



RV 減速器

中空旋轉平台

90度伺服減速器

諧波減速器

TQG 台崎減速機

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步進/伺服馬達專用 FOR STEPPER / SERVO MOTOR USE

行星式減速機 PLANETARY REDUCERS

台灣技術/精密傳動 TAIWAN TECHNOLOGY / PRECISION TRANSMISSION

TQG 台崎減速機



生產檢測中心
Production test center



公司簡介
Company Introduction

台崎減速機——是從專業製造齒輪工廠開始發展，工廠同仁和技術團隊在齒輪設計和製造有二十多年的生產經驗，後期成立行星減速器事業部，借鑒德國行星減速器的傳動原理，結合公司內部臺灣技術工藝的消化吸收，完善出系列的伺服和步進電機專用的行星減速器規格產品，所生產的伺服減速器產品具有低背隙（5-7arcmin），低噪音（60dB），高效率（≥95%）的特徵，減速機的輸入接口可以搭配任意品牌工廠的伺服馬達和步進馬達，行星減速器功能具有提高馬達轉子的慣性，提高剛性和縮短啓動與停止的定位時間，可以使馬達的功率小型化，提升機器在運轉時高慣性負載的安定性和降低震動的特點。

行星減速器產品規格尺寸可以直接替換德標和日標的減速機規格，產品系列齊全，尺寸與精度和日系和德系減速機完全一致，我工廠也可以承接非標的減速機型號和尺寸，產品廣泛運用工具機（龍門機床），激光切割機，木工雕刻機，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！

工廠匹配大量庫存，希望協同國內伺服電機廠家及系統集成商，共同扎根自動化機械行業和機器人行業領域，為中國機器人和自動化機械提升及工業4.0目標提供優質的自動化產品。

Taiqi Electromechanical Equipment (Shanghai) Co., Ltd. (following called TQG reducer company) is developed from a professional gear manufacturing plant. The factory colleagues and technical team have more than 20 years of production experience in gear design and manufacturing. In the later stage, the precision planetary gearbox division was established. Drawing on the transmission principle of the German planetary gearbox and combining with the digestion and absorption of the company's internal Taiwan technology, we have improved out a series of precision planetary gearboxes with full specifications for servo and stepper motors. The servo gearbox products manufactured by TQG reducer company are with features of low backlash (5-7arcmin), low noise (60dB) and high efficiency (≥95%). The input interface of TQG planetary gearbox can be matched with any brand of servo motors and stepper motors on the market.

The TQG precision planetary gearbox has the functional characteristics of improving the inertia of the motor rotor, improving the rigidity and shortening the start and stop positioning time, which can miniaturize the power of the motor, improve the stability of the high inertia load and reduce the vibration during the operation of the machine.

The product specifications of TQG reducers can directly replace the equivalent sizes of standard planetary gearbox from German and Japanese. The TQG reducer company has a complete product range, and the size and precision are exactly the same as those of the Japanese and German precision speed reducers. Besides, our factory can also accept customization of non-standard gearbox models and specifications. The TQG planetary gearboxes are widely used in tool machines (gantry machine tools), laser cutting machines, woodworking engraving machines, full servo tissue machines, precision embossing printing machines, precision coating machines, servo bending machines, CNC spring machine, and other highly automated equipment.

The TQG reducer factory matches a large number of stock and hopes to cooperate with domestic and overseas servo motor manufacturers and system integrators to take root in the field of automation machinery industry and robot industry, and provide high-quality automation products for China robot, automation machinery upgrading and industrial 4.0 goals.

產品目錄 Contents

PAGES

VRB

高精密型行星減速機
High Precision Planetary Reducer

VRB series



06-09

VRL

高精密型行星減速機
High Precision Planetary Reducer

VRL series



10-13

PAB

高精度高力矩行星減速機
High Precision High Torque Planetary Reducer

PAB series

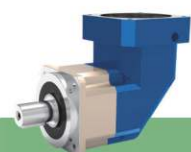


14-17

PAR

轉角型精密行星減速機
Angle Type Precision Planetary Reducer

PAR series



18-21

PLF

標準型行星減速機
Standard planetary Reducer

PLF series



22-25

PLE

標準型行星減速機
Standard planetary Reducer

PLE series



26-29

PAD

高精密法蘭輸出
High Precision Flange-output Reducer

PAD series



30-34

PADR

轉角高精度法蘭輸出
Angle High Precision Flange-output Reducer

PADR series



35-39

產品目錄 Contents

PAGES

PAF

標準型行星減速機
Standard planetary Reducer

PAF series



40-43

VRS

高力矩高精密行星減速機
High Torque High Precision Planetary Reducer

VRS series



44-47

PFR

轉角精密行星減速機
Angle Precision Planetary Reducer

PFR series



48-51

PER

轉角精密行星減速機
Angle Precision Planetary Reducer

PER series



52-55

VRSF

精密行星減速機
Precision Planetary Reducer

VRSF series



56-59

ZR

精密直角減速器
Precision Right Angle Reducer

ZR series

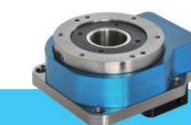


60-64

ZK

中空旋轉平臺
Hollow Shaft Rotating Platform

ZK series



65-76

DG

標準型行星減速機
Standard Planetary Reducer

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
☺☺ 強 Strong
☺☺☺ 最高 Highest

減速機選用參考表 Reducer Selection Table

減速機選用參考表依據伺服馬達輸出功率選擇

Selection Table Of Reducer (By 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"●"記號為可選用之減速比。

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.

功率等級

Performance classes

快速找到目標：程序概覽

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：只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产品。在此概覽中您可以找到产品的重要規格特性。

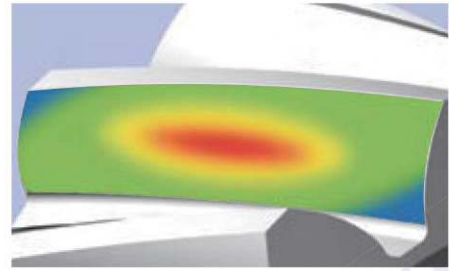
Achieve your goal faster: Our programme at a glance.

You no longer need to perform time-consuming searches of detailed information: Utilise our easy-to-use quick selection to select the products you need. In this overview you will find a direct comparison of the key features of our products.

產品技術 Product Technology

TQQ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，降低磨擦阻力與噪音。

Two multinational patents has been obtained on the lubrication structure of TQG series planetary reducers to ensure the highest output value.
 Patent 1: To reduce axial thrust bearing from the running of gears.
 Patent 2: To reduce frictional resistance and noise level



利用ANSYS技術對齒輪強度進行有限元分析，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.

PAB系列為例
 Take the PAB series as an example

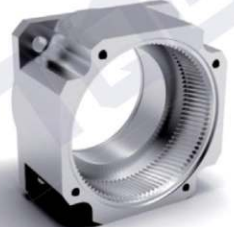


齒輪材料採用優質合金鋼，經碳-氮共滲處理，從而獲得最佳的耐磨性和耐衝擊韌性。
 Carbon-nitriding heat-treated high quality alloy steel is adopted in gear materials to obtain the best wear resistance and impact toughness.



輸出行星架採用一體式（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.

齒圈與輸出殼體採用一體化設計，採用優質鋼材，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強度。
 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.



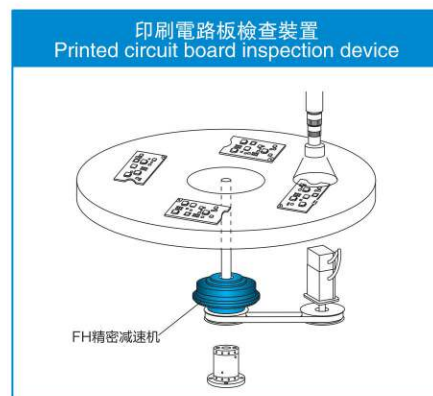
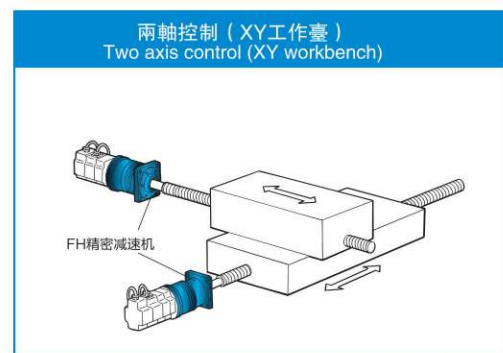
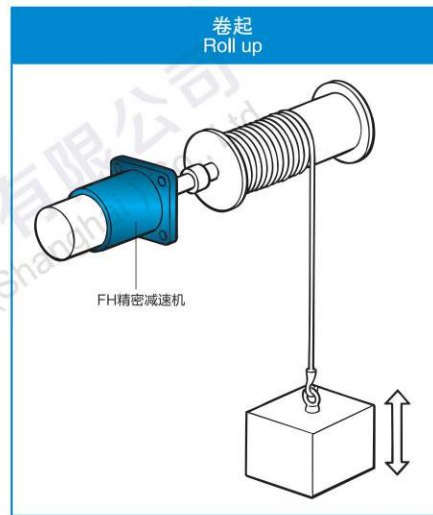
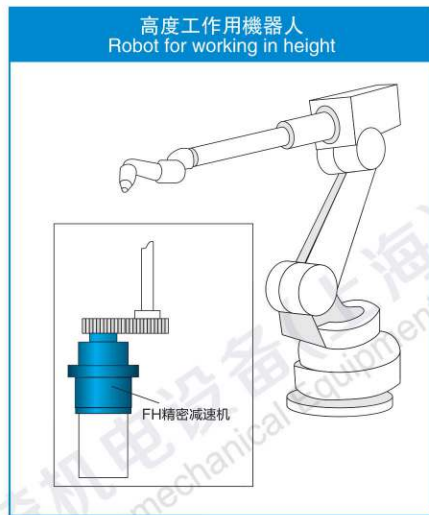
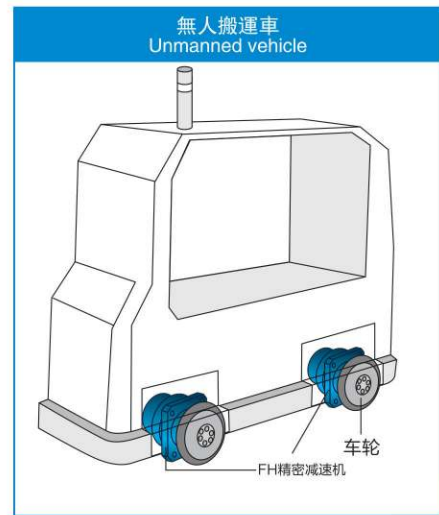
輸入軸與鎖緊裝置採用一體化設計，雙螺栓對稱分布，達到動態平衡的同時，通過雙螺栓的強力鎖死，有效防止電機軸傳動打滑，實現高精度零背隙的動力傳送。
 The input shaft and locking device are designed in an integrated way. The two bolts are symmetrically distributed to achieve dynamic balance. At the same time, through the strong locking of double bolts, the motor shaft transmission is effectively prevented from slipping and the high-precision zero backlash power transmission is achieved.



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 frontiers of precision motion control are widely used.

| | | | |
|---|--|---|--|
| <p>機器人的行走軸（齒條和小齒輪） The walking shaft of a robot (rack and pinion)</p> | <p>機床的龍門機器人 Gantry robot of machine tool</p> | <p>水平多關節機器人 Horizontal multi-joint robot</p> | <p>晶圓搬運機器人 Wafer handling robot</p> |
| <p>衝壓設備（鉚接） Stamping equipment (riveting)</p> | <p>彎管機 Pipe bending machine</p> | <p>注塑成型取出機器人 Injection mold taken-out robot</p> | <p>機床的轉塔刀架旋轉 Rotary tower knife frame rotation of machine tool</p> |
| <p>機床的XY軸 The XY axis of machine tool</p> | <p>分度工作臺驅動 Indexing table drive</p> | <p>塗抹用輥驅動 Roller drive for daubing use</p> | <p>裝載機用滑車 Pulley for loader use</p> |
| <p>軸輸入型皮帶驅動 Shaft input belt drive</p> | <p>液晶玻璃基板搬運機器人 Liquid crystal glass substrate handling robot</p> | <p>拉力試驗機 Tensile testing machine</p> | <p>頂棚行走式搬運車 Roof walking van</p> |



PRECISION PLANETARY REDUCERS

精密行星減速機

VRB



- 1. 静音**
使用斜齒輪實現順暢安靜地運轉。
- 2. 高精度**
背隙低於3分、定位精確。
- 3. 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。
- 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 contribute to reduce vibration and noise.
- 2. High precision**
Standard backlash is 3 arc-min, ideal for precision control.
- 3. High rigidity & torque**
High rigidity & high torque were achieved by uncaged needle roller bearings.
- 4. Adapter-bushing connection**
Can be attached to any motor all over the world.
- 5. No grease leakage**
Perfect solution using high viscosity anti-separation grease.
- 6. Maintenance-free**
No need to replace the grease for the life of the unit. Can be attached in any position.

減速機的選型/Indication of Model Numbers

VRB 系列/VRB Type

VRB090 - 10 - S1 - P1 / 馬達

減速機型式/Type

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: 輸出為孔
Output for holes

馬達型號/Motor Type

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 Class

P0: 高精度背隙/Micro Backlash P0
P1: 精密背隙/Precision Backlash P1
P2: 標準背隙/Standard Backlash P2

型號範圍: VRB090-100-S2-P1/Panasonic MSMJ 082S1A

Model Example: VRB090-100-S2-P1/Panasonic MSMJ 082S1A

VRB 減速機性能資料 Specification Table

| 規格 Model No | 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} / 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 | |
| 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 _{2aB} / Max. Radial Force | N | 1,2 | 3~100 | 780 | 1530 | 3250 | 6700 | 9400 | 14500 | 50000 | |
| 容許轉向力 F _{2a1B} / Max. Axial Force | N | 1,2 | 3~100 | 350 | 630 | 1300 | 3000 | 4000 | 6200 | 35000 | |
| 容許轉向力 F _{2a1B} / 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 | °C | 1,2 | 3~100 | (-15°C ~ +90°C) | | | | | | | |
| 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 (n ₁ =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 / Moment of Inertia /

| 規格 Model No | 單位 Unit | 節數 Stage | 減速比 Ratio | VRB042 | VRB060 | VRB090 | VRB115 | VRB142 | VRB180 | VRB220 | |
|--|--------------------|----------|-----------|--------|--------|--------|--------|--------|--------|--------|-------|
| 轉動慣量 J ₁ 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 |

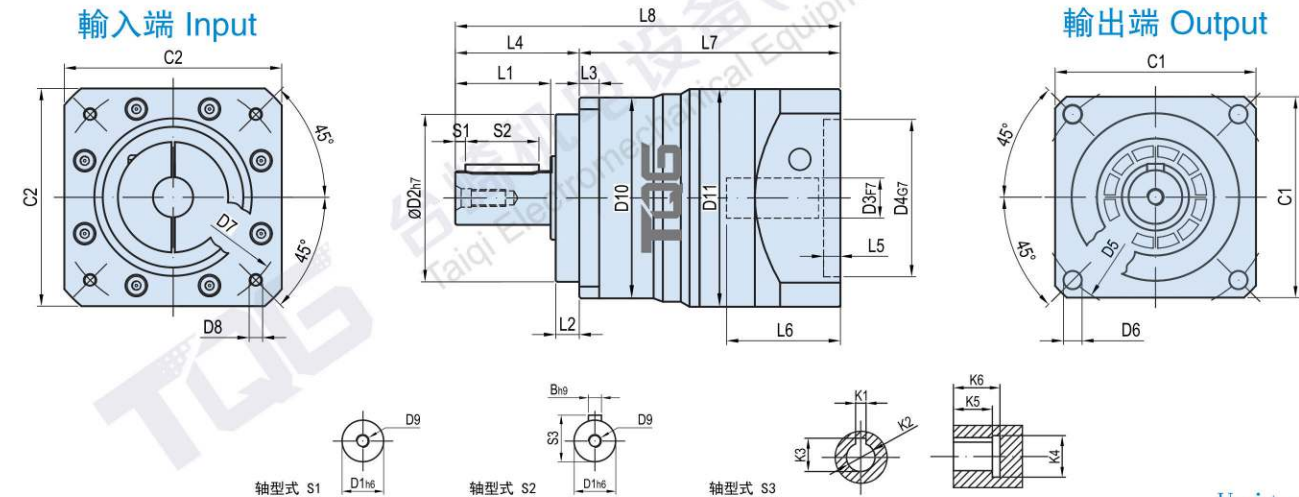
1. 減速比 (i=N_{in}/N_{out}) 2. 輸出轉數 100rpm 時，作用於輸出軸中心位置。 3. 最大加速力矩 T_{2B}=60% of T_{2NOT}，連續運轉使用壽命為 10000hrs。
 1. Ratio (i=N_{in}/N_{out}) 2. When output speed is 100rpm, acting on the output shaft center position.
 3. The Max. acceleration torque T_{2B}=60% of T_{2NOT}, continuous operation, service life is 10000hrs.

MODEL: VRB

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



外形尺寸圖 Dimensions:



Unit: mm

| 尺寸 Size | VRB042-L1 | VRB060-L1 | VRB090-L1 | VRB115-L1 | VRB142-L1 | VRB180-L1 | VRB220-L1 |
|---------|-------------------|--------------------|---------------------|---------------------|---------------------|-------------------------|-----------------------|
| D1 | φ 13 | φ 16 | φ 22 | φ 32 | φ 40 | φ 55 | φ 75 |
| D2 | φ 35 | φ 50 | φ 80 | φ 110 | φ 130 | φ 160 | φ 180 |
| D3 | φ 8 (φ 6.35-11) | φ 14 (φ 11-19) | φ 19 (φ 16-24) | φ 22 (φ 19-35) | φ 24 (φ 22-35) | φ 35 (φ 35-42) | φ 42 (φ 35-55) |
| D4 | φ 30 (φ 30-50) | φ 50 (φ 50-φ 70) | φ 70 (φ 70-φ 110) | φ 110 (φ 114.3) | φ 110 (φ 114.3) | φ 114.3 (φ 114.3-200) | φ 180 (φ 114.3-200) |
| D5 | φ 50 | φ 70 | φ 100 | φ 130 | φ 165 | φ 215 | φ 250 |
| D6 | 4-φ 3.4 | 4-φ 5.5 | 4-φ 7 | 4-φ 9 | 4-φ 11 | 4-φ 13 | 4-φ 17 |
| D7 | φ 46 (φ 45-70) | φ 70 (φ 70-φ 90) | φ 90 (φ 90-145) | φ 145 (φ 145-200) | φ 145 (φ 145-200) | φ 200 (φ 200-235) | φ 215 (φ 200-235) |
| 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 | φ 42 | φ 60 | φ 87 | φ 114.5 | φ 142 | φ 180 | φ 218 |
| D11 | φ 46 | φ 65 | φ 90 | φ 118 | φ 150 | φ 184 | φ 225.5 |
| 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 | φ 8 | φ 11 | φ 22 | φ 28 | φ 38 | φ 50 | φ 60 |
| K3 | 9.4 | 12.8 | 24.5 | 31.3 | 41.3 | 53.8 | 64.4 |
| K4 | φ 13 | φ 16 | φ 32 | φ 38 | φ 48 | φ 60 | φ 72 |
| K5 | 15 | 15 | 20 | 27 | 35 | 43 | 60 |
| K6 | 18 | 18 | 24 | 32 | 40 | 50 | 65 |

- 注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
 注2: 減速機出力軸可以為客戶定制大小和長短。
 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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

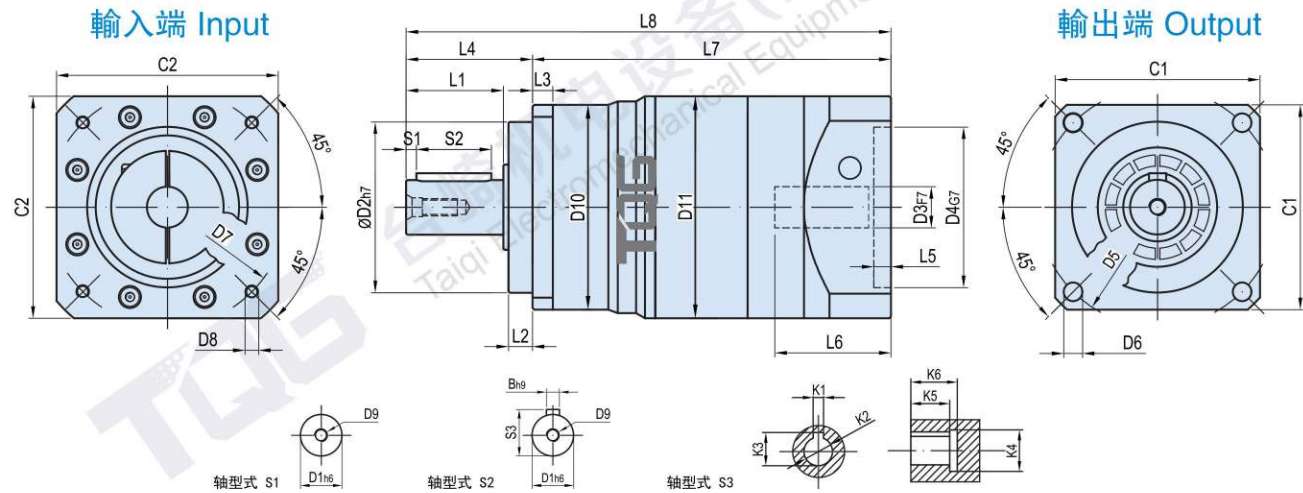
MODEL: VRB

雙段 2-Stage

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



外形尺寸圖 Dimensions:



Unit:mm

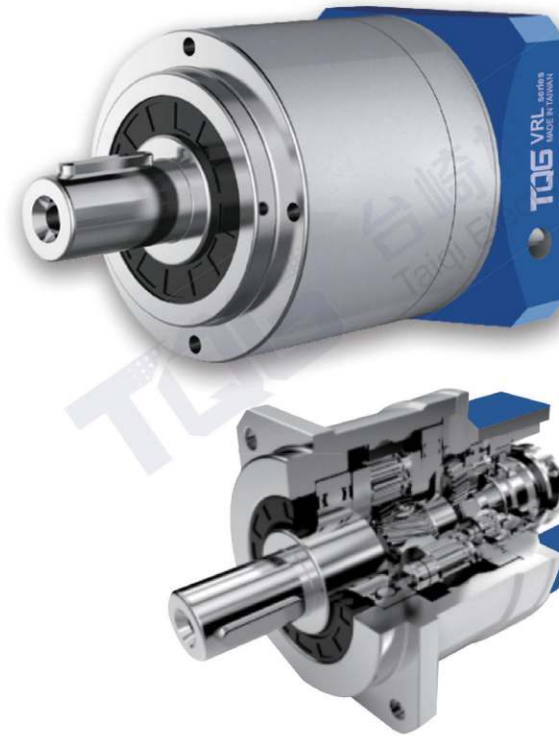
| 尺寸 Size | VRB042-L2 | VRB060-L2 | VRB090-L2 | VRB115-L2 | VRB142-L2 | VRB180-L2 | VRB220-L2 |
|---------|-----------------|--------------|---------------------|---------------------|-----------------|---------------------|-------------------|
| D1 | φ13 | φ16 | φ22 | φ32 | φ40 | φ55 | φ75 |
| D2 | 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: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
 注2: 減速機輸出軸可以為客戶定制大小和長短。
 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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PRECISION PLANETARY REDUCERS 精密行星減速機

VRL

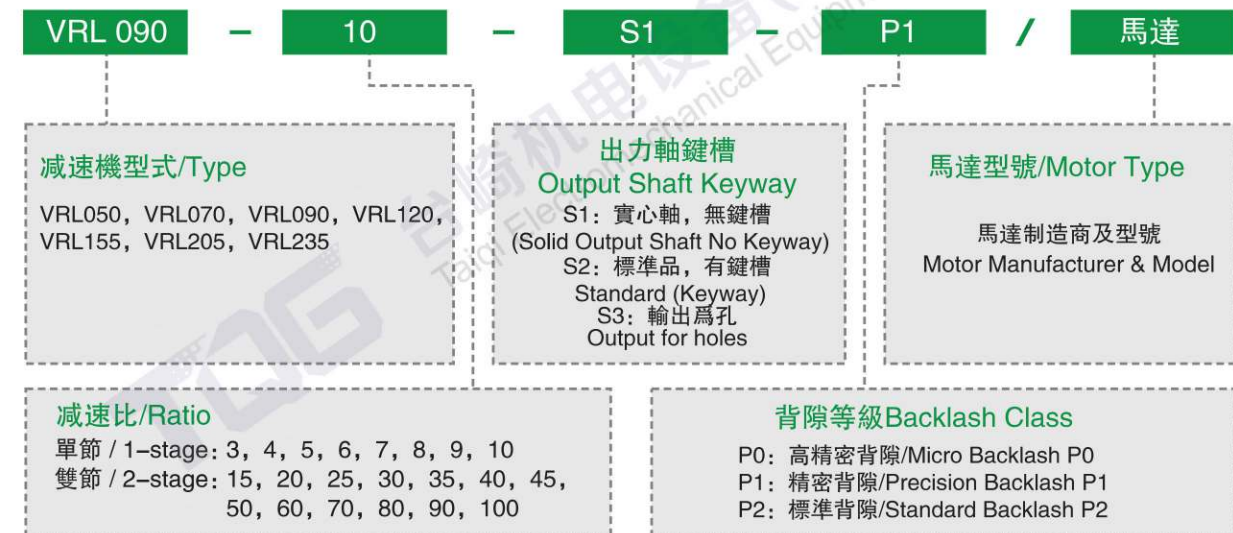


- 1. 静音**
使用斜齒輪實現順暢安靜地運轉。
- 2. 高精度**
背隙低於3分、定位精確。
- 3. 高剛性、高扭矩**
使用整體式滾珠軸承, 大大提高了剛性和扭矩。
- 4. 法蘭、連接器方式**
可以安裝到世界上任何一臺馬達上。
- 5. 無潤滑脂泄漏**
使用高粘度、不易分離的潤滑脂, 有效防止潤滑脂泄漏。
- 6. 維護方便**
在產品壽命期內無需更換潤滑脂, 安裝更便捷。

- 1. Quiet operation**
Helical gears contribute to reduce vibration and noise.
- 2. High precision**
Standard backlash is 3 arc-min, ideal for precision control.
- 3. High rigidity & torque**
High rigidity & high torque were achieved by uncaged needle roller bearings.
- 4. Adapter-bushing connection**
Can be attached to any motor all over the world.
- 5. No grease leakage**
Perfect solution using high viscosity anti-separation grease.
- 6. Maintenance-free**
No need to replace the grease for the life of the unit. Can be attached in any position.

減速機的選型/Indication of Model Numbers

VRL 系列/VRL Series



選型範例: VRL090-100-S2-P1/Panasonic MSMJ 082S1A

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

VRL 減速機性能資料 Pecification Table

| 規格 Model No | 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 | | | | |
| 最大輸出力矩 T _{2NOT} / 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 _{IN} / Rated Input Speed | rpm | 1,2 | 3~100 | 5000 | 5000 | 4000 | 4000 | 3000 | 3000 | 2000 | |
| 最大輸入轉速 N _{IE} / 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 _{2R} / Max. Radial Force | N | 1,2 | 3~100 | 680 | 1260 | 2880 | 6000 | 8200 | 12800 | 27800 | |
| 容許軸向力 F _{2A1B} / Max. Axial Force | N | 1,2 | 3~100 | 330 | 625 | 1250 | 2400 | 3890 | 6100 | 15000 | |
| 容許軸向力 F _{2A1B} / 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 | °C | 1,2 | 3~100 | (-15°C ~ +90°C) | | | | | | | |
| 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/Moment of Inertia/

| 規格 Model No | 單位 Unit | 節數 Stage | 減速比 Ratio | VRL050 | VRL070 | VRL090 | VRL120 | VRL155 | VRL205 | VRL235 | |
|--|--------------------|----------|-----------|--------|--------|--------|--------|--------|--------|--------|-------|
| 轉動慣量 J ₁ 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=N_{in}/N_{out}) 2. 輸出轉數100rpm時, 作用於輸出軸中心位置。 3. 最大加速力矩T_{2B}=60% of T_{2NOT}, 連續連轉使用壽命為10000hrs.
 1. Ratio (i=N_{in}/N_{out}) 2. When output speed is 100rpm, acting on the output shaft center position.
 3. The Max. acceleration torque T_{2B}=60% of T_{2NOT}, continuous operation, service life is 10000hrs.

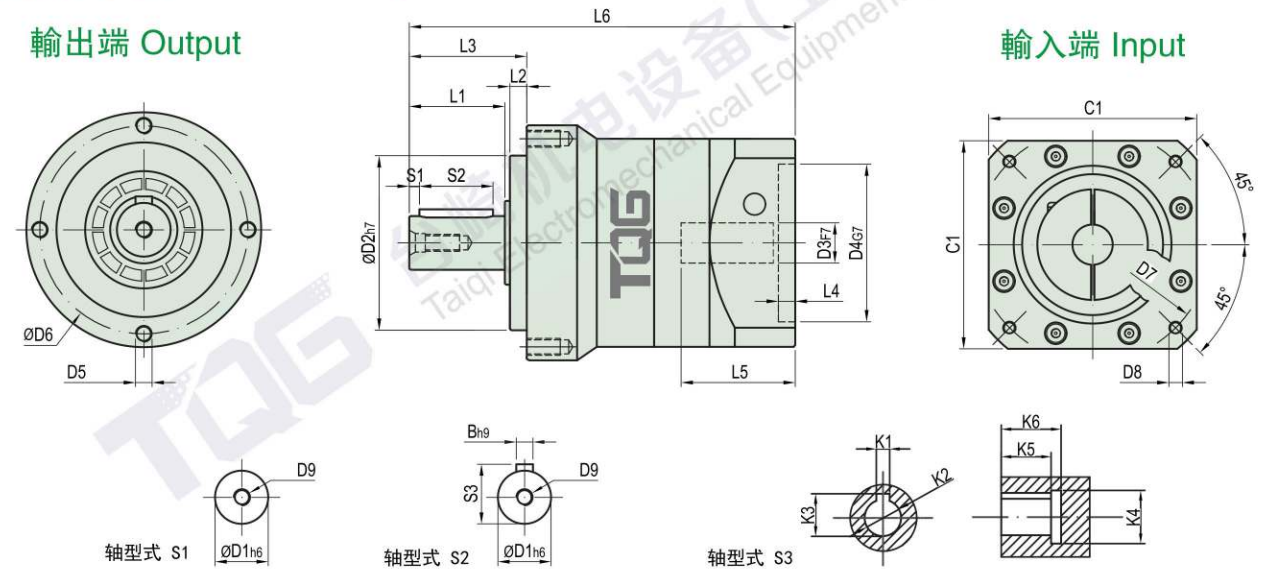
MODEL: VRL

單段 1-Stage

速比: 3, 4, 5, 6, 7, 8, 9, 10



外形尺寸圖 Dimensions:



Unit:mm

| 尺寸 Size | VRL070-L1 | VRL090-L1 | VRL120-L1 | VRL155-L1 | VRL205-L1 | VRL235-L1 |
|---------|------------------|---------------------|---------------------|---------------------|-------------------------|-----------------------|
| D1 | φ 16 | φ 22 | φ 32 | φ 40 | φ 55 | φ 75 |
| D2 | φ 52 | φ 68 | φ 90 | φ 120 | φ 160 | φ 180 |
| D3 | φ 14 (φ 11-14) | φ 19 (φ 16-24) | φ 22 (φ 19-35) | φ 24 (φ 22-35) | φ 35 (φ 35-φ 42) | φ 42 (φ 35-55) |
| D4 | φ 50 (φ 50-70) | φ 70 (φ 70-φ 110) | φ 110 (φ 114.3) | φ 110 (φ 114.3) | φ 114.3 (φ 114.3-200) | φ 180 (φ 114.3-200) |
| D5 | 4-M5X10L | 4-M6X12L | 4-M8X16L | 4-M10X20L | 4-M12X22L | 4-M16X28L |
| D6 | φ 62 | φ 80 | φ 108 | φ 140 | φ 184 | φ 210 |
| D7 | φ 70 (φ 70-90) | φ 90 (φ 90-145) | φ 145 (φ 145-200) | φ 145 (φ 145-200) | φ 200 (φ 200-235) | φ 215 (φ 200-235) |
| 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 | φ 11 | φ 22 | φ 28 | φ 38 | φ 50 | φ 60 |
| K3 | 12.8 | 24.5 | 31.3 | 41.3 | 53.8 | 64.4 |
| K4 | φ 16 | φ 32 | φ 38 | φ 48 | φ 60 | φ 72 |
| K5 | 15 | 20 | 27 | 35 | 43 | 60 |
| K6 | 18 | 24 | 32 | 40 | 50 | 65 |

- 注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
 注2: 減速機出力軸可以為客戶定制大小和長短。
 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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

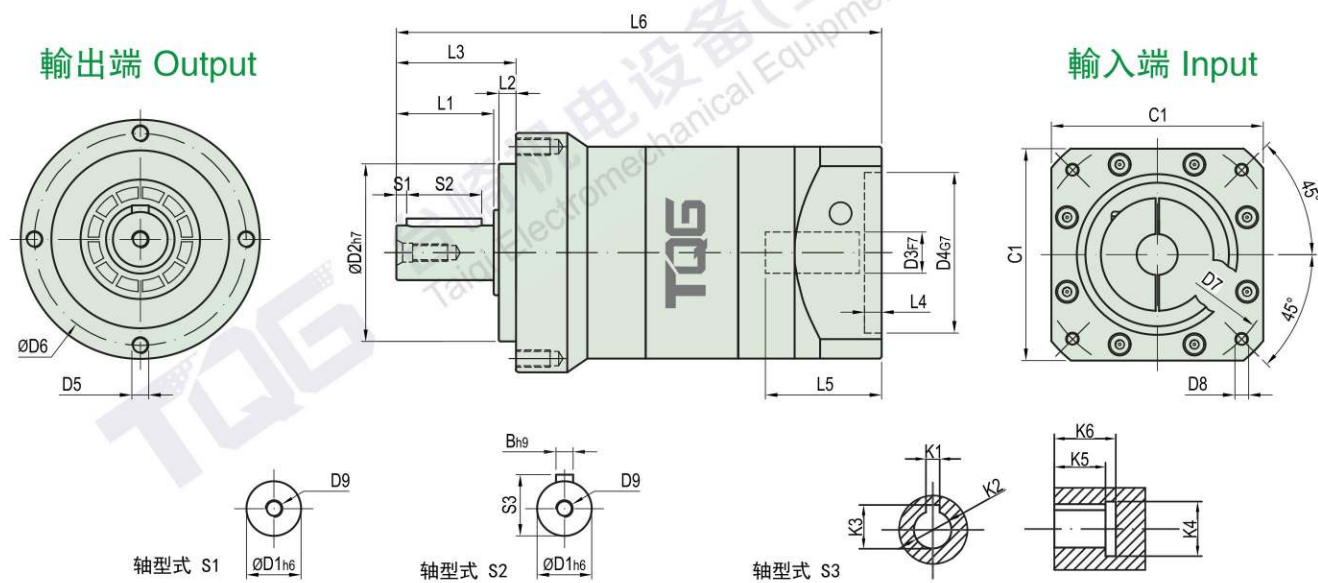
MODEL: VRL

雙段 2-Stage

速比: 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 | φ 16 | φ 22 | φ 32 | φ 40 | φ 55 | φ 75 |
| D2 | φ 52 | φ 68 | φ 90 | φ 120 | φ 160 | φ 180 |
| D3 | φ 14 (φ 11-14) | φ 19 (φ 11-19) | φ 22 (φ 16-24) | φ 24 (φ 19-35) | φ 35 (φ 22-35) | φ 42 (φ 35-42) |
| D4 | φ 50 | φ 70 (φ 50-φ 80) | φ 110 (φ 70-φ 110) | φ 110 (φ 114.3) | φ 110 (φ 114.3) | φ 180 (φ 114.3-200) |
| D5 | 4-M5X10L | 4-M6X12L | 4-M8X16L | 4-M10X20L | 4-M12X22L | 4-M16X28L |
| D6 | φ 62 | φ 80 | φ 108 | φ 140 | φ 184 | φ 210 |
| D7 | φ 70 | φ 90 (φ 70-100) | φ 145 (φ 90-145) | φ 145 (φ 145-200) | φ 145 (φ 145-200) | φ 215 (φ 200-235) |
| 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 | φ 11 | φ 22 | φ 28 | φ 38 | φ 50 | φ 60 |
| K3 | 12.8 | 24.5 | 31.3 | 41.3 | 53.8 | 64.4 |
| K4 | φ 16 | φ 32 | φ 38 | φ 48 | φ 60 | φ 72 |
| K5 | 15 | 20 | 27 | 35 | 43 | 60 |
| K6 | 18 | 24 | 32 | 40 | 50 | 65 |

注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
注2: 減速機出力軸可以為客戶定制大小和長短。
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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PRECISION PLANETARY REDUCERS

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
Integrated design of planet carrier and output shaft ensures the maximum torque stiffness and stability
- 齒輪箱表面利用無電鍍處理, 連接板采藍色陽極處理, 提高環境的耐受性和抗腐蝕能力。
Electroless Nickel deposition treatment and black anodizing treatment are employed to gear box surface and motor adapter module respectively. The tolerance to the environment and resistant to corrosion are enhanced.
- 最低的回程間隙 low backlash
- 高效率(95%) high efficiency (95%)
- 終生潤滑 life time lubrication

減速機的選型/Indication of Model Numbers

PAB 系列/PAB Type

PAB 090 - 10 - S1 - P1 / 馬達

減速機型式/Type
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: 輸出為孔
Output for holes

馬達型號/Motor Type
馬達製造商及型號
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 Class
P0: 高精密背隙/Micro Backlash P0
P1: 精密背隙/Precision Backlash P1
P2: 標準背隙/Standard Backlash P2

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

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

PAB 減速機性能資料 Specification Table

| 規格 Model No | 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} /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 | ≤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 _{2R} /Max. Radial Force | N | 1,2 | 3~100 | 780 | 1300 | 3200 | 6750 | 9400 | 14500 | 50000 | |
| 容許軸向力 F _{2A} /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 | °C | 1,2 | 3~100 | (-15°C ~ +90°C) | | | | | | | |
| 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/Moment of Inertia/

| 規格 Model No | 單位 Unit | 節數 Stage | 減速比 Ratio | PAB042 | PAB060 | PAB090 | PAB115 | PAB142 | PAB180 | PAB220 | |
|--|--------------------|----------|-----------|--------|--------|--------|--------|--------|--------|--------|-------|
| 轉動慣量 J ₁ 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 T_{2B}=60% of T_{2NOT} 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 T_{2B}=60% of T_{2NOT} 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.

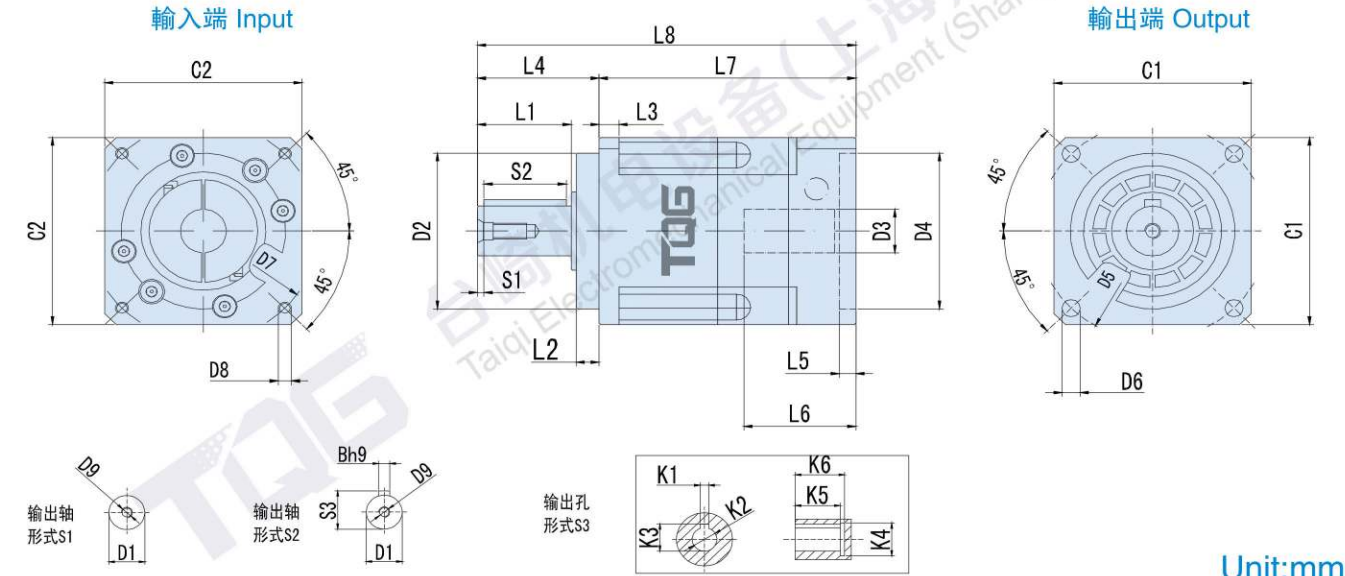
MODEL: PAB

單段 1-Stage

速比: 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: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。

注2: 減速機出力軸可以為客戶定制大小和長短。

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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

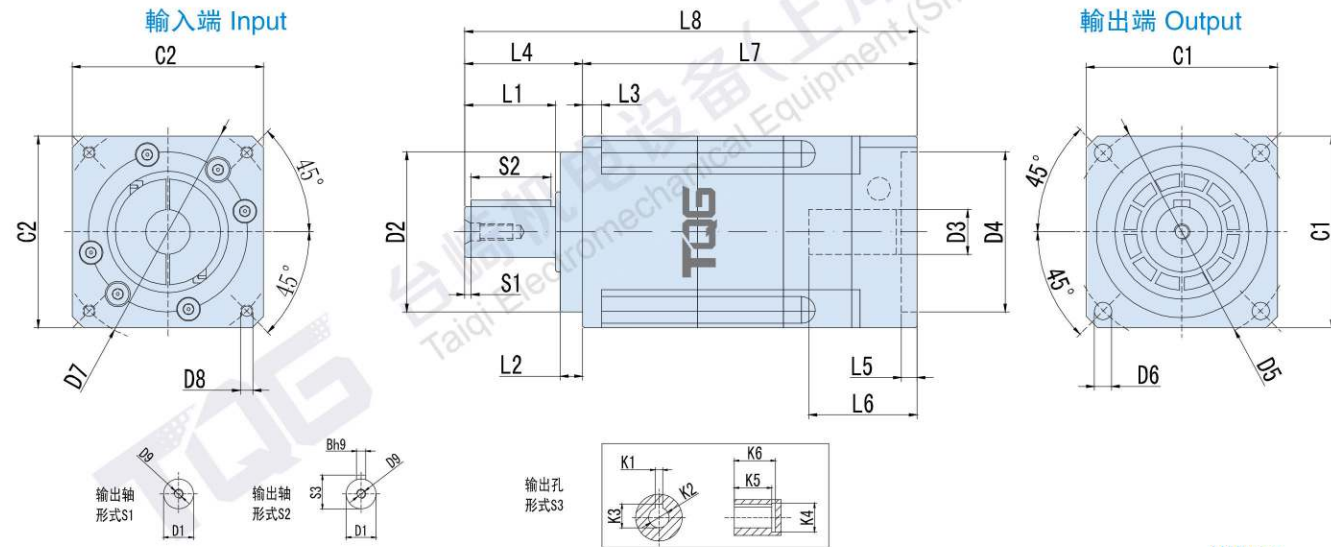
MODEL: PAB

雙段 2-Stage

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



外形尺寸圖 Dimensions:



Unit:mm

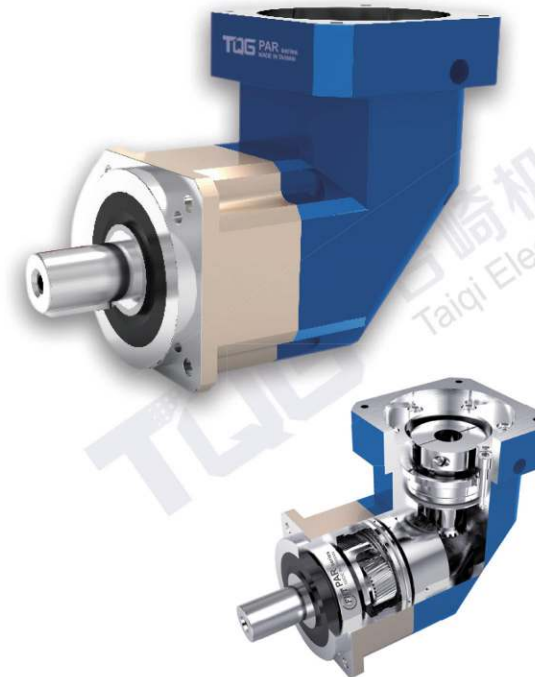
| 尺寸 Size | PAB042-L2 | PAB060-L2 | PAB090-L2 | PAB115-L2 | PAB142-L2 | PAB180-L2 | PAB220-L2 |
|---------|-------------|-------------|--------------|---------------|-----------------|---------------|----------------|
| D1 | φ 13 | φ 16 | φ 22 | φ 32 | φ 40 | φ 55 | φ 75 |
| D2 | φ 35 | φ 50 | φ 80 | φ 110 | φ 130 | φ 160 | φ 180 |
| D3 | φ 8(≤11) | φ 14(≤14) | φ 19(≤24) | φ 24(≤32) | φ 35(≤42) | φ 38(≤50) | φ 55(≤55) |
| D4 | φ 30(30-50) | φ 50(30-70) | φ 70(50-110) | φ 110(50-130) | φ 114.3(95-180) | φ 180(95-180) | φ 215(180-255) |
| D5 | φ 50 | φ 70 | φ 100 | φ 130 | φ 165 | φ 215 | φ 250 |
| D6 | 4-φ 3.4 | 4-φ 5.5 | 4-φ 6.6 | 4-φ 9 | 4-φ 11 | 4-φ 13 | 4-φ 17 |
| D7 | φ 46(22-70) | φ 70(45-90) | φ 90(70-145) | φ 145(70-145) | φ 200(90-215) | φ 200(90-300) | φ 235(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 | φ 8 | φ 11 | φ 22 | φ 28 | φ 38 | φ 50 | φ 60 |
| K3 | 9.2 | 12.7 | 25 | 31.3 | 42 | 53.8 | 64.4 |
| K4 | φ 13 | φ 16 | φ 32 | φ 38 | φ 48 | φ 60 | φ 72 |
| K5 | 15 | 15 | 20 | 27 | 35 | 43 | 60 |
| K6 | 18 | 18 | 24 | 32 | 40 | 50 | 65 |

注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
 注2: 減速機出力軸可以為客戶定制大小和長短。
 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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PRECISION PLANETARY REDUCERS 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**
Right angle reducer using spiral bevel gear
Customer can locate the motor at 90 degree away from the reducer if required to save space.
- 2.High rigidity & torque**
High rigidity & high torque was achieved by uncaged needle roller bearings.
- 3.Adapter-bushing connection**
Can be attached to any motor all over the world.
- 4.No grease leakage**
Perfect solution by high viscosity anti-separation grease.
- 5.Maintenance-free**
No need to replace the grease for the life time.
Can be attached in any position.

減速機的選型/Indication of Model Numbers

PAR 系列 /PAR Type

PAR090 - 10 - S1 - P1 / 馬達

| | | |
|--|---|--|
| 減速機型式/Type 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: 輸出為孔 Output for holes | 馬達型號/Motor Type 馬達製造商及型號 Motor manufacturer & model |
| 減速比 Ratio 單節 / 1-stage: 3, 4, 5, 6, 7, 8, 9, 10, 14, 20 雙節 / 2-stage: 15, 20, 25, 30, 35, 40, 50, 70, 80, 90, 100, 120, 140, 160, 180, 200 | 背隙等級Backlash Class P0: 高精度背隙/Micro Backlash P0 P1: 精密背隙/Precision Backlash P1 P2: 標準背隙/Standard Backlash P2 | |

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

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

PAR 減速機性能資料 Specification Table

| 規格 Model No | 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 | | | | |
| 最大輸出扭矩 T _{2NOT} / 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 _{IN} / Rated Input Speed | rpm | 1,2 | 3~200 | 3000 | 3000 | 3000 | 3000 | 2500 | 2000 | 2000 |
| | | | | 最大輸入轉速 n _{IB} / 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} / Max. Radial Force | N | 1,2 | 3~200 | 780 | 1300 | 3200 | 6750 | 9400 | 14500 | 50000 | | | | |
| 容許軸向力 F _{2aB} / 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 | °C | 1,2 | 3~200 | (-15°C ~ +90°C) | | | | | | | | | | |
| 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 / Moment of Inertia

| 規格 Model No | 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 |

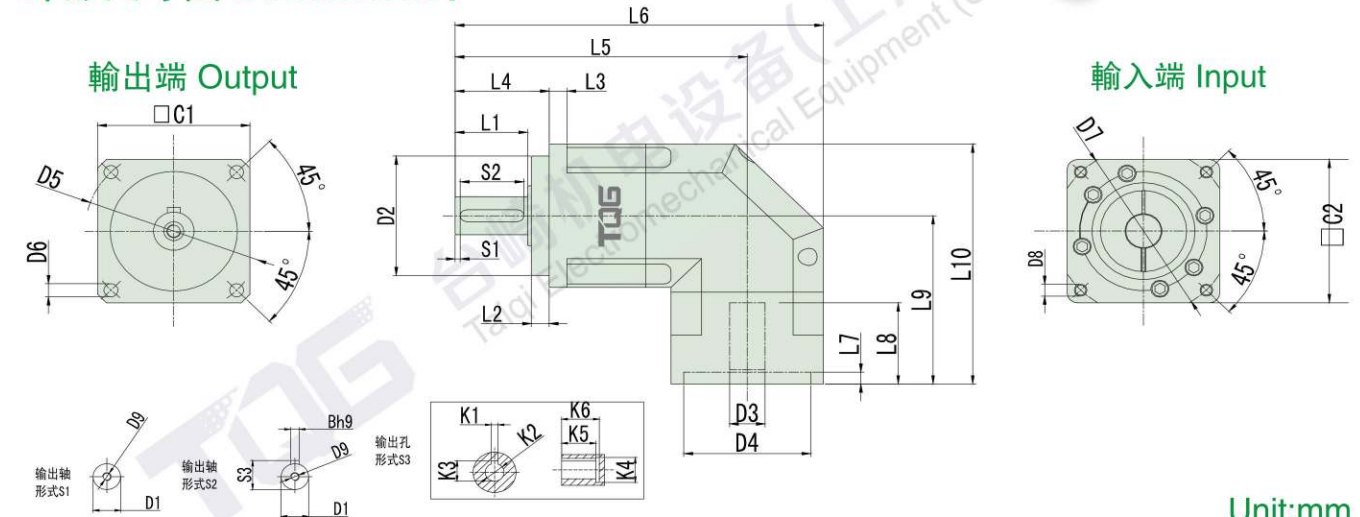
1. 最大加速力矩 T_{2B}=60% of T_{2NOT} 2. 輸出轉數 100rpm 時，作用於輸出軸中心位置。
 3. 三段大減速比不在上表中，有軸加長和加大設計，需要用到請告知銷售人員。
 1. The Max. acceleration torque T_{2B}=60% of T_{2NOT} 2. When output speed is 100rpm, inertia acts on the output shaft center position.
 3. 3-stage big ratios are not in the above table. There is shaft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

MODEL: PAR

單段 1-Stage
 速比: 3, 4, 5, 6, 7, 8, 9, 10, 14, 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 | φ 13 | φ 16 | φ 22 | φ 32 | φ 40 | φ 55 | φ 75 |
| D2 | φ 35 | φ 50 | φ 80 | φ 110 | φ 130 | φ 160 | φ 180 |
| D3 | φ 8(≤11) | φ 14(≤14) | φ 19(≤24) | φ 24(≤32) | φ 35(≤42) | φ 38(≤50) | φ 55(≤55) |
| D4 | φ 30(30-50) | φ 50(30-70) | φ 70(50-110) | φ 110(50-130) | φ 114.3(95-180) | φ 180(95-180) | φ 215(180-255) |
| D5 | φ 50 | φ 70 | φ 100 | φ 130 | φ 165 | φ 215 | φ 250 |
| D6 | 4-φ 3.4 | 4-φ 5.5 | 4-φ 6.6 | 4-φ 9 | 4-φ 11 | 4-φ 13 | 4-φ 17 |
| D7 | φ 46(22-70) | φ 70(45-90) | φ 90(70-145) | φ 145(70-145) | φ 200(90-215) | φ 200(90-300) | φ 235(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 | φ 8 | φ 11 | φ 22 | φ 28 | φ 38 | φ 50 | φ 60 |
| K3 | 9.2 | 12.7 | 25 | 31.3 | 42 | 53.8 | 64.4 |
| K4 | φ 13 | φ 16 | φ 32 | φ 38 | φ 48 | φ 60 | φ 72 |
| K5 | 15 | 15 | 20 | 27 | 35 | 43 | 60 |
| K6 | 18 | 18 | 24 | 32 | 40 | 50 | 65 |

- 注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。 Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
 注2: 減速機出力軸可以為客戶定制大小和長短。 Note 2: The reducer output shaft size and length can be customized for customers.
 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 3: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

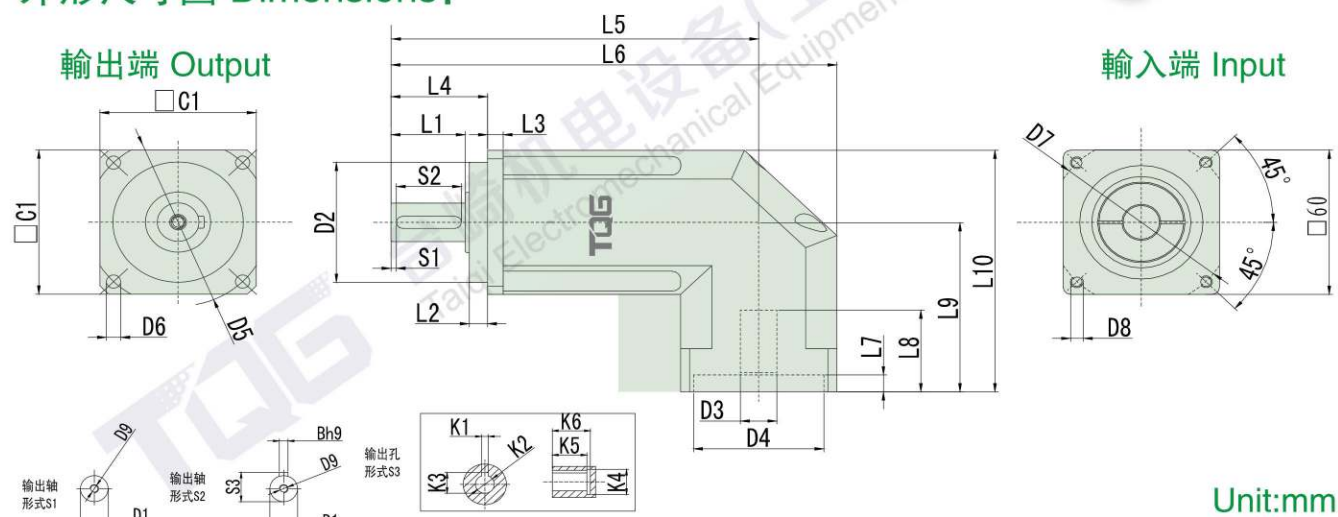
MODEL: PAR

雙段 2-Stage

速比: 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 | φ 13 | φ 16 | φ 22 | φ 32 | φ 40 | φ 55 | φ 75 |
| D2 | φ 35 | φ 50 | φ 80 | φ 110 | φ 130 | φ 160 | φ 180 |
| D3 | φ 8(≤11) | φ 14(≤14) | φ 19(≤24) | φ 24(≤32) | φ 35(≤42) | φ 38(≤50) | φ 55(≤55) |
| D4 | φ 30(30-50) | φ 50(30-70) | φ 70(50-110) | φ 110(50-130) | φ 114.3(95-180) | φ 180(95-180) | φ 215(180-255) |
| D5 | φ 50 | φ 70 | φ 100 | φ 130 | φ 165 | φ 215 | φ 250 |
| D6 | 4-φ 3.4 | 4-φ 5.5 | 4-φ 6.6 | 4-φ 9 | 4-φ 11 | 4-φ 13 | 4-φ 17 |
| D7 | φ 46(22-70) | φ 70(45-90) | φ 90(70-145) | φ 145(70-145) | φ 200(90-215) | φ 200(90-300) | φ 235(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 | φ 8 | φ 11 | φ 22 | φ 28 | φ 38 | φ 50 | φ 60 |
| K3 | 9.2 | 12.7 | 25 | 31.3 | 42 | 53.8 | 64.4 |
| K4 | φ 13 | φ 16 | φ 32 | φ 38 | φ 48 | φ 60 | φ 72 |
| K5 | 15 | 15 | 20 | 27 | 35 | 43 | 60 |
| K6 | 18 | 18 | 24 | 32 | 40 | 50 | 65 |

注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
 注2: 減速機出力軸可以為客戶定制大小和長短。
 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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PRECISION PLANETARY REDUCERS 精密行星減速機

PLF



- 1. 静音**
使用斜齒輪實現順暢安靜地運轉。
 - 2. 高精度**
背隙低於3分、定位精確。
 - 3. 高剛性、高扭矩**
使用整體式滾子軸承, 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 contribute to reduce vibration and noise.
 - 2. High precision**
Standard backlash is 3 arc-min, ideal for precision control.
 - 3. High rigidity & torque**
High rigidity & high torque were achieved by uncaged needle roller bearings.
 - 4. Adapter-bushing connection**
Can be attached to any motor all over the world.
 - 5. No grease leakage**
Perfect solution using high viscosity anti-separation grease.
 - 6. Maintenance-free**
No need to replace the grease for the life of the unit. Can be attached in any position.

減速機的選型/Indication of Model Numbers

PLF 系列/PLF Series

PLF 080 - 10 - S1 - P1 / 馬達

減速機型式/Type

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: 輸出為孔
Output for holes

馬達型號/Motor Type

馬達製造商及型號
Motor manufacturer and 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
 參節/ 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 Class

P0: 高精度背隙/Micro Backlash P0
 P1: 精密背隙/Precision Backlash P1
 P2: 標準背隙/Standard Backlash P2

選型範例: PLF080-100-S2-P1/Panasonic MSMJ 082S1A

Model Example: PLF080-100-S2-P1/Panasonic MSMJ 082S1A

PLF 減速機性能資料 Specification Table

| 規格 Model No | 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 _{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 | °C | 1,2 | 3~100 | -25°C~+90°C | | | | |
| 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 / Moment of Inertia

| 規格 Model No | 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 | 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 |

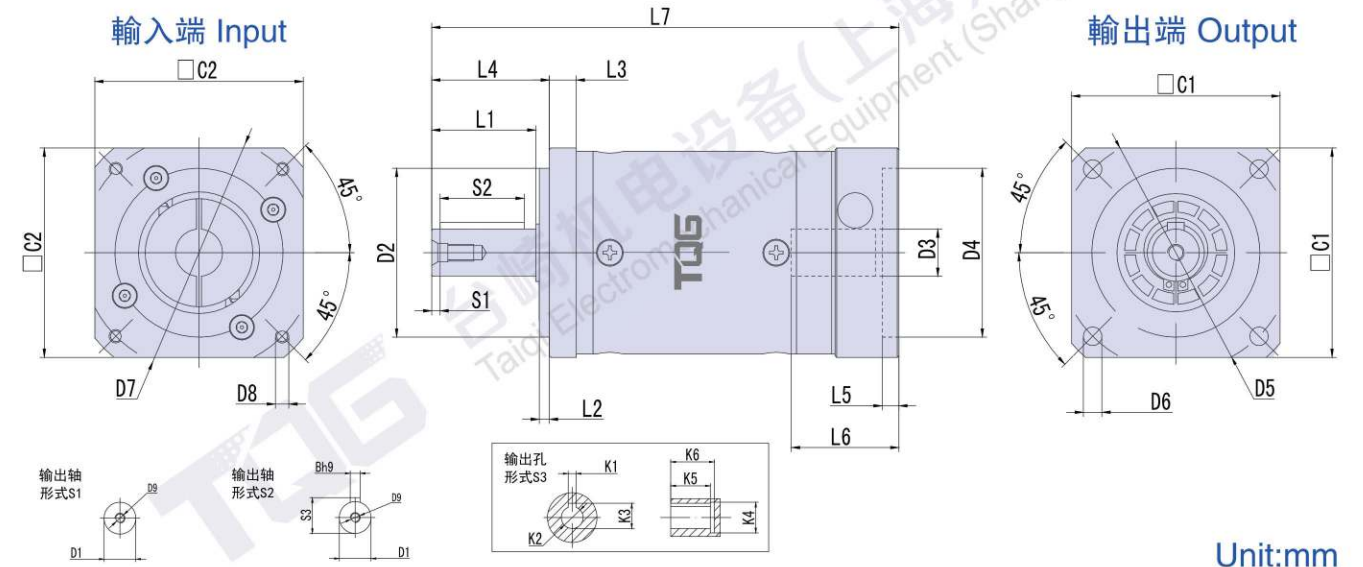
1. 減速比 (i=Nin/Nout) 2. 輸出轉數 100rpm 時，作用于輸出軸中心位置。 3. *連續運轉，使用壽命為 10000hrs。
 1. Ratio (i=Nin/Nout) 2. When output revolution is 100rpm, acting on the output shaft center position.
 3. *Continuous operation, service life is 10000hrs

MODEL: PLF

單段 1-Stage
 速比: 3, 4, 5, 7, 10,



外形尺寸圖 Dimensions:



Unit:mm

| 尺寸 Size | PLF040-L1 | PLF060-L1 | PLF080-L1 | PLF120-L1 | PLF160-L1 |
|---------|-------------|--------------|--------------|---------------|------------------|
| D1 | φ 12(13) | φ 14(16) | φ 20(22) | φ 25(32) | φ 40 |
| D2 | φ 26 | φ 50 | φ 80 | φ 110 | φ 130 |
| D3 | φ 8(≤11) | φ 14(≤19) | φ 19(≤24) | φ 24(≤32) | φ 35(42) |
| D4 | φ 30(30~50) | φ 50(50~70) | φ 70(50~110) | φ 110(70~130) | φ 114.3(110~150) |
| D5 | (φ 48) | (φ 70) | (φ 100) | (φ 130) | φ 185(165) |
| D6 | 4-φ 3.4 | 4-φ 5 | 4-φ 6.5 | 4-φ 9 | 4-φ 11 |
| D7 | φ 46(45~70) | φ 70(70~130) | φ 90(70~145) | φ 145(90~165) | φ 200(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 | φ 8 | φ 8 | φ 18 | φ 25 | φ 35 |
| K3 | 9.2 | 9.2 | 21 | 28 | 38.3 |
| K4 | φ 11 | φ 11 | φ 24 | φ 32 | φ 42 |
| K5 | 20 | 20 | 30 | 40 | 52 |
| K6 | 24 | 24 | 35 | 48 | 58 |

- 注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
 Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
 注2: 減速機出力軸可以為客戶定制大小和長短。
 Note 2: The reducer output shaft size and length can be customized for customers.
 注3: 輸入尺寸依據各品牌伺服馬達或步進馬達可以有變動。
 Note 3: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PLF 減速機性能資料 Specification Table

| 規格 Model No | 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 | | | |
| 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 |
| 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 _{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 | °C | 1,2 | 3~100 | -25°C~+90°C | | | | | | | |
| 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 / Moment of Inertia

| 規格 Model No | 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 | 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 |

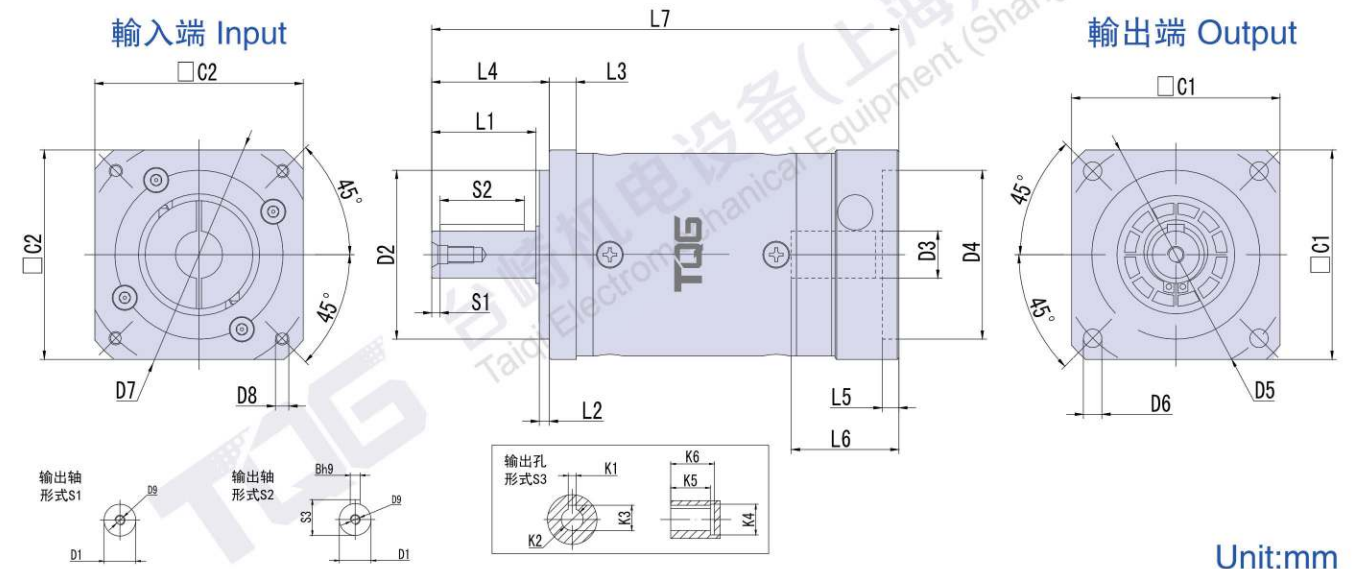
1. 減速比 (i=Nin/Nout)
2. 輸出轉數 100rpm 時，作用于輸出軸中心位置。
3. *連續運轉，使用壽命為 10000hrs。

MODEL: PLF

單段 1-Stage
速比: 3, 4, 5, 7, 10,



外形尺寸圖 Dimensions:



Unit:mm

| 尺寸 Size | PLF040-L1 | PLF060-L1 | PLF080-L1 | PLF120-L1 | PLF160-L1 |
|---------|-------------|--------------|--------------|---------------|------------------|
| D1 | φ 12(13) | φ 14(16) | φ 20(22) | φ 25(32) | φ 40 |
| D2 | φ 26 | φ 50 | φ 80 | φ 110 | φ 130 |
| D3 | φ 8(≤11) | φ 14(≤19) | φ 19(≤24) | φ 24(≤32) | φ 35(42) |
| D4 | φ 30(30~50) | φ 50(50~70) | φ 70(50~110) | φ 110(70~130) | φ 114.3(110~150) |
| D5 | (φ 48) | (φ 70) | (φ 100) | (φ 130) | φ 185(165) |
| D6 | 4-φ 3.4 | 4-φ 5 | 4-φ 6.5 | 4-φ 9 | 4-φ 11 |
| D7 | φ 46(45~70) | φ 70(70~130) | φ 90(70~145) | φ 145(90~165) | φ 200(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 | φ 8 | φ 8 | φ 18 | φ 25 | φ 35 |
| K3 | 9.2 | 9.2 | 21 | 28 | 38.3 |
| K4 | φ 11 | φ 11 | φ 24 | φ 32 | φ 42 |
| K5 | 20 | 20 | 30 | 40 | 52 |
| K6 | 24 | 24 | 35 | 48 | 58 |

- 注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
- 注2: 減速機出力軸可以為客戶定制大小和長短。
- 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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

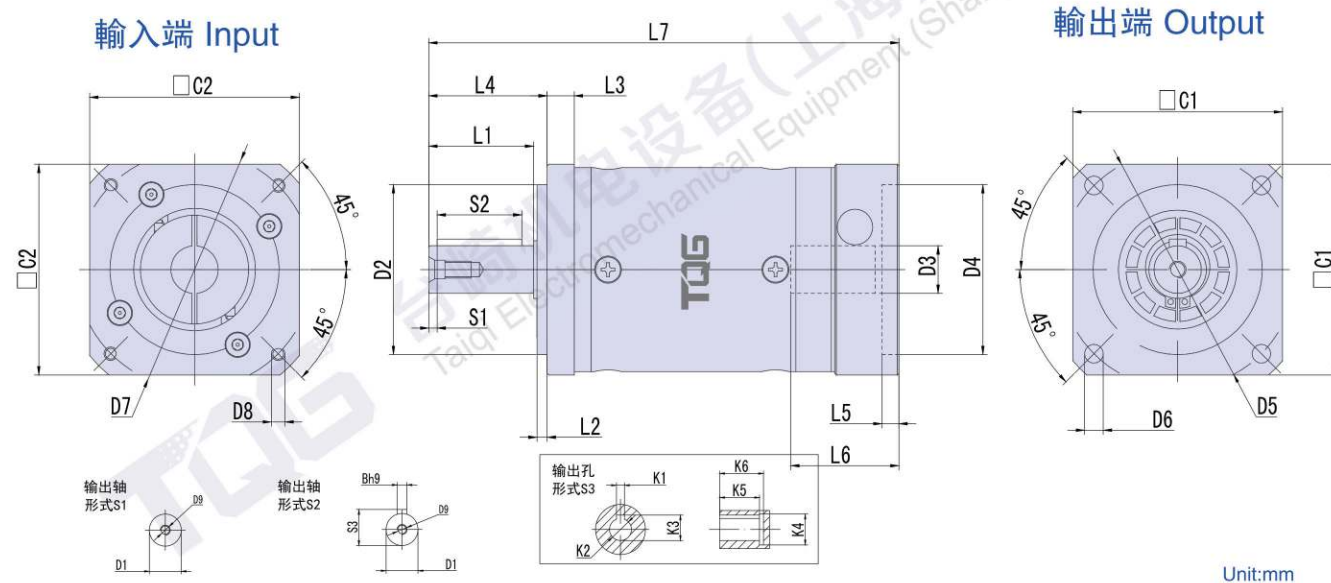
MODEL: PLF

雙段 2-Stage

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



外形尺寸圖 Dimensions:



| 尺寸 Size | PLF040-L2 | PLF060-L2 | PLF080-L2 | PLF120-L2 | PLF160-L2 |
|------------|-------------|--------------|--------------|---------------|------------------|
| D1 | φ 12(13) | φ 14(16) | φ 20(22) | φ 25(32) | φ 40 |
| D2 | φ 26 | φ 50 | φ 80 | φ 110 | φ 130 |
| D3 | φ 8(≤11) | φ 14(≤19) | φ 19(≤24) | φ 24(≤32) | φ 35(42) |
| D4 | φ 30(30-50) | φ 50(50-70) | φ 70(50-110) | φ 110(70-130) | φ 114.3(110-150) |
| D5 | φ 48 | (φ 70) | (φ 100) | (φ 130) | φ 185(165) |
| D6 | 4-φ 3.4 | 4-φ 5 | 4-φ 6.5 | 4-φ 9 | 4-φ 11 |
| D7 | φ 46(45-70) | φ 70(70-130) | φ 90(70-145) | φ 145(90-165) | φ 200(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 | φ 8 | φ 8 | φ 18 | φ 25 | φ 35 |
| K3 | 9.2 | 9.2 | 21 | 28 | 38.3 |
| K4 | φ 11 | φ 11 | φ 24 | φ 32 | φ 42 |
| K5 | 20 | 20 | 30 | 40 | 52 |
| K6 | 24 | 24 | 35 | 48 | 58 |

注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
 注2: 減速機出力軸可以為客戶定制大小和長短。
 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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PRECISION PLANETARY REDUCERS 精密行星減速機

PLE



- 1. 静音**
使用斜齒輪實現順暢安靜地運轉。
 - 2. 高精度**
背隙低於3分、定位精確。
 - 3. 高剛性、高扭矩**
使用整體式滾子軸承, 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 contribute to reduce vibration and noise.
 - 2. High precision**
Standard backlash is 3 arc-min, ideal for precision control.
 - 3. High rigidity & torque**
High rigidity & high torque were achieved by uncaged needle roller bearings.
 - 4. Adapter-bushing connection**
Can be attached to any motor all over the world.
 - 5. No grease leakage**
Perfect solution using high viscosity anti-separation grease.
 - 6. Maintenance-free**
No need to replace the grease for the life of the unit. Can be attached in any position.

減速機的選型/Indication of Model Numbers

PLE 系列/PLE Series

PLE 080 - 10 - S1 - P1 / 馬達

| | | |
|--|---|--|
| 減速機型式/Type 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: 輸出為孔 Output for holes | 馬達型號/Motor Type 馬達製造商及型號 Motor manufacturer and 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 參節/ 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 Class P0: 高精密背隙/Micro Backlash P0 P1: 精密背隙/Precision Backlash P1 P2: 標準背隙/Standard Backlash P2 | |

選型範例: PLE080-100-S2-P1/Panasonic MSMJ 082S1A
 Model Example: PLE080-100-S2-P1/Panasonic MSMJ 082S1A

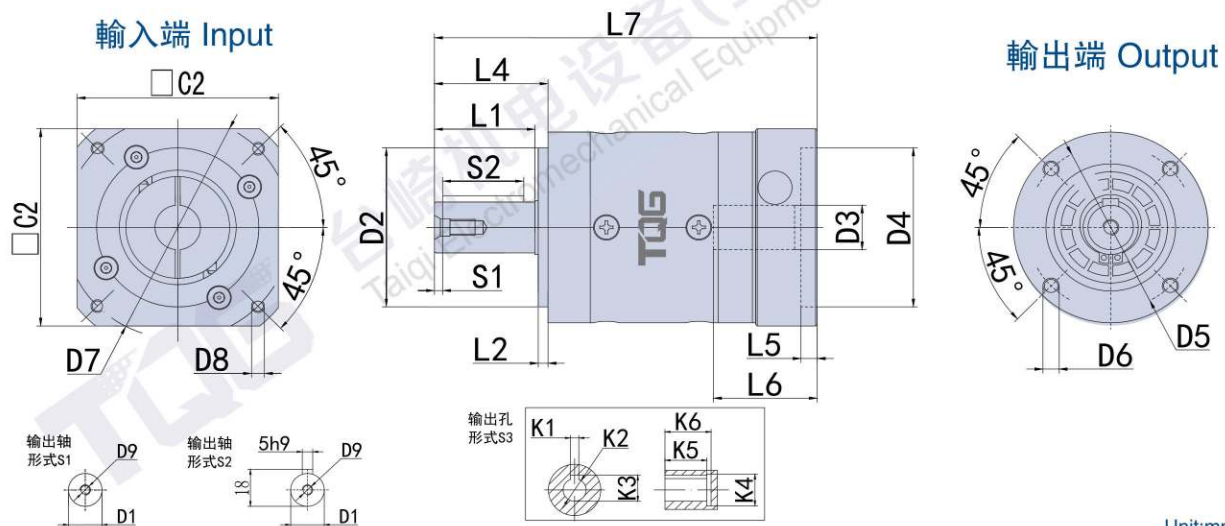
MODEL: PLE

雙段 2-Stage

速比: 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 | φ 12(13) | φ 14(16) | φ 20(22) | φ 25(32) | φ 40 |
| D2 | φ 26 | φ 40 | φ 60 | φ 80 | φ 130 |
| D3 | φ 8(≤11) | φ 14(≤19) | φ 19(≤24) | φ 24(≤32) | φ 35(42) |
| D4 | φ 30(30-50) | φ 50(50-70) | φ 70(50-110) | φ 110(70-110) | φ 114.3(110-150) |
| D5 | φ 34 | φ 52 | φ 70 | φ 100 | φ 145 |
| D6 | (4-M4) | (4-M5) | (4-M6) | (4-M10) | (4-M12) |
| D7 | φ 46(45-70) | φ 70(70-130) | φ 90(70-145) | φ 145(90-165) | φ 200(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 | φ 42 | φ 60 | φ 80 | φ 120 | φ 160 |
| 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 | φ 8 | φ 8 | φ 18 | φ 25 | φ 35 |
| K3 | 9.2 | 9.2 | 21 | 28 | 38.3 |
| K4 | φ 11 | φ 11 | φ 24 | φ 32 | φ 42 |
| K5 | 20 | 20 | 30 | 40 | 52 |
| K6 | 24 | 24 | 35 | 48 | 58 |

注1: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。

注2: 減速機出力軸可以為客戶定制大小和長短。

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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PRECISION PLANETARY REDUCERS

精密行星減速機

PAD



- 高精度**
背隙低于3分、定位精確。
 - 高剛性、高扭矩**
使用整體式滾子軸承, 大大提高了剛性和扭矩。
 - 高負載容量**
主軸承採用錐形滾針軸承, 實現高負載容量。
 - 法蘭、連接器方式**
可以安裝到世界上任何一臺馬達上。
 - 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。
 - 維護方便**
在產品壽命期內無需更換潤滑脂, 安裝更便捷。
- High precision**
Standard backlash is 3 arc-min, ideal for precision control
 - High rigidity & torque**
High rigidity & high torque were achieved by uncaged needle roller bearings.
 - High load capacity**
Adopting taper roller bearing for the main output shaft to increase radial and axial load.
 - Adapter-bushing connection**
Can be attached to any motor all over the world.
 - No grease leakage**
Perfect solution using high viscosity anti-separation grease.
 - Maintenance-free**
No need to replace the grease for the life of the unit. Can be attached in any position.

減速機的選型/Indication of Model Numbers

PAD 系列/PAD Series



選型範例: PAD090-100-S2-P1/Panasonic MSMJ 082S1A

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

PAD 減速機性能資料 Specification Table

| 規格 Model No | 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 |
| 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 | °C | 1,2 | 4~100 | (-15°C ~ +90°C) | | | | | | |
| 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 (n ₁ =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 / Moment of Inertia

| 規格 Model No | 單位 Unit | 節數 Stage | 減速比 Ratio | PAD047 | PAD064 | PAD090 | PAD110 | PAD140 | PAD200 | PAD255 |
|--|--------------------|----------|-----------|--------|--------|--------|--------|--------|--------|--------|
| 轉動慣量 J ₁ 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 |

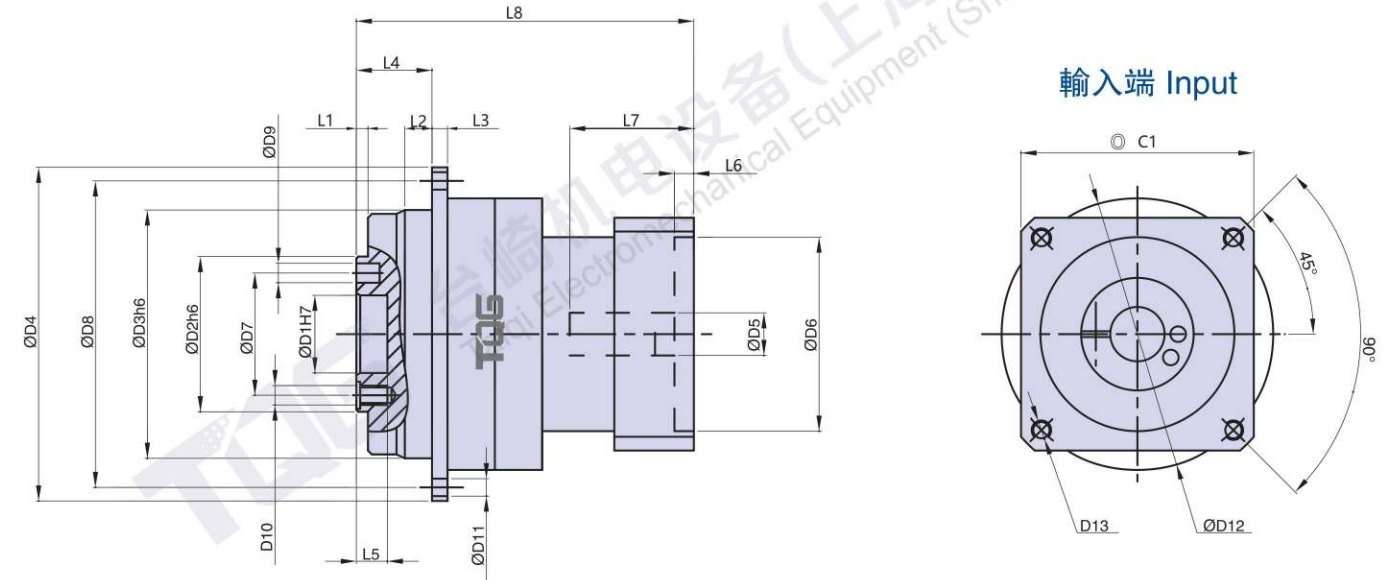
1. 最大減速比 (i=N_{in}/N_{out}) 2. 最大輸出力矩 T_{2B}=60% of T_{2NOT}
 3. 輸出轉數 100rpm 時, 作用於輸出法蘭位置, *連續連轉, 使用壽命為 15000hrs.
 1. 最大減速比 (i=N_{in}/N_{out}) 2. 最大輸出力矩 T_{2B}=60% of T_{2NOT}
 3. When output speed is 100rpm, acting on the output shaft center position, *Continuous operation, service life is 15000hrs.

MODEL: PAD

單段 1-Stage
 速比: 4, 5, 7, 10



外形尺寸圖 Dimensions:



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8 | Ø6x深度7 | Ø6x深度7 | Ø8x深度7 | Ø10x深度10 | Ø12x深度10 |
| D10 | 4-M3 | 7-M5x深度8 | 8-M6x深度12 | 11-M6x深度12 | 11-M8x深度17 | 11-M10x深度20 | 12-M16x深度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: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。 Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
 注2: 減速機出力軸可以為客戶定制大小和長短。 Note 2: The reducer output shaft size and length can be customized for customers.
 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 3: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

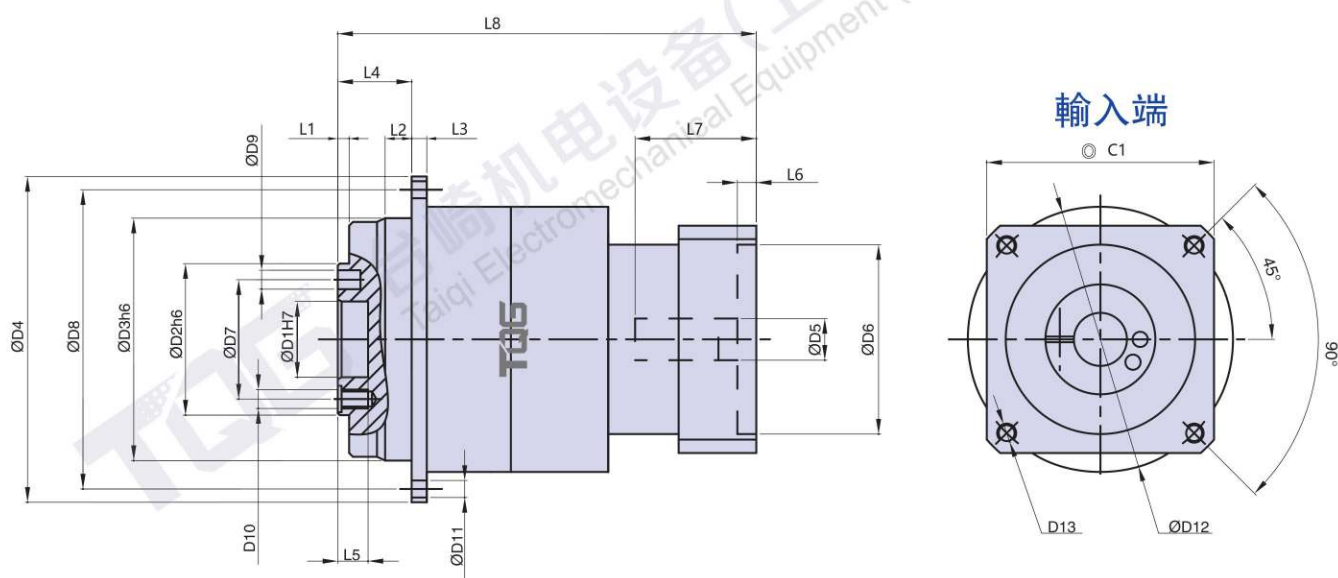
MODEL: PAD

雙段 2-Stage

速比: 20, 25, 28, 35, 40, 50, 70, 100



外形尺寸圖 Dimensions:



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8 | Ø6x深度7 | Ø6x深度7 | Ø8x深度7 | Ø10x深度10 | Ø12x深度10 |
| D10 | 4-M3 | 7-M5x深度8 | 8-M6x深度12 | 11-M6x深度12 | 11-M8x深度17 | 11-M10x深度20 | 12-M16x深度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: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。

注2: 減速機出力軸可以為客戶定制大小和長短。

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。

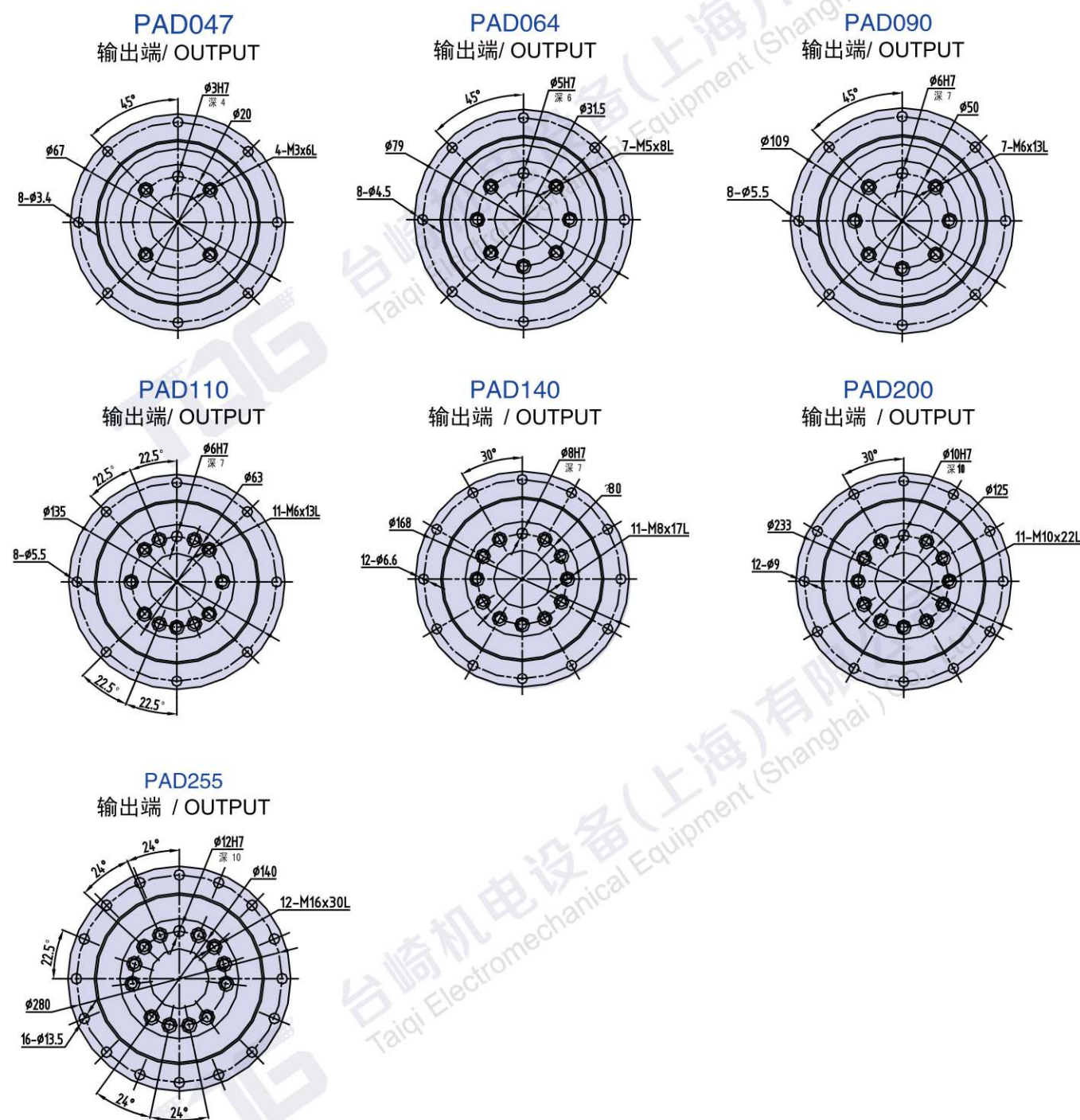
Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.

Note 2: The reducer output shaft size and length can be customized for customers.

Note 3: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

MODEL: PAD

輸出端尺寸圖 Dimensions:



PRECISION PLANETARY REDUCERS

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**
Right angle reducer using spiral bevel gear
Customer can locate the motor at 90 degree away from the reducer if required to save space.
- 2. High rigidity & torque**
High rigidity & high torque was achieved by uncaged needle roller bearings.
- 3. Adapter-bushing connection**
Can be attached to any motor all over the world.
- 4. No grease leakage**
Perfect solution by high viscosity anti-separation grease.
- 5. Maintenance-free**
No need to replace the grease for the life time.
Can be attached in any position.

減速機的選型/Indication of Model Numbers

PADR 系列/PADR Series

PADR 090 - 10 - S1 - P1 / 馬達

減速機型式/Type

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)

馬達型號/Motor Type

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 Class

P0: 高精度背隙/Micro Backlash P0
P1: 精密背隙/Precision Backlash P1
P2: 標準背隙/Standard Backlash P2

選型範例: PADR090-100-S2-P1/Panasonic MSMJ 082S1A

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

PADR 減速機性能資料 Specification Table

| 規格 Model No | 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 | | | |
| 最大輸出力矩 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 P_0 / Micro Backlash P_0 | arcmin | 1 | 4~10 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 |
| 精密背隙 P_1 / Precision Backlash P_1 | 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 P_2 / Standard Backlash P_2 | 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 N_{max}^3 | N | 1,2 | 4~100 | 43 | 125 | 235 | 430 | 1300 | 3064 | 5900 |
| 容許軸向力 F_{axB}^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 | °C | 1,2 | 4~100 | (-15°C ~ +90°C) | | | | | | |
| 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 ($n_1=3000$ rpm, 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 / Moment of Inertia

| 規格 Model No | 單位 Unit | 節數 Stage | 減速比 Ratio | PADR047 | PADR064 | PADR090 | PADR110 | PADR140 | PADR200 | PADR255 |
|---------------------------------|--------------------|-------------|--------------|---------|---------|---------|---------|---------|---------|---------|
| 轉動慣量 J_1 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 |
| | | | | 0.03 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | | 0.03 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | | 0.03 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | | 0.03 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 |

1. 減速比 ($i=N_{in}/N_{out}$)。 2. 最大輸出力矩 $T_{2B}=60\%$ of T_{2NOT} 。
3. 輸出轉數 100rpm 時，作用於輸出法蘭位置，*連續運轉使用壽命為 15000hrs。

1. Ratio ($i=N_{in}/N_{out}$) 2. 最大輸出力矩 $T_{2B}=60\%$ of T_{2NOT}
3. When output speed is 100rpm, acting on the output shaft center position *Continuous operation, service life is 15000hrs.

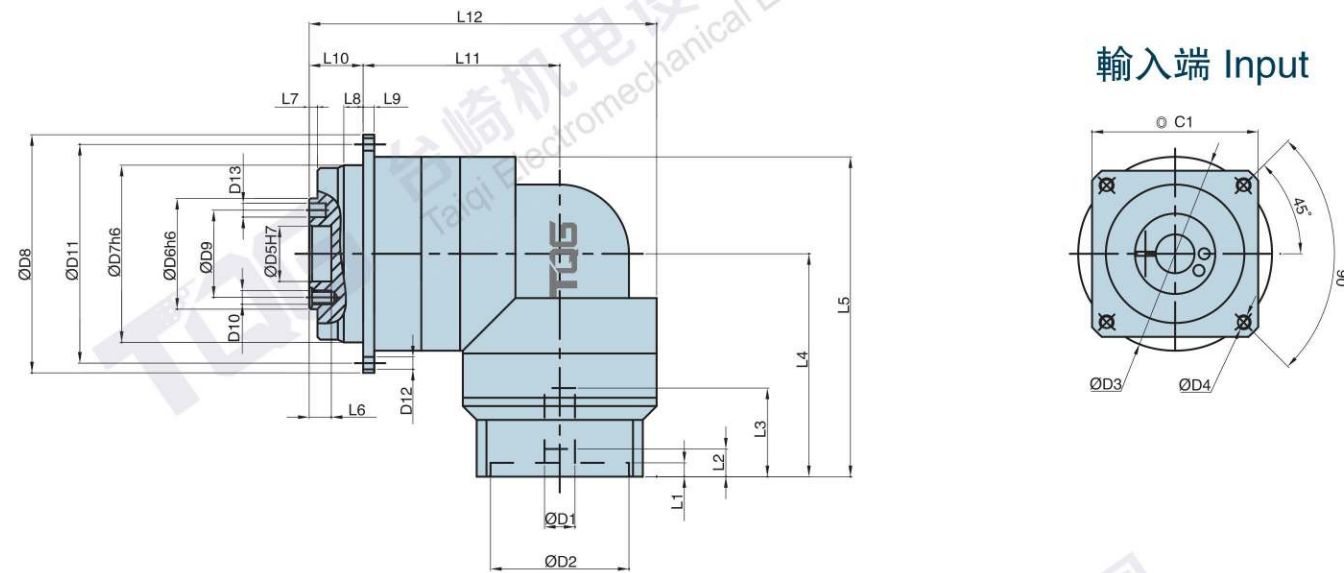
MODEL: PADR

單段 1-Stage

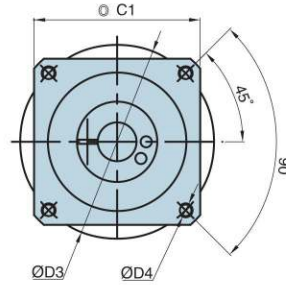
速比: 3, 4, 5, 7, 10



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8 | 8-M6x深度12 | 11-M6x深度12 | 11-M8x深度17 | 11-M10x深度20 | 12-M16x深度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8 | Ø6x深度7 | Ø6x深度7 | Ø8x深度7 | Ø10x深度10 | Ø12x深度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 |

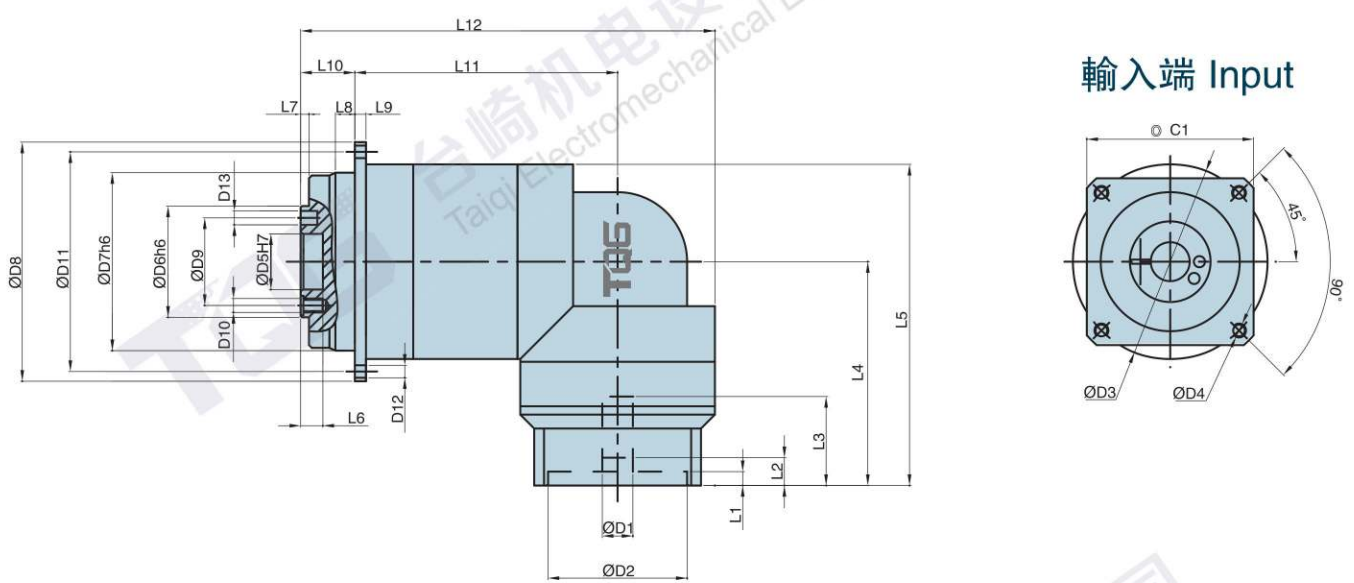
MODEL: PADR

雙段 2-Stage

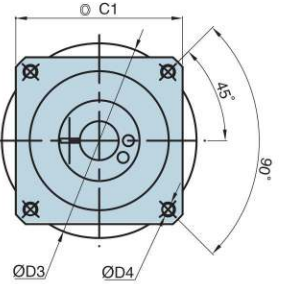
速比: 15, 20, 25, 30, 35, 40, 50, 70, 100



外形尺寸圖 Dimensions:



輸入端 Input

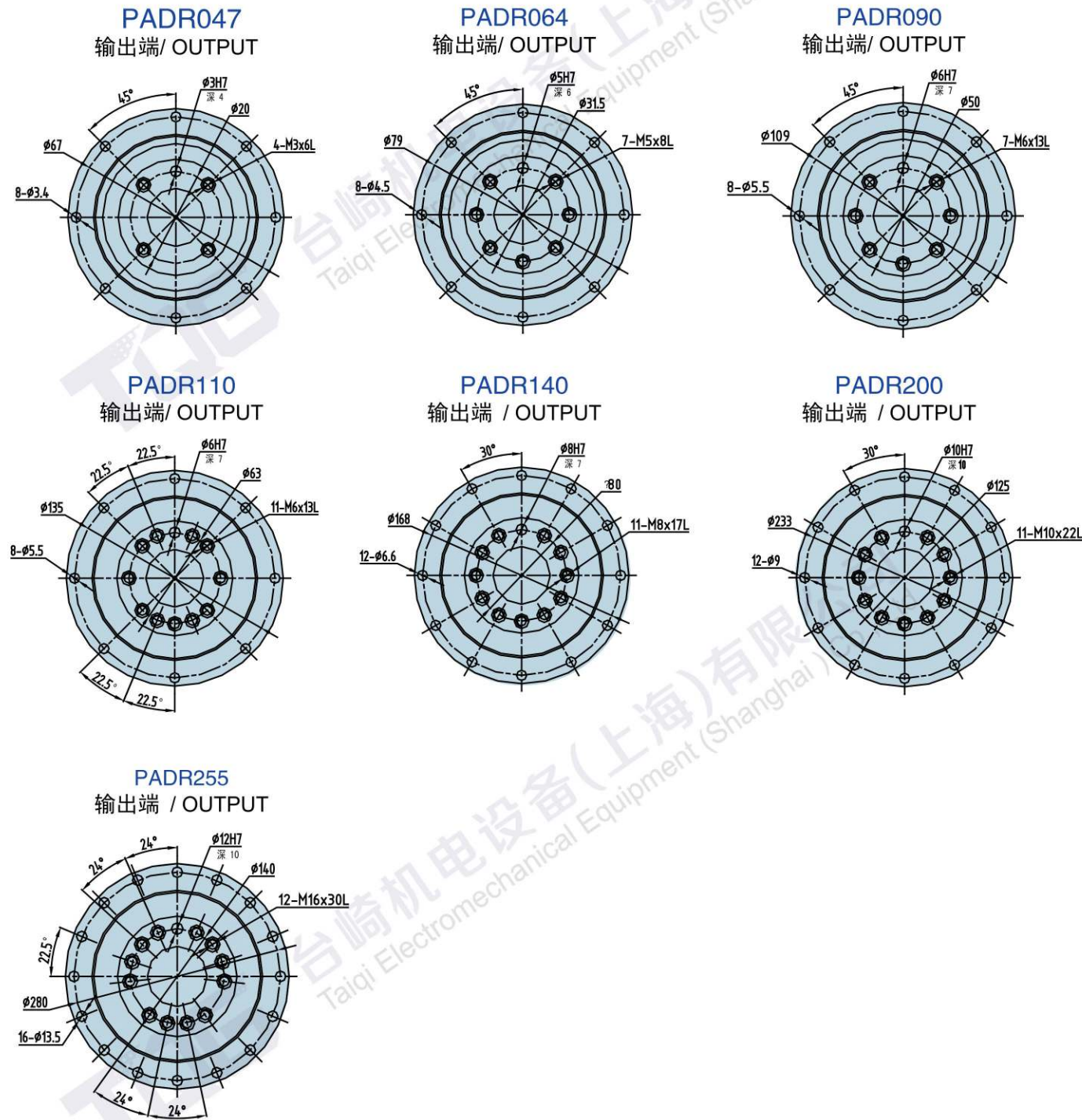


Unit:mm

| 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8 | 8-M6x深度12 | 11-M6x深度12 | 11-M8x深度17 | 11-M10x深度20 | 12-M16x深度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8 | Ø6x深度7 | Ø6x深度7 | Ø8x深度7 | Ø10x深度10 | Ø12x深度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 Dimensions:



PRECISION PLANETARY REDUCERS 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。
Integrated design of planet carrier and output shaft ensures the maximum torque stiffness and stability.
- 齒輪箱表面利用無電解鍍處理，連接板採藍色陽極處理，提高環境的耐受性和抗腐蝕能力。
Electroless Nickel deposition treatment and black anodizing treatment are employed to gear box surface and motor adapter module respectively. The tolerance to the environment and resistance to corrosion are enhanced.
- 最低的回程間隙 low backlash
- 高效率(95%) high efficiency (95%)
- 終生潤滑 life time lubrication

減速機的選型/Indication of Model Numbers

PAF 系列/PAF Series

| | | | | | | | | |
|---|---|---|---|----|--|----|---|----|
| PAF 090 | - | 10 | - | S1 | - | P1 | / | 馬達 |
| 減速機型式/Type 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: 輸出為孔 Output for holes | | | 馬達型號/Motor Type 馬達製造商及型號 Motor manufacturer and 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 Class P0: 高精度背隙/Micro Backlash P0 P1: 精密背隙/Precision Backlash P1 P2: 標準背隙/Standard Backlash P2 | | | |

選型範例: PAF090-100-S2-P1/Panasonic MSMJ 082S1A

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

PAF 減速機性能資料 Specification Table

| 規格 Model No | 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} / 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 _{2r} / Max. Radial Force | N | 1,2 | 3~100 | 750 | 1130 | 3000 | 6700 | 9150 | 14500 | 48500 | |
| 容許軸向力 F _{2a} / 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 | °C | 1,2 | 3~100 | (-15°C ~ +90°C) | | | | | | | |
| 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 / Moment of Inertia

| 規格 Model No | 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 |

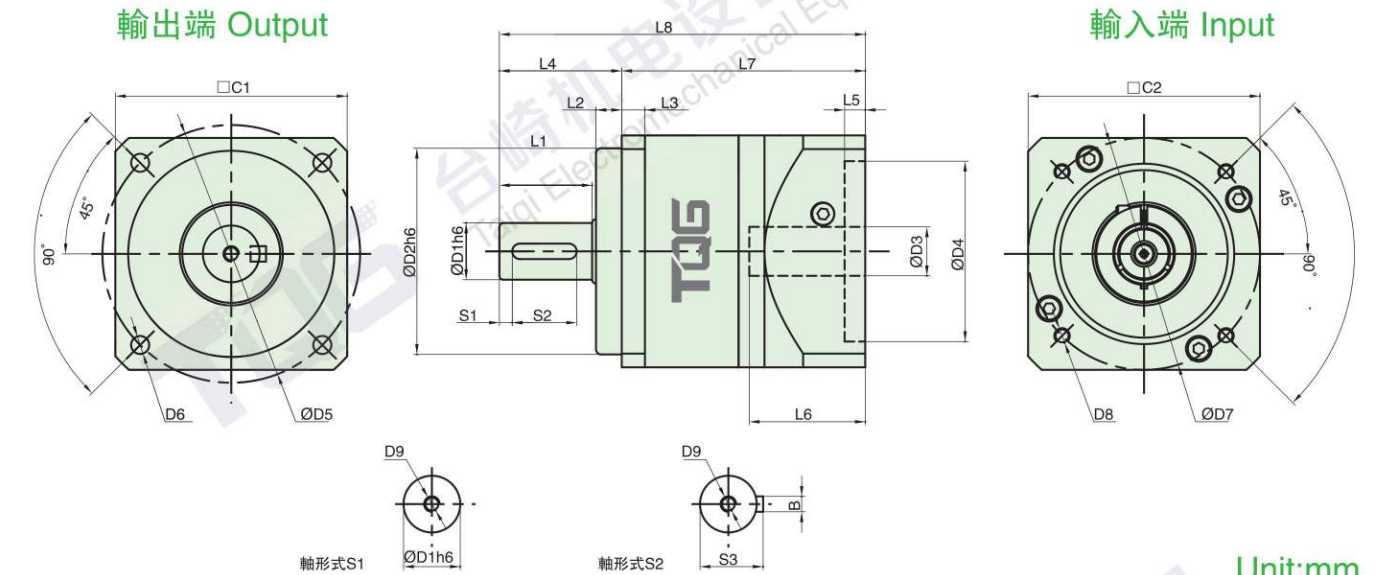
1. 最大加速力矩 T_{2B}=60% of T_{2NOT} 2. 輸出轉數 100rpm 時，作用於輸出軸中心位置。
 3. 三段大減速比不在上表中，有軸加長和加大設計，需要用到請告知銷售人員。
 1. The Max. acceleration torque T_{2B}=60% 2. When output speed is 100rpm, acting on the output shaft center position
 3. 3-stage big ratios are not in the above table. There is shaft lengthening and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

MODEL: PAF

單段 1-Stage
 速比: 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: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。 Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
 注2: 減速機出力軸可以為客戶定制大小和長短。 Note 2: The reducer output shaft size and length can be customized for customers.
 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 3: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

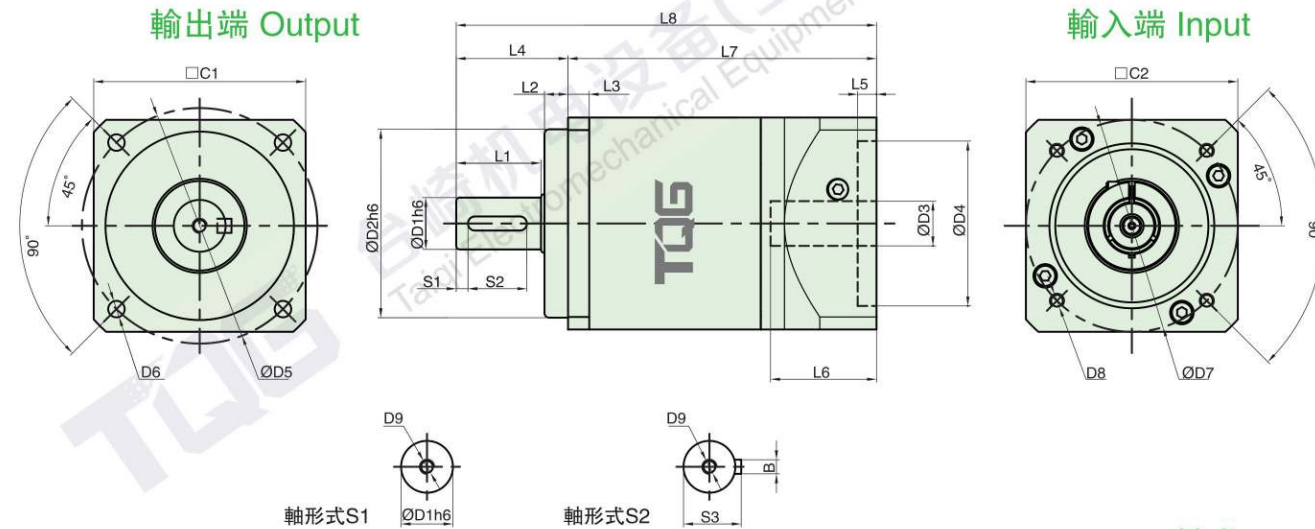
MODEL: PAF

雙段 2-Stage

速比: 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: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。

注2: 減速機出力軸可以為客戶定制大小和長短。

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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PRECISION PLANETARY REDUCERS

精密行星減速機

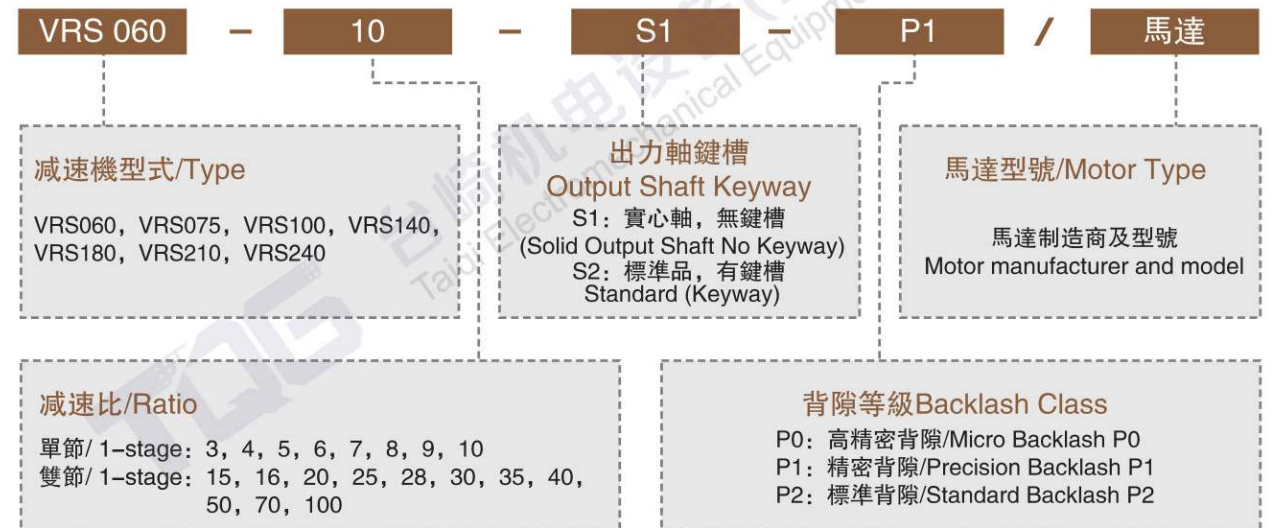
VRS



- 高精度**
背隙低於3分、定位精確。
 - 高剛性、高扭矩**
使用整體式滾子軸承, 大大提高了剛性和扭矩。
 - 高負載容量**
主軸承採用錐形滾針軸承, 實現高負載容量。
 - 法蘭、連接器方式**
可以安裝到世界上任何一臺馬達上。
 - 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。
 - 維護方便**
在產品壽命期內無需更換潤滑脂, 安裝更便捷。
- High precision**
Standard backlash is 3 arc-min, ideal for precision control
 - High rigidity & torque**
High rigidity & high torque were achieved by uncaged needle roller bearings.
 - High load capacity**
Adopting taper roller bearing for the main output shaft to increase radial and axial load.
 - Adapter-bushing connection**
Can be attached to any motor all over the world.
 - No grease leakage**
Perfect solution using high viscosity anti-separation grease.
 - Maintenance-free**
No need to replace the grease for the life of the unit. Can be attached in any position.

減速機的選型/Indication of Model Numbers

VRS 系列/VRS Series



選型範例: VRS180-100-S2-P1/Panasonic MSMJ 082S1A

Model Example: VRS180-100-S2-P1/Panasonic MSMJ 082S1A

VRS 減速機性能資料 Specification Table

| 規格 Model No | 單位 Unit | 節數 Stage | 減速比 Ratio | VRS060 | VRS075 | VRS100 | VRS140 | VRS180 | VRS210 | VRS240 | |
|--|-----------|----------|-----------|---------------------------|--|--------|--------|--------|--------|--------|------|
| 額定輸出扭矩 T _{2N0T} 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 | |
| | | 3 | 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 _{2N0T} ¹ / Max. Output Torque | Nm | | 1,2 | 3~100 | 3倍額定輸出扭矩/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 _{2aB} ² / Max. Radial Force | N | 1,2 | 3~100 | 2750 | 4100 | 6400 | 9880 | 15000 | 20000 | 27500 | |
| 容許軸向力 F _{2a1B} 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 | °C | 1,2 | 3~100 | (-15°C ~ +90°C) | | | | | | | |
| 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/Moment of Inertia/

| 規格 Model No | 單位 Unit | 節數 Stage | 減速 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. *連續運轉, 使用壽命為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

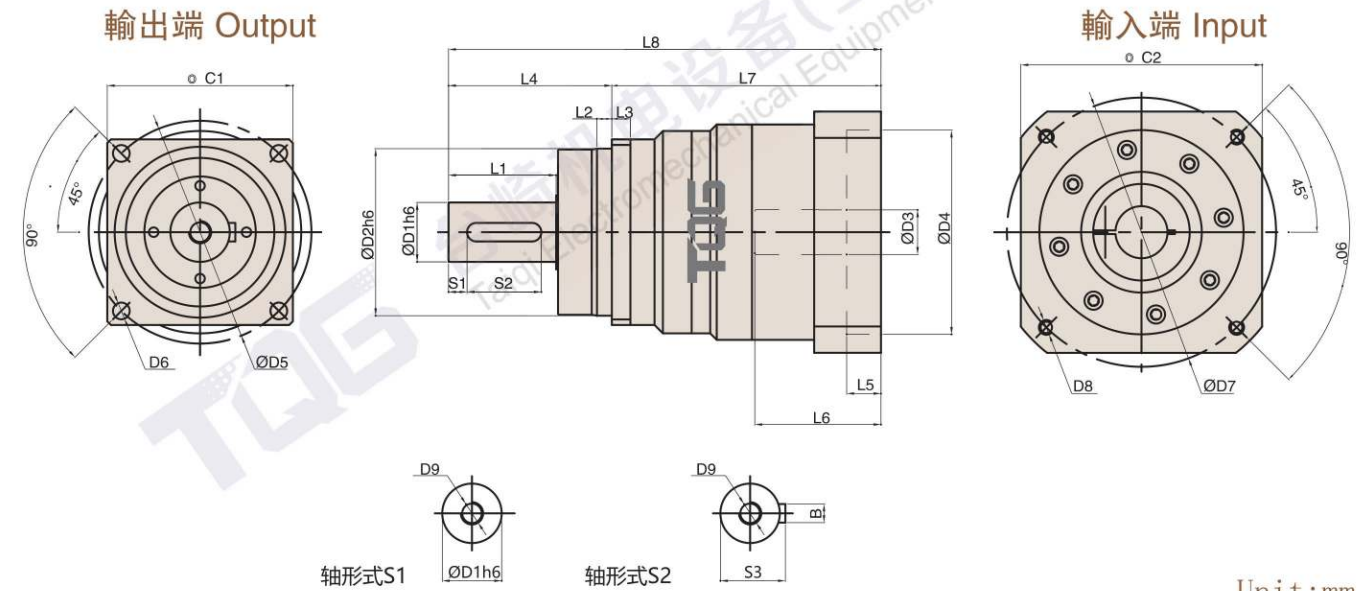
MODEL: VRS

單段 1-Stage

速比: 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: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。 Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
 注2: 減速機出力軸可以為客戶定制大小和長短。 Note 2: The reducer output shaft size and length can be customized for customers.
 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 3: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

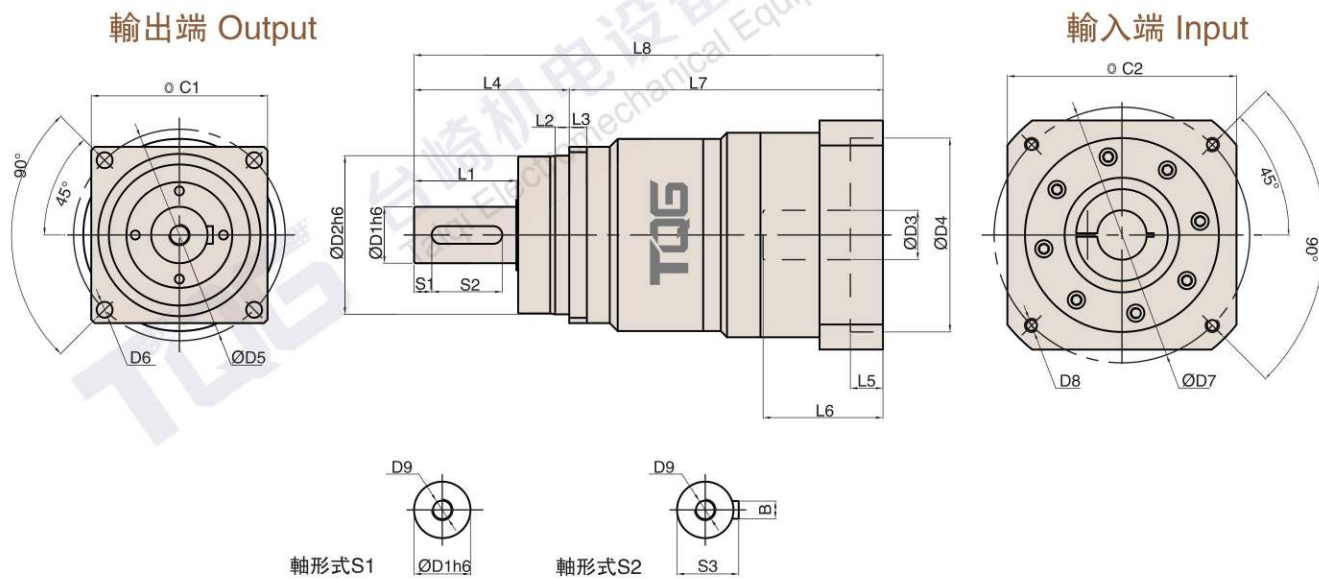
MODEL: VRS

雙段 2-Stage

速比: 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: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。

注2: 減速機出力軸可以為客戶定制大小和長短。

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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PRECISION PLANETARY REDUCERS

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

Right angle reducer using spiral bevel gear
Customer can locate the motor at 90 degree away from the reducer if required to save space.

2.High rigidity & torque

High rigidity & high torque was achieved by uncaged needle roller bearings.

3.Adapter-bushing connection

Can be attached to any motor all over the world.

4.No grease leakage

Perfect solution by high viscosity anti-separation grease.

5.Maintenance-free

No need to replace the grease for the life time.
Can be attached in any position.

減速機的選型/Indication of Model Numbers

PFR 系列/PFR Series

PFR 080 - 10 - S1 - P1 / 馬達

減速機型式/Type

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: 輸出為孔
Output for holes

馬達型號/Motor Type

馬達製造商及型號
Motor manufacturer and 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
參節/ 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 Class

P0: 高精度背隙/Micro Backlash P0
P1: 精密背隙/Precision Backlash P1
P2: 標準背隙/Standard Backlash P2

選型範例: PFR080-100-S2-P1/Panasonic MSMJ 082S1A

Models Example: PFR080-100-S2-P1/Panasonic MSMJ 082S1A

PFR 減速機性能資料 Specification Table

| 規格 Model No | 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 _{2B} ² / Max. Radial Force | N | 1,2 | 3~100 | 320 | 460 | 1300 | 3200 | 6520 |
| 容許軸向力F _{2A} ^{1B} / 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 | °C | 1,2 | 3~100 | -25°C~+90°C | | | | |
| 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/Moment of Inertia/

| 規格 Model No | 單位 Unit | 節數 Stage | 減速比 Ratio | PFR040 | PFR060 | PFR080 | PFR120 | PFR160 |
|---|--------------------|----------|-----------|--------|--------|--------|--------|--------|
| 轉動慣量J ₁ 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 |

- 最大加速力矩T_{2B}=60% of T_{2NOT} 2.輸出轉數100rpm時，作用于輸出軸中心位置。
- 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。
- The Max. acceleration torque T_{2B}=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

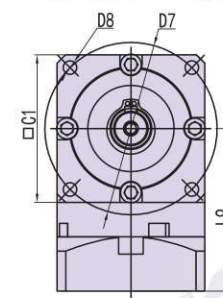
單段 1-Stage

速比: 3, 4, 5, 6, 7, 8, 9, 10, 14, 20

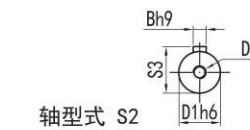
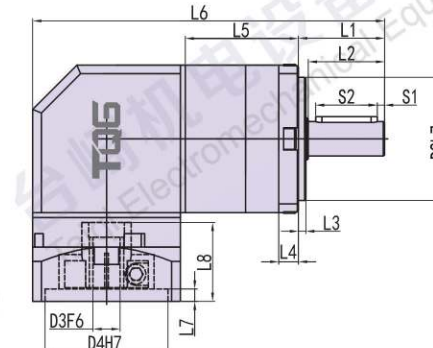


外形尺寸圖 Dimensions:

輸出端 Output



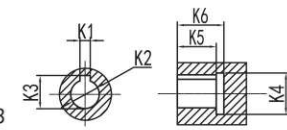
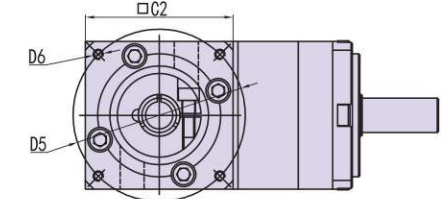
軸型式 S1



軸型式 S2

輸出端為孔尺寸 S3

輸入端 Input



Unit:mm

| 尺寸 Size | PFR060-L1 | PFR080-L1 | PFR120-L1 | PFR160-L1 |
|---------|--------------------|-------------------|----------------------|-------------------------|
| D1 | φ 14(16) | φ 20 (22) | φ 25 (32) | φ 40 |
| D2 | φ 50 | φ 80 | φ 110 | φ 130 |
| D3 | φ 14 (φ 6.35-19) | φ 19 (φ 11-24) | φ 22 (φ 16-24) | φ 35 (φ 22-38) |
| D4 | φ 50 (φ 30-70) | φ 70 (φ 50-110) | φ 110 (φ 55.5-110) | φ 114.3 (φ 110-114.3) |
| D5 | φ 70 (φ 45-90) | φ 90 (φ 70-145) | φ 145 (φ 90-155) | φ 200 (φ 145-200) |
| D6 | 4-M4 (M3-M6) | 4-M5 (M4-M8) | 4-M8 (M6-M12) | 4-M12 (M8-M12) |
| D7 | φ 70 | φ 100 | φ 130 | φ 185 |
| D8 | 4-φ 5.5 | 4-φ 6.5 | 4-φ 8.5 | 4-φ 11 |
| 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 | φ 11 | φ 22 | φ 28 | φ 38 |
| K3 | 12.8 | 24.5 | 31.3 | 41.3 |
| K4 | φ 16 | φ 32 | φ 38 | φ 48 |
| K5 | 15 | 20 | 27 | 35 |
| K6 | 18 | 24 | 32 | 40 |

MODEL: PFR

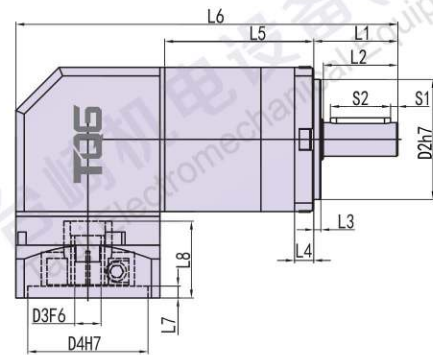
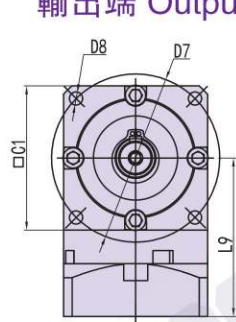
雙段 2-Stage

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

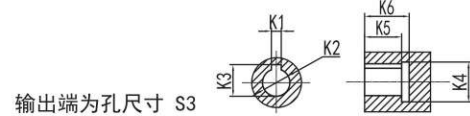
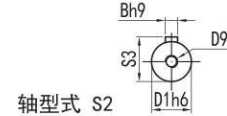
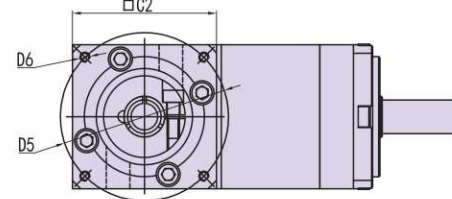


外形尺寸圖 Dimensions:

輸出端 Output



輸入端 Input



Unit:mm

| 尺寸 Size | PFR060-L2 | PFR080-L2 | PFR120-L2 | PFR160-L2 |
|---------|--------------------|-------------------|----------------------|-------------------------|
| D1 | φ 14 (16) | φ 20 (22) | φ 25 (32) | φ 40 |
| D2 | φ 50 | φ 80 | φ 110 | φ 130 |
| D3 | φ 14 (φ 6.35-19) | φ 19 (φ 11-24) | φ 22 (φ 16-24) | φ 35 (φ 22-38) |
| D4 | φ 50 (φ 30-70) | φ 70 (φ 50-110) | φ 110 (φ 55.5-110) | φ 114.3 (φ 110-114.3) |
| D5 | φ 70 (φ 45-90) | φ 90 (φ 70-145) | φ 145 (φ 90-155) | φ 200 (φ 145-200) |
| D6 | 4-M4 (M3-M6) | 4-M5 (M4-M8) | 4-M8 (M6-M12) | 4-M12 (M8-M12) |
| D7 | φ 70 | φ 100 | φ 130 | φ 185 |
| D8 | 4-φ 5.5 | 4-φ 6.5 | 4-φ 8.5 | 4-φ 11 |
| 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 | φ 11 | φ 22 | φ 28 | φ 38 |
| K3 | 12.8 | 24.5 | 31.3 | 41.3 |
| K4 | φ 16 | φ 32 | φ 38 | φ 48 |
| K5 | 15 | 20 | 27 | 35 |
| K6 | 18 | 24 | 32 | 40 |

PRECISION PLANETARY REDUCERS

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

Right angle reducer using spiral bevel gear
Customer can locate the motor at 90 degree away from the reducer if required to save space.

2.High rigidity & torque

High rigidity & high torque was achieved by uncaged needle roller bearings.

3.Adapter-bushing connection

Can be attached to any motor all over the world.

4.No grease leakage

Perfect solution by high viscosity anti-separation grease.

5.Maintenance-free

No need to replace the grease for the life time.
Can be attached in any position.

減速機的選型/Indication of Model Numbers

PER 系列/PER Series



選型範例: PER080-100-S2-P1/Panasonic MSMJ 082S1A

Models Example: PFR080-100-S2-P1/Panasonic MSMJ 082S1A

PER 減速機性能資料 Specification Table

| 規格 Model No | 單位 Unit | 節數 Stage | 減速比 Ratio | PER040 | PER060 | PER080 | PER120 | PER160 |
|---|-----------|----------|-----------|--|--------|--------|--------|--------|
| 額定輸出扭矩 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 _{2N01} / Max. Output Torque | Nm | 1,2 | 3~100 | 3倍額定輸出扭矩/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 _{2B} 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 / Moment of Inertia

| 規格 Model No | 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 T_{2B}=60% of T_{2NOT}。 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 T_{2B}=60% of T_{2NOT} 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

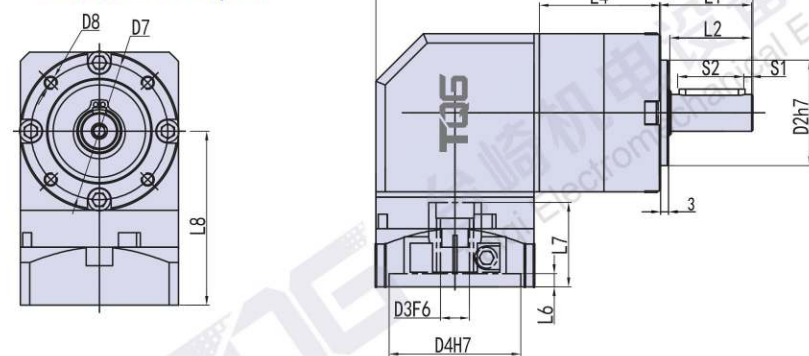
單段 1-Stage

速比: 3, 4, 5, 6, 7, 8, 9, 10, 14, 20

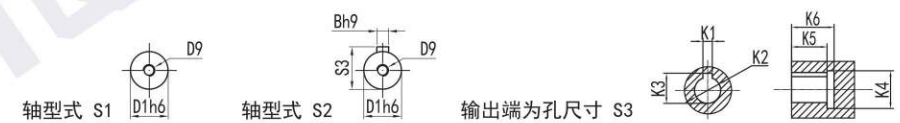
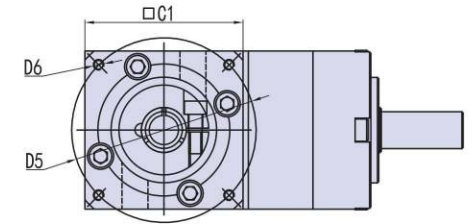


外形尺寸圖 Dimensions:

輸出端 Output



輸入端 Input



Unit:mm

| 尺寸 Size | PER060-L1 | PER080-L1 | PER120-L1 | PER160-L1 |
|---------|--------------------|-------------------|----------------------|-------------------------|
| D1 | φ 14 (16) | φ 20 (22) | φ 25 (32) | φ 40 |
| D2 | φ 40 | φ 60 | φ 80 | φ 130 |
| D3 | φ 14 (φ 6.35-19) | φ 19 (φ 11-24) | φ 22 (φ 16-24) | φ 35 (φ 22-38) |
| D4 | φ 50 (φ 30-70) | φ 70 (φ 50-110) | φ 110 (φ 55.5-110) | φ 114.3 (φ 110-114.3) |
| D5 | φ 70 (φ 45-90) | φ 90 (φ 70-145) | φ 145 (φ 90-155) | φ 200 (φ 145-200) |
| D6 | 4-M4 (M3-M6) | 4-M5 (M4-M8) | 4-M8 (M6-M12) | 4-M12 (M8-M12) |
| D7 | φ 52 | φ 70 | φ 100 | φ 145 |
| 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 | φ 11 | φ 22 | φ 28 | φ 38 |
| K3 | 12.8 | 24.5 | 31.3 | 41.3 |
| K4 | φ 16 | φ 32 | φ 38 | φ 48 |
| K5 | 15 | 20 | 27 | 35 |
| K6 | 18 | 24 | 32 | 40 |

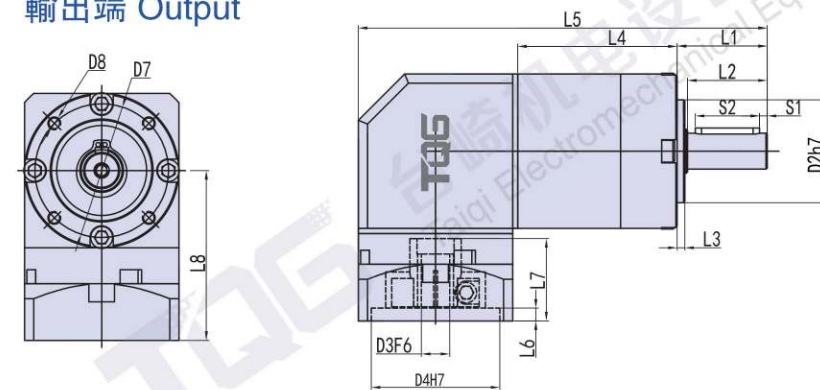
MODEL: PER

雙段 2-Stage

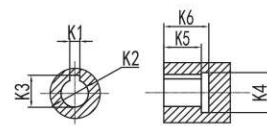
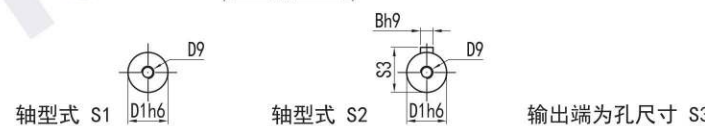
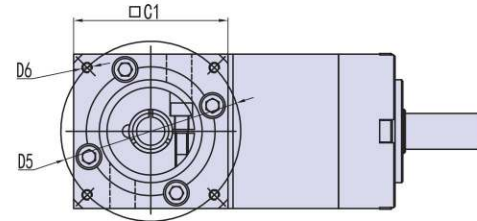
速比: 15, 20, 25, 30, 35, 40, 50, 70, 80, 100
120, 140, 160, 180, 200

外形尺寸圖 Dimensions:

輸出端 Output



輸入端 Input



Unit:mm

| 尺寸 Size | PER060-L2 | PER080-L2 | PER120-L2 | PER160-L2 |
|------------|--------------------|-------------------|----------------------|-------------------------|
| D1 | φ 14 (16) | φ 20 (22) | φ 25 (32) | φ 40 |
| D2 | φ 40 | φ 60 | φ 80 | φ 130 |
| D3 | φ 14 (φ 6.35-19) | φ 19 (φ 11-24) | φ 22 (φ 16-24) | φ 35 (φ 22-38) |
| D4 | φ 50 (φ 30-70) | φ 70 (φ 50-110) | φ 110 (φ 55.5-110) | φ 114.3 (φ 110-114.3) |
| D5 | φ 70 (φ 45-90) | φ 90 (φ 70-145) | φ 145 (φ 90-155) | φ 200 (φ 145-200) |
| D6 | 4-M4 (M3-M6) | 4-M5 (M4-M8) | 4-M8 (M6-M12) | 4-M12 (M8-M12) |
| D7 | φ 52 | φ 70 | φ 100 | φ 145 |
| 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 | φ 11 | φ 22 | φ 28 | φ 38 |
| K3 | 12.8 | 24.5 | 31.3 | 41.3 |
| K4 | φ 16 | φ 32 | φ 38 | φ 48 |
| K5 | 15 | 20 | 27 | 35 |
| K6 | 18 | 24 | 32 | 40 |

PRECISION PLANETARY REDUCERS 精密行星減速機

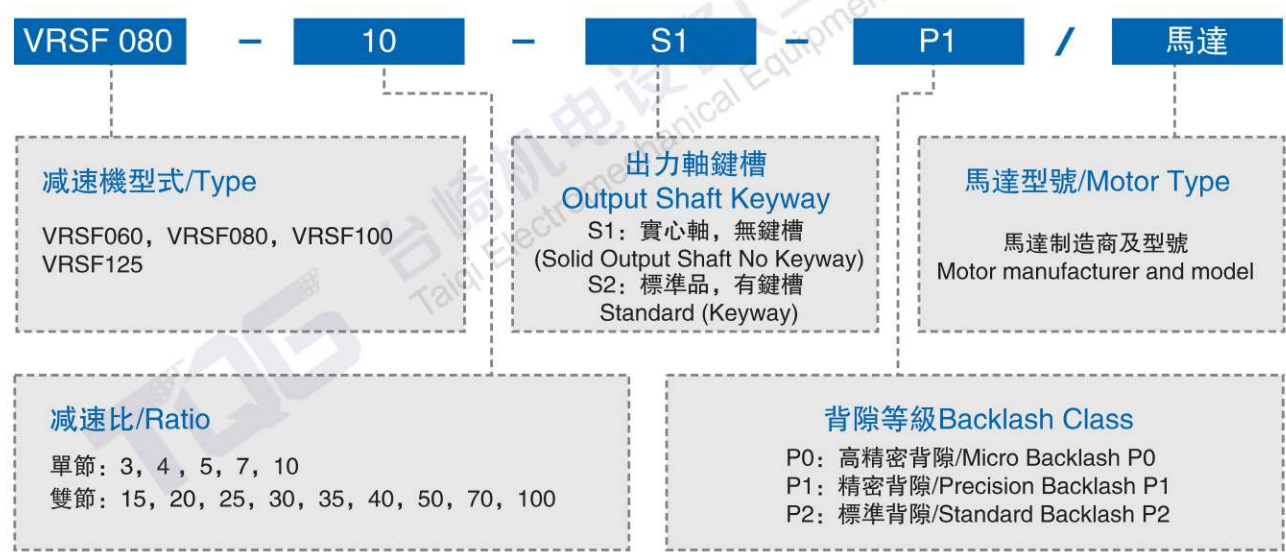
VRSF



- 1. 静音**
使用斜齒輪實現順暢安靜地運轉。
 - 2. 高精度**
背隙低於3分、定位精確。
 - 3. 高剛性、高扭矩**
使用整體式滾子軸承，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 contribute to reduce vibration and noise.
 - 2. High precision**
Standard backlash is 3 arc-min, ideal for precision control.
 - 3. High rigidity & torque**
High rigidity & high torque were achieved by uncaged needle roller bearings.
 - 4. Adapter-bushing connection**
Can be attached to any motor all over the world.
 - 5. No grease leakage**
Perfect solution using high viscosity anti-separation grease.
 - 6. Maintenance-free**
No need to replace the grease for the life of the unit. Can be attached in any position.

減速機的選型/Indication of Model Numbers

VRSF 系列/VRSF Series



選型範例: VRSF080-100-S2-P1/Panasonic MSMJ 082S1A
Model Example: VRSF080-100-S2-P1/Panasonic MSMJ 082S1A

VRSF 減速機性能資料 Specification Table

| 規格 Model No | 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 N _{axB} ³ | N | 1,2 | 3~100 | 800 | 1200 | 3200 | 5220 |
| 容許轉向力 F _{ax1B} 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 | °C | 1,2 | 3~100 | -25°C~+90°C | | | |
| 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 | ≤60 | ≤62 | ≤65 | ≤67 |

減速機轉動慣量 / Moment of Inertia

| 規格 Model No | 單位 Unit | 節數 Stage | 減速比 Ratio | VRSF060 | VRSF080 | VRSF100 | VRSF125 |
|--|--------------------|----------|-----------|---------|---------|---------|---------|
| 轉動慣量 J ₁ Moment of Inertia | kg.cm ² | 1 | 3 | 0.16 | 0.61 | 3.25 | 9.21 |
| | | | 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 |
| | | 2 | 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 |
| | | | 12~40 | 0.03 | 0.13 | 0.47 | 2.71 |
| | | | 50~100 | 0.03 | 0.13 | 0.44 | 2.57 |

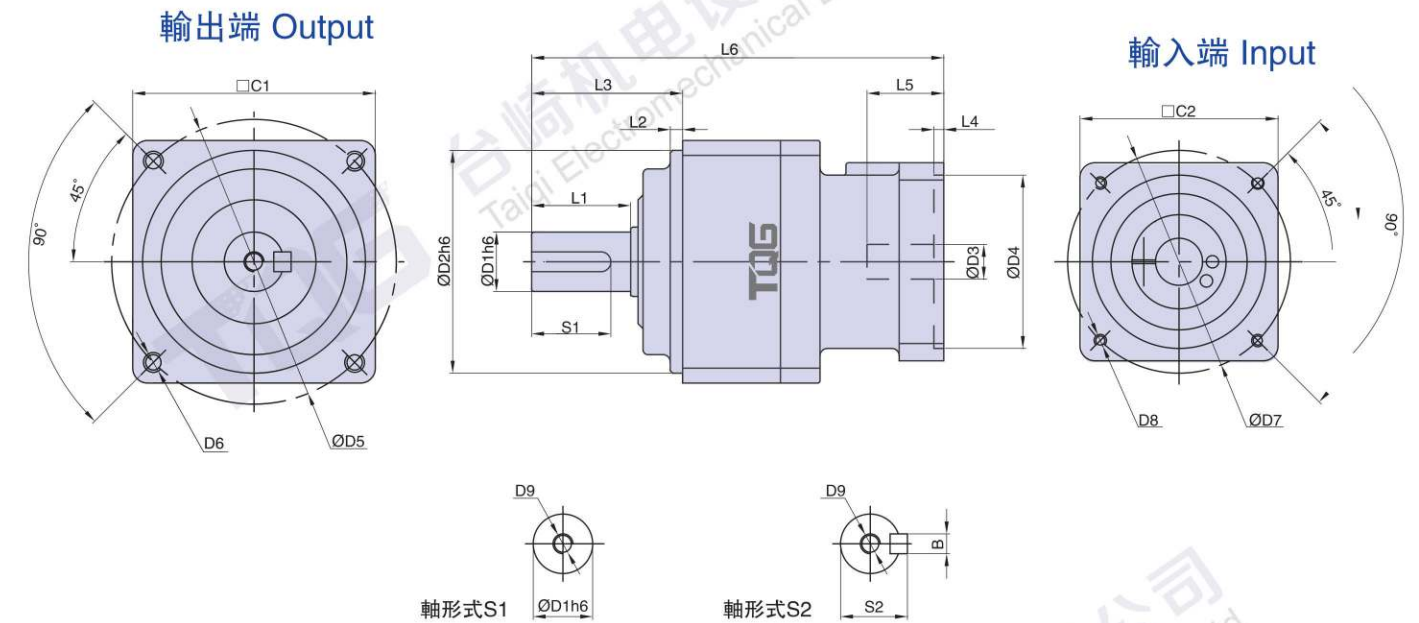
1. 減速比 (i=Nin/Nout)。 2. 最大輸出力矩 T_{2B}=60% of T_{2NOT}。
 3. 輸出轉速 100rpm 時，作用于輸出法蘭位置，*連續運轉使用壽命為 15000hrs。
 1. Ratio (i=Nin/Nout) 2. 最大輸出力矩 T_{2B}=60% of T_{2NOT}。
 3. When output revolution is 100rpm, acting on the output shaft center position, *Continuous operation, service life is 15000hrs

MODEL: VRSF

單段 1-Stage
 速比: 3, 4, 5, 7, 10



外形尺寸圖 Dimensions:



| 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: () 括號內為可選擇範圍尺寸，() 括號外為標準尺寸。
 Note 1: Inside of () is the optional range of sizes, outside of () is the standard sizes.
 注2: 減速機輸出軸可以為客戶定制大小和長短。
 Note 2: The reducer output shaft size and length can be customized for customers.
 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 3: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

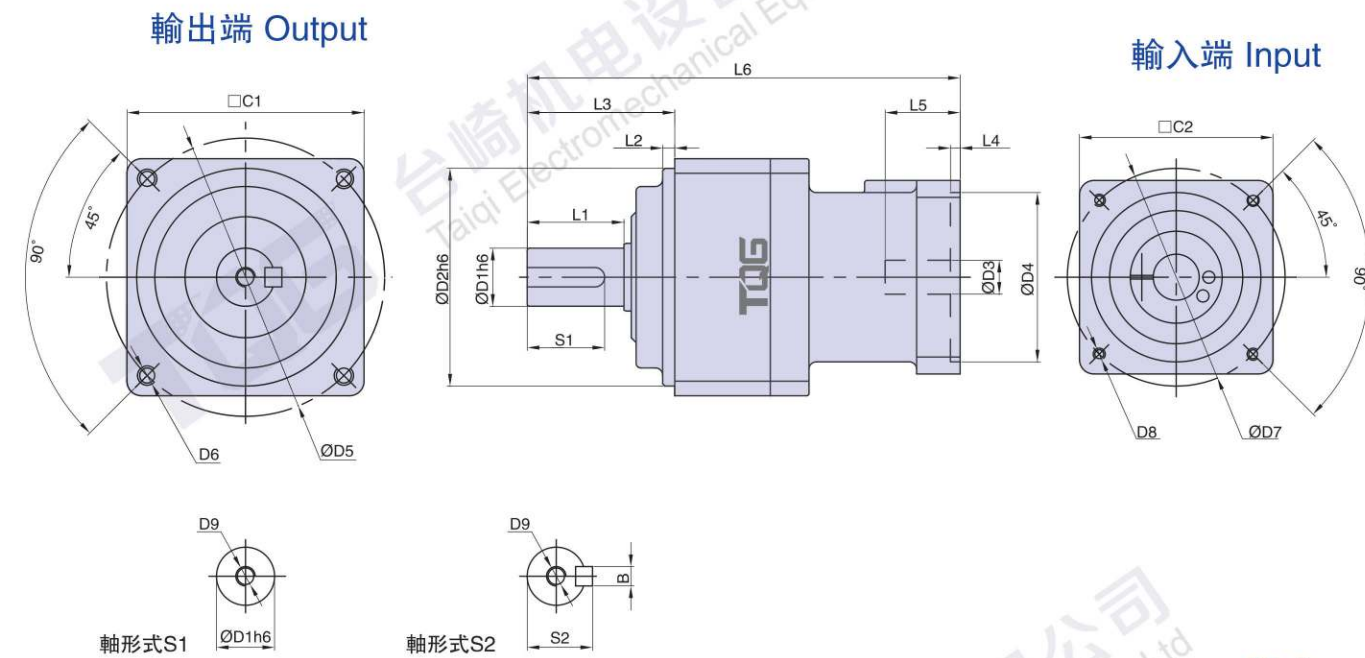
MODEL: VRSF

雙段 2-Stage

速比: 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: () 括號內為可選擇範圍尺寸, () 括號外為標準尺寸。
 注2: 減速機出力軸可以為客戶定制大小和長短。
 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: Input sizes can be subject to changed according to the brand servo motors or stepper motors sizes.

PRECISION PLANETARY 直角減速機

ZR

角度旋轉低背隙
小于10秒

- 採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。
- 傳動齒輪經精密研製, 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。

Low Rotating Backlash
Less Than 10sec

- The right angle reducer is precision machined on b-axis controlled machining center which allows for one-piece machining in one setup to assure the best geometric accuracy
- The transmission gears are precision ground providing low rotating backlash and high accuracy
- precise transmission low noise maximum stability and smoothness

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 is compactly constructed with small volume to save considerable installation space
- Although the reducer is small in volume and light in weight it is capable of providing high torque output and low backlash
- When ordering please advise the sizes of flange and shaft of your motor

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 Ø19 PCD90, M5 T1: 步進 Ø14 PCD98.4, M5
 V2: 伺服 Ø19 PCD90, M6 各廠牌 750W AC 伺服馬達 各廠牌 86 型步進馬達

入力軸 Input shaft MAX-ø19

馬達凸圓 Motor flange ø70

| 型號 Model No. | ZR90 |
|--------------------|--------|
| 容許最大轉矩 (kgf.m/N.m) | 12/120 |
| 破壞力矩值 (kgf.m/N.m) | 32/320 |
| 容許馬達轉速 (rpm/min) | 2500 |
| 背隙 (min-arc) | 0.5 |
| 重量 (kg) | 3.6 |

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 Ø24 PCD145, M10 T1: 步進 19 PCD98.4, M5
 V2: 伺服 Ø24 PCD145, M10 各廠牌 1.1~1.5KW AC 伺服 各廠牌 86 型步進馬達

馬達凸圓 Motor flange ø145

| 型號 Model No. | ZR120 |
|--------------------|--------|
| 容許最大轉矩 (kgf.m/N.m) | 16/160 |
| 破壞力矩值 (kgf.m/N.m) | 45/450 |
| 容許馬達轉速 (rpm/min) | 2500 |
| 背隙 (min-arc) | 0.5 |
| 重量 (kg) | 8 |

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 Ø19 PCD90, M5 T1: 步進 Ø14 PCD98.4, M5
 V2: 伺服 Ø19 PCD90, M6 各廠牌 750W AC 伺服馬達 各廠牌 86 型步進馬達

馬達凸圓 Motor flange ø70

| 型號 Model No. | ZR90S |
|--------------------|--------|
| 容許最大轉矩 (kgf.m/N.m) | 12/120 |
| 破壞力矩值 (kgf.m/N.m) | 32/320 |
| 容許馬達轉速 (rpm/min) | 2500 |
| 背隙 (min-arc) | 2 |
| 重量 (kg) | 6.5 |

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 Ø24 PCD145, M10 T1: 步進 19 PCD98.4, M5
 V2: 伺服 Ø24 PCD145, M10 各廠牌 1.1~1.5KW AC 伺服 各廠牌 86 型步進馬達

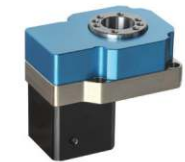
馬達凸圓 Motor flange ø130

| 型號 Model No. | ZR120S |
|--------------------|--------|
| 容許最大轉矩 (kgf.m/N.m) | 16/160 |
| 破壞力矩值 (kgf.m/N.m) | 45/450 |
| 容許馬達轉速 (rpm/min) | 2500 |
| 背隙 (min-arc) | 2 |
| 重量 (kg) | 15.5 |

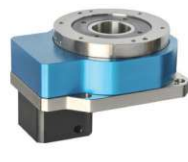
HOLLOW ROTARY ACTUATORS

中空軸旋轉平臺

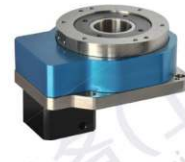
ZK



ZK60-5-5A



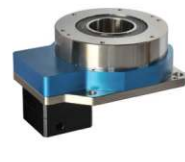
ZK100-8



ZK130-10



ZK200-10

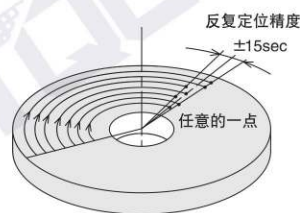


ZK275-10

- **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**
此旋轉平臺為中空式設計，無論是配綫或配管均方便。
- **Direct Mounting of Workpiece**
The rotating table allows for direct mouning of workpiece for added convenience in workpiece loading
- **Convenient Wiring**
The rotating table is a hollow structure design making it convenient for elec triv wiring or piping work
- **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為主，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。

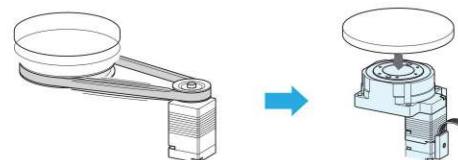
- **定位精準度高-反復定位精度爲 ±15sec**
空轉爲(Lost Motion)2min

減速機構部分採用超精密處理的齒輪，通過自身的調整機構消除齒隙，因此機構部分不會有齒隙。因單一方向的反復定位精度爲 ±15sec；而從兩方向定位時的空轉爲 2min，所以可以進行精準度的定位。



- **直接連結-簡易設計提升信賴**

中空的輸出平臺上，可直接安裝設備的工作台及機器手臂。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ZK系列因不需通過中間零件，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。



選用計算

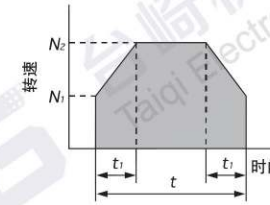
爲了選擇適合設備規格的產品，必須進行事先的計算工作。以下介紹選用ZK系列時的計算方式。

《必要轉矩的計算方式》

- 1 先計算工作物的慣性慣量。
工作慣性慣量請以傳動裝置慣性慣量的30倍以下爲準。
- 2 決定定位角度。
- 3 沒有摩擦轉矩時，請參考ZK系列的定位時間圖來確認定位時間。
- 4 決定定位時間與加減速時間。
但必須遵守以下兩個條件：
· 定位時間 > 根據定位時間圖求出最短的定位時間
· 加減速時間 $t_1 \times 2 \leq$ 定位時間
- 5 決定啟動轉速 N_1 ，然後按下面公式算出轉速 N_2 。請將 N_1 設爲低速 [0~數r/min]，注意不要設的太大。

$$N_2 [r/min] = \frac{\theta - 6N_1 t_1}{6(t - t_1)}$$

N_2 : 轉速[r/min]
 θ : 定位角度[°]
 N_1 : 啟動轉速[r/min]
 t : 定位時間[s]
 t_1 : 加速(減速)時間[s]



按上述公式計算得出的結果若不能滿足 $N_1 < N_2 \leq 200[r/min]$ 的條件，則請返回4，再次確認條件。

- 6 按下列公式計算加速轉矩

$$\text{加速轉矩 } T_a [N \cdot m] = (J_1 + J_2) \times \frac{\pi}{30} \times \frac{(N_2 - N_1)}{t_1}$$

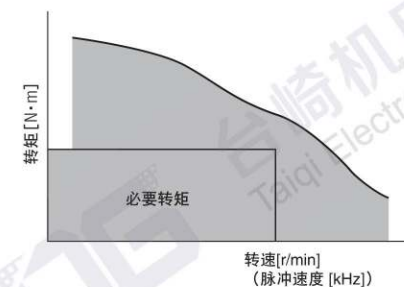
J_1 : 旋轉式傳動裝置的慣性慣量 [$kg \cdot m^2$]
 J_2 : 全慣性慣量 [$kg \cdot m^2$]
 N_2 : 轉速[r/min]
 N_1 : 啟動轉速[r/min]
 t_1 : 加速(減速)時間[s]

- 7 算出必要轉矩。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，再乘以安全係數後得出的數值。

$$\text{必要轉矩 } T = (\text{負載轉矩} [N \cdot m] + \text{加速轉矩} [N \cdot m]) \times \text{安全係數} = (T_L + T_a) \times S$$

安全係數 S 請設定在 1.5 以上。

- 8 確認必要轉矩 T 是否包含在轉速-轉矩特性的範圍以內。若不在範圍內，請轉回4，變更條件並重新計算。



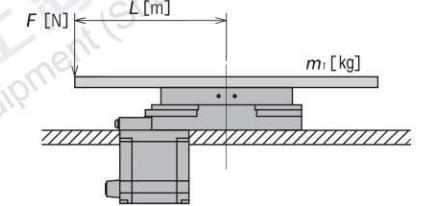
此外，將轉速換算成脈衝速度時，請按以下公式計算：

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

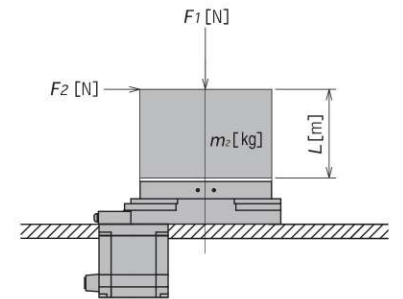
f : 脈衝速度[Hz]
 N : 轉速[r/min]
 θs : 旋轉平臺的步距角度[°/step]

《轉向負載、慣性負載的計算方法》

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，並確認是否在規格值內。



軸向負載 [N] $F_s = F + m \cdot Xg$
慣性負載 [N·m] $M = F \times L$

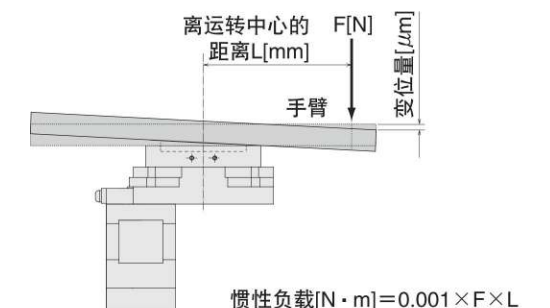


軸向負載 [N] $F_s = F_1 + m \cdot Xg$
慣性負載 [N·m] $M = F_1 \times (L + a)$

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

《因慣性負載引起的變爲量(參考值)》

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。



$$\text{慣性負載} [N \cdot m] = 0.001 \times F \times L$$

型號識別: Model Number Code

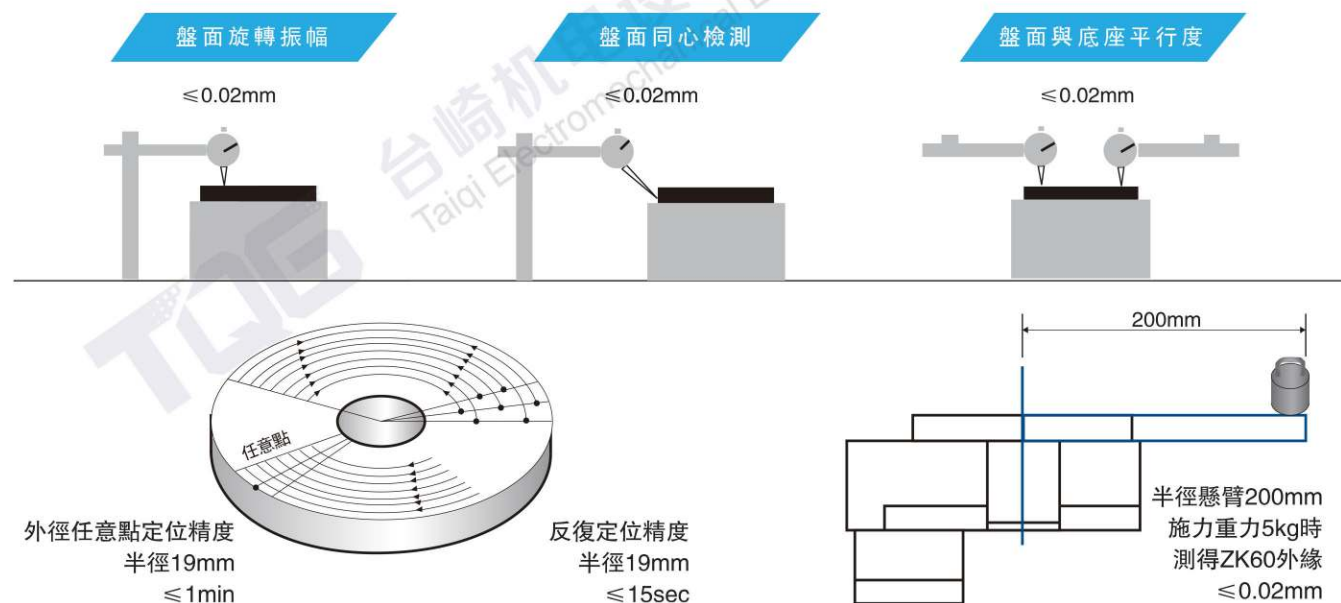


規格表 Specifications:

| 產品型號 | ZK60 | ZK60R |
|-------------|-------------|-------|
| 旋轉平臺軸承 | 深溝滾珠+止推滾珠軸承 | |
| 容許轉矩N.m | 5 | |
| 精度壽命 | 15000Hrs | |
| 允許轉速rpm | 200(盤面) | |
| 減速比 | 5 | 15 |
| 重復精度arc-sec | ≤15 | ≤20 |
| 定位精度arc-min | ≤1 | ≤1 |
| 旋轉平臺平行度mm | ≤0.02 | |
| 旋轉平臺同心度mm | ≤0.02 | |
| 保護等級 | IP40 | |

P.S: 圓周單位: 1 rpm=360° 1°=60'(arc-min) 1'=60"(arc-sec)
圓周誤差換算直線誤差: 盤面直徑 × 3.14159 ÷ (360° × 60' × 60") 背隙值

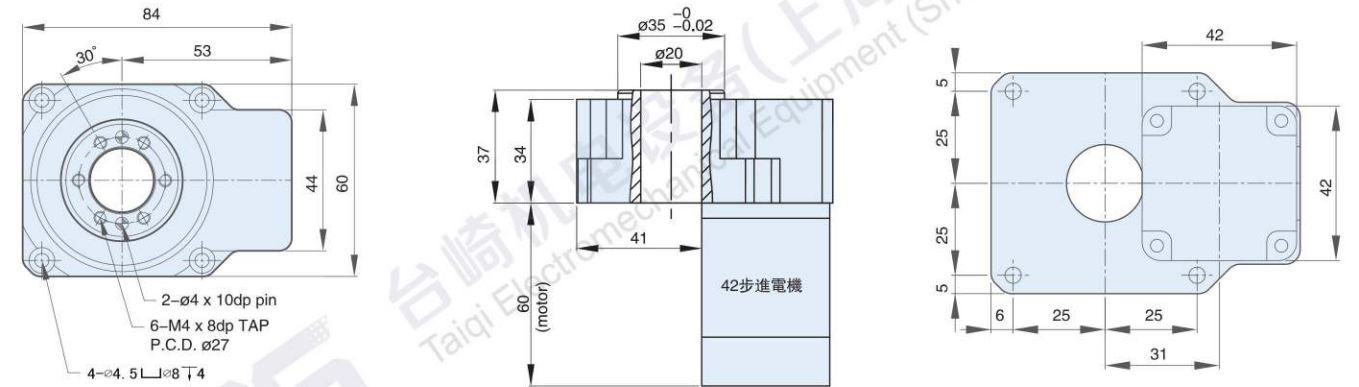
定位精度檢測 此規格定位精度僅以此比例檢驗



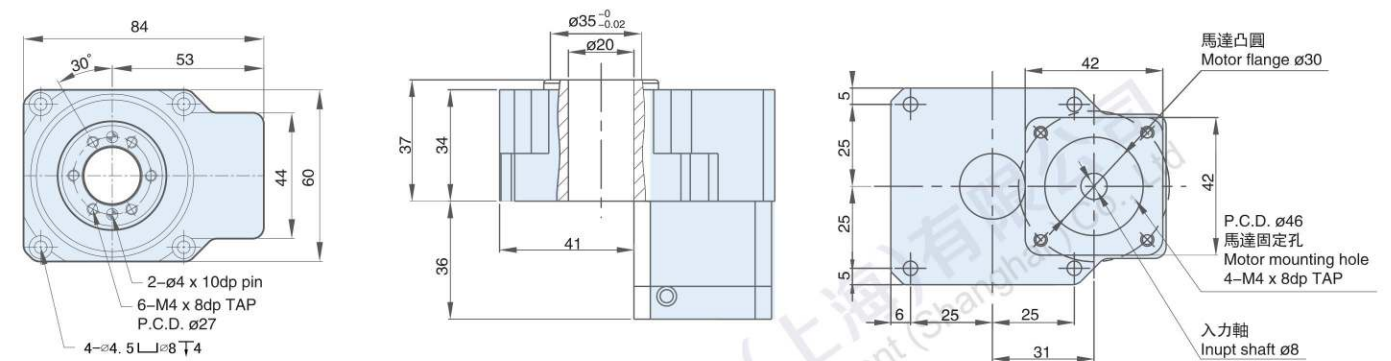
外形尺寸圖 Dimensions:

Unit:mm

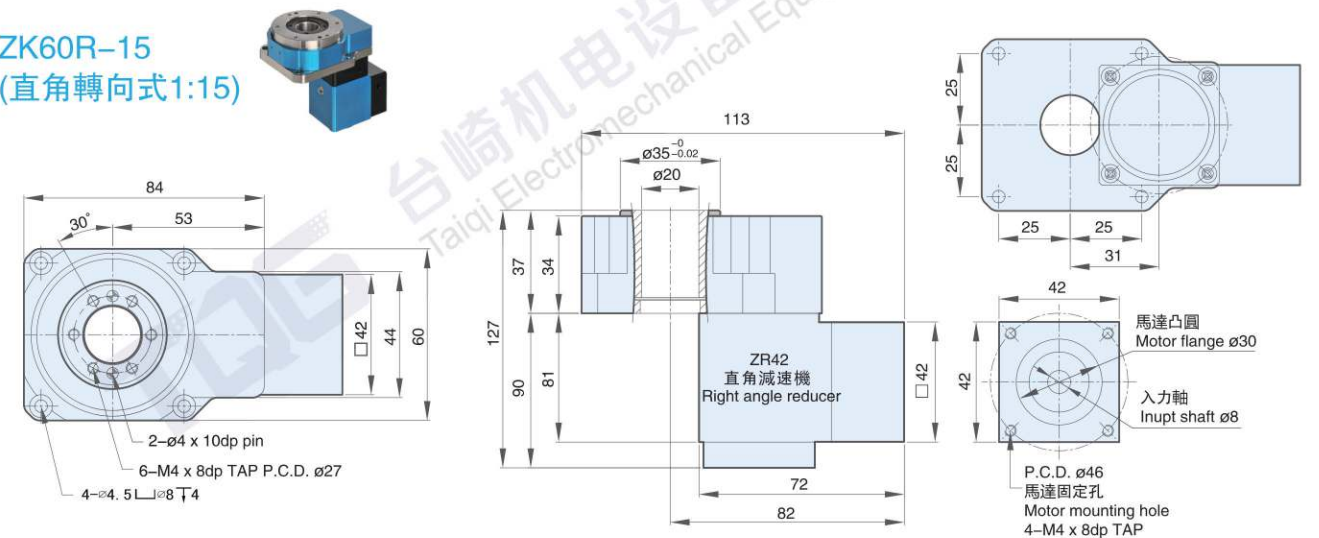
ZK60-5-5A
(此型號含步進42H5K-2A)



ZK60F-5
(附連接座可自行組裝馬達)



ZK60R-15
(直角轉向式1:15)



※訂購時請提供馬達法蘭尺寸
P.S: 原點 Sensor 規格(選配) OMRON EE-SX672

型號識別: Model Number Code

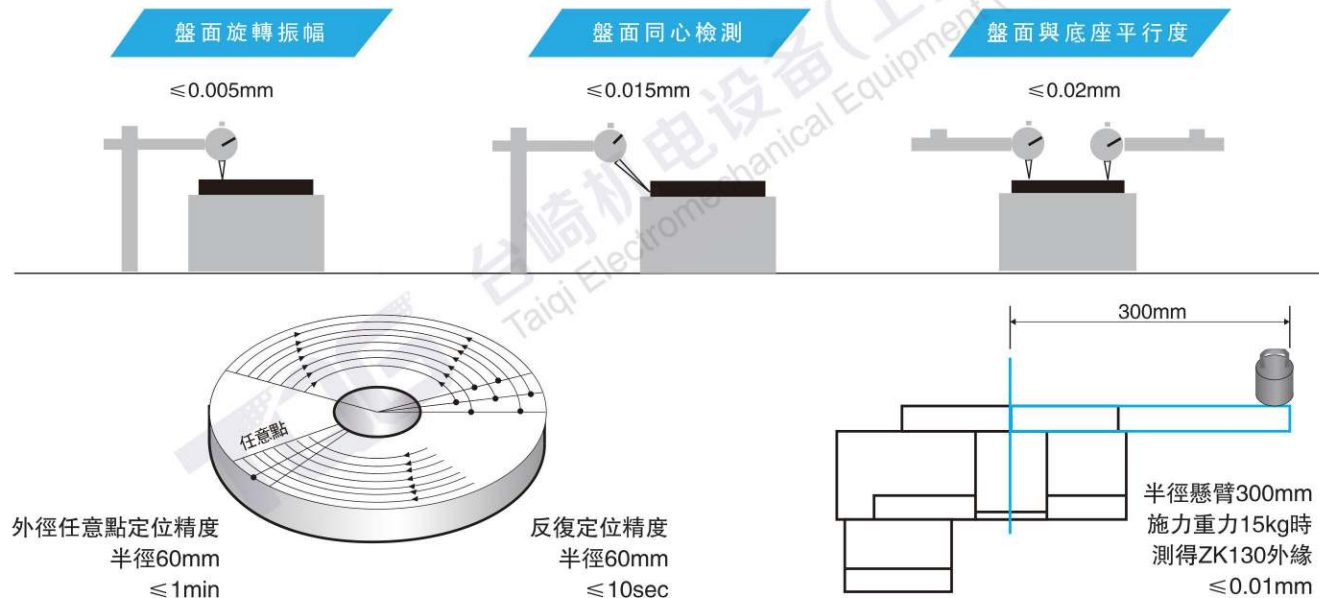


規格表 Specifications:

| 產品型號 | ZK130 | ZK130R | ZK130P |
|-------------|----------|--------|----------|
| 旋轉平臺軸承 | 圓錐滾子軸承 | | |
| 容許轉矩N.m | 45 | | |
| 精度壽命 | 20000Hrs | | |
| 允許轉速rpm | 200(盤面) | | |
| 減速比 | 10 | 20,30 | 30,40,50 |
| 重複精度arc-sec | ≤10 | ≤20 | ≤60 |
| 定位精度arc-min | ≤1 | ≤1 | ≤2 |
| 旋轉平臺平行度mm | ≤0.02 | | |
| 旋轉平臺同心度mm | ≤0.015 | | |
| 保護等級 | IP40 | | |

P.S:圓周單位: 1 rpm=360° 1° =60'(arc-min) 1'=60"(arc-sec)
圓周誤差換算直線誤差: 盤面直徑 × 3.14159 ÷ (360° × 60' × 60")背隙值

定位精度檢測 此規格定位精度僅以此比例檢驗

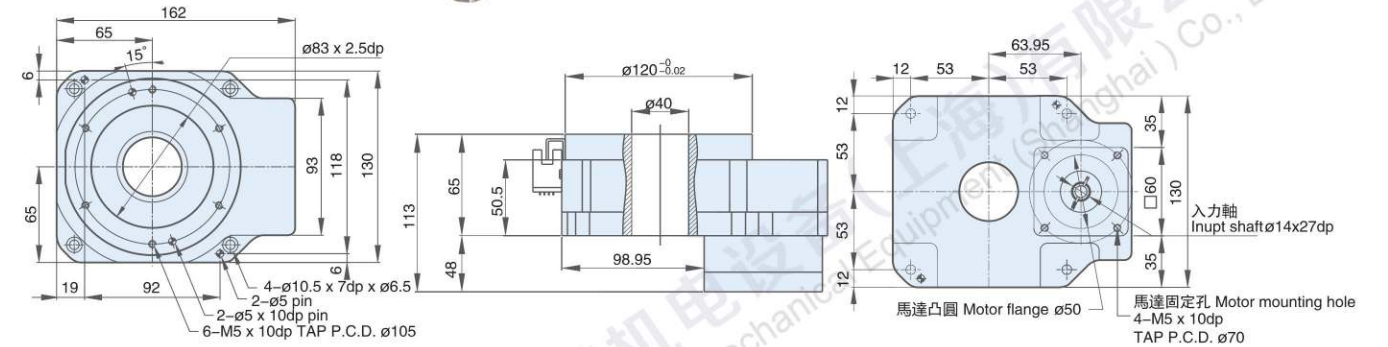


外形尺寸圖 Dimensions:

Unit:mm

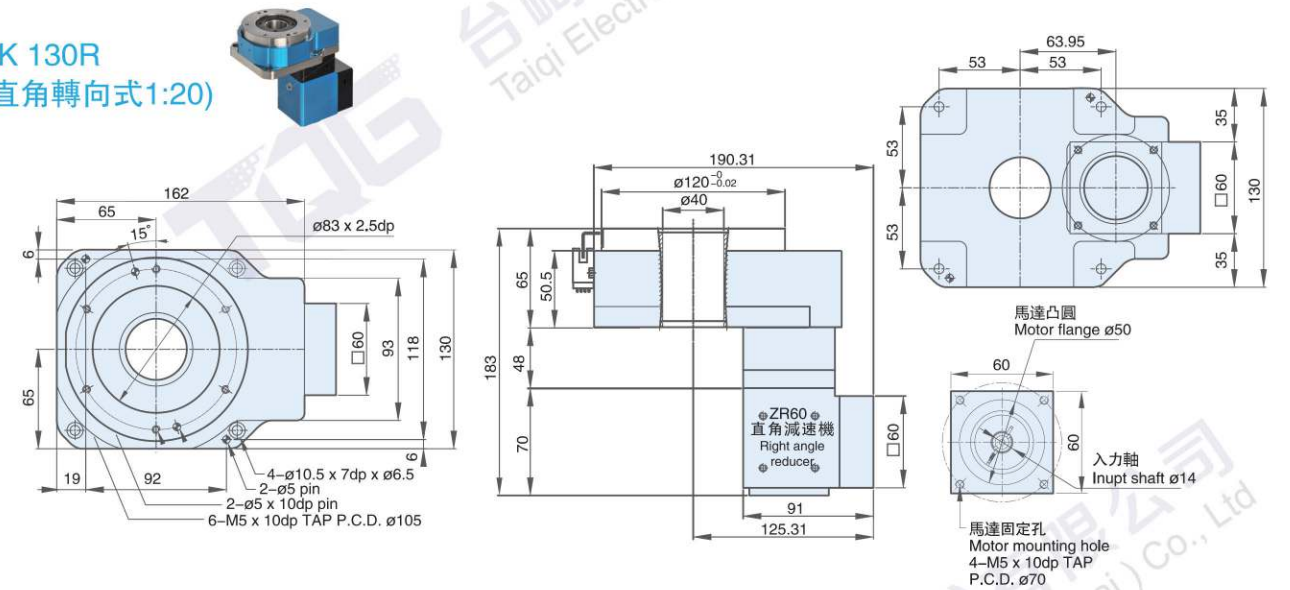
ZK 130

(附連接座可自行組裝馬達)



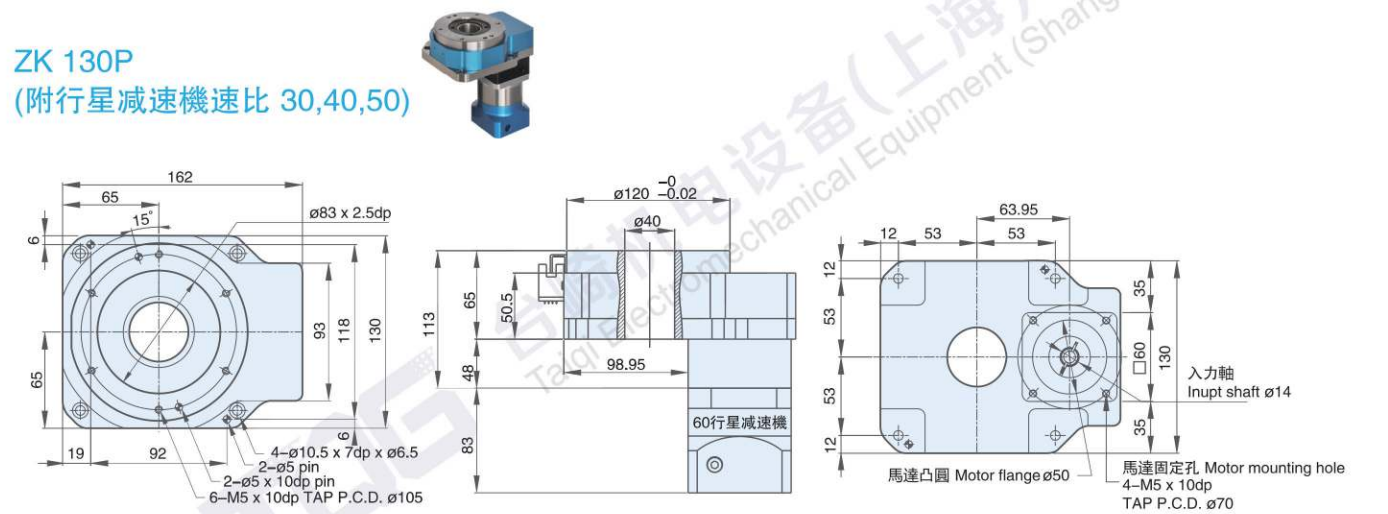
ZK 130R

(直角轉向式1:20)



ZK 130P

(附行星減速機速比 30,40,50)



※訂購時請提供馬達法蘭尺寸
P.S: 原點 Sensor 規格(選配) OMRON EE-SX672

型號識別: Model Number Code

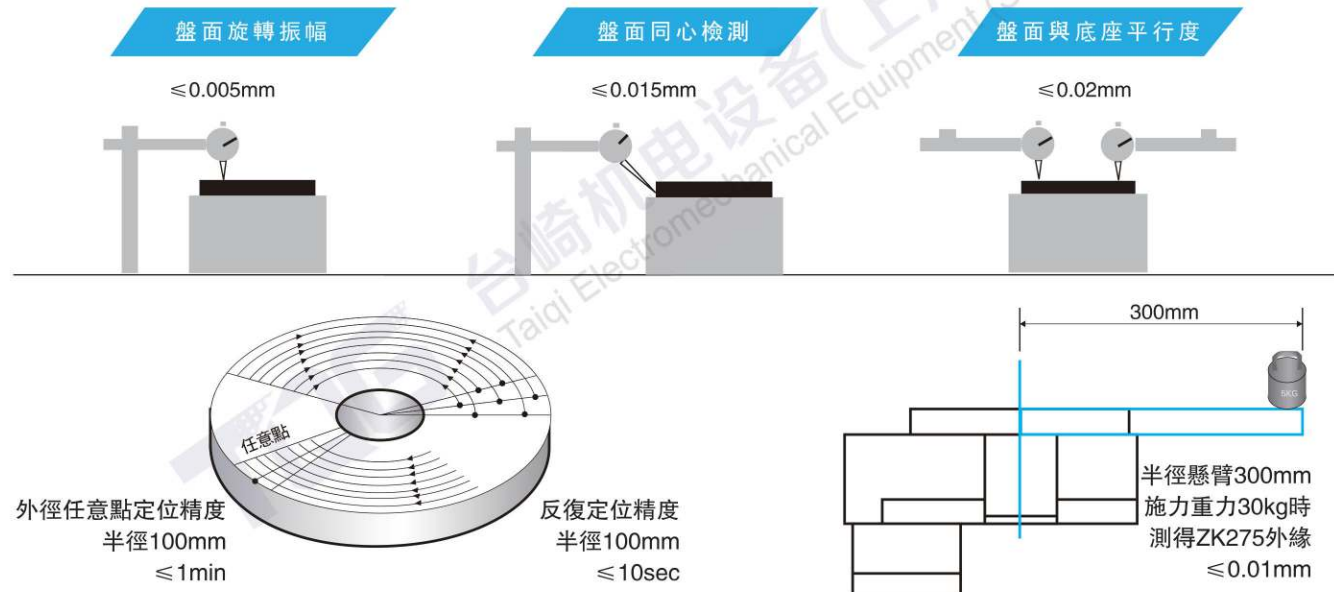


規格表 Specifications:

| 產品型號 | ZK275 | ZK275R | ZK275P |
|-------------|----------|--------|----------|
| 旋轉平臺軸承 | 圓錐滾子軸承 | | |
| 容許轉矩N.m | 80 | | |
| 精度壽命 | 20000Hrs | | |
| 允許轉速rpm | 200(盤面) | | |
| 減速比 | 10 | 20,30 | 30,40,50 |
| 重複精度arc-sec | ≤10 | ≤20 | ≤60 |
| 定位精度arc-min | ≤1 | ≤1 | ≤2 |
| 旋轉平臺平行度mm | ≤0.02 | | |
| 旋轉平臺同心度mm | ≤0.015 | | |
| 保護等級 | IP40 | | |

P.S:圓周單位: 1 rpm=360° 1° =60'(arc-min) 1'=60"(arc-sec)
圓周誤差換算直線誤差: 盤面直徑 × 3.14159 ÷ (360° × 60' × 60")背隙值

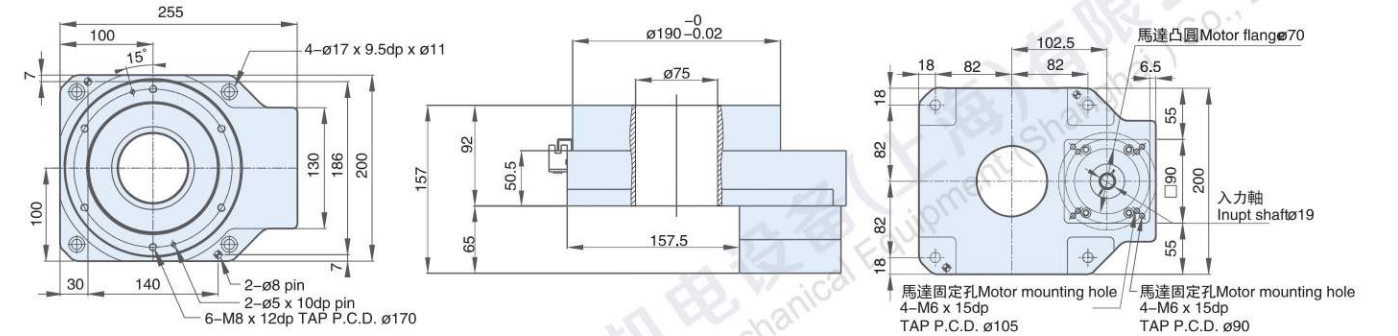
定位精度檢測 此規格定位精度僅以此比例檢驗



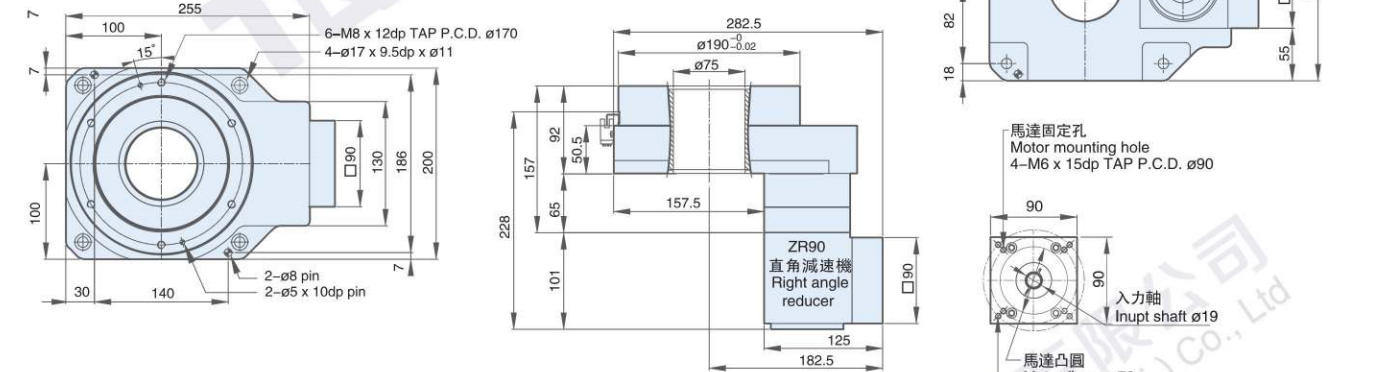
外形尺寸圖 Dimensions:

Unit:mm

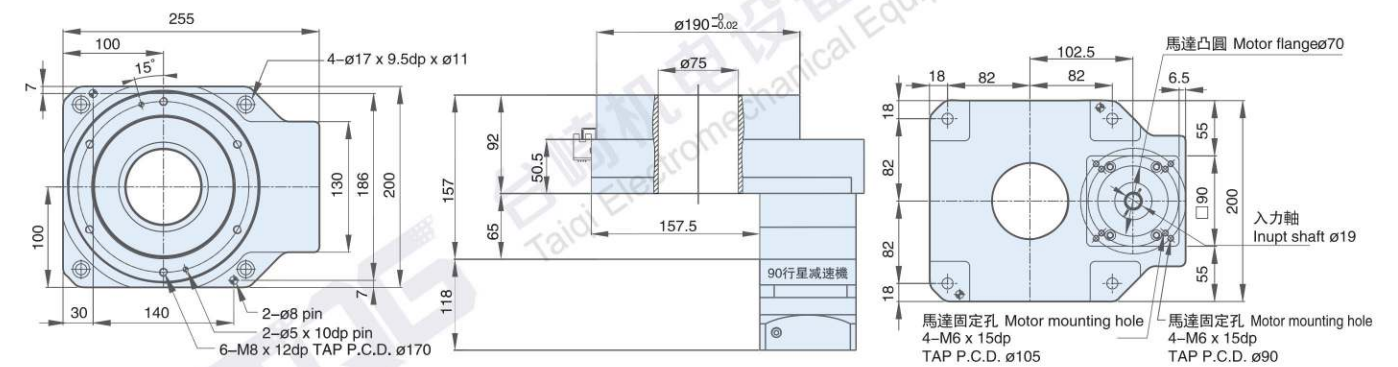
ZK 275 (附連接座可自行組裝馬達)



ZK 275R (直角轉向式1:20)



ZK 275P (附行星減速機速比 30,40,50)



※訂購時請提供馬達法蘭尺寸
P.S: 原點 Sensor 規格(選配) OMRON EE-SX672

空心旋轉減速機

HOLLOW ROTATING TAB

DG

直接連結

簡易設計提升信賴

大口徑中空旋轉式 傳動裝置

簡潔的配線與配管

定位精準度高

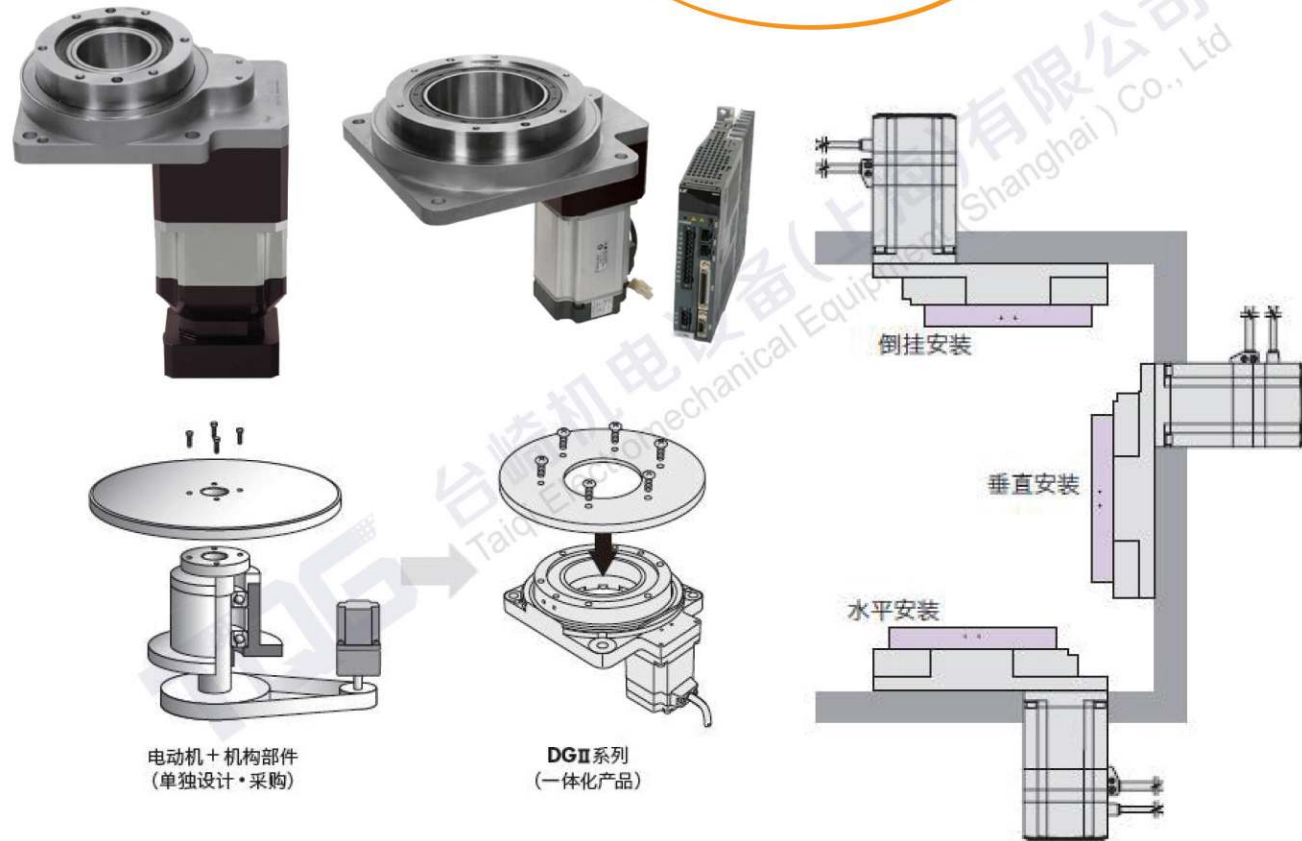
反復定位精度為±15sec
空轉 (Lost Motion) 為2min
角度傳達誤差為 4min

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

短時間定位

可在短時間內
實現慣性負載的定位!



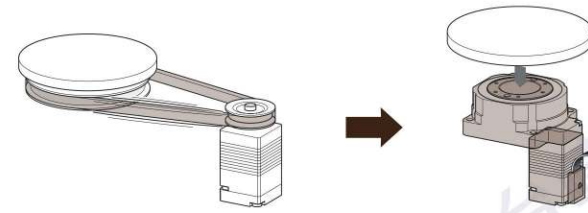
電動機+機構部件
(單獨設計·採購)

DGII系列
(一體化產品)

中空旋轉式傳軒裝置

●直接連結→簡易設計提升信賴

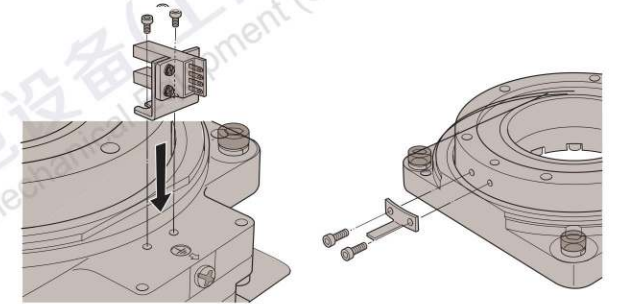
中空輸出平台上，可直接安裝設備的工作台及機器手臂。一般設備在通過皮帶輪等機構零件進行定位運行時，多受機構零件傳動效率的影響發生精度減低，或有維修機構零件的必要。而DG系列因不需通過中間零件，便可直接安裝，所以除了能直接運用產品本身的精度以外，也可以免去維修的麻煩。



●簡單原點還原→省卻設計與零件採購的時間與勞力

為了能簡單實現原點還原運行，本公司還為客戶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，可為用戶省去安裝傳感器所需的设计、制作、與零件採購等時間與勞力。

(DG130R 的傳感器、遮光板安裝例)



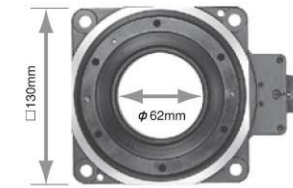
傳感器的安裝方式

遮光板的安裝方式

●大口徑中空旋轉平台→簡潔的配線與配管

因採用一段減速齒輪機構增大被驅動齒輪的直徑，實現了大口徑中空孔 (貫穿) 的设计。適用於拉線複雜的配線與配管等場合，使設備設計更為簡潔。

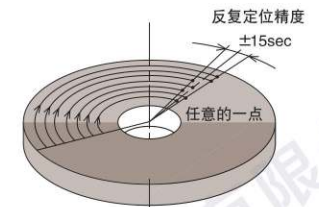
| | 安裝尺寸mm | 中空直徑mm |
|--------|--------|--------|
| DG60 | 60 | 28 |
| DG85R | 85 | 33 |
| DG130R | 130 | 62 |



例: DG130R 的場合

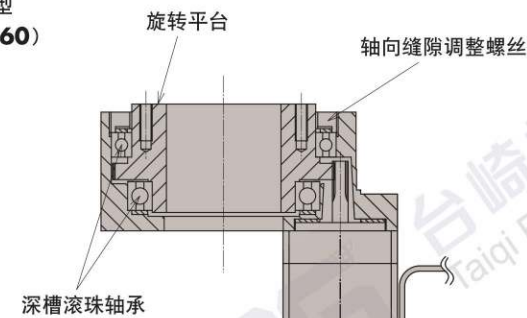
●定位精準度高→反復定位精度為±15sec 空轉為 (Lost Motion) 2min

減速機構部分採用超精密處理的齒輪，通過自身的調整機構消除齒隙，因此機構部分不會有齒隙。因單一方向的反復定位精度為±15sec; 而從兩方向定位時的空轉為2min，所以可以進行精準度高的定位。

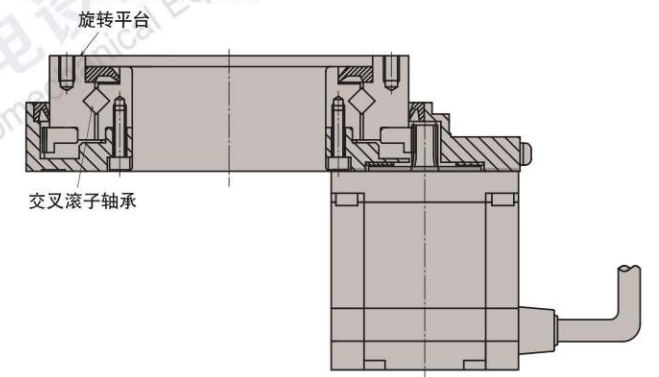


構造圖

●標準型 (DG60)



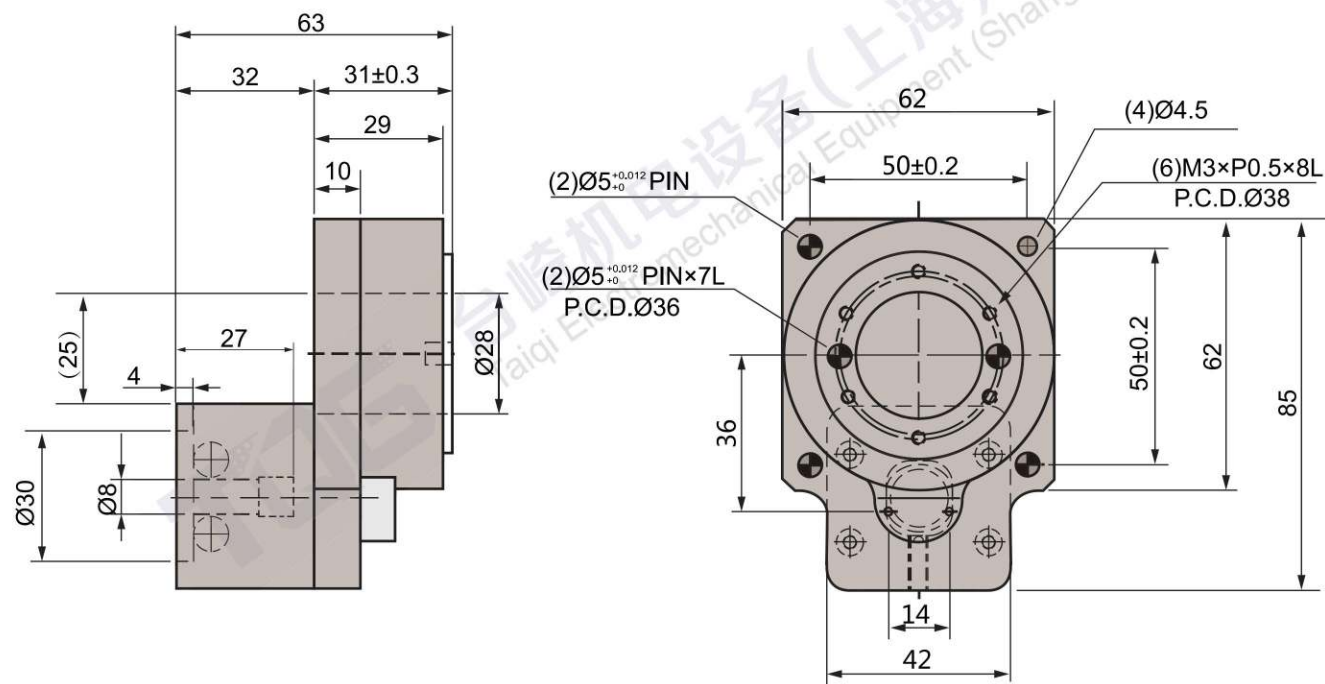
●高剛性型 (DG85R、DG130R)



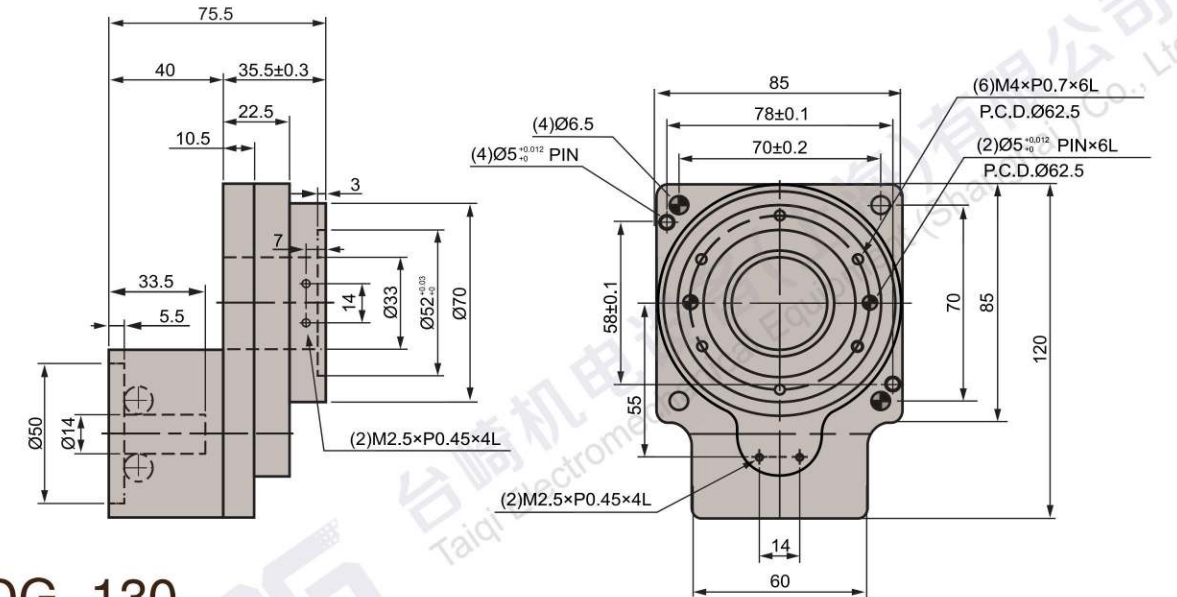
性能資料表

| 规格 | 单位 | DG-62 | DG-85 | DG-130 | DG-200 |
|---------|------------------|-------------------------|-------------------------|-------------------------|--------------------------|
| 匹配伺服馬達 | W | 100W | 200-400W | 200-400W | 750-1KW |
| 容許扭矩 | Nm | 3.5 | 20 | 20 | 65 |
| 轉動慣量 | kgm ² | 2480 x 10 ⁻⁶ | 2498 x 10 ⁻⁶ | 9472 x 10 ⁻⁶ | 93581 x 10 ⁻⁶ |
| 允許轉速 | rpm | 200 | 200 | 200 | 200 |
| 減速比 | | 1/5 | 1/5 | 1/10 | 1/10 |
| 定位精度 | sec | ≤15 | ≤15 | ≤15 | ≤15 |
| 反復定位精度 | sec | ±10 | ±5 | ±5 | ±5 |
| 容許推力載重 | kgf | 20 | 200 | 250 | 500 |
| 容許慣性載重 | Nm | 10 | 60 | 60 | 200 |
| 旋轉平臺平行度 | μm | ±5 | ±2 | ±2 | ±2 |
| 旋轉平臺同心度 | mm | ±0.01 | ±0.01 | ±0.01 | ±0.01 |
| 重量 | kg | 2.2 | 3 | 5.5 | 14 |

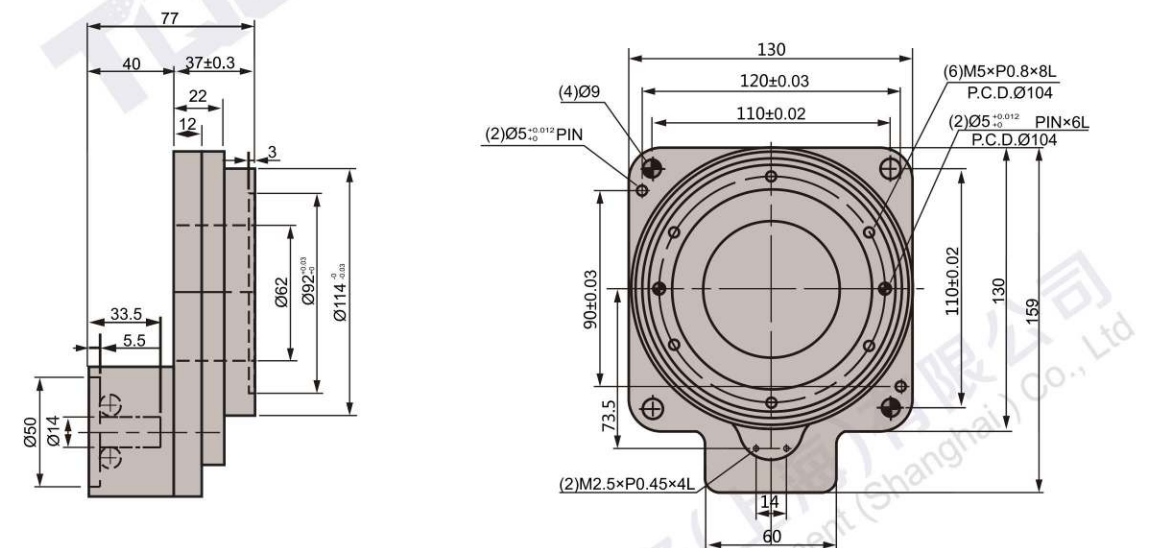
DG-62



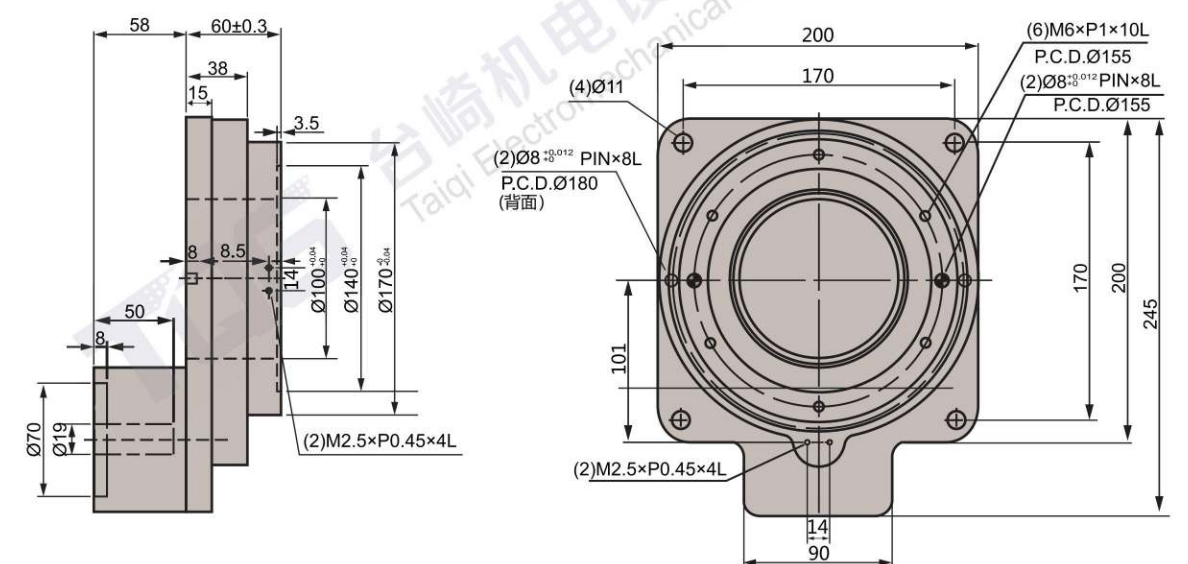
DG-85



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. 放在清潔乾燥的場所進行保管。
2. 若放在室外或有潮氣的場所保管時，應裝入箱內并用塑料等嚴密包裹，以避免受雨淋或外氣的侵蝕(採取防結露、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 confirm 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 filled 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，請事先與本公司聯繫。
 溫度設置為0℃~40℃。
 如在上述溫度範圍外使用本機時，必須與本公司聯繫。
 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 fix 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 filled 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
 · 突然出現很大的異常聲
 · 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 specification. 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

- 保修範圍限於交付產品單體。

以下費用和損害不在保修範圍內。

- 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

1 安裝步驟 Mounting procedure to the motor

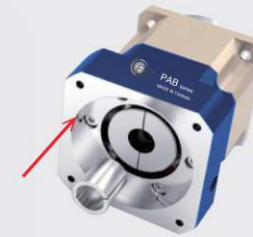
- 1 擦拭馬達軸上的防銹劑、潤滑脂等。
Wipe off anti-rust agent and oil on the motor shaft.



- 2 取下橡皮栓。
Remove the plug



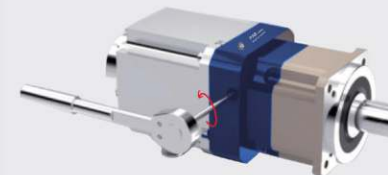
- 3 旋轉輸入軸使緊固螺栓的頭對準塞孔。此時，請確認緊固螺栓是鬆動的。
Turn the input shaft until the cap screw is seen. Make sure the cap screw is loosened.
如帶有軸套，安裝方法如圖所示。
In case the bushing has been attached, Please fix it to the reducer as the drawing below.



- 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 table 1)



- 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 table 1)



- 6 安裝橡皮栓，安裝完成。
Reinstall the plug. The procedure is done.



表1 Table 1

| 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：強度12.9以上

※Recommended bolt: Strength 12.9