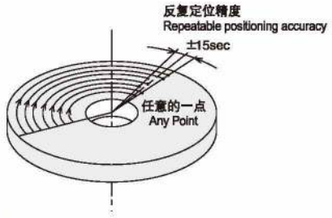
中空軸旋轉平臺

ZK

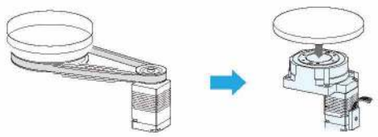
- **工作物可直接鎖固**
  旋轉盤面可直接鎖固工作物，提升工件轉載之方便性。
- **配綫方便**
  此旋轉平臺爲中空式設計，無論是配綫或配管均方便。
- **Working objects can be locked directly**
  The rotating disk surface can directly lock the working objects, and therefore improve the convenience of the workpiece transfer.
- **Wiring convenience**
  Featured with a hollow design, the rotating platform is convenient for wiring or piping.
- **可替代DD馬達和凸輪分割器**
  機械動作不外乎是 直綫、 圓周運動，直綫運動以各類型滑臺爲主，而圓周運動則以分割器最具代表性，再則因技術的成熟與設備精度要求，使得D.D Motor日漸普及。然而，傳統分割器已無法滿足任意分割之需求；而D.D Motor雖能多元應用，且精度高，但其價格成本，也往往成爲使用者欲采用的一大門檻。“中空旋轉盤”在兩者之間取得平衡，填補了功能上的需求。不但能大幅降低D.D Motor的成本，更能滿足分割器所無法提供的高精度及數位化控制。
- **Alternative D.D motor and cam splitter**
  Straight lines motions and circular motions are two kinds of mechanical movements. Linear motion are mainly based on various types of slides, while circular motions are the most representative motion of cam indexers. And due to the maturity of technology and the accuracy requirement of equipment, D.D motor is becoming more and more popular. However, the traditional splitter has been unable to meet the needs of any segmentation. Though D. D Motor can be applied in multiple ways and with high precision, its high price is the main factors that make user reconsider. ZK series hollow rotating table has successfully got a balance between the cam indexers and D.D motor. It fills the functional requirements that not only can greatly reduce the cost of D.D Motor, but also can meet the high–precision and digital control that the cam divider can’t provide.

ZK60–5–5A　ZK100–8　ZK130–10　ZK200–10　ZK275–10

- **定位精準度高–反復定位精度爲 ±15sec 空轉爲(Lost Motion)2min**
  High positioning accuracy. Repeatable positioning accuracy is ±15 sec and idling accuracy is 2 min
  减速机构部分采用超精密处理的齿轮，通过自身的调整机构消除齿隙，因此机构部分不会有齿隙。因单一方向的反复定位精度为 ±15sec；而从两方向定位时的空转为 2min，所以可以进行精准度高的定位。
  Ultra-precision machined gears are used in the speed reduction mechanism to eliminate the backlash through its own adjustment mechanism, thus there will be no backlash in the part of mechanism. As repeated positioning accuracy is ±15 sec in one direction and idling precision is 2 min in two directions, positioning with high accuracy is possible.



- **直接連結–簡易設計提升信賴**
  Direct connection – simple design enhances trust
  中空的输出平台上，可直接安装设备的工作台及机器手臂。一般设备在通过皮带轮等机构零件进行定位运行时，多受机构零件传动效率的影响发生精度减低，或有维修机构零件的必要。
  而ZK 系列因不需通过中间零件，便可直接安装，所以除了能直接运用产品本身的精度以外，也可以免去维修的麻烦。
  The worktable and robot arm of the equipment can be installed directly on the hollow output platform. When the general equipment positions and operates by means of pulleys and other mechanical parts. It is mostly affected by the transmission efficiency of the mechanical parts and therefore the accuracy is reduced, or there is a need to maintain the parts of the mechanism. While the ZK series hollow rotary actuators can be installed directly without intermediate parts. Therefore, in addition to the direct use of the accuracy of the actuator itself, maintenance can be avoided.



選用計算 Calculation of Selection

爲了選擇適合設備規格的產品,必須進行事先的計算工作。以下介紹選用zK系列時的計算方式。
Pre–calculation should be done in order to select suitable products of equipment. The introduction of calculation methods of the ZK series are as follow.

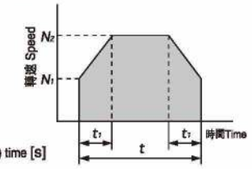
《必要轉矩的計算方式》
The calculation of the necessary torque

1 先计算工作物的惯性惯量。
工作惯性惯量请以传动装置惯性惯量的30倍以下为准。
2 决定定位角度。
3 没有摩擦轉矩時,請參考zK系列的定位時間圖來確認定位時間。
4 决定定位时间与加减速时间。
但必须遵守以下两个条件
·定位时间≥根据定位时间图求出最短的定位时间
·加减速时间t1×2≤定位时间
5 决定启动转速N1、然后按下面公式算出转速N2。请将N1设为低速[0~数r/min],注意不要设的太大。

1 Firstly, calculate the inertia of the working object.
The work inertia should be under the 30 times of the inertia of the transmission equipment.
2 Determine the positioning angle
3 If there is no friction torque, please refer to the positioning time chart of ZK series to confirm the positioning time.
4 Determine the positioning time and acceleration and deceleration time.
Observe the following two conditions:
Positioning time ≥Calculating the shortest positioning time according to the positioning time chart.
Time of acceleration and deceleration t x 2 ≤ Positioning time
5 Determine the start speed N1, then calculate the speed N2 according to the following formula. Please set N1 to low speed 0~ number r/min]. Be careful not to set it too large.

$$N_2\,[r/min] = \frac{\theta - 6N_1t_1}{6(t - t_1)}$$

N_2：轉速 Speed (r/min) [r/min]
θ ：定位角度Positioning angle[°]
N_1：啓動轉速Start speed[r/min]
t ：定位時間Positioning time [s]
t_1 ：加速(減速)時間Acceleration (deceleration) time [s]



按上述公式計算得出的結果若不能滿足N1≤N2≤200 [r/min]的條件,則請返回4,再次確認條件。
If the result calculated by the above formula can not satisfy the condition of N1 < N2 <≤200 (r/min), please return to procedure 4 and confirm the conditions again.

6 按下列公式計算加速轉矩
Calculate the acceleration torque according to the following formula

$$\underset{\text{Acceleration torque}}{\text{加速转矩}}Ta[N\cdot m] = (J_1 + J_L) \times \frac{\pi}{30} \times \frac{(N_2 - N_1)}{t}$$

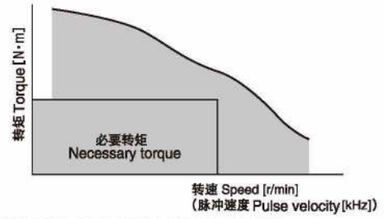
J_1 ：旋轉式傳動裝置的慣性慣量Inertia of a rotating drive [kg·m²]
J_L ：全慣性慣量Inertia [kg·m²]
N_2 ：轉速speed [r/min]
N_1 ：啓動轉速Starting speed [r/min]
t_1 ：加速（減速）時間Acceleration (deceleration) time [s]

7 算出必要的轉矩，必要轉矩爲由摩擦阻抗引起的負載轉矩與由慣性慣量引起的加速轉矩相加，再乘以安全系數後得出的數值
Calculate the necessary torque, the necessary torque is the load torque caused by the friction impedance plus the acceleration torque caused by the inertia, and then multiplied by the safety factor.

必要转矩T=（负载转矩[N·m]+加速转矩[N·m]）×安全系数=（TL+Ta）×S
Necessary torque　Load torque　Acceleration torque　Safety factor

安全系数S請設定在1.5以上。
Please set safety factor S above 1.5.

8 確認必要轉矩T是否包含在轉速一轉矩特性的範圍以內。若不在範圍內，請轉回4,變更條件并重新計算
Verify that the necessary torque T is included in the range of speed and torque characteristics. If not, please turn back to step 4, then change the conditions and recalculate.



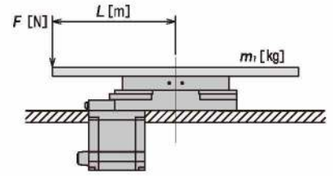
此外，將轉速換算成脉衝速度時，請按以下公式計算
In addition, when the speed is converted to the pulse speed, please calculate the following the below formula.

$$f\,[Hz] = \frac{6N}{\theta s}$$

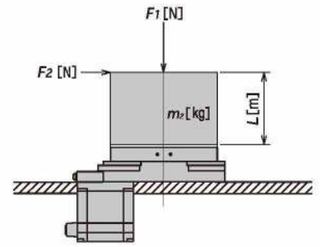
f ：脉衝速度Pulse velocity [Hz]
N ：轉速speed [r/min]
θs ：旋轉平臺的步距角度The step angle of the rotating platform[° /step]

《轉向負載、慣性負載的計算方法》
The calculation method of the steering load and the inertia load

如下圖所示當旋轉平臺上載有負載時,請按下面的公式算出軸向負載與慣性負載,并確認是否在規格值內。
As shown below, when the load is loaded on the rotary platform, please calculate the axial load and mass load according to the formula below, and confirm whether it is within the specification value.



軸向負載Axial load [N]　$Fs = F + m_t \times g$
慣性負載 Inertial load [N·m]　$M = F \times L$



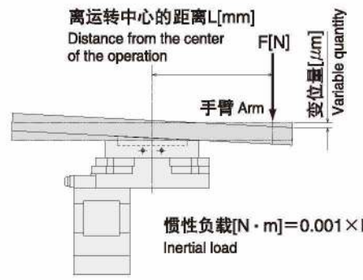
品名	a
ZK–60	0.01
ZK–100	0.02
ZK–130	0.03
ZK–200	0.04
ZK–275	0.05

$Fs = F_1 + m_x \times g$
$M = F_x \times (L + a)$

《因慣性負載引起的變爲量(參考值)》
Variable quantity (reference value) caused by an inertial load

在旋轉平臺上附加慣性負載時，位置會發生變化。
圖表中的變位量顯示慣性負載按固定方向作用時，在距離旋轉平臺轉心的L位置上的變化。
慣性負載若從正負兩方向作用時，變位量約爲2倍。

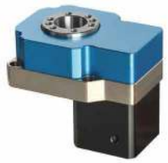
When attaching the inertia load to the rotating platform, the position will change. The variable quantity in the chart shows the change of inertia load on the L position of the center of rotation from the rotating platform to a fixed direction. If the inertia load acts on the positive and negative two directions, the variable quantity will be about 2 times.



型號識別：Model Identification

ZK — 60 — R — 5 — 5A

- ZK：旋轉平臺系列 Hollow Rotating Series
- 60：規格 Specifications
- R：選配 Optional
- 5：減速比 Ratio
- 5A：馬達類型 Motor



重量Weight:2kg

R：直角轉向減速 Right angle steering deceleration
F：附馬達連結座 with motor connection seat

V1: 伺服Servo Ø8 PCD45,M3 V2: 伺服Servo Ø8 PCD46,M4	T1:步進 Stepper Ø5 PCD43.8，M3 T2:步進 Stepper Ø6 PCD43.8，M3 5A：含步進馬達42H5K-2A
各廠牌100W AC 伺服馬達 100W AC servo motor for each brand	各廠牌42型步進馬達 42 stepper motor for each brand

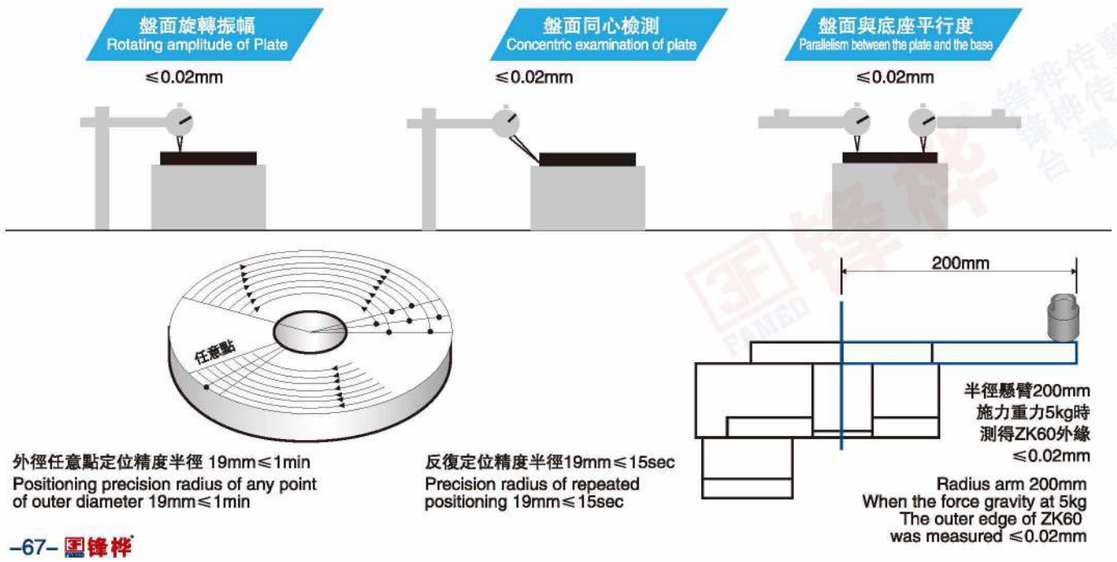
規格表 Specification

產品型號 Model	ZK60	ZK60R
旋轉平臺軸承 Bearing of rotate table	深溝滾珠+止推滾珠軸承 Deep groove ball+Thrust ball bearing	
容許轉矩 Allowable torque (N.m)	5	
精度壽命 Precision lifetime	15000Hrs	
允許轉速 Allowable speed (rpm)	200(盤面 Plate)	
減速比 Ratio	5	15
重復精度 Repeated accuracy(arc-sec)	≤15	≤20
定位精度 Positioning accuracy(arc-min)	≤1	≤1
旋轉平臺平行度 Parallelism of rotate plate(mm)	≤0.02	
旋轉平臺同心度 Coaxiality of rotate plate(mm)	≤0.02	
保護等級 Protection Class	IP40	

P.S:圓周單位 Circumferential unit：1 rpm=360° 1° =60'(arc-min) 1'=60"(arc-sec)
圓周誤差換算直綫誤差：盤面直徑×3.14159÷(360° ×60'×60")背隙值
Circumferential error conversion linear error:Disc diameter×3.14159÷(360° ×60'×60")The value of backlash

定位精度檢測 Positioning Accuracy Examination

此規格定位精度謹以此比例檢驗 The accuracy of this specification is tested by this ratio

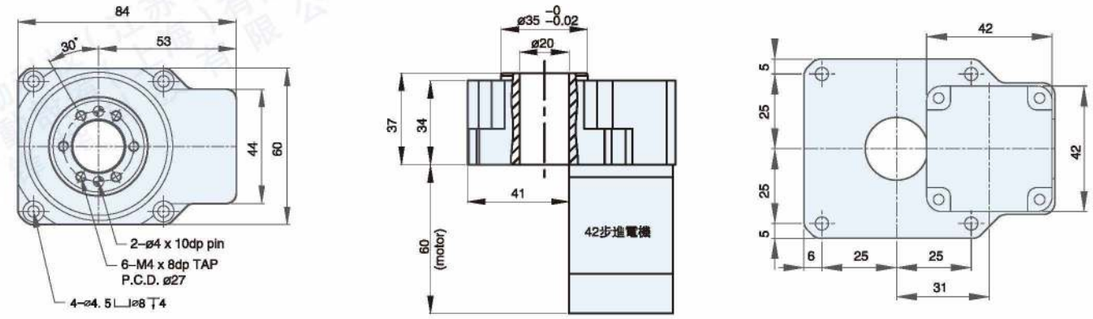


外形尺寸圖 Dimensions

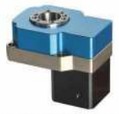
ZK60-5-5A

(此型號含步進 This model contains stepper motor 42H5K-2A)

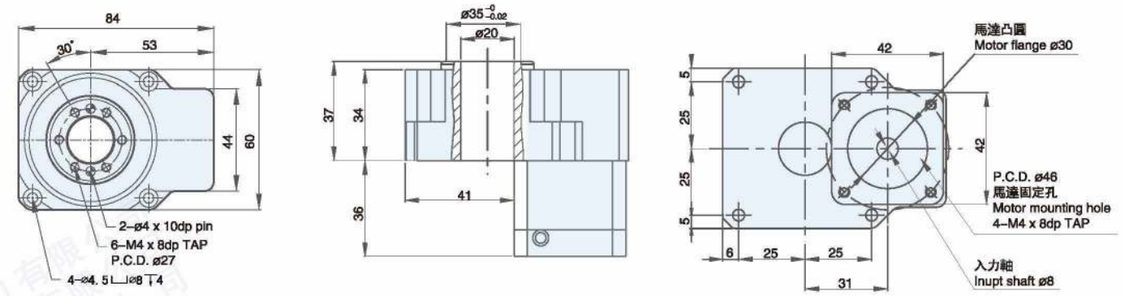
Unit:mm



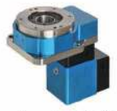
ZK60F-5



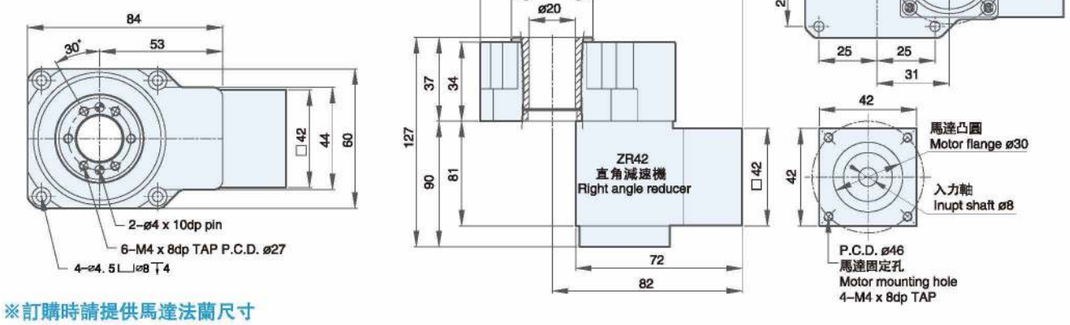
(附連接座可自行組裝馬達)
(A self assembled motor with a connecting seat)



ZK60R-15

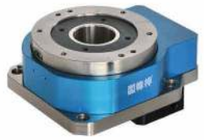


(直角轉向式 Right angle steering 1:15)



※訂購時請提供馬達法蘭尺寸
Please provide the size of the motor flange when ordering
P.S：原點 Sensor 規格(選配) OMRON EE-SX672
P.S：Origin Sensor specification (selection) OMRON EE-SX672

型號識別 Model Identification



ZK —— 100 —— R —— 8 —— V2

ZK	100	R	8	V2
旋轉平臺系列 Hollow Rotating Series	規格 Specifications	選配 Optional	減速比 Ratio	馬達類型 Motor

重量 Weight:2.5kg

R：直角轉向減速 Right angle steering deceleration
F：直向減速 In-line Direction Deceleration

V1: 伺服Servo Ø14 PCD70 M4 V2: 伺服Servo Ø14 PCD70 M5	T1:步進 Stepper Ø8 PCD66.67,M4 T2:步進 Stepper Ø8 PCD70,M4 T3:步進 Stepper Ø10 PCD70,M4
各廠牌200~400W AC 伺服馬達 200~400W AC servo motor for each brand	各廠牌60型步進馬達 60 stepper motor for each brand

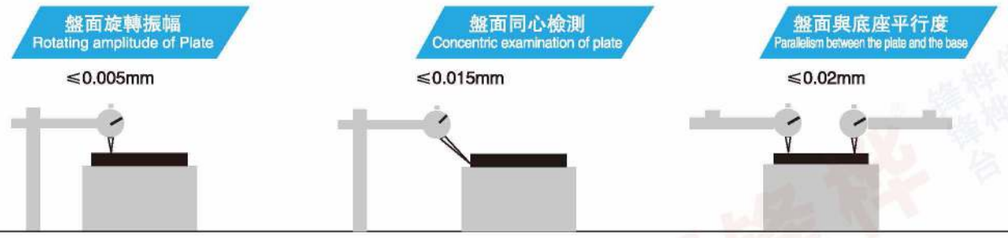
規格表 Specification

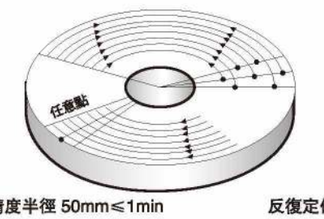
產品型號 Model	ZK100	ZK100R	ZK100P
旋轉平臺軸承 Bearing of rotate table	圓錐滾子軸承 Tapered roller bearing		
容許轉矩 Allowable torque (N.m)	45		
精度壽命 Precision lifetime	20000Hrs		
允許轉速 Allowable speed (rpm)	200(盤面 Plate)		
減速比 Ratio	8	16,24	24,32,40
重復精度 Repeated accuracy(arc-sec)	≤10	≤20	≤60
定位精度 Positioning accuracy(arc-min)	≤1	≤1	≤2
旋轉平臺平行度 Parallelism of rotate plate(mm)	≤0.02		
旋轉平臺同心度 Coaxiality of rotate plate(mm)	≤0.015		
保護等級 Protection Class	IP40		

P.S:圓周單位 Circumferential unit：1 rpm=360° 1° =60'(arc-min) 1'=60"(arc-sec)
圓周誤差換算直綫誤差：盤面直徑×3.14159÷(360° ×60'×60")背隙值
Circumferential error conversion linear error:Disc diameter×3.14159÷(360° ×60'×60")The value of backlash

定位精度檢測 Positioning Accuracy Examination

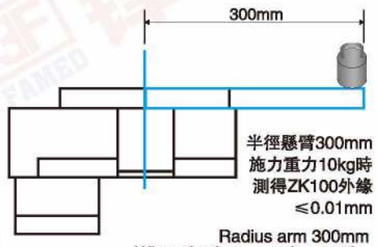
此規格定位精度謹以此比例檢驗 The accuracy of this specification is tested by this ratio





外徑任意點定位精度半徑 50mm≤1min
Positioning precision radius of any point of outer diameter 50mm≤1min

反復定位精度半徑 50mm≤10sec
Precision radius of repeated positioning 50mm≤10sec



半徑懸臂300mm
施力重力10kg時
測得ZK100外緣
≤0.01mm

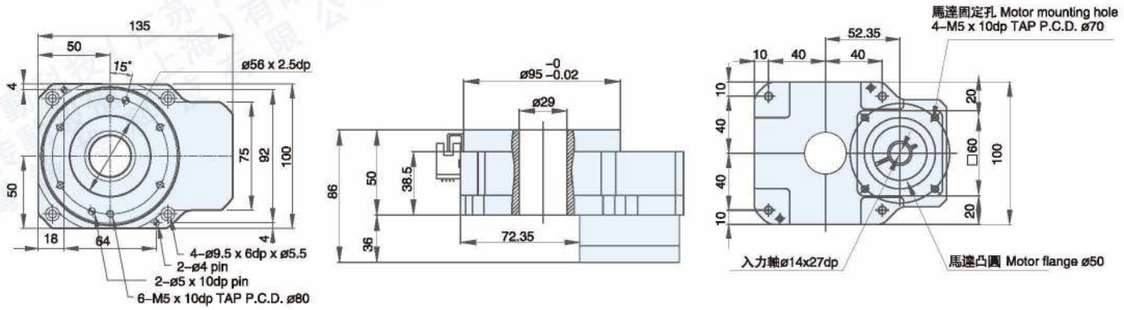
Radius arm 300mm
When the force gravity at 10kg
The outer edge of ZK100
was measured ≤0.01mm

外形尺寸圖 Dimensions

Unit:mm

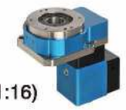
ZK 100

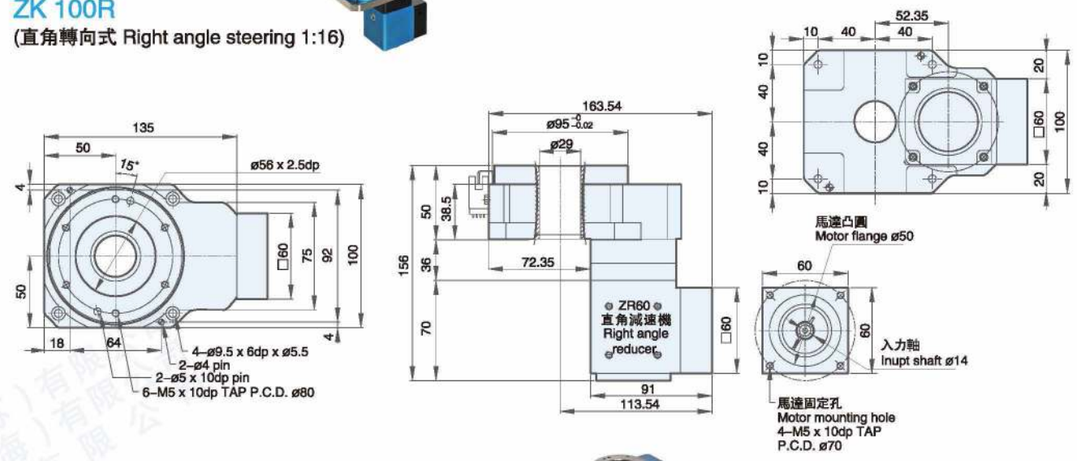
(附連接座可自行組裝馬達)
(A self assembled motor with a connecting seat)



ZK 100R

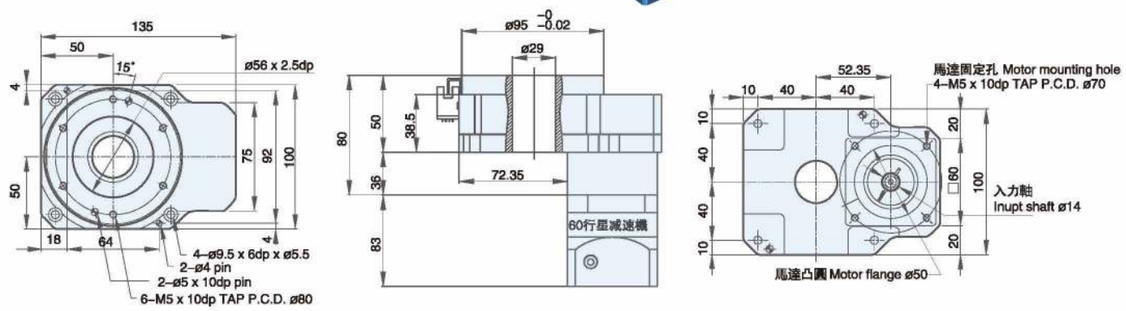
(直角轉向式 Right angle steering 1:16)





ZK 100P

(附行星減速機速比 Attached planetary reducer ratio 24,32,40)



※訂購時請提供馬達法蘭尺寸
Please provide the size of the motor flange when ordering
P.S：原點 Sensor 規格(選配) OMRON EE-SX672
P.S：Origin Sensor specification (selection) OMRON EE-SX672

型號識別 Model Identification

ZK —— 130 —— R —— 10 —— V2

旋轉平臺系列 Hollow Rotating Series	規格 Specifications	選配 Optional	減速比 Ratio	馬達類型 Motor
		R: 直角轉向減速 Right angle steering deceleration F: 直向減速 In-line Direction Deceleration		
			V1: 伺服Servo Ø14 PCD70 M4 V2: 伺服Servo Ø14 PCD70 M5 各廠牌200~400W AC 伺服馬達 200~400W AC servo motor for each brand	T1:步進 Stepper Ø8 PCD66.67,M4 T2:步進 Stepper Ø8 PCD70,M4 T3:步進 Stepper Ø10 PCD70,M4 各廠牌60型步進馬達 60 stepper motor for each brand

重量Weight:4.5kg

規格表 Specification

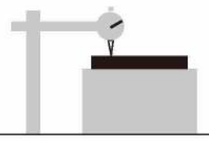
產品型號 Model	ZK130	ZK130R	ZK130P
旋轉平臺軸承 Bearing of rotate table	圓錐滾子軸承 Tapered roller bearing		
容許轉矩 Allowable torque (N.m)	45		
精度壽命 Precision lifetime	20000Hrs		
允許轉速 Allowable speed (rpm)	200(盤面 Plate)		
減速比 Ratio	10	20,30	30,40,50
重復精度 Repeated accuracy(arc-sec)	≤10	≤20	≤60
定位精度 Positioning accuracy(arc-min)	≤1	≤1	≤2
旋轉平臺平行度 Parallelism of rotate plate(mm)	≤0.02		
旋轉平臺同心度 Coaxiality of rotate plate(mm)	≤0.015		
保護等級 Protection Class	IP40		

P.S:圓周單位 Circumferential unit：1 rpm=360° 1° =60'(arc-min) 1'=60"(arc-sec)
圓周誤差換算直綫誤差：盤面直徑×3.14159÷(360° ×60'×60")背隙值
Circumferential error conversion linear error:Disc diameter×3.14159÷(360° ×60'×60")The value of backlash

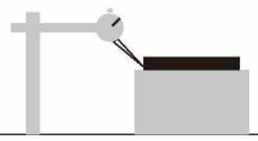
定位精度檢測 Positioning Accuracy Examination

此規格定位精度謹以此比例檢驗 The accuracy of this specification is tested by this ratio

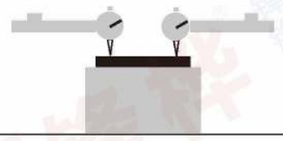
盤面旋轉振幅 Rotating amplitude of Plate
≤0.005mm

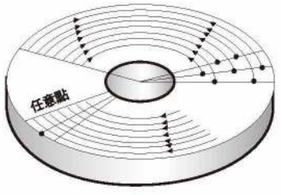


盤面同心檢測 Concentric examination of plate
≤0.015mm



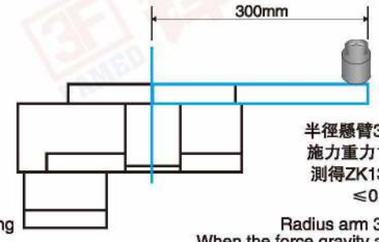
盤面與底座平行度 Parallelism between the plate and the base
≤0.02mm





外徑任意點定位精度半徑 60mm≤1min
Positioning precision radius of any point of outer diameter 60mm≤1min

反復定位精度半徑 60mm≤10sec
Precision radius of repeated positioning 60mm≤10sec



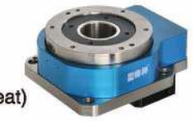
半徑懸臂300mm
施力重力15kg時
測得ZK130外緣
≤0.01mm

Radius arm 300mm
When the force gravity at 15kg
The outer edge of ZK130
was measured ≤0.01mm

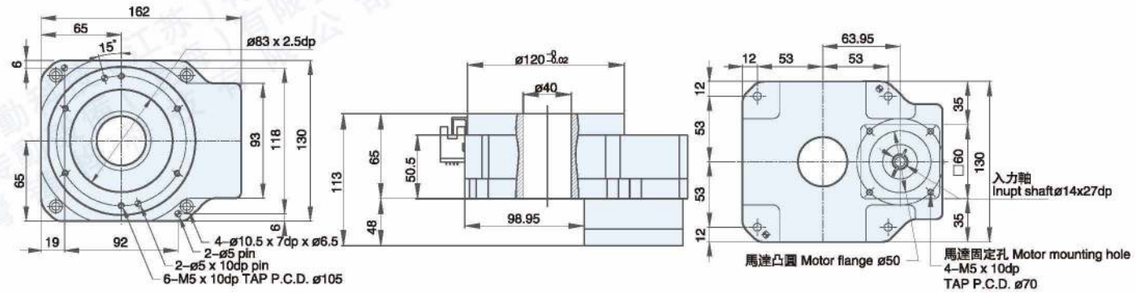
外形尺寸圖 Dimensions

ZK 130

(附連接座可自行組裝馬達)
(A self assembled motor with a connecting seat)

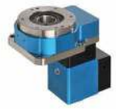


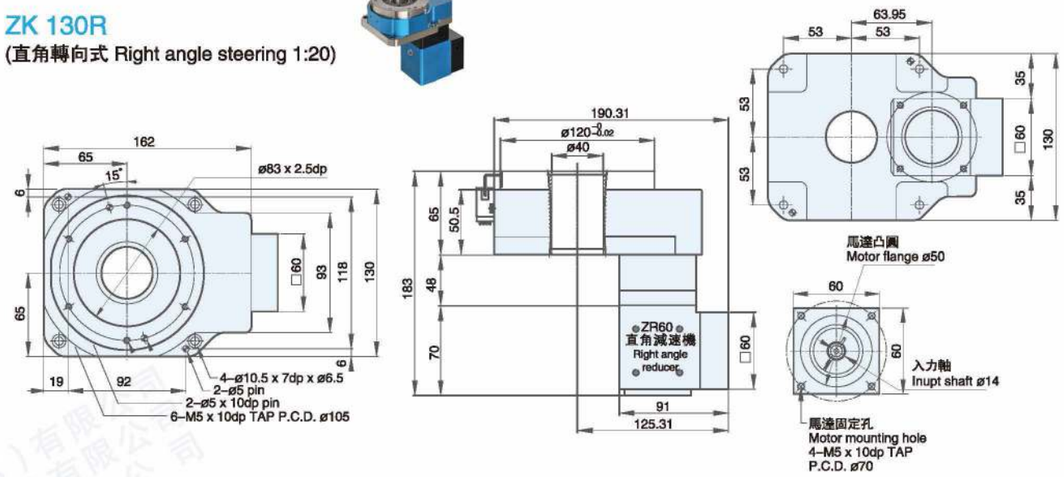
Unit:mm



ZK 130R

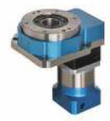
(直角轉向式 Right angle steering 1:20)

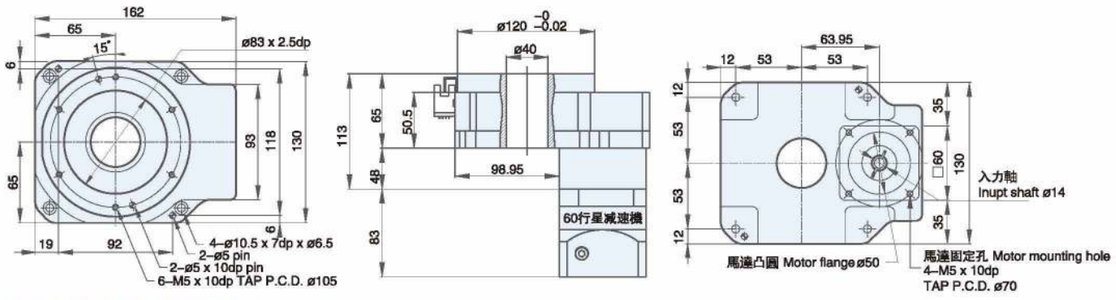




ZK 130P

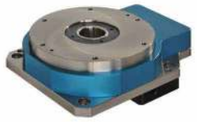
(附行星減速機速比 Attached planetary reducer ratio 30,40,50)





※訂購時請提供馬達法蘭尺寸
Please provide the size of the motor flange when ordering
P.S：原點 Sensor 規格(選配) OMRON EE-SX672
P.S：Origin Sensor specification (selection) OMRON EE-SX672

型號識別 Model Identification



ZK — 200 — R — 10 — V2

ZK	200	R	10	V2
旋轉平臺系列 Hollow Rotating Series	規格 Specifications	選配 Optional	減速比 Ratio	馬達類型 Motor

重量:11.5kg

R: 直角轉向減速 Right angle steering deceleration
F: 直向減速 In-line Direction Deceleration

V1: 伺服Servo Ø19 PCD90 M5 V2: 伺服Servo Ø19 PCD90 M6	T1:步進 Stepper Ø14 PCD98.4，M5
各廠牌750W AC 伺服馬達 750W AC servo motor for each brand	各廠牌86型步進馬達 86 stepper motor for each brand

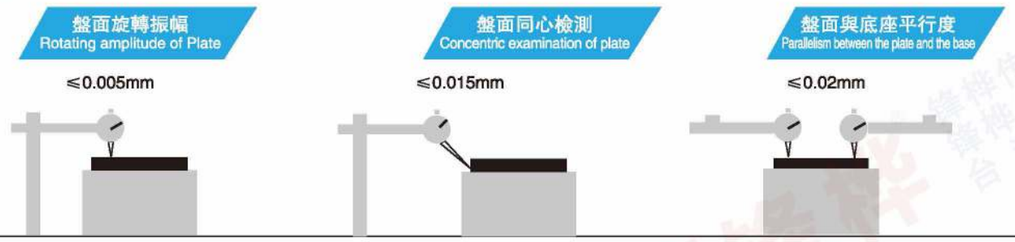
規格表 Specification

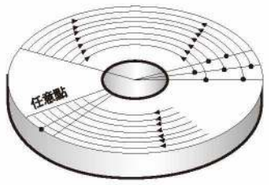
產品型號 Model	ZK200	ZK200R	ZK200P
旋轉平臺軸承 Bearing of rotate table	圓錐滾子軸承 Tapered roller bearing		
容許轉矩 Allowable torque (N.m)	80		
精度壽命 Precision lifetime	20000Hrs		
允許轉速 Allowable speed (rpm)	200(盤面 Plate)		
減速比 Ratio	10	20,30	30,40,50
重復精度 Repeated accuracy(arc-sec)	≤10	≤20	≤60
定位精度 Positioning accuracy(arc-min)	≤1	≤1	≤2
旋轉平臺平行度 Parallelism of rotate plate(mm)	≤0.02		
旋轉平臺同心度 Coaxiality of rotate plate(mm)	≤0.015		
保護等級 Protection Class	IP40		

P.S:圓周單位 Circumferential unit：1 rpm=360° 1° =60'(arc-min) 1'=60"(arc-sec)
圓周誤差換算直綫誤差：盤面直徑×3.14159÷(360° ×60'×60")背隙值
Circumferential error conversion linear error:Disc diameter×3.14159÷(360° ×60'×60")The value of backlash

定位精度檢測 Positioning Accuracy Examination

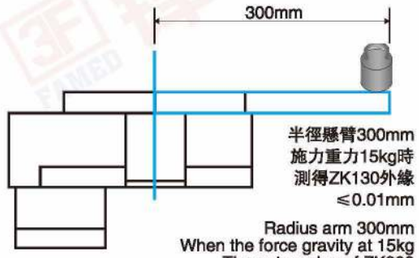
此規格定位精度謹以此比例檢驗 The accuracy of this specification is tested by this ratio





外徑任意點定位精度半徑 100mm≤1min
Positioning precision radius of any point of outer diameter 100mm≤1min

反復定位精度半徑 100mm≤10sec
Precision radius of repeated positioning 100mm≤10sec



半徑懸臂300mm
施力重力15kg時
測得ZK130外緣
≤0.01mm

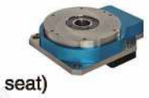
Radius arm 300mm
When the force gravity at 15kg
The outer edge of ZK200
was measured ≤0.01mm

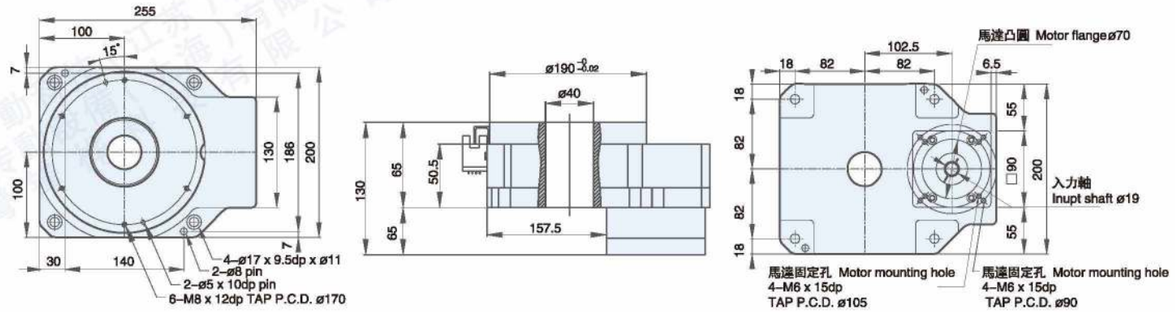
外形尺寸圖 Dimensions

Unit:mm

ZK 130

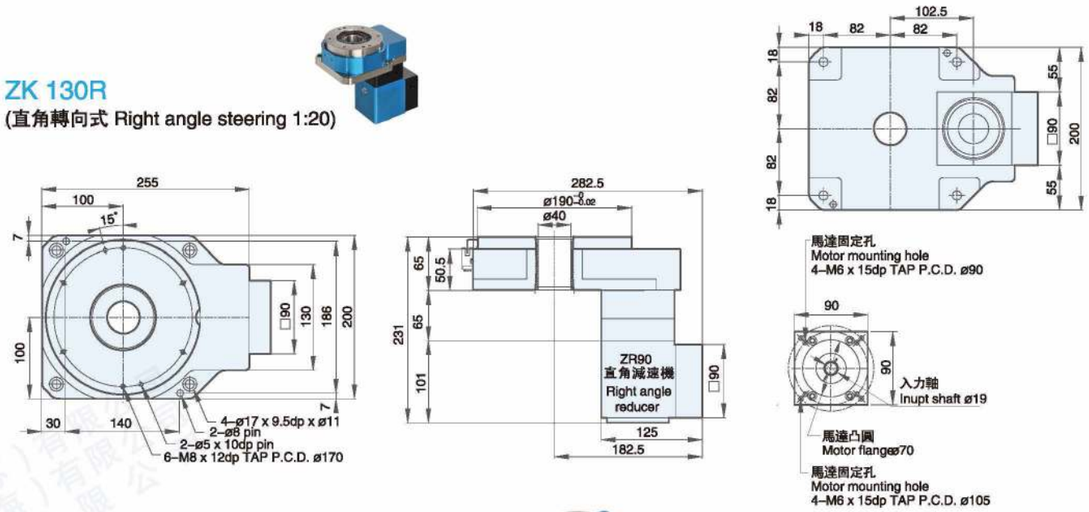
(附連接座可自行組裝馬達)
(A self assembled motor with a connecting seat)





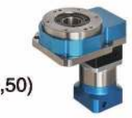
ZK 130R

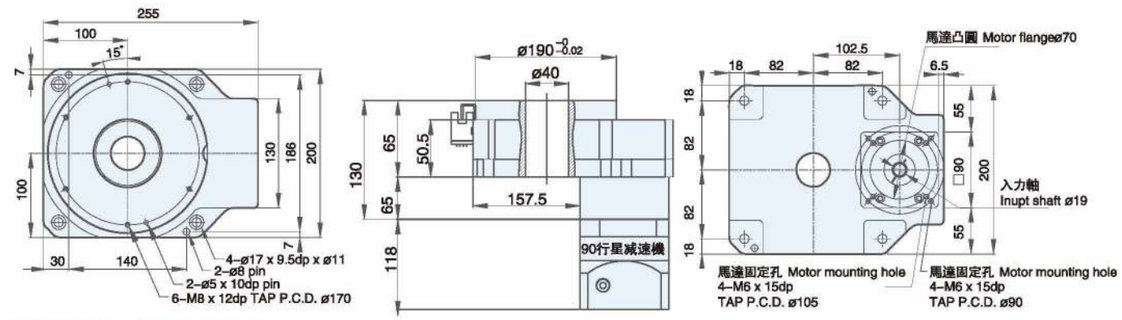
(直角轉向式 Right angle steering 1:20)



ZK 130P

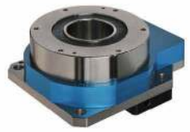
(附行星減速機速比 Attached planetary reducer ratio 30,40,50)





※訂購時請提供馬達法蘭尺寸
Please provide the size of the motor flange when ordering
P.S：原點 Sensor 規格(選配) OMRON EE-SX672
P.S：Origin Sensor specification (selection) OMRON EE-SX672

型號識別 Model Identification



ZK —— 275 —— R —— 10 —— V2

旋轉平臺系列 Hollow Rotating Series	規格 Specifications	選配 Optional	減速比 Ratio	馬達類型 Motor
		R: 直角轉向減速 Right angle steering deceleration F: 直向減速 In-line Direction Deceleration		V1: 伺服Servo Ø19 PCD90 M5 V2: 伺服Servo Ø19 PCD90 M6 各廠牌750W AC 伺服馬達 750W AC servo motor for each brand T1:步進 Stepper Ø14 PCD98.4，M5 各廠牌86型步進馬達 86 stepper motor for each brand

重量:16kg

規格表 Specification

產品型號 Model	ZK275	ZK275R	ZK275P
旋轉平臺軸承 Bearing of rotate table	圓錐滾子軸承 Tapered roller bearing		
容許轉矩 Allowable torque (N.m)	80		
精度壽命 Precision lifetime	20000Hrs		
允許轉速 Allowable speed (rpm)	200(盤面 Plate)		
減速比 Ratio	10	20,30	30,40,50
重復精度 Repeated accuracy(arc-sec)	≤10	≤20	≤60
定位精度 Positioning accuracy(arc-min)	≤1	≤1	≤2
旋轉平臺平行度 Parallelism of rotate plate(mm)	≤0.02		
旋轉平臺同心度 Coaxiality of rotate plate(mm)	≤0.015		
保護等級 Protection Class	IP40		

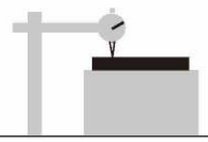
P.S:圓周單位 Circumferential unit：1 rpm=360° 1° =60'(arc-min) 1'=60"(arc-sec)
圓周誤差換算直綫誤差：盤面直徑×3.14159÷(360° ×60'×60")背隙值
Circumferential error conversion linear error:Disc diameter×3.14159÷(360° ×60'×60")The value of backlash

定位精度檢測 Positioning Accuracy Examination

此規格定位精度謹以此比例檢驗 The accuracy of this specification is tested by this ratio

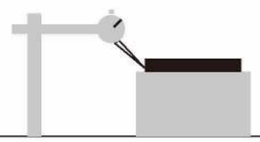
盤面旋轉振幅 Rotating amplitude of Plate

≤0.005mm



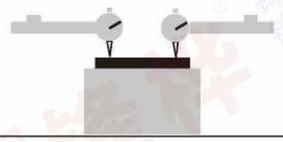
盤面同心檢測 Concentric examination of plate

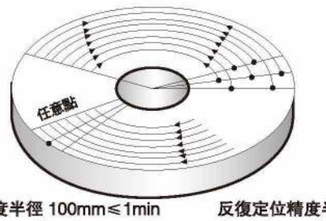
≤0.015mm



盤面與底座平行度 Parallelism between the plate and the base

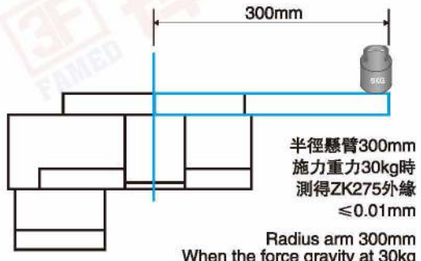
≤0.02mm





外徑任意點定位精度半徑 100mm≤1min
Positioning precision radius of any point of outer diameter 100mm≤1min

反復定位精度半徑 100mm≤10sec
Precision radius of repeated positioning 100mm≤10sec



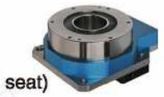
半徑懸臂300mm
施力重力30kg時
測得ZK275外緣
≤0.01mm

Radius arm 300mm
When the force gravity at 30kg
The outer edge of ZK275
was measured ≤0.01mm

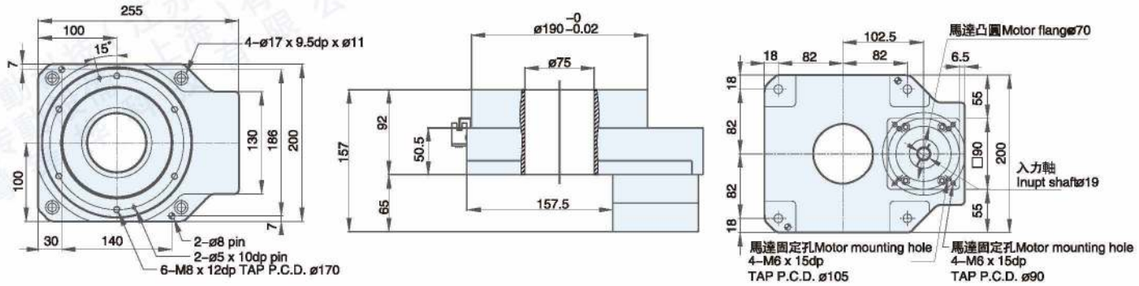
外形尺寸圖 Dimensions

ZK 275

(附連接座可自行組裝馬達)
(A self assembled motor with a connecting seat)

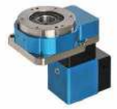


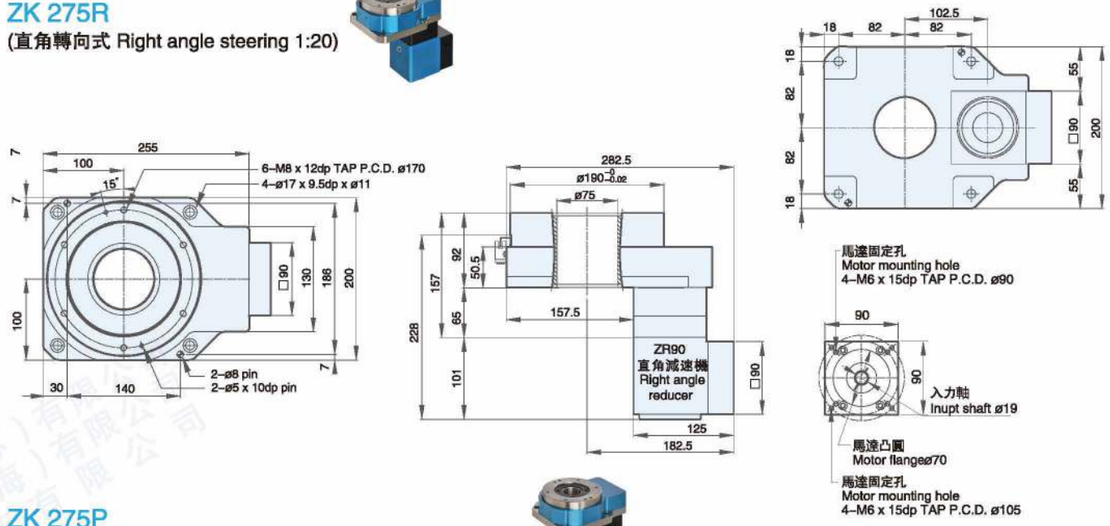
Unit:mm



ZK 275R

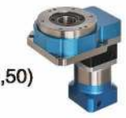
(直角轉向式 Right angle steering 1:20)

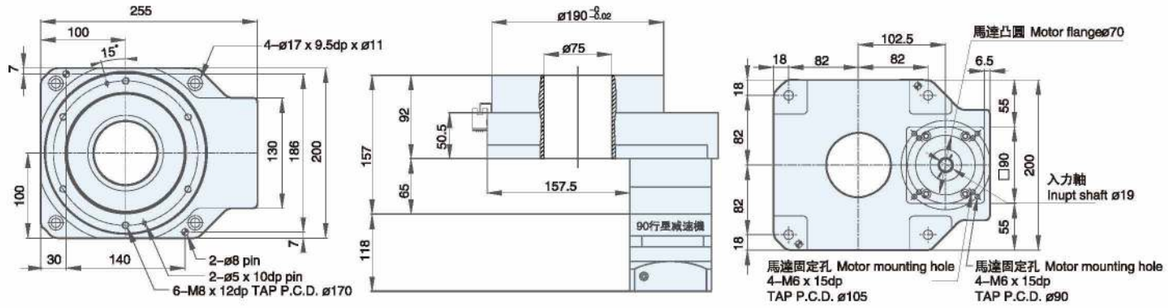




ZK 275P

(附行星減速機速比 Attached planetary reducer ratio 30,40,50)





※訂購時請提供馬達法蘭尺寸
Please provide the size of the motor flange when ordering
P.S：原點 Sensor 規格(選配) OMRON EE-SX672
P.S：Origin Sensor specification (selection) OMRON EE-SX672

中空旋轉平臺
HOLLOW ROTARY ACTUATOR

DG

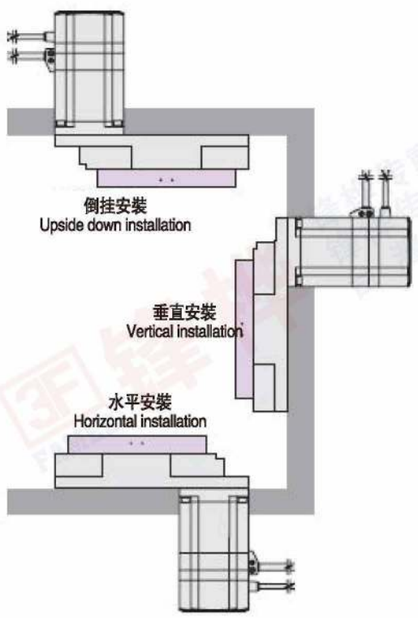
大口徑中空
旋轉式傳動裝置
簡潔的配綫與配管
Hollow rotary transmission device with large diameter
Simple wiring and piping

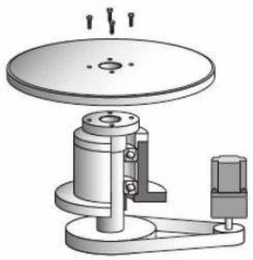
直接連結
簡易設計提升信賴
Direct connection
Simple design to improve trust

定位精準度高
反復定位精度爲±15sec
空轉（Lost Motion）爲2min
角度傳達誤差爲4min
High positioning precision
The accuracy of repeated positioning is + 15sec
Lost motion is 2mins
Angle transmission error is 4mins

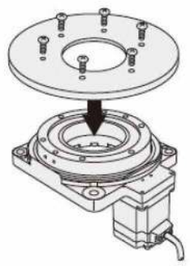
容易進行原點還原
使用原點傳感器套件（選購配件）
可輕易地安裝與實現原點還原
Easy of origin regression
regression thanks to the using the origin sensor kit (Choose and purchase accessories)

短時間定位
可在短時間內實現慣性負載的定位
Short time positioning
The positioning of the inertial load can be realized in a short time





電動機+機構部件（單獨設計* 采購）
Motor + mechanism components
(separate design * procurement)



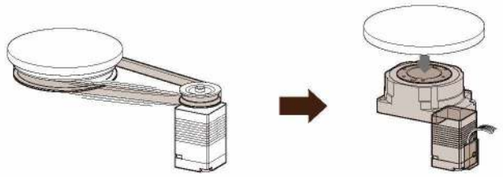
DGII系列series
(一體化產品 Integrated product)

中空旋轉式傳軒裝置 Hollow rotary transmission device

●直接連結→簡易設計提升信賴
Direct connection→Simple design to improve trust

中空的輸出平臺上,可直接安裝設備的工作臺及機器手臂。一般設備在通過皮帶輪等機構零件進行定位運行時,多受機構零件傳動效率的影響發生精度減低,或有維修機構零件的必要。
而DG系列因不通過中間零件,便可直接安裝,所以除了能直接運用產品本身的精度以外,也可以免去維修的麻煩。

The hollow output platform can directly install the worktable and machine arm of the equipment. When the general equipment is positioned and run through the belt pulley and other parts, the precision of the transmission efficiency of the mechanism is reduced, or the necessity of maintaining the parts of the mechanism.
The DG series can be directly installed because it does not pass through the intermediate parts, except that the accuracy of the product itself, it can also realize free–maintenance.



●大口徑中空旋轉平臺→簡潔的配綫與配管
Hollow rotary platform with large diameter→
simple wiring and piping

因采用一段減速齿轮机构增大被驱动齿轮的直径,实现了大口径中空孔(贯穿)的设计。适用于拉线复杂的配线与配管等场合,使设备设计更为简洁。

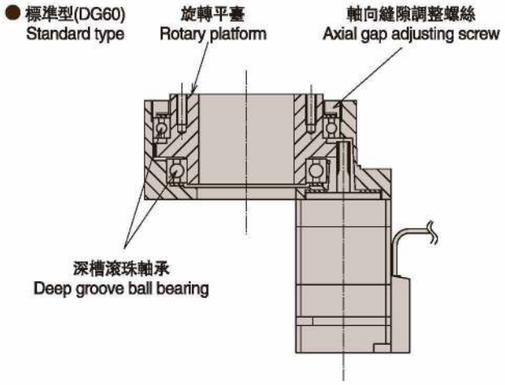
The design of a large diameter hollow hole (penetration) is realized by using one stage reduction gear mechanism to increase the diameter of the driven gear. It is suitable for the complicated wiring and piping application and so on, which makes the equipment design more succinct.

	安裝尺寸Size(mm)	中空直徑 Hollow diameter
DG60	60	28
DG85R	85	33
DG130R	130	62

例：DG130R的場合
Eg：The application of DG130R.

構造圖 Structure drawing

● 標準型(DG60)
Standard type

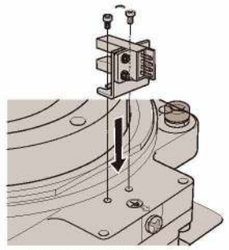


●簡單原點還原→省却設計與零件采購的時間與勞力
Simple origin regression→
save time and labor for design and parts procurement.

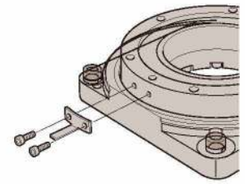
爲了能簡單實現原點還原運行,本公司還爲客户準備了原點傳感器套件(選購配件)。
套件中包括了標出原點時需要的所有零件,可爲用户省去安裝傳感器所需的設計、制作、與零件采購等時間與勞力。

In order to simplify the operation of the origin regression, the company also prepares the original sensor kit for customers(Choose and purchase accessories).
The kit includes all the parts required to mark the original point. It can save the users' time and labor of installing the sensor for the design, production, and part purchase.

（DG130R的傳感器、遮光板安裝例）
(DG130R sensor, example of shading plate installation)



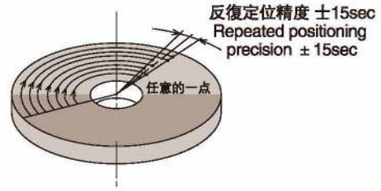
傳感器的安裝方式
Installation of sensor



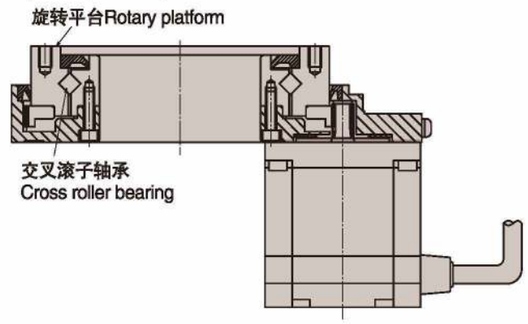
遮光板的安裝方式
Installation of shading plate

●定位精準度高→ 反復定位精度爲±15sec 空轉爲(Lost Motion)2min
High Positioning accuracy → repeated positioning accuracy is + 15sec Lost Motion is 2mins

The mechanism part have no backlash, because the gearbox adopts micro precision gear, and it can eliminate the backlash through its own adjusting mechanism. The repeated positioning accuracy of single direction is 15sec; while the lost motion is 2mins of two direction positioning, so it can achieve high precision positioning.



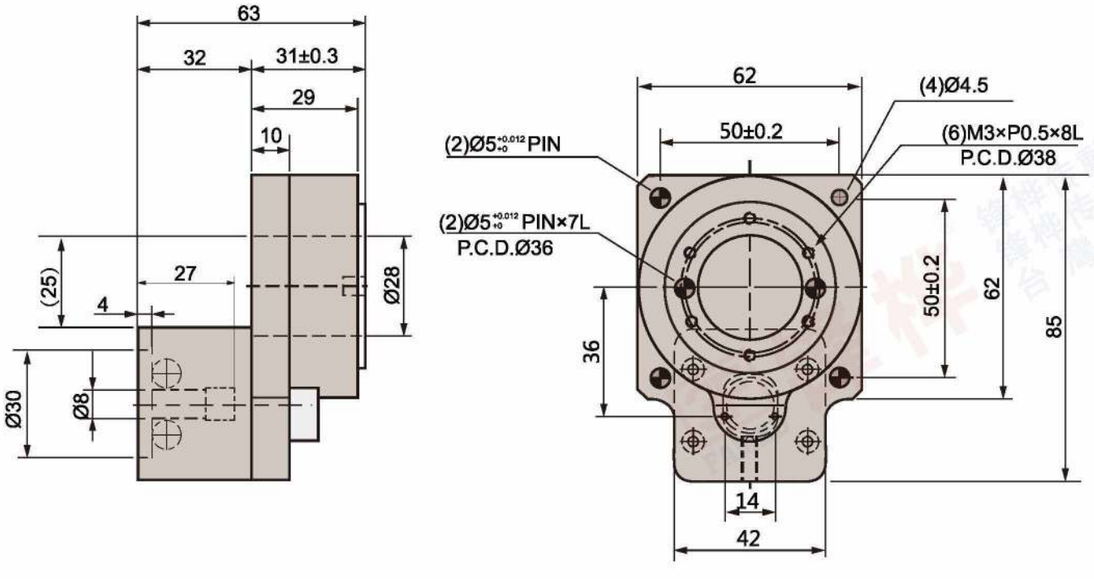
● 高剛性型 High rigidity type
(DG85R、DG130R)



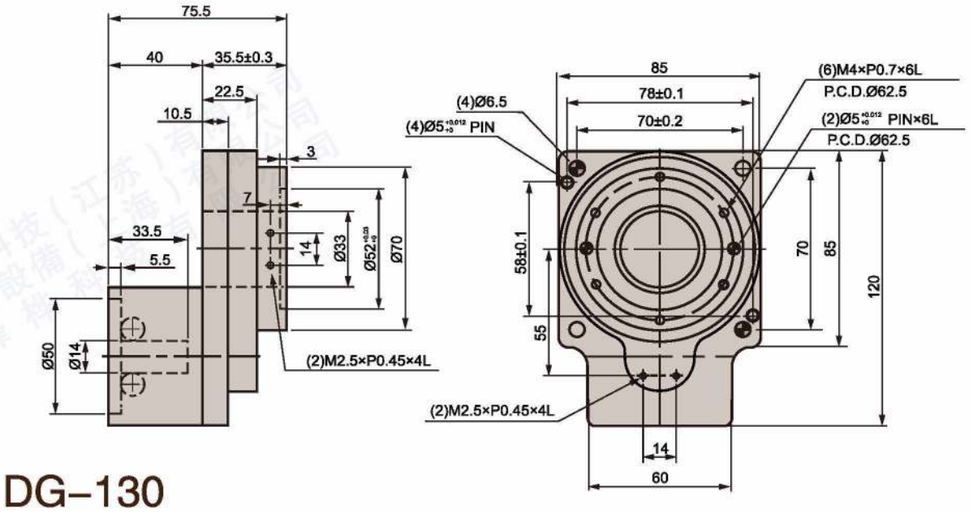
性能資料表 Technical parameter

規格 Specs	单位 Unit	DG-62	DG-85	DG-130	DG-200
匹配伺服馬達 Servo Motor	W	100W	200-400W	200-400W	750-1KW
容許扭矩 Permissible torque	Nm	3.5	20	20	65
轉動慣量 Moment of inertia	kgm^2	2480×10^{-6}	2498×10^{-6}	9472×10^{-6}	93581×10^{-6}
允許轉速 Allowable speed	rpm	200	200	200	200
減速比 Ratio		1/5	1/5	1/10	1/10
定位精度 Positioning accuracy	sec	≤15	≤15	≤15	≤15
反復定位精度 Repeated positioning accuracy	sec	±10	±5	±5	±5
容許推力載重 Permissible thrust load	kgf	20	200	250	500
容許慣性載重 Permissible inertia load	Nm	10	60	60	200
旋轉平臺平行度 Parallelism of rotating platform	μm	±5	±2	±2	±2
旋轉平臺同心度 Concentricity of rotating platform	mm	±0.01	±0.01	±0.01	±0.01
重量 weight	kg	2.2	3	5.5	14

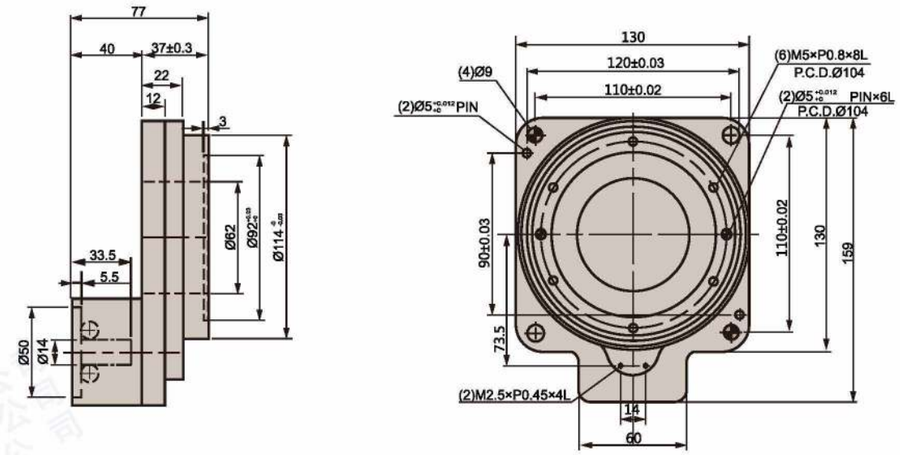
DG-62



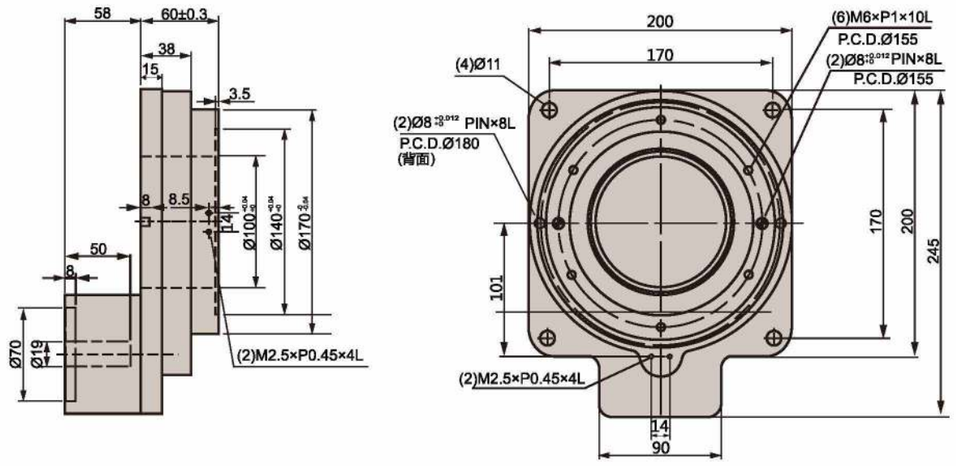
DG-85



DG-130



DG-200



安全注意事項　Safety Precautions

保管時的注意事項

需要暫時保管本產品時，請遵照下列要領進行。

1. 放在清潔幹燥的場所進行保管。
2. 若放在室外或有潮氣的場所保管時，應裝入箱内并用塑料等嚴密包裹，以避免受雨淋或外氣的侵蝕(采取防結露、生銹措施)。

Cautions for storage

Whenever temporarily keeping the product, keep the following directions:

1.Keep in a clean and dry place.
2.Whenever storing outdoors or in a humid place, put in a box so that it does not directly contact rain or external air and cover with a vinyl sheet(Take a measure to prevent rust.)

運行時的注意事項

減速機到廠後…

・減速機到貨後請確認減速機型號是否與訂購的型號相同。

・減速機輸出軸、輸入軸上塗有防銹劑，請擦拭後使用。

※取下輸入軸的橡膠栓，擦拭防銹劑。

※減速機上已充填完潤滑油(油脂)。本機到廠後即可使用。

Cautions for operation

When the reducer is delivered to you……

When the product delivered, please con rm that you received the exact same model you have ordered.

Please wipe out the input and output shaft of the reducer which is covered by anti–corrosive oil.

※Please remove the rubber cap on the input shaft before you wipe the shafts.

※Lubricant(grease) is already lled in the reducer. It is available as it is.

安裝、設置

請勿在會直接接觸到雨或水的場所使用。

需要在室外或受粉塵、水滴影響的場所使用時，請事先與本公司聯系。

溫度設置爲0℃~40℃。

如在上述溫度範圍外使用本機時，必須與本公司聯系。

將本機設置在不會振動且堅固的安裝臺上，并用螺栓緊固。

設置時應考慮到保養維修的便利性。

Fixation & installation

Avoid use in a place where rain or water drops directly.

In case of use outdoors or in a place where dust and water drops, consult in advance.

Install at 0℃~40℃ of surrounding temperature.

In case of use at temperature out of the above–mentioned range, contact the headquarters and consult on this.

Firmly x with a bolt onto a solid stand without vibration.

Install in consideration of convenience in repair and inspection.

運行開始前的注意事項

本公司產品出貨時已填充了規定量的潤滑脂，到貨後可直接使用。

初次運行時，應先確認輸出軸的旋轉方向後，再慢慢地增加負荷。

Cautions prior to starting the operation

Reducer can be used soon after arrival, since it has already been lled out with lubrication.

At initial operation, check the rotating direction of the output shaft and then gradually apply load.

運行中的注意事項

請注意不要超負荷。

輸入轉速不得超過規定以上的轉速。

發生下列情況時，請暫停運行立即進行檢查。

・溫度突然上升

・突然出現很大的异常聲

・轉速突然變得不穩定

Cautions during operation

Avoid overload. Ensure that input speed shall not be the number of revolutions beyond the speci cation.

In the following cases, stop the operation and check the following points:

・If temperature sharply increases

・If an abnormal noise appears sharply

・If the number of revolutions becomes unstable sharply

規定

・保修範圍衹限交付產品單體。

以下費用和損害不在保修範圍内。

1) 本產品的運輸費。

2) 本產品與其它裝置等連接或裝入後從該裝置等上拆下、安裝或其它附帶施工的費用。

3) 因本產品的故障，發生了使利用者失去使用機會或業務中斷等造成的間接損害。

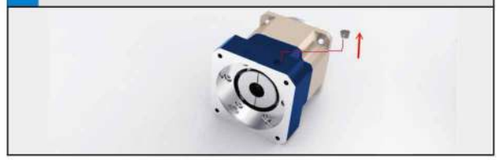
4) 其它所有派生的或伴隨的損害。

安裝方法　Installation

安裝步驟　Mounting procedure to the motor

1 擦拭馬達軸上的防銹劑、潤滑脂等。
Wipe off anti–rust agent and oil on the motor shaft.

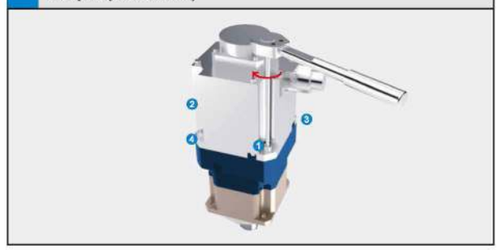
2 取下橡皮栓。
Remove the plug



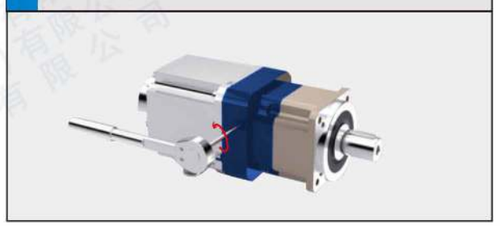
3 旋轉輸入軸使緊固螺栓的頭對準塞孔。此時，請確認緊固螺栓是鬆動的。
Turn the input shaft until the cap screw is seen. Make sure the cap screw is loosened.

如帶有軸套，安裝方法如圖所示。
In case the bushing has been attached, Please fix it to the reducer as the drawing below.

4 將減速機垂直放置在平坦的地方，使減速機的馬達安裝面朝上側。將馬達軸慢慢地插入輸入軸，注意避免撞擊到輸入軸，請確認馬達的法蘭面緊靠減速機的法蘭面。 按指定的緊固扭矩擰緊馬達安裝螺栓。(參考表 1)
Please place reducer vertically on the flat surface so the motor mounting part faces up. Carefully insert the motor shaft into the input shaft. (It should be inserted smoothly) Make sure the motor flange is perfectly fit to the reducer's flange. Tighten the motor installing bolts to the proper torque.(See table1)



5 使用轉矩扳手等按照指定的緊固扭矩擰緊緊固螺栓。(參考表 1)
Tighten the clamping bolt of the input shaft with torque wrench to the proper torque.(See table1)



6 安裝橡膠栓，安裝完成。
Reinstall the plug. The procedure is done.

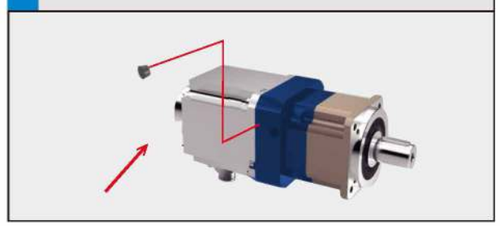


表1 Table1

螺栓尺寸 Bolt size			緊固螺栓 Clamping bolt	
	Nm	kgfm	Nm	kgfm
M3	1.1	0.11	1.9	0.18
M4	2.5	0.26	4.3	0.44
M5	5.1	0.52	8.7	0.89
M6	8.7	0.89	15	1.5
M8	21	2.1	36	3.7
M10	42	4.3	71	7.2
M12	72	7.3	125	13
M16	134	14	–	–

表2 Table 2

螺栓尺寸 Bolt size	緊固扭矩 Tightening torque	
	Nm	kgfm
M3	1.9	0.18
M4	4.3	0.44
M5	8.7	0.89
M6	15	1.5
M8	36	3.7
M10	71	7.2
M12	125	13
M16	310	32
M20	603	62

※推薦螺栓 ：强度12.9以上

※Recommended bolt：Strength 12.9