

[2022]

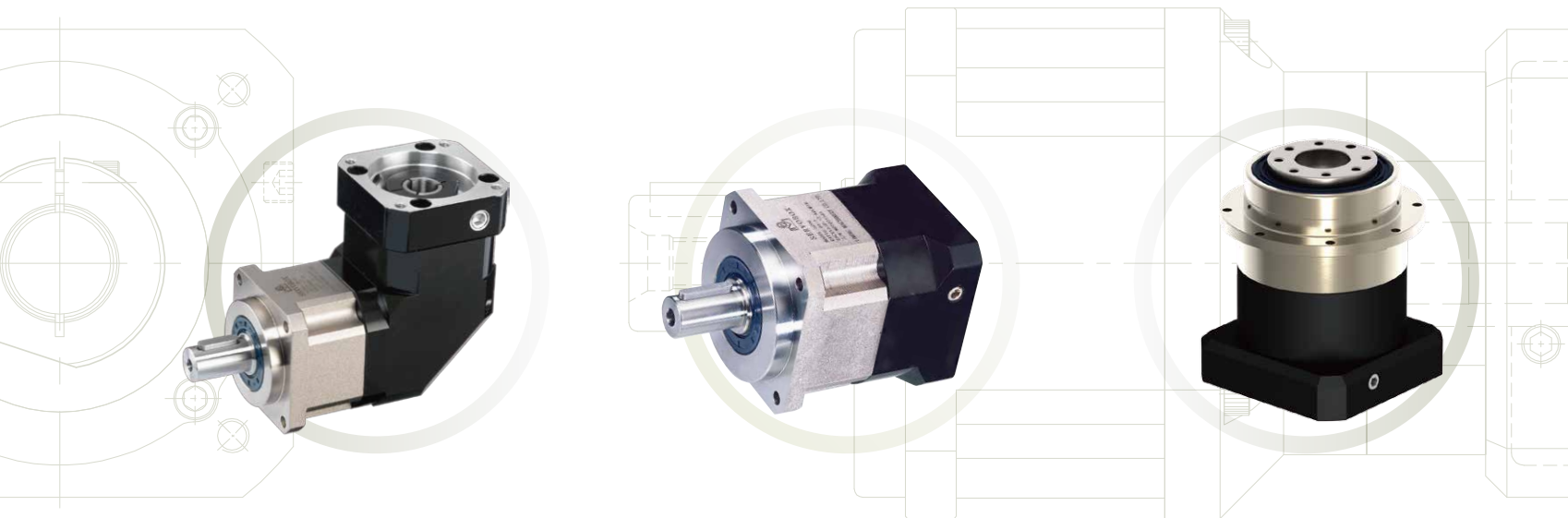
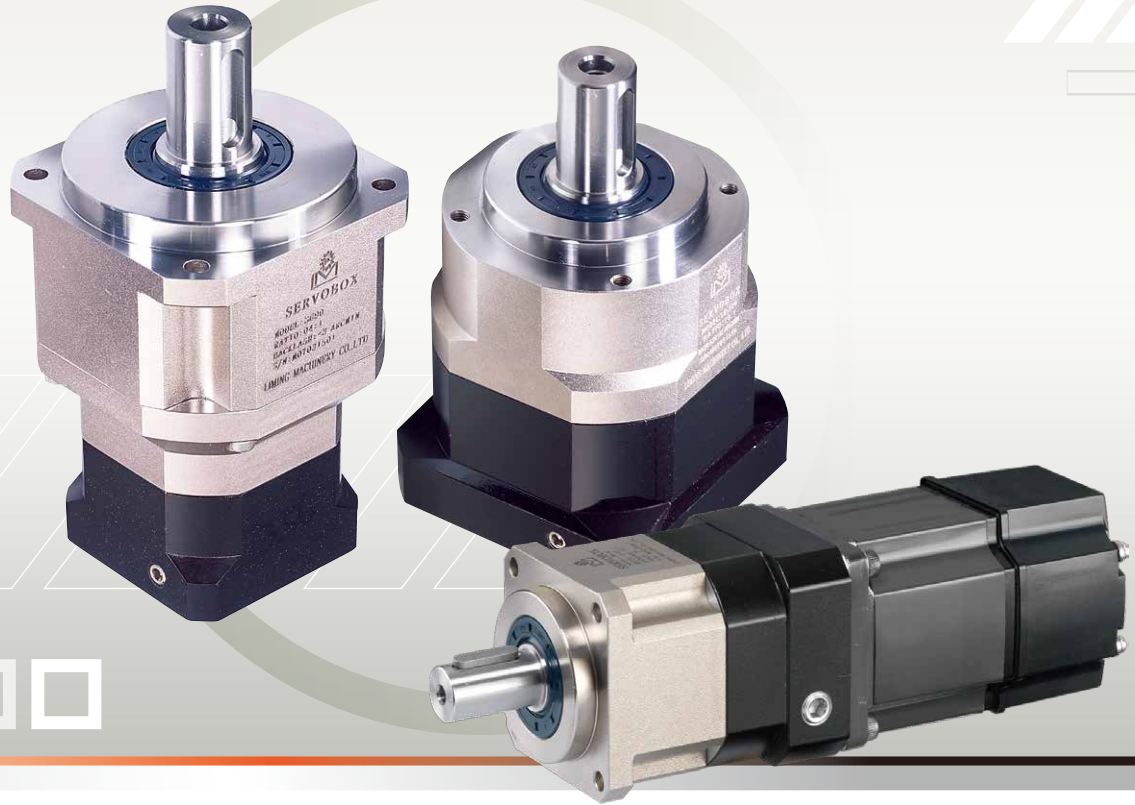


# Planetary Reducers 精密行星減速機

**SERVOBOX Series**

利明牌

精密行星減速機



【 傳動裝置的解決方案 / 減速機的領導品牌 】

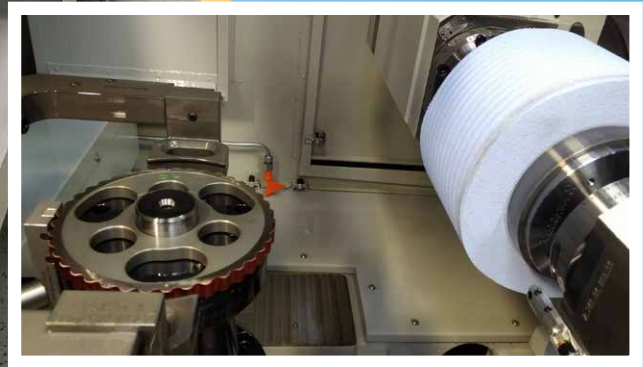
LI MING MACHINERY CO., LTD.

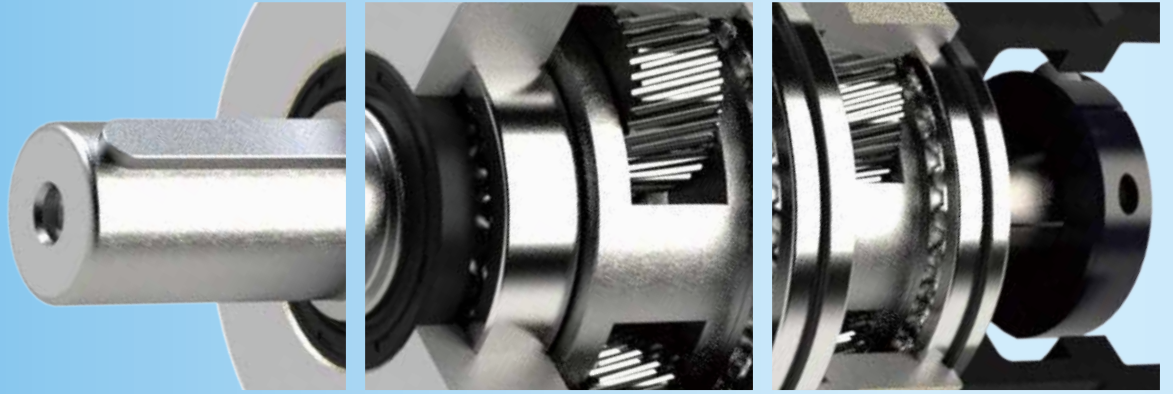


Quality First & Customer's Satisfaction





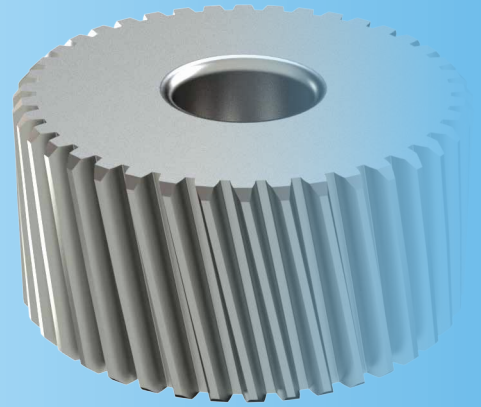
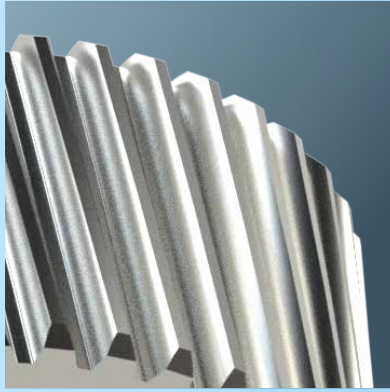
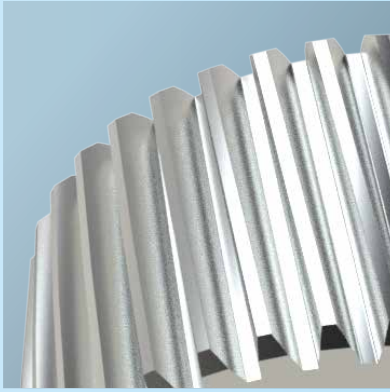





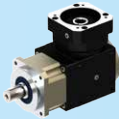









## 高精密伺服用行星減速機 High Precision Planetary Reducers

| 產品型號<br>MODEL                   | SB                                   | SE    | SF             | SA                    | SD            | SDD | SR   | SBL  | SEL          | SFL         | SDL                           |                          |
|---------------------------------|--------------------------------------|-------|----------------|-----------------------|---------------|-----|--|--|--------------|-------------|-------------------------------|--------------------------|
|                                 |                                      |       |                |                       |               |     |  |  |              |             |                               |                          |
| 頁次 Page                         | 14                                   | 42    | 84             | 98                    | 60            | 70  | 74   | 34   | 54           | 92          | 66                            |                          |
| 背隙等級 (單段)<br>Backlash (1-Stage) | 1'、3'、5'、7'                          |       |                |                       |               |     | ≤ 6'   | 2'、4'、6'、8'  |              |             |                               |                          |
| 背隙等級 (雙段)<br>Backlash (2-Stage) | 3'、5'、7'、9'                          |       |                |                       |               |     | ≤ 8'   | 4'、7'、9'、12'   |              |             |                               |                          |
| 減速比 (單段)<br>Ratio (1-Stage)     | 3、4、5、6、7、8、9、10                     |       |                | 4、5、7、10              |               |     | 2、3、4、6、9  | 3、4、5、6、7、8、9、10、12、14、16、18、20                          |              |             | 4、5、7、10、14、20                |                          |
| 減速比 (雙段)<br>Ratio (2-Stage)     | 15、20、25、30、35、40、50、60、70、80、90、100 |       |                | 20、25、35、40、50、70、100 |               |     | 10、15、20、24、30、36、40、45、60、90                    | 15、20、25、30、35、40、50、60、70、80、90、100、120、140、160、180、200 |              |             | 20、25、35、50、40、70、100、140、200 |                          |
| 減速比 (3段以上)<br>Ratio (3-Stage)   | ●                                    | ●     | -              | -                     |               |     | -  | ●  | ●            | -           | -                             |                          |
| 齒箱表面塗裝<br>Surface PaintCoat     | 無電解鍍 Coating                         |       |                |                       |               |     |  |  |              |             |                               |                          |
| 齒輪型式<br>Gear Type               | 螺旋齒輪<br>Helical Gear                 |       |                |                       |               |     | 螺旋齒輪 & 螺旋傘齒輪<br>Helical Gear & Spiral Bevel Gear |  |              |             |                               |                          |
| 軸承型式<br>Bearing Type            | 滾珠軸承<br>Ball                         |       | 滾錐軸承<br>Tapper |                       | 滾珠軸承<br>Ball  |     | 滾珠 / 滾錐<br>Ball / Tapper                         |  | 滾珠軸承<br>Ball |             | 滾錐<br>Tapper                  | 滾珠 / 滾錐<br>Ball / Tapper |
| 減速機固定型式<br>Fixed Reducer        | Bore-Hole                            | Screw | Bore-Hole      | Screw                 | Bore-Hole     |     | Screw  | Bore-Hole  | Screw        | Bore-Hole   |                               |                          |
| 內齒箱材質<br>Gearbox Material       | 鉻鉬合金鋼 SCM440                         |       |                |                       |               |     |  |  |              |             |                               |                          |
| 額定壽命<br>Service Life            | >30,000Hr                            |       |                |                       |               |     |  |  |              |             |                               |                          |
| 輸入孔徑<br>Input Bore              | 5.65mm ~ 75mm                        |       | 5.65mm ~ 55mm  | 6mm ~ 32mm            | 5.65mm ~ 55mm |     | 10mm ~ 28mm                                      | 5.65mm ~ 55mm  |              |             |                               |                          |
| 輸入功率<br>Input Power             | 100W ~ 75kW                          |       | 400W ~ 30kW    | 100W ~ 3.75kW         | 100W ~ 30kW   | -   | 400W ~ 2.2kW                                     | 100W ~ 75kW  |              | 400W ~ 30kW | 100W ~ 30kW                   |                          |





### 精密伺服用行星減速機 Precision Planetary Reducers

|  |   | 精密伺服用行星減速機 Precision Planetary Reducers   |   |   |   |   |   |   |   |   |   |           |
|--|---|---|---|---|---|---|---|---|---|---|---|-----------|
|  | SDH   | SBT   | PB  | PBL   | PBT   | SNL   | SN  | FA  | FB  | FE  | PE  |           |
|  |  |  |  |  |  |  |  |  |  |  |  |           |
|  | 78  | 40  | 104   | 112   | 120   | 134   | 128   | 122   | 136   | 142   | 150   |           |
|  | -   | 2'、4'、6'、8'   | <8'   | <10'  |   |   | <8'   |   |   | <12'  |   |           |
|  | 4'、7'、10'   | -   | <10'  | <12'  | -   | -   | <12'  |   |   | <20'  |   |           |
|  | -   | 3、4、5、6、7、8、9、10、15、20、25、30、35、40、45、50  | 同 SB<br>Same as SB  | 同 SBL<br>Same as SBL  | 同 SBT<br>Same as SBT  | 3、4、5、6、7、8、9、10、15、20、25、30、35、40、50   | 3、4、5、7、10  |   |   | 3~10  |   |           |
|  | 20、25、35<br>50、70、100<br>150  | -   | 同 SB<br>Same as SB  | 同 SBL<br>Same as SBL  | -   | -   | 15、20、25、30、35、40、50、70、100   |   |   | 12~64   |   |           |
|  | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   | -   |           |
|  | 無電解鍍 Coating  |   | 烤漆 Painting   |   |   |   |   |   |   |   |   |           |
|  | 螺旋齒輪 & 乾齒輪<br>Helical Gear & Hypoid Gear  | 螺旋齒輪 & 螺旋傘齒輪<br>Helical Gear & Spiral Bevel Gear                                  | 螺旋齒輪<br>Helical Gear  | 螺旋齒輪 & 螺旋傘齒輪<br>Helical Gear & Spiral Bevel Gear                                  |   |   | 螺旋齒輪<br>Helical Gear  |   |   | 直齒輪<br>Spur Gear  |   |           |
|  | 滾珠 / 滾錐<br>Ball / Tapper  | 滾珠軸承<br>Ball  | 滾珠軸承<br>Ball  |   |   |   |   |   |   |   |   |           |
|  | Bore-Hole   | Bore-Hole   | Bore-Hole   |   |   | Screw   |   | Bore-Hole   | Screw   |   |   |           |
|  | 鉻鉬合金鋼 SCM440  |   | 中碳鋼 S45C  |   |   |   |   |   |   |   |   |           |
|  | >30,000Hr   |   | >30,000Hr   |   |   |   |   |   |   |   |   | >20,000Hr |
|  | 5.65mm<br>~<br>55mm   | 6mm ~ 35mm  | 5.65mm ~ 55mm   |   | 6mm<br>~<br>35mm  | 6mm<br>~<br>38mm  | 6mm<br>~<br>24mm  | 6mm<br>~<br>32mm  | 5.65mm<br>~<br>55mm   | 6mm<br>~<br>14mm  |   |           |
|  | 100W ~ 30kW   | 100W ~ 30kW   | 100W ~ 75kW   |   | 100W<br>~<br>5.5kW  | 100W<br>~<br>7.5kW  | 100W<br>~<br>1.5kW  | 100W<br>~<br>3.75kW   | 100W<br>~<br>30kW   | 100W<br>~<br>0.4kW  |   |           |



# High Tech

H i g h P r e c i s i o n

傳動裝置的解決方案 / 減速機的領導品牌

## 品質第一、顧客滿意

利茗機械股份有限公司專業從事高科技的各種減速馬達、螺旋齒輪減速機、蝸桿蝸輪減速機，以及行星式減速機的設計、研發、生產。近年來肩負著顧客們對產品質量與價格的追求，不斷地在提高減速機的高性能，實現效率的最大化和提供廣泛的技術資源等方面做著不懈的努力。公司奉行『品質第一、顧客滿意』及『勤、誠、信』的經營理念，不斷吸納專業人才，使得公司始終擁有一批掌握業界高階技術的科技人才。公司以積極務實的作風，借鑒各種先進的管理經驗，不斷實現自我完善，建立起良好企業文化。

在減速機家族中，行星減速機以其體積小，承受扭力大，傳動效率高，減速範圍寬，精度高，而被廣泛應用於伺服、步進、直流等傳動系統中。在保證精密傳動的前提下，主要被用來降低轉速，增大扭矩和降低負載電機的轉動慣量比。高扭矩，低背隙及運轉安靜是 LIMING 減速機三大設計特點。LIMING 減速機一直位居市場領導地位。

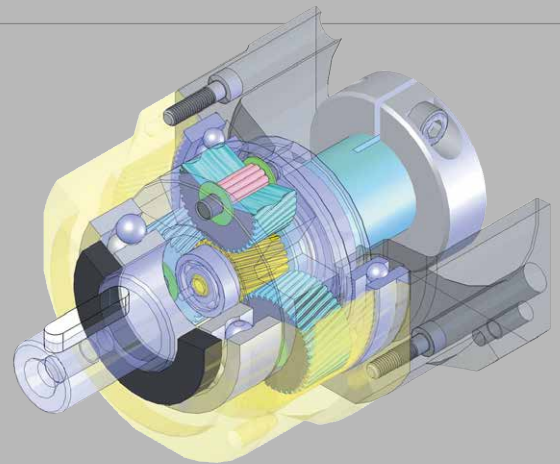


# Quality First & Customer's Satisfaction



LI MING Machinery CO., LTD. is specialist in design, R&D and manufacturing of a wide range of high-tech gear motor and helical gear reducers, worm gear reducers, planetary gear reducers. In recent years, to meet customers' requirements of quality and price, we have been dedicated to constantly upgrade the performance of gear reducer, maximize efficiency, and provide the most comprehensive technical supports. Under the company's policy of "Quality First; Customer Satisfaction and Intelligence; Sincerity; Honesty", we have invited many highly experienced talents. At LI MING, we have a team with outstanding background in high-tech field. LI MING's outstanding enterprise culture results from its practicality, constantly learning the advanced management system and a commitment to excellence.

## *The Art of Transmission*



## High Accuracy & Efficiency Profit

Among the wide range of speed reducers, the planetary gear reducer features compact construction, high-torque resistance, high transmission efficiency, wide range of speed reduction and high accuracy.

The planetary gear reducers are widely applied in servo, stepping and DC transmission system. With its outstanding feature of high precision transmission, the planetary gear reducer is excellent for reducing speed, increasing torque and reducing torsional inertia ratio. High torque, low backlash and low noise are three key features of LIMING's gear reducers, and these are the reasons why LIMING gear reducers are in the leading position in the industry.





## 自動化加工設備

秉持對減速機各部份零件的獨特加工特性的認知，我們自行開發設計一系列高效率自動化的加工設備，以配合系列高性能加工機械。

本公司經驗豐富的技術員，掌握零件加工特性精度控制，嚴格品質管制以確保所有零組件的精度及性能。一系列自動化加工設備為零件加工精度穩定性提供最穩固的基礎。



# Integrated

Manufacturing with  
Full Range of  
Automatic Equipment



# Integration / Automation Machining Equipment

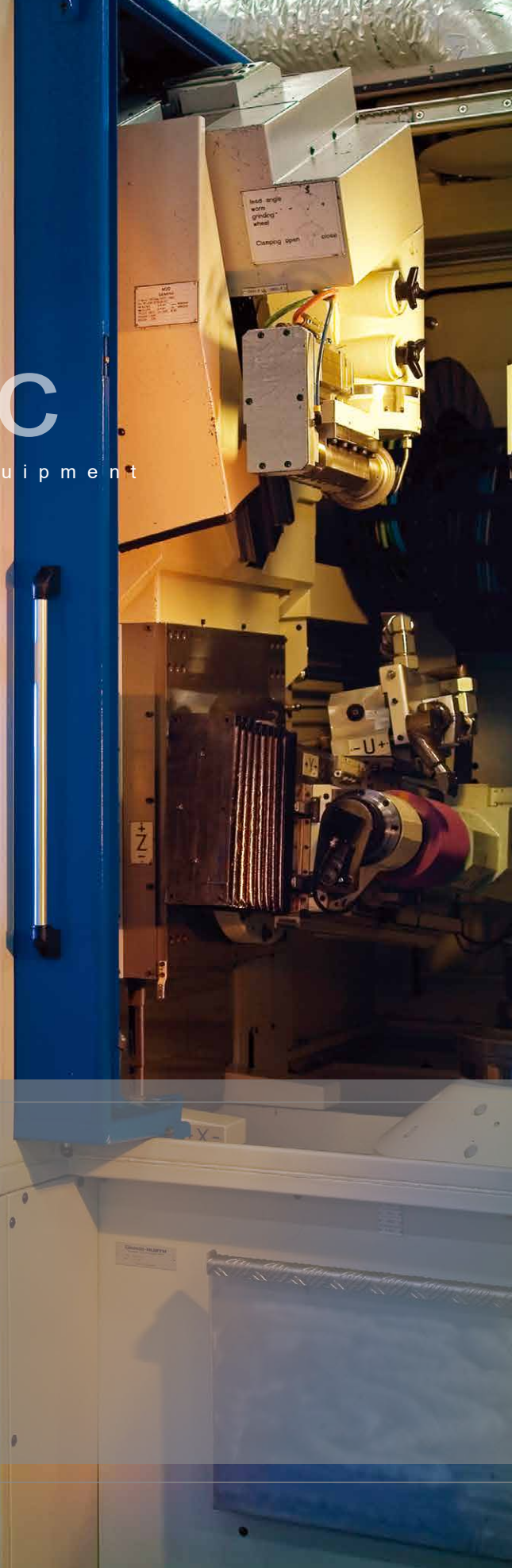


Based on our acknowledgement of the unique processing characteristics of speed reducers on all parts, we have developed and designed a series of high-efficiency automatic machining equipment to work with high-performance processing machines. Our well-experienced technicians take good control of precision in our parts, and stringent quality control to ensure the best precision and performance of all parts and components. A series of automatic processing equipment provides the most solid foundation for the consistency of precision in the machining of parts and components.



# Automatic

Processing Equipment



## 高精密的加工設備

利茗機械公司為增進技術精良·斥資購置整套最新 CNC 電腦加工機械設備·以精密零件加工·配合優秀工程人員·提升零件精度·確保穩定的品質。



# High Precision & Automatic Processing Equipment

To enhance technical improvement, LI MING Machinery Company has placed a huge investment in the purchase of a whole set of the latest generation of Computer Numerically-Controlled (CNC) machines and equipments, in combination with distinguished engineering personnel, to upgrade the precision of parts and ensure stable quality.







## 「全面品管」不只是口號

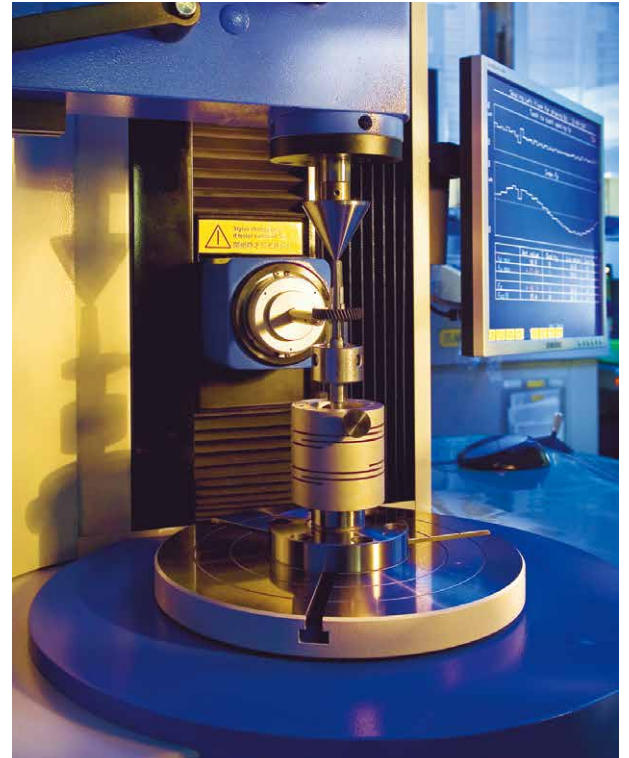
「全面品管」在利茗公司絕不是一句口號。我們對品質政策的執著，對每一個品質要求都訂有嚴格的品質標準書，迅速而確實的品質管制。每一個零件從最初的進料製程，裝配完成品的運轉等檢驗測試，鉅細靡遺，以完全符合您的要求及利茗的品質標準。品管部門有先進的檢驗設備，作精密的量測。「工欲善其事，必先利其器」，我們精密的檢驗儀器，是品質信賴的保證。

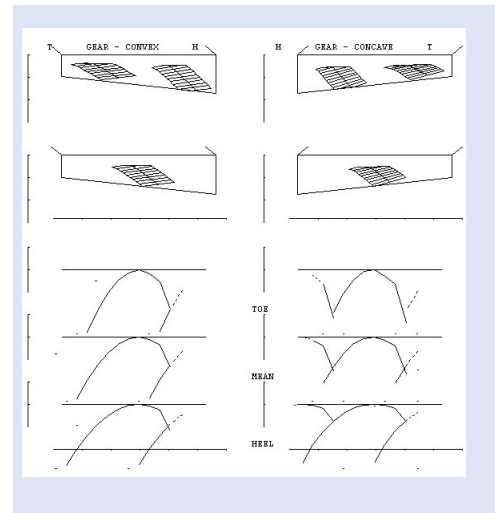
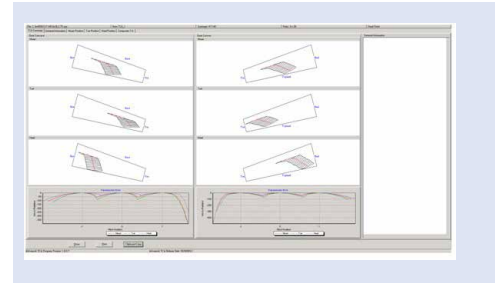
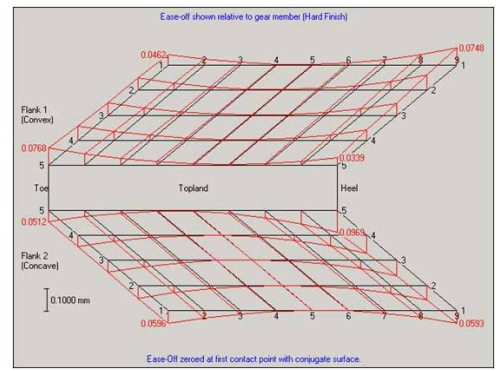




# Total Quality Management (TQM) isn't a Mere Slogan

Total Quality Management (TQM) is never a mere slogan of LI MING Company. We adhere to our quality policy. To each quality requirement, we have to set up rigorous quality standards for prompt and accurate quality control every single part is subjected to comprehensive inspection and tests, from initial receipt of material to assembly of finished products and regular operation, to completely satisfy your requirement. Our quality control department has the most advanced inspection equipment conducting precision measurement. A good tool is the master of all good works, our precision inspection equipments are the best assurance of our reliable quality.





## 先進的製造技術

使用高端的設計軟件及世界級的高精密的加工設備，並配合全面品質確保設計輸入到輸出端的品質一致的閉循環 (Close Loop) 生產流程。

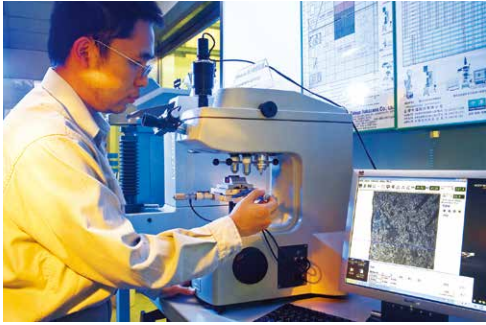
Using high-tech design software and world-class high-precision processing equipment, and with comprehensive quality control. Designed to ensure the quality of the input to the output of the same closed loop production process.



# Advanced

Manufacturing Technology



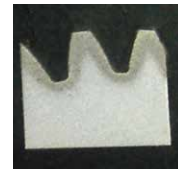
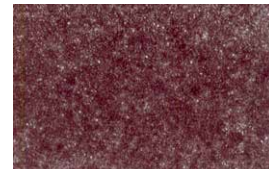


# Heat Treatment

## 熱處理

獨特真空滲碳齒輪兼具表面硬度與心部韌性·不但耐磨耗·且能在承受重負載的情況下·保持高嚙合精度。

Unique vacuum carburization treatment has the features of high surface hardness and interior toughness. It is hard-wearing and hard-tearing. It will keep good engagement under heavy loading.



\* 硬度分布圖 Hardenability curve \* 金相組織相片 Metallograph

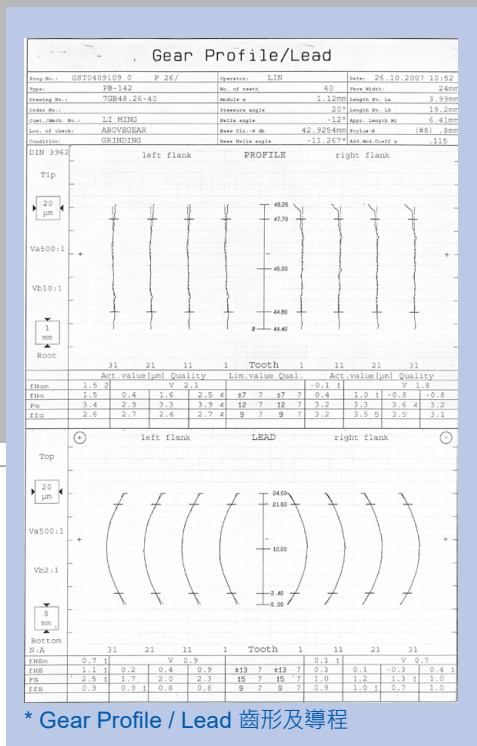
# High Precision

Gear Machining

## 高精度齒輪加工

行星齒輪及太陽齒輪材料採用高級之鎳鎢鉬合金鋼 (SNCM220)·切削加工後·經滲碳熱處理至硬度 57~60HRC·再進行齒面研磨·確保齒輪精度在 DIN6 級以內·比只有表面的氮化處理·獲得最佳的耐磨耗和耐衝擊韌性·壽命更長。

The planetary gear and sun gear are manufactured from high quality NI-Cr-Mo alloy steel (SNCM220), precision machined and carburized to hardness 57-60HRC. Precision teeth grinding assures gear accuracy reaches DIN6 class. It provides better wear resistance, impact resistance and longer service life than gears with only surface nitrided.

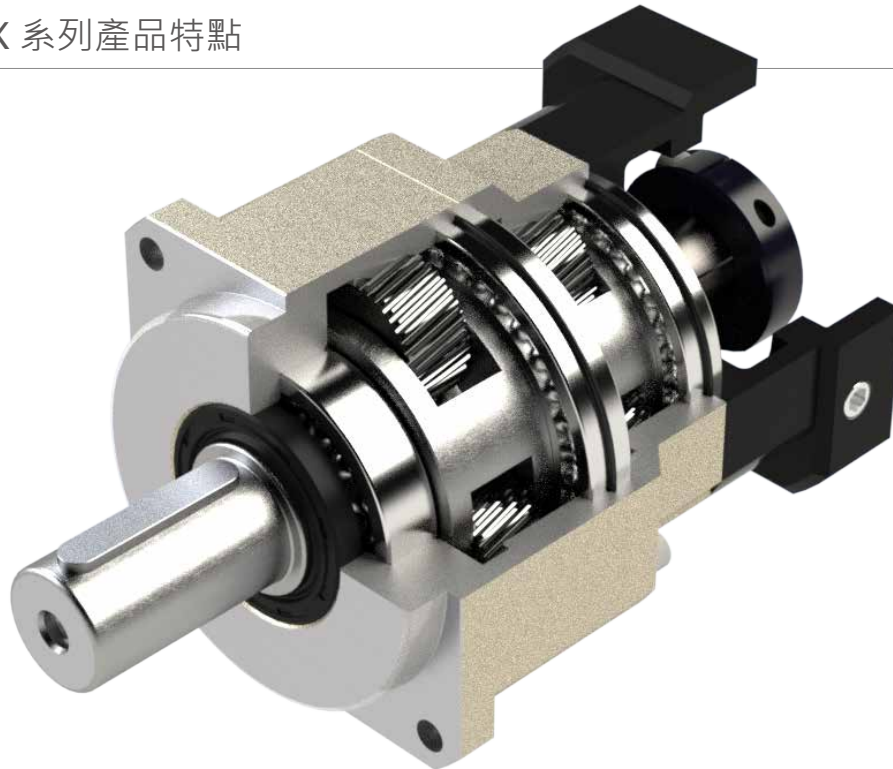


\* Gear Profile / Lead 齒形及導程



# Features of SERVBOX Series

SERVBOX 系列產品特點



## 螺旋齒輪設計

減速機構採用螺旋齒輪設計，齒形嚙合率為一般正齒輪的二倍以上，具有運轉平順、低噪音、高輸出扭矩和低背隙的特性。

## Helical Gear Design

The speed reduction mechanism employs helical gears, which provides two times meshing rate of teeth when comparing with regular spur gears. In addition, it also features extremely smooth running, low noise, high torque output and low backlash.



## 全合成潤滑油脂

採 IP65 防護等級的密封設計，潤滑油脂不洩漏免保養。

## Synthetic Lubrication Grease

The protective class IP65 seals design avoids leakage problem. It features no maintenance.



## 筒夾式連結機構

輸入端與馬達的連結採用筒夾式的鎖緊機構，並經動力平衡分析，以確保在高輸入轉速下結合介面的同心度和平衡度，及零背隙的動力傳遞。

## Collet Locking Mechanism

The input-end and the motor are coupled through a collet locking mechanism. It has passed dynamical balance analysis to assure concentricity and balance on the connection and no backlash for power transmission while running at high speed.





### 滿針滾針軸承設計

行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

### Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.



### 一體式行星臂架及雙懸臂設計

行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。並使用一次加工完成，控制精度在公差之內。

### Integrated Planetary Arm Bracket

The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy. The entire structure is one-time machined for controlling accuracy in the specified tolerance.



### 高精度齒輪加工

行星齒輪及太陽齒輪材料採用高級之鎳鉻鉬合金鋼 (SNCM220)，切削加工後，經滲碳熱處理至硬度 57~60HRC，再進行齒面研磨，確保齒輪精度在 DIN6 級以內，比只有表面的氮化處理，獲得最佳的耐磨耗和耐衝擊韌性，壽命更長。

### High Precision Gear Machining

The planetary gear and sun gear are made by high quality Ni-Cr-Mo alloy steel (SNCM220), precision machined and carburized to hardness 57-60 HRC. Precision teeth grinding assures gear accuracy reaches DIN6 class. It provides better wear resistance, impact resistance and longer service life than gears with only surface nitrided.

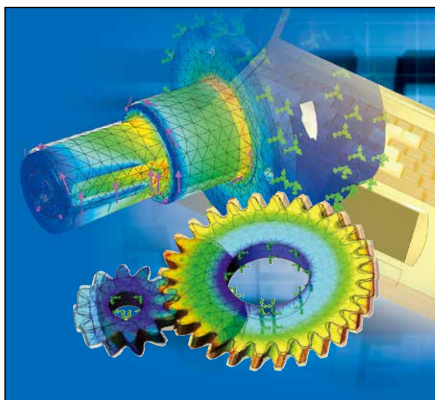


### 一體式齒輪箱本體

齒輪箱和內環齒輪採一體式的設計，材質為鎳鉻鉬合金鋼 SCM440，經調質後加工，輸出扭矩大，齒輪精度達 DIN6 級，精密度高，表面防鏽處理，提高環境的耐受性和抗腐蝕能力。

### One-piece Gear Box & Advanced Surface Treatment

The gear box and internal gear ring are one-piece constructed, which is made by Cr-Mo alloy steel (SCM440), and tempered for high torque output. High gear accuracy meets DIN6 class standard. Gearbox surface is anti-corrosive treated for upgrading environmental-resistant and corrosion-resistant capability.

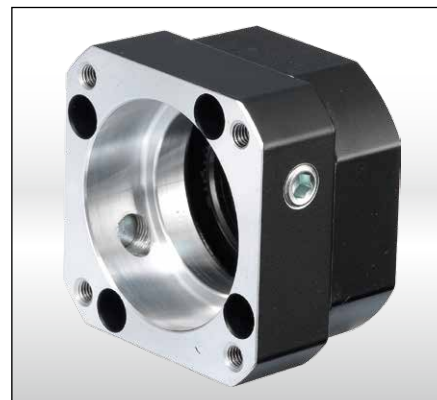


### CAE 設計分析技術

利用 3D-CAE 軟體的設計分析技術，對減速機整體強度進行分析及螺旋齒面作齒形及導程修整，以降低齒輪對嚙入及嚙出的衝擊和噪音，增加齒輪系及減速機的使用壽命。

### CAE Design and Analysis

Employs 3D-CAE software for analysis and design, the software allows for analyzing the strength of the entire gear reducer and modifying the helical teeth profile and lead. This reduces the impact and noise during teeth engage and disengage, while increasing the service life of gears and the gear reducer.



### 模組化馬達連接板設計

獨特的馬達連接板模組化設計，適用於任何廠牌和型式的伺服馬達，材質採用鋁合金，表面經由防氧化處理，提高環境的耐受性和抗腐蝕能力。

### Modular Design of Motor Connection Plate

The special modular design of motor connection plate is suitable for any brand and any type of servomotor. It is made by aluminum alloy. Its surface is anti-oxidant treated for upgrading environmental-resistant and corrosion-resistant capability.



# SERVOBOX

## Planetary Reducers

利明牌精密行星減速機 SERVBOX 系列，以螺旋齒輪設計，採用精密 CNC 滾齒機加工，咬合精準、運轉順暢、低噪音。一體式的齒輪箱本體，與同規格型減速機相比，體積小（省 1/4 以上體積與重量）輸出扭力大、傳動效率高。

SERVOBOX series high precision planetary gear reducer employs helical gears. All gears are high precision machined by CNC gear hobbing machine, providing high accuracy gear engagement, smooth running and minimum noise.

LIMING gear box is one-piece fabricated. When comparing with the competitive gear reducer, LIMING gear reducer features smaller construction (saves over 1/4 of size and weight), higher output torque and higher transmission efficiency.

## Characteristic of SERVBOX Series

### SERVBOX 系列產品特性

#### 低 噪 音

低於 65dB。

#### Low Noise

Under 65dB.

#### 低 背 隙

單段低於 7 弧分 (arcmin)，可選擇 1 弧分規格。  
雙段減速在 9 弧分以內。

#### Low Backlash

Backlash for 1-stage model is under 7 arcmin. Available to select specification with 1 arcmin of backlash. Backlash for 2-stage model is under 9 arcmin.

#### 高 效 率

單段式在 97% 以上，雙段式在 94% 以上。

#### High Efficiency

Efficiency for 1-stage model exceeds 97%; 2-stage model exceeds 94%.

#### 高輸入轉速

可達 5,000 RPM。

#### High Input Speed

Input speed allows for 5,000 RPM.

#### 高 扭 矩

比一般正齒輪行星減速機扭矩高。

#### High Torque

Higher output torque is in comparison with spur gear planetary gear reducers.

#### 高穩定性

採用高強度合金鋼材，整顆齒輪經硬化處理，非只有表面硬化，確保使用壽命及長期使用仍保持最初的精密度。

#### High Stability

Employs high tensile strength alloy steel. Gear hardening is made for the entire gear instead of only surface hardening, which extends gear service life and maintain high accuracy after a long period of operation.

#### 高減速比

採模組化設計，行星齒箱可相互連結，速比可達 1/10000 以上。

#### High Speed Reduction Ratio

The gear reducer is a modular design. The planetary gear box can be connected. Speed reduction ratio can reach over than 1/10000.



# Indication of Model Numbers

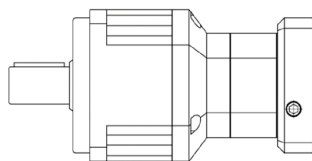
機種型號表示

| SB           | 90          | 10                         |   | P1                     | MOTOR              |
|--------------|-------------|----------------------------|---|------------------------|--------------------|
| 減速機型<br>Type | 型號<br>Model | 速比<br>Ratio                | 出力軸鍵槽<br>Output Bearing                           | 背隙等級<br>Backlash Class | 馬達型號<br>Motor Type |
| SB           | 44          | 單段 1-Stage                 | ☐ 標準品 · 有鍵槽<br>Standard (Keyway)                  | Ps                     | 馬達製造商及型號           |
| SE           | 62          | 3, 4, 5, 6, 7, 8,<br>9, 10 | N: 實心軸 · 無鍵槽<br>Solid Output Shaft<br>(No Keyway) | P0                     | Motor Brand &      |
| SB-A         | 90          | 雙段 2-Stage                 |   | P1                     | Model No.          |
| SE-A         | 120         | 15 ~ 100                   |   | P2                     |                    |
| SBL          | 142         | 三段 3-Stage                 |   |                        |                    |
| SEL          | 180         | 125 ~ 1000                 |   |                        |                    |
|              | 220         |                            |   |                        |                    |
|              | 270         |                            |   |                        |                    |
|              | 330         |                            |   |                        |                    |

## 標準型及 A-Type 說明

在 2 段或 3 段減速時，減速比高，輸出扭矩大，標準型的 2 段或 3 段齒箱為大齒箱接小齒箱，可限制入力馬力，以符合額定輸出扭矩。

A-Type 為二個相同框號齒箱的連結。



Standard

例如：使用伺服馬達，功率 0.5kW，額定輸出扭矩 2.39Nm，

馬達軸心為 Ø24mm

1. 假設減速比為 1/50 時：

輸出扭矩為  $2.39\text{Nm} \times 50 \times 94\%$  (效率) = 112Nm

可選擇 SB-120-50

額定輸出扭矩 333Nm S.F.=2.6(安全係數)

亦可選擇 SB-90A-50

額定輸出扭矩 141Nm S.F.=1.25(降框號使用)

2. 假設減速比為 1/100 時：

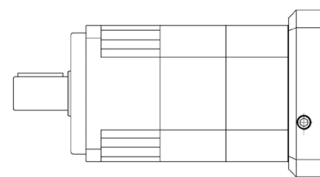
輸出扭矩為  $2.39 \times 100 \times 94\%$  (效率) = 224Nm

可選用 SB-120-100 S.F.=1.3

選用 SB-90A-100 時 S.F.=0.62 安全係數不足，不建議使用

## Description of Standard and A-Type

The features of 2-stage or 3-stage gearbox are high gear ratio and large output torque. The standard type of 2-stage or 3-stage gearbox are combined by big and small gearboxes to have a limit to input power and then to meet rated output torque. A-Type has a combination of 2 gearboxes with same frame.



A-Type

Example:

Servo motor 0.5 kW, rated output torque 2.39 Nm, motor shaft Ø24 mm.

1. Suppose the speed reduction ratio is 1/50:

Output torque is  $2.39 \text{ Nm} \times 50 \times 94\%$  (efficiency) = 112 Nm.

● You can select SB-120-50 with rated output torque of 333 Nm and S.F. = 2.6

● You can select SB-90A-50 with rated output torque of 141 Nm and S.F. = 1.25

2. Suppose the speed reduction ratio is 1/100:

Output torque is  $2.39 \times 100 \times 94\%$  (efficiency) = 224 Nm.

You can select SB-120-100 and S.F. = 1.3. You are not suggested to choose SB-90A-100 because of low S.F. = 0.62.

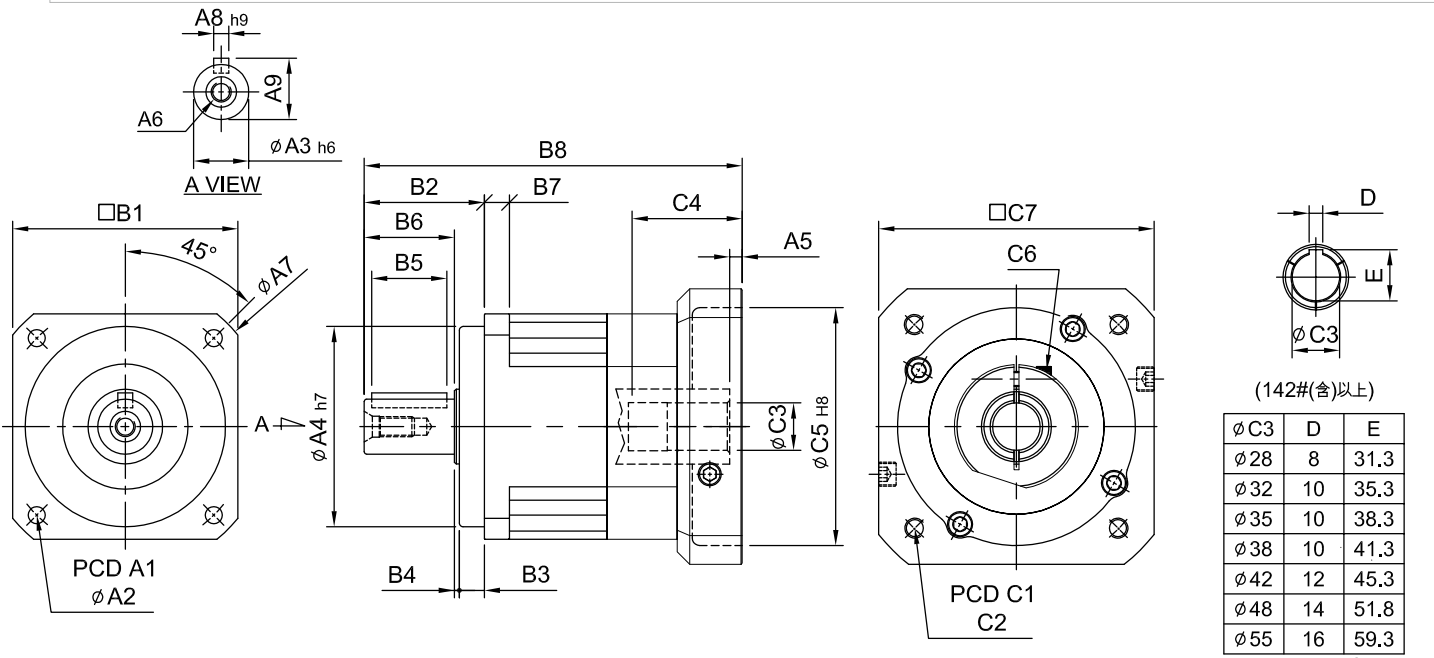
# SERVOBOX Planetary Reducers



## MODEL : SB

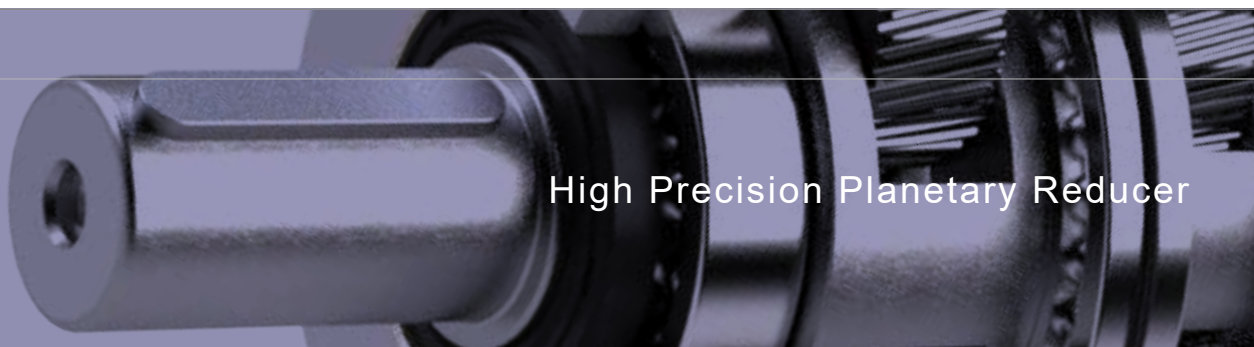
單段 1-Stage

RATIO : 3, 4, 5, 6, 7, 8, 9, 10



| Model Code  | 44        | 62          | 90             | 120         | 142         | 180               | 220           |
|-------------|-----------|-------------|----------------|-------------|-------------|-------------------|---------------|
| <b>A</b> A1 | 50        | 70          | 100            | 130         | 165         | 215               | 250           |
| A2          | 4.5       | 5.5         | 6.8            | 9           | 11          | 13                | 17            |
| A3          | 13        | 16          | 22             | 32          | 40          | 55                | 75            |
| A4          | 35        | 50          | 80             | 110         | 130         | 160               | 180           |
| A5          | 5         | 6           | 9·23.5         | 10·20       | 10          | 11.5·14.5         | 12.5·14.5     |
| A6          | M4 x P0.7 | M5 x P0.8   | M8 x P1.25     | M10 x P1.5  | M12 x P1.75 | M14 x P2.0        | M16 x P2.0    |
| A7          | 58        | 80          | 116            | 148         | 186         | 238               | 288           |
| A8          | 5         | 5           | 6              | 10          | 12          | 16                | 20            |
| A9          | 15        | 18          | 24.5           | 35          | 43          | 59                | 79.5          |
| <b>B</b> B1 | 44        | 62          | 90             | 120         | 142         | 180               | 220           |
| B2          | 26        | 36          | 48             | 65          | 92          | 106               | 139           |
| B3          | 5         | 7           | 10             | 12          | 15          | 20                | 30            |
| B4          | 1         | 1           | 2              | 3           | 3           | 4                 | 5             |
| B5          | 15        | 20          | 30             | 40          | 65          | 70                | 90            |
| B6          | 20        | 28          | 36             | 50          | 74          | 82                | 104           |
| B7          | 5         | 8           | 10             | 12          | 15          | 16                | 20            |
| B8          | 95        | 115·123     | 164.5·179      | 205·215     | 260.5       | 323.5·325.5       | 367.5         |
| <b>C</b> C1 | 46·60·63  | 70·75·90    | 90·100·115·145 | 115·145·165 | 145·165·215 | 200·215·265·300   | 200·265·300   |
| C2          | M3·M4·M5  | M4·M5·M6    | M5·M6·M8       | M6·M8·M10   | M8·M10·M12  | M10·M12·M16       | M12·M16       |
| C3          | 8·9·11    | 11·14·16·19 | 16·19·22·24    | 22·24·28·32 | 28·32·35·38 | 35·38·42·48·55    | 38·42·48·55   |
| C4          | 26·30.5   | 33.5·41.5   | 59·73.5        | 67·77       | 84.5        | 114.5·117.5       | 117.5·119.5   |
| C5          | 30·40·50  | 50·60·70    | 70·80·95·110   | 95·110·130  | 110·130·180 | 114.3·180·230·250 | 114.3·230·250 |
| C6          | M4 x P0.7 | M5 x P0.8   | M6 x P1.0      | M8 x P1.25  | M10 x P1.5  | M10 x P1.5        | M10 x P1.5    |
| C7          | 46·55     | 64·70·80    | 92·110·130     | 122·130·150 | 146·150·190 | 182·200·250·265   | 222·250·265   |





## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 44  | 62    | 90    | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 3           | 19  | 59    | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 4           | 16  | 51    | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 5           | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 6           | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 7           | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 8           | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 9           | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 10          | 14  | 43    | 141   | 294   | 549   | 1,059  | 1,779  |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 3 ~ 10      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 3 ~ 10      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 3 ~ 10      | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 3 ~ 10      | 6,000   | 6,000 | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 3 ~ 10      | -   | -     | ≤ 1   | ≤ 1   | ≤ 1   | ≤ 1    | ≤ 1    |
| 背隙 Backlash P0   |            | arcmin     | 3 ~ 10      | ≤ 3   | ≤ 3   | ≤ 3   | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    |
| 背隙 Backlash P1   |            | arcmin     | 3 ~ 10      | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P2   |            | arcmin     | 3 ~ 10      | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 3 ~ 10      | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 3 ~ 10      | 380   | 1,180 | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 3 ~ 10      | 190   | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 3 ~ 10      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 3 ~ 10      | ≥ 97%   |       |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 3 ~ 10      | - 25° C ~ + 90° C   |       |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 3 ~ 10      | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 3 ~ 10      | IP65  |       |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 3 ~ 10      | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 3 ~ 10      | ≤ 56  | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 3 ~ 10      | 0.6   | 1.28  | 3.6   | 8     | 14.3  | 28.3   | 42.5   |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

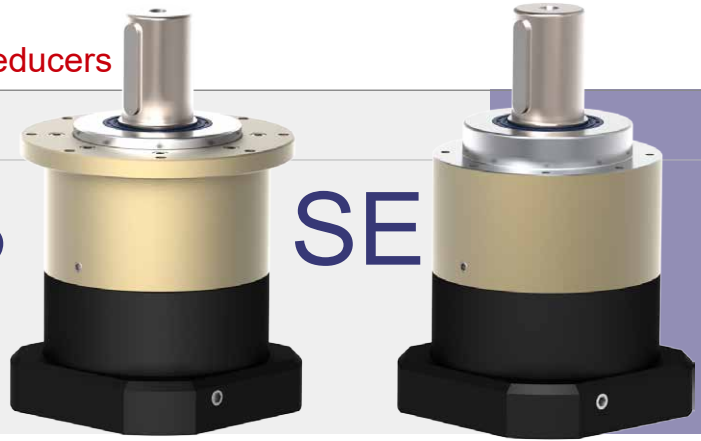
| Ratio | 44   | 62   | 90   | 120  | 142  | 180   | 220   |
|-------|------|------|------|------|------|-------|-------|
| 3     | 0.03 | 0.16 | 0.61 | 3.25 | 9.21 | 28.98 | 59.61 |
| 4     | 0.03 | 0.14 | 0.48 | 2.74 | 7.54 | 23.67 | 54.37 |
| 5     | 0.03 | 0.13 | 0.47 | 2.71 | 7.42 | 23.29 | 53.27 |
| 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 |

# SERVOBOX Planetary Reducers

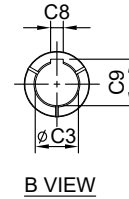
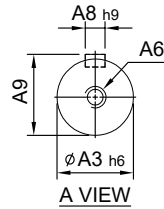
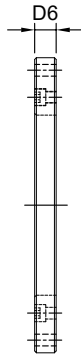
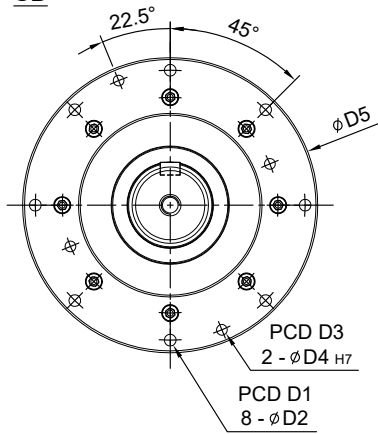
## MODEL : SB SE

單段 1-Stage

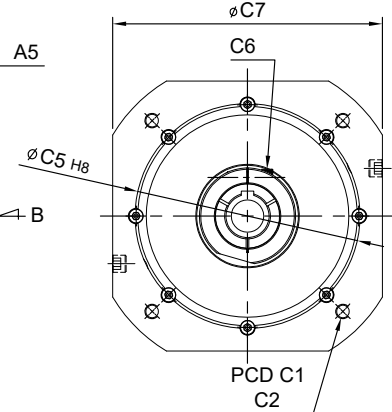
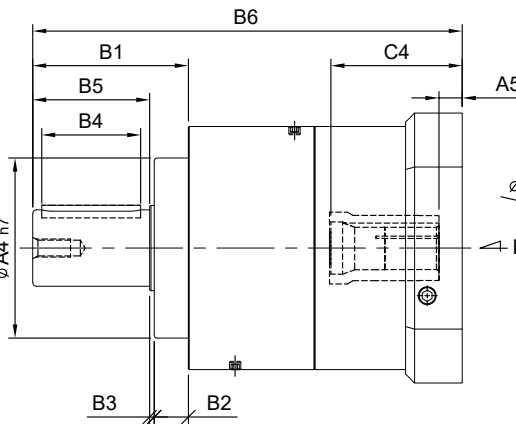
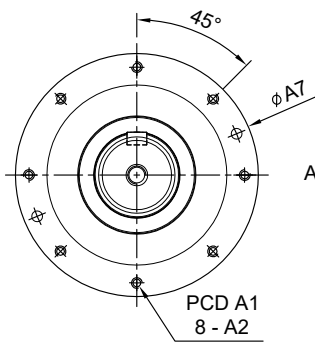
RATIO : 3, 4, 5, 7, 10



**SB**



**SE**



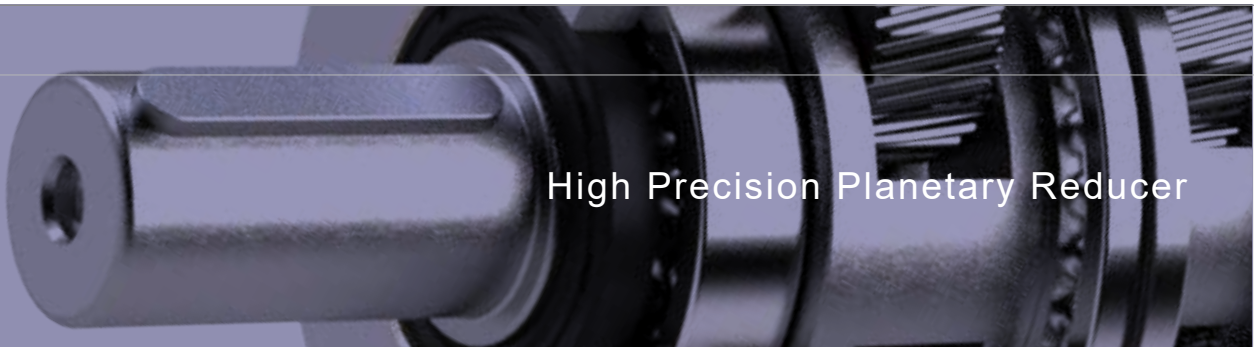
unit: mm

| Model Code | 270           | 330        |
|------------|---------------|------------|
| A1         | 240           | 300        |
| A2         | M12 x P1.75   | M16 x P2.0 |
| A3         | 85            | 100        |
| A4         | 200           | 250        |
| A5         | 25 · 30       | 25 · 30    |
| A6         | M20 x P2.5    | M24 x P3.0 |
| A7         | 270           | 336        |
| A8         | 22            | 28         |
| A9         | 90            | 106        |
| B1         | 173           | 187        |
| B2         | 38            | 42         |
| B3         | 5             | 5          |
| B4         | 110           | 120        |
| B5         | 130           | 140        |
| B6         | 476.5 · 481.5 | 514 · 519  |

unit: mm

| Model Code | 270                       | 330                     |
|------------|---------------------------|-------------------------|
| C1         | 265 · 300 · 350           | 265 · 300 · 350         |
| C2         | M12 · M16 · M18           | M12 · M16 · M18         |
| C3         | 48 · 55 · 60 · 65 · 70    | 55 · 60 · 65 · 75       |
| C4         | 145 · 150                 | 145 · 150               |
| C5         | 230 · 250 · 300           | 230 · 250 · 300         |
| C6         | M12 x P1.75               | M12 x P1.75             |
| C7         | 280 · 326                 | 280 · 326               |
| C8         | 14 · 16 · 18 · 20         | 16 · 18 · 20            |
| C9         | 51.8 · 59.3 · 64.4 · 74.8 | 59.3 · 64.4 · 69.4 · 80 |
| D1         | 300                       | 380                     |
| D2         | 13                        | 17                      |
| D3         | 300                       | 380                     |
| D4         | 12                        | 14                      |
| D5         | 328                       | 416                     |
| D6         | 24                        | 28                      |





| 規格<br>Model No.  | 代號         | 單位<br>Unit         | 速比<br>Ratio | 270   | 330                 |
|--|------------|--------------------|-------------|---|---------------------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm                 | 3           | 4,770   | 8,790               |
|  |            |                    | 4           | 4,730   | 8,730               |
|  |            |                    | 5           | 4,680   | 8,660               |
|  |            |                    | 7           | 4,570   | 8,520               |
|  |            |                    | 10          | 4,420   | 8,310               |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm                 | 3 ~ 10      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |                     |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm                 | 3 ~ 10      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |                     |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm                | 3 ~ 10      | 2,000   | 2,000               |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm                | 3 ~ 10      | 3,000   | 3,000               |
| 背隙 Backlash P3   |            | arcmin             | 3 ~ 10      | $\leq 1$  | $\leq 1$            |
| 背隙 Backlash P0   |            | arcmin             | 3 ~ 10      | $\leq 3$  | $\leq 3$            |
| 背隙 Backlash P1   |            | arcmin             | 3 ~ 10      | $\leq 5$  | $\leq 5$            |
| 背隙 Backlash P2   |            | arcmin             | 3 ~ 10      | $\leq 7$  | $\leq 7$            |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin          | 3 ~ 10      | 510   | 980                 |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N                  | 3 ~ 10      | 107,100   | 224,910             |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N                  | 3 ~ 10      | 53,550  | 112,455             |
| 使用壽命 Service Life  | $L_{H1}$   | hr                 | 3 ~ 10      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation : >30,000 (S1 Continuous Operation : >15,000 hrs) |                     |
| 效率 Efficiency  | $\eta$     | %                  | 3 ~ 10      | $\geq 97\%$   |                     |
| 使用溫度 Operating Temperature                               |            | $^{\circ}\text{C}$ | 3 ~ 10      | - 25 $^{\circ}\text{C}$ ~ + 90 $^{\circ}\text{C}$   |                     |
| 潤滑 Lubrication   |            |                    | 3 ~ 10      | 全合成潤滑油脂 Synthetic Grease  |                     |
| 防護等級 Protection Class                                    |            |                    | 3 ~ 10      | IP65  |                     |
| 安裝方向 Mounting Position                                   |            |                    | 3 ~ 10      | 任意方向 Any  |                     |
| 噪音值 Noise Level  |            | dB                 | 3 ~ 10      | $\leq 72$   | $\leq 74$           |
| 重量 Weight $\pm 3\%$                                      |            | Kg                 | 3 ~ 10      | SB : 97 · SE : 87.5   | SB : 190 · SE : 172 |

■ 轉動慣量 (kg.cm<sup>2</sup>) Mass Moments of Inertia

| Ratio | 270    | 330    |
|-------|--------|--------|
| 3     | 122.20 | 252.96 |
| 4     | 111.46 | 230.72 |
| 5     | 109.20 | 226.05 |
| 7     | 104.49 | 216.29 |
| 10    | 103.65 | 214.55 |

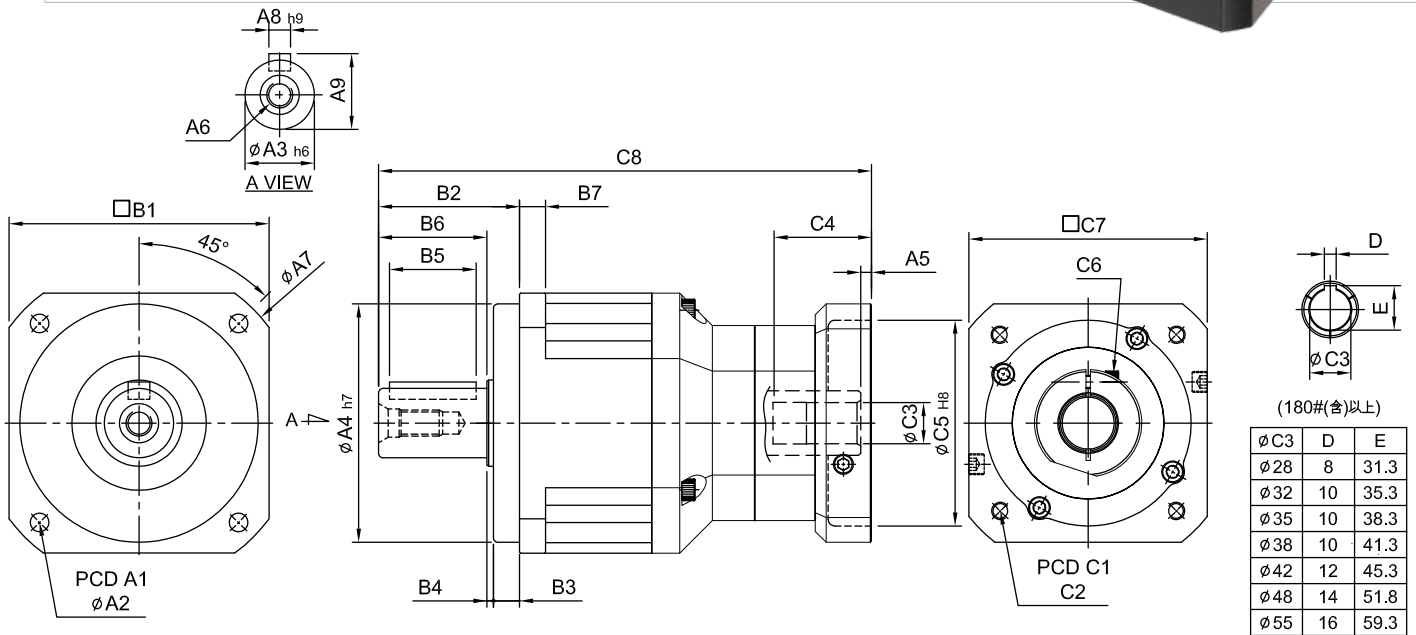
# SERVOBOX Planetary Reducers



## MODEL : SB

雙段 2-Stage

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



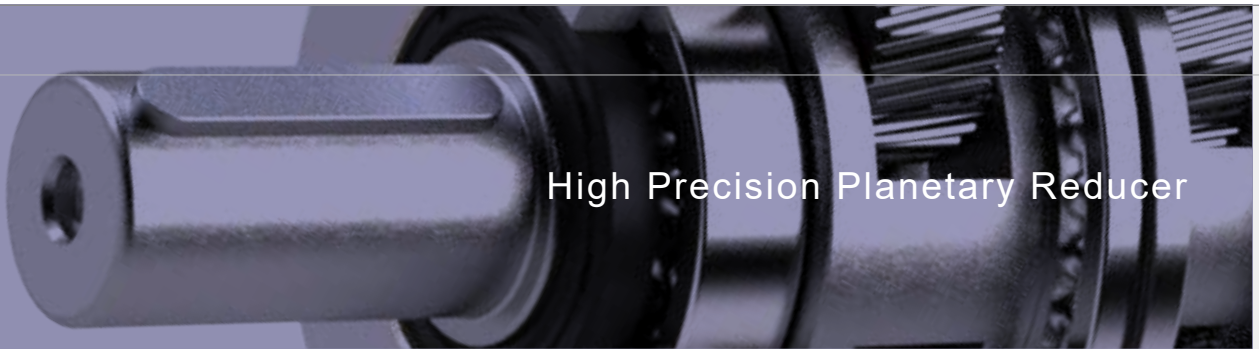
(180#(含)以上)

| ø C3 | D  | E    |
|------|----|------|
| ø 28 | 8  | 31.3 |
| ø 32 | 10 | 35.3 |
| ø 35 | 10 | 38.3 |
| ø 38 | 10 | 41.3 |
| ø 42 | 12 | 45.3 |
| ø 48 | 14 | 51.8 |
| ø 55 | 16 | 59.3 |

unit: mm

| Model Code  | 62           | 90                | 120                  | 142                 | 180               | 220                    |
|-------------|--------------|-------------------|----------------------|---------------------|-------------------|------------------------|
| <b>A</b> A1 | 70           | 100               | 130                  | 165                 | 215               | 250                    |
| A2          | 5.5          | 6.8               | 9                    | 11                  | 13                | 17                     |
| A3          | 16           | 22                | 32                   | 40                  | 55                | 75                     |
| A4          | 50           | 80                | 110                  | 130                 | 160               | 180                    |
| A5          | 5            | 6                 | 9 · 23.5             | 10 · 20             | 10                | 11.5 · 13.5            |
| A6          | M5 x P0.8    | M8 x P1.25        | M10 x P1.5           | M12 x P1.75         | M14 x P2.0        | M16 x P2.0             |
| A7          | 80           | 116               | 148                  | 186                 | 238               | 288                    |
| A8          | 5            | 6                 | 10                   | 12                  | 16                | 20                     |
| A9          | 18           | 24.5              | 35                   | 43                  | 59                | 79.5                   |
| <b>B</b> B1 | 62           | 90                | 120                  | 142                 | 180               | 220                    |
| B2          | 36           | 48                | 65                   | 92                  | 106               | 139                    |
| B3          | 7            | 10                | 12                   | 15                  | 20                | 30                     |
| B4          | 1            | 2                 | 3                    | 3                   | 4                 | 5                      |
| B5          | 20           | 30                | 40                   | 65                  | 70                | 90                     |
| B6          | 28           | 36                | 50                   | 74                  | 82                | 104                    |
| B7          | 8            | 10                | 12                   | 15                  | 16                | 20                     |
| <b>C</b> C1 | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165     | 145 · 165 · 215   | 200 · 215 · 265        |
| C2          | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8 · M10   | M6 · M8 · M10       | M8 · M10 · M12    | M10 · M12              |
| C3          | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32   | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
| C4          | 26 · 30.5    | 33.5 · 41.5       | 59 · 73.5            | 67 · 77             | 84.5              | 114.5 · 116.5          |
| C5          | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 70 · 95 · 110 · 130 | 110 · 130 · 180   | 114.3 · 180 · 230      |
| C6          | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25          | M10 x P1.5        | M10 x P1.5             |
| C7          | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150     | 146 · 180 · 190   | 182 · 200 · 250        |
| C8          | 139.5        | 172.5 · 180.5     | 241 · 255.5          | 298.5 · 308.5       | 358.5             | 446.5                  |





## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62  | 90    | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 59  | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 20          | 51  | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 25          | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 30          | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 35          | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 40          | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 50          | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 60          | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 70          | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 80          | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 90          | 44  | 145   | 278   | 516   | 993    | 1,694  |
| 100  | 43         | 141        | 294         | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 100    | 3,000   | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 100    | 6,000   | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 100    | -   | -     | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 100    | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 100    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 100    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 100    | 6   | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 100    | 1,180   | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 100    | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 100    | ≥ 94%   |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 100    | - 25° C ~ + 90° C   |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 100    | IP65  |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 100    | 任意方向 Any  |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 100    | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 100    | 1.73  | 4.6   | 9.42  | 17.2  | 34.1   | 57.3   |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 62   | 90   | 120  | 142  | 180  | 220   |
|-------|------|------|------|------|------|-------|
| 15    | 0.03 | 0.14 | 0.46 | 2.63 | 7.3  | 22.79 |
| 20    | 0.03 | 0.14 | 0.46 | 2.63 | 7.3  | 22.79 |
| 25    | 0.03 | 0.14 | 0.46 | 2.63 | 7.1  | 22.79 |
| 30    | 0.03 | 0.14 | 0.46 | 2.43 | 7.1  | 22.59 |
| 35    | 0.03 | 0.14 | 0.44 | 2.43 | 7.1  | 22.59 |
| 40    | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 |
| 50    | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 |
| 60    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 |
| 70    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 |
| 80    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 |
| 90    | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 |
| 100   | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 |

# SERVOBOX Planetary Reducers

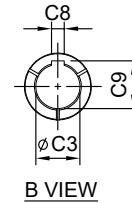
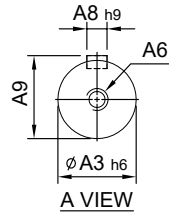
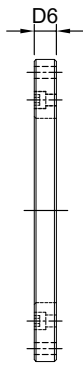
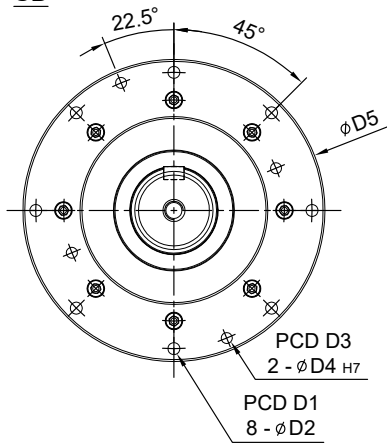
## MODEL : SB SE

雙段 2-Stage

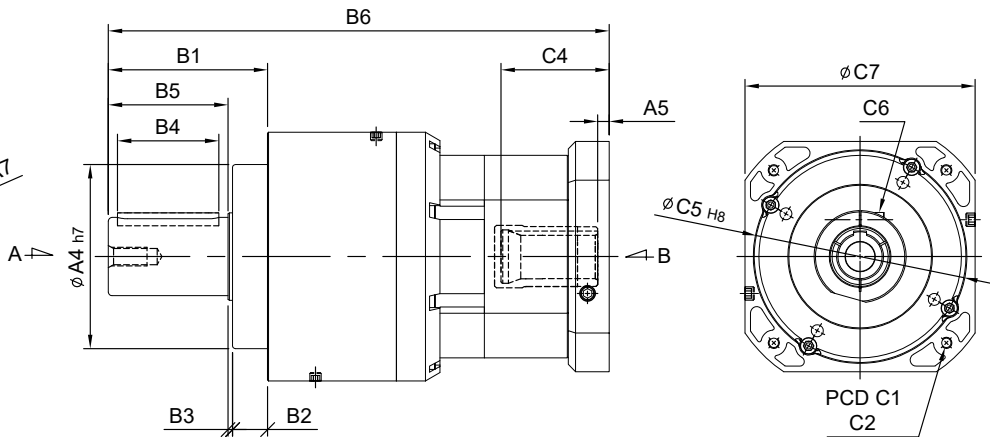
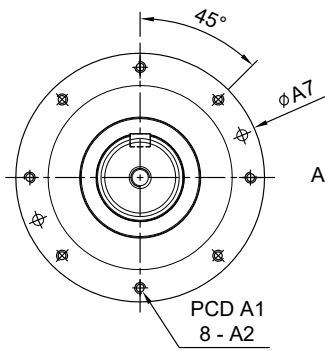
RATIO : 15, 20, 25, 30, 35,  
40, 50, 70, 100



**SB**



**SE**



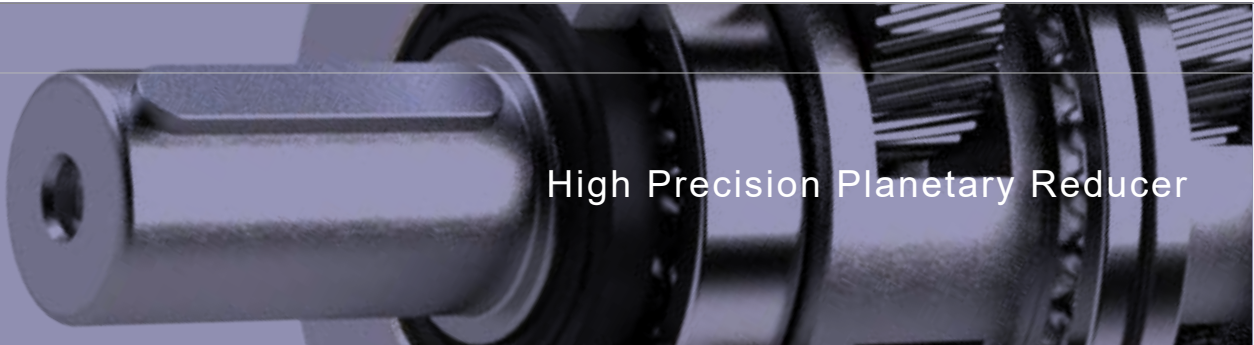
unit: mm

unit: mm

| Model Code | 270         | 330                 |
|------------|-------------|---------------------|
| A1         | 240         | 300                 |
| A2         | M12 x P1.75 | M16 x P2.0          |
| A3         | 85          | 100                 |
| A4         | 200         | 250                 |
| A5         | 12.5        | 26 · 23             |
| A6         | M20 x P2.5  | M24 x P3.0          |
| A7         | 270         | 336                 |
| A8         | 22          | 28                  |
| A9         | 90          | 106                 |
| B1         | 173         | 187                 |
| B2         | 38          | 42                  |
| B3         | 5           | 5                   |
| B4         | 110         | 120                 |
| B5         | 130         | 140                 |
| B6         | 544 · 547   | 625 · 632.5 · 635.5 |

| Model Code | 270                       | 330                              |
|------------|---------------------------|----------------------------------|
| C1         | 200 · 265 · 300           | 265 · 300 · 350                  |
| C2         | M12 · M16                 | M12 · M16 · M18                  |
| C3         | 38 · 42 · 48 · 55         | 48 · 55 · 60 · 65 · 70           |
| C4         | 117.5 · 120.5             | 146 · 149                        |
| C5         | 114.3 · 230 · 250         | 230 · 250 · 300                  |
| C6         | M10 x P1.5                | M12 x P1.75                      |
| C7         | 222 · 250 · 265           | 280 · 300 · 330                  |
| C8         | 10 · 12 · 14 · 16         | 14 · 16 · 18 · 20                |
| C9         | 41.3 · 45.3 · 51.8 · 59.3 | 51.8 · 59.3 · 64.4 · 69.4 · 74.8 |
| D1         | 300                       | 380                              |
| D2         | 13                        | 17                               |
| D3         | 300                       | 380                              |
| D4         | 12                        | 14                               |
| D5         | 328                       | 416                              |
| D6         | 24                        | 28                               |





| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 270   | 330                 |
|--|------------|------------|-------------|---|---------------------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 4,770   | 8,790               |
|  |            |            | 20          | 4,730   | 8,730               |
|  |            |            | 25          | 4,680   | 8,660               |
|  |            |            | 30          | 4,620   | 8,610               |
|  |            |            | 35          | 4,570   | 8,520               |
|  |            |            | 40          | 4,520   | 8,440               |
|  |            |            | 50          | 4,680   | 8,660               |
|  |            |            | 70          | 4,570   | 8,520               |
|  |            |            | 100         | 4,420   | 8,310               |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |                     |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |                     |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 100    | 2,000   | 2,000               |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 100    | 3,000   | 3,000               |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 100    | ≤ 3   | ≤ 3                 |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 100    | ≤ 5   | ≤ 5                 |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 100    | ≤ 7   | ≤ 7                 |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 100    | ≤ 9   | ≤ 9                 |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 100    | 510   | 980                 |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 100    | 107,100   | 224,910             |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 100    | 53,550  | 112,455             |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |                     |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 100    | ≥ 94%   |                     |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 100    | - 25° C ~ + 90° C   |                     |
| 潤滑 Lubrication   |            |            | 15 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |                     |
| 防護等級 Protection Class                                    |            |            | 15 ~ 100    | IP65  |                     |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 100    | 任意方向 Any  |                     |
| 噪音值 Noise Level  |            | dB         | 15 ~ 100    | ≤ 72  | ≤ 74                |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 100    | SB : 137 · SE : 127.5   | SB : 186 · SE : 176 |

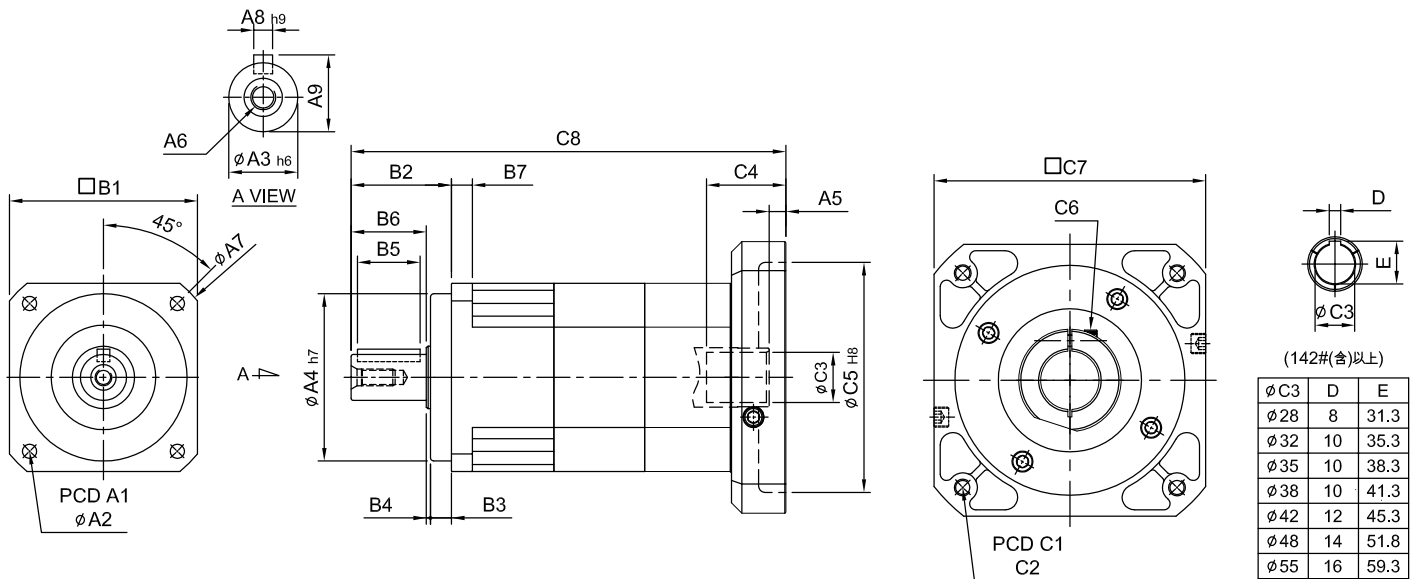
■ 轉動慣量 (kg.cm<sup>2</sup>) Mass Moments of Inertia

| Ratio | 270   | 330    |
|-------|-------|--------|
| 15    | 63.81 | 185.05 |
| 20    | 63.81 | 185.05 |
| 25    | 63.81 | 185.05 |
| 30    | 63.25 | 183.43 |
| 35    | 63.25 | 183.43 |
| 40    | 63.25 | 183.43 |
| 50    | 63.25 | 183.43 |
| 70    | 61.12 | 177.26 |
| 100   | 60.48 | 175.39 |

## MODEL : SB-A

雙段 2-Stage

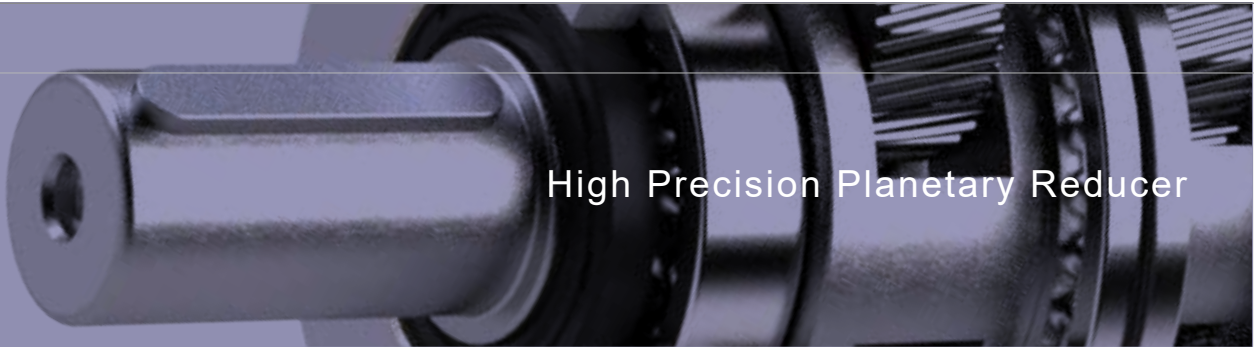
RATIO : 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100



unit: mm

| Model Code | 44A          | 62A               | 90A                  | 120A              | 142A              | 180A                   | 220A              |
|------------|--------------|-------------------|----------------------|-------------------|-------------------|------------------------|-------------------|
| A1         | 50           | 70                | 100                  | 130               | 165               | 215                    | 250               |
| A2         | 4.5          | 5.5               | 6.8                  | 9                 | 11                | 13                     | 17                |
| A3         | 13           | 16                | 22                   | 32                | 40                | 55                     | 75                |
| A4         | 35           | 50                | 80                   | 110               | 130               | 160                    | 180               |
| A5         | 5            | 6                 | 9 · 23.5             | 10 · 20           | 10                | 11.5 · 13.5            | 12.5 · 14.5       |
| A6         | M4 x P0.7    | M5 x P0.8         | M8 x P1.25           | M10 x P1.5        | M12 x P1.75       | M14 x P2.0             | M16 x P2.0        |
| A7         | 58           | 80                | 116                  | 148               | 186               | 238                    | 288               |
| A8         | 5            | 5                 | 6                    | 10                | 12                | 16                     | 20                |
| A9         | 15           | 18                | 24.5                 | 35                | 43                | 59                     | 79.5              |
| B1         | 44           | 62                | 90                   | 120               | 142               | 180                    | 220               |
| B2         | 26           | 36                | 48                   | 65                | 92                | 106                    | 139               |
| B3         | 5            | 7                 | 10                   | 12                | 15                | 20                     | 30                |
| B4         | 1            | 1                 | 2                    | 3                 | 3                 | 4                      | 5                 |
| B5         | 15           | 20                | 30                   | 40                | 65                | 70                     | 90                |
| B6         | 20           | 28                | 36                   | 50                | 74                | 82                     | 104               |
| B7         | 5            | 8                 | 10                   | 12                | 15                | 16                     | 20                |
| C1         | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   | 200 · 215 · 265        | 200 · 265 · 300   |
| C2         | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    | M10 · M12              | M12 · M16         |
| C3         | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32 | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 | 38 · 42 · 48 · 55 |
| C4         | 26 · 30.5    | 33.5              | 59 · 73.5            | 67 · 77           | 84.5              | 114.5 · 116.5          | 117.5 · 119.5     |
| C5         | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   | 114.3 · 180 · 230      | 114.3 · 230 · 250 |
| C6         | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.5         | M10 x P1.5        | M10 x P1.5             | M10 x P1.5        |
| C7         | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   | 182 · 200 · 250        | 222 · 250 · 265   |
| C8         | 121          | 148.8             | 208 · 222.5          | 261 · 271         | 327               | 404.5                  | 460.5             |





## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 44A   | 62A   | 90A   | 120A  | 142A  | 180A   | 220A   |
|--|------------|------------|-------------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 19  | 59    | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 20          | 16  | 51    | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 25          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 30          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 35          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 40          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 50          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 60          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 70          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 80          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 90          | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
| 100  | 14         | 43         | 141         | 294   | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 100    | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 100    | 6,000   | 6,000 | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 100    | -   | -     | -     | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 100    | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 100    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 100    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 100    | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 100    | 380   | 1,180 | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 100    | 190   | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 100    | ≥ 94%   |       |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 100    | - 25° C ~ + 90° C   |       |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 100    | IP65  |       |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 100    | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 100    | ≤ 56  | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 100    | 0.6   | 2     | 5.5   | 11    | 21    | 42     | 59     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 44A  | 62A  | 90A  | 120A | 142A | 180A  | 220A  |
|-------|------|------|------|------|------|-------|-------|
| 15    | 0.03 | 0.14 | 0.46 | 2.63 | 7.30 | 22.79 | 56.98 |
| 20    | 0.03 | 0.14 | 0.46 | 2.63 | 7.30 | 22.79 | 56.98 |
| 25    | 0.03 | 0.14 | 0.46 | 2.63 | 7.10 | 22.79 | 56.98 |
| 30    | 0.03 | 0.14 | 0.46 | 2.43 | 7.10 | 22.59 | 56.48 |
| 35    | 0.03 | 0.14 | 0.44 | 2.43 | 7.10 | 22.59 | 56.48 |
| 40    | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 | 56.48 |
| 50    | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 | 56.48 |
| 60    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |
| 70    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |
| 80    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |
| 90    | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 | 54.00 |
| 100   | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |

# SERVOBOX Planetary Reducers

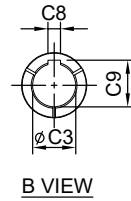
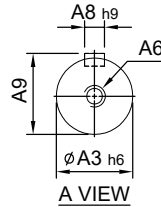
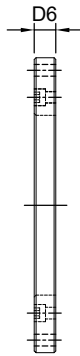
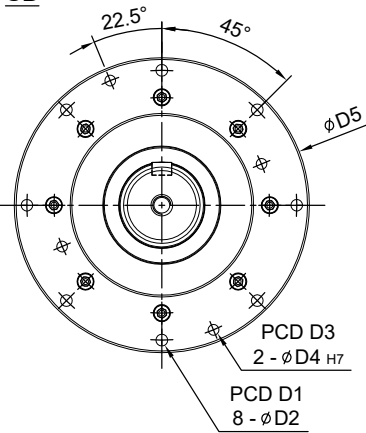
## MODEL: SB-A SE-A

雙段 2-Stage

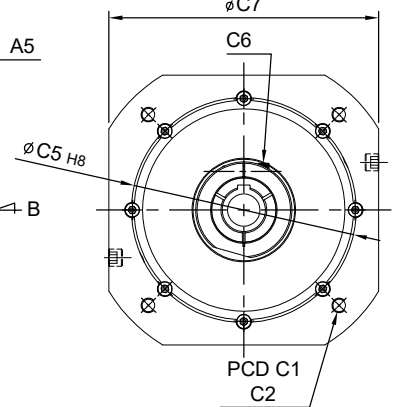
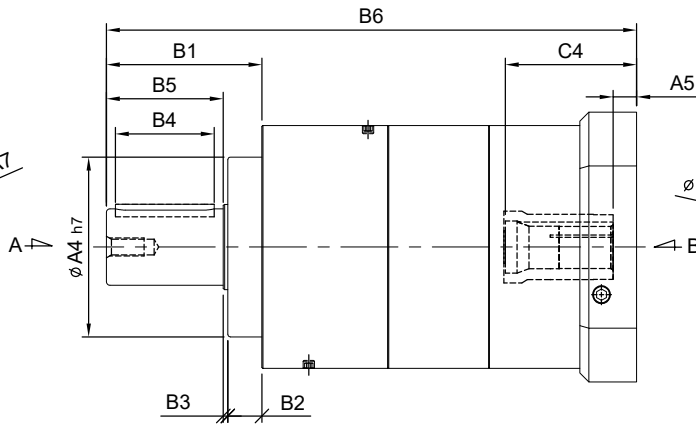
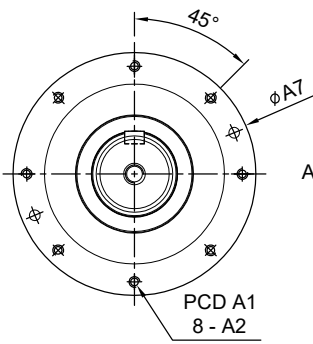
RATIO : 15, 20, 25, 30, 35,  
40, 50, 70, 100



SB



SE

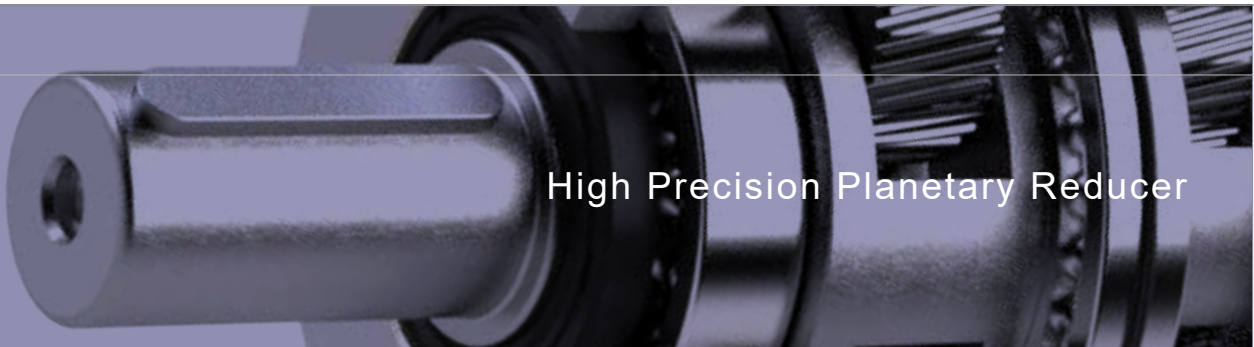


unit: mm

| Model | 270A          |
|-------|---------------|
| Code  |               |
| A1    | 240           |
| A2    | M12 x P1.75   |
| A3    | 85            |
| A4    | 200           |
| A5    | 26 · 23       |
| A6    | M20 x P2.5    |
| A7    | 270           |
| A8    | 22            |
| A9    | 90            |
| B1    | 173           |
| B2    | 38            |
| B3    | 5             |
| B4    | 110           |
| B5    | 130           |
| B6    | 586.5 · 589.5 |

unit: mm

| Model | 270A               |
|-------|--------------------|
| Code  |                    |
| C1    | 265 · 300 · 350    |
| C2    | M12 · M16 · M18    |
| C3    | 48 · 55 · 60       |
| C4    | 143 · 146 · 149    |
| C5    | 230 · 250 · 300    |
| C6    | M12 x P1.75        |
| C7    | 280 · 300 · 330    |
| C8    | 14 · 16 · 18       |
| C9    | 51.8 · 59.3 · 64.4 |
| D1    | 300                |
| D2    | 13                 |
| D3    | 300                |
| D4    | 12                 |
| D5    | 328                |
| D6    | 24                 |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 270A  |
|--|------------|------------|-------------|---|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 4,770   |
|  |            |            | 20          | 4,730   |
|  |            |            | 25          | 4,680   |
|  |            |            | 30          | 4,770   |
|  |            |            | 35          | 4,570   |
|  |            |            | 40          | 4,770   |
|  |            |            | 50          | 4,680   |
|  |            |            | 70          | 4,570   |
|  |            |            | 100         | 4,220   |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 100    | 2,000   |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 100    | 3,000   |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 100    | ≤ 3   |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 100    | ≤ 5   |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 100    | ≤ 7   |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 100    | ≤ 9   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 100    | 510   |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 100    | 107,100   |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 100    | 53,550  |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 100    | ≥ 94%   |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 100    | - 25° C ~ + 90° C   |
| 潤滑 Lubrication   |            |            | 15 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |
| 防護等級 Protection Class                                    |            |            | 15 ~ 100    | IP65  |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 100    | 任意方向 Any  |
| 噪音值 Noise Level  |            | dB         | 15 ~ 100    | ≤ 72  |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 100    | SB : 146 · SE : 136.5   |

### ■ 轉動慣量 (kg.cm<sup>2</sup>) Mass Moments of Inertia

| Ratio | 270A  |
|-------|-------|
| 15    | 65.74 |
| 20    | 65.74 |
| 25    | 65.74 |
| 30    | 64.86 |
| 35    | 64.86 |
| 40    | 64.86 |
| 50    | 64.86 |
| 70    | 62.62 |
| 100   | 61.17 |



# SERVOBOX Planetary Reducers

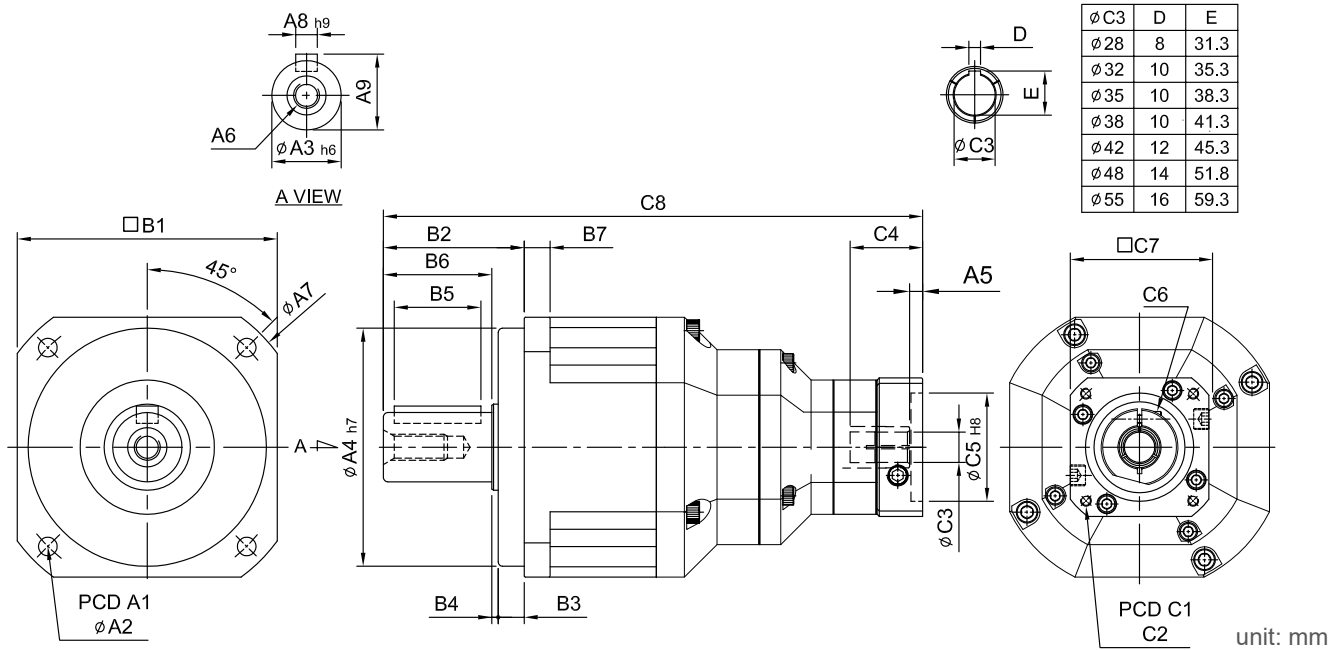


## MODEL : SB

三段 3-Stage

RATIO : 125, 150, 175, 200, 250, 300, 350,  
400, 450, 500, 600, 700, 800, 900, 1000

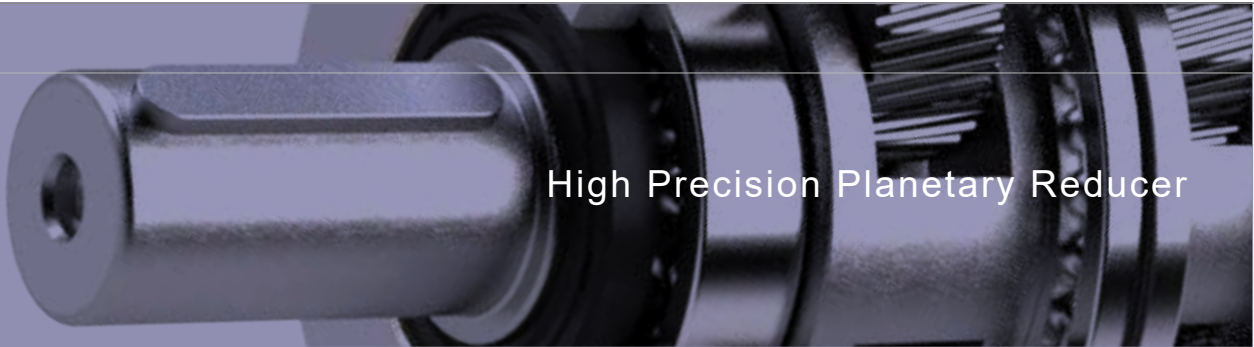
(220#)



| φC3 | D  | E    |
|-----|----|------|
| φ28 | 8  | 31.3 |
| φ32 | 10 | 35.3 |
| φ35 | 10 | 38.3 |
| φ38 | 10 | 41.3 |
| φ42 | 12 | 45.3 |
| φ48 | 14 | 51.8 |
| φ55 | 16 | 59.3 |

unit: mm

| Model Code | 90           | 120               | 142                  | 180               | 220               |
|------------|--------------|-------------------|----------------------|-------------------|-------------------|
| <b>A</b>   |              |                   |                      |                   |                   |
| A1         | 100          | 130               | 165                  | 215               | 250               |
| A2         | 6.8          | 9                 | 11                   | 13                | 17                |
| A3         | 22           | 32                | 40                   | 55                | 75                |
| A4         | 80           | 110               | 130                  | 160               | 180               |
| A5         | 5            | 6                 | 9 · 23.5             | 10 · 20           | 10                |
| A6         | M8 x P1.25   | M10 x P1.5        | M12 x P1.75          | M14 x P2.0        | M16 x P2.0        |
| A7         | 116          | 148               | 186                  | 238               | 288               |
| A8         | 6            | 10                | 12                   | 16                | 20                |
| A9         | 24.5         | 35                | 43                   | 59                | 79.5              |
| <b>B</b>   |              |                   |                      |                   |                   |
| B1         | 90           | 120               | 142                  | 180               | 220               |
| B2         | 48           | 65                | 92                   | 106               | 139               |
| B3         | 10           | 12                | 15                   | 20                | 30                |
| B4         | 2            | 3                 | 3                    | 4                 | 5                 |
| B5         | 30           | 40                | 65                   | 70                | 90                |
| B6         | 36           | 50                | 74                   | 82                | 104               |
| B7         | 10           | 12                | 15                   | 16                | 20                |
| <b>C</b>   |              |                   |                      |                   |                   |
| C1         | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   |
| C2         | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    |
| C3         | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32 | 28 · 32 · 35 · 38 |
| C4         | 26 · 30.5    | 33.5 · 41.5       | 59 · 73.5            | 67 · 77           | 84.5              |
| C5         | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   |
| C6         | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        |
| C7         | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   |
| C8         | 197          | 249 · 257         | 334.5 · 349          | 396.5 · 406.5     | 481.5             |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 90  | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 125         | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 150         | 165   | 335   | 583   | 1,206  | 2,030  |
|  |            |            | 175         | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 200         | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 250         | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 300         | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 350         | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 400         | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 450         | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 500         | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 600         | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 700         | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 800         | 143   | 298   | 553   | 1,070  | 1,824  |
| 900  | 145        | 278        | 516         | 993   | 1,694 |       |        |        |
| 1000   | 141        | 294        | 549         | 1,059   | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 125 ~ 1000  | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 125 ~ 1000  | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 125 ~ 1000  | 3,000   | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 125 ~ 1000  | 6,000   | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 125 ~ 1000  | -   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P0   |            | arcmin     | 125 ~ 1000  | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin     | 125 ~ 1000  | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin     | 125 ~ 1000  | ≤ 11  | ≤ 11  | ≤ 11  | ≤ 11   | ≤ 11   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 125 ~ 1000  | 14  | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 125 ~ 1000  | 3,200   | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 125 ~ 1000  | 1,600   | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 125 ~ 1000  | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 125 ~ 1000  | ≥ 90%   |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 125 ~ 1000  | - 25° C ~ + 90° C   |       |       |        |        |
| 潤滑 Lubrication   |            |            | 125 ~ 1000  | 全合成潤滑油脂 Synthetic Grease  |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 125 ~ 1000  | IP65  |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 125 ~ 1000  | 任意方向 Any  |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 125 ~ 1000  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 125 ~ 1000  | 5.2   | 10    | 18.1  | 35     | 63.7   |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 90   | 120  | 142  | 180  | 220  |
|-------|------|------|------|------|------|
| 125   | 0.01 | 0.04 | 0.71 | 1.42 | 3.29 |
| 150   | 0.01 | 0.04 | 0.51 | 0.92 | 2.15 |
| 175   | 0.01 | 0.04 | 0.40 | 0.83 | 1.26 |
| 200   | 0.01 | 0.04 | 0.21 | 0.65 | 0.98 |
| 250   | 0.01 | 0.04 | 0.11 | 0.52 | 0.82 |
| 300   | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 350   | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 400   | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 450   | 0.01 | 0.04 | 0.09 | 0.21 | 0.51 |
| 500   | 0.01 | 0.04 | 0.08 | 0.12 | 0.51 |
| 600   | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 700   | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 800   | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 900   | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 1000  | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |

# SERVOBOX Planetary Reducers



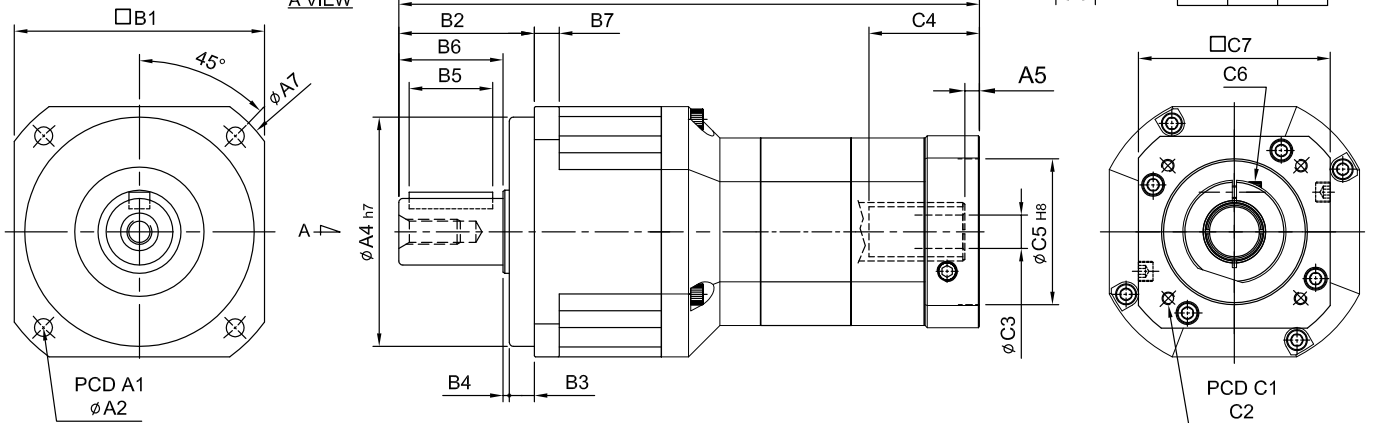
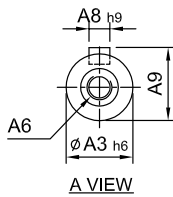
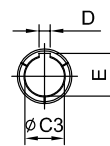
## MODEL : SB-A

三段 3-Stage

RATIO : 125, 150, 175, 200, 250, 300, 350,  
400, 450, 500, 600, 700, 800, 900, 1000

(180#(含)以上)

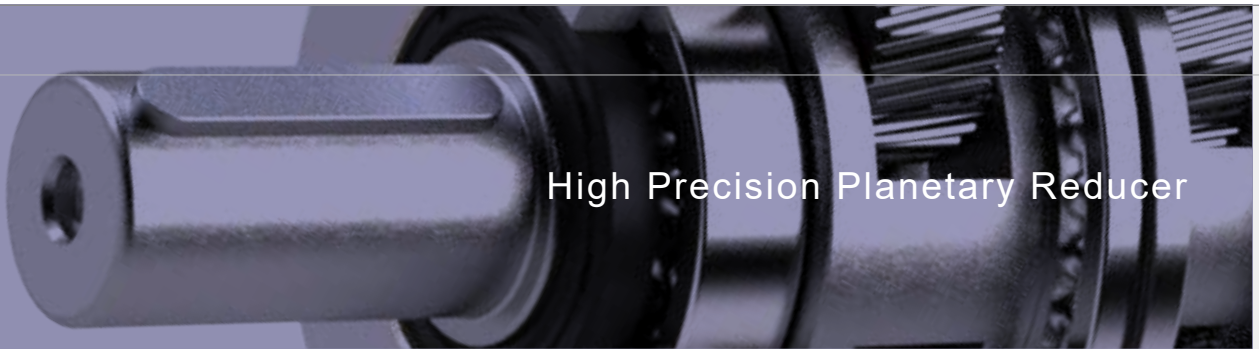
| ∅C3 | D  | E    |
|-----|----|------|
| ∅28 | 8  | 31.3 |
| ∅32 | 10 | 35.3 |
| ∅35 | 10 | 38.3 |
| ∅38 | 10 | 41.3 |
| ∅42 | 12 | 45.3 |
| ∅48 | 14 | 51.8 |
| ∅55 | 16 | 59.3 |



unit: mm

| Model Code | 62A          | 90A               | 120A                 | 142A              | 180A              | 220A                   |
|------------|--------------|-------------------|----------------------|-------------------|-------------------|------------------------|
| <b>A</b>   |              |                   |                      |                   |                   |                        |
| A1         | 70           | 100               | 130                  | 165               | 215               | 250                    |
| A2         | 5.5          | 6.8               | 9                    | 11                | 13                | 17                     |
| A3         | 16           | 22                | 32                   | 40                | 55                | 75                     |
| A4         | 50           | 80                | 110                  | 130               | 160               | 180                    |
| A5         | 5            | 6                 | 9 · 23.5             | 10 · 20           | 10                | 11.5 · 13.5            |
| A6         | M5 x P0.8    | M8 x P1.25        | M10 x P1.5           | M12 x P1.75       | M14 x P2.0        | M16 x P2.0             |
| A7         | 80           | 116               | 148                  | 186               | 238               | 288                    |
| A8         | 5            | 6                 | 10                   | 12                | 16                | 20                     |
| A9         | 18           | 24.5              | 35                   | 43                | 59                | 79.5                   |
| <b>B</b>   |              |                   |                      |                   |                   |                        |
| B1         | 62           | 90                | 120                  | 142               | 180               | 220                    |
| B2         | 36           | 48                | 65                   | 92                | 106               | 139                    |
| B3         | 7            | 10                | 12                   | 15                | 20                | 30                     |
| B4         | 1            | 2                 | 3                    | 3                 | 4                 | 5                      |
| B5         | 20           | 30                | 40                   | 65                | 70                | 90                     |
| B6         | 28           | 36                | 50                   | 74                | 82                | 104                    |
| B7         | 8            | 10                | 12                   | 15                | 16                | 20                     |
| <b>C</b>   |              |                   |                      |                   |                   |                        |
| C1         | 46 · 63 · 60 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   | 200 · 215 · 265        |
| C2         | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    | M10 · M12              |
| C3         | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32 | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
| C4         | 26 · 30.5    | 33.5 · 41.5       | 59 · 73.5            | 67 · 77           | 84.5              | 114.5 · 116.5          |
| C5         | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   | 114.3 · 180 · 230      |
| C6         | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        | M10 x P1.5             |
| C7         | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   | 182 · 200 · 250        |
| C8         | 165.5        | 206.3 · 214.3     | 284.5 · 299          | 354.5 · 364.5     | 425               | 527.5                  |





## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62A   | 90A   | 120A  | 142A  | 180A   | 220A   |
|--|------------|------------|-------------|---|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 125         | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 150         | 59  | 165   | 335   | 583   | 1,206  | 2,030  |
|  |            |            | 175         | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 200         | 51  | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 250         | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 300         | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 350         | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 400         | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 450         | 44  | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 500         | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 600         | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 700         | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
| 800  | 43         | 143        | 298         | 553   | 1,070 | 1,824 |       |        |        |
| 900  | 44         | 145        | 278         | 516   | 993   | 1,694 |       |        |        |
| 1000   | 43         | 141        | 294         | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 125 ~ 1000  | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque                                | $T_{2NOT}$ | Nm         | 125 ~ 1000  | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |        |        |
| 急停扭矩 Emergency Stop Torque                               |            |            |             |   |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{IN}$   | rpm        | 125 ~ 1000  | 3,000   | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{IB}$   | rpm        | 125 ~ 1000  | 6,000   | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 125 ~ 1000  | -   | -     | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P0   |            | arcmin     | 125 ~ 1000  | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin     | 125 ~ 1000  | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin     | 125 ~ 1000  | ≤ 11  | ≤ 11  | ≤ 11  | ≤ 11  | ≤ 11   | ≤ 11   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 125 ~ 1000  | 6   | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 125 ~ 1000  | 1,180   | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 125 ~ 1000  | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 125 ~ 1000  | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 125 ~ 1000  | ≥ 90%   |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 125 ~ 1000  | - 25° C ~ + 90° C   |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 125 ~ 1000  | 全合成潤滑油脂 Synthetic Grease  |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 125 ~ 1000  | IP65  |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 125 ~ 1000  | 任意方向 Any  |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 125 ~ 1000  | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 125 ~ 1000  | 4   | 6.5   | 13    | 30    | 57     | 87     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

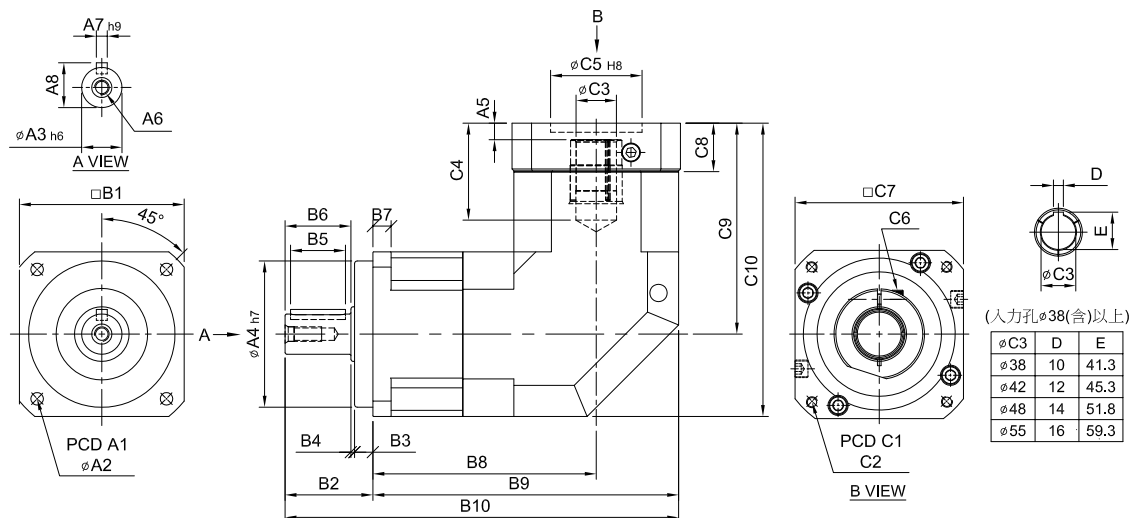
| Ratio | 62A  | 90A  | 120A | 142A | 180A | 220A |
|-------|------|------|------|------|------|------|
| 125   | 0.01 | 0.01 | 0.04 | 0.71 | 1.42 | 3.29 |
| 150   | 0.01 | 0.01 | 0.04 | 0.51 | 0.92 | 2.15 |
| 175   | 0.01 | 0.01 | 0.04 | 0.40 | 0.83 | 1.26 |
| 200   | 0.01 | 0.01 | 0.04 | 0.21 | 0.65 | 0.98 |
| 250   | 0.01 | 0.01 | 0.04 | 0.11 | 0.52 | 0.82 |
| 300   | 0.01 | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 350   | 0.01 | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 400   | 0.01 | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 450   | 0.01 | 0.01 | 0.04 | 0.09 | 0.21 | 0.51 |
| 500   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.51 |
| 600   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 700   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 800   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 900   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 1000  | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |

# SERVOBOX Planetary Reducers

## MODEL : SBL

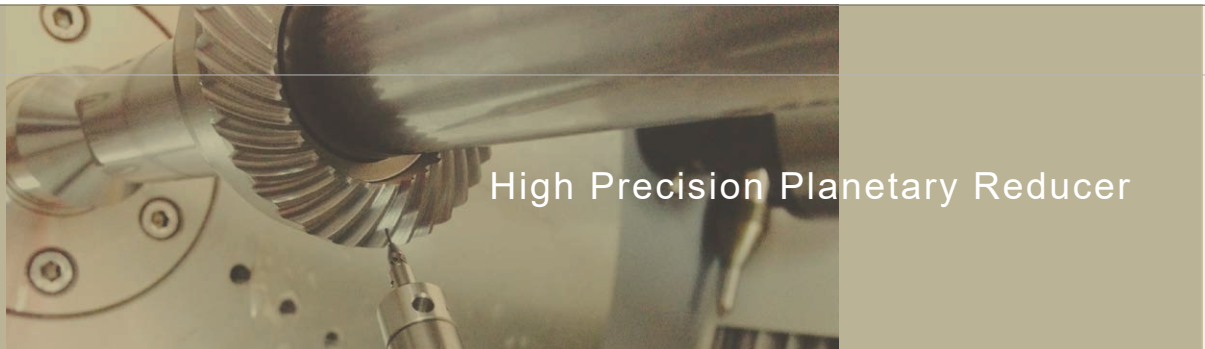
單段 1-Stage

RATIO : 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



unit: mm

| Model Code | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
|------------|-----------|-------------|----------------|-------------|-------------|----------------|---------------|
| <b>A</b>   |           |             |                |             |             |                |               |
| A1         | 50        | 70          | 100            | 130         | 165         | 215            | 250           |
| A2         | 4.5       | 5.5         | 6.8            | 9           | 11          | 13             | 17            |
| A3         | 13        | 16          | 22             | 32          | 40          | 55             | 75            |
| A4         | 35        | 50          | 80             | 110         | 130         | 160            | 180           |
| A5         | 6         | 6           | 9・23.5         | 10・20       | 10          | 12.5・14.5      | 12.5・14.5     |
| A6         | M4 x P0.7 | M5 x P0.8   | M8 x P1.25     | M10 x P1.5  | M12 x P1.75 | M14 x P2.0     | M16 x P2.0    |
| A7         | 5         | 5           | 6              | 10          | 12          | 16             | 20            |
| A8         | 15        | 18          | 24.5           | 35          | 43          | 59             | 79.5          |
| <b>B</b>   |           |             |                |             |             |                |               |
| B1         | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
| B2         | 26        | 36          | 48             | 65          | 92          | 106            | 139           |
| B3         | 5         | 7           | 10             | 12          | 15          | 20             | 30            |
| B4         | 1         | 1           | 2              | 3           | 3           | 4              | 5             |
| B5         | 15        | 20          | 30             | 40          | 65          | 70             | 90            |
| B6         | 20        | 28          | 36             | 50          | 74          | 82             | 104           |
| B7         | 5         | 8           | 10             | 12          | 15          | 16             | 20            |
| B8         | 76        | 84.5        | 122.1          | 148         | 165.5       | 223.6          | 231.6         |
| B9         | 98        | 115.5       | 167.1          | 208         | 236.5       | 313.6          | 341.6         |
| B10        | 124       | 151.5       | 215            | 273         | 328.5       | 419.6          | 480.6         |
| <b>C</b>   |           |             |                |             |             |                |               |
| C1         | 46・60・63  | 70・75・90    | 90・110・115・145 | 115・145・165 | 145・165・215 | 200・215・265    | 200・265・300   |
| C2         | M3・M4・M5  | M4・M5・M6    | M5・M6・M8       | M6・M8・M10   | M8・M10・M12  | M10・M12・M16    | M12・M16       |
| C3         | 8・11      | 11・14・16・19 | 16・19・22・24    | 24・28・32    | 28・32・35・38 | 35・38・42・48・55 | 38・42・48・55   |
| C4         | 27        | 33.5・42     | 53・58・67.5     | 67・77       | 67・84       | 117・119        | 117・119       |
| C5         | 30・40・50  | 50・60・70    | 70・80・95・110   | 95・110・130  | 110・130・180 | 114.3・180・230  | 114.3・230・250 |
| C6         | M4 x P0.7 | M5 x P0.8   | M6 x P1.0      | M8 x P1.25  | M10 x P1.5  | M10 x P1.5     | M10 x P1.5    |
| C7         | 46・55     | 64・70・80    | 92・110・130     | 122・130・150 | 146・150・190 | 182・200・250    | 222・250・265   |
| C8         | 16        | 21.5        | 26.5・41        | 35.5・45.5   | 35.5        | 45.5・47.5      | 45.5・47.5     |
| C9         | 61        | 77・85       | 115.3・129.8    | 141・151     | 165.7       | 235・237        | 235           |
| C10        | 83        | 108・116     | 160.3・174.8    | 201・211     | 236.7       | 325・327        | 345           |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 44  | 62    | 90    | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 3           | 19  | 59    | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 4           | 16  | 51    | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 5           | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 6           | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 7           | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 8           | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 9           | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 10          | 14  | 43    | 141   | 294   | 549   | 1,059  | 1,779  |
|  |            |            | 12          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 14          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 16          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
| 18   | 13         | 44         | 145         | 278   | 516   | 993   | 1,694 |       |        |        |
| 20   | 14         | 43         | 141         | 294   | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 3 ~ 20      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 3 ~ 20      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 3 ~ 20      | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 3 ~ 20      | 6,000   | 6,000 | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 3 ~ 20      | -   | -     | ≤ 2   | ≤ 2   | ≤ 2   | ≤ 2    | ≤ 2    |
| 背隙 Backlash P0   |            | arcmin     | 3 ~ 20      | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P1   |            | arcmin     | 3 ~ 20      | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6    | ≤ 6    |
| 背隙 Backlash P2   |            | arcmin     | 3 ~ 20      | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8    | ≤ 8    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 3 ~ 20      | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 3 ~ 20      | 380   | 1,180 | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 3 ~ 20      | 190   | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 3 ~ 20      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 3 ~ 20      | ≥ 95%   |       |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 3 ~ 20      | - 25° C ~ + 90° C   |       |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 3 ~ 20      | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 3 ~ 20      | IP65  |       |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 3 ~ 20      | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 3 ~ 20      | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74  | ≤ 76   | ≤ 78   |
| 重量 Weight ±3%  |            | Kg         | 3 ~ 20      | 1   | 2.3   | 6.6   | 13.2  | 22.3  | 50     | 75.2   |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 44   | 62   | 90   | 120  | 142  | 180  | 220   |
|-------|------|------|------|------|------|------|-------|
| 3     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 4     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 5     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 6     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 7     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 8     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 9     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 10    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 12    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |
| 14    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |
| 16    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |
| 18    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |
| 20    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |

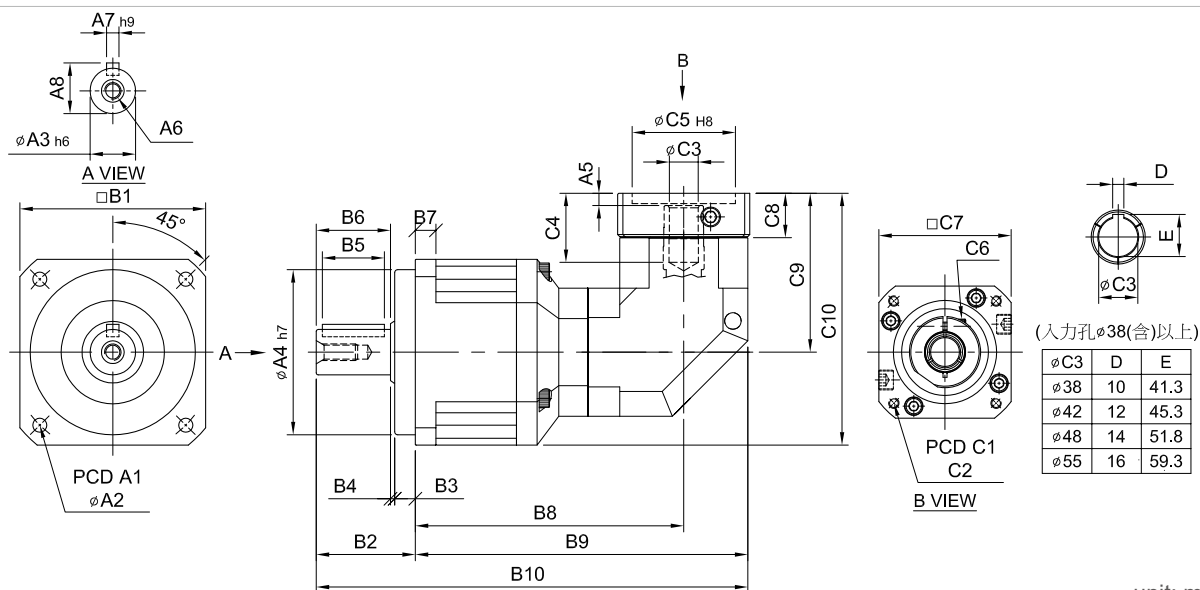


# SERVOBOX Planetary Reducers

## MODEL : SBL

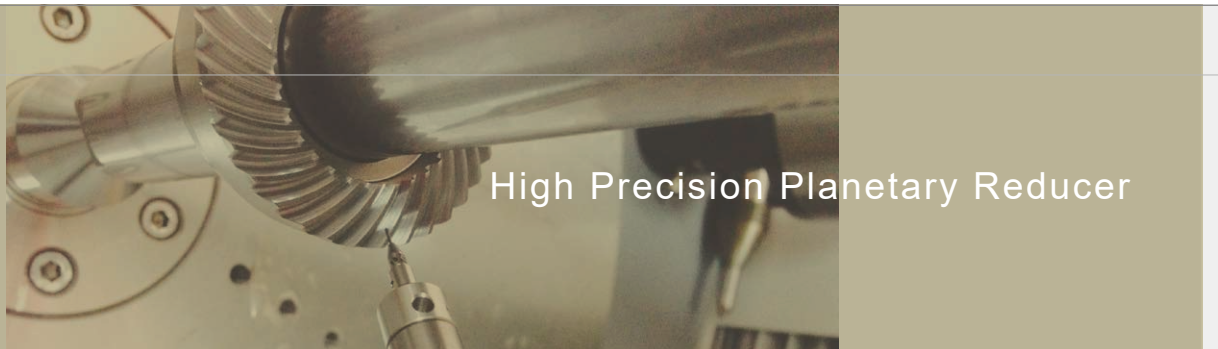
雙段 2-Stage

RATIO : 15, 20, 25, 30, 35, 40, 50, 60, 70,  
80, 90, 100, 120, 140, 160, 180, 200



unit: mm

| Model Code | 62           | 90                | 120                  | 142             | 180               | 220                    |
|------------|--------------|-------------------|----------------------|-----------------|-------------------|------------------------|
| A1         | 70           | 100               | 130                  | 165             | 215               | 250                    |
| A2         | 5.5          | 6.8               | 9                    | 11              | 13                | 17                     |
| A3         | 16           | 22                | 32                   | 40              | 55                | 75                     |
| A4         | 50           | 80                | 110                  | 130             | 160               | 180                    |
| A5         | 6            | 6                 | 9 · 23.5             | 10 · 20         | 10                | 12.5 · 14.5            |
| A6         | M5 x P0.8    | M8 x P1.25        | M10 x P1.5           | M12 x P1.75     | M14 x P2.0        | M16 x P2.0             |
| A7         | 5            | 6                 | 10                   | 12              | 16                | 20                     |
| A8         | 18           | 24.5              | 35                   | 43              | 59                | 79.5                   |
| B1         | 62           | 90                | 120                  | 142             | 180               | 220                    |
| B2         | 36           | 48                | 65                   | 92              | 106               | 139                    |
| B3         | 7            | 10                | 12                   | 15              | 20                | 30                     |
| B4         | 1            | 2                 | 3                    | 3               | 4                 | 5                      |
| B5         | 20           | 30                | 40                   | 65              | 70                | 90                     |
| B6         | 28           | 36                | 50                   | 74              | 82                | 104                    |
| B7         | 8            | 10                | 12                   | 15              | 16                | 20                     |
| B8         | 110.5        | 130               | 181.6                | 214.5           | 249.5             | 313.6                  |
| B9         | 132.5        | 161               | 266.6                | 274.5           | 320.5             | 403.6                  |
| B10        | 168.5        | 209               | 291.6                | 366.5           | 426.5             | 542.6                  |
| C1         | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 110 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215   | 200 · 215 · 265        |
| C2         | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8 · M10   | M6 · M8 · M10   | M8 · M10 · M12    | M10 · M12 · M16        |
| C3         | 8 · 11       | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 24 · 28 · 32    | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
| C4         | 27           | 33.5 · 42         | 53 · 58 · 67.5       | 67 · 77         | 67 · 84           | 117 · 119              |
| C5         | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180   | 114.3 · 180 · 230      |
| C6         | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25      | M10 x P1.5        | M10 x P1.5             |
| C7         | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 150 · 190   | 182 · 200 · 250        |
| C8         | 16           | 21.5              | 26.5 · 41            | 35.5 · 45.5     | 35.5              | 45.5 · 47.5            |
| C9         | 61           | 77 · 85           | 115.3 · 129.8        | 141 · 151       | 165.7             | 235 · 237              |
| C10        | 92           | 122 · 130         | 175.3 · 189.8        | 212 · 222       | 255.7             | 345 · 347              |



High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62  | 90    | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 59  | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 20          | 51  | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 25          | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 30          | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 35          | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 40          | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 50          | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 60          | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 70          | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 80          | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 90          | 44  | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 100         | 43  | 141   | 294   | 549   | 1,059  | 1,779  |
|  |            |            | 120         | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 140         | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
| 160  | 43         | 143        | 298         | 553   | 1,070 | 1,824 |       |        |        |
| 180  | 44         | 145        | 278         | 516   | 993   | 1,694 |       |        |        |
| 200  | 43         | 141        | 294         | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 200    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 200    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 200    | 3,000   | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 200    | 6,000   | 6,000 | 5,000 | 5,000 | 4,000  | 4,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 200    | -   | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 200    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 200    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 200    | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12   | ≤ 12   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 200    | 6   | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 200    | 1,180   | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 200    | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 200    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 200    | ≥ 92%   |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 200    | - 25° C ~ + 90° C   |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 200    | 全合成潤滑油脂 Synthetic Grease  |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 200    | IP65  |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 200    | 任意方向 Any  |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 200    | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74  | ≤ 76   | ≤ 78   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 200    | 2   | 5.5   | 12.5  | 23.2  | 44.4   | 79.5   |

■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

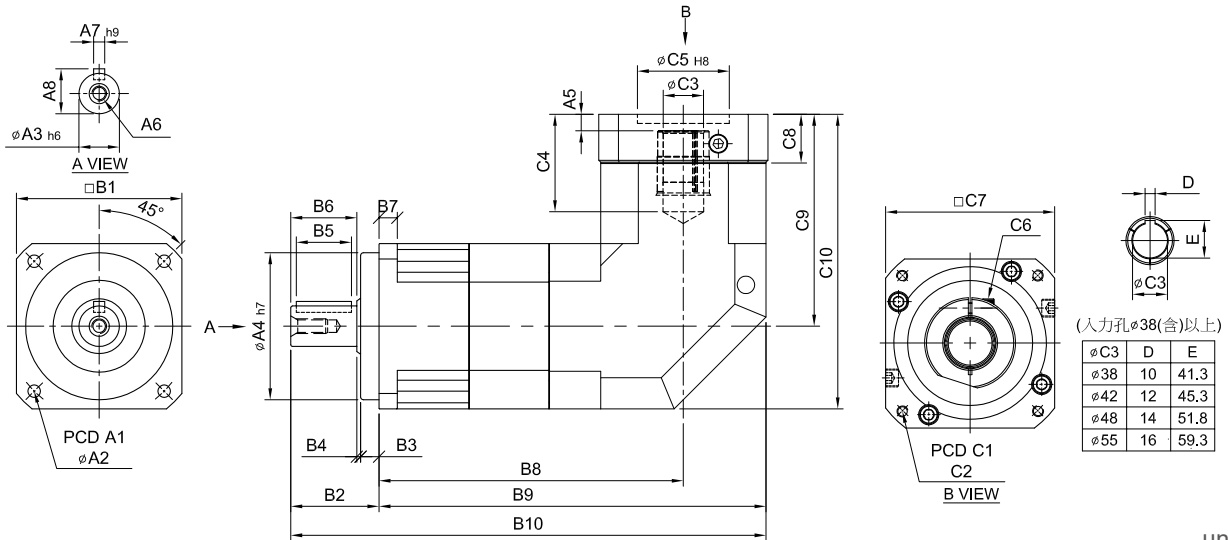
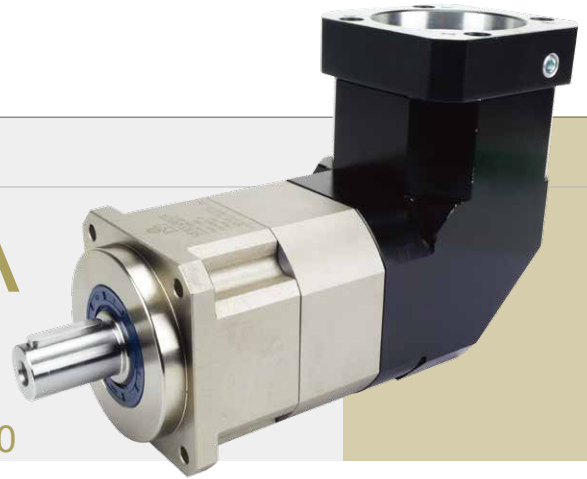
| Ratio | 62   | 90   | 120  | 142  | 180  | 220  |
|-------|------|------|------|------|------|------|
| 15    | 0.09 | 0.36 | 2.28 | 6.85 | 26.2 | 70.1 |
| 20    | 0.09 | 0.36 | 2.28 | 6.85 | 26.2 | 70.1 |
| 25    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 30    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 35    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 40    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 50    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 60    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 70    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 80    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 90    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 100   | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 120   | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |
| 140   | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |
| 160   | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |
| 180   | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |
| 200   | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |

# SERVOBOX Planetary Reducers

## MODEL : SBL-A

雙段 2-Stage

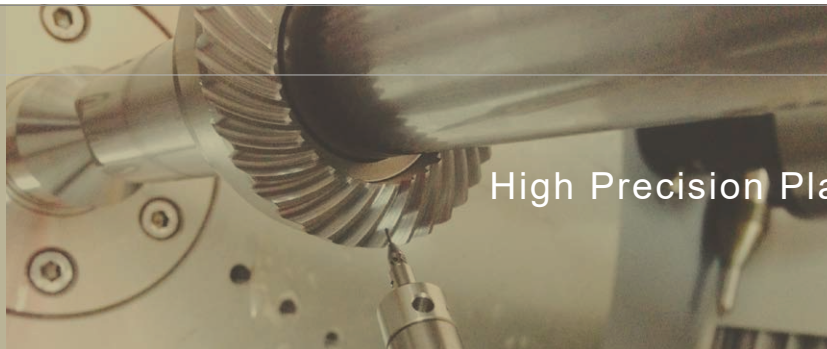
RATIO : 15, 20, 25, 30, 35, 40, 50, 60, 70,  
80, 90, 100, 120, 140, 160, 180, 200



unit: mm

| Model Code | 44A       | 62A         | 90A            | 120A        | 142A        | 180A           | 220A          |
|------------|-----------|-------------|----------------|-------------|-------------|----------------|---------------|
| <b>A</b>   |           |             |                |             |             |                |               |
| A1         | 50        | 70          | 100            | 130         | 165         | 215            | 250           |
| A2         | 4.5       | 5.5         | 6.8            | 9           | 11          | 13             | 17            |
| A3         | 13        | 16          | 22             | 32          | 40          | 55             | 75            |
| A4         | 35        | 50          | 80             | 110         | 130         | 160            | 180           |
| A5         | 6         | 6           | 9·23.5         | 10·20       | 10          | 12.5·14.5      | 12.5·14.5     |
| A6         | M4 x P0.7 | M5 x P0.8   | M8 x P1.25     | M10 x P1.5  | M12 x P1.75 | M14 x P2.0     | M16 x P2.0    |
| A7         | 5         | 5           | 6              | 10          | 12          | 16             | 20            |
| A8         | 15        | 18          | 24.5           | 35          | 43          | 59             | 79.5          |
| <b>B</b>   |           |             |                |             |             |                |               |
| B1         | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
| B2         | 26        | 36          | 48             | 65          | 92          | 106            | 139           |
| B3         | 5         | 7           | 10             | 12          | 15          | 20             | 30            |
| B4         | 1         | 1           | 2              | 3           | 3           | 4              | 5             |
| B5         | 15        | 20          | 30             | 40          | 65          | 70             | 90            |
| B6         | 20        | 28          | 36             | 50          | 74          | 82             | 104           |
| B7         | 5         | 8           | 10             | 12          | 15          | 16             | 20            |
| B8         | 102       | 118.3       | 165.6          | 204         | 232         | 304.6          | 324.6         |
| B9         | 124       | 149.3       | 210.6          | 264         | 303         | 394.6          | 434.6         |
| B10        | 150       | 185.3       | 258.6          | 329         | 395         | 500.6          | 573.6         |
| <b>C</b>   |           |             |                |             |             |                |               |
| C1         | 46·60·63  | 70·75·90    | 90·110·115·145 | 115·145·165 | 145·165·215 | 200·215·265    | 200·265·300   |
| C2         | M3·M4·M5  | M4·M5·M6    | M5·M6·M8       | M6·M8·M10   | M8·M10·M12  | M10·M12·M16    | M12·M16       |
| C3         | 8·11      | 11·14·16·19 | 16·19·22·24    | 24·28·32    | 28·32·35·38 | 35·38·42·48·55 | 38·42·48·55   |
| C4         | 27        | 33.5·42     | 53·58·67.5     | 67·77       | 67·84       | 117·119        | 117·119       |
| C5         | 30·40·50  | 50·60·70    | 70·80·95·110   | 95·110·130  | 110·130·180 | 114.3·180·230  | 114.3·230·250 |
| C6         | M4 x P0.7 | M5 x P0.8   | M6 x P1.0      | M8 x P1.25  | M10 x P1.5  | M10 x P1.5     | M10 x P1.5    |
| C7         | 46·55     | 64·70·80    | 92·110·130     | 122·130·150 | 146·150·190 | 182·200·250    | 220·250·265   |
| C8         | 16        | 21.5        | 26.5·41        | 35.5·45.5   | 35.5        | 45.5·47.5      | 45.5·47.5     |
| C9         | 61        | 77          | 115.3·129.8    | 141·151     | 165.7       | 235·237        | 235·237       |
| C10        | 83        | 108         | 160.3·174.8    | 201·211     | 236.7       | 325·327        | 345·347       |





High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 44A   | 62A   | 90A   | 120A  | 142A  | 180A   | 220A   |
|--|------------|------------|-------------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 19  | 59    | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 20          | 16  | 51    | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 25          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 30          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 35          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 40          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 50          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 60          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 70          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 80          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 90          | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 100         | 14  | 43    | 141   | 294   | 549   | 1,059  | 1,779  |
|  |            |            | 120         | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 140         | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
| 160  | 14         | 43         | 143         | 298   | 553   | 1,070 | 1,824 |       |        |        |
| 180  | 13         | 44         | 145         | 278   | 516   | 993   | 1,694 |       |        |        |
| 200  | 14         | 43         | 141         | 294   | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 200    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 200    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 200    | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 200    | 6,000   | 6,000 | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 200    | -   | -     | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 200    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 200    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 200    | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12   | ≤ 12   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 200    | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 200    | 380   | 1,180 | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 200    | 190   | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_{H1}$   | hr         | 15 ~ 200    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 200    | ≥ 92%   |       |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 200    | -25° C ~ +90° C   |       |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 200    | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 200    | IP65  |       |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 200    | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 200    | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74  | ≤ 76   | ≤ 78   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 200    | 1.2   | 3     | 8.2   | 12.5  | 23.2  | 52.4   | 94.5   |

■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 44A  | 62A  | 90A  | 120A | 142A  | 180A | 220A |
|-------|------|------|------|------|-------|------|------|
| 15    | 0.09 | 0.36 | 2.28 | 6.85 | 23.45 | 55.2 | 80.2 |
| 20    | 0.09 | 0.36 | 2.28 | 6.85 | 23.45 | 55.2 | 80.2 |
| 25    | 0.09 | 0.36 | 2.28 | 6.85 | 23.45 | 50.4 | 76.5 |
| 30    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 35    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 40    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 50    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 60    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 70    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 80    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 90    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 100   | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 120   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |
| 140   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |
| 160   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |
| 180   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |
| 200   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |

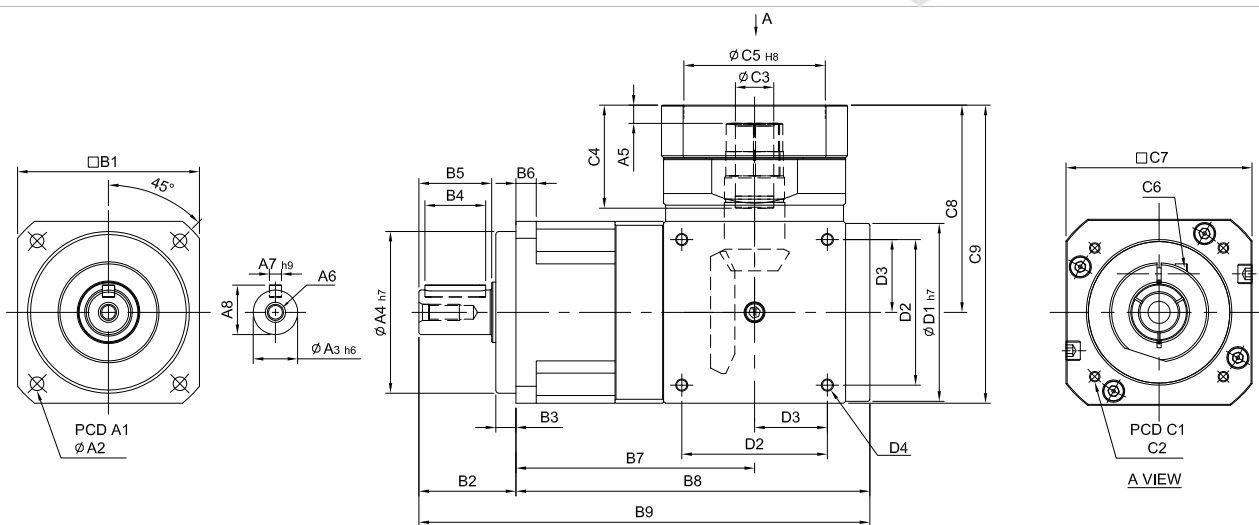
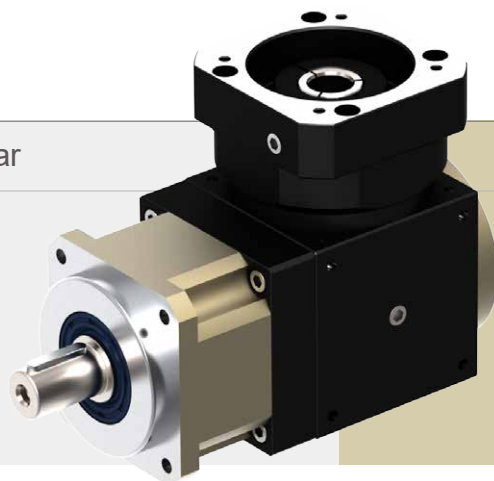
# SERVOBOX Planetary Reducers

螺旋齒輪 Helical Gear & 螺旋傘齒輪 Spiral Bevel Gear

## MODEL : SBT

單段 1-Stage

RATIO : 3, 4, 5, 6, 7, 8, 9, 10, 15,  
20, 25, 30, 35, 40, 45, 50



unit: mm

| Model Code | 44        | 62           | 90                   | 120                  | 142             | 180             | 220               |
|------------|-----------|--------------|----------------------|----------------------|-----------------|-----------------|-------------------|
| <b>A</b>   |           |              |                      |                      |                 |                 |                   |
| A1         | 50        | 70           | 100                  | 130                  | 165             | 215             | 250               |
| A2         | 4.5       | 5.5          | 6.8                  | 9                    | 11              | 13              | 17                |
| A3         | 13        | 16           | 22                   | 32                   | 40              | 55              | 75                |
| A4         | 35        | 50           | 80                   | 110                  | 130             | 160             | 180               |
| A5         | 5         | 7            | 9 · 23.5             | 9 · 23.5             | 10              | 9.5             | 14 · 16           |
| A6         | M4 x P0.7 | M5 x P0.8    | M8 x P1.25           | M10 x P1.5           | M12 x P1.75     | M14 x P2.0      | M16xP2.0          |
| A7         | 5         | 5            | 6                    | 10                   | 12              | 16              | 20                |
| A8         | 15        | 18           | 24.5                 | 35                   | 43              | 59              | 79.5              |
| <b>B</b>   |           |              |                      |                      |                 |                 |                   |
| B1         | 44        | 62           | 90                   | 120                  | 142             | 180             | 220               |
| B2         | 26        | 36           | 48                   | 65                   | 92              | 106             | 139               |
| B3         | 5         | 7            | 10                   | 12                   | 15              | 20              | 30                |
| B4         | 15        | 20           | 30                   | 40                   | 65              | 70              | 90                |
| B5         | 20        | 28           | 36                   | 50                   | 74              | 82              | 104               |
| B6         | 5         | 8            | 10                   | 12                   | 15              | 16              | 20                |
| B7         | 67.5      | 87.5         | 118                  | 145                  | 175             | 207             | 237               |
| B8         | 99.5      | 128          | 175                  | 215                  | 260             | 307             | 360               |
| B9         | 125.5     | 164          | 223                  | 280                  | 352             | 413             | 499               |
| <b>C</b>   |           |              |                      |                      |                 |                 |                   |
| C1         | 46        | 70 · 75 · 90 | 90 · 100 · 115 · 145 | 90 · 100 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215 | 200 · 215 · 265   |
| C2         | M4        | M4 · M5 · M6 | M5 · M6 · M8         | M5 · M6 · M8         | M6 · M8 · M10   | M8 · M10 · M12  | M10 · M12 · M16   |
| C3         | 8         | 11 · 14      | 19 · 24              | 22 · 24              | 28 · 32 · 35    | 35 · 38         | 42 · 48 · 55      |
| C4         | 26        | 36           | 51 · 65.5            | 51 · 65.5            | 68              | 84.5            | 117 · 119         |
| C5         | 30        | 50 · 60 · 70 | 70 · 80 · 95 · 110   | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180 | 114.3 · 180 · 230 |
| C6         | M4 x P0.7 | M5 x P0.8    | M6 x P1.0            | M6 x P1.0            | M8 x P1.25      | M10 x P1.5      | M10xP1.5          |
| C7         | 42        | 64 · 70 · 80 | 92 · 110 · 130       | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 150 · 190 | 182 · 200 · 250   |
| C8         | 57        | 77           | 103 · 117            | 122 · 136            | 154             | 189             | 252 · 254         |
| C9         | 82        | 110          | 148 · 162            | 182 · 196            | 225             | 279             | 362 · 364         |
| <b>D</b>   |           |              |                      |                      |                 |                 |                   |
| D1         | 48        | 62           | 88                   | 106                  | 135             | 164             | 205               |
| D2         | -         | 52           | 72                   | 88                   | 110             | 134             | 170               |
| D3         | -         | 26           | 36                   | 44                   | 55              | 67              | 85                |
| D4         | -         | M5 x P0.8    | M6 x P1.0            | M8 x P1.25           | M10 x P1.5      | M12 x P1.75     | M16xP2.0          |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 44  | 62    | 90    | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 3           | 19  | 59    | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 4           | 16  | 51    | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 5           | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 6           | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 7           | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 8           | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 9           | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 10          | 16  | 48    | 160   | 333   | 618   | 1,189  | 1,779  |
|  |            |            | 15          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,030  |
|  |            |            | 20          | 16  | 48    | 160   | 333   | 618   | 1,189  | 1,804  |
|  |            |            | 25          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 30          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 35          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 40          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 45          | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
| 50   | 14         | 43         | 141         | 294   | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 3 ~ 50      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque                                | $T_{2NOT}$ | Nm         | 3 ~ 50      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 急停扭矩 Emergency Stop Torque                               |            |            |             |   |       |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{IN}$   | rpm        | 3 ~ 50      | 3,000   | 3,000 | 3,000 | 2,500 | 2,500 | 2,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{IB}$   | rpm        | 3 ~ 50      | 6,000   | 6,000 | 5,500 | 4,500 | 3,500 | 3,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 3 ~ 50      | -   | -     | ≤ 2   | ≤ 2   | ≤ 2   | ≤ 2    | ≤ 2    |
| 背隙 Backlash P0   |            | arcmin     | 3 ~ 50      | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P1   |            | arcmin     | 3 ~ 50      | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6    | ≤ 6    |
| 背隙 Backlash P2   |            | arcmin     | 3 ~ 50      | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8    | ≤ 8    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 3 ~ 50      | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 3 ~ 50      | 380   | 1,180 | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 3 ~ 50      | 190   | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 3 ~ 50      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 3 ~ 50      | ≥ 95%   |       |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 3 ~ 50      | -25° C ~ + 90° C  |       |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 3 ~ 50      | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 3 ~ 50      | IP65  |       |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 3 ~ 50      | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 3 ~ 50      | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74  | ≤ 76   | ≤ 76   |
| 重量 Weight ±3%  |            | Kg         | 3 ~ 50      | 1.2   | 2.2   | 7.1   | 13    | 24    | 48     | 78     |

### 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 44   | 62   | 90   | 120  | 142  | 180  | 220 |
|-------|------|------|------|------|------|------|-----|
| 3     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135 |
| 4     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135 |
| 5     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135 |
| 6     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135 |
| 7     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135 |
| 8     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135 |
| 9     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135 |
| 10    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135 |
| 15    | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61.3 | 135 |
| 20    | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61.3 | 135 |
| 25    | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61.3 | 135 |
| 30    | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61.3 | 135 |
| 35    | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61.3 | 135 |
| 40    | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61.3 | 135 |
| 45    | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61.3 | 135 |
| 50    | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61.3 | 135 |

### 行星減速機搭配傘齒輪減速機型號及速比一覽表

The Model & Ratio Table of Precision Planetary Reducer Assembly Bevel Gear Reducer

| 型號<br>Model | 減速比<br>Ratio                                      | 法蘭盤框號<br>Flange Model | 傘齒輪減速機<br>Bevel Gear<br>Reducer Model |
|-------------|---|-----------------------|---------------------------------------|
| 44          |   | 44                    | -                                     |
| 62          |   | 62                    | ST65                                  |
| 90          | 3·4·5·6·7<br>8·9·10·15·20<br>25·30·35·40<br>45·50 | 90                    | ST90                                  |
| 120         |   | 90                    | ST110                                 |
| 142         |   | 120                   | ST140                                 |
| 180         |   | 142                   | ST170                                 |
| 220         |   | 180                   | ST210                                 |

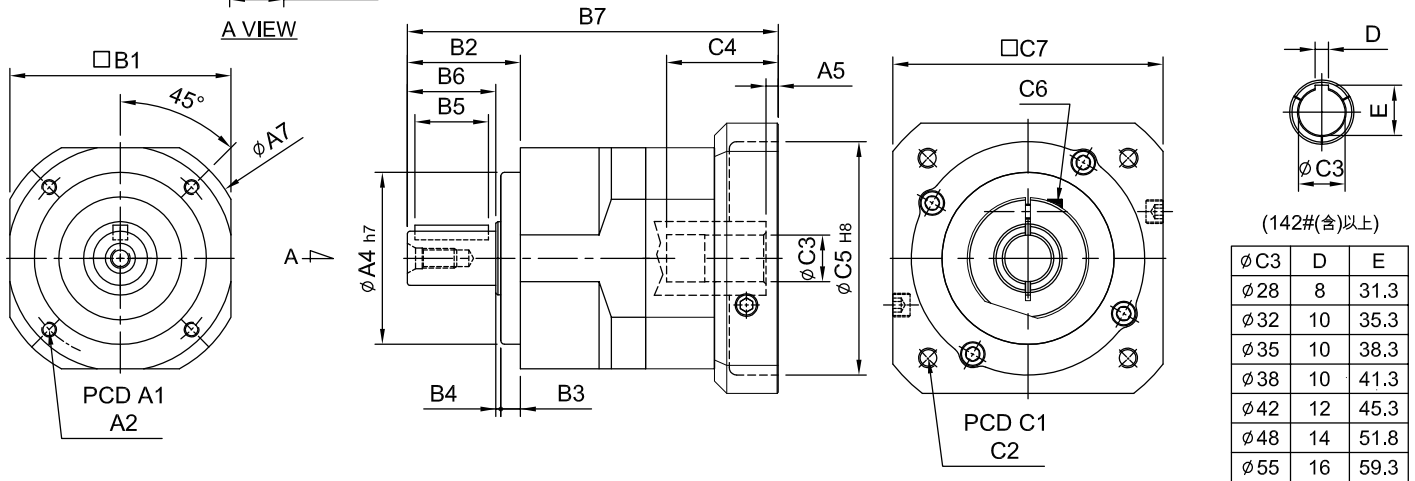
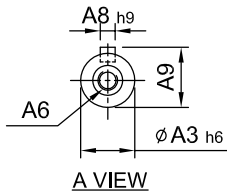


# SERVOBOX Planetary Reducers

## MODEL : SE

單段 1-Stage

RATIO : 3, 4, 5, 6, 7, 8, 9, 10



(142#(含)以上)

| $\phi C3$ | D  | E    |
|-----------|----|------|
| $\phi 28$ | 8  | 31.3 |
| $\phi 32$ | 10 | 35.3 |
| $\phi 35$ | 10 | 38.3 |
| $\phi 38$ | 10 | 41.3 |
| $\phi 42$ | 12 | 45.3 |
| $\phi 48$ | 14 | 51.8 |
| $\phi 55$ | 16 | 59.3 |

unit: mm

| Model Code | 44                | 62                | 90                   | 120               | 142               | 180                     | 220               |
|------------|-------------------|-------------------|----------------------|-------------------|-------------------|-------------------------|-------------------|
| A1         | 44                | 62                | 82                   | 110               | 140               | 184                     | 218               |
| A2         | M4 x P0.7         | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        | M12 x P1.75             | M16 x P2.0        |
| A3         | 13                | 16                | 22                   | 32                | 40                | 55                      | 75                |
| A4         | 35                | 50                | 70                   | 90                | 120               | 160                     | 180               |
| A5         | 5                 | 6                 | 9 · 23.5             | 10 · 20           | 10                | 11.5 · 14.5             | 12.5 · 14.5       |
| A6         | M4 x P0.7         | M5 x P0.8         | M8 x P1.25           | M10 x P1.5        | M12 x P1.75       | M14 x P2.0              | M16 x P2.0        |
| A7         | 50                | 70                | 102                  | 134               | 166               | 215                     | 252               |
| A8         | 5                 | 5                 | 6                    | 10                | 12                | 16                      | 20                |
| A9         | 15                | 18                | 24.5                 | 35                | 43                | 59                      | 79.5              |
| B1         | 44                | 62                | 90                   | 120               | 142               | 180                     | 220               |
| B2         | 26                | 36                | 46                   | 65                | 92                | 106                     | 139               |
| B3         | 5                 | 7                 | 8                    | 12                | 15                | 20                      | 30                |
| B4         | 1                 | 1                 | 2                    | 3                 | 3                 | 4                       | 5                 |
| B5         | 15                | 20                | 30                   | 40                | 65                | 70                      | 90                |
| B6         | 20                | 28                | 36                   | 50                | 74                | 82                      | 104               |
| B7         | 95                | 115 · 123         | 164.5 · 179          | 205 · 215         | 260.5             | 323.5 · 326.5           | 367.5             |
| C1         | 46 · 60 · 63 · 90 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   | 200 · 215 · 265 · 300   | 200 · 265 · 300   |
| C2         | M3 · M4 · M5      | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    | M10 · M12               | M12 · M16         |
| C3         | 8 · 9 · 11        | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32 | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55  | 38 · 42 · 48 · 55 |
| C4         | 26 · 30.5         | 33.5 · 41.5       | 59 · 73.5            | 67 · 77           | 84.5              | 114.5 · 117.5           | 117.5 · 119.5     |
| C5         | 30 · 40 · 50      | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   | 114.3 · 180 · 230 · 250 | 114.3 · 230 · 250 |
| C6         | M4 x P0.7         | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        | M10 x P1.5              | M10 x P1.5        |
| C7         | 46 · 55           | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   | 182 · 200 · 250 · 265   | 222 · 250 · 265   |

## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 44  | 62    | 90    | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 3           | 19  | 59    | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 4           | 16  | 51    | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 5           | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 6           | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 7           | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 8           | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 9           | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 10          | 14  | 43    | 141   | 294   | 549   | 1,059  | 1,779  |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 3 ~ 10      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 3 ~ 10      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{IN}$   | rpm        | 3 ~ 10      | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{IB}$   | rpm        | 3 ~ 10      | 6,000   | 6,000 | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 3 ~ 10      | -   | -     | ≤ 1   | ≤ 1   | ≤ 1   | ≤ 1    | ≤ 1    |
| 背隙 Backlash P0   |            | arcmin     | 3 ~ 10      | ≤ 3   | ≤ 3   | ≤ 3   | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    |
| 背隙 Backlash P1   |            | arcmin     | 3 ~ 10      | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P2   |            | arcmin     | 3 ~ 10      | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 3 ~ 10      | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 3 ~ 10      | 380   | 1,180 | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 3 ~ 10      | 190   | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 3 ~ 10      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 3 ~ 10      | ≥ 97%   |       |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 3 ~ 10      | - 25° C ~ + 90° C   |       |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 3 ~ 10      | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 3 ~ 10      | IP65  |       |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 3 ~ 10      | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 3 ~ 10      | ≤ 56  | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 3 ~ 10      | 0.58  | 1.32  | 3.4   | 7.88  | 14    | 29.16  | 39     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

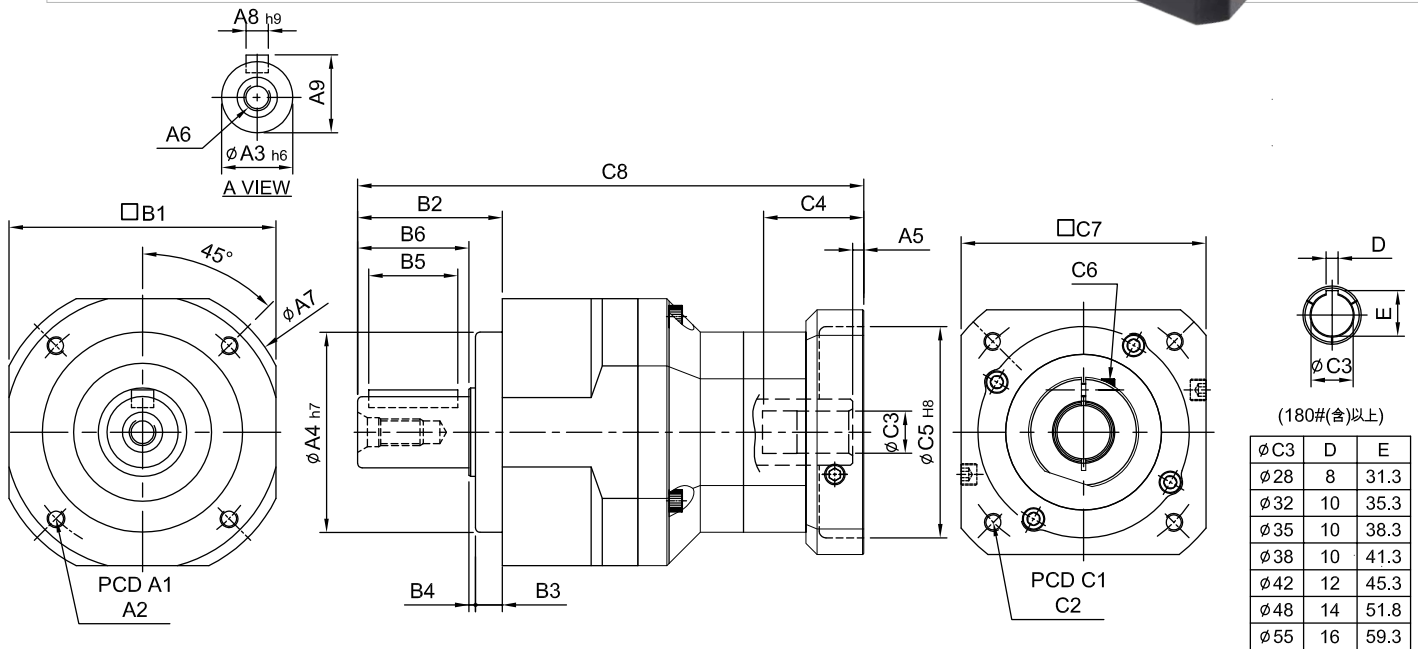
| Ratio | 44   | 62   | 90   | 120  | 142  | 180   | 220   |
|-------|------|------|------|------|------|-------|-------|
| 3     | 0.03 | 0.16 | 0.61 | 3.25 | 9.21 | 28.98 | 69.61 |
| 4     | 0.03 | 0.14 | 0.48 | 2.74 | 7.54 | 23.67 | 54.37 |
| 5     | 0.03 | 0.13 | 0.47 | 2.71 | 7.42 | 23.29 | 53.27 |
| 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 |

# SERVOBOX Planetary Reducers

## MODEL : SE

雙段 2-Stage

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



unit: mm

| Model Code | 62           | 90                | 120                  | 142               | 180               | 220                    |
|------------|--------------|-------------------|----------------------|-------------------|-------------------|------------------------|
| A1         | 62           | 82                | 110                  | 140               | 184               | 218                    |
| A2         | M5 x P0.8    | M6 x P1.0         | M8 x P1.25           | M10 x P1.5        | M12 x P1.75       | M16 x P2.0             |
| A3         | 16           | 22                | 32                   | 40                | 55                | 75                     |
| A4         | 50           | 70                | 90                   | 120               | 160               | 180                    |
| A5         | 5            | 6                 | 9 · 23.5             | 10 · 20           | 10                | 11.5 · 13.5            |
| A6         | M5 x P0.8    | M8 x P1.25        | M10 x P1.5           | M12 x P1.75       | M14 x P2.0        | M16 x P2.0             |
| A7         | 70           | 102               | 134                  | 166               | 215               | 252                    |
| A8         | 5            | 6                 | 10                   | 12                | 16                | 20                     |
| A9         | 18           | 24.5              | 35                   | 43                | 59                | 79.5                   |
| B1         | 62           | 90                | 120                  | 142               | 180               | 220                    |
| B2         | 36           | 46                | 65                   | 92                | 106               | 139                    |
| B3         | 7            | 8                 | 12                   | 15                | 20                | 30                     |
| B4         | 1            | 2                 | 3                    | 3                 | 4                 | 5                      |
| B5         | 20           | 30                | 40                   | 65                | 70                | 90                     |
| B6         | 28           | 36                | 50                   | 74                | 82                | 104                    |
| C1         | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   | 200 · 215 · 265        |
| C2         | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    | M10 · M12              |
| C3         | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32 | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
| C4         | 26 · 30.5    | 33.5 · 41.5       | 59 · 73.5            | 67 · 77           | 84.5              | 114.5 · 116.5          |
| C5         | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   | 114.3 · 180 · 230      |
| C6         | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        | M10 x P1.5             |
| C7         | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   | 182 · 200 · 250        |
| C8         | 139.5        | 172.5 · 180.5     | 241 · 255.5          | 298.5 · 308.5     | 358.5             | 446.5                  |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62  | 90    | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 59  | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 20          | 51  | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 25          | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 30          | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 35          | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 40          | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 50          | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 60          | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 70          | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 80          | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 90          | 44  | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 100         | 43  | 141   | 294   | 549   | 1,059  | 1,779  |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{IN}$   | rpm        | 15 ~ 100    | 3,000   | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{IB}$   | rpm        | 15 ~ 100    | 6,000   | 6,000 | 5,000 | 5,000 | 4,000  | 4,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 100    | -   | -     | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 100    | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 100    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 100    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 100    | 6   | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 100    | 1,180   | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 100    | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 100    | ≥ 94%   |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 100    | - 25° C ~ + 90° C   |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 100    | IP65  |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 100    | 任意方向 Any  |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 100    | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 100    | 1.68  | 4.4   | 9.3   | 15.5  | 34.8   | 56.5   |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

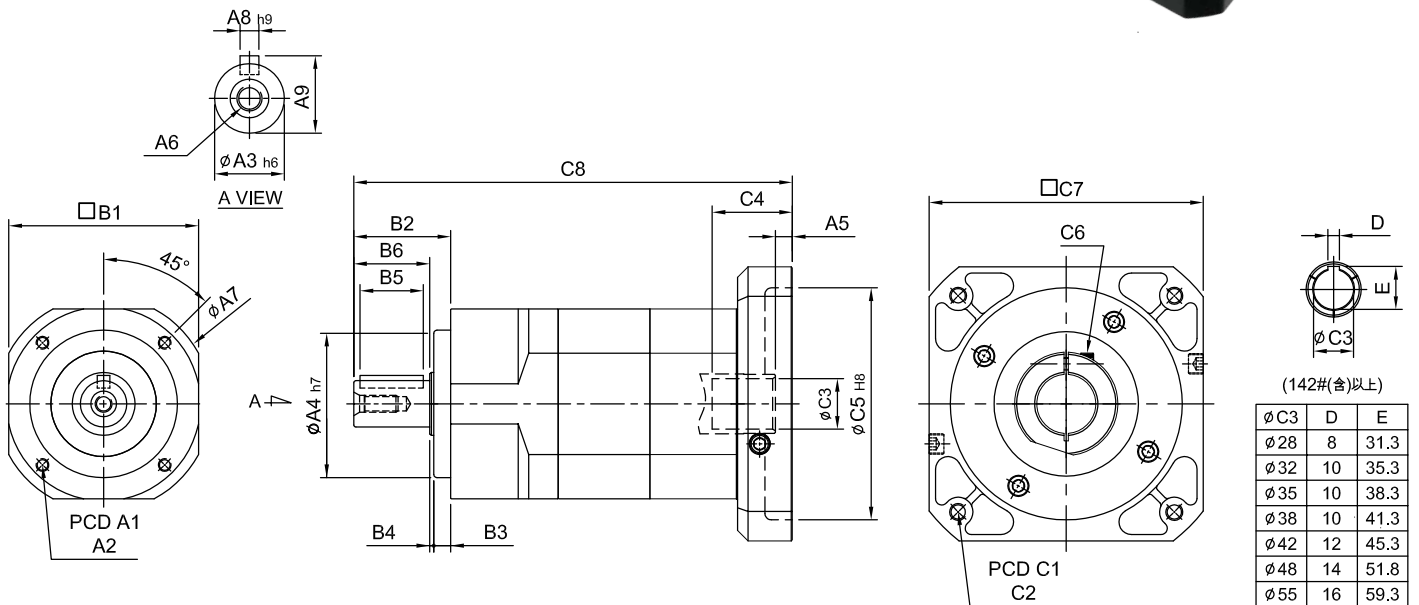
| Ratio | 62   | 90   | 120  | 142  | 180  | 220   |
|-------|------|------|------|------|------|-------|
| 15    | 0.03 | 0.14 | 0.46 | 2.63 | 7.3  | 22.79 |
| 20    | 0.03 | 0.14 | 0.46 | 2.63 | 7.3  | 22.79 |
| 25    | 0.03 | 0.14 | 0.46 | 2.63 | 7.1  | 22.79 |
| 30    | 0.03 | 0.14 | 0.46 | 2.43 | 7.1  | 22.59 |
| 35    | 0.03 | 0.14 | 0.44 | 2.43 | 7.1  | 22.59 |
| 40    | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 |
| 50    | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 |
| 60    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 |
| 70    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 |
| 80    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 |
| 90    | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 |
| 100   | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 |

# SERVOBOX Planetary Reducers

## MODEL : SE-A

雙段 2-Stage

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



unit: mm

| Model Code | 44A          | 62A               | 90A                  | 120A              | 142A              | 180A                   | 220A              |
|------------|--------------|-------------------|----------------------|-------------------|-------------------|------------------------|-------------------|
| <b>A</b>   |              |                   |                      |                   |                   |                        |                   |
| A1         | 44           | 62                | 82                   | 110               | 140               | 184                    | 218               |
| A2         | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        | M12 x P1.75            | M16 x P2.0        |
| A3         | 13           | 16                | 22                   | 32                | 40                | 55                     | 75                |
| A4         | 35           | 50                | 70                   | 90                | 120               | 160                    | 180               |
| A5         | 5            | 6                 | 9 · 23.5             | 10 · 20           | 10                | 11.5 · 13.5            | 12.5 · 14.5       |
| A6         | M4 x P0.7    | M5 x P0.8         | M8 x P1.25           | M10 x P1.5        | M12 x P1.75       | M14 x P2.0             | M16 x P2.0        |
| A7         | 50           | 70                | 102                  | 134               | 166               | 215                    | 252               |
| A8         | 5            | 5                 | 6                    | 10                | 12                | 16                     | 20                |
| A9         | 15           | 18                | 24.5                 | 35                | 43                | 59                     | 79.5              |
| <b>B</b>   |              |                   |                      |                   |                   |                        |                   |
| B1         | 44           | 62                | 90                   | 120               | 142               | 180                    | 220               |
| B2         | 26           | 36                | 46                   | 65                | 92                | 106                    | 139               |
| B3         | 5            | 7                 | 8                    | 12                | 15                | 20                     | 30                |
| B4         | 1            | 1                 | 2                    | 3                 | 3                 | 4                      | 5                 |
| B5         | 15           | 20                | 30                   | 40                | 65                | 70                     | 90                |
| B6         | 20           | 28                | 36                   | 50                | 74                | 82                     | 104               |
| <b>C</b>   |              |                   |                      |                   |                   |                        |                   |
| C1         | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   | 200 · 215 · 265        | 200 · 265 · 300   |
| C2         | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    | M10 · M12              | M12 · M16         |
| C3         | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32 | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 | 38 · 42 · 48 · 55 |
| C4         | 26 · 30.5    | 33.5              | 59 · 73.5            | 67 · 77           | 84.5              | 114.5 · 116.5          | 117.5 · 119.5     |
| C5         | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   | 114.3 · 180 · 230      | 114.3 · 230 · 250 |
| C6         | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        | M10 x P1.5             | M10 x P1.5        |
| C7         | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   | 182 · 200 · 250        | 222 · 250 · 265   |
| C8         | 121          | 148.8             | 208 · 222.5          | 261 · 271         | 327               | 404.5                  | 460.5             |

## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 44A   | 62A   | 90A   | 120A  | 142A  | 180A   | 220A   |
|--|------------|------------|-------------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 19  | 59    | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 20          | 16  | 51    | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 25          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 30          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 35          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 40          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 50          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 60          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 70          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 80          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
| 90   | 13         | 44         | 145         | 278   | 516   | 993   | 1,694 |       |        |        |
| 100  | 14         | 43         | 141         | 294   | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{IN}$   | rpm        | 15 ~ 100    | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{IB}$   | rpm        | 15 ~ 100    | 6,000   | 6,000 | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 100    | -   | -     | -     | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 100    | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 100    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 100    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 100    | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 100    | 380   | 1,180 | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 100    | 190   | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 100    | ≥ 94%   |       |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 100    | - 25° C ~ + 90° C   |       |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 100    | IP65  |       |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 100    | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 100    | ≤ 56  | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 100    | 0.9   | 2     | 6     | 10.2  | 22.5  | 42     | 59     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 44A  | 62A  | 90A  | 120A | 142A | 180A  | 220A  |
|-------|------|------|------|------|------|-------|-------|
| 15    | 0.03 | 0.14 | 0.46 | 2.63 | 7.30 | 22.79 | 56.98 |
| 20    | 0.03 | 0.14 | 0.46 | 2.63 | 7.30 | 22.79 | 56.98 |
| 25    | 0.03 | 0.14 | 0.46 | 2.63 | 7.10 | 22.79 | 56.98 |
| 30    | 0.03 | 0.14 | 0.46 | 2.43 | 7.10 | 22.59 | 56.48 |
| 35    | 0.03 | 0.14 | 0.44 | 2.43 | 7.10 | 22.59 | 56.48 |
| 40    | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 | 56.48 |
| 50    | 0.03 | 0.14 | 0.44 | 2.39 | 6.92 | 22.59 | 56.48 |
| 60    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |
| 70    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |
| 80    | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |
| 90    | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 | 54.00 |
| 100   | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 | 54.00 |



# SERVOBOX Planetary Reducers

## MODEL : SE

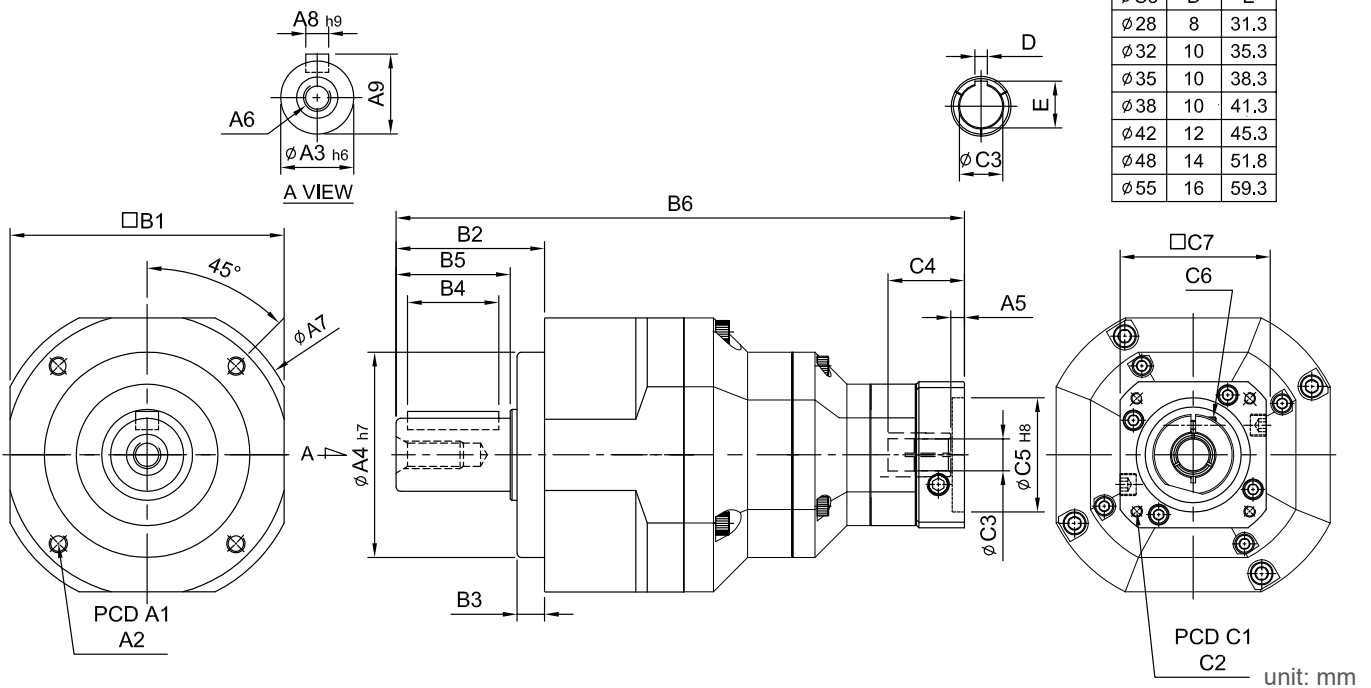
三段 3-Stage

RATIO : 125, 150, 175, 200, 250, 300, 350,  
400, 450, 500, 600, 700, 800, 900, 1000



(220#)

| $\phi$ C3 | D  | E    |
|-----------|----|------|
| $\phi$ 28 | 8  | 31.3 |
| $\phi$ 32 | 10 | 35.3 |
| $\phi$ 35 | 10 | 38.3 |
| $\phi$ 38 | 10 | 41.3 |
| $\phi$ 42 | 12 | 45.3 |
| $\phi$ 48 | 14 | 51.8 |
| $\phi$ 55 | 16 | 59.3 |



unit: mm

| Model Code  | 90           | 120               | 142                  | 180               | 220               |
|-------------|--------------|-------------------|----------------------|-------------------|-------------------|
| <b>A</b> A1 | 82           | 110               | 140                  | 184               | 218               |
| A2          | M6 x P1.0    | M8 x P1.25        | M10 x P1.5           | M12 x P1.75       | M16 x P2.0        |
| A3          | 22           | 32                | 40                   | 55                | 75                |
| A4          | 70           | 90                | 120                  | 160               | 180               |
| A5          | 5            | 6                 | 9 · 23.5             | 10 · 20           | 10                |
| A6          | M8 x P1.25   | M10 x P1.5        | M12 x P1.75          | M14 x P2.0        | M16 x P2.0        |
| A7          | 102          | 134               | 166                  | 215               | 252               |
| A8          | 6            | 10                | 12                   | 16                | 20                |
| A9          | 24.5         | 35                | 43                   | 59                | 79.5              |
| <b>B</b> B1 | 90           | 120               | 142                  | 180               | 220               |
| B2          | 46           | 65                | 92                   | 106               | 139               |
| B3          | 8            | 12                | 15                   | 20                | 30                |
| B4          | 30           | 40                | 65                   | 70                | 90                |
| B5          | 36           | 50                | 74                   | 82                | 104               |
| B6          | 195          | 249 · 257         | 334.5 · 349          | 396.5 · 406.5     | 481.5             |
| <b>C</b> C1 | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   |
| C2          | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    |
| C3          | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32 | 28 · 32 · 35 · 38 |
| C4          | 26 · 30.5    | 33.5 · 41.5       | 59 · 73.5            | 67 · 77           | 84.5              |
| C5          | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   |
| C6          | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        |
| C7          | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   |

## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 90  | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 125         | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 150         | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 175         | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 200         | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 250         | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 300         | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 350         | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 400         | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 450         | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 500         | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 600         | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 700         | 149   | 309   | 573   | 1,108  | 1,870  |
| 800  | 143        | 298        | 553         | 1,070   | 1,824 |       |        |        |
| 900  | 145        | 278        | 516         | 993   | 1,694 |       |        |        |
| 1000   | 141        | 294        | 549         | 1,059   | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 125 ~ 1000  | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque                                | $T_{2NOT}$ | Nm         | 125 ~ 1000  | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |        |        |
| 急停扭矩 Emergency Stop Torque                               |            |            |             |   |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{IN}$   | rpm        | 125 ~ 1000  | 3,000   | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{IB}$   | rpm        | 125 ~ 1000  | 6,000   | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 125 ~ 1000  | -   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P0   |            | arcmin     | 125 ~ 1000  | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin     | 125 ~ 1000  | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin     | 125 ~ 1000  | ≤ 11  | ≤ 11  | ≤ 11  | ≤ 11   | ≤ 11   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 125 ~ 1000  | 14  | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 125 ~ 1000  | 3,200   | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 125 ~ 1000  | 1,600   | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 125 ~ 1000  | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation : >30,000 (S1 Continuous Operation : >15,000 hrs) |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 125 ~ 1000  | ≥ 90%   |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 125 ~ 1000  | - 25° C ~ + 90° C   |       |       |        |        |
| 潤滑 Lubrication   |            |            | 125 ~ 1000  | 全合成潤滑油脂 Synthetic Grease  |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 125 ~ 1000  | IP65  |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 125 ~ 1000  | 任意方向 Any  |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 125 ~ 1000  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 125 ~ 1000  | 4.9   | 10    | 23    | 47     | 70     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 90   | 120  | 142  | 180  | 220  |
|-------|------|------|------|------|------|
| 125   | 0.01 | 0.04 | 0.71 | 1.42 | 3.29 |
| 150   | 0.01 | 0.04 | 0.51 | 0.92 | 2.15 |
| 175   | 0.01 | 0.04 | 0.40 | 0.83 | 1.26 |
| 200   | 0.01 | 0.04 | 0.21 | 0.65 | 0.98 |
| 250   | 0.01 | 0.04 | 0.11 | 0.52 | 0.82 |
| 300   | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 350   | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 400   | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 450   | 0.01 | 0.04 | 0.09 | 0.21 | 0.51 |
| 500   | 0.01 | 0.04 | 0.08 | 0.12 | 0.51 |
| 600   | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 700   | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 800   | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 900   | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 1000  | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |

# SERVOBOX Planetary Reducers

## MODEL : SE-A

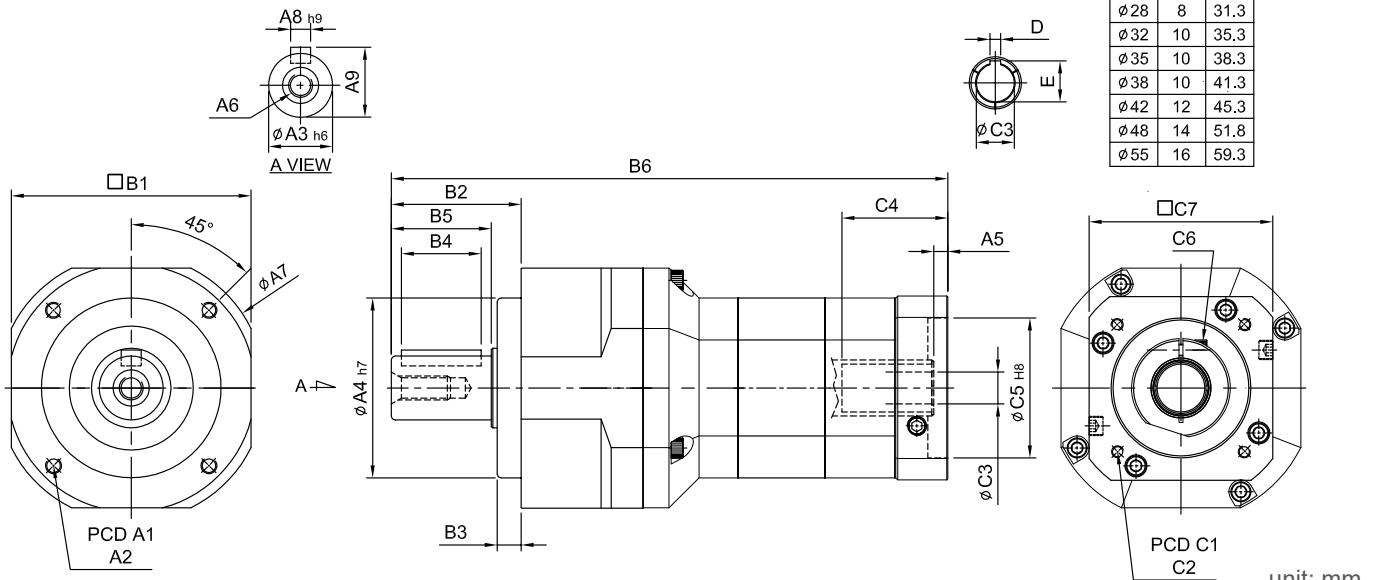
三段 3-Stage

RATIO : 125, 150, 175, 200, 250, 300, 350,  
400, 450, 500, 600, 700, 800, 900, 1000



(180#(含)以上)

| φC3 | D  | E    |
|-----|----|------|
| φ28 | 8  | 31.3 |
| φ32 | 10 | 35.3 |
| φ35 | 10 | 38.3 |
| φ38 | 10 | 41.3 |
| φ42 | 12 | 45.3 |
| φ48 | 14 | 51.8 |
| φ55 | 16 | 59.3 |



unit: mm

| Model Code  | 62A          | 90A               | 120A                 | 142A              | 180A              | 220A                   |
|-------------|--------------|-------------------|----------------------|-------------------|-------------------|------------------------|
| <b>A</b> A1 | 62           | 82                | 110                  | 140               | 184               | 218                    |
| A2          | M5 x P0.8    | M6 x P1.0         | M8 x P1.25           | M10 x P1.5        | M12 x P1.75       | M16 x P2.0             |
| A3          | 16           | 22                | 32                   | 40                | 55                | 75                     |
| A4          | 50           | 70                | 90                   | 120               | 160               | 180                    |
| A5          | 6.5          | 6                 | 9 · 23.5             | 10 · 20           | 10                | 11.5 · 13.5            |
| A6          | M5 x P0.8    | M8 x P1.25        | M10 x P1.5           | M12 x P1.75       | M14 x P2.0        | M16 x P2.0             |
| A7          | 70           | 102               | 134                  | 166               | 215               | 252                    |
| A8          | 5            | 6                 | 10                   | 12                | 16                | 20                     |
| A9          | 18           | 24.5              | 35                   | 43                | 59                | 79.5                   |
| <b>B</b> B1 | 62           | 90                | 120                  | 142               | 180               | 220                    |
| B2          | 36           | 46                | 65                   | 92                | 106               | 139                    |
| B3          | 7            | 8                 | 12                   | 15                | 20                | 30                     |
| B4          | 20           | 30                | 40                   | 65                | 70                | 90                     |
| B5          | 28           | 36                | 50                   | 74                | 82                | 104                    |
| B6          | 165.5        | 204.5 · 212.5     | 284.5                | 354.5             | 425               | 527.5                  |
| <b>C</b> C1 | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   | 200 · 215 · 265        |
| C2          | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    | M10 · M12              |
| C3          | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32 | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
| C4          | 26 · 30.5    | 33.5 · 41.5       | 59 · 73.5            | 67 · 77           | 84.5              | 114.5 · 116.5          |
| C5          | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   | 114.3 · 180 · 230      |
| C6          | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        | M10 x P1.5             |
| C7          | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   | 182 · 200 · 250        |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62A   | 90A   | 120A  | 142A  | 180A   | 220A   |
|--|------------|------------|-------------|---|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 125         | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 150         | 59  | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 175         | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 200         | 51  | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 250         | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 300         | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 350         | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 400         | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 450         | 44  | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 500         | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 600         | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
| 700  | 45         | 149        | 309         | 573   | 1,108 | 1,870 |       |        |        |
| 800  | 43         | 143        | 298         | 553   | 1,070 | 1,824 |       |        |        |
| 900  | 44         | 145        | 278         | 516   | 993   | 1,694 |       |        |        |
| 1000   | 43         | 141        | 294         | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 125 ~ 1000  | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque                                | $T_{2NOT}$ | Nm         | 125 ~ 1000  | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |        |        |
| 急停扭矩 Emergency Stop Torque                               |            |            |             |   |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{IN}$   | rpm        | 125 ~ 1000  | 3,000   | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{IB}$   | rpm        | 125 ~ 1000  | 6,000   | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 125 ~ 1000  | -   | -     | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P0   |            | arcmin     | 125 ~ 1000  | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin     | 125 ~ 1000  | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin     | 125 ~ 1000  | ≤ 11  | ≤ 11  | ≤ 11  | ≤ 11  | ≤ 11   | ≤ 11   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 125 ~ 1000  | 6   | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 125 ~ 1000  | 1,180   | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 125 ~ 1000  | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 125 ~ 1000  | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 125 ~ 1000  | ≥ 90%   |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 125 ~ 1000  | - 25° C ~ + 90° C   |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 125 ~ 1000  | 全合成潤滑油脂 Synthetic Grease  |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 125 ~ 1000  | IP65  |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 125 ~ 1000  | 任意方向 Any  |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 125 ~ 1000  | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65  | ≤ 67   | ≤ 70   |
| 重量 Weight ±3%  |            | Kg         | 125 ~ 1000  | 2.5   | 6.5   | 13    | 26    | 56.5   | 86     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 62A  | 90A  | 120A | 142A | 180A | 220A |
|-------|------|------|------|------|------|------|
| 125   | 0.01 | 0.01 | 0.04 | 0.71 | 1.42 | 3.29 |
| 150   | 0.01 | 0.01 | 0.04 | 0.51 | 0.92 | 2.15 |
| 175   | 0.01 | 0.01 | 0.04 | 0.4  | 0.83 | 1.26 |
| 200   | 0.01 | 0.01 | 0.04 | 0.21 | 0.65 | 0.98 |
| 250   | 0.01 | 0.01 | 0.04 | 0.11 | 0.52 | 0.82 |
| 300   | 0.01 | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 350   | 0.01 | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 400   | 0.01 | 0.01 | 0.04 | 0.09 | 0.21 | 0.82 |
| 450   | 0.01 | 0.01 | 0.04 | 0.09 | 0.21 | 0.51 |
| 500   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.51 |
| 600   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 700   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 800   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 900   | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |
| 1000  | 0.01 | 0.01 | 0.04 | 0.08 | 0.12 | 0.25 |

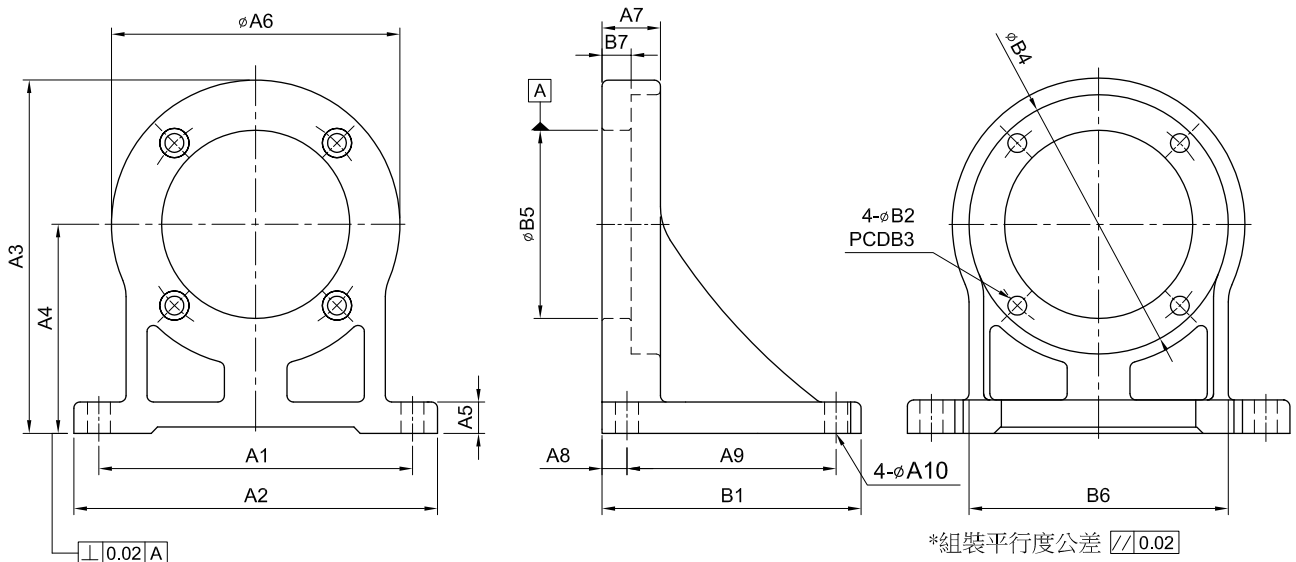
# Accessories for SE

## SE 選配件



## L Type Base Kits

L 型腳座



unit: mm

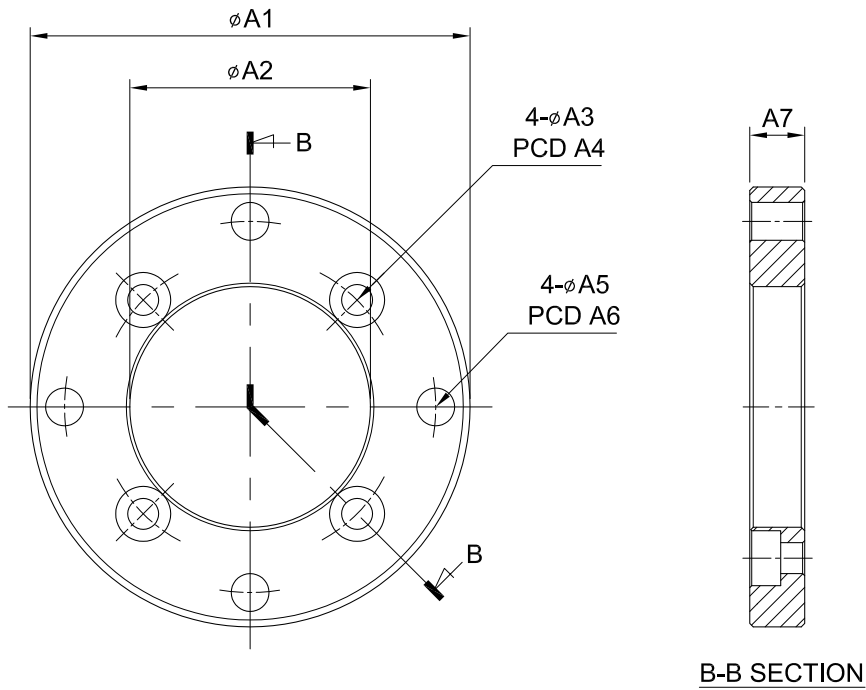
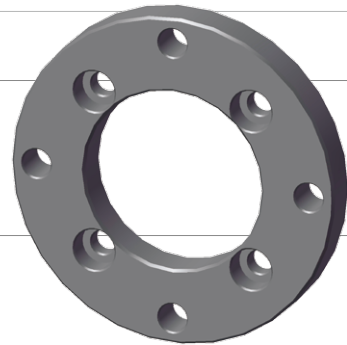
| Model Code | 44   | 62   | 90   | 120  | 142   | 180   | 220   |
|------------|------|------|------|------|-------|-------|-------|
| A1         | 70   | 90   | 110  | 150  | 190   | 240   | 280   |
| A2         | 88   | 108  | 130  | 176  | 220   | 276   | 330   |
| A3         | 75.5 | 95.5 | 127  | 170  | 207.5 | 274   | 334   |
| A4         | 45   | 55   | 75   | 100  | 120   | 160   | 200   |
| A5         | 8    | 9    | 11   | 16   | 19    | 24    | 30    |
| A6         | 60   | 81   | 104  | 140  | 175   | 228   | 268   |
| A7         | 13   | 16   | 21   | 28   | 35    | 45    | 60    |
| A8         | 10   | 10   | 11   | 14   | 16    | 19    | 26    |
| A9         | 40   | 50   | 75   | 100  | 120   | 160   | 200   |
| A10        | Ø7   | Ø7   | Ø9   | Ø11  | Ø13   | Ø17   | Ø21   |
| B1         | 60   | 70   | 97   | 128  | 152   | 198   | 252   |
| B2         | Ø4.5 | Ø5.5 | Ø6.8 | Ø9   | Ø11   | Ø13   | Ø17   |
| B3         | 44   | 62   | 82   | 110  | 140   | 184   | 218   |
| B4         | 50   | 70   | 92   | 124  | 155   | 205   | 242   |
| B5         | 35   | 50   | 70   | 90   | 120   | 160   | 180   |
| B6         | 50   | 70   | 90   | 125  | 156   | 200   | 230   |
| B7         | 6    | 8    | 9    | 14   | 16    | 21    | 30    |
| C Kg       |      | 0.71 | 1.57 | 3.86 | 6.41  | 13.44 | 27.73 |

※ 重量誤差 3%

High Precision Planetary Reducer

# Connecting Plate

連接板



B-B SECTION

unit: mm

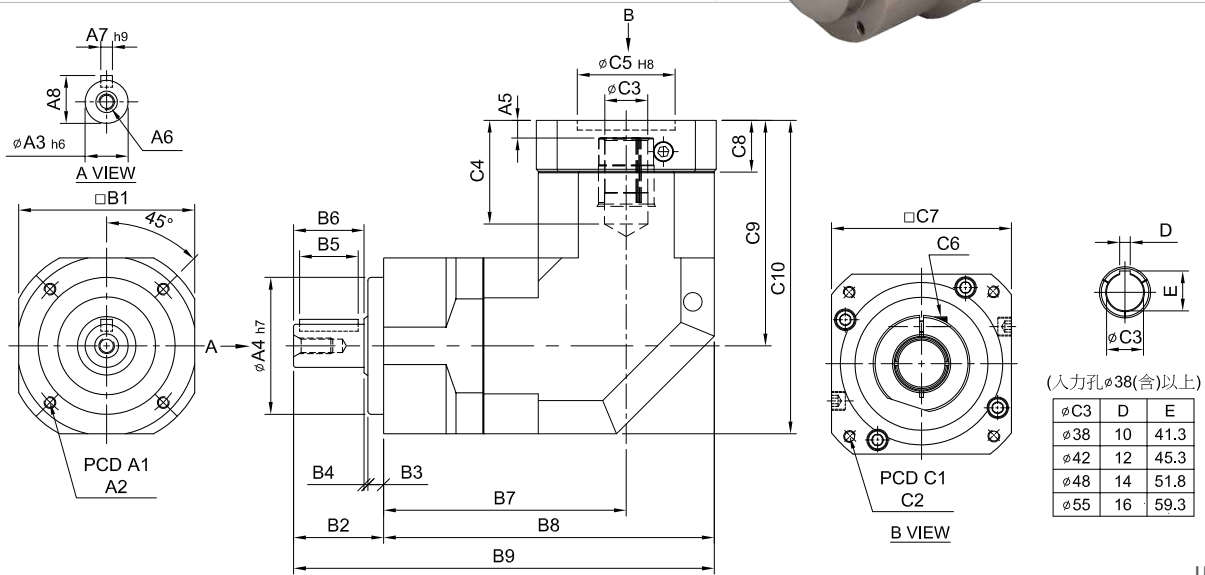
| A  | Model Code | 44  | 62  | 90  | 120 | 142 | 180 | 220 |
|----|------------|-----|-----|-----|-----|-----|-----|-----|
|    | A1         | 64  | 88  | 123 | 158 | 188 | 238 | 298 |
| A2 | 35         | 50  | 70  | 90  | 120 | 160 | 180 |     |
| A3 | 4.5        | 5.5 | 6.8 | 9   | 11  | 13  | 17  |     |
| A4 | 44         | 62  | 82  | 110 | 140 | 184 | 218 |     |
| A5 | 5.5        | 6.8 | 9   | 11  | 13  | 15  | 17  |     |
| A6 | 54         | 75  | 106 | 140 | 165 | 210 | 260 |     |
| A7 | 8          | 9   | 11  | 14  | 17  | 22  | 30  |     |

# SERVOBOX Planetary Reducers

## MODEL : SEL

單段 1-Stage

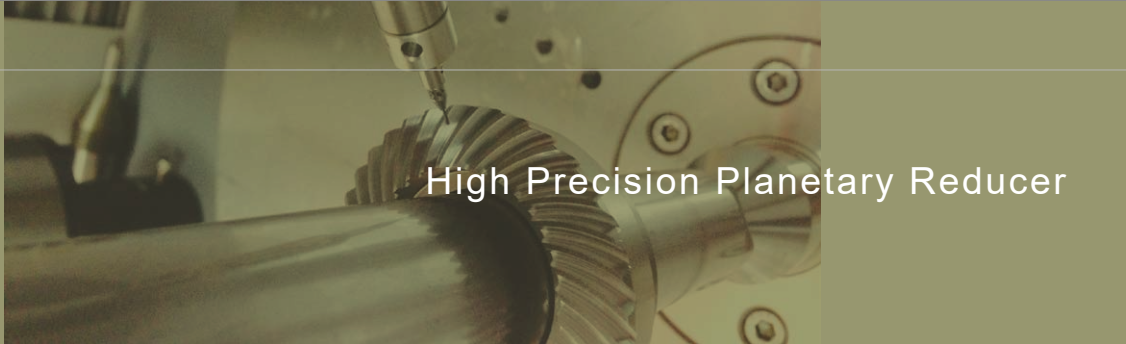
RATIO : 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



unit: mm

| Model Code | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
|------------|-----------|-------------|----------------|-------------|-------------|----------------|---------------|
| <b>A</b>   |           |             |                |             |             |                |               |
| A1         | 44        | 62          | 82             | 110         | 140         | 184            | 218           |
| A2         | M4 x P0.7 | M5 x P0.8   | M6 x P1.0      | M8 x P1.25  | M10 x P1.5  | M12 x P1.75    | M16 x P2.0    |
| A3         | 13        | 16          | 22             | 32          | 40          | 55             | 75            |
| A4         | 35        | 50          | 70             | 90          | 120         | 160            | 180           |
| A5         | 6         | 6           | 9・23.5         | 10・20       | 10          | 12.5・14.5      | 12.5・14.5     |
| A6         | M4 x P0.7 | M5 x P0.8   | M8 x P1.25     | M10 x P1.5  | M12 x P1.75 | M14 x P2.0     | M16 x P2.0    |
| A7         | 5         | 5           | 6              | 10          | 12          | 16             | 20            |
| A8         | 15        | 18          | 24.5           | 35          | 43          | 59             | 79.5          |
| <b>B</b>   |           |             |                |             |             |                |               |
| B1         | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
| B2         | 26        | 36          | 46             | 65          | 92          | 106            | 139           |
| B3         | 5         | 7           | 8              | 12          | 15          | 20             | 30            |
| B4         | 1         | 1           | 2              | 3           | 3           | 4              | 5             |
| B5         | 15        | 20          | 30             | 40          | 65          | 70             | 90            |
| B6         | 20        | 28          | 36             | 50          | 74          | 82             | 104           |
| B7         | 76        | 84.5        | 122.1          | 148         | 165.5       | 223.6          | 231.6         |
| B8         | 98        | 115.5       | 167.1          | 208         | 236.5       | 313.6          | 341.6         |
| B9         | 124       | 151.5       | 215.1          | 273         | 328.5       | 419.6          | 480.6         |
| <b>C</b>   |           |             |                |             |             |                |               |
| C1         | 46・60・63  | 70・75・90    | 90・110・115・145 | 115・145・165 | 145・165・215 | 200・215・265    | 200・265・300   |
| C2         | M3・M4・M5  | M4・M5・M6    | M5・M6・M8       | M6・M8・M10   | M8・M10・M12  | M10・M12・M16    | M12・M16       |
| C3         | 8・11      | 11・14・16・19 | 16・19・22・24    | 24・28・32    | 28・32・35・38 | 35・38・42・48・55 | 38・42・48・55   |
| C4         | 27        | 33.5・42     | 53・58・67.5     | 67・77       | 67・84       | 117・119        | 117・119       |
| C5         | 30・40・50  | 50・60・70    | 70・80・95・110   | 95・110・130  | 110・130・180 | 114.3・180・230  | 114.3・230・250 |
| C6         | M4 x P0.7 | M5 x P0.8   | M6 x P1.0      | M8 x P1.25  | M10 x P1.5  | M10 x P1.5     | M10 x P1.5    |
| C7         | 46・55     | 64・70・80    | 92・110・130     | 122・130・150 | 146・180・190 | 182・200・250    | 222・250・265   |
| C8         | 16        | 21.5        | 26.5・41        | 35.5・45.5   | 35.5        | 45.5・47.5      | 45.5・47.5     |
| C9         | 61        | 77・85       | 115.3・129.8    | 141・151     | 165.7       | 235・237        | 235・237       |
| C10        | 83        | 108・116     | 160.3・174.8    | 201・211     | 236.7       | 325・327        | 345・347       |





## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 44  | 62    | 90    | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 3           | 19  | 59    | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 4           | 16  | 51    | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 5           | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 6           | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 7           | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 8           | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 9           | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 10          | 14  | 43    | 141   | 294   | 549   | 1,059  | 1,779  |
|  |            |            | 12          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 14          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 16          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 18          | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
| 20   | 14         | 43         | 141         | 294   | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 3 ~ 20      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 3 ~ 20      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 3 ~ 20      | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 3 ~ 20      | 6,000   | 6,000 | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 3 ~ 20      | -   | -     | ≤ 2   | ≤ 2   | ≤ 2   | ≤ 2    | ≤ 2    |
| 背隙 Backlash P0   |            | arcmin     | 3 ~ 20      | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P1   |            | arcmin     | 3 ~ 20      | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6    | ≤ 6    |
| 背隙 Backlash P2   |            | arcmin     | 3 ~ 20      | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8    | ≤ 8    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 3 ~ 20      | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 3 ~ 20      | 380   | 1,180 | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 3 ~ 20      | 190   | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_H$      | hr         | 3 ~ 20      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 3 ~ 20      | ≥ 95%   |       |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 3 ~ 20      | - 25° C ~ + 90° C   |       |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 3 ~ 20      | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 3 ~ 20      | IP65  |       |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 3 ~ 20      | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 3 ~ 20      | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74  | ≤ 76   | ≤ 78   |
| 重量 Weight ±3%  |            | Kg         | 3 ~ 20      | 0.8   | 2.8   | 6.3   | 9.2   | 22.5  | 52.3   | 75     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

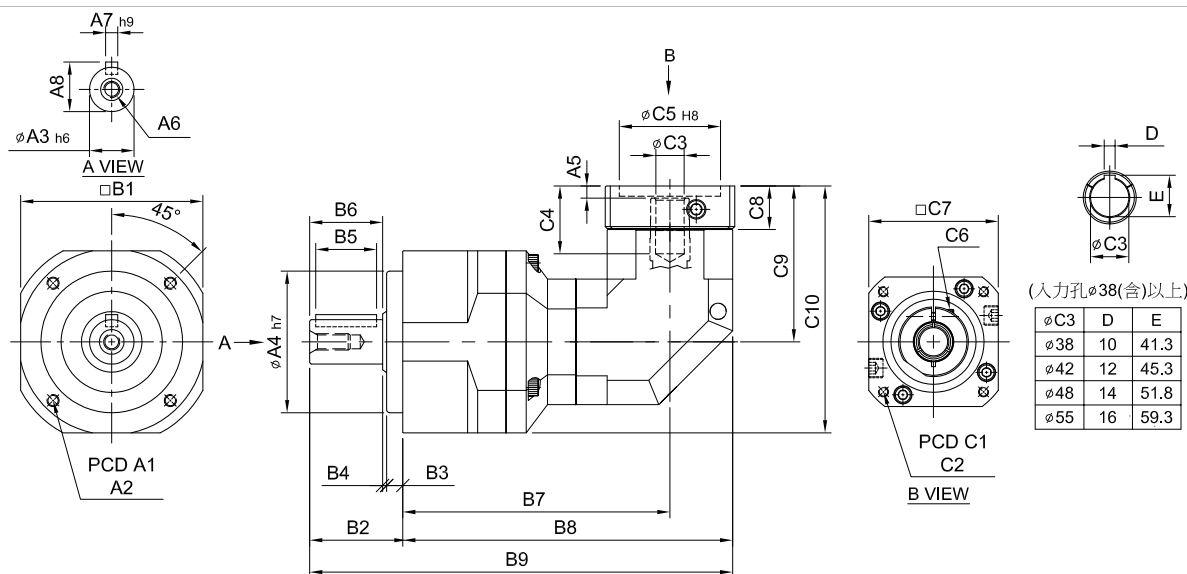
| Ratio | 44   | 62   | 90   | 120  | 142  | 180  | 220   |
|-------|------|------|------|------|------|------|-------|
| 3     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 4     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 5     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 6     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 7     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 8     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 9     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 10    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135   |
| 12    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |
| 14    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |
| 16    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |
| 18    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |
| 20    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 65.5 | 119.2 |

# SERVOBOX Planetary Reducers

## MODEL : SEL

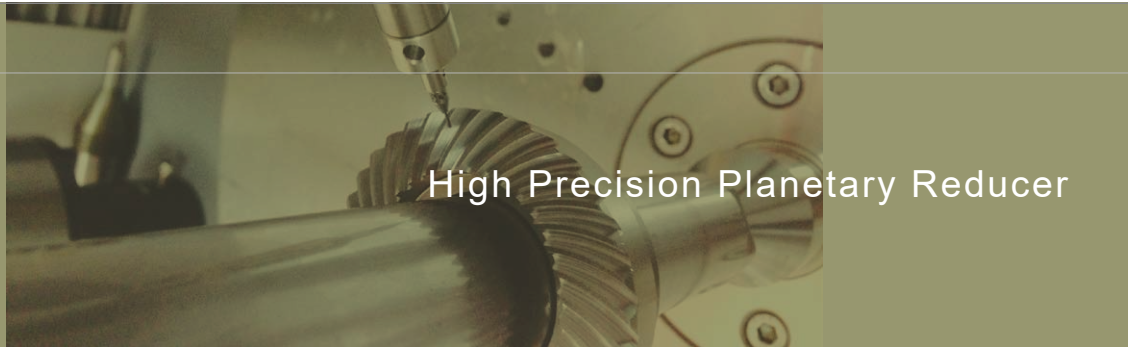
雙段 2-Stage

RATIO : 15, 20, 25, 30, 35, 40, 50, 60, 70,  
80, 90, 100, 120, 140, 160, 180, 200



unit: mm

| Model Code  | 62           | 90                | 120                  | 142             | 180               | 220                           |
|-------------|--------------|-------------------|----------------------|-----------------|-------------------|-------------------------------|
| <b>A</b> A1 | 62           | 82                | 110                  | 140             | 184               | 218                           |
| A2          | M5 x P0.8    | M6 x P1.0         | M8 x P1.25           | M10 x P1.5      | M12 x P1.75       | M16 x P2.0                    |
| A3          | 16           | 22                | 32                   | 40              | 55                | 75                            |
| A4          | 50           | 70                | 90                   | 120             | 160               | 180                           |
| A5          | 6            | 6                 | 9 · 23.5             | 10 · 20         | 10                | 12.5 · 14.5                   |
| A6          | M5 x P0.8    | M8 x P1.25        | M10 x P1.5           | M12 x P1.75     | M14 x P2.0        | M16 x P2.0                    |
| A7          | 5            | 6                 | 10                   | 12              | 16                | 20                            |
| A8          | 18           | 24.5              | 35                   | 43              | 59                | 79.5                          |
| <b>B</b> B1 | 62           | 90                | 120                  | 142             | 180               | 220                           |
| B2          | 36           | 46                | 65                   | 92              | 106               | 139                           |
| B3          | 7            | 8                 | 12                   | 15              | 20                | 30                            |
| B4          | 1            | 2                 | 3                    | 3               | 4                 | 5                             |
| B5          | 20           | 30                | 40                   | 65              | 70                | 90                            |
| B6          | 28           | 36                | 50                   | 74              | 82                | 104                           |
| B7          | 110.5        | 132               | 181.6                | 214.5           | 249.5             | 313.6                         |
| B8          | 132.5        | 163               | 226.6                | 274.5           | 320.5             | 403.6                         |
| B9          | 168.5        | 209               | 291.6                | 366.5           | 426.5             | 542.6                         |
| <b>C</b> C1 | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 110 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215   | 200 · 215 · 265               |
| C2          | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10   | M8 · M10 · M12    | M12 · M16                     |
| C3          | 8 · 11       | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 24 · 28 · 32    | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55        |
| C4          | 27           | 33.5 · 42         | 53 · 58 · 67.5       | 67 · 77         | 67 · 84           | 117 · 119                     |
| C5          | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180   | 114.3 · 180 · 200 · 230 · 250 |
| C6          | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25      | M10 x P1.5        | M10 x P1.5                    |
| C7          | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 180 · 190   | 182 · 200 · 220 · 250 · 265   |
| C8          | 16           | 21.5              | 26.5 · 41            | 35.5 · 45.5     | 35.5              | 45.5 · 47.5                   |
| C9          | 61           | 77 · 85           | 115.3 · 129.8        | 141 · 151       | 165.7             | 235 · 237                     |
| C10         | 92           | 122 · 130         | 175.3 · 189.8        | 212 · 222       | 255.7             | 345 · 347                     |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62  | 90    | 120   | 142   | 180    | 220    |
|--|------------|------------|-------------|---|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 59  | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 20          | 51  | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 25          | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 30          | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 35          | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 40          | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 50          | 48  | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 60          | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 70          | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 80          | 43  | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 90          | 44  | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 100         | 43  | 141   | 294   | 549   | 1,059  | 1,779  |
|  |            |            | 120         | 45  | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 140         | 45  | 149   | 309   | 573   | 1,108  | 1,870  |
| 160  | 43         | 143        | 298         | 553   | 1,070 | 1,824 |       |        |        |
| 180  | 44         | 145        | 278         | 516   | 993   | 1,694 |       |        |        |
| 200  | 43         | 141        | 294         | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 200    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 200    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 200    | 3,000   | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 200    | 6,000   | 6,000 | 5,000 | 5,000 | 4,000  | 4,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 200    | -   | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 200    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 200    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 200    | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12   | ≤ 12   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 200    | 6   | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 200    | 1,180   | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 200    | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_{H1}$   | hr         | 15 ~ 200    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 200    | ≥ 92%   |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 200    | - 25° C ~ + 90° C   |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 200    | 全合成潤滑油脂 Synthetic Grease  |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 200    | IP65  |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 200    | 任意方向 Any  |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 200    | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74  | ≤ 76   | ≤ 78   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 200    | 1.8   | 5.8   | 12    | 22.8  | 43.9   | 78.5   |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

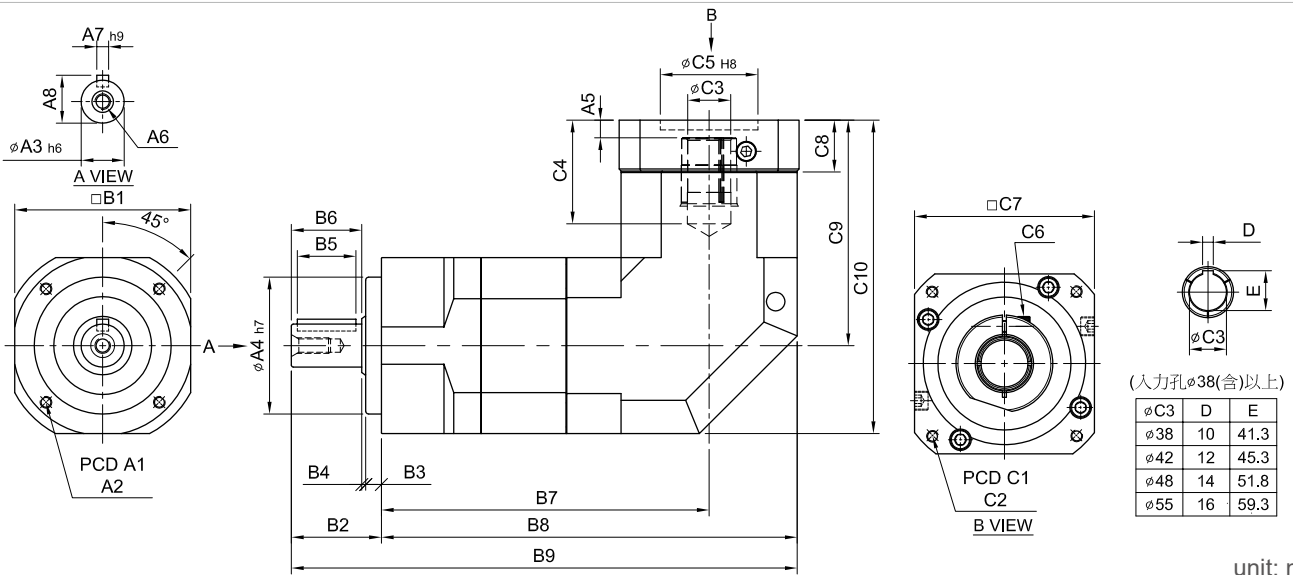
| Ratio | 62   | 90   | 120  | 142  | 180  | 220  |
|-------|------|------|------|------|------|------|
| 15    | 0.09 | 0.36 | 6.28 | 6.85 | 26.2 | 70.1 |
| 20    | 0.09 | 0.36 | 6.28 | 6.85 | 26.2 | 70.1 |
| 25    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 30    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 35    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 40    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 50    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 60    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 70    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 80    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 90    | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 100   | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 120   | 0.03 | 0.1  | 1.88 | 6.2  | 21.2 | 65.1 |
| 140   | 0.03 | 0.1  | 1.88 | 6.2  | 21.2 | 65.1 |
| 160   | 0.03 | 0.1  | 1.88 | 6.2  | 21.2 | 65.1 |
| 180   | 0.03 | 0.1  | 1.88 | 6.2  | 21.2 | 65.1 |
| 200   | 0.03 | 0.1  | 1.88 | 6.2  | 21.2 | 65.1 |

# SERVOBOX Planetary Reducers

## MODEL : SEL-A

雙段 2-Stage

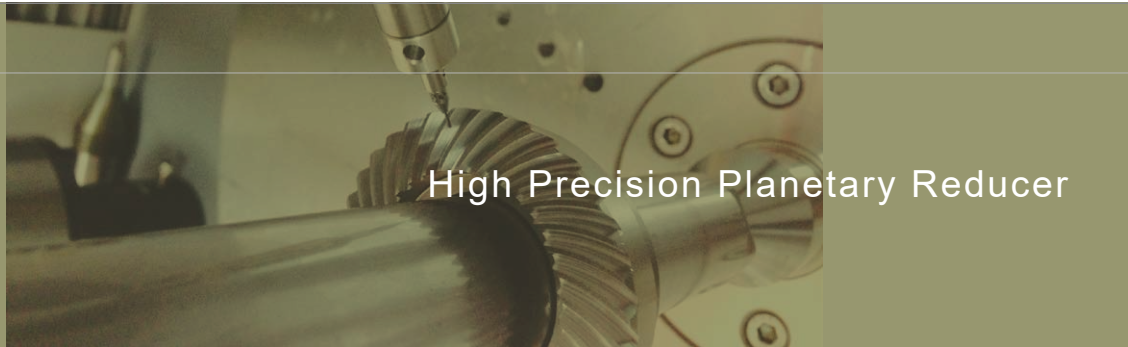
RATIO : 15, 20, 25, 30, 35, 40, 50, 60, 70,  
80, 90, 100, 120, 140, 160, 180, 200



unit: mm

| Model Code  | 44A          | 62A               | 90A                  | 120A            | 142A              | 180A                   | 220A              |
|-------------|--------------|-------------------|----------------------|-----------------|-------------------|------------------------|-------------------|
| <b>A</b> A1 | 44           | 62                | 82                   | 110             | 140               | 184                    | 218               |
| A2          | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25      | M10 x P1.5        | M12 x P1.75            | M16 x P2.0        |
| A3          | 13           | 16                | 22                   | 32              | 40                | 55                     | 75                |
| A4          | 35           | 50                | 70                   | 90              | 120               | 160                    | 180               |
| A5          | 6            | 6                 | 9 · 23.5             | 10 · 20         | 10                | 12.5 · 14.5            | 12.5 · 14.5       |
| A6          | M4 x P0.7    | M5 x P0.8         | M8 x P1.25           | M10 x P1.5      | M12 x P1.75       | M14 x P2.0             | M16 x P2.0        |
| A7          | 5            | 5                 | 6                    | 10              | 12                | 16                     | 20                |
| A8          | 15           | 18                | 24.5                 | 35              | 43                | 59                     | 79.5              |
| <b>B</b> B1 | 44           | 62                | 90                   | 120             | 142               | 180                    | 220               |
| B2          | 26           | 36                | 46                   | 65              | 92                | 106                    | 139               |
| B3          | 5            | 7                 | 8                    | 12              | 15                | 20                     | 30                |
| B4          | 1            | 1                 | 2                    | 3               | 3                 | 4                      | 5                 |
| B5          | 15           | 20                | 30                   | 40              | 65                | 70                     | 90                |
| B6          | 20           | 28                | 36                   | 50              | 74                | 82                     | 104               |
| B7          | 102          | 118.3             | 167.6                | 204             | 232               | 304.6                  | 324.6             |
| B8          | 124          | 149.3             | 212.6                | 264             | 303               | 394.6                  | 434.6             |
| B9          | 150          | 185.3             | 258.6                | 329             | 395               | 500.6                  | 573.6             |
| <b>C</b> C1 | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215   | 200 · 215 · 265        | 200 · 265 · 300   |
| C2          | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10   | M8 · M10 · M12    | M10 · M12 · M16        | M12 · M16         |
| C3          | 8 · 11       | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 24 · 28 · 32    | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 | 38 · 42 · 48 · 55 |
| C4          | 27           | 33.5 · 42         | 53 · 58 · 67.5       | 67 · 77         | 67 · 84           | 117 · 119              | 117 · 119         |
| C5          | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180   | 114.3 · 180 · 230      | 114.3 · 230 · 250 |
| C6          | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25      | M10 x P1.5        | M10 x P1.5             | M10 x P1.5        |
| C7          | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 150 · 190   | 182 · 200 · 250        | 220 · 250 · 265   |
| C8          | 16           | 21.5              | 26.5 · 41            | 35.5 · 45.5     | 35.5              | 45.5 · 47.5            | 45.5 · 47.5       |
| C9          | 61           | 77                | 115.3 · 129.8        | 141 · 151       | 165.7             | 235 · 237              | 235 · 237         |
| C10         | 83           | 108               | 160.3 · 174.8        | 201 · 211       | 236.7             | 325 · 327              | 345 · 347         |





## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 44A   | 62A   | 90A   | 120A  | 142A  | 180A   | 220A   |
|--|------------|------------|-------------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 19  | 59    | 165   | 335   | 625   | 1,206  | 2,030  |
|  |            |            | 20          | 16  | 51    | 146   | 300   | 555   | 1,069  | 1,804  |
|  |            |            | 25          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 30          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 35          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 40          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 50          | 16  | 48    | 160   | 333   | 618   | 1,189  | 2,010  |
|  |            |            | 60          | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 70          | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 80          | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
|  |            |            | 90          | 13  | 44    | 145   | 278   | 516   | 993    | 1,694  |
|  |            |            | 100         | 14  | 43    | 141   | 294   | 549   | 1,059  | 1,779  |
|  |            |            | 120         | 15  | 45    | 151   | 311   | 583   | 1,118  | 1,911  |
|  |            |            | 140         | 15  | 45    | 149   | 309   | 573   | 1,108  | 1,870  |
|  |            |            | 160         | 14  | 43    | 143   | 298   | 553   | 1,070  | 1,824  |
| 180  | 13         | 44         | 145         | 278   | 516   | 993   | 1,694 |       |        |        |
| 200  | 14         | 43         | 141         | 294   | 549   | 1,059 | 1,779 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 200    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 200    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 200    | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 3,000  | 2,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 200    | 6,000   | 6,000 | 6,000 | 5,000 | 5,000 | 4,000  | 3,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 200    | -   | -     | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 200    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 200    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 200    | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12   | ≤ 12   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 200    | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 200    | 380   | 1,180 | 3,200 | 6,800 | 9,300 | 15,600 | 51,000 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 200    | 190   | 590   | 1,600 | 3,400 | 4,650 | 7,800  | 25,500 |
| 使用壽命 Service Life  | $L_{tH}$   | hr         | 15 ~ 200    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 200    | ≥ 92%   |       |       |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 200    | -25° C ~ +90° C   |       |       |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 200    | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 200    | IP65  |       |       |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 200    | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 200    | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74  | ≤ 76   | ≤ 78   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 200    | 1   | 2.9   | 8     | 12    | 22.6  | 51.7   | 94.5   |

### ■ 轉動慣量 Mass Moments of Inertia (kg·cm<sup>2</sup>)

| Ratio | 44A  | 62A  | 90A  | 120A | 142A  | 180A | 220A |
|-------|------|------|------|------|-------|------|------|
| 15    | 0.09 | 0.36 | 2.28 | 6.85 | 23.45 | 55.2 | 80.2 |
| 20    | 0.09 | 0.36 | 2.28 | 6.85 | 23.45 | 55.2 | 80.2 |
| 25    | 0.09 | 0.36 | 2.28 | 6.85 | 23.45 | 50.4 | 76.5 |
| 30    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 35    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 40    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 50    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 60    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 70    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 80    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 90    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 100   | 0.09 | 0.36 | 2.28 | 6.85 | 23.5  | 50.4 | 76.5 |
| 120   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |
| 140   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |
| 160   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |
| 180   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |
| 200   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8  | 48.7 | 74.2 |



# SERVOBOX Planetary Reducers

## Characteristic of SD Series

### SD 系列產品特性

#### 靜音

使用斜齒輪實現順暢安靜地運轉。

#### Quiet operation

Helical gears contribute to reduce vibration and noise.

#### 高精度

背隙低於 3 弧分，定位精確。

#### High precision

Backlash  $\leq 3$  arc-min reaches precision alignment.

#### 高剛性、高扭矩

使用整體式滿針滾針軸承，及一體式內齒箱，大大提高了剛性和扭矩。

#### High rigidity & torque

High rigidity & high torque are achieved by integrant needle roller bearings and one-piece constructed.



## Indication of Model Numbers

### 機種型號表示

| SD               | 90   | 10  |   | P1                     | MOTOR                                  |
|------------------|--|---|---|------------------------|--|
| 減速機型<br>Type     | 型號<br>Model                                | 速比<br>Ratio   | 出力軸承形式<br>Output Bearing  | 背隙等級<br>Backlash Class | 馬達型號<br>Motor Type                     |
| SD<br>SDL<br>SDD | 47<br>64<br>90<br>110<br>140<br>200<br>255 | 單段 1-Stage<br>4, 5, 7, 10<br><br>雙段 2-Stage<br>20, 25, 35, 40,<br>50, 70, 100 | <input type="checkbox"/> 標準品・滾珠軸承<br>Standard<br>(Ball Bearing)<br>(47#~255#)<br><br>T: 滾錐軸承<br>Taper Bearing<br>(90#~255#) | Ps<br>P0<br>P1<br>P2   | 馬達製造商及型號<br>Motor Brand &<br>Model No. |



# Features of SD Series

## SD 系列產品特點

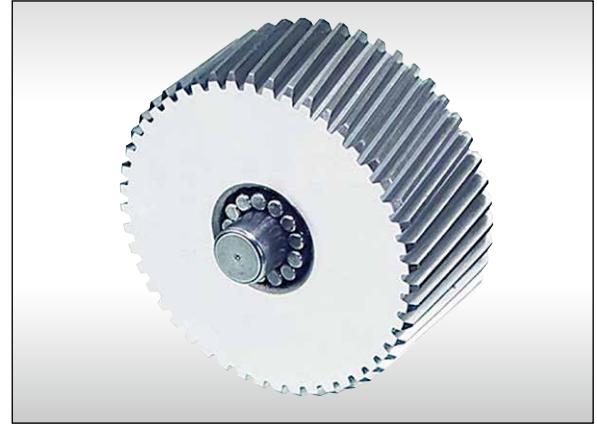


### 一體式齒輪箱本體

齒輪箱和內環齒輪採一體式的設計，經調質後加工，輸出扭矩大，齒輪精度達 DIN6 級，精密度高。

### One-piece Gearbox Housing

The gearbox and internal ring gear are one-piece constructed. High gear accuracy meets DIN6 class.



### 滿針滾針軸承設計

行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

### Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.



### 筒夾式連結機構

輸入端與馬達的連結採用筒夾式的鎖緊機構，並經動平衡分析，以確保在高輸入轉速下結合介面的同心度和平衡度，及零背隙的動力傳遞。

### Collet Locking Mechanism

The input-end and the motor are coupled through a collet locking mechanism. It has passed dynamical balance analysis to assure concentricity and balance on the connection and no backlash for power transmission while running at high speed.



### 一體式的行星臂架及雙懸臂設計

行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。並使用一次加工完成，控制精度在公差之內。

### Integrated Planetary Arm Bracket

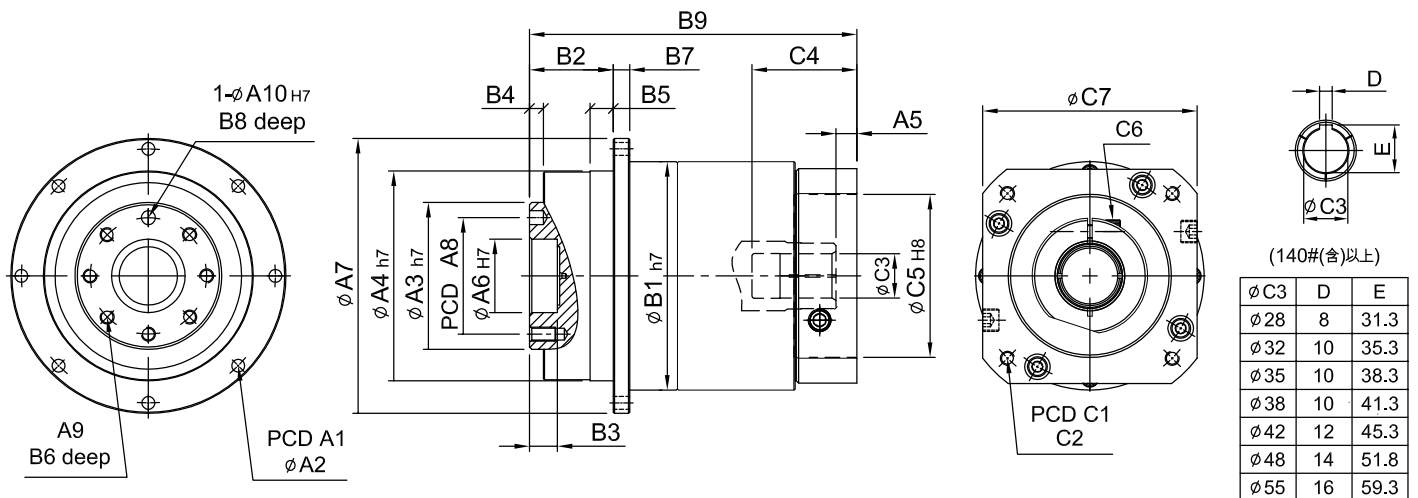
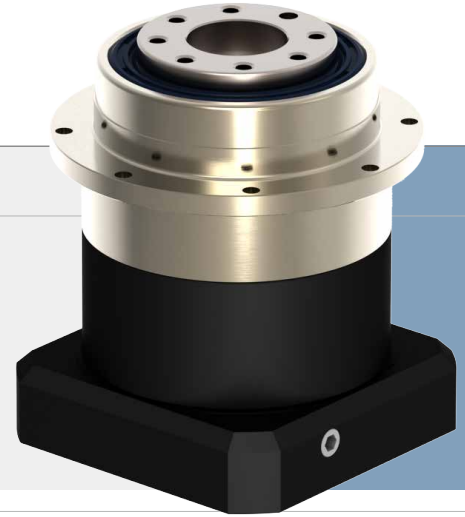
The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy. The entire structure is one-time machined for controlling accuracy in the specified tolerance.

# SERVOBOX Planetary Reducers

## MODEL : SD

單段 1-Stage

RATIO : 4, 5, 7, 10



unit: mm

| Model Code | 47            | 64            | 90             | 110            | 140             | 200             | 255             |
|------------|---------------|---------------|----------------|----------------|-----------------|-----------------|-----------------|
| A1         | 67            | 79            | 109            | 135            | 168             | 233             | 280             |
| A2         | 8-3.4         | 8-4.5         | 8-5.5          | 8-5.5          | 12-6.6          | 12-9.0          | 16-13.5         |
| A3         | 28            | 40            | 63             | 80             | 100             | 160             | 180             |
| A4         | 47            | 64            | 90             | 110            | 140             | 200             | 255             |
| A5         | 5             | 6             | 9-23.5         | 10-20          | 10              | 11.5-13.5       | 10.5-12.5       |
| A6         | 12            | 20            | 31.5           | 40             | 50              | 80              | 100             |
| A7         | 72            | 86            | 118            | 146            | 179             | 248             | 300             |
| A8         | 20            | 31.5          | 50             | 63             | 80              | 125             | 140             |
| A9         | 4 - M3 x P0.5 | 7 - M5 x P0.8 | 7 - M6 x P1.0  | 11 - M6 x P1.0 | 11 - M8 x P1.25 | 11 - M10 x P1.5 | 12 - M16 x P2.0 |
| A10        | 3             | 5             | 6              | 6              | 8               | 10              | 12              |
| B1         | 59            | 70            | 98             | 125            | 156             | 212             | 255             |
| B2         | 19.5          | 19.5          | 30             | 29             | 38              | 50              | 66              |
| B3         | 5             | 7             | 12             | 12             | 12              | 16              | 20              |
| B4         | 3             | 4             | 6              | 6              | 6               | 8               | 12              |
| B5         | 5             | 6             | 10             | 10             | 15              | 15              | 20              |
| B6         | 6.5           | 8             | 12             | 12             | 16              | 22              | 32              |
| B7         | 4             | 5             | 7              | 8              | 10              | 12              | 18              |
| B8         | 4             | 6             | 6              | 7              | 7               | 10              | 10              |
| B9         | 74.7          | 84.5-92.5     | 133-147.5      | 153-173        | 186.5           | 250.5-252.5     | 263-265         |
| C1         | 46-60-63      | 70-75-90      | 90-100-115-145 | 115-145-165    | 145-165-215     | 200-215-265     | 200-265-300     |
| C2         | M3-M4-M5      | M4-M5-M6      | M5-M6-M8       | M6-M8-M10      | M8-M10-M12      | M10-M12-M16     | M12-M16         |
| C3         | 8-11          | 11-14-16-19   | 16-19-22-24    | 24-28-32-35    | 28-32-35-38     | 35-38-42-48-55  | 38-42-48-55     |
| C4         | 32            | 34-41.5       | 58.5-73        | 67-82          | 84.5            | 114.5-116.5     | 115.5-117.5     |
| C5         | 30-40-50      | 50-60-70      | 70-80-95-110   | 95-110-130     | 110-130-180     | 114.3-180-230   | 114.3-230-250   |
| C6         | M4 x P0.7     | M5 x P0.8     | M6 x P1.0      | M8 x P1.25     | M10 x P1.5      | M10 x P1.5      | M10 x P1.5      |
| C7         | 46-55         | 64-70-80      | 92-110-130     | 122-130-150    | 146-150-190     | 182-200-250     | 222-250-265     |



# High Precision Planetary Reducer

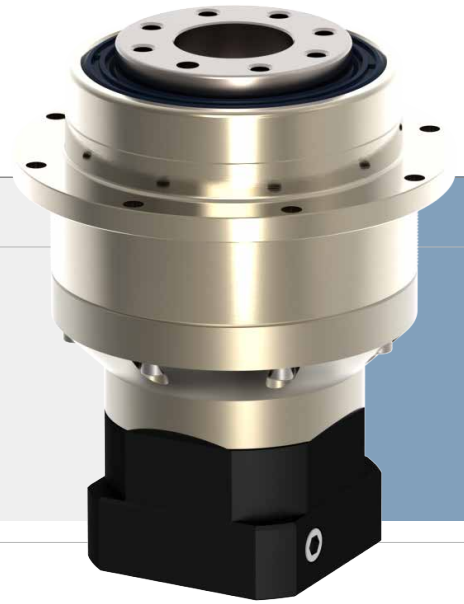
| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 47  | 64    | 90     | 110    | 140    | 200    | 255     |
|--|------------|------------|-------------|---|-------|--------|--------|--------|--------|---------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 4           | 22  | 60    | 160    | 335    | 650    | 1,200  | 2,020   |
|  |            |            | 5           | 20  | 50    | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 7           | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 10          | 16  | 43    | 136    | 294    | 549    | 1,059  | 1,779   |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 4 ~ 10      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |        |        |        |        |         |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 4 ~ 10      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |        |        |        |        |         |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 4 ~ 10      | 3,000   | 3,000 | 3,000  | 3,000  | 3,000  | 3,000  | 2,000   |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 4 ~ 10      | 6,000   | 6,000 | 6,000  | 6,000  | 5,000  | 4,000  | 3,000   |
| 背隙 Backlash Ps   |            | arcmin     | 4 ~ 10      | -   | -     | ≤ 1    | ≤ 1    | ≤ 1    | ≤ 1    | ≤ 1     |
| 背隙 Backlash P0   |            | arcmin     | 4 ~ 10      | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    | ≤ 3    | ≤ 3    | ≤ 3     |
| 背隙 Backlash P1   |            | arcmin     | 4 ~ 10      | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    | ≤ 5    | ≤ 5    | ≤ 5     |
| 背隙 Backlash P2   |            | arcmin     | 4 ~ 10      | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7     |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 4 ~ 10      | 6   | 14    | 30     | 86     | 155    | 450    | 1126    |
| 容許徑向力 Max. Radial Force<br>滾珠軸承 Ball Bearing             | $F_{2rB}$  | N          | 4 ~ 10      | 2,040   | 2,520 | 8,460  | 12,720 | 14,070 | 35,200 | 39,600  |
| 容許軸向力 Max. Axial Force<br>滾珠軸承 Ball Bearing              | $F_{2aB}$  | N          | 4 ~ 10      | 1,020   | 1,260 | 4,230  | 6,360  | 7,035  | 17,600 | 19,800  |
| 容許徑向力 Max. Radial Force<br>滾錐軸承 Taper Bearing            | $F_{2rB}$  | N          | 4 ~ 10      | -   | -     | 14,660 | 23,000 | 37,200 | 73,600 | 107,200 |
| 容許軸向力 Max. Axial Force<br>滾錐軸承 Taper Bearing             | $F_{2aB}$  | N          | 4 ~ 10      | -   | -     | 7,330  | 11,500 | 18,600 | 36,800 | 53,600  |
| 最大傾斜力矩 Max. Tilting Moment<br>滾珠軸承 Ball Bearing ※        | $M_{2K}$   | Nm         | 4 ~ 10      | 31  | 98    | 185    | 320    | 940    | 2,200  | 4,300   |
| 最大傾斜力矩 Max. Tilting Moment<br>滾錐軸承 Taper Bearing ※       | $M_{2K}$   | Nm         | 4 ~ 10      | -   | -     | 280    | 480    | 1,400  | 3,300  | 6,480   |
| 使用壽命 Service Life  | $L_H$      | hr         | 4 ~ 10      | S5 周期運轉: >30,000 (S1 連續運轉: >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |        |        |        |        |         |
| 效率 Efficiency  | $\eta$     | %          | 4 ~ 10      | ≥ 97%   |       |        |        |        |        |         |
| 使用溫度 Operating Temperature                               |            | °C         | 4 ~ 10      | - 25° C ~ + 90° C   |       |        |        |        |        |         |
| 潤滑 Lubrication   |            |            | 4 ~ 10      | 全合成潤滑油脂 Synthetic Grease  |       |        |        |        |        |         |
| 防護等級 Protection Class                                    |            |            | 4 ~ 10      | IP65  |       |        |        |        |        |         |
| 安裝方向 Mounting Position                                   |            |            | 4 ~ 10      | 任意方向 Any  |       |        |        |        |        |         |
| 噪音值 Noise Level  |            | dB         | 4 ~ 10      | ≤ 56  | ≤ 58  | ≤ 60   | ≤ 63   | ≤ 65   | ≤ 67   | ≤ 70    |
| 重量 Weight ±3%  |            | Kg         | 4 ~ 10      | 0.7   | 1.4   | 4.2    | 7.4    | 13.9   | 32.4   | 55      |

※Applied to the output shaft center at 100 rpm.

## ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 47   | 64   | 90   | 110  | 140  | 200   | 255   |
|-------|------|------|------|------|------|-------|-------|
| 4     | 0.03 | 0.13 | 0.47 | 2.75 | 7.46 | 24.00 | 55    |
| 5     | 0.03 | 0.12 | 0.45 | 2.70 | 7.41 | 23.23 | 53.19 |
| 7     | 0.03 | 0.12 | 0.45 | 2.64 | 7.12 | 22.11 | 50.78 |
| 10    | 0.03 | 0.12 | 0.43 | 2.56 | 7.01 | 22.21 | 50.50 |

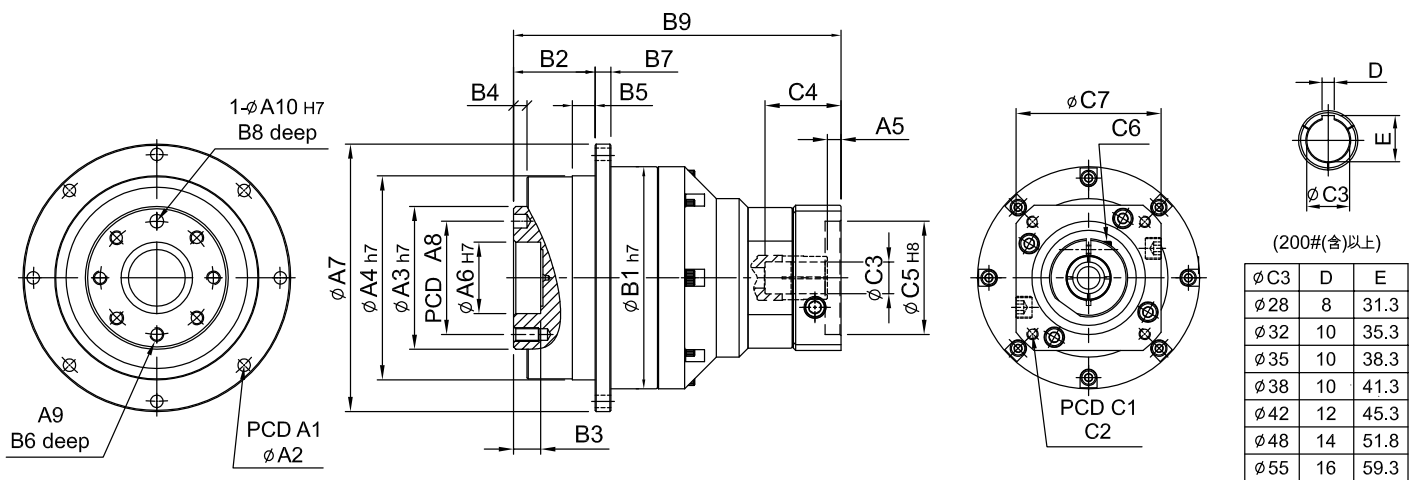
# SERVOBOX Planetary Reducers



## MODEL : SD

雙段 2-Stage

RATIO : 20, 25, 35, 40, 50, 70, 100



(200#(含)以上)

| Model Code | 47   | 64   | 90   | 110  | 140  | 200  | 255  |
|------------|------|------|------|------|------|------|------|
| ∅ C3       | 8    | 10   | 10   | 12   | 14   | 16   | 16   |
| D          | 31.3 | 35.3 | 38.3 | 41.3 | 45.3 | 51.8 | 59.3 |
| E          | 31.3 | 35.3 | 38.3 | 41.3 | 45.3 | 51.8 | 59.3 |

unit: mm

| Model Code | 47            | 64            | 90            | 110            | 140               | 200             | 255             |
|------------|---------------|---------------|---------------|----------------|-------------------|-----------------|-----------------|
| A1         | 67            | 79            | 109           | 135            | 168               | 233             | 280             |
| A2         | 8-3.4         | 8-4.5         | 8-5.5         | 8-5.5          | 12-6.6            | 12-9.0          | 16-13.5         |
| A3         | 28            | 40            | 63            | 80             | 100               | 160             | 180             |
| A4         | 47            | 64            | 90            | 110            | 140               | 200             | 255             |
| A5         | 5             | 5             | 6             | 9-23           | 10-20             | 10              | 11.5-13.5       |
| A6         | 12            | 20            | 31.5          | 40             | 50                | 80              | 100             |
| A7         | 72            | 86            | 118           | 146            | 179               | 248             | 300             |
| A8         | 20            | 31.5          | 50            | 63             | 80                | 125             | 140             |
| A9         | 4 - M3 x P0.5 | 7 - M5 x P0.8 | 7 - M6 x P1.0 | 11 - M6 x P1.0 | 11 - M8 x P1.25   | 11 - M10 x P1.5 | 12 - M16 x P2.0 |
| A10        | 3             | 5             | 6             | 6              | 8                 | 10              | 12              |
| B1         | 59            | 70            | 98            | 125            | 156               | 212             | 255             |
| B2         | 19.5          | 19.5          | 30            | 29             | 38                | 50              | 66              |
| B3         | 5             | 7             | 12            | 12             | 12                | 16              | 20              |
| B4         | 3             | 4             | 6             | 6              | 6                 | 8               | 12              |
| B5         | 5             | 6             | 10            | 10             | 15                | 15              | 20              |
| B6         | 6.5           | 8             | 12            | 12             | 16                | 22              | 32              |
| B7         | 4             | 5             | 7             | 8              | 10                | 12              | 16              |
| B8         | 4             | 6             | 6             | 7              | 7                 | 10              | 10              |
| B9         | 100.7         | 109           | 144.5-152.5   | 189-203.5      | 224.5-234.5-244.5 | 290.5           | 349-351         |
| C1         | 46-60-63      | 46-60-63      | 70-75-90      | 90-100-115-145 | 115-145-165       | 145-165-215     | 200-215-265     |
| C2         | M3-M4-M5      | M3-M4-M5      | M4-M5-M6      | M5-M6-M8       | M6-M8-M10         | M8-M10-M12      | M10-M12-M16     |
| C3         | 8-11          | 8-11          | 11-14-16-19   | 16-19-22-24    | 22-24-28-32-35    | 28-32-35-38     | 35-38-42-48-55  |
| C4         | 26            | 26-30.5       | 33.5-41.5     | 59-73.5        | 67-77-82          | 84.5            | 114.5-116.5     |
| C5         | 30-40-50      | 30-40-50      | 50-60-70      | 70-80-95-110   | 95-110-130        | 110-130-180     | 114.3-180-230   |
| C6         | M4 x P0.7     | M4 x P0.7     | M5 x P1.8     | M6 x P1.0      | M8 x P1.25        | M10 x P1.5      | M10 x P1.5      |
| C7         | 46-55         | 46-55         | 64-70-80      | 92-110-130     | 122-130-150       | 146-150-190     | 182-200-250     |

# High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 47  | 64    | 90     | 110    | 140    | 200    | 255     |
|--|------------|------------|-------------|---|-------|--------|--------|--------|--------|---------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 20          | 22  | 60    | 160    | 335    | 650    | 1,200  | 2,020   |
|  |            |            | 25          | 20  | 50    | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 35          | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 40          | 22  | 60    | 160    | 335    | 650    | 1,200  | 2,020   |
|  |            |            | 50          | 20  | 50    | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 70          | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 100         | 16  | 43    | 136    | 294    | 549    | 1,059  | 1,779   |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 20 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |        |        |        |        |         |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 20 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |        |        |        |        |         |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 20 ~ 100    | 3,000   | 3,000 | 3,000  | 3,000  | 3,000  | 3,000  | 2,000   |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 20 ~ 100    | 6,000   | 6,000 | 6,000  | 6,000  | 5,000  | 4,000  | 3,000   |
| 背隙 Backlash Ps   |            | arcmin     | 20 ~ 100    | -   | -     | -      | ≤ 3    | ≤ 3    | ≤ 3    | ≤ 3     |
| 背隙 Backlash P0   |            | arcmin     | 20 ~ 100    | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    | ≤ 5    | ≤ 5    | ≤ 5     |
| 背隙 Backlash P1   |            | arcmin     | 20 ~ 100    | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7     |
| 背隙 Backlash P2   |            | arcmin     | 20 ~ 100    | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    | ≤ 9    | ≤ 9    | ≤ 9     |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 20 ~ 100    | 6   | 14    | 30     | 86     | 155    | 450    | 1,126   |
| 容許徑向力 Max. Radial Force<br>滾珠軸承 Ball Bearing             | $F_{2rB}$  | N          | 4 ~ 10      | 2,040   | 2,520 | 8,460  | 12,720 | 14,070 | 35,200 | 39,600  |
| 容許軸向力 Max. Axial Force<br>滾珠軸承 Ball Bearing              | $F_{2aB}$  | N          | 4 ~ 10      | 1,020   | 1,260 | 4,230  | 6,360  | 7,035  | 17,600 | 19,800  |
| 容許徑向力 Max. Radial Force<br>滾錐軸承 Taper Bearing            | $F_{2rB}$  | N          | 4 ~ 10      | -   | -     | 14,660 | 23,000 | 37,200 | 73,600 | 107,200 |
| 容許軸向力 Max. Axial Force<br>滾錐軸承 Taper Bearing             | $F_{2aB}$  | N          | 4 ~ 10      | -   | -     | 7,330  | 11,500 | 18,600 | 36,800 | 53,600  |
| 最大傾斜力矩 Max. Tilting Moment<br>滾珠軸承 Ball Bearing ※        | $M_{2K}$   | Nm         | 4 ~ 10      | 31  | 98    | 185    | 320    | 940    | 2,200  | 4,300   |
| 最大傾斜力矩 Max. Tilting Moment<br>滾錐軸承 Taper Bearing ※       | $M_{2K}$   | Nm         | 4 ~ 10      | -   | -     | 280    | 480    | 1,400  | 3,300  | 6,480   |
| 使用壽命 Service Life  | $L_H$      | hr         | 20 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |        |        |        |        |         |
| 效率 Efficiency  | $\eta$     | %          | 20 ~ 100    | ≥ 94%   |       |        |        |        |        |         |
| 使用溫度 Operating Temperature                               |            | °C         | 20 ~ 100    | - 25° C ~ + 90° C   |       |        |        |        |        |         |
| 潤滑 Lubrication   |            |            | 20 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |       |        |        |        |        |         |
| 防護等級 Protection Class                                    |            |            | 20 ~ 100    | IP65  |       |        |        |        |        |         |
| 安裝方向 Mounting Position                                   |            |            | 20 ~ 100    | 任意方向 Any  |       |        |        |        |        |         |
| 噪音值 Noise Level  |            | dB         | 20 ~ 100    | ≤ 56  | ≤ 58  | ≤ 60   | ≤ 63   | ≤ 65   | ≤ 67   | ≤ 70    |
| 重量 Weight ±3%  |            | Kg         | 20 ~ 100    | 1   | 1.9   | 4.8    | 9.4    | 16.7   | 40.12  | 64      |

※Applied to the output shaft center at 100 rpm.

## ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

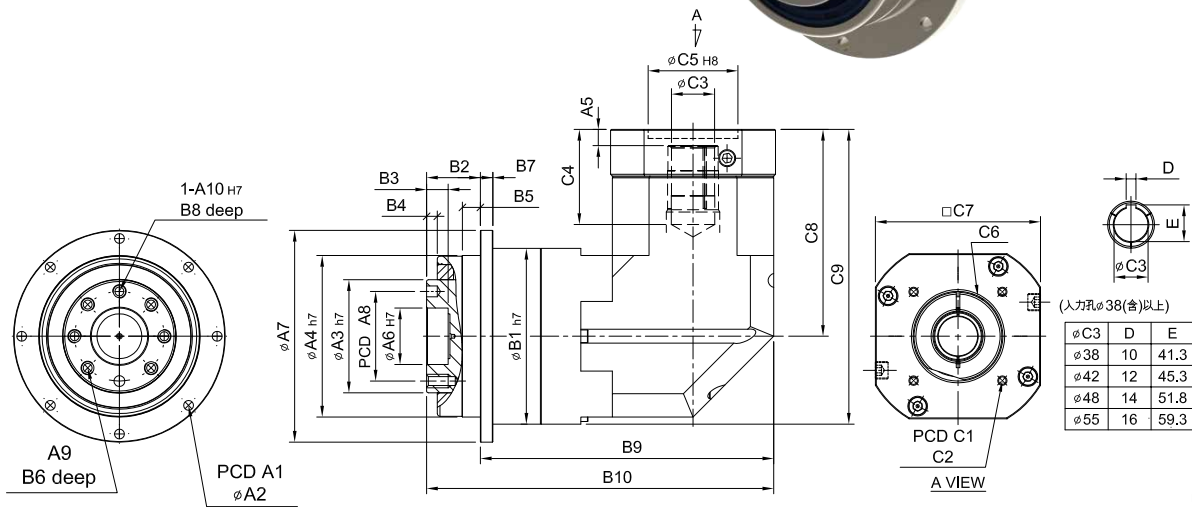
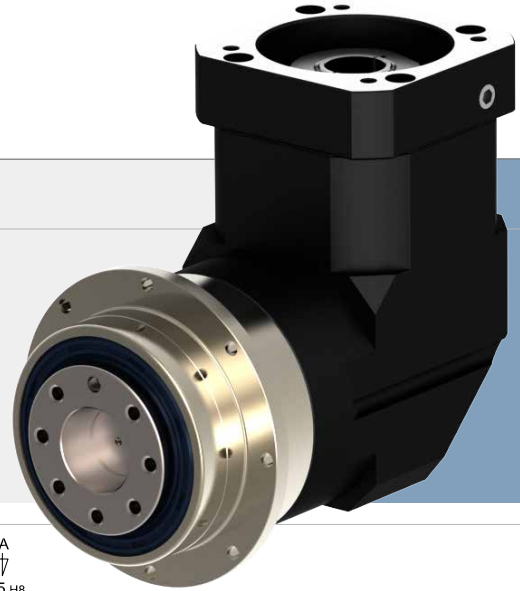
| Ratio | 47   | 64   | 90   | 110  | 140 | 200  | 255   |
|-------|------|------|------|------|-----|------|-------|
| 20    | 0.03 | 0.03 | 0.15 | 0.45 | 2.7 | 7.22 | 23.22 |
| 25    | 0.03 | 0.03 | 0.15 | 0.45 | 2.7 | 7.22 | 23.22 |
| 35    | 0.03 | 0.03 | 0.15 | 0.45 | 2.7 | 7.22 | 23.22 |
| 40    | 0.03 | 0.03 | 0.15 | 0.45 | 2.7 | 7.22 | 23.22 |
| 50    | 0.03 | 0.03 | 0.14 | 0.4  | 2.6 | 7.05 | 23.07 |
| 70    | 0.03 | 0.03 | 0.14 | 0.4  | 2.6 | 7.05 | 23.07 |
| 100   | 0.03 | 0.03 | 0.14 | 0.4  | 2.6 | 7.01 | 22.67 |

# SERVOBOX Planetary Reducers

## MODEL : SDL

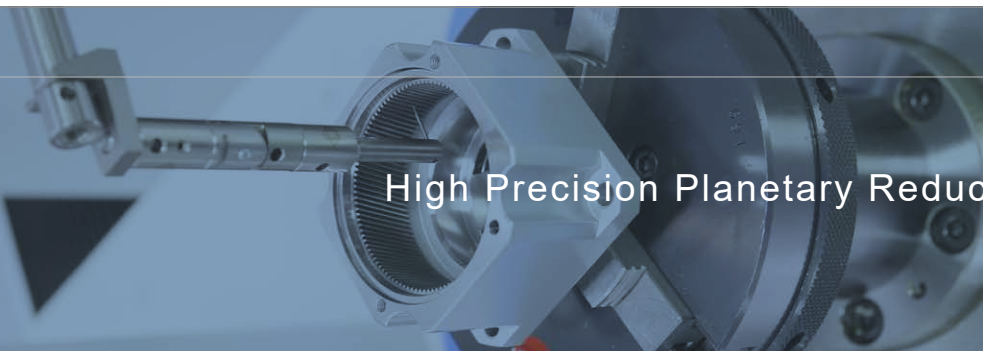
單段 1-Stage

RATIO : 4, 5, 7, 10, 14, 20



| Model Code | 47            | 64            | 90                   | 110             | 140             | 200                    | 255               |
|------------|---------------|---------------|----------------------|-----------------|-----------------|------------------------|-------------------|
| A1         | 67            | 79            | 109                  | 135             | 168             | 233                    | 280               |
| A2         | 8-3.4         | 8-4.5         | 8-5.5                | 8-5.5           | 12-6.6          | 12-9.0                 | 16-13.5           |
| A3         | 28            | 40            | 63                   | 80              | 100             | 160                    | 180               |
| A4         | 47            | 64            | 90                   | 110             | 140             | 200                    | 255               |
| A5         | 6             | 6             | 9 · 23.5             | 10 · 20         | 10              | 12.5 · 14.5            | 12.5 · 14.5       |
| A6         | 12            | 20            | 31.5                 | 40              | 50              | 80                     | 100               |
| A7         | 72            | 86            | 118                  | 146             | 179             | 248                    | 300               |
| A8         | 20            | 31.5          | 50                   | 63              | 80              | 125                    | 140               |
| A9         | 4 - M3 x P0.5 | 7 - M5 x P0.8 | 7 - M6 x P1.0        | 11 - M6 x P1.0  | 11 - M8 x P1.25 | 11 - M10 x P1.5        | 12 - M16 x P2.0   |
| A10        | 3             | 5             | 6                    | 6               | 8               | 10                     | 12                |
| B1         | 59            | 70            | 98                   | 125             | 156             | 212                    | 255               |
| B2         | 19.5          | 19.5          | 30                   | 29              | 38              | 50                     | 66                |
| B3         | 5             | 7             | 12                   | 12              | 12              | 16                     | 20                |
| B4         | 3             | 4             | 6                    | 6               | 6               | 8                      | 12                |
| B5         | 5             | 6             | 10                   | 10              | 15              | 15                     | 20                |
| B6         | 6.5           | 8             | 12                   | 12              | 16              | 22                     | 32                |
| B7         | 4             | 5             | 7                    | 8               | 10              | 12                     | 18                |
| B8         | 4             | 6             | 6                    | 7               | 7               | 10                     | 10                |
| B9         | 84.2          | 105.5         | 163.6                | 203             | 227.5           | 313                    | 332.5             |
| B10        | 103.7         | 125           | 193.6                | 232             | 265.5           | 363                    | 398.5             |
| C1         | 46 · 60 · 63  | 70 · 75 · 90  | 90 · 110 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215 | 200 · 215 · 265        | 200 · 265 · 300   |
| C2         | M3 · M4 · M5  | M4 · M5 · M6  | M5 · M6 · M8         | M6 · M8 · M10   | M8 · M10 · M12  | M10 · M12 · M16        | M12 · M16         |
| C3         | 8 · 9 · 11    | 11 · 14 · 19  | 16 · 19 · 22 · 24    | 24 · 28 · 32    | 32 · 35 · 38    | 35 · 38 · 42 · 48 · 55 | 38 · 42 · 48 · 55 |
| C4         | 27            | 33.5 · 42     | 53 · 67.5            | 67 · 77         | 85              | 132 · 134              | 132 · 134         |
| C5         | 30 · 40 · 50  | 50 · 60 · 70  | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180 | 114.3 · 180 · 230      | 220 · 250 · 265   |
| C6         | M4 x P0.7     | M5 x P0.8     | M6 x P1.0            | M8 x P1.25      | M10 x P1.5      | M10 x P1.5             | M10 x P1.5        |
| C7         | 46 · 55       | 64 · 70 · 80  | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 150 · 190 | 182 · 200 · 250        | 222 · 250 · 265   |
| C8         | 61            | 77 · 85       | 115.3 · 129.8        | 141 · 151       | 165.7           | 235 · 237              | 235 · 273         |
| C9         | 90.5          | 112 · 120     | 164.3 · 178.8        | 203.5 · 213.5   | 243.7           | 341 · 343              | 362 · 364         |





## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 47  | 64    | 90     | 110    | 140    | 200    | 255     |
|--|------------|------------|-------------|---|-------|--------|--------|--------|--------|---------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 4           | 22  | 60    | 160    | 335    | 650    | 1,200  | 2,020   |
|  |            |            | 5           | 20  | 50    | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 7           | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 10          | 20  | 50    | 136    | 294    | 549    | 1,059  | 1,779   |
|  |            |            | 14          | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 20          | 16  | 43    | 136    | 294    | 549    | 1,059  | 1,779   |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 4 ~ 20      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |        |        |        |        |         |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 4 ~ 20      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |        |        |        |        |         |
| 額定輸入轉速 Rated Input Speed                                 | $n_{IN}$   | rpm        | 4 ~ 20      | 3,000   | 3,000 | 3,000  | 3,000  | 3,000  | 3,000  | 2,000   |
| 最大輸入轉速 Max. Input Speed                                  | $n_{IB}$   | rpm        | 4 ~ 20      | 6,000   | 6,000 | 6,000  | 6,000  | 5,000  | 4,000  | 3,000   |
| 背隙 Backlash P <sub>s</sub>                               |            | arcmin     | 4 ~ 20      | -   | -     | ≤ 2    | ≤ 2    | ≤ 2    | ≤ 2    | ≤ 2     |
| 背隙 Backlash P <sub>0</sub>                               |            | arcmin     | 4 ~ 20      | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    | ≤ 4    | ≤ 4    | ≤ 4     |
| 背隙 Backlash P <sub>1</sub>                               |            | arcmin     | 4 ~ 20      | ≤ 6   | ≤ 6   | ≤ 6    | ≤ 6    | ≤ 6    | ≤ 6    | ≤ 6     |
| 背隙 Backlash P <sub>2</sub>                               |            | arcmin     | 4 ~ 20      | ≤ 8   | ≤ 8   | ≤ 8    | ≤ 8    | ≤ 8    | ≤ 8    | ≤ 8     |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 4 ~ 20      | 6   | 14    | 30     | 86     | 155    | 450    | 1,126   |
| 容許徑向力 Max. Radial Force<br>滾珠軸承 Ball Bearing             | $F_{2rB}$  | N          | 4 ~ 10      | 2,040   | 2,520 | 8,460  | 12,720 | 14,070 | 35,200 | 39,600  |
| 容許軸向力 Max. Axial Force<br>滾珠軸承 Ball Bearing              | $F_{2aB}$  | N          | 4 ~ 10      | 1,020   | 1,260 | 4,230  | 6,360  | 7,035  | 17,600 | 19,800  |
| 容許徑向力 Max. Radial Force<br>滾錐軸承 Taper Bearing            | $F_{2rB}$  | N          | 4 ~ 10      | -   | -     | 14,660 | 23,000 | 37,200 | 73,600 | 107,200 |
| 容許軸向力 Max. Axial Force<br>滾錐軸承 Taper Bearing             | $F_{2aB}$  | N          | 4 ~ 10      | -   | -     | 7,330  | 11,500 | 18,600 | 36,800 | 53,600  |
| 最大傾斜力矩 Max. Tilting Moment<br>滾珠軸承 Ball Bearing ※        | $M_{2K}$   | Nm         | 4 ~ 10      | 31  | 98    | 185    | 320    | 940    | 2,200  | 4,300   |
| 最大傾斜力矩 Max. Tilting Moment<br>滾錐軸承 Taper Bearing ※       | $M_{2K}$   | Nm         | 4 ~ 10      | -   | -     | 280    | 480    | 1,400  | 3,300  | 6,480   |
| 使用壽命 Service Life  | $L_H$      | hr         | 4 ~ 20      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |        |        |        |        |         |
| 效率 Efficiency  | $\eta$     | %          | 4 ~ 20      | ≥ 95%   |       |        |        |        |        |         |
| 使用溫度 Operating Temperature                               |            | °C         | 4 ~ 20      | - 25° C ~ + 90° C   |       |        |        |        |        |         |
| 潤滑 Lubrication   |            |            | 4 ~ 20      | 全合成潤滑油脂 Synthetic Grease  |       |        |        |        |        |         |
| 防護等級 Protection Class                                    |            |            | 4 ~ 20      | IP65  |       |        |        |        |        |         |
| 安裝方向 Mounting Position                                   |            |            | 4 ~ 20      | 任意方向 Any  |       |        |        |        |        |         |
| 噪音值 Noise Level  |            | dB         | 4 ~ 20      | ≤ 65  | ≤ 68  | ≤ 70   | ≤ 72   | ≤ 74   | ≤ 76   | ≤ 78    |
| 重量 Weight ±3%  |            | Kg         | 4 ~ 20      | 1.1   | 2.3   | 6.9    | 13.4   | 23     | 80     | 90      |

※Applied to the output shaft center at 100 rpm.

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

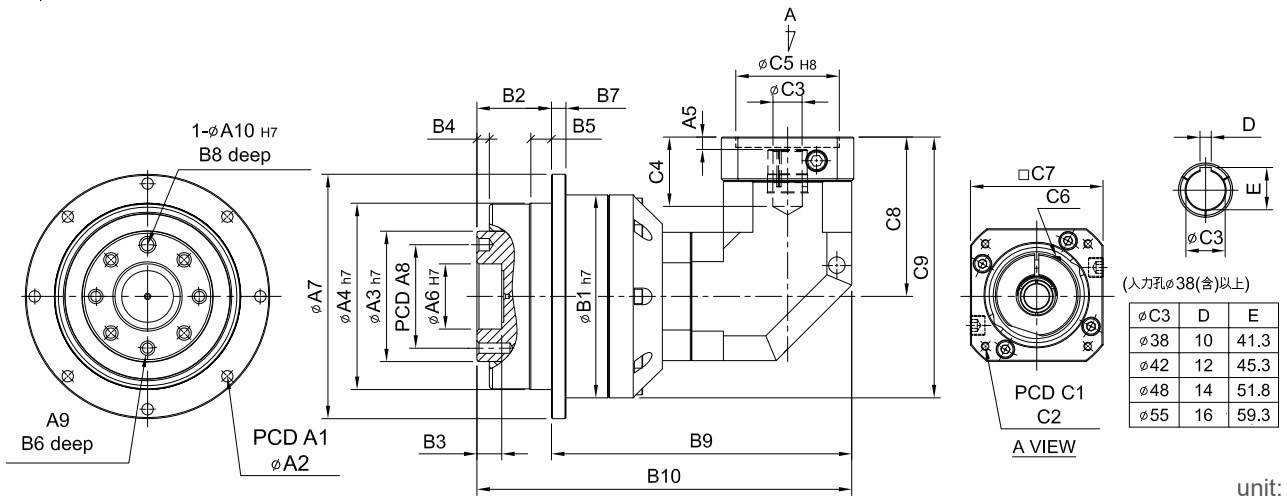
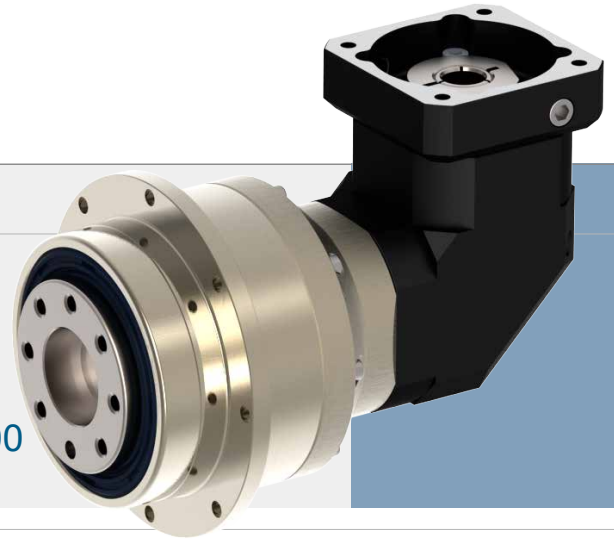
| Ratio | 47   | 64   | 90   | 110  | 140  | 200  | 255   |
|-------|------|------|------|------|------|------|-------|
| 4     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.1 | 134.8 |
| 5     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.1 | 134.8 |
| 7     | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.1 | 134.8 |
| 10    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.1 | 134.8 |
| 14    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 66.5 | 120.2 |
| 20    | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 66.3 | 118.8 |

# SERVOBOX Planetary Reducers

## MODEL : SDL

雙段 2-Stage

RATIO : 20, 25, 35, 40, 50, 70, 100, 140, 200



unit: mm

| Model Code  | 47            | 64            | 90            | 110            | 140             | 200             | 255             |
|-------------|---------------|---------------|---------------|----------------|-----------------|-----------------|-----------------|
| <b>A</b> A1 | 67            | 79            | 109           | 135            | 168             | 233             | 280             |
| A2          | 8-3.4         | 8-4.5         | 8-5.5         | 8-5.5          | 12-6.6          | 12-9.0          | 16-13.5         |
| A3          | 28            | 40            | 63            | 80             | 100             | 160             | 180             |
| A4          | 47            | 64            | 90            | 110            | 140             | 200             | 255             |
| A5          | 6             | 6             | 9·23          | 9·23.5         | 10              | 12.5            | 12.5·14.5       |
| A6          | 12            | 20            | 31.5          | 40             | 50              | 80              | 100             |
| A7          | 72            | 86            | 118           | 146            | 179             | 248             | 300             |
| A8          | 20            | 31.5          | 50            | 63             | 80              | 125             | 140             |
| A9          | 4 - M3 x P0.5 | 7 - M5 x P0.8 | 7 - M6 x P1.0 | 11 - M6 x P1.0 | 11 - M8 x P1.25 | 11 - M10 x P1.5 | 12 - M16 x P2.0 |
| A10         | 3             | 5             | 6             | 6              | 8               | 10              | 12              |
| <b>B</b> B1 | 59            | 70            | 98            | 125            | 156             | 212             | 255             |
| B2          | 19.5          | 19.5          | 30            | 29             | 38              | 50              | 66              |
| B3          | 5             | 7             | 12            | 12             | 12              | 16              | 20              |
| B4          | 3             | 4             | 6             | 6              | 6               | 8               | 12              |
| B5          | 5             | 6             | 10            | 10             | 15              | 15              | 20              |
| B6          | 6.5           | 8             | 12            | 12             | 16              | 22              | 32              |
| B7          | 4             | 5             | 7             | 8              | 10              | 12              | 16              |
| B8          | 4             | 6             | 6             | 7              | 7               | 10              | 10              |
| B9          | 110.2         | 118.5         | 151           | 210.6          | 254.5           | 308.5           | 379.1           |
| B10         | 129.7         | 138           | 181           | 239.6          | 292.5           | 358.5           | 445.1           |
| <b>C</b> C1 | 46·60·63      | 46·60·63      | 70·75·90      | 90·110·115·145 | 115·145·165     | 145·165·215     | 200·215·265     |
| C2          | M3·M4·M5      | M3·M4·M5      | M4·M5·M6      | M5·M6·M8·M10   | M6·M8·M10       | M8·M10·M12      | M10·M12·M16     |
| C3          | 8·9·11        | 8·9·11        | 14·16·19      | 16·19·22·24    | 24·28·32        | 35·38           | 35·38·42·48·55  |
| C4          | 27            | 27            | 33.5·42       | 53·67.5        | 67·77           | 85              | 117·119         |
| C5          | 30·40·50      | 30·40·50      | 50·60·70      | 70·80·95·110   | 95·110·130      | 110·130·180     | 114.3·180·230   |
| C6          | M4 x P0.7     | M4 x P0.7     | M5 x P0.8     | M6 x P1.0      | M8 x P1.25      | M10 x P1.5      | M10 x P1.5      |
| C7          | 46·55         | 46·55         | 64·70·80      | 92·110·130     | 122·130·150     | 146·150·190     | 182·200·250     |
| C8          | 61            | 61            | 77·85         | 115.3·129.8    | 141·151         | 165.7           | 235·237         |
| C9          | 90.5          | 96            | 126·134       | 177.8·192.3    | 219·229         | 271.7           | 362.5·364.5     |

# High Precision Planetary Reducer

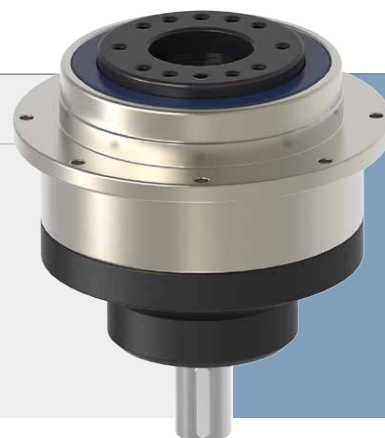
| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 47  | 64    | 90     | 110    | 140    | 200    | 255     |
|--|------------|------------|-------------|---|-------|--------|--------|--------|--------|---------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 20          | 22  | 60    | 160    | 335    | 650    | 1,200  | 2,020   |
|  |            |            | 25          | 20  | 50    | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 35          | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 40          | 22  | 60    | 160    | 335    | 650    | 1,200  | 2,020   |
|  |            |            | 50          | 20  | 50    | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 70          | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 100         | 16  | 43    | 136    | 294    | 549    | 1,059  | 1,779   |
|  |            |            | 140         | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
| 200  | 16         | 43         | 136         | 294   | 549   | 1,059  | 1,779  |        |        |         |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 20 ~ 200    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |        |        |        |        |         |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 20 ~ 200    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |        |        |        |        |         |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 20 ~ 200    | 3,000   | 3,000 | 3,000  | 3,000  | 3,000  | 3,000  | 2,000   |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 20 ~ 200    | 6,000   | 6,000 | 6,000  | 6,000  | 6,000  | 4,000  | 3,000   |
| 背隙 Backlash Ps   |            | arcmin     | 20 ~ 200    | -   | -     | -      | ≤ 4    | ≤ 4    | ≤ 4    | ≤ 4     |
| 背隙 Backlash P0   |            | arcmin     | 20 ~ 200    | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7     |
| 背隙 Backlash P1   |            | arcmin     | 20 ~ 200    | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    | ≤ 9    | ≤ 9    | ≤ 9     |
| 背隙 Backlash P2   |            | arcmin     | 20 ~ 200    | ≤ 12  | ≤ 12  | ≤ 12   | ≤ 12   | ≤ 12   | ≤ 12   | ≤ 12    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 20 ~ 200    | 6   | 14    | 30     | 86     | 155    | 450    | 1,126   |
| 容許徑向力 Max. Radial Force<br>滾珠軸承 Ball Bearing             | $F_{2rB}$  | N          | 4 ~ 10      | 2,040   | 2,520 | 8,460  | 12,720 | 14,070 | 35,200 | 39,600  |
| 容許軸向力 Max. Axial Force<br>滾珠軸承 Ball Bearing              | $F_{2aB}$  | N          | 4 ~ 10      | 1,020   | 1,260 | 4,230  | 6,360  | 7,035  | 17,600 | 19,800  |
| 容許徑向力 Max. Radial Force<br>滾錐軸承 Taper Bearing            | $F_{2rB}$  | N          | 4 ~ 10      | -   | -     | 14,660 | 23,000 | 37,200 | 73,600 | 107,200 |
| 容許軸向力 Max. Axial Force<br>滾錐軸承 Taper Bearing             | $F_{2aB}$  | N          | 4 ~ 10      | -   | -     | 7,330  | 11,500 | 18,600 | 36,800 | 53,600  |
| 最大傾斜力矩 Max. Tilting Moment<br>滾珠軸承 Ball Bearing ※        | $M_{2K}$   | Nm         | 4 ~ 10      | 31  | 98    | 185    | 320    | 940    | 2,200  | 4,300   |
| 最大傾斜力矩 Max. Tilting Moment<br>滾錐軸承 Taper Bearing ※       | $M_{2K}$   | Nm         | 4 ~ 10      | -   | -     | 280    | 480    | 1,400  | 3,300  | 6,480   |
| 使用壽命 Service Life  | $L_H$      | hr         | 20 ~ 200    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |        |        |        |        |         |
| 效率 Efficiency  | $\eta$     | %          | 20 ~ 200    | ≥ 92%   |       |        |        |        |        |         |
| 使用溫度 Operating Temperature                               |            | °C         | 20 ~ 200    | - 25° C ~ + 90° C   |       |        |        |        |        |         |
| 潤滑 Lubrication   |            |            | 20 ~ 200    | 全合成潤滑油脂 Synthetic Grease  |       |        |        |        |        |         |
| 防護等級 Protection Class                                    |            |            | 20 ~ 200    | IP65  |       |        |        |        |        |         |
| 安裝方向 Mounting Position                                   |            |            | 20 ~ 200    | 任意方向 Any  |       |        |        |        |        |         |
| 噪音值 Noise Level  |            | dB         | 20 ~ 200    | ≤ 65  | ≤ 68  | ≤ 70   | ≤ 72   | ≤ 74   | ≤ 76   | ≤ 78    |
| 重量 Weight ±3%  |            | Kg         | 20 ~ 200    | 1.4   | 2     | 6      | 11.8   | 22.3   | 48.5   | 97.5    |

※Applied to the output shaft center at 100 rpm.

## ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 47   | 64   | 90   | 110  | 140  | 200  | 255  |
|-------|------|------|------|------|------|------|------|
| 20    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 22.8 | 68.2 |
| 25    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 22.8 | 68.2 |
| 35    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 22.8 | 68.2 |
| 40    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 22.8 | 68.2 |
| 50    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 22.8 | 68.2 |
| 70    | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 22.8 | 68.2 |
| 100   | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 22.8 | 68.2 |
| 140   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 21.1 | 64.9 |
| 200   | 0.03 | 0.08 | 1.88 | 6.2  | 21.8 | 21.1 | 64.9 |

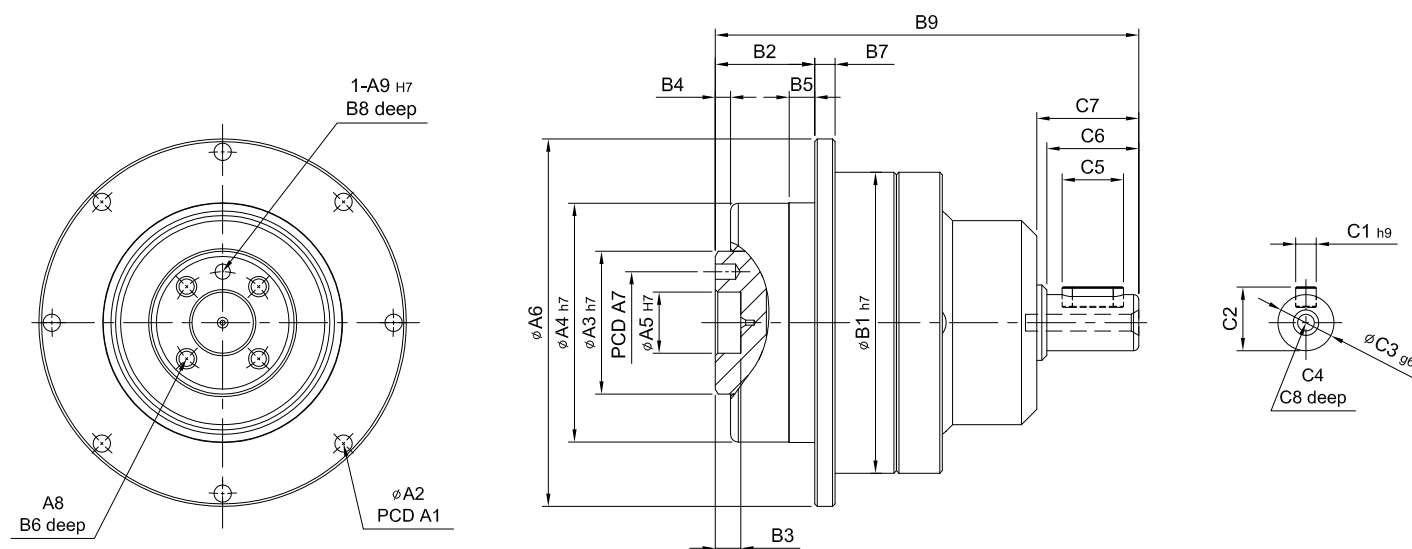
# SERVOBX Planetary Reducers



## MODEL : SDD

單段 1-Stage

RATIO : 4, 5, 7, 10



unit: mm

| Model Code | 47 | 64            | 90            | 110           | 140            | 200             | 255             |                |
|------------|----|---------------|---------------|---------------|----------------|-----------------|-----------------|----------------|
| <b>A</b>   | A1 | 67            | 79            | 109           | 135            | 168             | 233             | 280            |
|            | A2 | 8-3.4         | 8-4.5         | 8-5.5         | 8-5.5          | 12-6.6          | 12-9.0          | 16-13.5        |
|            | A3 | 28            | 40            | 63            | 80             | 100             | 160             | 180            |
|            | A4 | 47            | 64            | 90            | 110            | 140             | 200             | 255            |
|            | A5 | 12            | 20            | 31.5          | 40             | 50              | 80              | 100            |
|            | A6 | 72            | 86            | 118           | 146            | 179             | 248             | 300            |
|            | A7 | 20            | 31.5          | 50            | 63             | 80              | 125             | 140            |
|            | A8 | 4 - M3 x P0.5 | 7 - M5 x P0.8 | 7 - M6 x P1.0 | 11 - M6 x P1.0 | 11 - M8 x P1.25 | 11 - M10 x P1.5 | 12 - M16 x 2.0 |
|            | A9 | 3             | 5             | 6             | 6              | 8               | 10              | 12             |
| <b>B</b>   | B1 | 59            | 70            | 98            | 125            | 156             | 212             | 255            |
|            | B2 | 19.5          | 19.5          | 30            | 29             | 38              | 50              | 66             |
|            | B3 | 5             | 7             | 12            | 12             | 12              | 16              | 20             |
|            | B4 | 1.5           | 4             | 6             | 6              | 6               | 8               | 12             |
|            | B5 | 5             | 6             | 10            | 10             | 15              | 15              | 20             |
|            | B6 | 6.5           | 8             | 12            | 12             | 16              | 22              | 32             |
|            | B7 | 4             | 5             | 7             | 8              | 10              | 12              | 18             |
|            | B8 | 4             | 6             | 6             | 7              | 7               | 10              | 10             |
|            | B9 | 83            | 99            | 134           | 160            | 195             | 252             | 322.5          |
| <b>C</b>   | C1 | 4             | 5             | 5             | 6              | 10              | 12              | 16             |
|            | C2 | 12.5          | 16            | 18            | 24.5           | 35              | 43              | 59             |
|            | C3 | 11            | 14            | 16            | 22             | 32              | 40              | 55             |
|            | C4 | M4 x P0.7     | M5 x P0.8     | M6 x P1.0     | M8 x P1.25     | M12 x P1.75     | M14 x P2.0      | M16 x P2.0     |
|            | C5 | 12            | 20            | 20            | 30             | 40              | 50              | 75             |
|            | C6 | 18            | 24            | 28            | 36             | 50              | 60              | 85             |
|            | C7 | 20            | 26.3          | 31.5          | 40             | 54              | 65              | 90             |
|            | C8 | 8             | 10            | 12            | 16             | 24              | 28              | 32             |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 47  | 64    | 90     | 110    | 140    | 200    | 255     |
|--|------------|------------|-------------|---|-------|--------|--------|--------|--------|---------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 4           | 22  | 60    | 160    | 335    | 650    | 1,200  | 2,020   |
| 5  |            |            | 20          | 50  | 155   | 333    | 618    | 1,189  | 2,010  |         |
| 7  |            |            | 19          | 47  | 142   | 309    | 573    | 1,108  | 1,870  |         |
| 10   |            |            | 16          | 43  | 136   | 294    | 549    | 1,059  | 1,779  |         |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 4 ~ 10      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |        |        |        |        |         |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 4 ~ 10      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |        |        |        |        |         |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 4 ~ 10      | 3,000   | 3,000 | 3,000  | 3,000  | 3,000  | 3,000  | 2,000   |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 4 ~ 10      | 6,000   | 6,000 | 6,000  | 6,000  | 5,000  | 4,000  | 3,000   |
| 背隙 Backlash Ps   |            | arcmin     | 4 ~ 10      | -   | -     | ≤ 1    | ≤ 1    | ≤ 1    | ≤ 1    | ≤ 1     |
| 背隙 Backlash P0   |            | arcmin     | 4 ~ 10      | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    | ≤ 3    | ≤ 3    | ≤ 3     |
| 背隙 Backlash P1   |            | arcmin     | 4 ~ 10      | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    | ≤ 5    | ≤ 5    | ≤ 5     |
| 背隙 Backlash P2   |            | arcmin     | 4 ~ 10      | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7     |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 4 ~ 10      | 6   | 14    | 30     | 86     | 155    | 450    | 1,126   |
| 容許徑向力 Max. Radial Force<br>滾珠軸承 Ball Bearing             | $F_{2rB}$  | N          | 4 ~ 10      | 2,040   | 2,520 | 8,460  | 12,720 | 14,070 | 35,200 | 39,600  |
| 容許軸向力 Max. Axial Force<br>滾珠軸承 Ball Bearing              | $F_{2aB}$  | N          | 4 ~ 10      | 1,020   | 1,260 | 4,230  | 6,360  | 7,035  | 17,600 | 19,800  |
| 容許徑向力 Max. Radial Force<br>滾錐軸承 Taper Bearing            | $F_{2rB}$  | N          | 4 ~ 10      | -   | -     | 14,660 | 23,000 | 37,200 | 73,600 | 107,200 |
| 容許軸向力 Max. Axial Force<br>滾錐軸承 Taper Bearing             | $F_{2aB}$  | N          | 4 ~ 10      | -   | -     | 7,330  | 11,500 | 18,600 | 36,800 | 53,600  |
| 最大傾斜力矩 Max. Tilting Moment<br>滾珠軸承 Ball Bearing ※        | $M_{2K}$   | Nm         | 4 ~ 10      | 31  | 98    | 185    | 320    | 940    | 2,200  | 4,300   |
| 最大傾斜力矩 Max. Tilting Moment<br>滾錐軸承 Taper Bearing ※       | $M_{2K}$   | Nm         | 4 ~ 10      | -   | -     | 280    | 480    | 1,400  | 3,300  | 6,480   |
| 使用壽命 Service Life  | $L_H$      | hr         | 4 ~ 10      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |        |        |        |        |         |
| 效率 Efficiency  | $\eta$     | %          | 4 ~ 10      | ≥ 97%   |       |        |        |        |        |         |
| 使用溫度 Operating Temperature                               |            | °C         | 4 ~ 10      | - 25° C ~ + 90° C   |       |        |        |        |        |         |
| 潤滑 Lubrication   |            |            | 4 ~ 10      | 全合成潤滑油脂 Synthetic Grease  |       |        |        |        |        |         |
| 防護等級 Protection Class                                    |            |            | 4 ~ 10      | IP65  |       |        |        |        |        |         |
| 安裝方向 Mounting Position                                   |            |            | 4 ~ 10      | 任意方向 Any  |       |        |        |        |        |         |
| 噪音值 Noise Level  |            | dB         | 4 ~ 10      | ≤ 56  | ≤ 58  | ≤ 60   | ≤ 63   | ≤ 65   | ≤ 67   | ≤ 70    |
| 重量 Weight ±3%  |            | Kg         | 4 ~ 10      | 0.71  | 1.3   | 3.6    | 6.2    | 12     | 32     | 53      |

※Applied to the output shaft center at 100 rpm.

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 47   | 64   | 90   | 110  | 140  | 200   | 255   |
|-------|------|------|------|------|------|-------|-------|
| 4     | 0.03 | 0.13 | 0.47 | 2.75 | 7.46 | 24.00 | 55    |
| 5     | 0.03 | 0.12 | 0.45 | 2.70 | 7.41 | 23.23 | 53.19 |
| 7     | 0.03 | 0.12 | 0.45 | 2.64 | 7.12 | 22.11 | 50.78 |
| 10    | 0.03 | 0.12 | 0.43 | 2.56 | 7.01 | 22.21 | 50.50 |

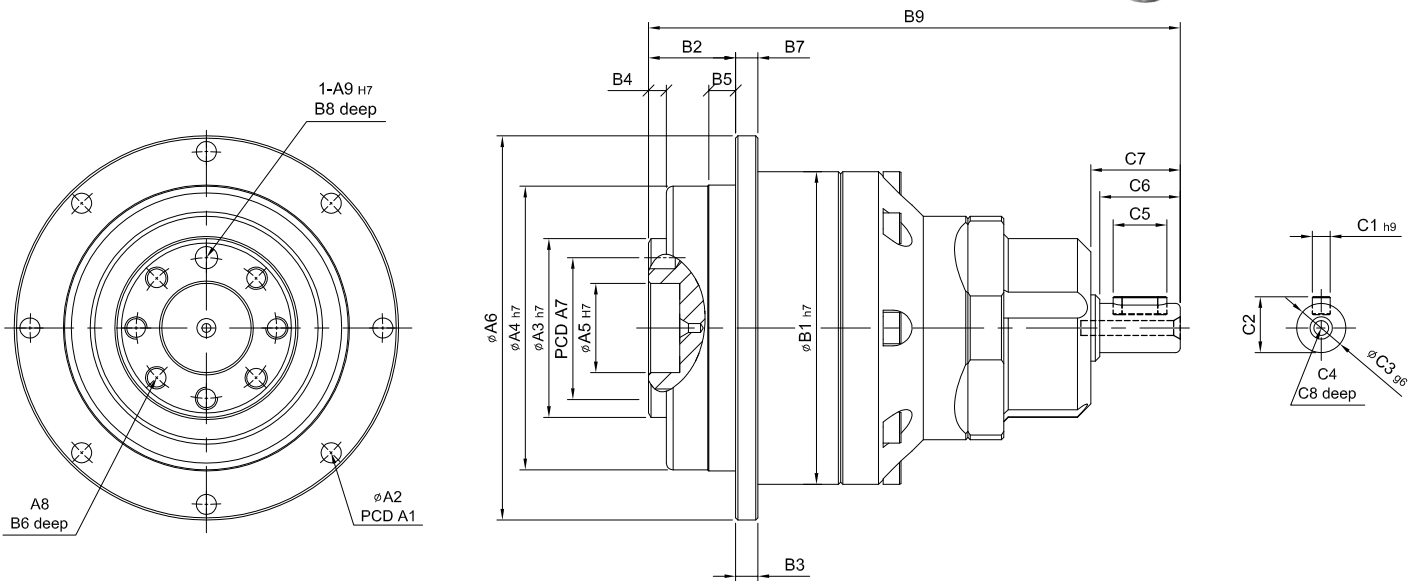
# SERVOBX Planetary Reducers



## MODEL : SDD

雙段 2-Stage

RATIO : 20, 25, 35, 40, 50, 70, 100



unit: mm

| Model Code | 47 | 64            | 90            | 110           | 140            | 200             | 255             |                 |
|------------|----|---------------|---------------|---------------|----------------|-----------------|-----------------|-----------------|
| <b>A</b>   | A1 | 67            | 79            | 109           | 135            | 168             | 233             | 280             |
|            | A2 | 8-3.4         | 8-4.5         | 8-5.5         | 8-5.5          | 12-6.6          | 12-9.0          | 16-13.5         |
|            | A3 | 28            | 40            | 63            | 80             | 100             | 160             | 180             |
|            | A4 | 47            | 64            | 90            | 110            | 140             | 200             | 255             |
|            | A5 | 12            | 20            | 31.5          | 40             | 50              | 80              | 100             |
|            | A6 | 72            | 86            | 118           | 146            | 179             | 248             | 300             |
|            | A7 | 20            | 31.5          | 50            | 63             | 80              | 125             | 140             |
|            | A8 | 4 - M3 x P0.5 | 7 - M5 x P0.8 | 7 - M6 x P1.0 | 11 - M6 x P1.0 | 11 - M8 x P1.25 | 11 - M10 x P1.5 | 12 - M16 x P2.0 |
| <b>B</b>   | A9 | 3             | 5             | 6             | 6              | 8               | 10              | 12              |
|            | B1 | 59            | 70            | 98            | 125            | 156             | 212             | 255             |
|            | B2 | 19.5          | 19.5          | 30            | 29             | 38              | 50              | 66              |
|            | B3 | 5             | 7             | 12            | 12             | 12              | 16              | 20              |
|            | B4 | 1.5           | 4             | 6             | 6              | 6               | 8               | 12              |
|            | B5 | 5             | 6             | 10            | 10             | 15              | 15              | 20              |
|            | B6 | 6.5           | 8             | 12            | 12             | 16              | 22              | 32              |
|            | B7 | 4             | 5             | 7             | 8              | 10              | 12              | 18              |
|            | B8 | 4             | 6             | 6             | 7              | 7               | 10              | 10              |
|            | B9 | 109           | 119           | 159           | 190            | 231.5           | 299             | 350.5           |
| <b>C</b>   | C1 | 4             | 4             | 5             | 5              | 6               | 10              | 12              |
|            | C2 | 12.5          | 12.5          | 16            | 18             | 24.5            | 35              | 43              |
|            | C3 | 11            | 11            | 14            | 16             | 22              | 32              | 40              |
|            | C4 | M4 x P0.7     | M4 x P0.7     | M5 x P0.8     | M6 x P1.0      | M8 x P1.25      | M12 x P1.75     | M14 x P2.0      |
|            | C5 | 12            | 12            | 20            | 20             | 30              | 40              | 50              |
|            | C6 | 18            | 18            | 24            | 28             | 36              | 50              | 60              |
|            | C7 | 20            | 20            | 26            | 31.5           | 40              | 54              | 65              |
|            | C8 | 8             | 8             | 10            | 12             | 16              | 24              | 28              |

## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 47  | 64    | 90     | 110    | 140    | 200    | 255     |
|--|------------|------------|-------------|---|-------|--------|--------|--------|--------|---------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 20          | 22  | 60    | 160    | 335    | 650    | 1,200  | 2,020   |
|  |            |            | 25          | 20  | 50    | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 35          | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 40          | 22  | 60    | 160    | 335    | 650    | 1,200  | 2,020   |
|  |            |            | 50          | 20  | 50    | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 70          | 19  | 47    | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 100         | 16  | 43    | 136    | 294    | 549    | 1,059  | 1,779   |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 20 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |        |        |        |        |         |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 20 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |        |        |        |        |         |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 20 ~ 100    | 3,000   | 3,000 | 3,000  | 3,000  | 3,000  | 3,000  | 2,000   |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 20 ~ 100    | 6,000   | 6,000 | 6,000  | 6,000  | 5,000  | 4,000  | 3,000   |
| 背隙 Backlash Ps   |            | arcmin     | 20 ~ 100    | -   | -     | -      | ≤ 3    | ≤ 3    | ≤ 3    | ≤ 3     |
| 背隙 Backlash P0   |            | arcmin     | 20 ~ 100    | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    | ≤ 5    | ≤ 5    | ≤ 5     |
| 背隙 Backlash P1   |            | arcmin     | 20 ~ 100    | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7     |
| 背隙 Backlash P2   |            | arcmin     | 20 ~ 100    | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    | ≤ 9    | ≤ 9    | ≤ 9     |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 20 ~ 100    | 6   | 14    | 30     | 86     | 155    | 450    | 1,126   |
| 容許徑向力 Max. Radial Force<br>滾珠軸承 Ball Bearing             | $F_{2rB}$  | N          | 4 ~ 10      | 2,040   | 2,520 | 8,460  | 12,720 | 14,070 | 35,200 | 39,600  |
| 容許軸向力 Max. Axial Force<br>滾珠軸承 Ball Bearing              | $F_{2aB}$  | N          | 4 ~ 10      | 1,020   | 1,260 | 4,230  | 6,360  | 7,035  | 17,600 | 19,800  |
| 容許徑向力 Max. Radial Force<br>滾錐軸承 Taper Bearing            | $F_{2rB}$  | N          | 4 ~ 10      | -   | -     | 14,660 | 23,000 | 37,200 | 73,600 | 107,200 |
| 容許軸向力 Max. Axial Force<br>滾錐軸承 Taper Bearing             | $F_{2aB}$  | N          | 4 ~ 10      | -   | -     | 7,330  | 11,500 | 18,600 | 36,800 | 53,600  |
| 最大傾斜力矩 Max. Tilting Moment<br>滾珠軸承 Ball Bearing ※        | $M_{2K}$   | Nm         | 4 ~ 10      | 31  | 98    | 185    | 320    | 940    | 2,200  | 4,300   |
| 最大傾斜力矩 Max. Tilting Moment<br>滾錐軸承 Taper Bearing ※       | $M_{2K}$   | Nm         | 4 ~ 10      | -   | -     | 280    | 480    | 1,400  | 3,300  | 6,480   |
| 使用壽命 Service Life  | $L_H$      | hr         | 20 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |        |        |        |        |         |
| 效率 Efficiency  | $\eta$     | %          | 20 ~ 100    | ≥ 94%   |       |        |        |        |        |         |
| 使用溫度 Operating Temperature                               |            | °C         | 20 ~ 100    | - 25° C ~ + 90° C   |       |        |        |        |        |         |
| 潤滑 Lubrication   |            |            | 20 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |       |        |        |        |        |         |
| 防護等級 Protection Class                                    |            |            | 20 ~ 100    | IP65  |       |        |        |        |        |         |
| 安裝方向 Mounting Position                                   |            |            | 20 ~ 100    | 任意方向 Any  |       |        |        |        |        |         |
| 噪音值 Noise Level  |            | dB         | 20 ~ 100    | ≤ 56  | ≤ 58  | ≤ 60   | ≤ 63   | ≤ 65   | ≤ 67   | ≤ 70    |
| 重量 Weight ±3%  |            | Kg         | 20 ~ 100    | 1.15  | 1.7   | 4.25   | 8.5    | 14.95  | 37.2   | 69      |

※Applied to the output shaft center at 100 rpm.

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

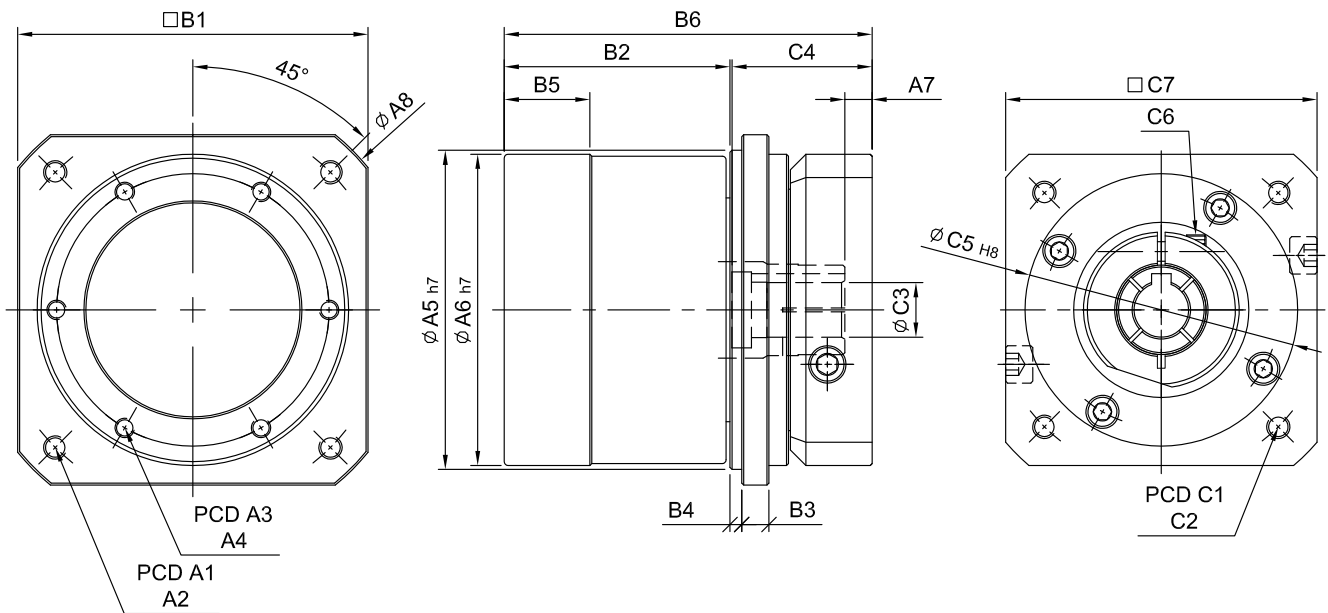
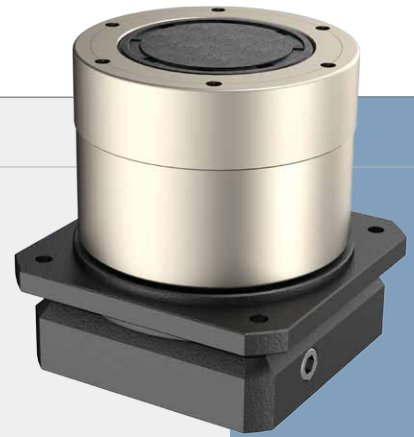
| Ratio | 47   | 64   | 90   | 110  | 140 | 200  | 255   |
|-------|------|------|------|------|-----|------|-------|
| 20    | 0.03 | 0.03 | 0.15 | 0.45 | 2.7 | 7.22 | 23.22 |
| 25    | 0.03 | 0.03 | 0.15 | 0.45 | 2.7 | 7.22 | 23.22 |
| 35    | 0.03 | 0.03 | 0.15 | 0.45 | 2.7 | 7.22 | 23.22 |
| 40    | 0.03 | 0.03 | 0.15 | 0.45 | 2.7 | 7.22 | 23.22 |
| 50    | 0.03 | 0.03 | 0.14 | 0.4  | 2.6 | 7.05 | 23.07 |
| 70    | 0.03 | 0.03 | 0.14 | 0.4  | 2.6 | 7.05 | 23.07 |
| 100   | 0.03 | 0.03 | 0.14 | 0.4  | 2.6 | 7.01 | 22.67 |

# SERVOBOX Planetary Reducers

## MODEL : SR

單段 1-Stage

RATIO : 2, 3, 4, 6, 9



unit: mm

| Model |    | 82        | 100        | 132        |
|-------|----|-----------|------------|------------|
| A     | A1 | 100       | 122        | 166        |
|       | A2 | M6 x P1.0 | M8 x P1.25 | M10 x P1.5 |
|       | A3 | 70        | 84         | 114        |
|       | A4 | M5 x P0.8 | M6 x P1.0  | M8 x P1.25 |
|       | A5 | 82        | 100        | 132        |
|       | A6 | 80        | 96         | 128        |
|       | A7 | 7·9       | 8·17       | 11.5       |
|       | A8 | 116       | 139        | 184        |
| B     | B1 | 90        | 108        | 140        |
|       | B2 | 58        | 63         | 85.5       |
|       | B3 | 7         | 9.5        | 12         |
|       | B4 | 3         | 3.5        | 4          |
|       | B5 | 22        | 24         | 34         |
|       | B6 | 94.5      | 111.5      | 143        |
| C     | C1 | 85        | 115        | 130        |
|       | C2 | M6 x P1.0 | M6 x P1.0  | M8 x P1.25 |
|       | C3 | 14·19     | 19·24      | 24·28      |
|       | C4 | 36·43     | 47·56      | 63.5       |
|       | C5 | 70        | 95         | 110        |
|       | C6 | M5 x P0.8 | M6 x P1.0  | M8 x P1.25 |
|       | C7 | 80        | 110        | 130        |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 82  | 100   | 132   |
|--|------------|------------|-------------|---|-------|-------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 2           | 96  | 145   | 301   |
|  |            |            | 3           | 91  | 135   | 270   |
|  |            |            | 4           | 84  | 128   | 265   |
|  |            |            | 6           | 80  | 123   | 258   |
|  |            |            | 9           | 75  | 116   | 246   |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 2 ~ 9       | 1.5 倍額定輸出力矩 1.5 Times of Rated Output Torque  |       |       |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 2 ~ 9       | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 2 ~ 9       | 3,000   |       |       |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 2 ~ 9       | 6,000   |       |       |
| 背隙 Backlash  |            | arcmin     | 2 ~ 9       | ≤ 6   | ≤ 6   | ≤ 6   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 2 ~ 9       | 10  | 14    | 27    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 2 ~ 9       | 3,000   | 3,400 | 7,200 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 2 ~ 9       | 1,500   | 1,700 | 3,600 |
| 使用壽命 Service Life  | $L_H$      | hr         | 2 ~ 9       | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |
| 效率 Efficiency  | $\eta$     | %          | 2 ~ 9       | ≥ 97%   |       |       |
| 使用溫度 Operating Temperature                               |            | °C         | 2 ~ 9       | - 25° C ~ + 90° C   |       |       |
| 潤滑 Lubrication   |            |            | 2 ~ 9       | 全合成潤滑油脂 Synthetic Grease  |       |       |
| 防護等級 Protection Class                                    |            |            | 2 ~ 9       | IP65  |       |       |
| 安裝方向 Mounting Position                                   |            |            | 2 ~ 9       | 任意方向 Any  |       |       |
| 噪音值 Noise Level  |            | dB         | 2 ~ 9       | ≤ 60  | ≤ 62  | ≤ 64  |
| 重量 Weight ±3%  |            | Kg         | 2 ~ 9       | 2.5   |       |       |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

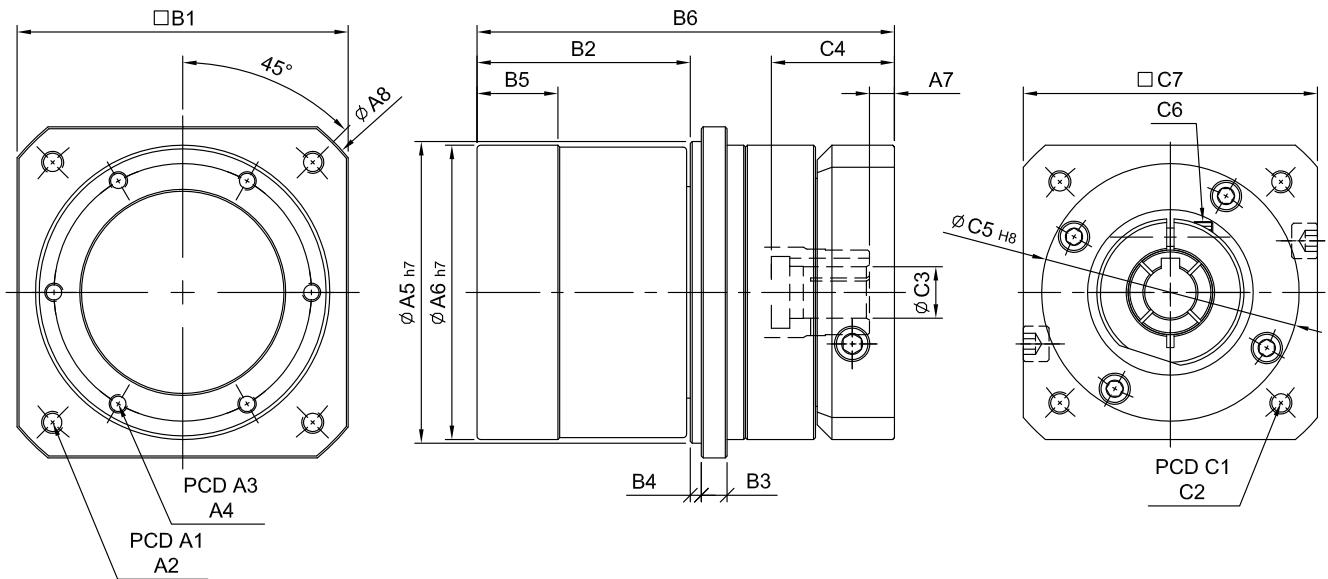
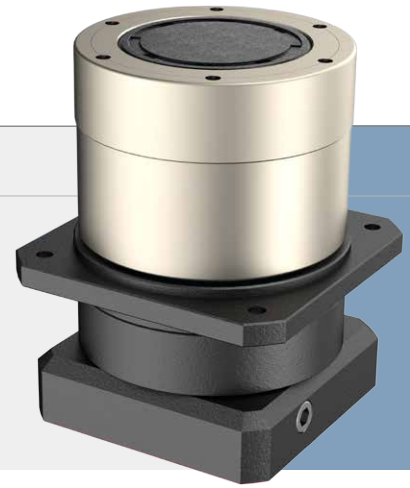
| Ratio | 82  | 100 | 132 |
|-------|-----|-----|-----|
| 2     | 0.3 | 0.5 | 2.7 |
| 3     | 0.3 | 0.5 | 2.7 |
| 4     | 0.3 | 0.5 | 2.7 |
| 6     | 0.3 | 0.5 | 2.7 |
| 9     | 0.3 | 0.5 | 2.7 |

# SERVOBOX Planetary Reducers

## MODEL : SR

雙段 2-Stage

RATIO : 10, 15, 20, 24, 30, 36, 40, 45, 60, 90



unit: mm

| Model    | 82        | 100        | 132        |
|----------|-----------|------------|------------|
| <b>A</b> |           |            |            |
| Code     |           |            |            |
| A1       | 100       | 122        | 166        |
| A2       | M6 x P1.0 | M8 x P1.25 | M10 x P1.5 |
| A3       | 70        | 84         | 114        |
| A4       | M5 x P0.8 | M6 x P1.0  | M8 x P1.25 |
| A5       | 82        | 100        | 132        |
| A6       | 80        | 96         | 128        |
| A7       | 7-9       | 8          | 8          |
| A8       | 116       | 139        | 184        |
| <b>B</b> |           |            |            |
| B1       | 90        | 108        | 140        |
| B2       | 58        | 63         | 85.5       |
| B3       | 7         | 9.5        | 12         |
| B4       | 3         | 3.5        | 4          |
| B5       | 22        | 24         | 34         |
| B6       | 113.5     | 137        | 168        |
| <b>C</b> |           |            |            |
| C1       | 85        | 115        | 145        |
| C2       | M6 x P1.0 | M6 x P1.0  | M8 x P1.25 |
| C3       | 14-19     | 19         | 19-24      |
| C4       | 33.5-40.8 | 43.5       | 52         |
| C5       | 70        | 95         | 110        |
| C6       | M5 x P0.8 | M5 x P0.8  | M8 x P1.25 |
| C7       | 80        | 110        | 130        |

## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 82  | 100   | 132   |
|--|------------|------------|-------------|---|-------|-------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 10          | 96  | 145   | 301   |
|  |            |            | 15          | 91  | 135   | 270   |
|  |            |            | 20          | 84  | 128   | 265   |
|  |            |            | 24          | 80  | 123   | 258   |
|  |            |            | 30          | 80  | 123   | 258   |
|  |            |            | 36          | 75  | 116   | 246   |
|  |            |            | 40          | 84  | 128   | 265   |
|  |            |            | 45          | 75  | 116   | 246   |
|  |            |            | 60          | 80  | 123   | 258   |
| 90   | 75         | 116        | 246         |   |       |       |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 10 ~ 90     | 1.5 倍額定輸出力矩 1.5 Times of Rated Output Torque  |       |       |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 10 ~ 90     | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 10 ~ 90     | 3,000   |       |       |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 10 ~ 90     | 6,000   |       |       |
| 背隙 Backlash  |            | arcmin     | 10 ~ 90     | ≤ 8   | ≤ 8   | ≤ 8   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 10 ~ 90     | 10  | 14    | 27    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 10 ~ 90     | 3,000   | 3,400 | 7,200 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 10 ~ 90     | 1,500   | 1,700 | 3,600 |
| 使用壽命 Service Life  | $L_H$      | hr         | 10 ~ 90     | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |
| 效率 Efficiency  | $\eta$     | %          | 10 ~ 90     | ≥ 94%   |       |       |
| 使用溫度 Operating Temperature                               |            | °C         | 10 ~ 90     | - 25° C ~ + 90° C   |       |       |
| 潤滑 Lubrication   |            |            | 10 ~ 90     | 全合成潤滑油脂 Synthetic Grease  |       |       |
| 防護等級 Protection Class                                    |            |            | 10 ~ 90     | IP65  |       |       |
| 安裝方向 Mounting Position                                   |            |            | 10 ~ 90     | 任意方向 Any  |       |       |
| 噪音值 Noise Level  |            | dB         | 10 ~ 90     | ≤ 60  | ≤ 62  | ≤ 64  |
| 重量 Weight ±3%  |            | Kg         | 10 ~ 90     | 2.8   |       |       |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 82  | 100 | 132 |
|-------|-----|-----|-----|
| 2     | 0.3 | 0.5 | 2.7 |
| 3     | 0.3 | 0.5 | 2.7 |
| 4     | 0.3 | 0.5 | 2.7 |
| 6     | 0.3 | 0.5 | 2.7 |
| 9     | 0.3 | 0.5 | 2.7 |

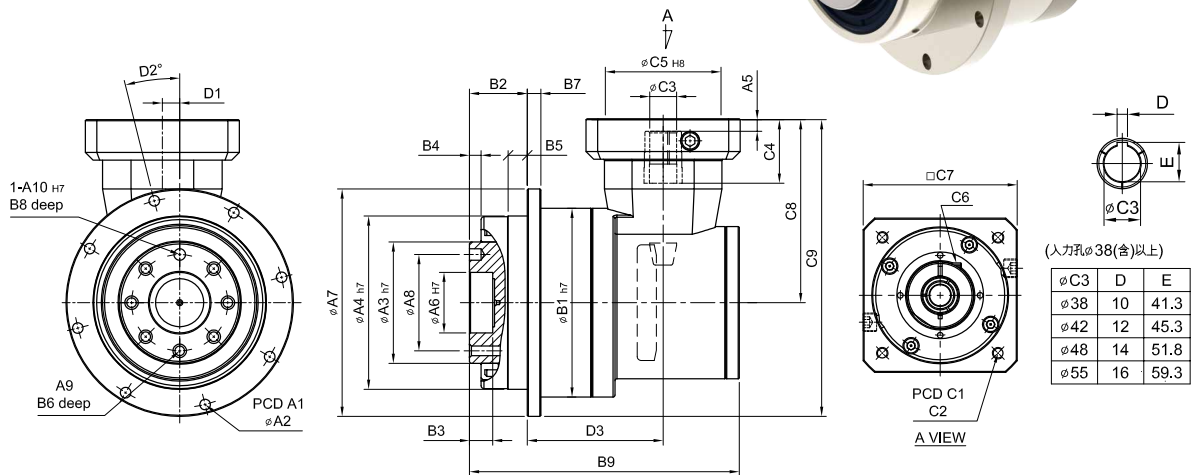
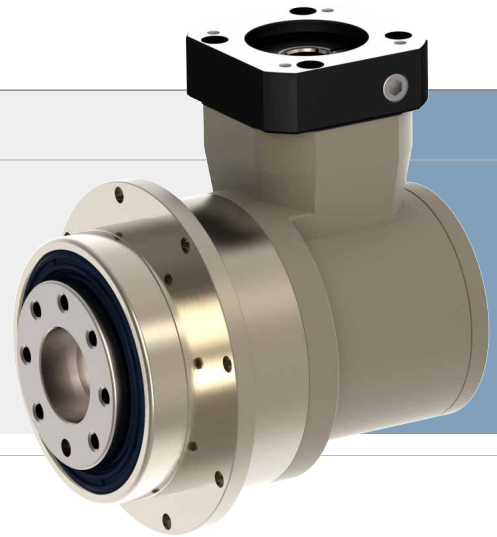
# SERVOBOX Planetary Reducers

螺旋齒輪 Helical Gear & 戟齒輪 Hypoid Gear

## MODEL : SDH

雙段 2-Stage

RATIO : 20, 25, 35, 50, 70, 100, 150



unit: mm

| Model Code | 64            | 90            | 110                  | 140             | 200             | 255               |
|------------|---------------|---------------|----------------------|-----------------|-----------------|-------------------|
| <b>A</b>   |               |               |                      |                 |                 |                   |
| A1         | 79            | 109           | 135                  | 168             | 233             | 280               |
| A2         | 8-4.5         | 8-5.5         | 8-5.5                | 12-6.6          | 12-9.0          | 16-13.5           |
| A3         | 40            | 63            | 80                   | 100             | 160             | 180               |
| A4         | 64            | 90            | 110                  | 140             | 200             | 255               |
| A5         | 5             | 6             | 9                    | 10              | 10              | 13                |
| A6         | 20            | 31.5          | 40                   | 50              | 80              | 100               |
| A7         | 86            | 118           | 146                  | 179             | 248             | 300               |
| A8         | 31.5          | 50            | 63                   | 80              | 125             | 140               |
| A9         | 7 - M5 x P0.8 | 7 - M6 x P1.0 | 11 - M6 x P1.0       | 11 - M8 x P1.25 | 11 - M10 x P1.5 | 12 - M16 x P2.0   |
| A10        | 5             | 6             | 6                    | 8               | 10              | 12                |
| <b>B</b>   |               |               |                      |                 |                 |                   |
| B1         | 70            | 98            | 125                  | 156             | 212             | 255               |
| B2         | 19.5          | 30            | 29                   | 38              | 50              | 66                |
| B3         | 7             | 12            | 12                   | 12              | 16              | 20                |
| B4         | 4             | 6             | 6                    | 6               | 8               | 12                |
| B5         | 6             | 10            | 10                   | 15              | 15              | 20                |
| B6         | 8             | 12            | 12                   | 16              | 22              | 32                |
| B7         | 5             | 7             | 8                    | 10              | 12              | 18                |
| B8         | 6             | 6             | 7                    | 7               | 10              | 10                |
| B9         | 96            | 140           | 168                  | 202             | 273             | 303.5             |
| <b>C</b>   |               |               |                      |                 |                 |                   |
| C1         | 46 · 60 · 63  | 70 · 75 · 90  | 90 · 110 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215 | 200 · 215 · 265   |
| C2         | M3 · M4 · M5  | M4 · M5 · M6  | M5 · M6 · M8         | M6 · M8 · M10   | M8 · M10 · M12  | M10 · M12 · M16   |
| C3         | 8 · 9 · 11    | 14            | 24                   | 32              | 38              | 42 · 48 · 55      |
| C4         | 26            | 33            | 59                   | 67              | 85              | 116               |
| C5         | 30 · 40 · 50  | 50 · 60 · 70  | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180 | 114.3 · 180 · 230 |
| C6         | M4 x P0.7     | M5 x P0.8     | M6 x P1.0            | M8 x P1.25      | M10 x P1.5      | M10 x P1.5        |
| C7         | 46 · 55       | 64 · 70 · 80  | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 150 · 190 | 182 · 200 · 250   |
| C8         | 69            | 95.5          | 126.5                | 149             | 203             | 259.5             |
| C9         | 112           | 154.5         | 199.5                | 238.5           | 327             | 409.5             |
| C10        | 1/8"PT        | 1/8"PT        | 1/8"PT               | 1/4"PT          | 1/4"PT          | 3/8"PT            |
| <b>D</b>   |               |               |                      |                 |                 |                   |
| D1         | 9             | 9             | 14                   | 18              | 27              | 32                |
| D2         | 19            | 14            | 14                   | 0               | 0               | 18                |
| D3         | 46.2          | 70.5          | 90                   | 103.8           | 144             | 147.5             |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 64  | 90     | 110    | 140    | 200    | 255     |
|--|------------|------------|-------------|---|--------|--------|--------|--------|---------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 20          | 60  | 160    | 335    | 650    | 1,200  | 2,020   |
|  |            |            | 25          | 50  | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 35          | 47  | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 50          | 50  | 155    | 333    | 618    | 1,189  | 2,010   |
|  |            |            | 70          | 47  | 142    | 309    | 573    | 1,108  | 1,870   |
|  |            |            | 100         | 43  | 136    | 294    | 549    | 1,059  | 1,779   |
|  |            |            | 150         | 43  | 136    | 294    | 549    | 1,059  | 1,779   |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 20 ~ 150    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |        |        |        |        |         |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 20 ~ 150    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |        |        |        |        |         |
| 額定輸入轉速 Rated Input Speed                                 | $n_{IN}$   | rpm        | 20 ~ 150    | 3,000   | 3,000  | 3,000  | 3,000  | 2,000  | 2,000   |
| 最大輸入轉速 Max. Input Speed                                  | $n_{IB}$   | rpm        | 20 ~ 150    | 6,000   | 6,000  | 5,000  | 5,000  | 4,000  | 4,000   |
| 背隙 Backlash P0   |            | arcmin     | 20 ~ 150    | ≤ 4   | ≤ 4    | ≤ 4    | ≤ 4    | ≤ 4    | ≤ 4     |
| 背隙 Backlash P1   |            | arcmin     | 20 ~ 150    | ≤ 7   | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7    | ≤ 7     |
| 背隙 Backlash P2   |            | arcmin     | 20 ~ 150    | ≤ 10  | ≤ 10   | ≤ 10   | ≤ 10   | ≤ 10   | ≤ 10    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 20 ~ 150    | 14  | 30     | 86     | 155    | 450    | 1,126   |
| 容許徑向力 Max. Radial Force<br>滾珠軸承 Ball Bearing             | $F_{2rB}$  | N          | 4 ~ 10      | 2,520   | 8,460  | 12,720 | 14,070 | 35,200 | 39,600  |
| 容許軸向力 Max. Axial Force<br>滾珠軸承 Ball Bearing              | $F_{2aB}$  | N          | 4 ~ 10      | 1,260   | 4,230  | 6,360  | 7,035  | 17,600 | 19,800  |
| 容許徑向力 Max. Radial Force<br>滾錐軸承 Taper Bearing            | $F_{2rB}$  | N          | 4 ~ 10      | -   | 14,660 | 23,000 | 37,200 | 73,600 | 107,200 |
| 容許軸向力 Max. Axial Force<br>滾錐軸承 Taper Bearing             | $F_{2aB}$  | N          | 4 ~ 10      | -   | 7,330  | 11,500 | 18,600 | 36,800 | 53,600  |
| 最大傾斜力矩 Max. Tilting Moment<br>滾珠軸承 Ball Bearing ※        | $M_{2K}$   | Nm         | 4 ~ 10      | 98  | 185    | 320    | 940    | 2,200  | 4,300   |
| 最大傾斜力矩 Max. Tilting Moment<br>滾錐軸承 Taper Bearing ※       | $M_{2K}$   | Nm         | 4 ~ 10      | -   | 280    | 480    | 1,400  | 3,300  | 6,480   |
| 使用壽命 Service Life  | $L_H$      | hr         | 20 ~ 150    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |        |        |        |        |         |
| 效率 Efficiency  | $\eta$     | %          | 20 ~ 150    | ≥ 95%   |        |        |        |        |         |
| 使用溫度 Operating Temperature                               |            | °C         | 20 ~ 150    | - 25° C ~ + 90° C   |        |        |        |        |         |
| 潤滑 Lubrication   |            |            | 20 ~ 150    | 全合成潤滑油脂 Synthetic Grease  |        |        |        |        |         |
| 防護等級 Protection Class                                    |            |            | 20 ~ 150    | IP65  |        |        |        |        |         |
| 安裝方向 Mounting Position                                   |            |            | 20 ~ 150    | 任意方向 Any  |        |        |        |        |         |
| 噪音值 Noise Level  |            | dB         | 20 ~ 150    | ≤ 68  | ≤ 70   | ≤ 72   | ≤ 74   | ≤ 76   | ≤ 78    |
| 重量 Weight ±3%  |            | Kg         | 20 ~ 150    | 1.7   | 4.7    | 9.2    | 17.4   | 38.8   | 61.7    |

※Applied to the output shaft center at 100 rpm.

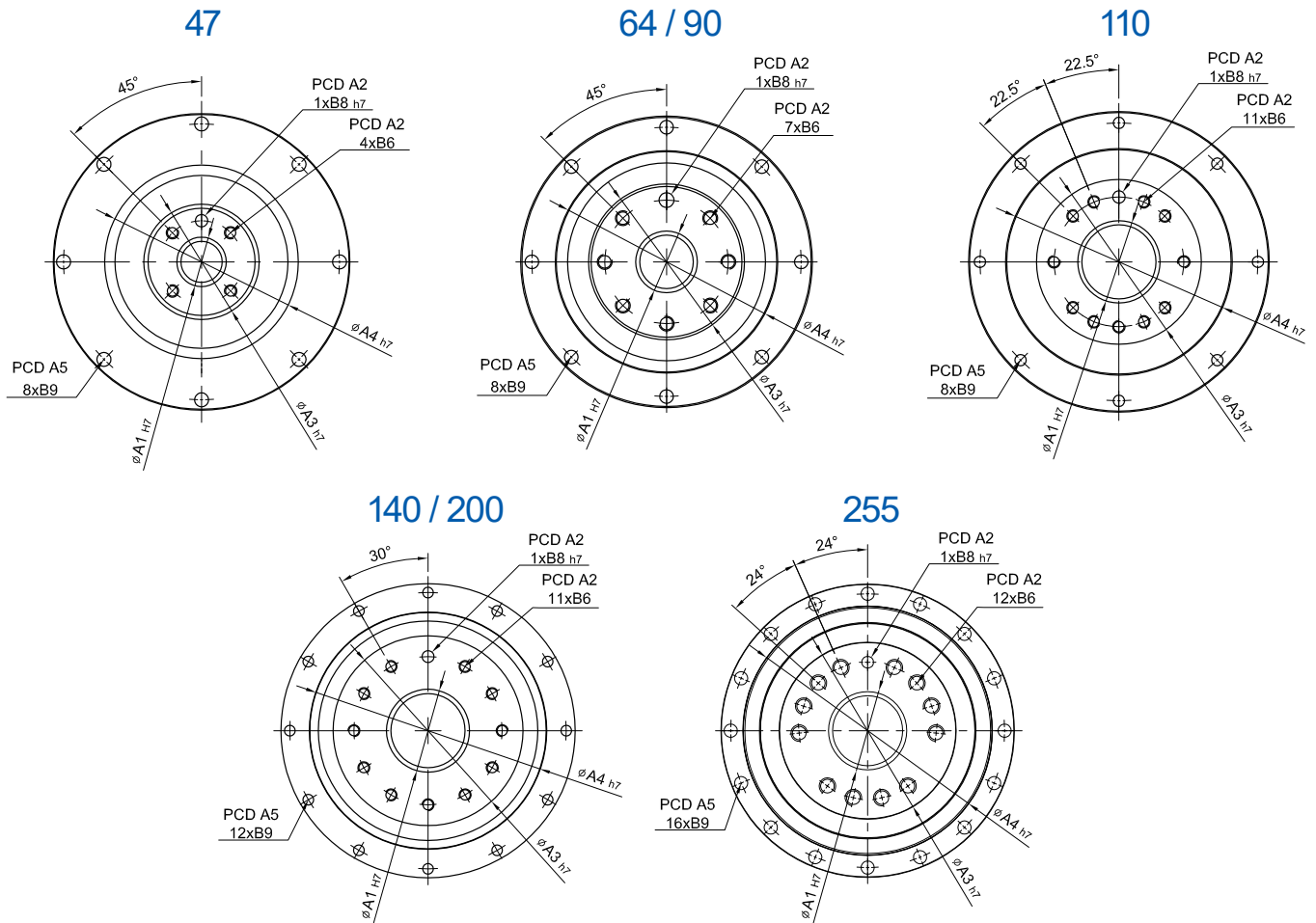
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| Ratio | 64   | 90   | 110  | 140  | 200  | 255   |
|-------|------|------|------|------|------|-------|
| 20    | 0.03 | 0.15 | 0.45 | 2.7  | 7.22 | 23.22 |
| 25    | 0.22 | 1.37 | 4.11 | 14.1 | 40.8 | 80.8  |
| 35    | 0.22 | 1.37 | 4.11 | 14.1 | 40.8 | 80.8  |
| 50    | 0.18 | 1.14 | 3.43 | 11.7 | 34.0 | 67.4  |
| 70    | 0.03 | 0.14 | 0.4  | 2.6  | 7.05 | 23.07 |
| 100   | 0.03 | 0.14 | 0.4  | 2.6  | 7.01 | 22.67 |
| 150   | 0.03 | 0.14 | 0.4  | 2.6  | 7.01 | 22.67 |



# Output Frame Dimension of SD, SDL, SDD Series

SD、SDL、SDD 系列出力法蘭尺寸表



單段 1-Stage SD · SDL · SDD 雙段 2-Stage SD · SDL · SDD

unit: mm

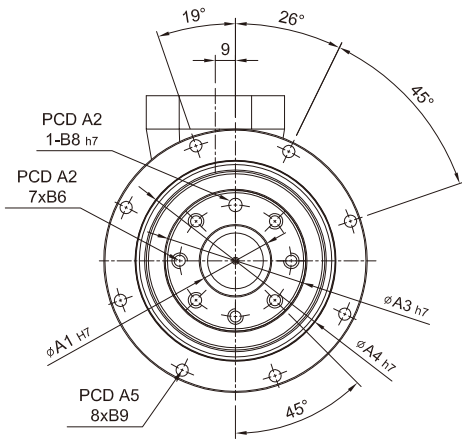
| Model Code | 47       | 64        | 90        | 110     | 140     | 200        | 255      |
|------------|----------|-----------|-----------|---------|---------|------------|----------|
|            | <b>A</b> | A1        | 12        | 20      | 31.5    | 40         | 80       |
| A2         |          | 20        | 31.5      | 50      | 63      | 125        | 140      |
| A3         |          | 28        | 40        | 63      | 80      | 160        | 180      |
| A4         |          | 47        | 64        | 90      | 110     | 200        | 255      |
| A5         |          | 67        | 79        | 109     | 135     | 168        | 233      |
| <b>B</b>   | B6       | M3 x P0.5 | M5 x P0.8 | M6 x P1 | M6 x P1 | M10 x P1.5 | M16 x P2 |
|            | B8       | 3         | 5         | 6       | 6       | 10         | 12       |
|            | B9       | 3.4       | 4.5       | 5.5     | 5.5     | 9          | 13.5     |



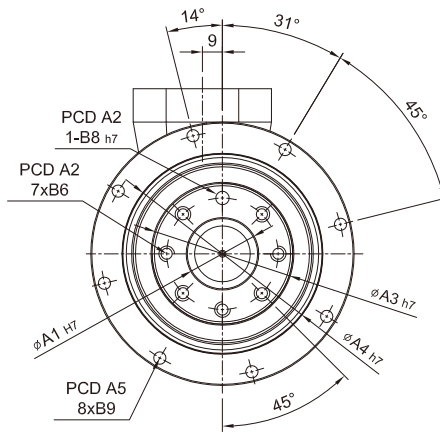
# Output Frame Dimension of SDH Series

## SDH 系列出力法蘭尺寸表

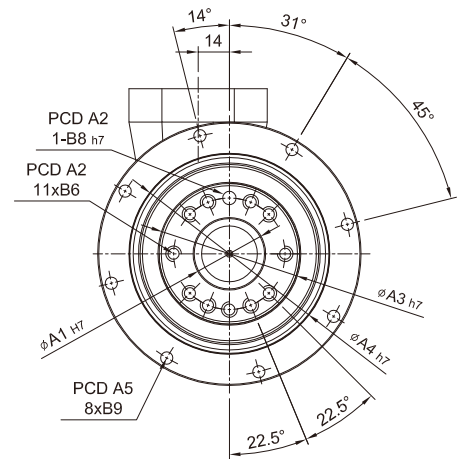
**SDH64**



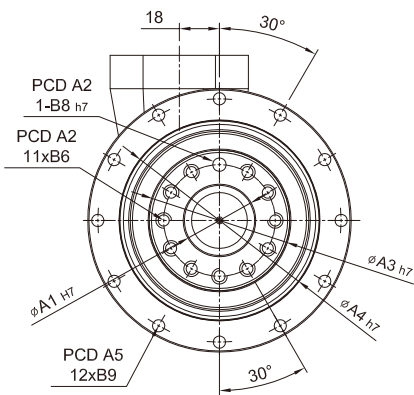
**SDH90**



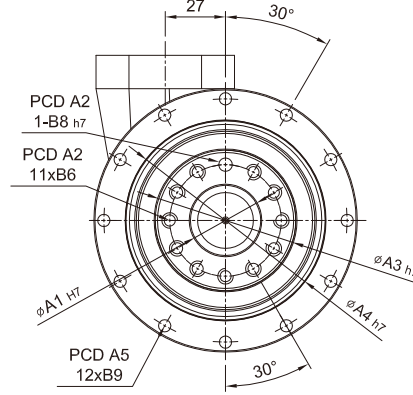
**SDH110**



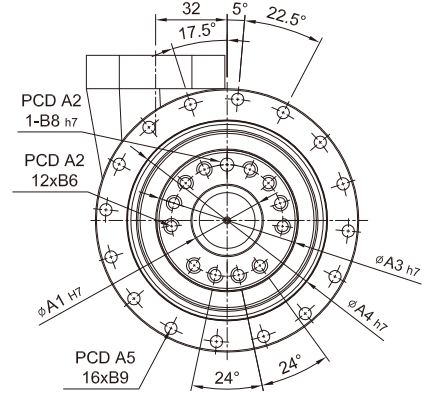
**SDH140**



**SDH200**



**SDH255**



雙段 2-Stage SDH

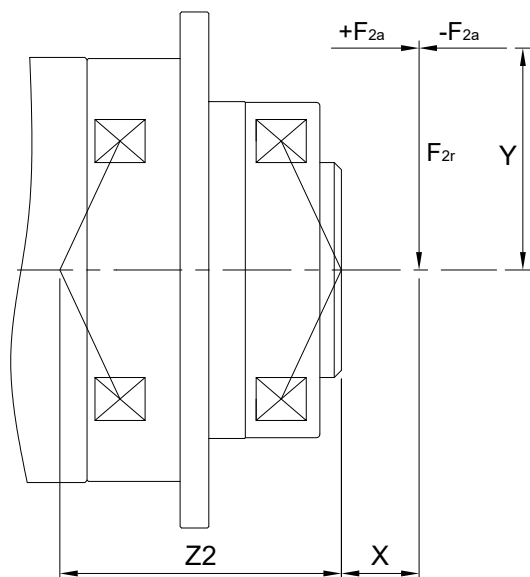
unit: mm

| Code     | Model    | 64        | 90      | 110     | 140        | 200        | 255      |
|----------|----------|-----------|---------|---------|------------|------------|----------|
|          | <b>A</b> | A1        | 20      | 31.5    | 40         | 50         | 80       |
| A2       |          | 31.5      | 50      | 63      | 80         | 125        | 140      |
| A3       |          | 40        | 63      | 80      | 100        | 160        | 180      |
| A4       |          | 64        | 90      | 110     | 140        | 200        | 255      |
| A5       |          | 79        | 109     | 135     | 168        | 233        | 280      |
| <b>B</b> | B6       | M5 x P0.8 | M6 x P1 | M6 x P1 | M8 x P1.25 | M10 x P1.5 | M16 x P2 |
|          | B8       | 5         | 6       | 6       | 8          | 10         | 12       |
|          | B9       | 4.5       | 5.5     | 5.5     | 6.6        | 9          | 13.5     |



## Max. Tilting Moment $M_{2K}$ of SD, SDL, SDD, SDH Series

SD、SDL、SDD、SDH 系列最大傾斜力矩



$$M_{2K} = \frac{F_{2a} \cdot Y + F_{2r} \cdot (X + Z2)}{1000}$$

$M_{2K}$  : [Nm]

$F_{2a}, F_{2r}$  : [N]

$X, Y, Z2$  : [mm]

unit: mm

|      |                    | Model |    |    |      |     |      |       |
|------|--------------------|-------|----|----|------|-----|------|-------|
| Code |                    | 47    | 64 | 90 | 110  | 140 | 200  | 255   |
| Z2   | 滾珠軸承 Ball Bearing  | 22.5  | 28 | 34 | 41   | 48  | 60   | 68    |
|      | 滾錐軸承 Taper Bearing | -     | -  | 50 | 60.6 | 77  | 98.8 | 114.5 |





# SERVOBOX Planetary Reducers

## Characteristic of SF Series

SF 系列產品特性



### 靜音

使用斜齒輪實現順暢安靜地運轉。

### Quiet operation

Helical gears contribute to reduce vibration and noise.

### 高精度

背隙低於 3 弧分，定位精確。

### High precision

Backlash  $\leq 3$  arc-min reaches precision alignment.

### 高剛性、高扭矩

使用整體式滿針滾針軸承，及一體式內齒箱，大大提高了剛性和扭矩。

### High rigidity & torque

High rigidity & high torque are achieved by integrant needle roller bearings and one-piece constructed.

### 高承載

使用雙滾錐軸承設計，承受更大軸向負荷。

### High Load-Bearing Capacity

High load-bearing capacity are achieved by dual taper bearing.

## Indication of Model Numbers

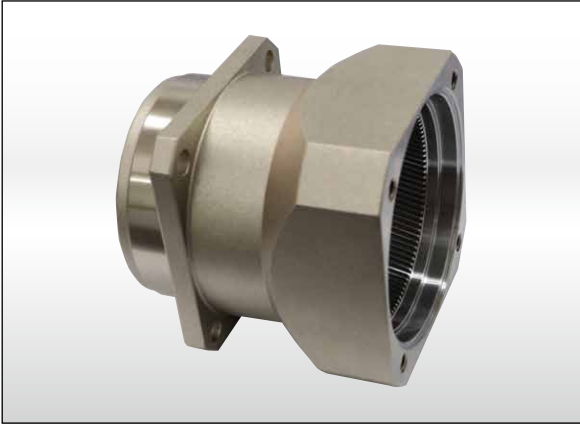
機種型號表示

| SF           | 142         | 10                      |   | P1                     | MOTOR              |
|--------------|-------------|-------------------------|---|------------------------|--------------------|
| 減速機型<br>Type | 型號<br>Model | 速比<br>Ratio             | 出力軸鍵槽<br>Output Bearing                                 | 背隙等級<br>Backlash Class | 馬達型號<br>Motor Type |
| SF           | 62          | 單段 1-Stage              | <input type="checkbox"/> 標準品，有鍵槽                        | Ps                     | 馬達製造商及型號           |
| SF-A         | 75          | 3, 4, 5, 6, 7, 8, 9, 10 | <input type="checkbox"/> Standard (Keyway)              | P0                     | Motor Brand &      |
| SFL          | 100         |                         |   | P1                     | Model No.          |
| SFL-A        | 142         | 雙段 2-Stage              | <input type="checkbox"/> N: 實心軸，無鍵槽                     | P2                     |                    |
|              | 180         | 15 ~ 100                | <input type="checkbox"/> Solid Output Shaft (No Keyway) |                        |                    |



# Features of SF Series

## SF 系列產品特點



### 一體式螺旋內齒輪箱

齒輪箱和內環齒輪採一體式的設計，減速機構採用螺旋齒輪設計，齒形嚙合率為一般正齒輪的二倍以上，具有運轉平順、低噪音、高輸出扭矩和低背隙的特性。

### One-piece Helical Gear Box

The gear box and internal ring gear are one-piece constructed. The speed reduction mechanism employs helical gears, which provides two times meshing rate of teeth when comparing with regular spur gears. In addition, it also has features of extremely smooth running, low noise, high output torque and low backlash.



### 滿針滾針軸承設計

行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

### Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.

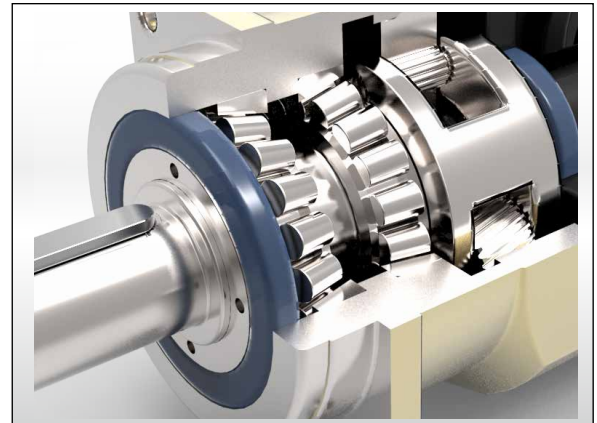


### 筒夾式連結機構

輸入端與馬達的連結採用筒夾式的鎖緊機構，並經動平衡分析，以確保在高輸入轉速下結合介面的同心度和平衡度，及零背隙的動力傳遞。

### Collet Locking Mechanism

The input-end and the motor are coupled through a collet locking mechanism. It has passed dynamical balance analysis to assure concentricity and balance on the connection and no backlash for power transmission while running at high speed.



### 一體式的行星臂架及雙懸臂設計

行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。

### Integrated Planetary Arm Bracket

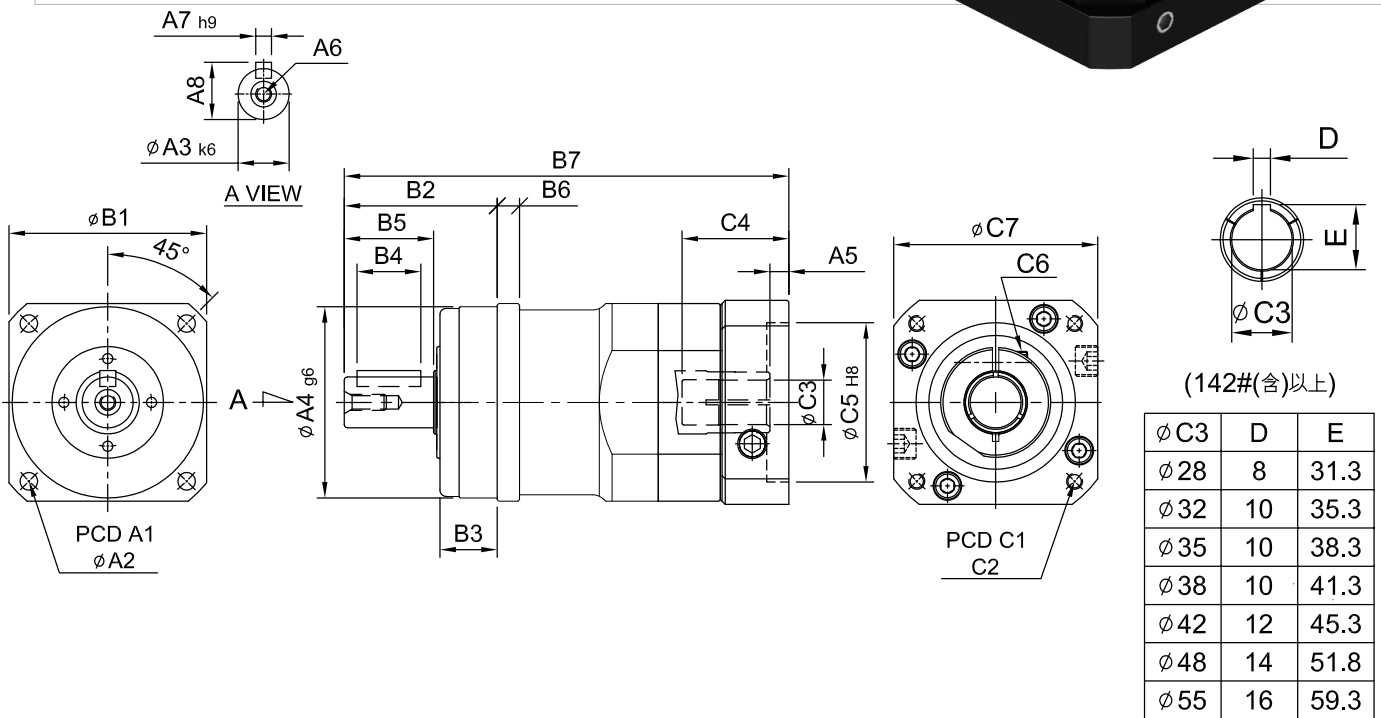
The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy.

# SERVOBOX Planetary Reducers

## MODEL : SF

單段 1-Stage

RATIO : 3, 4, 5, 6, 7, 8, 9, 10



unit: mm

|          | Model Code | Model             |                      |                   |                   |                        |
|----------|------------|-------------------|----------------------|-------------------|-------------------|------------------------|
|          |            | 62                | 75                   | 100               | 142               | 180                    |
| <b>A</b> | A1         | 68                | 85                   | 120               | 165               | 215                    |
|          | A2         | 5.5               | 6.8                  | 9                 | 11                | 13                     |
|          | A3         | 16                | 22                   | 32                | 40                | 55                     |
|          | A4         | 60                | 70                   | 90                | 130               | 160                    |
|          | A5         | 6                 | 9.2                  | 10.5              | 10                | 11.5 · 13.5            |
|          | A6         | M5 x P0.8         | M8 x P1.25           | M10 x P1.5        | M12 x P1.75       | M14 x P2.0             |
|          | A7         | 5                 | 6                    | 10                | 12                | 16                     |
|          | A8         | 18                | 24.5                 | 35                | 43                | 59                     |
| <b>B</b> | B1         | 62                | 76                   | 106               | 142               | 180                    |
|          | B2         | 48                | 56                   | 88                | 112               | 112                    |
|          | B3         | 18                | 18                   | 27                | 27                | 26                     |
|          | B4         | 20                | 32                   | 50                | 70                | 70                     |
|          | B5         | 28                | 36                   | 58                | 82                | 82                     |
|          | B6         | 6                 | 7                    | 10                | 12                | 15                     |
|          | B7         | 139.5 · 147.5     | 191                  | 242.5             | 306               | 360 · 362              |
| <b>C</b> | C1         | 70 · 75 · 90      | 90 · 110 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   | 200 · 215 · 265        |
|          | C2         | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    | M10 · M12 · M16        |
|          | C3         | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 24 · 28 · 32 · 35 | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
|          | C4         | 33.5              | 59.2                 | 67.5              | 84.5              | 114.5 · 116.5          |
|          | C5         | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   | 114.3 · 180 · 230      |
|          | C6         | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        | M10 x P1.5             |
|          | C7         | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   | 182 · 200 · 250        |





## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62  | 75    | 100   | 142    | 180    |
|--|------------|------------|-------------|---|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 3           | 59  | 165   | 216   | 625    | 1,206  |
|  |            |            | 4           | 51  | 146   | 208   | 555    | 1,069  |
|  |            |            | 5           | 48  | 155   | 333   | 618    | 1,189  |
|  |            |            | 6           | 45  | 150   | 315   | 583    | 1,118  |
|  |            |            | 7           | 45  | 142   | 309   | 573    | 1,108  |
|  |            |            | 8           | 43  | 141   | 305   | 553    | 1,070  |
|  |            |            | 9           | 44  | 140   | 293   | 516    | 993    |
| 10   | 43         | 136        | 294         | 549   | 1,059 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 3 ~ 10      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 3 ~ 10      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 3 ~ 10      | 3,000   | 3,000 | 3,000 | 3,000  | 3,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 3 ~ 10      | 6,000   | 6,000 | 6,000 | 5,000  | 4,000  |
| 背隙 Backlash Ps   |            | arcmin     | 3 ~ 10      | -   | ≤ 1   | ≤ 1   | ≤ 1    | ≤ 1    |
| 背隙 Backlash P0   |            | arcmin     | 3 ~ 10      | ≤ 3   | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    |
| 背隙 Backlash P1   |            | arcmin     | 3 ~ 10      | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P2   |            | arcmin     | 3 ~ 10      | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 3 ~ 10      | 8   | 15    | 27    | 60     | 150    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 3 ~ 10      | 2,240   | 4,150 | 8,760 | 12,750 | 17,860 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 3 ~ 10      | 1,920   | 3,780 | 7,500 | 10,840 | 15,180 |
| 使用壽命 Service Life  | $L_H$      | hr         | 3 ~ 10      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 3 ~ 10      | ≥ 97%   |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 3 ~ 10      | - 25° C ~ + 90° C   |       |       |        |        |
| 潤滑 Lubrication   |            |            | 3 ~ 10      | 全合成潤滑油脂 Synthetic Grease  |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 3 ~ 10      | IP65  |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 3 ~ 10      | 任意方向 Any  |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 3 ~ 10      | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65   | ≤ 67   |
| 重量 Weight ±3%  |            | Kg         | 3 ~ 10      | 1.7   | 4.5   | 8.3   | 16.7   | 34.3   |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

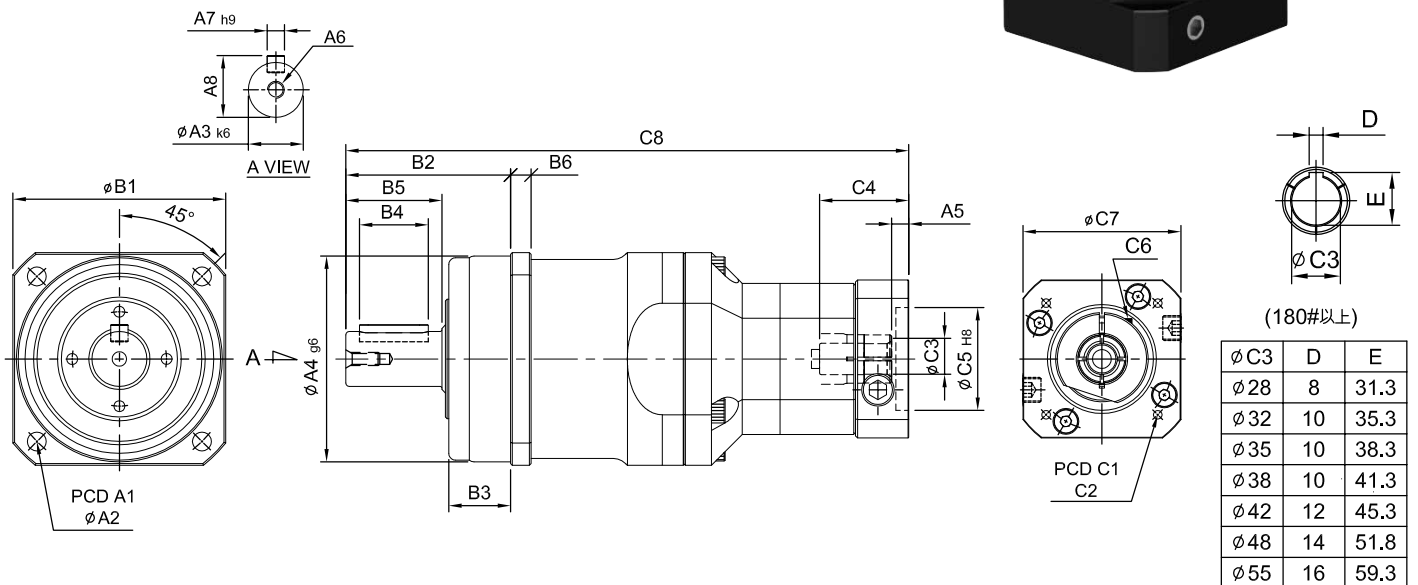
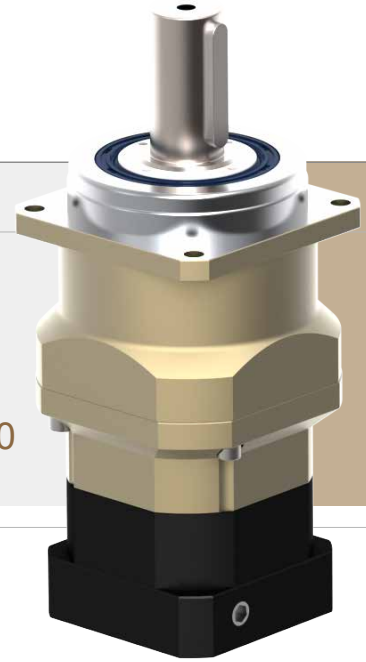
| 速比 Ratio | 62   | 75   | 100  | 142  | 180   |
|----------|------|------|------|------|-------|
| 3        | 0.15 | 0.60 | 3.21 | 9.18 | 28.82 |
| 4        | 0.14 | 0.51 | 2.80 | 7.51 | 23.56 |
| 5        | 0.13 | 0.45 | 2.71 | 7.40 | 23.74 |
| 6        | 0.13 | 0.45 | 2.65 | 7.15 | 22.65 |
| 7        | 0.12 | 0.42 | 2.54 | 7.15 | 22.40 |
| 8        | 0.12 | 0.42 | 2.51 | 7.01 | 22.35 |
| 9        | 0.12 | 0.42 | 2.51 | 7.01 | 22.35 |
| 10       | 0.12 | 0.42 | 2.51 | 7.01 | 22.35 |

# SERVOBOX Planetary Reducers

## MODEL : SF

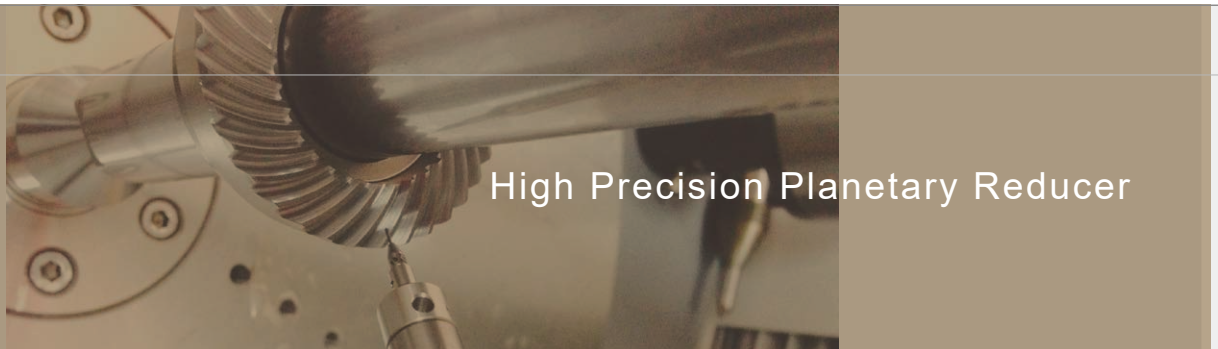
雙段 2-Stage

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



unit: mm

| Model Code | 62           | 75                | 100                  | 142               | 180               |
|------------|--------------|-------------------|----------------------|-------------------|-------------------|
| <b>A</b>   |              |                   |                      |                   |                   |
| A1         | 68           | 85                | 120                  | 165               | 215               |
| A2         | 5.5          | 6.8               | 9                    | 11                | 13                |
| A3         | 16           | 22                | 32                   | 40                | 55                |
| A4         | 60           | 70                | 90                   | 130               | 160               |
| A5         | 5            | 6                 | 9                    | 10                | 10                |
| A6         | M5 x P0.8    | M8 x P1.25        | M10 x P1.5           | M12 x P1.75       | M14 x P2.0        |
| A7         | 5            | 6                 | 10                   | 12                | 16                |
| A8         | 18           | 24.5              | 35                   | 43                | 59                |
| <b>B</b>   |              |                   |                      |                   |                   |
| B1         | 62           | 76                | 106                  | 142               | 180               |
| B2         | 48           | 56                | 88                   | 112               | 112               |
| B3         | 18           | 18                | 27                   | 27                | 26                |
| B4         | 20           | 32                | 50                   | 70                | 70                |
| B5         | 28           | 36                | 58                   | 82                | 82                |
| B6         | 6            | 7                 | 10                   | 12                | 15                |
| <b>C</b>   |              |                   |                      |                   |                   |
| C1         | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 110 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   |
| C2         | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10     | M8 · M10 · M12    |
| C3         | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32 | 28 · 32 · 35 · 38 |
| C4         | 26           | 33.5              | 59                   | 67                | 84.5              |
| C5         | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   |
| C6         | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        |
| C7         | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   |
| C8         | 164          | 198.8 · 206.8     | 278                  | 344               | 395               |



| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62  | 75    | 100   | 142    | 180    |
|--|------------|------------|-------------|---|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 59  | 165   | 216   | 625    | 1,206  |
|  |            |            | 20          | 51  | 146   | 208   | 555    | 1,069  |
|  |            |            | 25          | 48  | 155   | 333   | 618    | 1,189  |
|  |            |            | 30          | 45  | 150   | 315   | 583    | 1,118  |
|  |            |            | 35          | 45  | 142   | 309   | 573    | 1,108  |
|  |            |            | 40          | 51  | 146   | 208   | 555    | 1,070  |
|  |            |            | 50          | 48  | 155   | 333   | 618    | 1,189  |
|  |            |            | 60          | 45  | 150   | 315   | 583    | 1,118  |
|  |            |            | 70          | 45  | 142   | 309   | 573    | 1,108  |
|  |            |            | 80          | 43  | 141   | 305   | 553    | 1,070  |
|  |            |            | 90          | 44  | 140   | 293   | 516    | 993    |
| 100  | 43         | 136        | 294         | 549   | 1,059 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 100    | 3,000   | 3,000 | 3,000 | 3,000  | 3,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 100    | 6,000   | 6,000 | 5,000 | 5,000  | 4,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 100    | -   | -     | ≤ 3   | ≤ 3    | ≤ 3    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 100    | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 100    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 100    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 100    | 8   | 15    | 27    | 60     | 140    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 100    | 2,240   | 4,150 | 8,760 | 12,750 | 17,860 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 100    | 1,920   | 3,780 | 7,500 | 10,840 | 15,180 |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 100    | ≥ 94%   |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 100    | - 25° C ~ + 90° C   |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 100    | IP65  |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 100    | 任意方向 Any  |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 100    | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65   | ≤ 67   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 100    | 2.52  | 4.8   | 8.48  | 19.98  | 37.3   |

■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

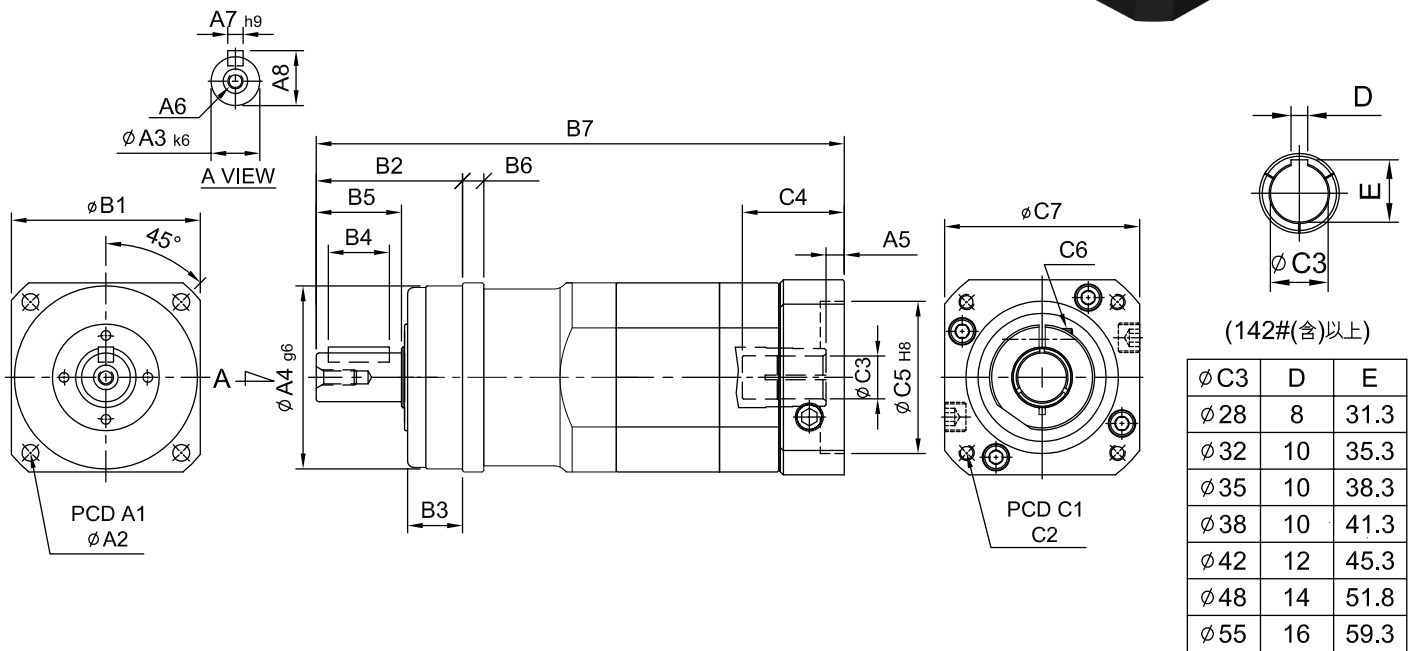
| 速比 Ratio | 62   | 75   | 100  | 142  | 180  |
|----------|------|------|------|------|------|
| 15       | 0.03 | 0.13 | 0.47 | 2.63 | 7.30 |
| 20       | 0.03 | 0.13 | 0.47 | 2.63 | 7.30 |
| 25       | 0.03 | 0.13 | 0.47 | 2.63 | 7.10 |
| 30       | 0.03 | 0.13 | 0.47 | 2.43 | 7.10 |
| 35       | 0.03 | 0.13 | 0.47 | 2.43 | 7.10 |
| 40       | 0.03 | 0.13 | 0.47 | 2.43 | 6.92 |
| 50       | 0.03 | 0.13 | 0.44 | 2.43 | 6.92 |
| 60       | 0.03 | 0.13 | 0.44 | 2.39 | 6.72 |
| 70       | 0.03 | 0.13 | 0.44 | 2.39 | 6.72 |
| 80       | 0.03 | 0.13 | 0.44 | 2.39 | 6.72 |
| 90       | 0.03 | 0.13 | 0.44 | 2.39 | 6.72 |
| 100      | 0.03 | 0.13 | 0.44 | 2.39 | 6.72 |

# SERVOBOX Planetary Reducers

## MODEL : SF-A

雙段 2-Stage

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



unit: mm

| Model Code  | 62A               | 75A                  | 100A            | 142A              | 180A                   |
|-------------|-------------------|----------------------|-----------------|-------------------|------------------------|
| <b>A</b> A1 | 68                | 85                   | 120             | 165               | 215                    |
| A2          | 5.5               | 6.8                  | 9               | 11                | 13                     |
| A3          | 16                | 22                   | 32              | 40                | 55                     |
| A4          | 60                | 70                   | 90              | 130               | 160                    |
| A5          | 6                 | 8                    | 10.5            | 10                | 11.5 · 13.5            |
| A6          | M5 x P0.8         | M8 x P1.25           | M10 x P1.5      | M12 x P1.75       | M14 x P2.0             |
| A7          | 5                 | 6                    | 10              | 12                | 16                     |
| A8          | 18                | 24.5                 | 35              | 43                | 59                     |
| <b>B</b> B1 | 62                | 76                   | 106             | 142               | 180                    |
| B2          | 48                | 56                   | 88              | 112               | 112                    |
| B3          | 18                | 18                   | 27              | 27                | 26                     |
| B4          | 20                | 32                   | 50              | 70                | 70                     |
| B5          | 28                | 36                   | 58              | 82                | 82                     |
| B6          | 6                 | 7                    | 10              | 12                | 15                     |
| B7          | 173.3 · 181.3     | 214                  | 282.5           | 373               | 441 · 443              |
| <b>C</b> C1 | 70 · 75 · 90      | 90 · 110 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215   | 200 · 215 · 265        |
| C2          | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10   | M8 · M10 · M12    | M10 · M12 · M16        |
| C3          | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 24 · 28 · 32    | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
| C4          | 33.5              | 51                   | 67.5            | 84.5              | 114.5 · 116.5          |
| C5          | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180   | 114.3 · 180 · 230      |
| C6          | M5 x P0.8         | M6 x P1.0            | M8 x P1.25      | M10 x P1.5        | M10 x P1.5             |
| C7          | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 150 · 190   | 182 · 200 · 250        |





## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62A   | 75A   | 100A  | 142A   | 180A   |
|--|------------|------------|-------------|---|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 59  | 165   | 216   | 625    | 1,206  |
|  |            |            | 20          | 51  | 146   | 208   | 555    | 1,069  |
|  |            |            | 25          | 48  | 155   | 333   | 618    | 1,189  |
|  |            |            | 30          | 45  | 150   | 315   | 583    | 1,118  |
|  |            |            | 35          | 45  | 142   | 309   | 573    | 1,108  |
|  |            |            | 40          | 51  | 146   | 208   | 555    | 1,069  |
|  |            |            | 50          | 48  | 155   | 333   | 618    | 1,189  |
|  |            |            | 70          | 45  | 142   | 309   | 573    | 1,108  |
| 100  | 43         | 136        | 294         | 549   | 1,059 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 100    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 100    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 100    | 3,000   | 3,000 | 3,000 | 3,000  | 3,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 100    | 6,000   | 6,000 | 5,000 | 5,000  | 4,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 100    | -   | ≤ 3   | ≤ 3   | ≤ 3    | ≤ 3    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 100    | ≤ 5   | ≤ 5   | ≤ 5   | ≤ 5    | ≤ 5    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 100    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 100    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 100    | 8   | 15    | 27    | 60     | 140    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 100    | 2,240   | 4,150 | 8,760 | 12,750 | 17,860 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 100    | 1,920   | 3,780 | 7,500 | 10,840 | 15,180 |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 100    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 100    | ≥ 94%   |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 100    | - 25° C ~ + 90° C   |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 100    | 全合成潤滑油脂 Synthetic Grease  |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 100    | IP65  |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 100    | 任意方向 Any  |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 100    | ≤ 58  | ≤ 60  | ≤ 63  | ≤ 65   | ≤ 67   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 100    | 2.6   | 8.2   | 11.5  | 25.6   | 43     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

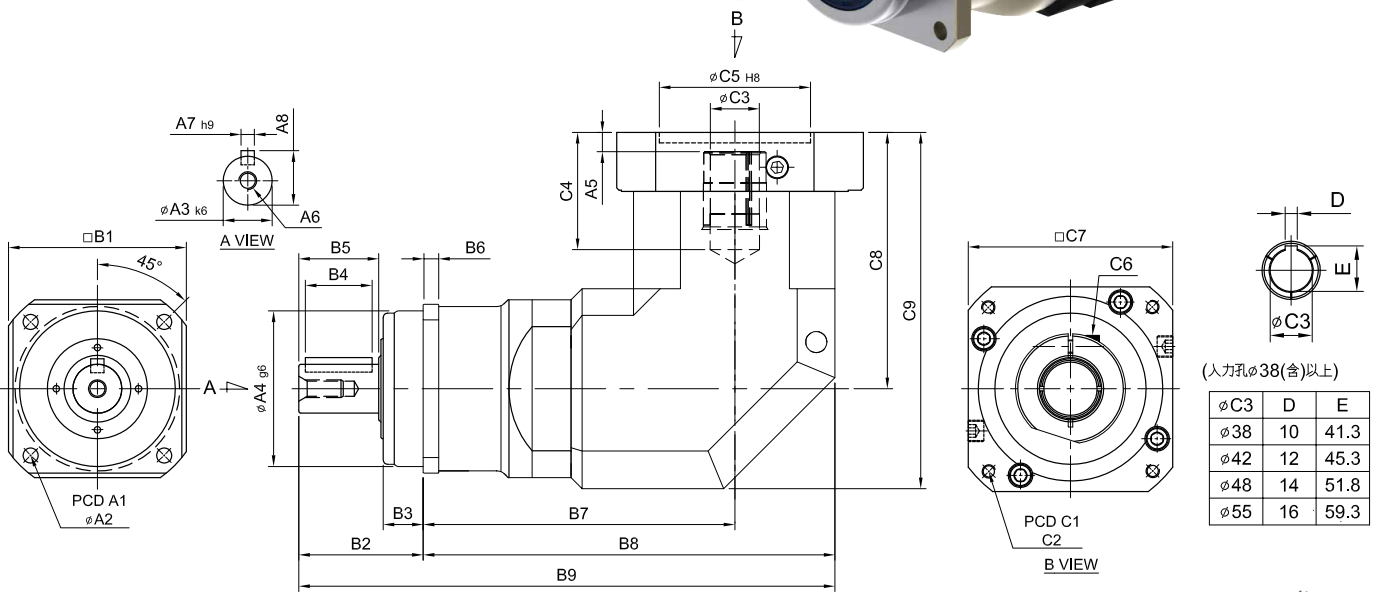
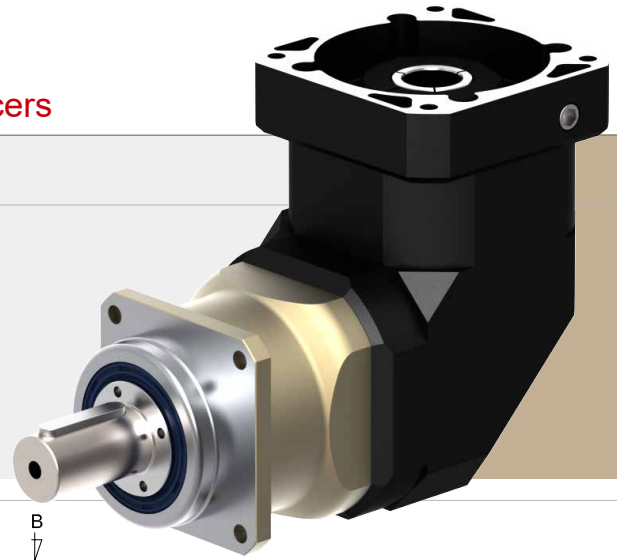
| 速比 Ratio | 62A  | 75A  | 100A | 142A | 180A  |
|----------|------|------|------|------|-------|
| 15       | 0.15 | 0.60 | 3.21 | 9.18 | 28.82 |
| 20       | 0.14 | 0.51 | 2.80 | 7.51 | 23.56 |
| 25       | 0.13 | 0.45 | 2.71 | 7.40 | 23.24 |
| 30       | 0.15 | 0.60 | 3.21 | 9.18 | 28.82 |
| 35       | 0.12 | 0.42 | 2.54 | 7.15 | 22.40 |
| 40       | 0.14 | 0.51 | 2.80 | 7.51 | 23.56 |
| 50       | 0.13 | 0.45 | 2.71 | 7.40 | 23.24 |
| 70       | 0.12 | 0.42 | 2.54 | 7.15 | 22.40 |
| 100      | 0.12 | 0.42 | 2.51 | 7.01 | 22.35 |

# SERVOBOX Planetary Reducers

## MODEL : SFL

單段 1-Stage

RATIO : 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



unit: mm

| Model Code  | 62                | 75                   | 100             | 142               | 180                    |
|-------------|-------------------|----------------------|-----------------|-------------------|------------------------|
| <b>A</b> A1 | 68                | 85                   | 120             | 165               | 215                    |
| A2          | 5.5               | 6.8                  | 9               | 11                | 13                     |
| A3          | 16                | 22                   | 32              | 40                | 55                     |
| A4          | 60                | 70                   | 90              | 130               | 160                    |
| A5          | 6                 | 9                    | 10              | 10                | 12.5 · 14.5            |
| A6          | M5 x P0.8         | M8 x P1.25           | M10 x P1.5      | M12 x P1.75       | M14 x P2.0             |
| A7          | 5                 | 6                    | 10              | 12                | 16                     |
| A8          | 18                | 24.5                 | 35              | 43                | 59                     |
| <b>B</b> B1 | 62                | 76                   | 106             | 142               | 180                    |
| B2          | 48                | 56                   | 88              | 112               | 112                    |
| B3          | 18                | 18                   | 27              | 27                | 26                     |
| B4          | 20                | 32                   | 50              | 70                | 70                     |
| B5          | 28                | 36                   | 58              | 82                | 82                     |
| B6          | 6                 | 7                    | 10              | 12                | 15                     |
| B7          | 97                | 142.9                | 162             | 191               | 254.1                  |
| B8          | 128               | 187.9                | 222             | 262               | 344.1                  |
| B9          | 176               | 243.9                | 310             | 374               | 456.1                  |
| <b>C</b> C1 | 70 · 75 · 90      | 90 · 110 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215   | 200 · 215 · 265        |
| C2          | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10   | M8 · M10 · M12    | M10 · M12 · M16        |
| C3          | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 24 · 28 · 32    | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
| C4          | 33.5 · 41.5       | 53 · 67.5            | 67 · 77         | 85                | 117 · 119              |
| C5          | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180   | 114.3 · 180 · 230      |
| C6          | M5 x P0.8         | M6 x P1.0            | M8 x P1.25      | M10 x P1.5        | M10 x P1.5             |
| C7          | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 150 · 190   | 182 · 200 · 250        |
| C8          | 77 · 85           | 115.3                | 141             | 165.7             | 235 · 237              |
| C9          | 108 · 116         | 160.3                | 201             | 236.7             | 325 · 327              |



| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62  | 75    | 100   | 142    | 180    |
|--|------------|------------|-------------|---|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 3           | 59  | 165   | 216   | 625    | 1,206  |
|  |            |            | 4           | 51  | 146   | 208   | 555    | 1,069  |
|  |            |            | 5           | 48  | 155   | 333   | 618    | 1,189  |
|  |            |            | 6           | 45  | 150   | 315   | 583    | 1,118  |
|  |            |            | 7           | 45  | 142   | 309   | 573    | 1,108  |
|  |            |            | 8           | 43  | 141   | 305   | 553    | 1,070  |
|  |            |            | 9           | 44  | 140   | 293   | 516    | 993    |
|  |            |            | 10          | 43  | 136   | 294   | 549    | 1,059  |
|  |            |            | 12          | 45  | 150   | 315   | 583    | 1,118  |
|  |            |            | 14          | 45  | 142   | 309   | 573    | 1,108  |
|  |            |            | 16          | 43  | 141   | 305   | 553    | 1,070  |
| 18   | 44         | 140        | 293         | 516   | 993   |       |        |        |
| 20   | 43         | 138        | 294         | 549   | 1,059 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 3 ~ 20      | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 3 ~ 20      | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 3 ~ 20      | 3,000   | 3,000 | 3,000 | 3,000  | 3,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 3 ~ 20      | 6,000   | 6,000 | 6,000 | 5,000  | 4,000  |
| 背隙 Backlash Ps   |            | arcmin     | 3 ~ 20      | -   | ≤ 2   | ≤ 2   | ≤ 2    | ≤ 2    |
| 背隙 Backlash P0   |            | arcmin     | 3 ~ 20      | ≤ 4   | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P1   |            | arcmin     | 3 ~ 20      | ≤ 6   | ≤ 6   | ≤ 6   | ≤ 6    | ≤ 6    |
| 背隙 Backlash P2   |            | arcmin     | 3 ~ 20      | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8    | ≤ 8    |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 3 ~ 20      | 8   | 15    | 27    | 60     | 150    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 3 ~ 20      | 2,240   | 4,150 | 8,760 | 12,750 | 17,860 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 3 ~ 20      | 1,920   | 3,780 | 7,500 | 10,840 | 15,180 |
| 使用壽命 Service Life  | $L_H$      | hr         | 3 ~ 20      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 3 ~ 20      | ≥ 95%   |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 3 ~ 20      | - 25° C ~ + 90° C   |       |       |        |        |
| 潤滑 Lubrication   |            |            | 3 ~ 20      | 全合成潤滑油脂 Synthetic Grease  |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 3 ~ 20      | IP65  |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 3 ~ 20      | 任意方向 Any  |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 3 ~ 20      | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74   | ≤ 76   |
| 重量 Weight ±3%  |            | Kg         | 3 ~ 20      | 2.7   | 7.5   | 10.9  | 25.6   | 57.9   |

■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

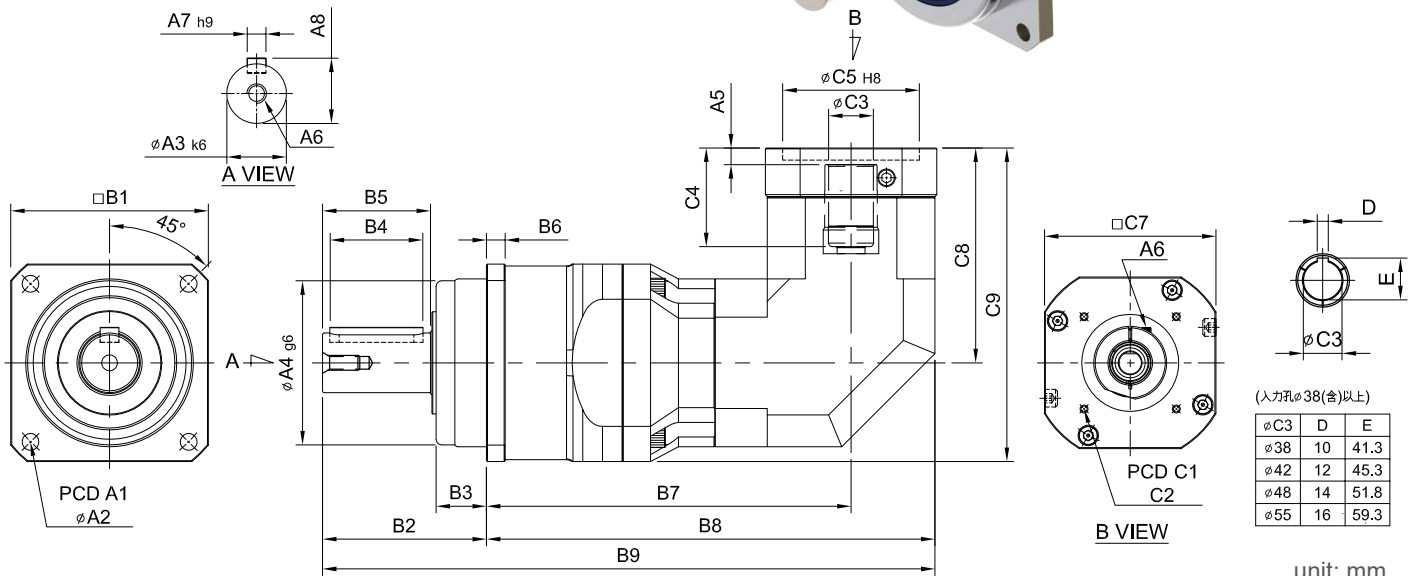
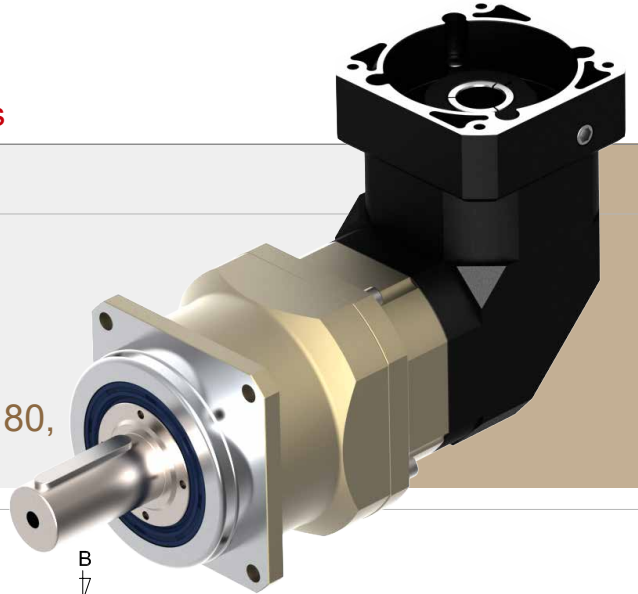
| 速比 Ratio | 62   | 75   | 100  | 142   | 180   |
|----------|------|------|------|-------|-------|
| 3        | 0.30 | 2.11 | 6.42 | 18.36 | 57.65 |
| 4        | 0.28 | 2.02 | 5.61 | 18.02 | 56.17 |
| 5        | 0.26 | 2.01 | 5.42 | 17.21 | 55.05 |
| 6        | 0.24 | 2.00 | 5.33 | 16.50 | 53.44 |
| 7        | 0.24 | 1.97 | 5.09 | 15.85 | 51.10 |
| 8        | 0.24 | 1.94 | 5.06 | 14.94 | 49.03 |
| 9        | 0.24 | 1.94 | 5.04 | 14.61 | 48.08 |
| 10       | 0.24 | 1.94 | 5.02 | 14.02 | 41.33 |
| 12       | 0.22 | 1.94 | 4.98 | 13.86 | 41.12 |
| 14       | 0.22 | 1.94 | 4.95 | 13.53 | 40.50 |
| 16       | 0.21 | 1.92 | 4.91 | 13.03 | 40.11 |
| 18       | 0.21 | 1.91 | 4.87 | 12.57 | 39.73 |
| 20       | 0.20 | 1.88 | 4.75 | 12.11 | 38.65 |

# SERVOBOX Planetary Reducers

## MODEL : SFL

雙段 2-Stage

RATIO : 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



unit: mm

| Model Code  | Model        |                   |                      |                   |                   |
|-------------|--------------|-------------------|----------------------|-------------------|-------------------|
|             | 62           | 75                | 100                  | 142               | 180               |
| <b>A</b> A1 | 68           | 85                | 120                  | 165               | 215               |
| A2          | 5.5          | 6.8               | 9                    | 11                | 13                |
| A3          | 16           | 22                | 32                   | 40                | 55                |
| A4          | 60           | 70                | 90                   | 130               | 160               |
| A5          | 6            | 6                 | 9                    | 10                | 10                |
| A6          | M5 x P0.8    | M8 x P1.25        | M10 x P1.5           | M12 x P1.75       | M14 x P2.0        |
| A7          | 5            | 6                 | 10                   | 12                | 16                |
| A8          | 18           | 24.5              | 35                   | 43                | 59                |
| <b>B</b> B1 | 62           | 76                | 106                  | 142               | 180               |
| B2          | 48           | 56                | 88                   | 112               | 112               |
| B3          | 18           | 18                | 27                   | 27                | 26                |
| B4          | 20           | 32                | 50                   | 70                | 70                |
| B5          | 28           | 36                | 58                   | 82                | 82                |
| B6          | 6            | 7                 | 10                   | 12                | 15                |
| B7          | 123          | 148.3             | 195.6                | 240               | 280               |
| B8          | 145          | 179.3             | 240.6                | 300               | 351               |
| B9          | 193          | 235.3             | 328.6                | 412               | 463               |
| <b>C</b> C1 | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 110 · 115 · 145 | 115 · 145 · 165   | 145 · 165 · 215   |
| C2          | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8 · M10   | M6 · M8 · M10     | M8 · M10 · M12    |
| C3          | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 24 · 28 · 32 · 35 | 28 · 32 · 35 · 38 |
| C4          | 27           | 33.5 · 41.5       | 53                   | 67                | 85                |
| C5          | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 95 · 110 · 130    | 110 · 130 · 180   |
| C6          | M4 x P0.7    | M5 x P0.8         | M6 x P1.0            | M8 x P1.25        | M10 x P1.5        |
| C7          | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150   | 146 · 150 · 190   |
| C8          | 61           | 77 · 85           | 115.3                | 141               | 165.7             |
| C9          | 92           | 117 · 125         | 168.3                | 212               | 255.7             |





## High Precision Planetary Reducer

| 規格 Model No.   | 代號         | 單位 Unit   | 速比 Ratio | 62  | 75    | 100   | 142    | 180    |
|--|------------|-----------|----------|---|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm        | 15       | 59  | 165   | 216   | 625    | 1,206  |
|  |            |           | 20       | 51  | 146   | 208   | 555    | 1,069  |
|  |            |           | 25       | 48  | 155   | 333   | 618    | 1,189  |
|  |            |           | 30       | 45  | 150   | 315   | 583    | 1,118  |
|  |            |           | 35       | 45  | 142   | 309   | 573    | 1,108  |
|  |            |           | 40       | 43  | 141   | 305   | 553    | 1,070  |
|  |            |           | 50       | 48  | 155   | 333   | 618    | 1,189  |
|  |            |           | 60       | 45  | 150   | 315   | 583    | 1,118  |
|  |            |           | 70       | 45  | 142   | 309   | 573    | 1,108  |
|  |            |           | 80       | 43  | 141   | 305   | 553    | 1,070  |
|  |            |           | 90       | 44  | 140   | 293   | 516    | 993    |
|  |            |           | 100      | 43  | 136   | 294   | 549    | 1,059  |
|  |            |           | 120      | 45  | 150   | 315   | 583    | 1,118  |
|  |            |           | 140      | 45  | 142   | 309   | 573    | 1,108  |
| 160  | 43         | 141       | 305      | 553   | 1,070 |       |        |        |
| 180  | 44         | 140       | 293      | 516   | 993   |       |        |        |
| 200  | 51         | 146       | 208      | 555   | 1,069 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm        | 15 ~ 200 | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm        | 15 ~ 200 | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm       | 15 ~ 200 | 3,000   | 3,000 | 3,000 | 3,000  | 3,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm       | 15 ~ 200 | 6,000   | 6,000 | 5,000 | 5,000  | 4,000  |
| 背隙 Backlash Ps   |            | arcmin    | 15 ~ 200 | -   | -     | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P0   |            | arcmin    | 15 ~ 200 | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin    | 15 ~ 200 | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin    | 15 ~ 200 | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12   | ≤ 12   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin | 15 ~ 200 | 8   | 15    | 27    | 60     | 150    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N         | 15 ~ 200 | 2,240   | 4,150 | 8,760 | 12,750 | 17,860 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N         | 15 ~ 200 | 1,920   | 3,780 | 7,500 | 10,840 | 15,180 |
| 使用壽命 Service Life  | $L_H$      | hr        | 15 ~ 200 | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %         | 15 ~ 200 | ≥ 92%   |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C        | 15 ~ 200 | - 25° C ~ + 90° C   |       |       |        |        |
| 潤滑 Lubrication   |            |           | 15 ~ 200 | 全合成潤滑油脂 Synthetic Grease  |       |       |        |        |
| 防護等級 Protection Class                                    |            |           | 15 ~ 200 | IP65  |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |           | 15 ~ 200 | 任意方向 Any  |       |       |        |        |
| 噪音值 Noise Level  |            | dB        | 15 ~ 200 | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74   | ≤ 76   |
| 重量 Weight ±3%  |            | Kg        | 15 ~ 200 | 2.93  | 4.8   | 11.38 | 21.5   | 46.47  |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

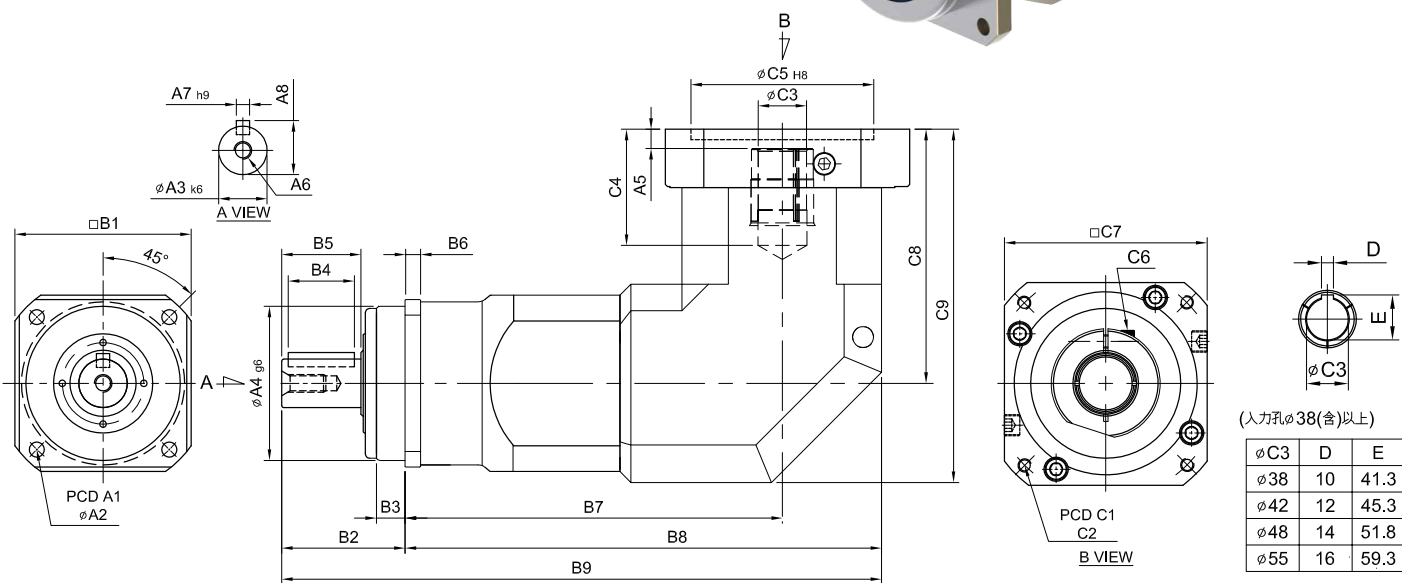
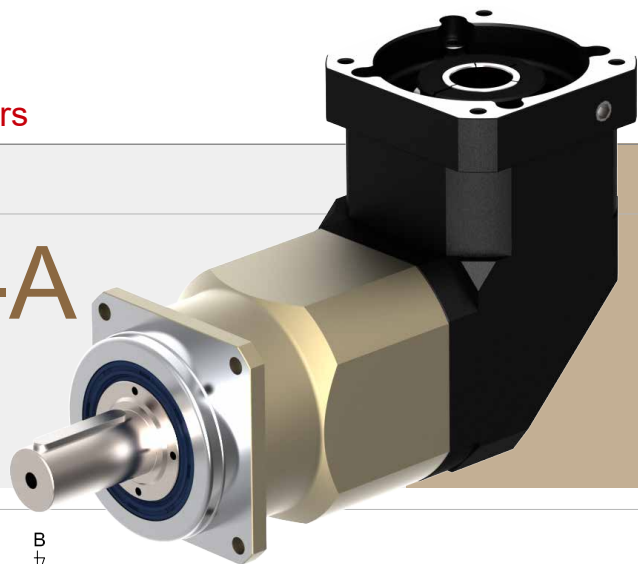
| 速比 Ratio | 62   | 75   | 100  | 142  | 180  |
|----------|------|------|------|------|------|
| 15       | 0.09 | 0.34 | 2.20 | 6.85 | 26.2 |
| 20       | 0.09 | 0.34 | 2.20 | 6.85 | 26.2 |
| 25       | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 30       | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 35       | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 40       | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 50       | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 60       | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 70       | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 80       | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 90       | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 100      | 0.09 | 0.34 | 2.20 | 6.85 | 23.1 |
| 120      | 0.03 | 0.30 | 1.86 | 6.20 | 21.2 |
| 140      | 0.03 | 0.30 | 1.86 | 6.20 | 21.2 |
| 160      | 0.03 | 0.30 | 1.86 | 6.20 | 21.2 |
| 180      | 0.03 | 0.30 | 1.86 | 6.20 | 21.2 |
| 200      | 0.03 | 0.30 | 1.86 | 6.20 | 21.2 |

# SERVOBOX Planetary Reducers

## MODEL : SFL-A

雙段 2-Stage

RATIO : 15, 20, 25, 30, 35, 40, 50, 60,  
70, 80, 100, 140, 200



unit: mm

| Model Code | 62A          | 75A                  | 100A            | 142A            | 180A              |
|------------|--------------|----------------------|-----------------|-----------------|-------------------|
| <b>A</b>   |              |                      |                 |                 |                   |
| A1         | 68           | 85                   | 120             | 165             | 215               |
| A2         | 5.5          | 6.8                  | 9               | 11              | 13                |
| A3         | 16           | 22                   | 32              | 40              | 55                |
| A4         | 60           | 70                   | 90              | 130             | 160               |
| A5         | 6            | 9                    | 10              | 10              | 12.5 · 14.5       |
| A6         | M5 x P0.8    | M8 x P1.25           | M10 x P1.5      | M12 x P1.75     | M14 x P2.0        |
| A7         | 5            | 6                    | 10              | 12              | 16                |
| A8         | 18           | 24.5                 | 35              | 43              | 59                |
| <b>B</b>   |              |                      |                 |                 |                   |
| B1         | 62           | 76                   | 106             | 142             | 180               |
| B2         | 48           | 56                   | 88              | 112             | 112               |
| B3         | 18           | 18                   | 27              | 27              | 26                |
| B4         | 20           | 32                   | 50              | 70              | 70                |
| B5         | 28           | 36                   | 58              | 82              | 82                |
| B6         | 6            | 7                    | 10              | 12              | 15                |
| B7         | 130.8        | 173.9                | 206             | 258             | 335.1             |
| B8         | 161.8        | 218.9                | 266             | 329             | 425.1             |
| B9         | 209.8        | 274.9                | 354             | 441             | 537.1             |
| <b>C</b>   |              |                      |                 |                 |                   |
| C1         | 70 · 75 · 90 | 90 · 110 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215 | 200 · 215 · 265   |
| C2         | M4 · M5 · M6 | M5 · M6 · M8         | M6 · M8 · M10   | M8 · M10 · M12  | M10 · M12 · M16   |
| C3         | 14 · 19      | 19 · 22 · 24         | 24 · 28 · 32    | 28 · 32 · 35    | 38 · 42 · 48 · 55 |
| C4         | 33.5 · 41.5  | 53 · 67.5            | 67 · 77         | 85              | 117 · 119         |
| C5         | 50 · 60 · 70 | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180 | 114.3 · 180 · 230 |
| C6         | M5 x P0.8    | M6 x P1.0            | M8 x P1.25      | M10 x P1.5      | M10 x P1.5        |
| C7         | 64 · 70 · 80 | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 150 · 190 | 182 · 200 · 250   |
| C8         | 77 · 85      | 115.3                | 141             | 165.7           | 235 · 237         |
| C9         | 108 · 116    | 160.3                | 201             | 236.7           | 325 · 327         |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 62A   | 75A   | 100A  | 142A   | 180A   |
|--|------------|------------|-------------|---|-------|-------|--------|--------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 59  | 165   | 216   | 625    | 1,206  |
|  |            |            | 20          | 51  | 146   | 208   | 555    | 1,069  |
|  |            |            | 25          | 48  | 155   | 333   | 618    | 1,189  |
|  |            |            | 30          | 45  | 150   | 315   | 583    | 1,118  |
|  |            |            | 35          | 45  | 142   | 309   | 573    | 1,108  |
|  |            |            | 40          | 43  | 141   | 305   | 555    | 1,070  |
|  |            |            | 50          | 48  | 155   | 333   | 618    | 1,189  |
|  |            |            | 60          | 45  | 150   | 315   | 583    | 1,118  |
|  |            |            | 70          | 45  | 142   | 309   | 573    | 1,108  |
|  |            |            | 80          | 43  | 141   | 305   | 553    | 1,070  |
|  |            |            | 100         | 43  | 136   | 294   | 549    | 1,059  |
|  |            |            | 140         | 45  | 142   | 309   | 573    | 1,108  |
| 200  | 51         | 146        | 208         | 555   | 1,069 |       |        |        |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15 ~ 200    | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |       |       |        |        |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15 ~ 200    | 3 倍額定輸出力矩 3 Times of Rated Output Torque  |       |       |        |        |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15 ~ 200    | 3,000   | 3,000 | 3,000 | 3,000  | 3,000  |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15 ~ 200    | 6,000   | 6,000 | 5,000 | 5,000  | 4,000  |
| 背隙 Backlash Ps   |            | arcmin     | 15 ~ 200    | -   | ≤ 4   | ≤ 4   | ≤ 4    | ≤ 4    |
| 背隙 Backlash P0   |            | arcmin     | 15 ~ 200    | ≤ 7   | ≤ 7   | ≤ 7   | ≤ 7    | ≤ 7    |
| 背隙 Backlash P1   |            | arcmin     | 15 ~ 200    | ≤ 9   | ≤ 9   | ≤ 9   | ≤ 9    | ≤ 9    |
| 背隙 Backlash P2   |            | arcmin     | 15 ~ 200    | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12   | ≤ 12   |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15 ~ 200    | 8   | 15    | 27    | 60     | 150    |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15 ~ 200    | 2,240   | 4,150 | 8,760 | 12,750 | 17,860 |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15 ~ 200    | 1,920   | 3,780 | 7,500 | 10,840 | 15,180 |
| 使用壽命 Service Life  | $L_H$      | hr         | 15 ~ 200    | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |        |        |
| 效率 Efficiency  | $\eta$     | %          | 15 ~ 200    | ≥ 92%   |       |       |        |        |
| 使用溫度 Operating Temperature                               |            | °C         | 15 ~ 200    | - 25° C ~ + 90° C   |       |       |        |        |
| 潤滑 Lubrication   |            |            | 15 ~ 200    | 全合成潤滑油脂 Synthetic Grease  |       |       |        |        |
| 防護等級 Protection Class                                    |            |            | 15 ~ 200    | IP65  |       |       |        |        |
| 安裝方向 Mounting Position                                   |            |            | 15 ~ 200    | 任意方向 Any  |       |       |        |        |
| 噪音值 Noise Level  |            | dB         | 15 ~ 200    | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74   | ≤ 76   |
| 重量 Weight ±3%  |            | Kg         | 15 ~ 200    | 3.5   | 11.1  | 16.8  | 29.9   | 66.1   |

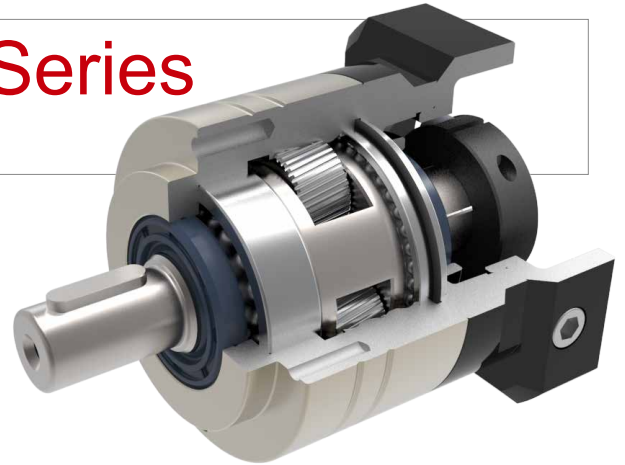
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 62A  | 75A  | 100A | 142A | 180A  |
|----------|------|------|------|------|-------|
| 15       | 0.15 | 0.60 | 3.21 | 9.18 | 28.82 |
| 20       | 0.14 | 0.51 | 2.80 | 7.51 | 23.56 |
| 25       | 0.13 | 0.45 | 2.71 | 7.40 | 23.24 |
| 30       | 0.12 | 0.43 | 2.66 | 7.32 | 22.91 |
| 35       | 0.12 | 0.42 | 2.54 | 7.15 | 22.40 |
| 40       | 0.14 | 0.51 | 2.80 | 7.51 | 23.56 |
| 50       | 0.13 | 0.45 | 2.71 | 7.40 | 23.24 |
| 60       | 0.12 | 0.43 | 2.66 | 7.32 | 22.91 |
| 70       | 0.12 | 0.42 | 2.54 | 7.15 | 22.40 |
| 80       | 0.14 | 0.51 | 2.80 | 7.51 | 23.56 |
| 100      | 0.13 | 0.45 | 2.71 | 7.40 | 23.24 |
| 140      | 0.12 | 0.42 | 2.54 | 7.15 | 22.40 |
| 200      | 0.11 | 0.41 | 2.48 | 7.02 | 22.14 |

# SERVOBOX Planetary Reducers

## Characteristic of SA Series

SA 系列產品特性



### 靜音

使用研磨等級螺旋傘齒輪及螺旋齒輪實現順暢安靜地運轉。

### Quiet Operation

Grinding spiral bevel gear & Helical gears contribute to reduce vibration and noise.

### 高剛性、高扭矩

使用整體式滿針滾針軸承，一體式內齒箱及螺旋齒輪，提高了剛性和扭矩。

### High Rigidity & High Torque

High rigidity & high torque are achieved by integrant needle roller bearings and one-piece constructed.

### 高效率

單段式在 95% 以上，雙段式在 92% 以上。

### High Efficiency

Efficiency for 1-stage model exceeds 95%; 2-stage model exceeds 92%.

## Indication of Model Numbers

機種型號表示

| SA           | 90                           | 10   |  | P1   | MOTOR                                  |
|--------------|------------------------------|--|--|--|--|
| 減速機型<br>Type | 型號<br>Model                  | 速比<br>Ratio  | 出力軸鍵槽<br>Output Bearing  | 背隙等級<br>Backlash Class   | 馬達型號<br>Motor Type                     |
| SA           | 50<br>70<br>90<br>120<br>160 | 單段 1-Stage<br>3, 4, 5, 7, 10<br><br>雙段 2-Stage<br>15, 20, 25, 30,<br>35, 40, 50, 70, 100 | □標準品 · 有鍵槽<br>Standard (Keyway)<br><br>N: 實心軸 · 無鍵槽<br>Solid Output Shaft<br>(No Keyway) | 單段 1-Stage<br>Ps ≤ 1<br>P0 ≤ 3<br>P1 ≤ 5<br>P2 ≤ 7<br>雙段 2-Stage<br>Ps ≤ 3<br>P0 ≤ 5<br>P1 ≤ 7<br>P2 ≤ 9 | 馬達製造商及型號<br>Motor Brand &<br>Model No. |



# Features of SA Series

## SA 系列產品特點



### 螺旋齒輪設計及高精度齒輪加工

減速機構採用螺旋齒輪設計，齒形嚙合率為一般正齒輪的二倍以上，具有運轉平順、低噪音、高輸出扭矩和低背隙的特性。

材料採用高級鎳鉻鉬合金鋼 (SNM220)，切削加工後，經滲碳熱處理至硬度 57~60HRC，再進行齒面研磨，確保齒輪精度 DIN6 級以內。

### Helical Gear Design

The speed reduction mechanism employs helical gears, which provides two times meshing rate when comparing with regular spur gears. In addition, it also features extremely smooth running, low noise, high torque output and low backlash.

### High Precision Gear Machining

Manufactured from high quality Ni-Cr-Mo alloy steel (SNM220), precision achined and carburized to hardness 57-60 HRC. Precision teeth grinding sure gear accuracy reaches DIN6 class.



### 一體式的行星臂架及雙懸臂設計

行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。

### Integrated Planetary Arm Bracket

The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy.



### 筒夾式連結機構

輸入端與馬達的連結採用筒夾式的鎖緊機構，並經動平衡分析，以確保在高輸入轉速下結合介面的同心度和平衡度，及零背隙的動力傳遞。

### Collet Locking Mechanism

The input-end and the motor are coupled through a collet locking mechanism. It has passed dynamical balance analysis to assure concentricity and balance on the connection and no backlash for power transmission while running at high speed.

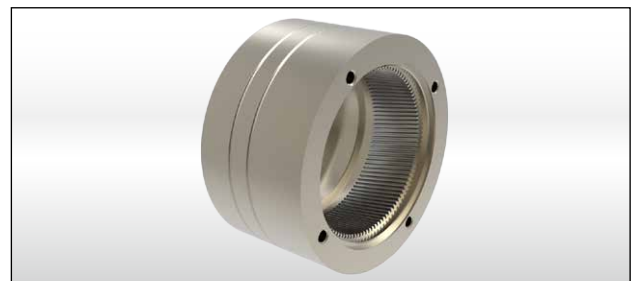


### 滿針滾針軸承設計

行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

### Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.



### 一體式齒輪箱本體

齒輪箱和內環齒輪採一體式的設計，提高結構剛性及輸出扭矩。

### One-piece Gear Box & Advanced Surface Treatment

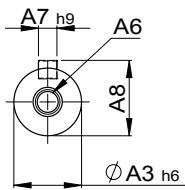
The gear box and internal ring gear are one-piece constructed to achieve high rigidity and high torque.

# SERVOBOX Planetary Reducers

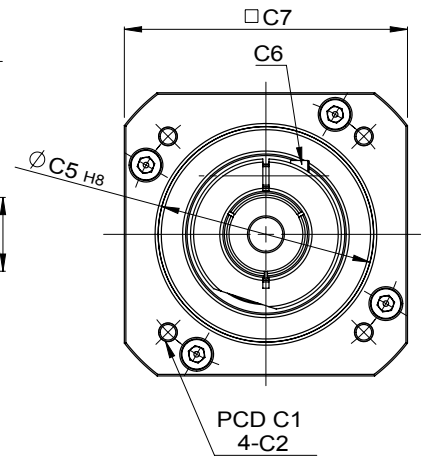
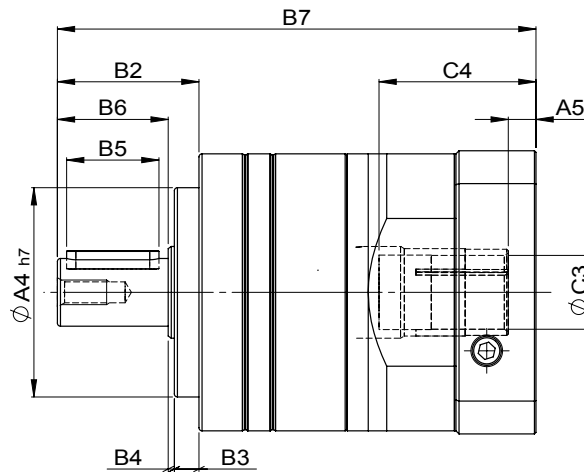
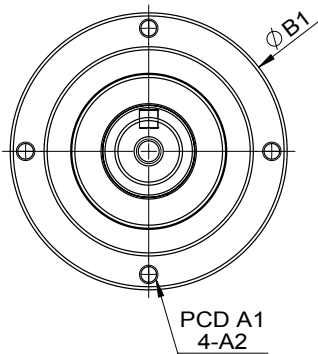
## MODEL : SA

單段 1-Stage

RATIO : 3, 4, 5, 7, 10

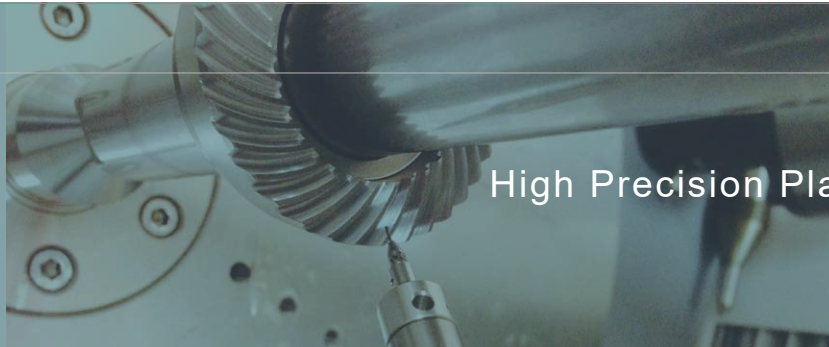


A VIEW



unit: mm

| Model    | 50                | 70           | 90                   | 120             | 160          |
|----------|-------------------|--------------|----------------------|-----------------|--------------|
| <b>A</b> |                   |              |                      |                 |              |
| Code     |                   |              |                      |                 |              |
| A1       | 44                | 62           | 80                   | 108             | 140          |
| A2       | M4 x 0.7          | M5 x 0.8     | M6 x 1.0             | M8 x 1.25       | M10 x 1.5    |
| A3       | 12                | 16           | 22                   | 32              | 40           |
| A4       | 35                | 52           | 68                   | 90              | 120          |
| A5       | 4.5               | 6            | 9 · 23.5             | 10 · 20         | 10           |
| A6       | M4 x 0.7          | M5 x 0.8     | M8 x 1.25            | M12 x 1.75      | M12 x 1.75   |
| A7       | 4                 | 5            | 6                    | 10              | 12           |
| A8       | 13.5              | 18           | 24.5                 | 35              | 43           |
| <b>B</b> |                   |              |                      |                 |              |
| B1       | 51                | 70           | 90                   | 122             | 160          |
| B2       | 25.5              | 36           | 46                   | 70              | 88           |
| B3       | 4                 | 6.5          | 8                    | 9               | 8            |
| B4       | 1.5               | 1.5          | 2                    | 3               | 2            |
| B5       | 15                | 20           | 30                   | 50              | 65           |
| B6       | 20                | 28           | 36                   | 58              | 78           |
| B7       | 96.5              | 115          | 155.5 · 170          | 211 · 221       | 238.5        |
| <b>C</b> |                   |              |                      |                 |              |
| C1       | 45 · 46 · 63 · 70 | 70 · 75 · 90 | 90 · 100 · 115 · 145 | 115 · 145 · 165 | 165          |
| C2       | M3 · M4 · M5      | M5 · M6      | M6 · M8              | M6 · M8 · M10   | M10          |
| C3       | 11 · 14           | 14 · 19      | 19 · 24              | 24 · 28 · 32    | 24 · 28 · 32 |
| C4       | 32                | 33.5 · 41    | 51 · 65.5            | 67 · 77         | 63           |
| C5       | 30 · 40 · 50      | 50 · 60 · 70 | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 130          |
| C6       | M4 x 0.7          | M5 x 0.8     | M6 x 1.0             | M8 x 1.25       | M8 x 1.25    |
| C7       | 46 · 55 · 60      | 70 · 75 · 80 | 92 · 110 · 130       | 122 · 130 · 150 | 150          |



## High Precision Planetary Reducer

| 規格<br>Model No.  | 代號         | 單位<br>Unit         | 速比<br>Ratio | 50  | 70        | 90        | 120       | 160       |
|--|------------|--------------------|-------------|---|-----------|-----------|-----------|-----------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm                 | 3           | 17  | 54        | -         | -         | 625       |
|  |            |                    | 4           | 15  | 48        | 146       | 208       | 555       |
|  |            |                    | 5           | 14  | 45        | 155       | 333       | 618       |
|  |            |                    | 9           | 13  | 41        | 142       | 309       | 573       |
|  |            |                    | 10          | 12  | 40        | 136       | 294       | 549       |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm                 | 3 ~ 10      | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm                 | 3 ~ 10      | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm                | 3 ~ 10      | 3,000   |           |           |           |           |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm                | 3 ~ 10      | 6,000   | 6,000     | 6,000     | 5,000     | 5,000     |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin          | 3 ~ 10      | 3   | 3         | 15        | 27        | 60        |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N                  | 3 ~ 10      | 320   | 800       | 4,150     | 8,760     | 9,300     |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N                  | 3 ~ 10      | 160   | 400       | 3,780     | 7,500     | 4,650     |
| 使用壽命 Service Life  | $L_H$      | hr                 | 3 ~ 10      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |
| 效率 Efficiency  | $\eta$     | %                  | 3 ~ 10      | $\geq 97\%$   |           |           |           |           |
| 使用溫度 Operating Temperature                               |            | $^{\circ}\text{C}$ | 3 ~ 10      | -25 $^{\circ}\text{C}$ ~ +90 $^{\circ}\text{C}$   |           |           |           |           |
| 潤滑 Lubrication   |            |                    | 3 ~ 10      | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |
| 防護等級 Protection Class                                    |            |                    | 3 ~ 10      | IP 65   |           |           |           |           |
| 安裝方向 Mounting Position                                   |            |                    | 3 ~ 10      | 任意方向 Any  |           |           |           |           |
| 噪音值 Noise Level  |            | dB                 | 3 ~ 10      | $\leq 58$   | $\leq 58$ | $\leq 60$ | $\leq 63$ | $\leq 65$ |
| 重量 Weight $\pm 2\%$                                      |            | Kg                 | 3 ~ 10      | 0.6   | 1.4       | 2.8       | 6.7       | 13.25     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

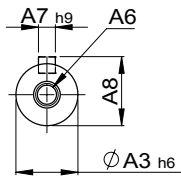
| 速比 Ratio | 50   | 70   | 90   | 120  | 160  |
|----------|------|------|------|------|------|
| 3        | 0.03 | 0.15 | -    | -    | 9.21 |
| 4        | 0.03 | 0.15 | 0.51 | 2.8  | 7.54 |
| 5        | 0.03 | 0.13 | 0.45 | 2.71 | 7.42 |
| 7        | 0.03 | 0.13 | 0.42 | 2.54 | 7.14 |
| 10       | 0.03 | 0.13 | 0.42 | 2.51 | 7.03 |

# SERVOBOX Planetary Reducers

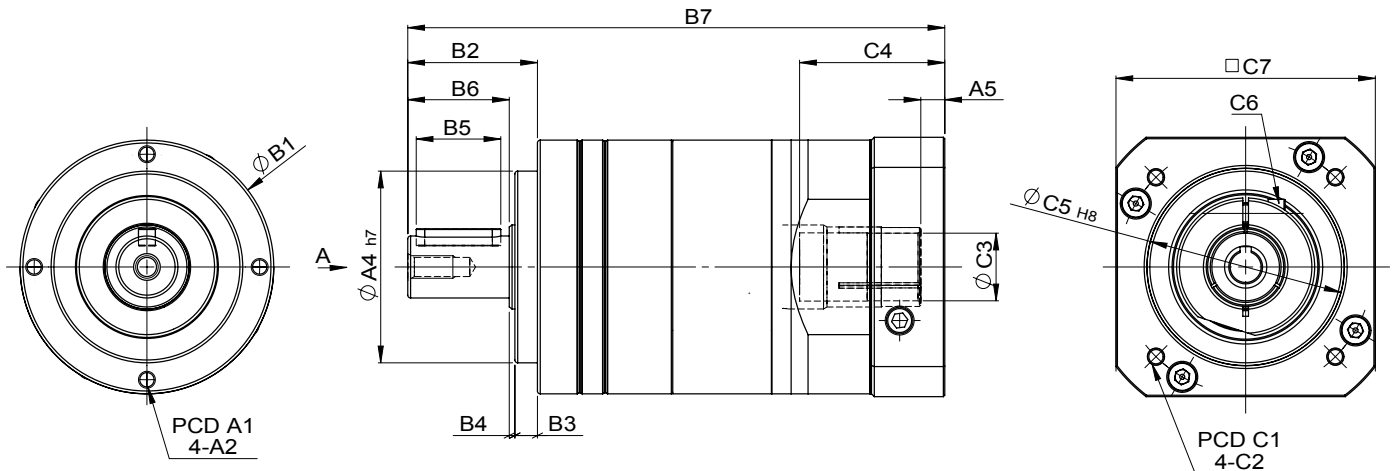
## MODEL : SA

雙段 2-Stage

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



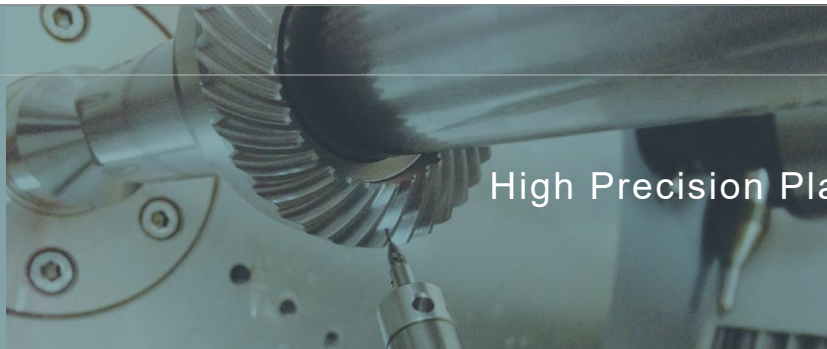
A VIEW



unit: mm

| Code     | Model    | 50                | 70           | 90                   | 120             | 160             |
|----------|----------|-------------------|--------------|----------------------|-----------------|-----------------|
|          | <b>A</b> | A1                | 44           | 62                   | 80              | 108             |
|          | A2       | M4 x 0.7          | M5 x 0.8     | M6 x 1.0             | M8 x 1.25       | M10 x 1.5       |
|          | A3       | 12                | 16           | 22                   | 32              | 40              |
|          | A4       | 35                | 52           | 68                   | 90              | 120             |
|          | A5       | 4.5               | 6            | 9 · 23.5             | 10 · 20         | 10              |
|          | A6       | M4 x 0.7          | M5 x 0.8     | M8 x 1.25            | M12 x 1.75      | M12 x 1.75      |
|          | A7       | 4                 | 5            | 6                    | 10              | 12              |
|          | A8       | 13.5              | 18           | 24.5                 | 35              | 43              |
| <b>B</b> | B1       | 51                | 70           | 90                   | 122             | 160             |
|          | B2       | 25.5              | 36           | 46                   | 70              | 88              |
|          | B3       | 4                 | 6.5          | 8                    | 9               | 8               |
|          | B4       | 1.5               | 1.5          | 2                    | 3               | 2               |
|          | B5       | 15                | 20           | 30                   | 50              | 65              |
|          | B6       | 20                | 28           | 36                   | 58              | 78              |
|          | B7       | 122.5             | 148.8        | 155.5 · 170          | 257             | 298.5           |
| <b>C</b> | C1       | 45 · 46 · 63 · 70 | 70 · 75 · 90 | 90 · 100 · 115 · 145 | 115 · 145 · 165 | 115 · 145 · 165 |
|          | C2       | M3 · M4 · M5      | M5 · M6      | M6 · M8              | M6 · M8 · M10   | M6 · M8 · M10   |
|          | C3       | 11 · 14           | 14 · 19      | 19 · 24              | 24 · 28 · 32    | 24 · 28 · 32    |
|          | C4       | 32                | 33.5 · 41    | 51 · 65.5            | 67 · 77         | 67              |
|          | C5       | 30 · 40 · 50      | 50 · 60 · 70 | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 95 · 110 · 130  |
|          | C6       | M4 x 0.7          | M5 x 0.8     | M6 x 1.0             | M8 x 1.25       | M8 x 1.25       |
|          | C7       | 46 · 55 · 60      | 70 · 75 · 80 | 92 · 110 · 130       | 122 · 130 · 150 | 122 · 130 · 150 |





## High Precision Planetary Reducer

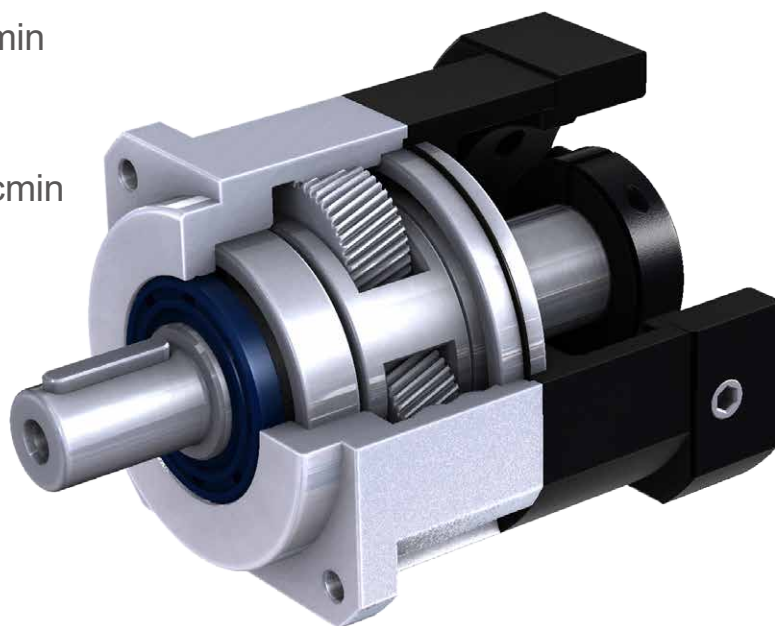
| 規格<br>Model No.  | 代號         | 單位<br>Unit | 速比<br>Ratio | 50  | 70           | 90           | 120          | 160          |
|--|------------|------------|-------------|---|--------------|--------------|--------------|--------------|
| 額定輸出扭矩<br>Rated Output Torque<br>(Nominal output torque) | $T_{2N}$   | Nm         | 15          | 17  | 54           | -            | -            | 625          |
|  |            |            | 20          | 15  | 48           | 126          | 267          | 555          |
|  |            |            | 25          | 14  | 45           | 158          | 296          | 618          |
|  |            |            | 30          | 13  | 41           | -            | -            | 583          |
|  |            |            | 35          | 13  | 41           | 128          | 275          | 573          |
|  |            |            | 40          | 12  | 39           | 123          | 265          | 553          |
|  |            |            | 50          | 14  | 45           | 138          | 296          | 618          |
|  |            |            | 70          | 13  | 41           | 128          | 275          | 573          |
|  |            |            | 100         | 12  | 40           | 121          | 262          | 549          |
| 最大加速扭矩 Max. Acceleration Torque                          | $T_{2B}$   | Nm         | 15~100      | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |              |              |              |              |
| 最大輸出扭矩 Max. Output Torque<br>急停扭矩 Emergency Stop Torque  | $T_{2NOT}$ | Nm         | 15~100      | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |              |              |              |              |
| 額定輸入轉速 Rated Input Speed                                 | $n_{1N}$   | rpm        | 15~100      | 3,000   |              |              |              |              |
| 最大輸入轉速 Max. Input Speed                                  | $n_{1B}$   | rpm        | 15~100      | 6,000   | 6,000        | 6,000        | 5,000        | 5,000        |
| 扭轉剛性 Torsional Rigidity                                  |            | Nm/arcmin  | 15~100      | 3   | 3            | 15           | 27           | 60           |
| 容許徑向力 Max. Radial Force                                  | $F_{2rB}$  | N          | 15~100      | 320   | 800          | 4,150        | 8,760        | 9,300        |
| 容許軸向力 Max. Axial Force                                   | $F_{2aB}$  | N          | 15~100      | 160   | 400          | 2,075        | 7,500        | 4,650        |
| 使用壽命 Service Life  | $L_H$      | hr         | 15~100      | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |              |              |              |              |
| 效率 Efficiency  | $\eta$     | %          | 15~100      | $\geq 94\%$   |              |              |              |              |
| 使用溫度 Operating Temperature                               |            | °C         | 15~100      | -25°C ~ +90°C   |              |              |              |              |
| 潤滑 Lubrication   |            |            | 15~100      | 全合成潤滑油脂 Synthetic Grease  |              |              |              |              |
| 防護等級 Protection Class                                    |            |            | 15~100      | IP 65   |              |              |              |              |
| 安裝方向 Mounting Position                                   |            |            | 15~100      | 任意方向 Any  |              |              |              |              |
| 噪音值 Noise Level  |            | dB         | 15~100      | $\leq 60$ dB  | $\leq 60$ dB | $\leq 63$ dB | $\leq 63$ dB | $\leq 65$ dB |
| 重量 Weight $\pm 2\%$                                      |            | Kg         | 15~100      | 1.05  | 2.2          | 4.48         | 9.84         | 18.5         |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 50   | 70   | 90   | 120  | 160  |
|----------|------|------|------|------|------|
| 15       | 0.03 | 0.13 | -    | -    | 2.63 |
| 20       | 0.03 | 0.13 | 0.13 | 0.47 | 2.63 |
| 25       | 0.03 | 0.13 | 0.13 | 0.47 | 2.63 |
| 30       | 0.03 | 0.13 | -    | -    | 2.43 |
| 35       | 0.03 | 0.13 | 0.13 | 0.47 | 2.43 |
| 40       | 0.03 | 0.13 | 0.13 | 0.47 | 2.43 |
| 50       | 0.03 | 0.13 | 0.13 | 0.44 | 2.43 |
| 70       | 0.03 | 0.13 | 0.13 | 0.44 | 2.39 |
| 100      | 0.03 | 0.13 | 0.13 | 0.44 | 2.39 |

# PB series

- 全系列單段背隙  $\leq 8$  弧分  
1-Stage Backlash  $\leq 8$  arcmin
- 全系列雙段背隙  $\leq 10$  弧分  
2-Stage Backlash  $\leq 10$  arcmin



## Indication of Model Numbers

### 機種型號表示

|               |  |   |   |                    |
|---------------|--|---|---|--------------------|
| PB            | 90   | 10  | □   | MOTOR              |
| 減速機機型<br>Type | 型號<br>Model                                | 速比<br>Ratio   | 出力軸鍵槽<br>Output Shaft Keyway  | 馬達型號<br>Motor Type |
| PB<br>PB-A    | 44<br>62<br>90<br>120<br>142<br>180<br>220 | 單段 1-Stage<br>3, 4, 5, 6, 7, 8, 9, 10<br><br>雙段 2-Stage<br>15, 20, 25, 30, 35, 40,<br>50, 60, 70, 80, 90, 100 | □ 標準品 · 有鍵槽<br>Standard (Keyway)<br><br>N: 實心軸 · 無鍵槽<br>Solid Output Shaft<br>(No Keyway) |                    |

**靜音**  
使用高精度斜齒輪實現順暢安靜地運轉。

**Quiet operation**  
Helical gears contribute to reduce vibration and noise.

**高扭矩**  
比一般正齒輪行星減速機扭矩高。

**High Torque**  
High output torque is in comparison with spur gear planetary gear reducers.

**高效率**  
單段式在 97% 以上，雙段式在 94% 以上。

**High Efficiency**  
Efficiency for 1-stage model exceeds 97%; 2-stage model exceeds 94%.

# Features of PB Series

## PB 系列產品特點

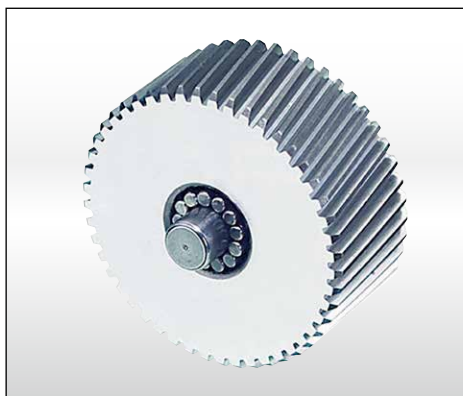


### 一體式行星臂架及雙懸臂設計

行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。

### Integrated Planetary Arm Bracket

The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy.



### 滿針滾針軸承設計

行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

### Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.



### 筒夾式連結機構

輸入端與馬達的連結採用筒夾式的鎖緊機構，並經動平衡分析，以確保在高輸入轉速下結合介面的同心度和平衡度，及零背隙的動力傳遞。

### Collet Locking Mechanism

The input-end and the motor are coupled through a collet locking mechanism. It has passed dynamical balance analysis to assure concentricity and balance on the connection and no backlash for power transmission while running at high speed.



### 一體式螺旋內齒輪箱

齒輪箱和內環齒輪採一體式的設計，減速機構採用螺旋齒輪設計，齒形嚙合率為一般正齒輪的二倍以上，具有運轉平順、低噪音、高輸出扭矩和低背隙的特性。

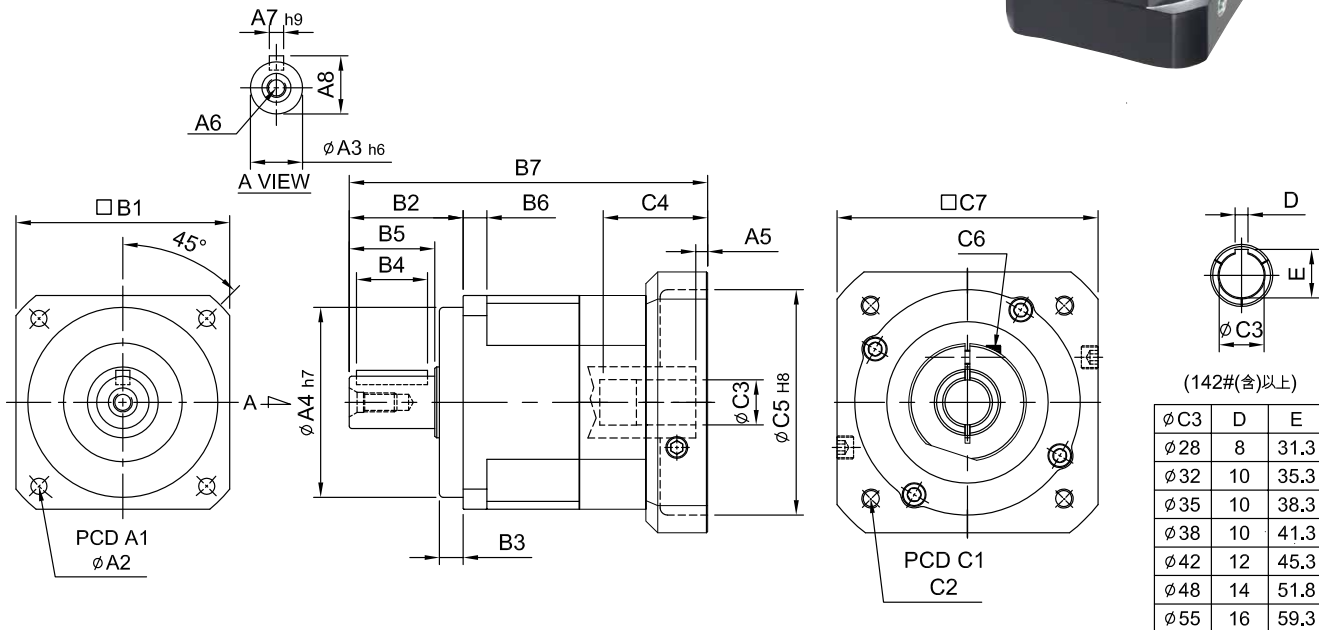
### One-piece Helical Gear Box

The gear box and internal ring gear are one-piece constructed. The speed reduction mechanism employs helical gears, which provides two times meshing rate of teeth when comparing with regular spur gears. In addition, it also has features of extremely smooth running, low noise, high output torque and low backlash.

# MODEL : PB

單段 1-Stage

RATIO : 3, 4, 5, 6, 7, 8, 9, 10



|      |       | unit: mm  |             |                |             |             |                |               |
|------|-------|-----------|-------------|----------------|-------------|-------------|----------------|---------------|
| Code | Model | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
| A    | A1    | 50        | 70          | 100            | 130         | 165         | 215            | 250           |
|      | A2    | 4.5       | 5.5         | 6.8            | 9           | 11          | 13             | 17            |
|      | A3    | 13        | 16          | 22             | 32          | 40          | 55             | 75            |
|      | A4    | 35        | 50          | 80             | 110         | 130         | 160            | 180           |
|      | A5    | 5         | 6           | 9·23.5         | 10·20       | 10          | 11.5·13.5      | 12.5·14.5     |
|      | A6    | M4 × P0.7 | M5 × P0.8   | M8 × P1.25     | M10 × P1.5  | M12 × P1.75 | M14 × P2.0     | M16 × P2.0    |
|      | A7    | 5         | 5           | 6              | 10          | 12          | 16             | 20            |
|      | A8    | 15        | 18          | 24.5           | 35          | 43          | 59             | 79.5          |
| B    | B1    | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
|      | B2    | 26        | 36          | 48             | 65          | 92          | 106            | 139           |
|      | B3    | 5         | 7           | 10             | 12          | 15          | 20             | 30            |
|      | B4    | 15        | 20          | 30             | 40          | 65          | 70             | 90            |
|      | B5    | 20        | 28          | 36             | 50          | 74          | 82             | 104           |
|      | B6    | 5         | 8           | 10             | 12          | 15          | 16             | 20            |
|      | B7    | 95        | 115·123     | 164.5·179      | 205·215     | 260.5       | 323.5·325.5    | 367.5·369.5   |
| C    | C1    | 46·60·63  | 70·75·90    | 90·100·115·145 | 115·145·165 | 145·165·215 | 200·215·265    | 200·265·300   |
|      | C2    | M3·M4·M5  | M4·M5·M6    | M5·M6·M8       | M6·M8·M10   | M8·M10·M12  | M10·M12·M16    | M12·M16       |
|      | C3    | 8·9·11    | 11·14·16·19 | 16·19·22·24    | 22·24·28·32 | 28·32·35·38 | 35·38·42·48·55 | 38·42·48·55   |
|      | C4    | 26·30.5   | 33.5·41.5   | 59·73.5        | 67·77       | 84.5        | 116.5·118.5    | 117.5·119.5   |
|      | C5    | 30·40·50  | 50·60·70    | 70·80·95·110   | 95·110·130  | 110·130·180 | 114.3·180·230  | 114.3·230·250 |
|      | C6    | M4 × P0.7 | M5 × P0.8   | M6 × P1.0      | M8 × P1.25  | M10 × P1.5  | M10 × P1.5     | M10 × P1.5    |
|      | C7    | 46·55     | 64·70·80    | 92·110·130     | 122·130·150 | 146·150·190 | 182·200·250    | 222·250·265   |

# Characteristic of PB 1-Stage

## PB 單段特性

| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 44  | 62        | 90        | 120       | 142       | 180       | 220       |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 3        | 17  | 54        | 145       | 301       | 553       | 1,067     | 1,786     |
|   |            |           | 4        | 15  | 48        | 128       | 269       | 491       | 940       | 1,587     |
|   |            |           | 5        | 14  | 45        | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 6        | 13  | 41        | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 7        | 13  | 41        | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 8        | 12  | 39        | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 9        | 11  | 40        | 120       | 227       | 412       | 875       | 1,490     |
|   |            |           | 10       | 12  | 40        | 116       | 246       | 452       | 930       | 1,565     |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 3~10     | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 3~10     | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{IN}$   | rpm       | 3~10     | 3,000   | 3,000     | 3,000     | 3,000     | 3,000     | 3,000     | 2,000     |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{IB}$   | rpm       | 3~10     | 6,000   | 6,000     | 6,000     | 5,000     | 5,000     | 4,000     | 3,000     |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 3~10     | 3   | 6         | 14        | 27        | 60        | 140       | 240       |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 3~10     | 360   | 1,120     | 3,040     | 6,460     | 8,830     | 14,820    | 48,450    |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 3~10     | 180   | 560       | 1,520     | 3,230     | 4,410     | 7,410     | 24,225    |
| 使用壽命 / Service Life   | $L_{H1}$   | hr        | 3~10     | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 3~10     | $\geq 97\%$   |           |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 3~10     | -25° C ~ +90° C   |           |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 3~10     | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 3~10     | IP65  |           |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 3~10     | 任意方向 Any  |           |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 3~10     | $\leq 56$   | $\leq 58$ | $\leq 60$ | $\leq 63$ | $\leq 65$ | $\leq 67$ | $\leq 70$ |
| 重量 / Weight $\pm 3\%$                                       |            | Kg        | 3~10     | 0.58  | 1.35      | 3.69      | 8.63      | 14.55     | 28.3      | 42.5      |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

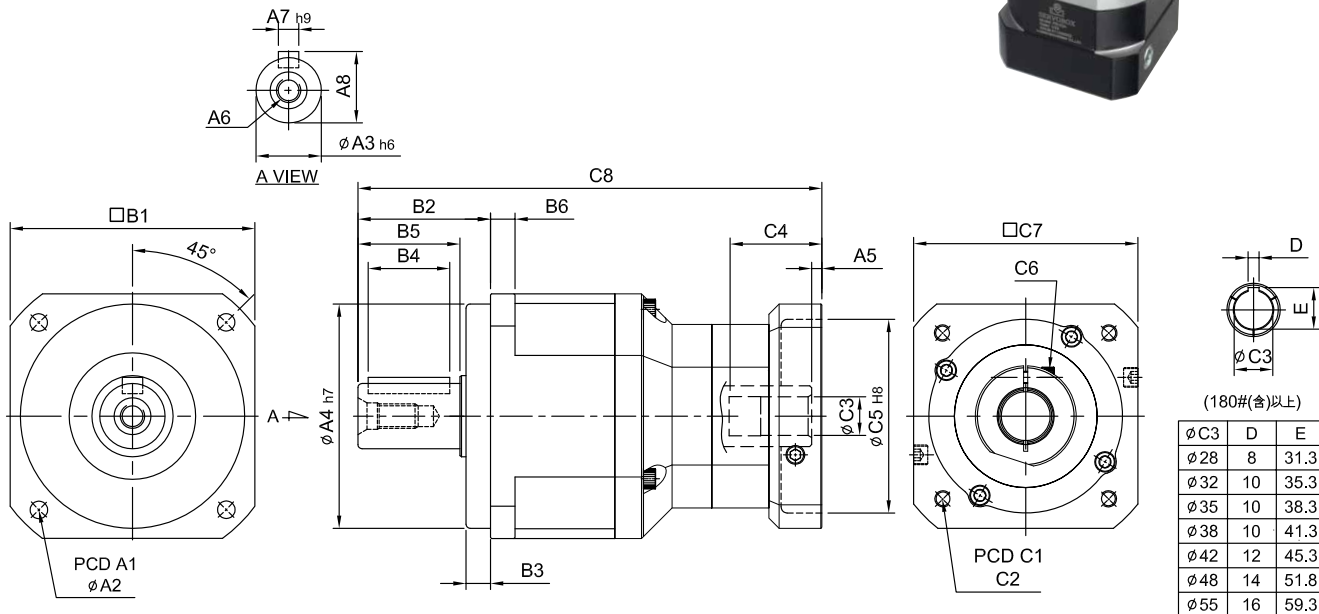
| 速比 Ratio | 44   | 62   | 90   | 120  | 142  | 180   | 220   |
|----------|------|------|------|------|------|-------|-------|
| 3        | 0.03 | 0.16 | 0.61 | 3.25 | 9.21 | 28.98 | 59.61 |
| 4        | 0.03 | 0.14 | 0.48 | 2.74 | 7.54 | 23.67 | 54.37 |
| 5        | 0.03 | 0.13 | 0.47 | 2.74 | 7.42 | 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 |



# MODEL : PB

雙段 2-Stage

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



unit: mm

| Code | Model | 62           | 90                | 120                  | 142                 | 180               | 220                    |
|------|-------|--------------|-------------------|----------------------|---------------------|-------------------|------------------------|
| A    | A1    | 70           | 100               | 130                  | 165                 | 215               | 250                    |
|      | A2    | 5.5          | 6.8               | 9                    | 11                  | 13                | 17                     |
|      | A3    | 16           | 22                | 32                   | 40                  | 55                | 75                     |
|      | A4    | 50           | 80                | 110                  | 130                 | 160               | 180                    |
|      | A5    | 5            | 6                 | 9 · 23.5             | 10 · 20             | 10                | 11.5 · 13.5            |
|      | A6    | M5 × P0.8    | M8 × P1.25        | M10 × P1.5           | M12 × P1.75         | M14 × P2.0        | M16 × P2.0             |
|      | A7    | 5            | 6                 | 10                   | 12                  | 16                | 20                     |
|      | A8    | 18           | 24.5              | 35                   | 43                  | 59                | 79.5                   |
| B    | B1    | 62           | 90                | 120                  | 142                 | 180               | 220                    |
|      | B2    | 36           | 48                | 65                   | 92                  | 106               | 139                    |
|      | B3    | 7            | 10                | 12                   | 15                  | 20                | 30                     |
|      | B4    | 20           | 30                | 40                   | 65                  | 70                | 90                     |
|      | B5    | 28           | 36                | 50                   | 74                  | 82                | 104                    |
|      | B6    | 8            | 10                | 12                   | 15                  | 16                | 20                     |
| C    | C1    | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 100 · 115 · 145 | 115 · 145 · 165     | 145 · 165 · 215   | 200 · 215 · 265        |
|      | C2    | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8         | M6 · M8 · M10       | M8 · M10 · M12    | M10 · M12              |
|      | C3    | 8 · 9 · 11   | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 22 · 24 · 28 · 32   | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
|      | C4    | 26 · 30.5    | 33.5 · 41.5       | 59 · 73.5            | 67 · 77             | 84.5              | 116.5 · 118.5          |
|      | C5    | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 70 · 95 · 110 · 130 | 110 · 130 · 180   | 114.3 · 180 · 230      |
|      | C6    | M4 × P0.7    | M5 × P0.8         | M6 × P1.0            | M8 × P1.25          | M10 × P1.5        | M10 × P1.5             |
|      | C7    | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150     | 146 · 180 · 190   | 182 · 200 · 250        |
|      | C8    | 139.5        | 172.5 · 180.5     | 241 · 255.5          | 298.5 · 308.5       | 358.5             | 446.5 · 448.5          |

# Characteristic of PB 2-Stage

## PB 雙段特性

| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 62  | 90        | 120       | 142       | 180       | 220       |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 15       | 54  | 145       | 301       | 553       | 1,067     | 1,786     |
|   |            |           | 20       | 48  | 128       | 269       | 491       | 940       | 1,587     |
|   |            |           | 25       | 45  | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 30       | 41  | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 35       | 41  | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 40       | 39  | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 50       | 45  | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 60       | 41  | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 70       | 41  | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 80       | 40  | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 90       | 40  | 120       | 227       | 412       | 875       | 1,490     |
|   |            |           | 100      | 40  | 116       | 246       | 452       | 930       | 1,565     |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 15~100   | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 15~100   | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 15~100   | 3,000   | 3,000     | 3,000     | 3,000     | 3,000     | 3,000     |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 15~100   | 6,000   | 6,000     | 5,000     | 5,000     | 4,000     | 4,000     |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 15~100   | 6   | 14        | 27        | 60        | 140       | 240       |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 15~100   | 1,120   | 3,040     | 6,460     | 8,830     | 14,820    | 48,450    |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 15~100   | 560   | 1,520     | 3,230     | 4,410     | 7,410     | 24,225    |
| 使用壽命 / Service Life   | $L_H$      | hr        | 15~100   | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 15~100   | $\geq 94\%$   |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 15~100   | -25° C ~ +90° C   |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 15~100   | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 15~100   | IP65  |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 15~100   | 任意方向 Any  |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 15~100   | $\leq 58$   | $\leq 60$ | $\leq 63$ | $\leq 65$ | $\leq 67$ | $\leq 70$ |
| 重量 / Weight $\pm 3\%$                                       |            | Kg        | 15~100   | 1.6   | 4.04      | 9.49      | 17        | 34.1      | 57.3      |

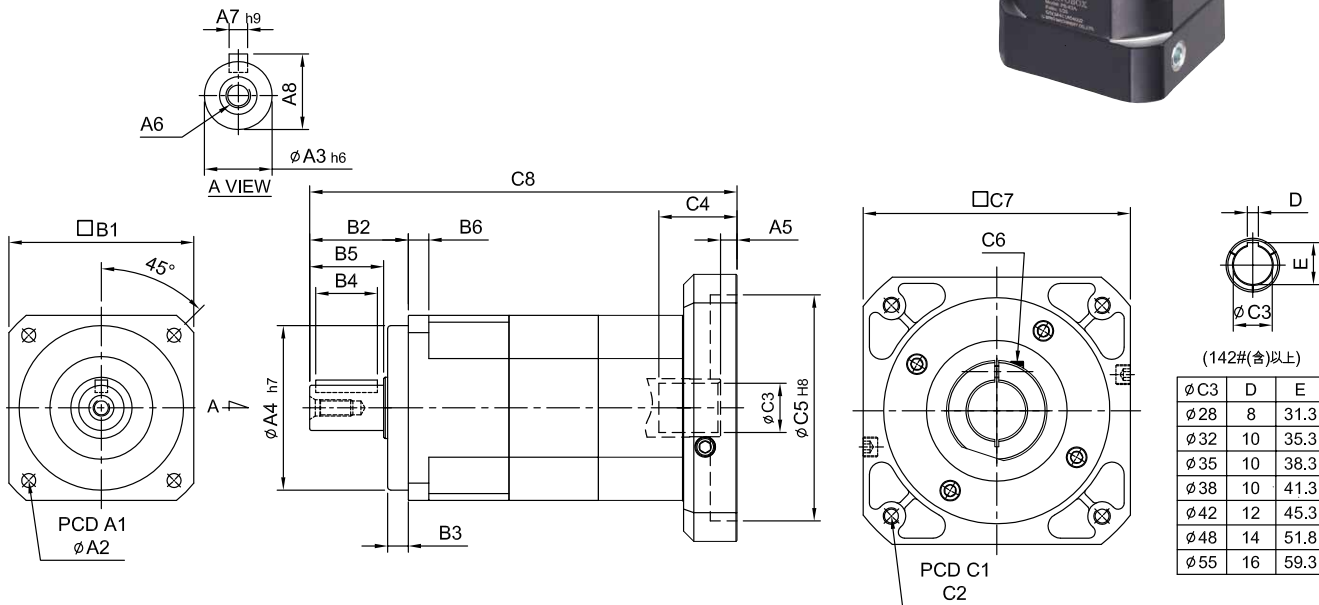
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 62   | 90   | 120  | 142  | 180  | 220   |
|----------|------|------|------|------|------|-------|
| 15       | 0.03 | 0.14 | 0.46 | 2.63 | 7.3  | 22.79 |
| 20       | 0.03 | 0.14 | 0.46 | 2.63 | 7.3  | 22.79 |
| 25       | 0.03 | 0.14 | 0.46 | 2.63 | 7.1  | 22.79 |
| 30       | 0.03 | 0.14 | 0.46 | 2.43 | 7.1  | 22.59 |
| 35       | 0.03 | 0.14 | 0.44 | 2.43 | 7.1  | 22.59 |
| 40       | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 |
| 50       | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 |
| 60       | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 |
| 70       | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 |
| 80       | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 |
| 90       | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 |
| 100      | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 |

# MODEL : PB-A

雙段 2-Stage

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



unit: mm

| Code | Model | 44A       | 62A         | 90A            | 120A        | 142A        | 180A           | 220A          |
|------|-------|-----------|-------------|----------------|-------------|-------------|----------------|---------------|
| A    | A1    | 50        | 70          | 100            | 130         | 165         | 215            | 250           |
|      | A2    | 4.5       | 5.5         | 6.8            | 9           | 11          | 13             | 17            |
|      | A3    | 13        | 16          | 22             | 32          | 40          | 55             | 75            |
|      | A4    | 35        | 50          | 80             | 110         | 130         | 160            | 180           |
|      | A5    | 5         | 6           | 9·23.5         | 10·20       | 10          | 11.5·13.5      | 12.5·14.5     |
|      | A6    | M4 × P0.7 | M5 × P0.8   | M8 × P1.25     | M10 × P1.5  | M12 × P1.75 | M14 × P2.0     | M16 × P2.0    |
|      | A7    | 5         | 5           | 6              | 10          | 12          | 16             | 20            |
|      | A8    | 15        | 18          | 24.5           | 35          | 43          | 59             | 79.5          |
| B    | B1    | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
|      | B2    | 26        | 36          | 48             | 65          | 92          | 106            | 139           |
|      | B3    | 5         | 7           | 10             | 12          | 15          | 20             | 30            |
|      | B4    | 15        | 20          | 30             | 40          | 65          | 70             | 90            |
|      | B5    | 20        | 28          | 36             | 50          | 74          | 82             | 104           |
|      | B6    | 5         | 8           | 10             | 12          | 15          | 16             | 20            |
| C    | C1    | 46·60·63  | 70·75·90    | 90·100·115·145 | 115·145·165 | 145·165·215 | 200·215·265    | 200·265·300   |
|      | C2    | M3·M4·M5  | M4·M5·M6    | M5·M6·M8       | M6·M8·M10   | M8·M10·M12  | M10·M12        | M12·M16       |
|      | C3    | 8·9·11    | 11·14·16·19 | 16·19·22·24    | 22·24·28·32 | 28·32·35·38 | 35·38·42·48·55 | 38·42·48·55   |
|      | C4    | 26        | 33.5·41.5   | 59·73.5        | 67·77       | 84.5        | 114.5·116.5    | 117.5·119.5   |
|      | C5    | 30·40·50  | 50·60·70    | 70·80·95·110   | 95·110·130  | 110·130·180 | 114.3·180·230  | 114.3·230·250 |
|      | C6    | M4 × P0.7 | M5 × P0.8   | M6 × P1.0      | M8 × P1.25  | M10 × P1.5  | M10 × P1.5     | M10 × P1.5    |
|      | C7    | 46·55     | 64·70·80    | 92·110·130     | 122·130·150 | 146·150·190 | 182·200·250    | 222·250·265   |
|      | C8    | 121       | 148.8·156.8 | 208·222.5      | 261·271     | 327         | 404.5·406.5    | 460.5·462.5   |

# Characteristic of PB-A 2-Stage

## PB-A 雙段特性

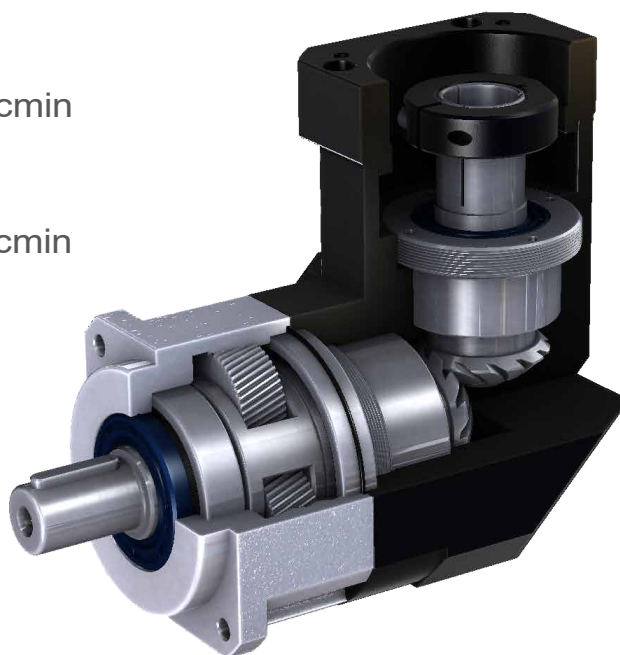
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 44A   | 62A       | 90A       | 120A      | 142A      | 180A      | 220A      |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 15       | 17  | 54        | 145       | 301       | 553       | 1,067     | 1,786     |
|   |            |           | 20       | 15  | 48        | 128       | 269       | 491       | 940       | 1,587     |
|   |            |           | 25       | 14  | 45        | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 30       | 13  | 41        | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 35       | 13  | 41        | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 40       | 12  | 39        | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 50       | 14  | 45        | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 60       | 13  | 41        | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 70       | 13  | 41        | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 80       | 12  | 40        | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 90       | 11  | 40        | 120       | 227       | 412       | 875       | 1,490     |
| 100   | 12         | 40        | 116      | 246   | 452       | 930       | 1,565     |           |           |           |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 15~100   | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 15~100   | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 15~100   | 3,000   | 3,000     | 3,000     | 3,000     | 3,000     | 3,000     | 3,000     |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 15~100   | 6,000   | 6,000     | 6,000     | 5,000     | 5,000     | 4,000     | 4,000     |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 15~100   | 3   | 6         | 14        | 27        | 60        | 140       | 240       |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 15~100   | 360   | 1,120     | 3,040     | 6,460     | 8,830     | 14,820    | 48,450    |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 15~100   | 180   | 560       | 1,520     | 3,230     | 4,410     | 7,410     | 24,225    |
| 使用壽命 / Service Life   | $L_{H1}$   | hr        | 15~100   | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 15~100   | $\geq 94\%$   |           |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 15~100   | -25° C ~ +90° C   |           |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 15~100   | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 15~100   | IP65  |           |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 15~100   | 任意方向 Any  |           |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 15~100   | $\leq 56$   | $\leq 58$ | $\leq 60$ | $\leq 63$ | $\leq 65$ | $\leq 67$ | $\leq 70$ |
| 重量 / Weight $\pm 3\%$                                       |            | Kg        | 15~100   | 0.86  | 2         | 5.48      | 10        | 21.4      | 42        | 59        |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 44A  | 62A  | 90A  | 120A | 142A | 180A  | 220A  |
|----------|------|------|------|------|------|-------|-------|
| 15       | 0.03 | 0.14 | 0.46 | 2.63 | 7.3  | 22.79 | 56.98 |
| 20       | 0.03 | 0.14 | 0.46 | 2.63 | 7.3  | 22.79 | 56.98 |
| 25       | 0.03 | 0.14 | 0.46 | 2.63 | 7.1  | 22.79 | 56.98 |
| 30       | 0.03 | 0.14 | 0.46 | 2.43 | 7.1  | 22.59 | 56.48 |
| 35       | 0.03 | 0.14 | 0.44 | 2.43 | 7.1  | 22.59 | 56.48 |
| 40       | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 | 56.48 |
| 50       | 0.03 | 0.14 | 0.44 | 2.43 | 6.92 | 22.59 | 56.48 |
| 60       | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |
| 70       | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |
| 80       | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |
| 90       | 0.03 | 0.14 | 0.40 | 2.39 | 6.72 | 21.60 | 54.00 |
| 100      | 0.03 | 0.14 | 0.43 | 2.39 | 6.72 | 21.83 | 54.58 |

# PBL series

- 全系列單段背隙  $\leq 10$  弧分  
1-Stage Backlash  $\leq 10$  arcmin
- 全系列雙段背隙  $\leq 12$  弧分  
2-Stage Backlash  $\leq 12$  arcmin



## Indication of Model Numbers

### 機種型號表示

|               |  |   |  |   |   |                    |
|---------------|--|---|--|---|---|--------------------|
| <b>PBL</b>    | <b>90</b>                                  | - | <b>10</b>  | □   | - | <b>MOTOR</b>       |
| 減速機機型<br>Type | 型號<br>Model                                |   | 速比<br>Ratio  | 出力軸鍵槽<br>Output Shaft Keyway  |   | 馬達型號<br>Motor Type |
| PBL           | 44<br>62<br>90<br>120<br>142<br>180<br>220 |   | 單段 1-Stage<br>3, 4, 5, 6, 7, 8, 9, 10,<br>12, 14, 16, 18, 20<br><br>雙段 2-Stage<br>15, 20, 25, 30, 35, 40,<br>50, 60, 70, 80, 90, 100,<br>120, 140, 160, 180, 200 | □ 標準品 · 有鍵槽<br>Standard (Keyway)<br><br>N: 實心軸 · 無鍵槽<br>Solid Output Shaft<br>(No Keyway) |   |                    |

#### 靜音

使用研磨等級螺旋傘齒輪及螺旋齒輪實現順暢安靜地運轉。

#### Quiet operation

Grinding spiral bevel gear & Helical gears contribute to reduce vibration and noise.

#### 高剛性、高扭矩

使用整體式滿針滾針軸承，一體式內齒箱及螺旋齒輪，提高了鋼性和扭矩。

#### High Rigidity & High Torque

High rigidity & high torque are achieved by integrant needle roller bearings and one-piece constructed.

#### 高效率

單段式在 95% 以上，雙段式在 92% 以上。

#### High Efficiency

Efficiency for 1-stage model exceeds 95%; 2-stage model exceeds 92%.



# Features of PBL Series

## PBL 系列產品特點



### 螺旋傘齒輪

研磨等級螺旋傘齒輪傳動效率高，傳動比穩定，圓弧重疊係數大，承載能力高，傳動平穩平順，工作可靠，結構緊湊，耐磨損，壽命長。

### Spiral Bevel Gear

Grinding spiral bevel gear is excellent in transmission efficiency, stability, durability, large arc overlapping factor, heavy loading, compact structure, wear-resisting and long service life.

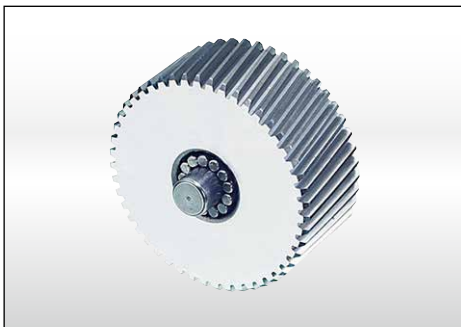


### 一體式行星臂架及雙懸臂設計

行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。

### Integrated Planetary Arm Bracket

The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy.



### 滿針滾針軸承設計

行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

### Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.



### 筒夾式連結機構

輸入端與馬達的連結採用筒夾式的鎖緊機構，並經動平衡分析，以確保在高輸入轉速下結合介面的同心度和平衡度，及零背隙的動力傳遞。

### Collet Locking Mechanism

The input-end and the motor are coupled through a collet locking mechanism. It has passed dynamical balance analysis to assure concentricity and balance on the connection and no backlash for power transmission while running at high speed.



### 一體式螺旋內齒輪箱

齒輪箱和內環齒輪採一體式的設計，減速機構採用螺旋齒輪設計，齒形嚙合率為一般正齒輪的二倍以上，具有運轉平順、低噪音、高輸出扭矩和低背隙的特性。

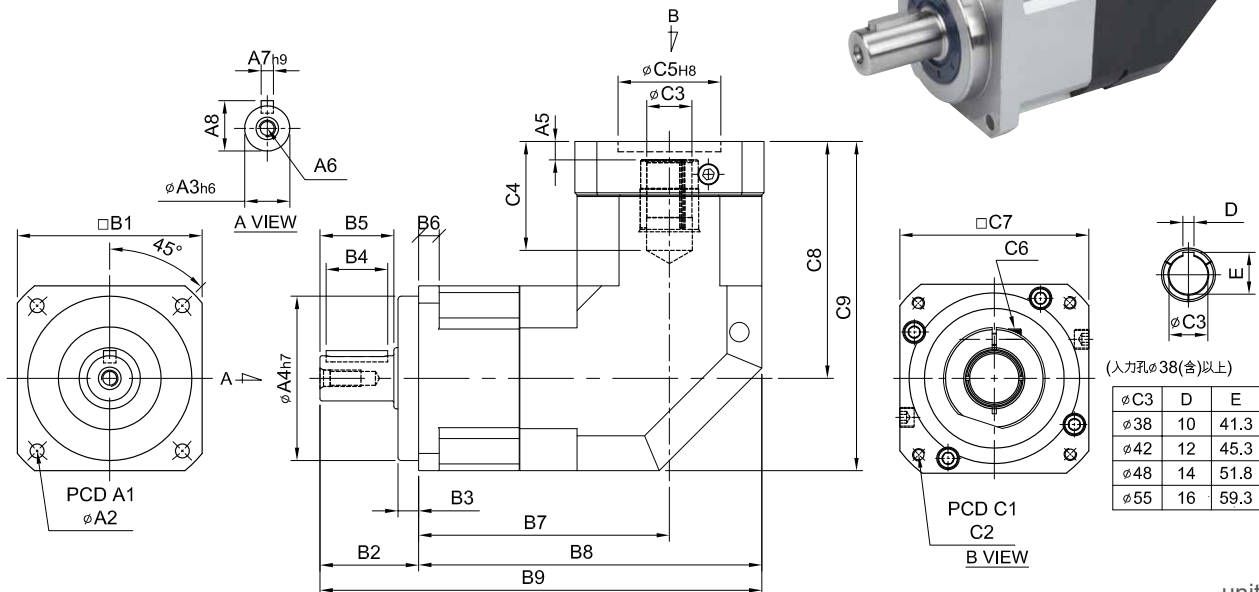
### One-piece Helical Gear Box

The gear box and internal ring gear are one-piece constructed. The speed reduction mechanism employs helical gears, which provides two times meshing rate of teeth when comparing with regular spur gears. In addition, it also has features of extremely smooth running, low noise, high output torque and low backlash.

# MODEL : PBL

單段 1-Stage

RATIO : 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



unit: mm

| Code | Model | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
|------|-------|-----------|-------------|----------------|-------------|-------------|----------------|---------------|
| A    | A1    | 50        | 70          | 100            | 130         | 165         | 215            | 250           |
|      | A2    | 4.5       | 5.5         | 6.8            | 9           | 11          | 13             | 17            |
|      | A3    | 13        | 16          | 22             | 32          | 40          | 55             | 75            |
|      | A4    | 35        | 50          | 80             | 110         | 130         | 160            | 180           |
|      | A5    | 6         | 6           | 9・23.5         | 10・20       | 10          | 12.5・14.5      | 12.5・14.5     |
|      | A6    | M4 × P0.7 | M5 × P0.8   | M8 × P1.25     | M10 × P1.5  | M12 × P1.75 | M14 × P2.0     | M16 × P2.0    |
|      | A7    | 5         | 5           | 6              | 10          | 12          | 16             | 20            |
|      | A8    | 15        | 18          | 24.5           | 35          | 43          | 59             | 79.5          |
| B    | B1    | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
|      | B2    | 26        | 36          | 48             | 65          | 92          | 106            | 139           |
|      | B3    | 5         | 7           | 10             | 12          | 15          | 20             | 30            |
|      | B4    | 15        | 20          | 30             | 40          | 65          | 70             | 90            |
|      | B5    | 20        | 28          | 36             | 50          | 74          | 82             | 104           |
|      | B6    | 5         | 8           | 10             | 12          | 15          | 16             | 20            |
|      | B7    | 76        | 84.5        | 122.1          | 148         | 165.5       | 223.6          | 231.6         |
|      | B8    | 98        | 115.5       | 167.1          | 208         | 236.5       | 313.6          | 341.6         |
|      | B9    | 124       | 151.5       | 215.1          | 273         | 328.5       | 419.6          | 480.6         |
| C    | C1    | 46・60・63  | 70・75・90    | 90・100・115・145 | 115・145・165 | 145・165・215 | 200・215・265    | 200・265・300   |
|      | C2    | M3・M4・M5  | M4・M5・M6    | M5・M6・M8       | M6・M8・M10   | M8・M10・M12  | M10・M12・M16    | M12・M16       |
|      | C3    | 8・11      | 11・14・16・19 | 16・19・22・24    | 24・28・32    | 28・32・35・38 | 35・38・42・48・55 | 38・42・48・55   |
|      | C4    | 27        | 33.5・42     | 53・67.5        | 67・77       | 85          | 117・119        | 117・119       |
|      | C5    | 30・40・50  | 50・60・70    | 70・80・95・110   | 95・110・130  | 110・130・180 | 114.3・180・230  | 114.3・230・250 |
|      | C6    | M4 × P0.7 | M5 × P0.8   | M6 × P1.0      | M8 × P1.25  | M10 × P1.5  | M10 × P1.5     | M10 × P1.5    |
|      | C7    | 46・55     | 64・70・80    | 92・110・130     | 122・130・150 | 146・150・190 | 182・200・250    | 222・250・265   |
|      | C8    | 61        | 77・85       | 115.3・129.8    | 141・151     | 165.7       | 235・237        | 235・237       |
|      | C9    | 83        | 108・116     | 160.3・174.8    | 201・211     | 236.7       | 325・327        | 345・347       |

# Characteristic of PBL 1-Stage

## PBL 單段特性

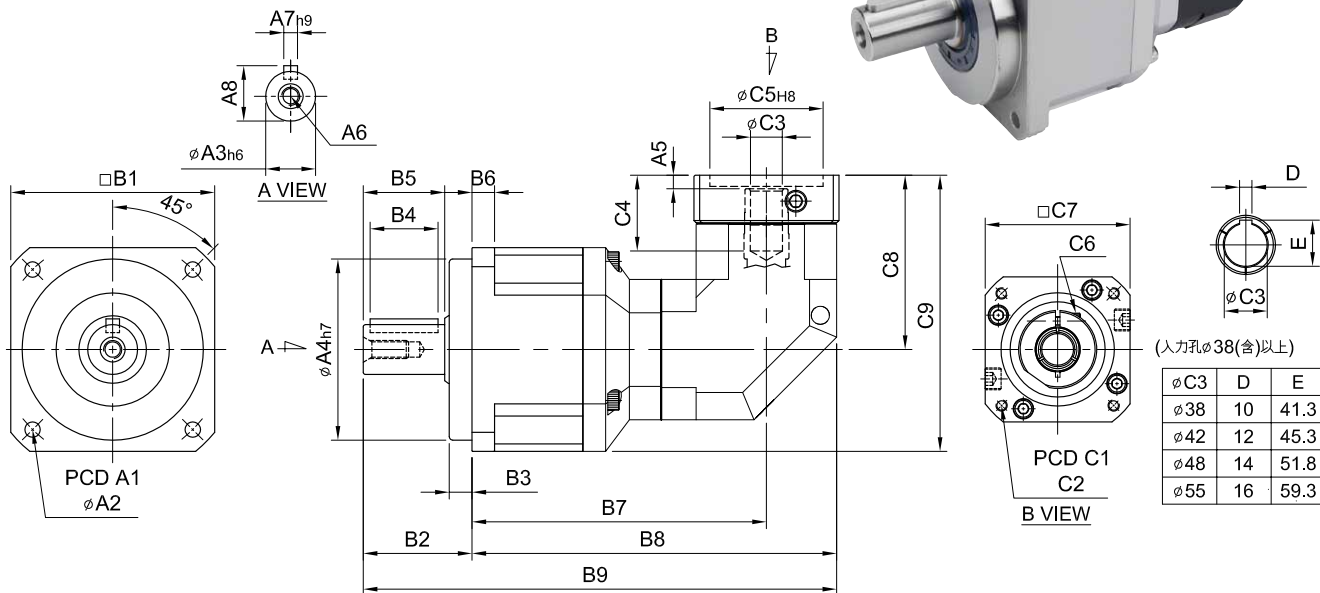
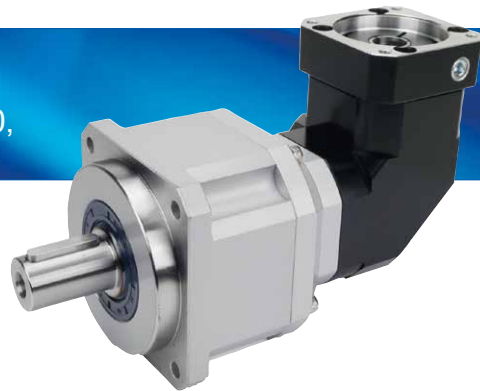
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 44  | 62        | 90        | 120       | 142       | 180       | 220       |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 3        | 17  | 54        | 145       | 301       | 553       | 1,067     | 1,786     |
|   |            |           | 4        | 15  | 48        | 128       | 269       | 491       | 940       | 1,587     |
|   |            |           | 5        | 14  | 45        | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 6        | 13  | 41        | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 7        | 13  | 41        | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 8        | 12  | 39        | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 9        | 11  | 40        | 120       | 227       | 412       | 875       | 1,490     |
|   |            |           | 10       | 12  | 40        | 116       | 246       | 452       | 930       | 1,565     |
|   |            |           | 12       | 13  | 41        | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 14       | 13  | 41        | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 16       | 12  | 39        | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 18       | 11  | 40        | 120       | 227       | 412       | 875       | 1,490     |
| 20  | 12         | 40        | 116      | 246   | 452       | 930       | 1,565     |           |           |           |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 3~20     | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 3~20     | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 3~20     | 3,000   | 3,000     | 3,000     | 3,000     | 3,000     | 3,000     | 2,000     |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 3~20     | 6,000   | 6,000     | 6,000     | 5,000     | 5,000     | 4,000     | 3,000     |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 3~20     | 3   | 6         | 14        | 27        | 60        | 140       | 240       |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 3~20     | 360   | 1,120     | 3,040     | 6,460     | 8,830     | 14,820    | 48,450    |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 3~20     | 180   | 560       | 1,520     | 3,230     | 4,410     | 7,410     | 24,225    |
| 使用壽命 / Service Life   | $L_H$      | hr        | 3~20     | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |           |
| 效 率 / Efficiency  | $\eta$     | %         | 3~20     | $\geq 95\%$   |           |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 3~20     | -25° C ~ +90° C   |           |           |           |           |           |           |
| 潤 滑 / Lubrication   |            |           | 3~20     | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 3~20     | IP65  |           |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 3~20     | 任意方向 Any  |           |           |           |           |           |           |
| 噪 音 值 / Noise Level   |            | dB        | 3~20     | $\leq 65$   | $\leq 68$ | $\leq 70$ | $\leq 72$ | $\leq 74$ | $\leq 76$ | $\leq 78$ |
| 重 量 / Weight $\pm 3\%$                                      |            | Kg        | 3~20     | 0.99  | 2.1       | 6.88      | 12.5      | 23.16     | 51        | 75.2      |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 44   | 62   | 90   | 120  | 142  | 180  | 220   |
|----------|------|------|------|------|------|------|-------|
| 3        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135.0 |
| 4        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135.0 |
| 5        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135.0 |
| 6        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135.0 |
| 7        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135.0 |
| 8        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135.0 |
| 9        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135.0 |
| 10       | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68.2 | 135.0 |
| 12       | 0.03 | 0.08 | 1.88 | 6.20 | 21.8 | 65.5 | 119.2 |
| 14       | 0.03 | 0.08 | 1.88 | 6.20 | 21.8 | 65.5 | 119.2 |
| 16       | 0.03 | 0.08 | 1.88 | 6.20 | 21.8 | 65.5 | 119.2 |
| 18       | 0.03 | 0.08 | 1.88 | 6.20 | 21.8 | 65.5 | 119.2 |
| 20       | 0.03 | 0.08 | 1.88 | 6.20 | 21.8 | 65.5 | 119.2 |

# MODEL : PBL

RATIO : 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200 ( 雙段 2-Stage )



unit: mm

| Code | Model | 62           | 90                | 120                  | 142                 | 180               | 220                    |
|------|-------|--------------|-------------------|----------------------|---------------------|-------------------|------------------------|
| A    | A1    | 70           | 100               | 130                  | 165                 | 215               | 250                    |
|      | A2    | 5.5          | 6.8               | 9                    | 11                  | 13                | 17                     |
|      | A3    | 16           | 22                | 32                   | 40                  | 55                | 75                     |
|      | A4    | 50           | 80                | 110                  | 130                 | 160               | 180                    |
|      | A5    | 6            | 6                 | 9 · 23.5             | 10 · 20             | 10                | 12.5 · 14.5            |
|      | A6    | M5 × P0.8    | M8 × P1.25        | M10 × P1.5           | M12 × P1.75         | M14 × P2.0        | M16 × P2.0             |
|      | A7    | 5            | 6                 | 10                   | 12                  | 16                | 20                     |
|      | A8    | 18           | 24.5              | 35                   | 43                  | 59                | 79.5                   |
| B    | B1    | 62           | 90                | 120                  | 142                 | 180               | 220                    |
|      | B2    | 36           | 48                | 65                   | 92                  | 106               | 139                    |
|      | B3    | 7            | 10                | 12                   | 15                  | 20                | 30                     |
|      | B4    | 20           | 30                | 40                   | 65                  | 70                | 90                     |
|      | B5    | 28           | 36                | 50                   | 74                  | 82                | 104                    |
|      | B6    | 8            | 10                | 12                   | 15                  | 16                | 20                     |
|      | B7    | 110.5        | 130               | 181.6                | 214.5               | 249.5             | 313.6                  |
|      | B8    | 132.5        | 161               | 266.6                | 274.5               | 320.5             | 403.6                  |
|      | B9    | 168.5        | 209               | 291.6                | 366.5               | 426.5             | 542.6                  |
| C    | C1    | 46 · 60 · 63 | 70 · 75 · 90      | 90 · 110 · 115 · 145 | 115 · 145 · 165     | 145 · 165 · 215   | 200 · 215 · 265        |
|      | C2    | M3 · M4 · M5 | M4 · M5 · M6      | M5 · M6 · M8 · M10   | M6 · M8 · M10       | M8 · M10 · M12    | M10 · M12 · M16        |
|      | C3    | 8 · 11       | 11 · 14 · 16 · 19 | 16 · 19 · 22 · 24    | 24 · 28 · 32        | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 · 55 |
|      | C4    | 27           | 33.5 · 42         | 53 · 67.5            | 67 · 77             | 85                | 117 · 119              |
|      | C5    | 30 · 40 · 50 | 50 · 60 · 70      | 70 · 80 · 95 · 110   | 70 · 95 · 110 · 130 | 110 · 130 · 180   | 114.3 · 180 · 230      |
|      | C6    | M4 × P0.7    | M5 × P0.8         | M6 × P1.0            | M8 × P1.25          | M10 × P1.5        | M10 × P1.5             |
|      | C7    | 46 · 55      | 64 · 70 · 80      | 92 · 110 · 130       | 122 · 130 · 150     | 146 · 150 · 190   | 182 · 200 · 250        |
|      | C8    | 61           | 77 · 85           | 115.3 · 129.8        | 141 · 151           | 165.7             | 235 · 237              |
|      | C9    | 92           | 122 · 130         | 175.3 · 189.8        | 212 · 222           | 255.7             | 345 · 347              |

# Characteristic of PBL 2-Stage

## PBL 雙段特性

| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 62  | 90        | 120       | 142       | 180       | 220       |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 15       | 54  | 145       | 301       | 553       | 1,067     | 1,786     |
|   |            |           | 20       | 48  | 128       | 269       | 491       | 940       | 1,587     |
|   |            |           | 25       | 45  | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 30       | 41  | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 35       | 41  | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 40       | 39  | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 50       | 45  | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 60       | 41  | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 70       | 41  | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 80       | 40  | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 90       | 40  | 120       | 227       | 412       | 875       | 1,490     |
|   |            |           | 100      | 40  | 116       | 246       | 452       | 930       | 1,565     |
|   |            |           | 120      | 41  | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 140      | 41  | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 160      | 40  | 115       | 241       | 442       | 942       | 1,605     |
| 180   | 40         | 120       | 227      | 412   | 875       | 1,490     |           |           |           |
| 200   | 40         | 116       | 246      | 452   | 930       | 1,565     |           |           |           |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 15~200   | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 15~200   | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 15~200   | 3,000   | 3,000     | 3,000     | 3,000     | 3,000     | 2,000     |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 15~200   | 6,000   | 6,000     | 5,000     | 5,000     | 4,000     | 3,000     |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 15~200   | 6   | 14        | 27        | 60        | 140       | 240       |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 15~200   | 1,120   | 3,040     | 6,460     | 8,830     | 14,820    | 48,450    |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 15~200   | 560   | 1,520     | 3,230     | 4,410     | 7,410     | 24,225    |
| 使用壽命 / Service Life   | $L_{11}$   | hr        | 15~200   | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 15~200   | $\geq 92\%$   |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 15~200   | -25° C ~ +90° C   |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 15~200   | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 15~200   | IP65  |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 15~200   | 任意方向 Any  |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 15~200   | $\leq 68$   | $\leq 70$ | $\leq 72$ | $\leq 74$ | $\leq 76$ | $\leq 78$ |
| 重量 / Weight $\pm 3\%$                                       |            | Kg        | 15~200   | 2   | 6.1       | 12.5      | 23.2      | 41.4      | 73        |

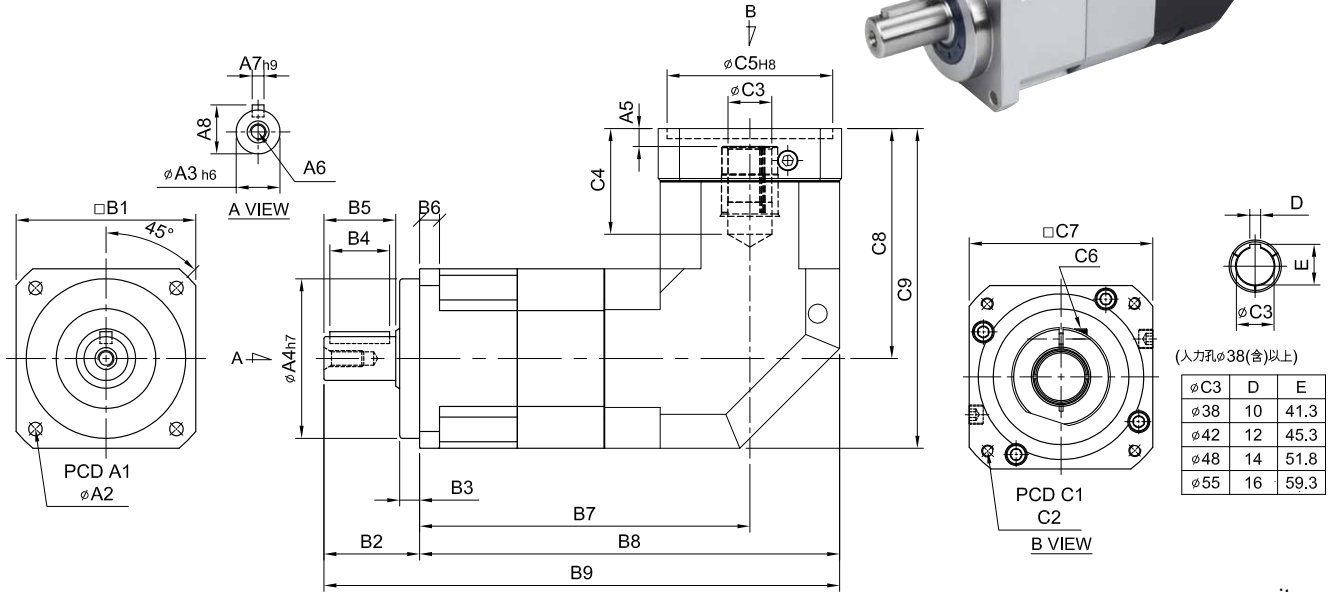
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 62   | 90   | 120  | 142  | 180  | 220  |
|----------|------|------|------|------|------|------|
| 15       | 0.09 | 0.36 | 2.28 | 6.85 | 26.2 | 70.1 |
| 20       | 0.09 | 0.36 | 2.28 | 6.85 | 26.2 | 70.1 |
| 25       | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 30       | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 35       | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 40       | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 50       | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 60       | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 70       | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 80       | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 90       | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 100      | 0.09 | 0.36 | 2.28 | 6.85 | 23.1 | 68.2 |
| 120      | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |
| 140      | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |
| 160      | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |
| 180      | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |
| 200      | 0.03 | 0.10 | 1.88 | 6.20 | 21.2 | 65.1 |



# MODEL : PBL-A

RATIO : 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200 ( 雙段 2-Stage)



unit: mm

| Code | Model | 44A       | 62A         | 90A            | 120A        | 142A        | 180A           | 220A          |
|------|-------|-----------|-------------|----------------|-------------|-------------|----------------|---------------|
| A    | A1    | 50        | 70          | 100            | 130         | 165         | 215            | 250           |
|      | A2    | 4.5       | 5.5         | 6.8            | 9           | 11          | 13             | 17            |
|      | A3    | 13        | 16          | 22             | 32          | 40          | 55             | 75            |
|      | A4    | 35        | 50          | 80             | 110         | 130         | 160            | 180           |
|      | A5    | 6         | 6           | 9·23.5         | 10·20       | 10          | 12.5·14.5      | 12.5·14.5     |
|      | A6    | M4 × P0.7 | M5 × P0.8   | M8 × P1.25     | M10 × P1.5  | M12 × P1.75 | M14 × P2.0     | M16 · P2.0    |
|      | A7    | 5         | 5           | 6              | 10          | 12          | 16             | 20            |
|      | A8    | 15        | 18          | 24.5           | 35          | 43          | 59             | 79.5          |
| B    | B1    | 44        | 62          | 90             | 120         | 142         | 180            | 220           |
|      | B2    | 26        | 36          | 48             | 65          | 92          | 106            | 139           |
|      | B3    | 5         | 7           | 10             | 12          | 15          | 20             | 30            |
|      | B4    | 15        | 20          | 30             | 40          | 65          | 70             | 90            |
|      | B5    | 20        | 28          | 36             | 50          | 74          | 82             | 104           |
|      | B6    | 5         | 8           | 10             | 12          | 15          | 16             | 20            |
|      | B7    | 102       | 118.3       | 165.6          | 204         | 232         | 304.6          | 324.6         |
|      | B8    | 124       | 149.3       | 210.6          | 264         | 303         | 394.6          | 434.6         |
| C    | B9    | 150       | 185.3       | 258.6          | 329         | 395         | 500.6          | 573.6         |
|      | C1    | 46·60·63  | 70·75·90    | 90·100·115·145 | 115·145·165 | 145·165·215 | 200·215·265    | 200·265·300   |
|      | C2    | M3·M4·M5  | M4·M5·M6    | M5·M6·M8       | M6·M8·M10   | M8·M10·M12  | M10·M12·M16    | M12·M16       |
|      | C3    | 8·11      | 11·14·16·19 | 16·19·22·24    | 24·28·32    | 28·32·35·38 | 35·38·42·48·55 | 38·42·48·55   |
|      | C4    | 27        | 33.5·42     | 53·67.5        | 67·77       | 85          | 117·119        | 117·119       |
|      | C5    | 30·40·50  | 50·60·70    | 70·80·95·110   | 95·110·130  | 110·130·180 | 114.3·180·230  | 114.3·230·250 |
|      | C6    | M4 × P0.7 | M5 × P0.8   | M6 × P1.0      | M8 × P1.25  | M10 × P1.5  | M10 × P1.5     | M10 · P1.5    |
|      | C7    | 46·55     | 64·70·80    | 92·110·130     | 122·130·150 | 146·150·190 | 182·200·250    | 220·250·265   |
|      | C8    | 61        | 77·85       | 115.3·129.8    | 141·151     | 165.7       | 235·237        | 235·237       |
| C9   | 83    | 108·116   | 160.3·174.8 | 201·211        | 236.7       | 325·327     | 345·347        |               |

# Characteristic of PBL-A 2-Stage

## PBL-A 雙段特性

| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 44A   | 62A       | 90A       | 120A      | 142A      | 180A      | 220A      |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 15       | 17  | 54        | 145       | 301       | 553       | 1,067     | 1,786     |
|   |            |           | 20       | 15  | 48        | 128       | 269       | 491       | 940       | 1,587     |
|   |            |           | 25       | 14  | 45        | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 30       | 13  | 41        | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 35       | 13  | 41        | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 40       | 12  | 39        | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 50       | 11  | 45        | 132       | 278       | 510       | 1,050     | 1,770     |
|   |            |           | 60       | 12  | 41        | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 70       | 13  | 41        | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 80       | 13  | 40        | 115       | 241       | 442       | 942       | 1,605     |
|   |            |           | 90       | 12  | 40        | 120       | 227       | 412       | 875       | 1,490     |
|   |            |           | 100      | 11  | 40        | 116       | 246       | 452       | 930       | 1,565     |
|   |            |           | 120      | 12  | 41        | 125       | 252       | 466       | 985       | 1,680     |
|   |            |           | 140      | 13  | 41        | 123       | 258       | 473       | 975       | 1,645     |
|   |            |           | 160      | 13  | 39        | 115       | 241       | 442       | 942       | 1,605     |
| 180   | 12         | 40        | 120      | 227   | 412       | 875       | 1,490     |           |           |           |
| 200   | 11         | 40        | 116      | 246   | 452       | 930       | 1,565     |           |           |           |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 15~200   | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 15~200   | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 15~200   |   | 3,000     | 3,000     | 3,000     | 3,000     | 3,000     | 2,000     |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 15~200   |   | 6,000     | 6,000     | 5,000     | 5,000     | 4,000     | 3,000     |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 15~200   |   | 6         | 14        | 27        | 60        | 140       | 240       |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 15~200   |   | 1,120     | 3,040     | 6,460     | 8,830     | 14,820    | 48,450    |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 15~200   |   | 560       | 1,520     | 3,230     | 4,410     | 7,410     | 24,225    |
| 使用壽命 / Service Life   | $L_{H1}$   | hr        | 15~200   | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 15~200   | $\geq 92\%$   |           |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 15~200   | -25° C ~ +90° C   |           |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 15~200   | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 15~200   | IP65  |           |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 15~200   | 任意方向 Any  |           |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 15~200   | $\leq 65$   | $\leq 68$ | $\leq 70$ | $\leq 72$ | $\leq 74$ | $\leq 76$ | $\leq 78$ |
| 重量 / Weight $\pm 3\%$                                       |            | Kg        | 15~200   | 1.5   | 3         | 8.15      | 13.9      | 29.4      | 52.4      | 94.5      |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

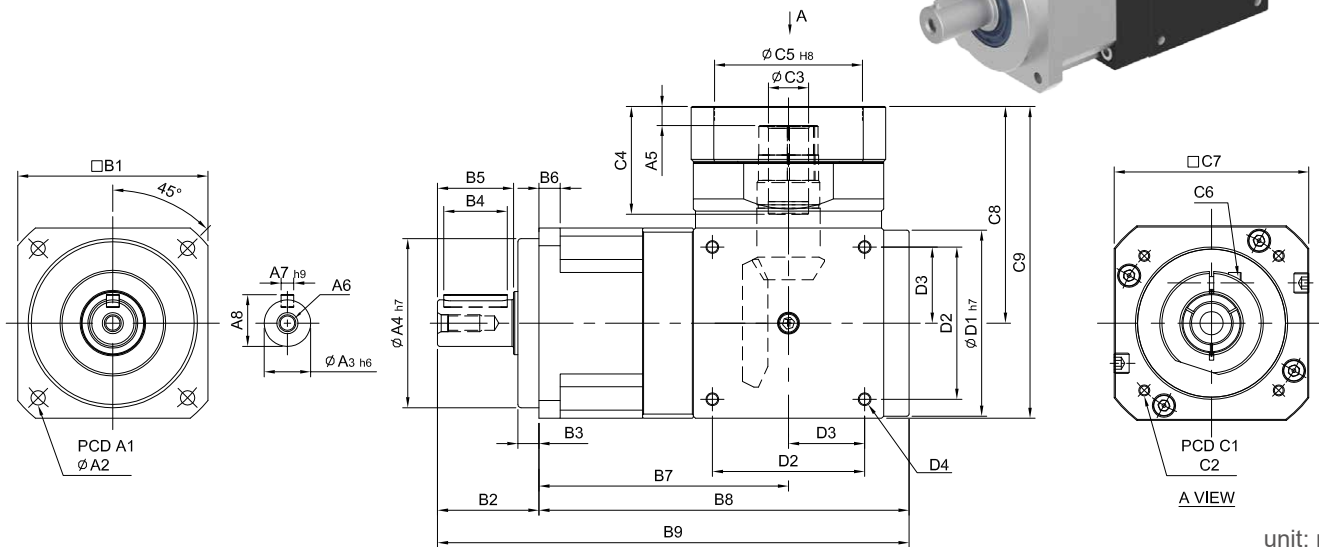
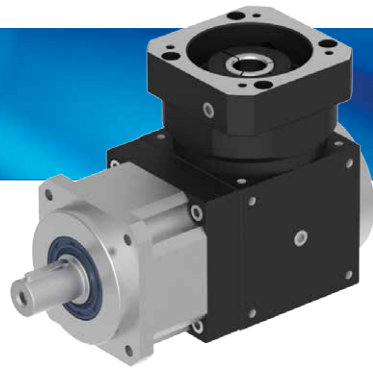
| 速比 Ratio | 44A  | 62A  | 90A  | 120A | 142A  | 180A | 220A |
|----------|------|------|------|------|-------|------|------|
| 15       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 55.2 | 80.2 |
| 20       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 55.2 | 80.2 |
| 25       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 30       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 35       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 40       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 50       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 60       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 70       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 80       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 90       | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 100      | 0.09 | 0.36 | 2.28 | 6.85 | 23.50 | 50.4 | 76.5 |
| 120      | 0.03 | 0.08 | 1.88 | 6.20 | 21.80 | 48.7 | 74.2 |
| 140      | 0.03 | 0.08 | 1.88 | 6.20 | 21.80 | 48.7 | 74.2 |
| 160      | 0.03 | 0.08 | 1.88 | 6.20 | 21.80 | 48.7 | 74.2 |
| 180      | 0.03 | 0.08 | 1.88 | 6.20 | 21.80 | 48.7 | 74.2 |
| 200      | 0.03 | 0.08 | 1.88 | 6.20 | 21.80 | 48.7 | 74.2 |

# MODEL : PBT

單段 1-Stage

RATIO : 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50

螺旋齒輪 Helical Gear & 螺旋傘齒輪 Spiral Bevel Gear



unit: mm

| Code | Model | 44        | 62        | 90             | 120            | 142         | 180         | 220           |
|------|-------|-----------|-----------|----------------|----------------|-------------|-------------|---------------|
| A    | A1    | 50        | 70        | 100            | 130            | 165         | 215         | 250           |
|      | A2    | 4.5       | 5.5       | 6.8            | 9              | 11          | 13          | 17            |
|      | A3    | 13        | 16        | 22             | 32             | 40          | 55          | 75            |
|      | A4    | 35        | 50        | 80             | 110            | 130         | 160         | 180           |
|      | A5    | 5         | 7         | 9·23.5         | 9·23.5         | 10          | 9.5         | 14·16         |
|      | A6    | M4 x P0.7 | M5 x P0.8 | M8 x P1.25     | M10 x P1.5     | M12 x P1.75 | M14 x P2.0  | M16xP2.0      |
|      | A7    | 5         | 5         | 6              | 10             | 12          | 16          | 20            |
|      | A8    | 15        | 18        | 24.5           | 35             | 43          | 59          | 79.5          |
| B    | B1    | 44        | 62        | 90             | 120            | 142         | 180         | 220           |
|      | B2    | 26        | 36        | 48             | 65             | 92          | 106         | 139           |
|      | B3    | 5         | 7         | 10             | 12             | 15          | 20          | 30            |
|      | B4    | 15        | 20        | 30             | 40             | 65          | 70          | 90            |
|      | B5    | 20        | 28        | 36             | 50             | 74          | 82          | 104           |
|      | B6    | 5         | 8         | 10             | 12             | 15          | 16          | 20            |
|      | B7    | 67.5      | 87.5      | 118            | 145            | 175         | 207         | 237           |
|      | B8    | 99.5      | 128       | 175            | 215            | 260         | 307         | 360           |
|      | B9    | 125.5     | 164       | 223            | 280            | 352         | 413         | 499           |
| C    | C1    | 46        | 70·75·90  | 90·100·115·145 | 90·100·115·145 | 115·145·165 | 145·165·215 | 200·215·265   |
|      | C2    | M4        | M4·M5·M6  | M5·M6·M8       | M5·M6·M8       | M6·M8·M10   | M8·M10·M12  | M10·M12·M16   |
|      | C3    | 8         | 11·14     | 19·24          | 22·24          | 28·32·35    | 35·38       | 42·48·55      |
|      | C4    | 26        | 36        | 51·65.5        | 51·65.5        | 68          | 84.5        | 117·119       |
|      | C5    | 30        | 50·60·70  | 70·80·95·110   | 70·80·95·110   | 95·110·130  | 110·130·180 | 114.3·180·230 |
|      | C6    | M4 x P0.7 | M5 x P0.8 | M6 x P1.0      | M6 x P1.0      | M8 x P1.25  | M10 x P1.5  | M10xP1.5      |
|      | C7    | 42        | 64·70·80  | 92·110·130     | 92·110·130     | 122·130·150 | 146·150·190 | 182·200·250   |
|      | C8    | 57        | 77        | 103·117        | 122·136        | 154         | 189         | 252·254       |
|      | C9    | 82        | 110       | 148·162        | 182·196        | 225         | 279         | 362·364       |
| D    | D1    | 48        | 62        | 88             | 106            | 135         | 164         | 205           |
|      | D2    | -         | 52        | 72             | 88             | 110         | 134         | 170           |
|      | D3    | -         | 26        | 36             | 44             | 55          | 67          | 85            |
|      | D4    | -         | M5 x P0.8 | M6 x P1.0      | M8 x P1.25     | M10 x P1.5  | M12 x P1.75 | M16xP2.0      |

# Characteristic of PBT 1-Stage

## PBT 單段特性

| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 44  | 62    | 90    | 120   | 142   | 180    | 220    |
|---|------------|-----------|----------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 3        | 17  | 54    | 145   | 301   | 553   | 1,067  | 1,786  |
|   |            |           | 4        | 15  | 48    | 128   | 269   | 491   | 940    | 1,587  |
|   |            |           | 5        | 14  | 45    | 132   | 278   | 510   | 1,050  | 1,770  |
|   |            |           | 6        | 13  | 41    | 125   | 252   | 466   | 985    | 1,680  |
|   |            |           | 7        | 13  | 41    | 123   | 258   | 473   | 975    | 1,645  |
|   |            |           | 8        | 12  | 39    | 115   | 241   | 442   | 942    | 1,605  |
|   |            |           | 9        | 11  | 40    | 120   | 227   | 412   | 875    | 1,490  |
|   |            |           | 10       | 14  | 45    | 132   | 278   | 510   | 1,050  | 1,565  |
|   |            |           | 15       | 14  | 45    | 132   | 278   | 510   | 1,050  | 1,786  |
|   |            |           | 20       | 14  | 45    | 132   | 278   | 510   | 1,050  | 1,587  |
|   |            |           | 25       | 14  | 45    | 132   | 278   | 510   | 1,050  | 1,770  |
|   |            |           | 30       | 13  | 41    | 125   | 252   | 466   | 985    | 1,680  |
|   |            |           | 35       | 13  | 41    | 123   | 258   | 473   | 975    | 1,645  |
|   |            |           | 40       | 12  | 39    | 115   | 241   | 442   | 942    | 1,605  |
|   |            |           | 45       | 11  | 40    | 120   | 227   | 412   | 875    | 1,490  |
| 50  | 12         | 40        | 116      | 246   | 452   | 930   | 1,565 |       |        |        |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 3~50     | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 3~50     | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{IN}$   | rpm       | 3~50     | 3,000   | 3,000 | 3,000 | 2,500 | 2,500 | 2,000  | 2,000  |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{IB}$   | rpm       | 3~50     | 6,000   | 6,000 | 5,500 | 4,500 | 3,500 | 3,000  | 3,000  |
| 背隙 / Backlash   |            | arcmin    | 3~50     | ≤ 10  | ≤ 10  | ≤ 10  | ≤ 10  | ≤ 10  | ≤ 10   | ≤ 10   |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 3~50     | 3   | 6     | 14    | 27    | 60    | 140    | 240    |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 3~50     | 360   | 1,120 | 3,040 | 6,460 | 8,830 | 14,820 | 48,450 |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 3~50     | 180   | 560   | 1,520 | 3,230 | 4,410 | 7,410  | 24,225 |
| 使用壽命 / Service Life   | $L_H$      | hr        | 3~50     | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 / Efficiency   | $\eta$     | %         | 3~50     | ≥ 95%   |       |       |       |       |        |        |
| 使用溫度 / Operating Temperature                                |            | °C        | 3~50     | -25° C ~ +90° C   |       |       |       |       |        |        |
| 潤滑 / Lubrication  |            |           | 3~50     | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 / Protection Class                                     |            |           | 3~50     | IP65  |       |       |       |       |        |        |
| 安裝方向 / Mounting Position                                    |            |           | 3~50     | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 / Noise Level   |            | dB        | 3~50     | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 74  | ≤ 76   | ≤ 76   |
| 重量 / Weight ±3%   |            | Kg        | 3~50     | 1.2   | 2     | 7     | 13    | 24    | 48     | 78     |

### ■ 轉動慣量 Mass Moments of Inertia (kg·cm<sup>2</sup>)

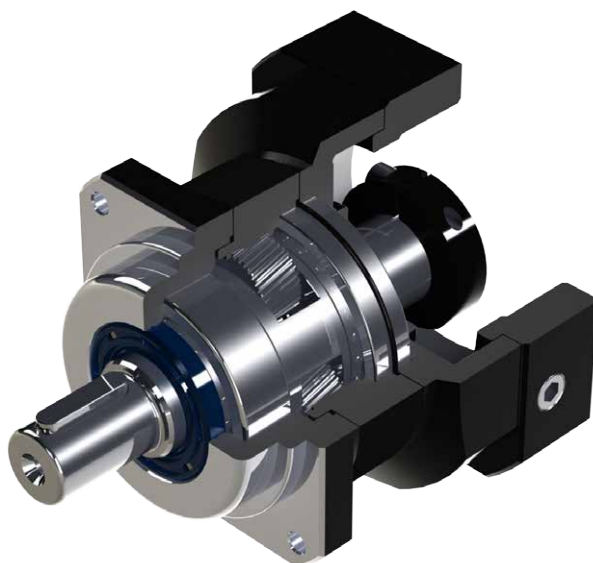
| 速比 Ratio | 44   | 62   | 90   | 120  | 142  | 180  | 220 |
|----------|------|------|------|------|------|------|-----|
| 3        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68   | 135 |
| 4        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68   | 135 |
| 5        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68   | 135 |
| 6        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68   | 135 |
| 7        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68   | 135 |
| 8        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68   | 135 |
| 9        | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68   | 135 |
| 10       | 0.09 | 0.36 | 2.28 | 6.85 | 23.5 | 68   | 135 |
| 15       | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61   | 135 |
| 20       | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61   | 135 |
| 25       | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61   | 135 |
| 30       | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61   | 135 |
| 35       | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61   | 135 |
| 40       | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61   | 135 |
| 45       | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61.3 | 135 |
| 50       | 0.06 | 0.22 | 2.05 | 6.21 | 21.2 | 61   | 135 |

### 行星減速機搭配傘齒輪減速機型號及速比一覽表 The Model & Ratio Table of Precision Planetary Reducer Assembly Bevel Gear Reducer

| 型號 Model | 減速比 Ratio  | 法蘭盤框號 Flange Model | 傘齒輪減速機 Bevel Gear Reducer Model |
|----------|--|--------------------|---------------------------------|
| 44       |  | 44                 |                                 |
| 62       |  | 62                 | ST65                            |
| 90       | 3·4·5·6<br>7·8·9·10<br>15·20·25<br>30·35·40<br>45·50 | 90                 | ST90                            |
| 120      |  | 90                 | ST110                           |
| 142      |  | 120                | ST140                           |
| 180      |  | 142                | ST170                           |
| 220      |  | 180                | ST210                           |

# FA series

- 全系列單段背隙  $\leq 8$  弧分  
1-Stage Backlash  $\leq 8$  arcmin
- 全系列雙段背隙  $\leq 12$  弧分  
2-Stage Backlash  $\leq 12$  arcmin



## Indication of Model Numbers

### 機種型號表示

|               |  |   |  |   |   |                    |
|---------------|--|---|--|---|---|--------------------|
| FA            | 80   | - | 10   | □   | - | MOTOR              |
| 減速機機型<br>Type | 型號<br>Model                                      |   | 速比<br>Ratio  | 出力軸鍵槽<br>Output Shaft Keyway  |   | 馬達型號<br>Motor Type |
| FA            | 50<br>70<br>80<br>90<br>100<br>120<br>142<br>180 |   | 單段 1-Stage<br>3, 4, 5, 7, 10<br><br>雙段 2-Stage<br>15, 20, 25, 30,<br>35, 40, 50, 70, 100 | <input type="checkbox"/> 標準品 · 有鍵槽<br>Standard (Keyway)<br><br><input type="checkbox"/> N: 實心軸 · 無鍵槽<br>Solid Output Shaft<br>(No Keyway) |   |                    |

#### 靜音

使用研磨等級螺旋傘齒輪及螺旋齒輪實現順暢安靜地運轉。

#### Quiet operation

Grinding spiral bevel gear & Helical gears contribute to reduce vibration and noise.

#### 高剛性、高扭矩

使用整體式滿針滾針軸承，一體式內齒箱及螺旋齒輪，提高了剛性和扭矩。

#### High Rigidity & High Torque

High rigidity & high torque are achieved by integrant needle roller bearings and one-piece constructed.



# Features of FA Series

## FA 系列產品特點



### 螺旋齒輪設計及高精度齒輪加工

減速機構採用螺旋齒輪設計，齒形嚙合率為一般正齒輪的二倍以上，具有運轉平順、低噪音、高輸出扭矩和低背隙的特性。  
材料採用高級鎳鉻鉬合金鋼 (SNCM220)，切削加工後，經滲碳熱處理至硬度 57~60HRC，再進行齒面研磨，確保齒輪精度 DIN6 級以內。

### Helical Gear Design

The speed reduction mechanism employs helical gears, which provides two times meshing rate of teeth when comparing with regular spur gears. In addition, it also features extremely smooth running, low noise, high torque output and low backlash.

### High Precision Gear Machining

Manufactured from high quality Ni-Cr-Mo alloy steel (SNCM220), precision achined and carburized to hardness 57-60 HRC. Precision teeth grinding sure gear accuracy reaches DIN6 class.



### 滿針滾針軸承設計

行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

### Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.

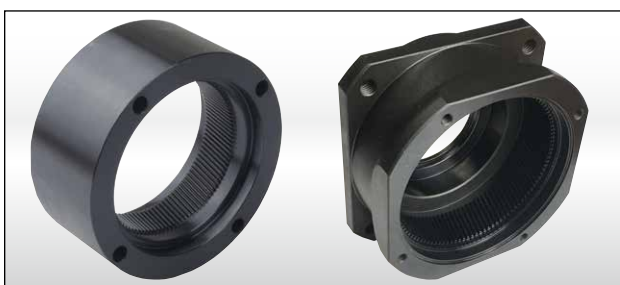


### 一體式行星臂架

行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。

### Integrated Planetary Arm Bracket

The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy.



### 一體式齒輪箱本體

齒輪箱和內環齒輪採一體式的設計，提高結構剛性及輸出扭矩。

### One-piece Gear Box & Advanced Surface Treatment

The gear box and internal ring gear are one-piece constructed to achieve high rigidity and high torque.



### 筒夾式連結機構

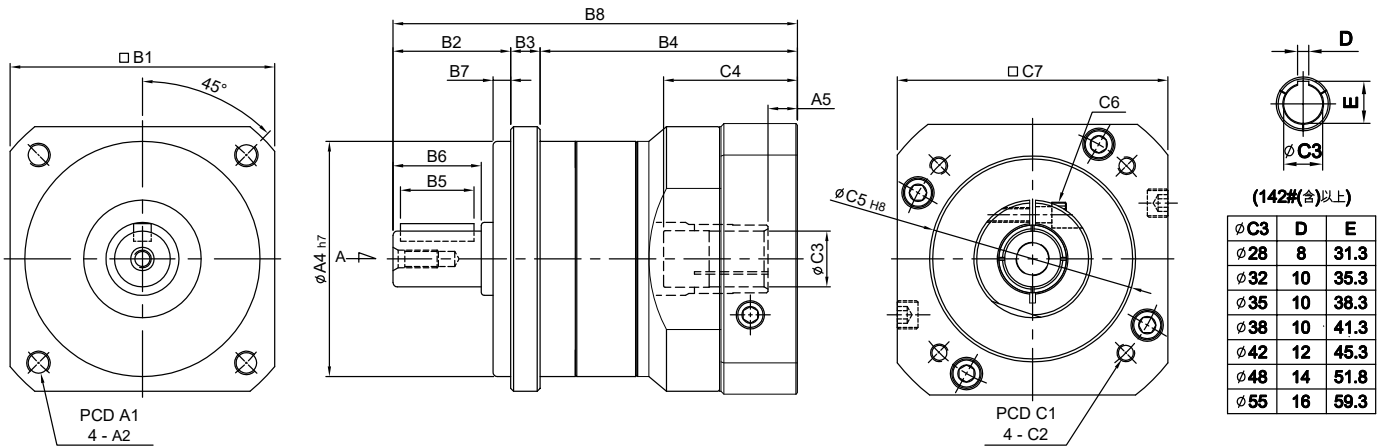
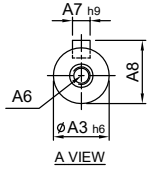
輸入端與馬達的連結採用筒夾式的鎖緊機構，並經動力平衡分析，以確保在高輸入轉速下結合介面的同心度和平衡度，及零背隙的動力傳遞。

### Collet Locking Mechanism

The input-end and the motor are coupled through a collet locking mechanism. It has passed dynamical balance analysis to assure concentricity and balance on the connection and no backlash for power transmission while running at high speed.

# MODEL : FA

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



(142#(含)以上)

| ∅C3 | D  | E    |
|-----|----|------|
| ∅28 | 8  | 31.3 |
| ∅32 | 10 | 35.3 |
| ∅35 | 10 | 38.3 |
| ∅38 | 10 | 41.3 |
| ∅42 | 12 | 45.3 |
| ∅48 | 14 | 51.8 |
| ∅55 | 16 | 59.3 |

unit: mm

| Model Code | 50                       | 70                | 80                  | 90                   | 100                  | 120                | 142                         | 180                         |
|------------|--------------------------|-------------------|---------------------|----------------------|----------------------|--------------------|-----------------------------|-----------------------------|
| <b>A</b>   |                          |                   |                     |                      |                      |                    |                             |                             |
| A1         | 60                       | 76                | 90                  | 100                  | 115                  | 135                | 165                         | 215                         |
| A2         | M5 x P0.8                | ∅5.5              | M6 x P1.0           | M8 x P1.25           | M8 x P1.25           | M10 x P1.5         | M12 x P1.75                 | M14 x P2.0                  |
| A3         | 12                       | 16                | 19                  | 19                   | 24                   | 32                 | 40                          | 55                          |
| A4         | 50                       | 60                | 70                  | 80                   | 90                   | 110                | 130                         | 160                         |
| A5         | 4.5                      | 6                 | 10                  | 10                   | 8                    | 10                 | 10                          | 9.5                         |
| A6         | M4 x P0.7 deep 11        | M5 x P0.8 deep 14 | M6 x P1.0 deep 15   | M6 x P1.0 deep 15    | M8 x P1.25 deep 20   | M10 x P1.5 deep 23 | M10 x P1.5 deep 23          | M10 x P1.5 deep 23          |
| A7         | 4                        | 5                 | 6                   | 6                    | 8                    | 10                 | 12                          | 16                          |
| A8         | 13.5                     | 18                | 21.5                | 21.5                 | 27                   | 35                 | 43                          | 59                          |
| <b>B</b>   |                          |                   |                     |                      |                      |                    |                             |                             |
| B1         | 52                       | 70                | 80                  | 90                   | 102                  | 120                | 142                         | 180                         |
| B2         | 32                       | 36                | 50                  | 40                   | 61                   | 72                 | 87                          | 106                         |
| B3         | 6                        | 7                 | 11                  | 10                   | 13                   | 10                 | 15                          | 16                          |
| B4         | 58.5                     | 72/80             | 76.5                | 87.5                 | 89.5/104             | 123/133            | 158.5                       | 201.5/204.5                 |
| B5         | 15                       | 20                | 25                  | 25                   | 30                   | 40                 | 65                          | 70                          |
| B6         | 20                       | 28                | 30                  | 30                   | 40                   | 50                 | 74                          | 82                          |
| B7         | 4.5                      | 7                 | 5                   | 6                    | 5                    | 10                 | 10                          | 20                          |
| B8         | 96.5                     | 115 · 123         | 137.5               | 137.5                | 163.5 · 178          | 205 · 215          | 260.5                       | 323.5 · 326.5               |
| <b>C</b>   |                          |                   |                     |                      |                      |                    |                             |                             |
| C1         | 45 · 46 · 48.5 · 63 · 70 | 70 · 75 · 85      | 70 · 90 · 100 · 115 | 90 · 100 · 115 · 145 | 90 · 100 · 115 · 145 | 115 · 145 · 165    | 130 · 145 · 165 · 175 · 215 | 149 · 200 · 215 · 265 · 300 |
| C2         | M3 · M4 · M5             | M5 · M6           | M5 · M6             | M6 · M8              | M6 · M8              | M6 · M8 · M10      | M8 · M10 · M12              | M8 · M12 · M16              |
| C3         | 8 · 10 · 11 · 14         | 11 · 14 · 16 · 19 | 16 · 19             | 16 · 19              | 19 · 22 · 24         | 22 · 24 · 28 · 32  | 28 · 32 · 35 · 38           | 35 · 38 · 42 · 48 · 55      |
| C4         | 32                       | 33.5 · 41.5       | 45.5                | 45.5                 | 51 · 65.5            | 67 · 77            | 84.5                        | 114.5 · 117.5               |
| C5         | 30 · 40 · 50             | 50 · 60 · 70      | 50 · 70 · 80 · 95   | 70 · 80 · 95 · 110   | 70 · 80 · 95 · 110   | 95 · 110 · 130     | 110 · 130 · 180             | 114.3 · 180 · 230 · 250     |
| C6         | M4 x P0.7                | M5 x P0.8         | M5 x P0.8           | M5 x P0.8            | M6 x P1.0            | M8 x P1.25         | M10 x P1.5                  | M10 x P1.5                  |
| C7         | 46 · 55 · 60             | 64 · 70 · 80      | 80 · 92 · 110       | 92 · 110 · 130       | 92 · 110 · 130       | 122 · 130 · 150    | 146 · 150 · 190             | 182 · 200 · 250 · 265       |

# Characteristic of FA 1-Stage

## FA 單段特性

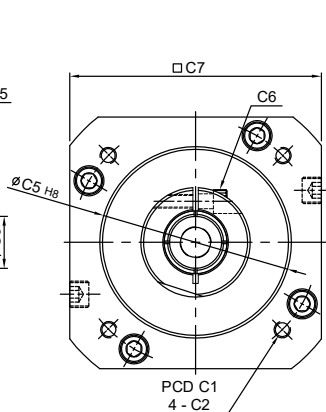
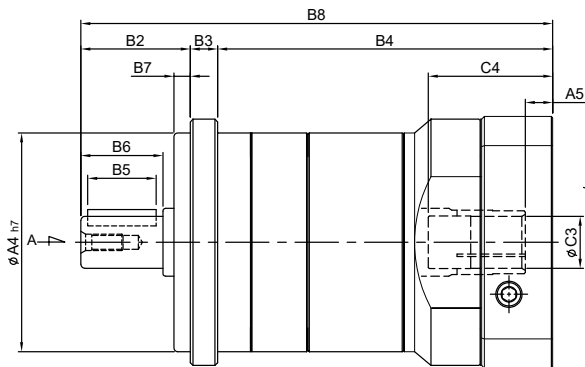
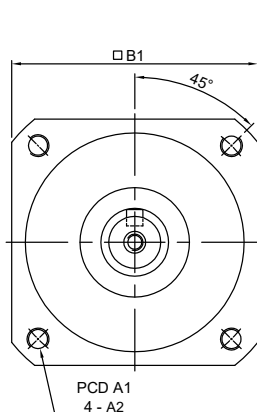
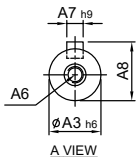
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 50  | 70        | 80        | 90        | 100       | 120       | 142       | 180       |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm        | 3        | 19  | 54        | 112       | 112       | 165       | 286       | 550       | 1,060     |
|   |            |           | 4        | 16  | 48        | 110       | 110       | 146       | 255       | 490       | 940       |
|   |            |           | 5        | 16  | 45        | 108       | 108       | 160       | 264       | 510       | 1,050     |
|   |            |           | 7        | 15  | 41        | 105       | 105       | 149       | 245       | 470       | 970       |
|   |            |           | 10       | 14  | 40        | 100       | 100       | 141       | 234       | 450       | 930       |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 3        | 34  | 97        | 202       | 202       | 297       | 515       | 990       | 1,900     |
|   |            |           | 4        | 29  | 86        | 198       | 198       | 263       | 459       | 880       | 1,690     |
|   |            |           | 5        | 29  | 81        | 194       | 194       | 288       | 475       | 910       | 1,890     |
|   |            |           | 7        | 27  | 74        | 189       | 189       | 268       | 441       | 840       | 1,740     |
|   |            |           | 10       | 25  | 72        | 180       | 180       | 254       | 421       | 810       | 1,670     |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 3~10     | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 3~10     | 3,000   |           |           |           |           |           |           |           |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 3~10     | 5,000   |           |           |           |           |           |           |           |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 3~10     | 3   | 5         | 12        | 12        | 14        | 23        | 60        | 140       |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 3~10     | 350   | 800       | 1,200     | 1,200     | 3,200     | 5,220     | 8,800     | 14,800    |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 3~10     | 180   | 400       | 600       | 600       | 1,600     | 2,600     | 4,400     | 7,400     |
| 使用壽命 / Service Life   | $L_H$      | hr        | 3~10     | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 3~10     | $\geq 97\%$   |           |           |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 3~10     | -25°C ~ +90°C   |           |           |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 3~10     | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 3~10     | IP 65   |           |           |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 3~10     | 任意 Any  |           |           |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 3~10     | $\leq 58$   | $\leq 58$ | $\leq 60$ | $\leq 60$ | $\leq 65$ | $\leq 67$ | $\leq 69$ | $\leq 70$ |
| 重量 / Weight $\pm 2\%$                                       |            | Kg        | 3~10     | 0.64  | 1         | 1.6       | 1.96      | 3.76      | 7.43      | 16.7      | 33        |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 50   | 70   | 80   | 90   | 100  | 120  | 142 | 180  |
|----------|------|------|------|------|------|------|-----|------|
| 3        | 0.03 | 0.16 | 0.48 | 0.48 | 0.6  | 3.21 | 9.2 | 29   |
| 4        | 0.03 | 0.14 | 0.38 | 0.38 | 0.45 | 2.64 | 7.5 | 23.7 |
| 5        | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.64 | 7.4 | 23.3 |
| 7        | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.62 | 7.1 | 22.5 |
| 10       | 0.03 | 0.13 | 0.35 | 0.35 | 0.41 | 2.51 | 7.0 | 22.5 |

# MODEL : FA

RATIO : 15, 20, 25, 30, 35, 40, 50, 70, 100 ( 雙段 2-Stage)



(142#(含)以上)

| φC3 | D  | E    |
|-----|----|------|
| φ28 | 8  | 31.3 |
| φ32 | 10 | 35.3 |
| φ35 | 10 | 38.3 |
| φ38 | 10 | 41.3 |
| φ42 | 12 | 45.3 |
| φ48 | 14 | 51.8 |
| φ55 | 16 | 59.3 |

unit: mm

| Model    | 50                       | 70                   | 80                   | 90                   | 100                   | 120                   | 142                         | 180                         |
|----------|--------------------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------------|-----------------------------|
| <b>A</b> |                          |                      |                      |                      |                       |                       |                             |                             |
| A1       | 60                       | 76                   | 90                   | 100                  | 115                   | 135                   | 165                         | 215                         |
| A2       | M5 x P0.8                | φ5.5                 | M6 x P1.0            | M8 x P1.25           | M8 x P1.25            | M10 x P1.5            | M12 x P1.75                 | M14 x P2.0                  |
| A3       | 12                       | 16                   | 19                   | 19                   | 24                    | 32                    | 40                          | 55                          |
| A4       | 50                       | 60                   | 70                   | 80                   | 90                    | 110                   | 130                         | 160                         |
| A5       | 4.5                      | 6                    | 10                   | 10                   | 8                     | 10                    | 10                          | 9.5                         |
| A6       | M4 x P0.7<br>deep 11     | M5 x P0.8<br>deep 14 | M6 x P1.0<br>deep 15 | M6 x P1.0<br>deep 15 | M8 x P1.25<br>deep 20 | M10 x P1.5<br>deep 23 | M10 x P1.5<br>deep 23       | M10 x P1.5<br>deep 23       |
| A7       | 4                        | 5                    | 6                    | 6                    | 8                     | 10                    | 12                          | 16                          |
| A8       | 13.5                     | 18                   | 21.5                 | 21.5                 | 27                    | 35                    | 43                          | 59                          |
| <b>B</b> |                          |                      |                      |                      |                       |                       |                             |                             |
| B1       | 52                       | 70                   | 80                   | 90                   | 102                   | 120                   | 142                         | 180                         |
| B2       | 32                       | 36                   | 50                   | 40                   | 61                    | 72                    | 87                          | 106                         |
| B3       | 6                        | 7                    | 11                   | 10                   | 13                    | 10                    | 15                          | 16                          |
| B4       | 84.5                     | 105.8/113.8          | 99.5/111.5           | 122.5                | 133/147.5             | 179/189               | 158.5                       | 282.5/285.5                 |
| B5       | 15                       | 20                   | 25                   | 25                   | 30                    | 40                    | 65                          | 70                          |
| B6       | 20                       | 28                   | 30                   | 30                   | 40                    | 50                    | 74                          | 82                          |
| B7       | 4.5                      | 7                    | 5                    | 6                    | 5                     | 10                    | 10                          | 20                          |
| B8       | 122.5                    | 148.8 · 156.8        | 160.5 · 172.5        | 172.5                | 207 · 221.5           | 261 · 271             | 260.5                       | 404.5 · 407.5               |
| <b>C</b> |                          |                      |                      |                      |                       |                       |                             |                             |
| C1       | 45 · 46 · 48.5 · 63 · 70 | 70 · 75 · 85         | 70 · 90 · 100 · 115  | 90 · 100 · 115 · 145 | 90 · 100 · 115 · 145  | 115 · 145 · 165       | 130 · 145 · 165 · 175 · 215 | 149 · 200 · 215 · 265 · 300 |
| C2       | M3 · M4 · M5             | M5 · M6              | M5 · M6              | M6 · M8              | M6 · M8               | M6 · M8 · M10         | M8 · M10 · M12              | M8 · M12 · M16<br>M12 · M16 |
| C3       | 8 · 10 · 11 · 14         | 11 · 14 · 16 · 19    | 14 · 16 · 19         | 14 · 16 · 19         | 19 · 22 · 24          | 22 · 24 · 28 · 32     | 28 · 32 · 35 · 38           | 35 · 38 · 42 · 48 · 55      |
| C4       | 32                       | 33.5 · 41.5          | 33.5 · 45.5          | 45.5                 | 51 · 65.5             | 67 · 77               | 84.5                        | 114.5 · 117.5               |
| C5       | 30 · 40 · 50             | 50 · 60 · 70         | 50 · 70 · 80 · 95    | 70 · 80 · 95 · 110   | 70 · 80 · 95 · 110    | 95 · 110 · 130        | 110 · 130 · 180             | 114.3 · 180 · 230 · 250     |
| C6       | M4 x P0.7                | M5 x P0.8            | M5 x P0.8            | M5 x P0.8            | M6 x P1.0             | M8 x P1.25            | M10 x P1.5                  | M10 x P1.5                  |
| C7       | 46 · 55 · 60             | 64 · 70 · 80         | 80 · 92 · 110        | 92 · 110 · 130       | 92 · 110 · 130        | 122 · 130 · 150       | 146 · 150 · 190             | 182 · 200 · 250 · 265       |

# Characteristic of FA 2-Stage

## FA 雙段特性

| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 50  | 70        | 80        | 90        | 100       | 120       | 142       | 180       |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm        | 15       | 19  | 54        | 112       | 112       | 165       | 286       | 550       | 1,060     |
|   |            |           | 20       | 16  | 48        | 110       | 110       | 146       | 255       | 490       | 940       |
|   |            |           | 25       | 16  | 45        | 108       | 108       | 160       | 264       | 510       | 1,050     |
|   |            |           | 30       | 19  | 41        | 112       | 112       | 165       | 286       | 550       | 1,060     |
|   |            |           | 35       | 15  | 41        | 105       | 105       | 149       | 245       | 470       | 970       |
|   |            |           | 40       | 16  | 39        | 110       | 110       | 146       | 255       | 490       | 940       |
|   |            |           | 50       | 16  | 45        | 108       | 108       | 160       | 264       | 510       | 1,050     |
|   |            |           | 70       | 15  | 41        | 105       | 105       | 149       | 245       | 470       | 970       |
|   |            |           | 100      | 14  | 40        | 100       | 100       | 141       | 234       | 450       | 930       |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 15~100   | 1.8 倍額定輸出力矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 15~100   | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 15~100   | 3,000   |           |           |           |           |           |           |           |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 15~100   | 5,000   |           |           |           |           |           |           | 4,000     |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 15~100   | 3   | 5         | 12        | 12        | 14        | 23        | 60        | 140       |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 15~100   | 350   | 800       | 1,200     | 1,200     | 3,200     | 5,220     | 8,800     | 14,800    |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 15~100   | 180   | 400       | 600       | 600       | 1,600     | 2,600     | 4,400     | 7,400     |
| 使用壽命 / Service Life   | $L_H$      | hr        | 15~100   | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 15~100   | $\geq 94\%$   |           |           |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 15~100   | -25°C ~ +90°C   |           |           |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 15~100   | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 15~100   | IP 65   |           |           |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 15~100   | 任意 Any  |           |           |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 15~100   | $\leq 60$   | $\leq 60$ | $\leq 62$ | $\leq 62$ | $\leq 67$ | $\leq 69$ | $\leq 70$ | $\leq 72$ |
| 重量 / Weight $\pm 2\%$                                       |            | Kg        | 15~100   | 0.96  | 2.1       | 2.8       | 3.06      | 5.92      | 10.3      | 20.5      | 41        |

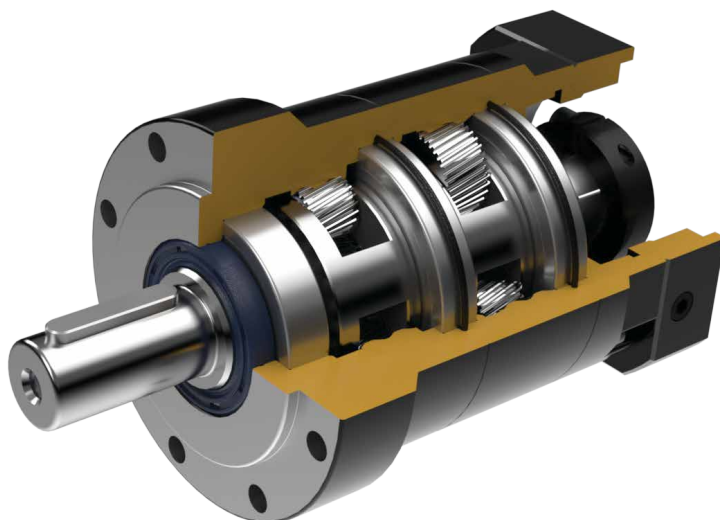
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 50   | 70   | 80   | 90   | 100  | 120  | 142 | 180  |
|----------|------|------|------|------|------|------|-----|------|
| 15       | 0.03 | 0.13 | 0.41 | 0.41 | 0.45 | 2.64 | 7.3 | 22.8 |
| 20       | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.64 | 7.3 | 22.8 |
| 25       | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.64 | 7.1 | 22.8 |
| 30       | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.64 | 7.3 | 22.6 |
| 35       | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.64 | 6.7 | 22.6 |
| 40       | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.64 | 7.3 | 22.6 |
| 50       | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.51 | 7.1 | 22.6 |
| 70       | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.51 | 6.7 | 21.9 |
| 100      | 0.03 | 0.13 | 0.38 | 0.38 | 0.45 | 2.51 | 6.7 | 21.9 |




# SN series

- 全系列單段背隙  $\leq 8$  弧分  
1-Stage Backlash  $\leq 8$  arcmin
- 全系列雙段背隙  $\leq 12$  弧分  
2-Stage Backlash  $\leq 12$  arcmin



## Indication of Model Numbers

### 機種型號表示

|               |             |   |                     |   |   |                    |
|---------------|-------------|---|---------------------|---|---|--------------------|
| <b>SN</b>     | <b>80</b>   | — | <b>10</b>           |  | — | <b>MOTOR</b>       |
| 減速機機型<br>Type | 型號<br>Model |   | 速比<br>Ratio         | 出力軸鍵槽<br>Output Shaft Keyway  |   | 馬達型號<br>Motor Type |
| SN            | 50          |   | 單段 1-Stage          | <input type="checkbox"/> 標準品 · 有鍵槽<br>Standard (Keyway)                             |   |                    |
| SNL           | 60          |   | 3, 4, 5, 7, 10      |   |   |                    |
|               | 70          |   | 雙段 2-Stage          | <input type="checkbox"/> N: 實心軸 · 無鍵槽<br>Solid Output Shaft<br>(No Keyway)          |   |                    |
|               | 80          |   | 15, 20, 25, 30,     |   |   |                    |
|               | 90          |   | 35, 40, 50, 70, 100 |   |   |                    |
|               | 115         |   |                     |   |   |                    |
|               | 120         |   |                     |   |   |                    |
|               | 155         |   |                     |   |   |                    |
|               | 160         |   |                     |   |   |                    |

#### 靜音

使用研磨等級螺旋傘齒輪及螺旋齒輪實現順暢安靜地運轉。

#### Quiet operation

Grinding spiral bevel gear & Helical gears contribute to reduce vibration and noise.

#### 高剛性、高扭矩

使用整體式滿針滾針軸承，一體式內齒箱及螺旋齒輪，提高了剛性和扭矩。

#### High Rigidity & High Torque

High rigidity & high torque are achieved by integrant needle roller bearings and one-piece constructed.

#### 高效率

單段式在 95% 以上，雙段式在 92% 以上。

#### High Efficiency

Efficiency for 1-stage model exceeds 95%; 2-stage model exceeds 92%.

# Features of SN Series

## SN 系列產品特點



### 螺旋齒輪設計及高精度齒輪加工

減速機構採用螺旋齒輪設計，齒形嚙合率為一般正齒輪的二倍以上，具有運轉平順、低噪音、高輸出扭矩和低背隙的特性。

材料採用高級鎳鉻鉬合金鋼 (SNCM220)，切削加工後，經滲碳熱處理至硬度 57~60HRC，再進行齒面研磨，確保齒輪精度 DIN6 級以內。

### Helical Gear Design

The speed reduction mechanism employs helical gears, which provides two times meshing rate of teeth when comparing with regular spur gears. In addition, it also features extremely smooth running, low noise, high torque output and low backlash.

### High Precision Gear Machining

Manufactured from high quality Ni-Cr-Mo alloy steel (SNCM220), precision achined and carburized to hardness 57-60 HRC. Precision teeth grinding sure gear accuracy reaches DIN6 class.



### 一體式行星臂架

行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。

### Integrated Planetary Arm Bracket

The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy.



### 滿針滾針軸承設計

行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

### Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.

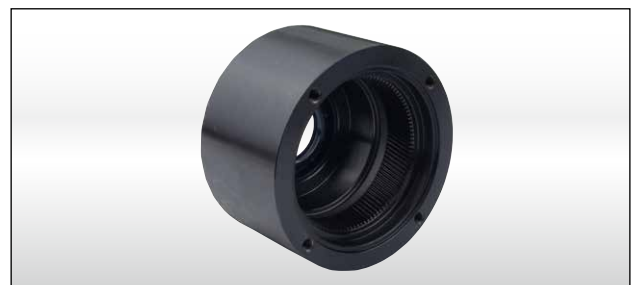


### 筒夾式連結機構

輸入端與馬達的連結採用筒夾式的鎖緊機構，並經動力平衡分析，以確保在高輸入轉速下結合介面的同心度和平衡度，及零背隙的動力傳遞。

### Collet Locking Mechanism

The input-end and the motor are coupled through a collet locking mechanism. It has passed dynamical balance analysis to assure concentricity and balance on the connection and no backlash for power transmission while running at high speed.



### 一體式齒輪箱本體

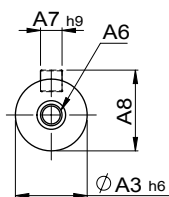
齒輪箱和內環齒輪採一體式的設計，提高結構剛性及輸出扭矩。

### One-piece Gear Box & Advanced Surface Treatment

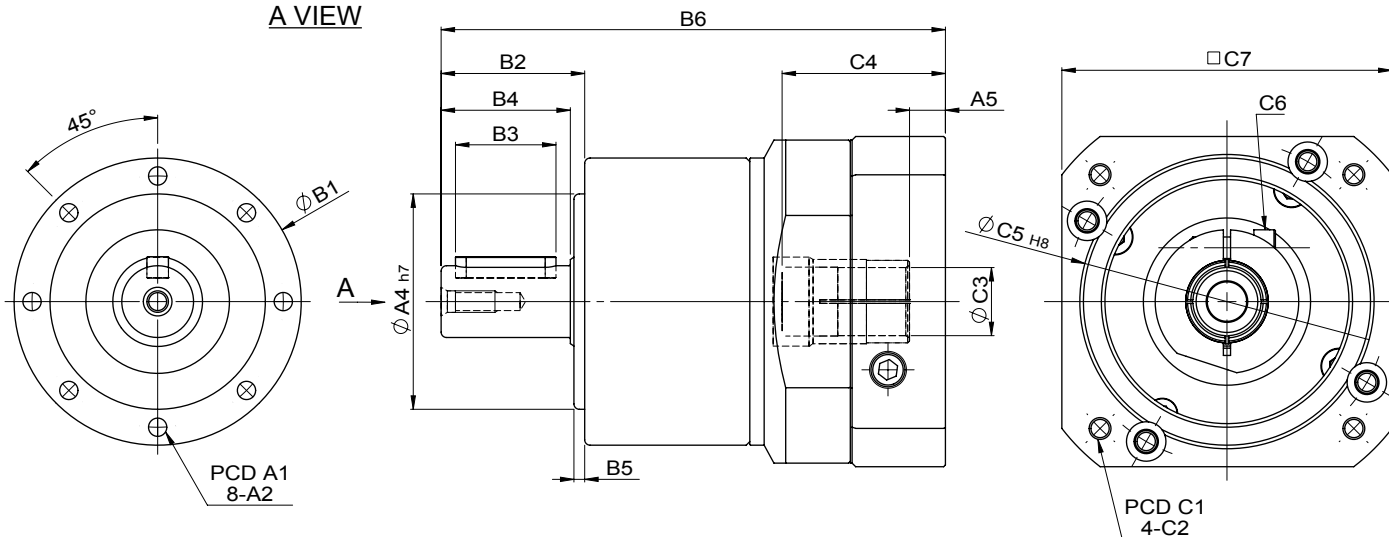
The gear box and internal ring gear are one-piece constructed to achieve high rigidity and high torque.

# MODEL : SN

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



A VIEW



unit: mm

| Model Code | 50 | 60               | 70               | 80          | 90             | 115            | 120            | 155         | 160                        |                            |
|------------|----|------------------|------------------|-------------|----------------|----------------|----------------|-------------|----------------------------|----------------------------|
| A          | A1 | 44               | 52               | 62          | 70             | 80             | 100            | 108         | 140                        | 145                        |
|            | A2 | M4 x P0.7        | M5 x P0.8        | M5 x P0.8   | M6 x P1.0      | M6 x P1.0      | M10 x P1.5     | M8 x P1.25  | M10 x P1.5                 | M12 x P1.75                |
|            | A3 | 12               | 14               | 16          | 20             | 22             | 25             | 32          | 40                         | 40                         |
|            | A4 | 35               | 40               | 52          | 60             | 68             | 80             | 90          | 120                        | 130                        |
|            | A5 | 4.5              | 4.5              | 6           | 10             | 9·23.5         | 8·22.5         | 10          | 10                         | 10                         |
|            | A6 | M4 x P0.7        | M4 x P0.7        | M5 x P0.8   | M6 x P1.0      | M6 x P1.0      | M8 x P1.25     | M12 x P1.75 | M12 x P1.75                | M12 x P1.75                |
|            | A7 | 4                | 5                | 5           | 6              | 6              | 8              | 10          | 12                         | 12                         |
|            | A8 | 13.5             | 16               | 18          | 22.5           | 24.5           | 28             | 35          | 43                         | 43                         |
| B          | B1 | 51               | 60               | 70          | 80             | 90             | 115            | 122         | 155                        | 160                        |
|            | B2 | 25.5             | 34               | 36          | 40             | 46             | 56             | 70          | 88                         | 88                         |
|            | B3 | 15               | 25               | 20          | 28             | 30             | 40             | 50          | 65                         | 65                         |
|            | B4 | 20               | 30               | 28          | 36             | 36             | 50             | 58          | 78                         | 78                         |
|            | B5 | 4                | 3                | 6.5         | 3              | 8              | 4              | 9           | 8                          | 8                          |
|            | B6 | 96.5             | 108              | 115         | 140.5          | 155.5·170      | 173.5·188      | 211·221     | 238.5<br>260.5             | 238.5<br>260.5             |
| C          | C1 | 45·46·48.5·63·70 | 45·46·48.5·63·70 | 70·75·90    | 90·100·115·145 | 90·100·115·145 | 90·100·115·145 | 115·145·165 | 115·145·165<br>145·165·200 | 115·145·165<br>145·165·200 |
|            | C2 | M3·M4·M5         | M3·M4·M5         | M5·M6       | M6·M8          | M6·M8          | M6·M8          | M6·M8·M10   | M6·M8·M10<br>M8·M10·M12    | M6·M8·M10<br>M8·M10·M12    |
|            | C3 | 8·10·11·14       | 8·9·10·12.7·14   | 11·14·16·19 | 14·16·19       | 19·24          | 19·22·24       | 24·28·32    | 24·28·32<br>35·38          | 24·28·32<br>35·38          |
|            | C4 | 32               | 32               | 33.5        | 45.5           | 51·65.5        | 51·65.5        | 67·77       | 63<br>84.5                 | 63<br>84.5                 |
|            | C5 | 30·40·50         | 30·40·50         | 50·60·70    | 70·80·95·110   | 70·80·95·110   | 70·80·95·110   | 95·110·130  | 95·110·130<br>110·130·180  | 95·110·130<br>110·130·180  |
|            | C6 | M4 x P0.7        | M4 x P0.7        | M5 x P0.8   | M5 x P0.8      | M6 x P1.0      | M6 x P1.0      | M8 x P1.25  | M8 x P1.25<br>M10 x P1.5   | M8 x P1.25<br>M10 x P1.5   |
|            | C7 | 46·55·60         | 46·55·60         | 70·75·80    | 92·110·130     | 92·110·130     | 92·110·130     | 122·130·150 | 122·130·150<br>146·150·190 | 122·130·150<br>146·150·190 |

# Characteristic of SN 1-Stage

## SN 單段特性

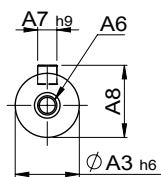
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 50  | 60        | 70        | 80        | 90        | 115       | 120       | 155       | 160       |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm        | 3        | 17  | 28        | 54        | 112       | 146       | 165       | 301       | 553       | 625       |
|   |            |           | 4        | 15  | 38        | 48        | 110       | 144       | 146       | 269       | 491       | 555       |
|   |            |           | 5        | 14  | 40        | 45        | 108       | 140       | 160       | 278       | 510       | 618       |
|   |            |           | 7        | 13  | 35        | 41        | 105       | 128       | 149       | 258       | 473       | 573       |
|   |            |           | 10       | 12  | 25        | 40        | 100       | 123       | 141       | 246       | 452       | 549       |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 3~10     | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 3~10     | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{IN}$   | rpm       | 3~10     | 3,000   |           |           |           |           |           |           |           |           |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 3~10     | 6,000   |           |           |           |           |           | 5,000     |           |           |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 3~10     | 3   | 4         | 5         | 12        | 13        | 14        | 27        | 49        | 60        |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 3~10     | 670   | 1,030     | 1,760     | 2,350     | 2,920     | 3,500     | 6,100     | 8,830     | 9,200     |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 3~10     | 335   | 515       | 880       | 1,175     | 1,460     | 1,750     | 3,050     | 4,415     | 4,600     |
| 使用壽命 / Service Life   | $L_H$      | hr        | 3~10     | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 3~10     | $\geq 97\%$   |           |           |           |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 3~10     | -25° C ~ +90° C   |           |           |           |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 3~10     | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 3~10     | IP65  |           |           |           |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 3~10     | 任意 Any  |           |           |           |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 3~10     | $\leq 58$   | $\leq 58$ | $\leq 58$ | $\leq 60$ | $\leq 60$ | $\leq 63$ | $\leq 63$ | $\leq 65$ | $\leq 65$ |
| 重量 / Weight $\pm 2\%$                                       |            | Kg        | 3~10     | 0.73  | 0.99      | 1.25      | 2.1       | 2.8       | 4.98      | 6.7       | 13.6      | 15        |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

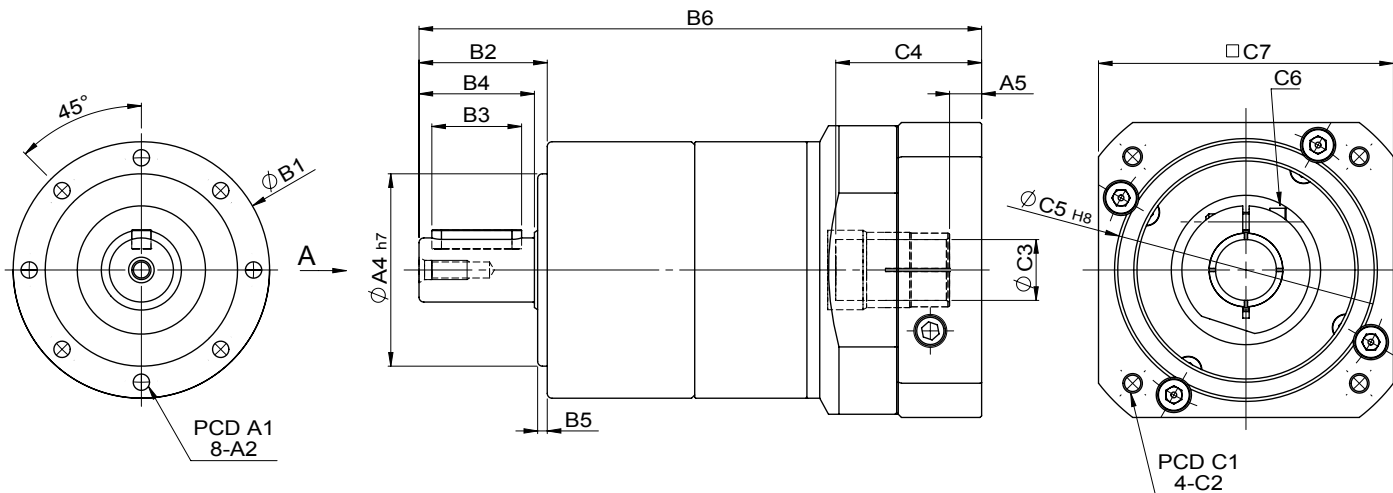
| 速比 Ratio | 50   | 60   | 70   | 80   | 90   | 115  | 120  | 155  | 160  |
|----------|------|------|------|------|------|------|------|------|------|
| 3        | 0.03 | 0.06 | 0.15 | 0.48 | 0.55 | 0.60 | 3.01 | 8.14 | 9.21 |
| 4        | 0.03 | 0.06 | 0.15 | 0.38 | 0.42 | 0.45 | 2.52 | 6.63 | 7.42 |
| 5        | 0.03 | 0.06 | 0.13 | 0.38 | 0.42 | 0.45 | 2.52 | 6.63 | 7.42 |
| 7        | 0.03 | 0.06 | 0.13 | 0.38 | 0.42 | 0.45 | 2.31 | 6.55 | 7.14 |
| 10       | 0.03 | 0.06 | 0.13 | 0.35 | 0.38 | 0.41 | 2.30 | 6.46 | 7.03 |

# MODEL : SN

RATIO : 15, 20, 25, 30, 35, 40, 50, 70, 100 ( 雙段 2-Stage )



A VIEW



unit: mm

| Model Code | 50 | 60               | 70               | 80          | 90             | 115            | 120            | 155         | 160         |             |
|------------|----|------------------|------------------|-------------|----------------|----------------|----------------|-------------|-------------|-------------|
| A          | A1 | 44               | 52               | 62          | 70             | 80             | 100            | 108         | 140         | 145         |
|            | A2 | M4 x P0.7        | M5 x P0.8        | M5 x P0.8   | M6 x P1.0      | M6 x P1.0      | M10 x P1.5     | M8 x P1.25  | M10 x P1.5  | M12 x P1.75 |
|            | A3 | 12               | 14               | 16          | 20             | 22             | 25             | 32          | 40          | 40          |
|            | A4 | 35               | 40               | 52          | 60             | 68             | 80             | 90          | 120         | 130         |
|            | A5 | 4.5              | 4.5              | 6           | 10             | 8.5            | 8·22.5         | 10          | 10          | 10          |
|            | A6 | M4 x P0.7        | M4 x P0.7        | M5 x P0.8   | M6 x P1.0      | M6 x P1.0      | M8 x P1.25     | M12 x P1.75 | M12 x P1.75 | M12 x P1.75 |
|            | A7 | 4                | 5                | 5           | 6              | 6              | 8              | 10          | 12          | 12          |
|            | A8 | 13.5             | 16               | 18          | 22.5           | 24.5           | 28             | 35          | 43          | 43          |
| B          | B1 | 51               | 60               | 70          | 80             | 90             | 115            | 122         | 155         | 160         |
|            | B2 | 25.5             | 34               | 36          | 40             | 46             | 56             | 70          | 88          | 88          |
|            | B3 | 15               | 25               | 20          | 28             | 30             | 40             | 50          | 65          | 65          |
|            | B4 | 20               | 30               | 28          | 36             | 36             | 50             | 58          | 78          | 80          |
|            | B5 | 4                | 3                | 6.5         | 3              | 8              | 4              | 9           | 8           | 8           |
|            | B6 | 122.5            | 134              | 148.8       | 175.5          | 190.5·205      | 217·231.5      | 257·267     | 298.5       | 298.5       |
| C          | C1 | 45·46·48.5·63·70 | 45·46·48.5·63·70 | 70·75·90    | 90·100·115·145 | 90·100·115·145 | 90·100·115·145 | 115·145·165 | 115·145·165 | 115·145·165 |
|            | C2 | M3·M4·M5         | M3·M4·M5         | M5·M6       | M6·M8          | M6·M8          | M6·M8          | M6·M8·M10   | M6·M8·M10   | M6·M8·M10   |
|            | C3 | 8·10·11·14       | 8·9·10·12.7·14   | 11·14·16·19 | 14·16·19       | 19·24          | 19·22·24       | 24·28·32    | 24·28·32    | 24·28·32    |
|            | C4 | 32               | 32               | 33.5        | 45.5           | 51·65.5        | 51·65.5        | 67·77       | 67          | 67          |
|            | C5 | 30·40·50         | 30·40·50         | 50·60·70    | 70·80·95·110   | 70·80·95·110   | 70·80·95·110   | 95·110·130  | 95·110·130  | 95·110·130  |
|            | C6 | M4 x P0.7        | M4 x P0.7        | M5 x P0.8   | M5 x P0.8      | M6 x P1.0      | M6 x P1.0      | M8 x P1.25  | M8 x P1.25  | M8 x P1.25  |
|            | C7 | 46·55·60         | 46·55·60         | 70·75·80    | 92·110·130     | 92·110·130     | 92·110·130     | 122·130·150 | 122·130·150 | 122·130·150 |



# Characteristic of SN 2-Stage

## SN 雙段特性

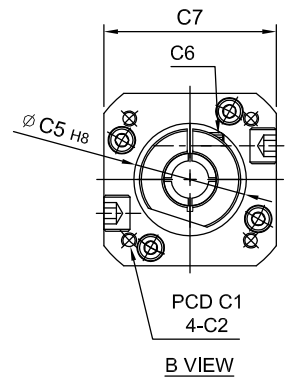
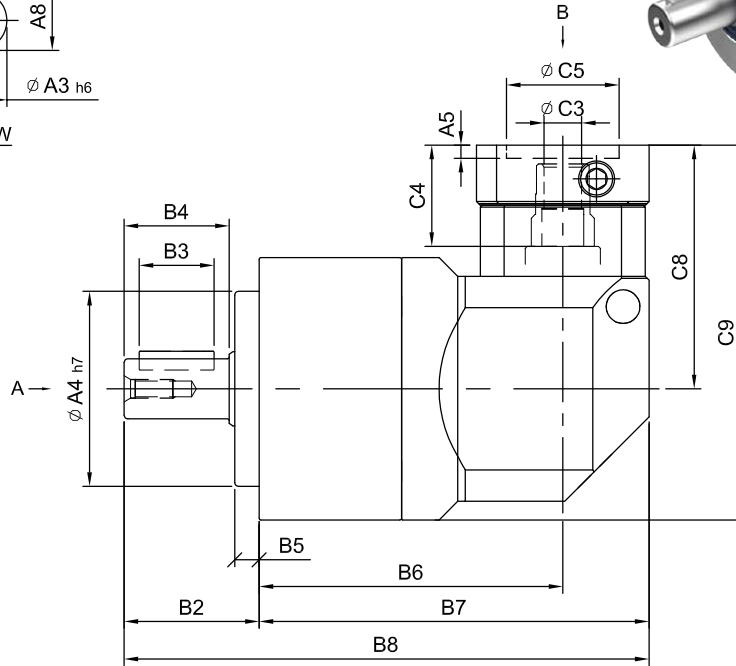
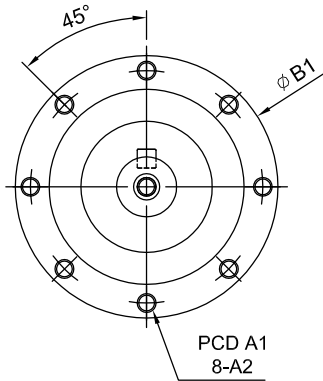
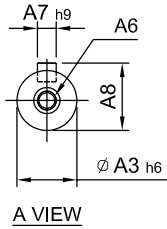
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 50  | 60        | 70        | 80        | 90        | 115       | 120       | 155       | 160       |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm        | 15       | 17  | 28        | 54        | 112       | 146       | 165       | 301       | 553       | 625       |
|   |            |           | 20       | 15  | 38        | 48        | 110       | 144       | 146       | 269       | 491       | 555       |
|   |            |           | 25       | 14  | 40        | 45        | 108       | 140       | 160       | 278       | 510       | 618       |
|   |            |           | 30       | 17  | 28        | 54        | 112       | 146       | 165       | 301       | 553       | 625       |
|   |            |           | 35       | 13  | 35        | 41        | 105       | 128       | 149       | 258       | 473       | 618       |
|   |            |           | 40       | 15  | 38        | 48        | 110       | 144       | 146       | 269       | 491       | 555       |
|   |            |           | 50       | 14  | 40        | 45        | 108       | 140       | 160       | 278       | 510       | 618       |
|   |            |           | 70       | 13  | 35        | 41        | 105       | 128       | 149       | 258       | 473       | 573       |
|   |            |           | 100      | 12  | 25        | 40        | 100       | 123       | 141       | 246       | 452       | 549       |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 15~100   | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 15~100   | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 15~100   | 3,000   |           |           |           |           |           |           |           |           |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 15~100   | 6,000   |           |           |           |           |           | 5,000     |           |           |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 15~100   | 3   | 4         | 5         | 12        | 13        | 14        | 27        | 49        | 60        |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 15~100   | 670   | 1,030     | 1,760     | 2,350     | 2,920     | 3,500     | 6,100     | 8,830     | 9,200     |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 15~100   | 335   | 515       | 880       | 1,175     | 1,460     | 1,750     | 3,050     | 4,415     | 4,600     |
| 使用壽命 / Service Life   | $L_H$      | hr        | 15~100   | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 15~100   | $\geq 94\%$   |           |           |           |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 15~100   | -25° C ~ +90° C   |           |           |           |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 15~100   | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 15~100   | IP65  |           |           |           |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 15~100   | 任意 Any  |           |           |           |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 15~100   | $\leq 60$   | $\leq 60$ | $\leq 60$ | $\leq 62$ | $\leq 62$ | $\leq 65$ | $\leq 65$ | $\leq 67$ | $\leq 67$ |
| 重量 / Weight $\pm 2\%$                                       |            | Kg        | 15~100   | 1.05  | 1.46      | 1.9       | 3.2       | 4.48      | 6.92      | 9.84      | 17        | 18.5      |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 50    | 60   | 70   | 80   | 90   | 115  | 120  | 155  | 160  |
|----------|-------|------|------|------|------|------|------|------|------|
| 15       | 0.025 | 0.05 | 0.11 | 0.29 | 0.38 | 0.40 | 2.71 | 7.81 | 8.68 |
| 20       | 0.025 | 0.05 | 0.11 | 0.29 | 0.38 | 0.40 | 2.29 | 6.27 | 7.08 |
| 25       | 0.025 | 0.05 | 0.11 | 0.29 | 0.38 | 0.40 | 2.29 | 6.01 | 6.97 |
| 30       | 0.025 | 0.05 | 0.11 | 0.29 | 0.38 | 0.40 | 2.71 | 7.81 | 8.65 |
| 35       | 0.025 | 0.05 | 0.11 | 0.29 | 0.38 | 0.40 | 2.17 | 5.92 | 6.71 |
| 40       | 0.025 | 0.05 | 0.11 | 0.29 | 0.38 | 0.40 | 2.29 | 6.27 | 7.08 |
| 50       | 0.025 | 0.05 | 0.11 | 0.29 | 0.38 | 0.40 | 2.29 | 6.01 | 6.97 |
| 70       | 0.025 | 0.05 | 0.11 | 0.29 | 0.38 | 0.40 | 2.17 | 5.92 | 6.71 |
| 100      | 0.025 | 0.05 | 0.11 | 0.26 | 0.32 | 0.38 | 2.11 | 5.80 | 6.61 |

# MODEL : SNL

RATIO : 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 50 (單段 1-Stage)



unit: mm

| Model Code | 50 | 60      | 70      |         | 80      |         | 90             |                | 120            |                | 155            | 160       |                |             |
|------------|----|---------|---------|---------|---------|---------|----------------|----------------|----------------|----------------|----------------|-----------|----------------|-------------|
| A          | A1 | 44      | 52      | 62      |         | 70      |                | 80             |                | 108            |                | 140       | 145            |             |
|            | A2 | M4xP0.7 | M5xP0.8 | M5xP0.8 |         | M6xP1.0 |                | M6xP1.0        |                | M8xP1.25       |                | M10xP1.5  | M12xP1.75      |             |
|            | A3 | 12      | 14      | 16      |         | 20      |                | 22             |                | 32             |                | 40        | 40             |             |
|            | A4 | 35      | 40      | 52      |         | 60      |                | 68             |                | 90             |                | 120       | 130            |             |
|            | A5 | 6       | 6       | 5       | 3.5     | 6       | 7              | 9              | 7              | 9              | 9 · 23.5       | 10 · 20   | 10             | 10          |
|            | A6 | M4xP0.7 | M4xP0.7 | M5xP0.8 |         | M6xP1.0 |                | M6xP1.0        |                | M12xP1.75      |                | M12xP1.75 | M12xP1.75      |             |
|            | A7 | 4       | 5       | 5       |         | 6       |                | 6              |                | 10             |                | 12        | 12             |             |
|            | A8 | 13.5    | 16      | 18      |         | 22.5    |                | 24.5           |                | 35             |                | 43        | 43             |             |
| B          | B1 | 51      | 60      | 70      |         | 80      |                | 90             |                | 122            |                | 155       | 160            |             |
|            | B2 | 25.5    | 34      | 36      |         | 40      |                | 46             |                | 70             |                | 88        | 88             |             |
|            | B3 | 15      | 25      | 20      |         | 28      |                | 30             |                | 50             |                | 65        | 65             |             |
|            | B4 | 20      | 30      | 28      |         | 36      |                | 36             |                | 58             |                | 78        | 78             |             |
|            | B5 | 4       | 3       | 6.5     |         | 3       |                | 8              |                | 9              |                | 8         | 8              |             |
|            | B6 | 68.5    | 72      | 81      |         | 92      |                | 95.5           |                | 128            |                | 180       | 180            |             |
|            | B7 | 90.5    | 94      | 104     |         | 123.5   |                | 127            |                | 173            |                | 242.5     | 242.5          |             |
|            | B8 | 116     | 128     | 140     |         | 163.5   |                | 173            |                | 243            |                | 330.5     | 330.5          |             |
| C          | C1 | 46 · 63 | 46 · 63 | 70      | 90      | 70      | 90 · 100 · 145 | 70             | 90 · 100 · 145 | 90 · 100 · 145 | 145 · 165      | 165 · 200 | 165 · 200      |             |
|            | C2 | M4 · M5 | M4 · M5 | M4 · M5 | M5 · M6 | M4 · M5 | M6 · M8        | M4 · M5        | M6 · M8        | M6 · M8        | M8 · M10       | M10 · M12 | M8 · M10 · M12 |             |
|            | C3 | 8 · 11  | 8 · 11  | 11      | 14      | 19      | 14             | 19 · 22 · 24   | 14             | 19 · 22 · 24   | 19 · 22 · 24   | 28 · 32   | 35 · 38        | 35 · 38     |
|            | C4 | 26      | 26      | 27      | 32      | 42      | 36             | 53             | 36             | 51 · 65.5      | 51 · 65.5      | 67 · 77   | 81.5           | 81.5        |
|            | C5 | 30 · 40 | 30 · 40 | 50      |         | 70      | 50             | 70 · 80 · 110  | 50             | 70 · 80 · 110  | 70 · 80 · 110  | 110 · 130 | 114.3 · 130    | 114.3 · 130 |
|            | C6 | M4xP0.7 | M4xP0.7 | M4xP0.7 | M5xP0.8 | M5xP0.8 | M6xP1.0        | M5xP0.8        | M6xP1.0        | M6xP1.0        | M6xP1.0        | M8xP1.25  | M8xP1.25       | M8xP1.25    |
|            | C7 | 46 · 55 | 46 · 55 | 60      |         | 80      | 60             | 92 · 110 · 130 | 60             | 92 · 110 · 130 | 92 · 110 · 130 | 130 · 150 | 150 · 180      | 150 · 180   |
|            | C8 | 59      | 59      | 65      | 70      | 80      | 77             | 97             | 77             | 97             | 102.5          | 123.5     | 168            | 168         |
|            | C9 | 84.5    | 89      | 100     | 105     | 115     | 117            | 137            | 122            | 142            | 163.5          | 184.5     | 248            | 248         |

# Characteristic of SNL 1-Stage

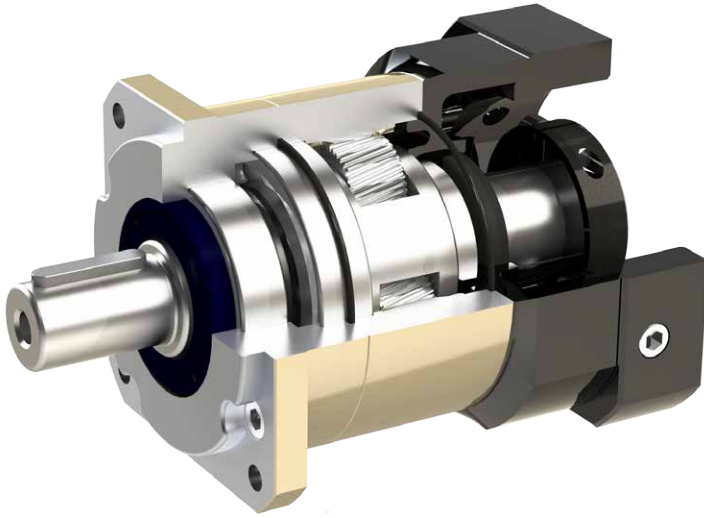
## SNL 單段特性

| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 50  | 60        | 70        | 80        | 90        | 120       | 155       | 160       |
|---|------------|-----------|----------|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm        | 3        | 17  | 28        | 54        | 112       | 146       | 301       | 553       | 625       |
|   |            |           | 4        | 15  | 38        | 48        | 110       | 144       | 269       | 491       | 555       |
|   |            |           | 5        | 14  | 40        | 45        | 108       | 140       | 278       | 510       | 618       |
|   |            |           | 6        | 17  | 28        | 54        | 112       | 146       | 301       | 553       | 625       |
|   |            |           | 7        | 13  | 35        | 41        | 105       | 128       | 258       | 473       | 573       |
|   |            |           | 8        | 15  | 38        | 48        | 110       | 144       | 269       | 491       | 555       |
|   |            |           | 9        | 17  | 28        | 54        | 112       | 146       | 301       | 553       | 625       |
|   |            |           | 10       | 14  | 40        | 45        | 108       | 140       | 278       | 510       | 618       |
|   |            |           | 15       | 14  | 40        | 45        | 108       | 140       | 278       | 510       | 618       |
|   |            |           | 20       | 14  | 40        | 45        | 108       | 140       | 278       | 510       | 618       |
|   |            |           | 25       | 14  | 40        | 45        | 108       | 140       | 278       | 510       | 618       |
|   |            |           | 30       | 12  | 25        | 40        | 100       | 123       | 246       | 452       | 549       |
|   |            |           | 35       | 13  | 35        | 41        | 105       | 128       | 258       | 473       | 573       |
|   |            |           | 40       | 12  | 25        | 40        | 100       | 123       | 246       | 452       | 549       |
|   |            |           | 50       | 12  | 25        | 40        | 100       | 123       | 246       | 452       | 549       |
| 最大加速扭矩 /<br>Max. Acceleration Torque                        | $T_{2B}$   | Nm        | 3~50     | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |           |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 3~50     | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |           |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 3~50     | 3,000   |           |           |           |           |           |           |           |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 3~50     | 6,000   |           |           |           |           |           | 5,000     |           |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 3~50     | 3   | 4         | 5         | 12        | 14        | 27        | 49        | 60        |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 3~50     | 670   | 1030      | 1760      | 2350      | 2920      | 6100      | 8830      | 9200      |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 3~50     | 335   | 515       | 880       | 1175      | 1460      | 3050      | 4415      | 4600      |
| 使用壽命 / Service Life   | $L_H$      | hr        | 3~50     | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |           |           |           |           |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 3~50     | $\geq 94\%$   |           |           |           |           |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 3~50     | -25° C ~ +90° C   |           |           |           |           |           |           |           |
| 潤滑 / Lubrication  |            |           | 3~50     | 全合成潤滑油脂 Synthetic Grease  |           |           |           |           |           |           |           |
| 防護等級 / Protection Class                                     |            |           | 3~50     | IP65  |           |           |           |           |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 3~50     | 任意 Any  |           |           |           |           |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 3~50     | $\leq 65$   | $\leq 66$ | $\leq 68$ | $\leq 70$ | $\leq 71$ | $\leq 72$ | $\leq 74$ | $\leq 74$ |
| 重量 / Weight $\pm 2\%$                                       |            | Kg        | 3~50     | 1.0   | 1.3       | 1.9       | 3         | 3.6       | 8.6       | 22        | 23        |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 50   | 60   | 70   | 80   | 90   | 120  | 155   | 160   |
|----------|------|------|------|------|------|------|-------|-------|
| 3~50     | 0.09 | 0.11 | 0.83 | 1.19 | 1.37 | 5.49 | 20.32 | 25.76 |

# FB series



- 全系列單段背隙  $\leq 8$  弧分  
1-Stage Backlash  $\leq 8$  arcmin
- 全系列雙段背隙  $\leq 12$  弧分  
2-Stage Backlash  $\leq 12$  arcmin

## Indication of Model Numbers

機種型號表示

|               |  |  |   |                    |
|---------------|--|--|---|--------------------|
| FB            | 90   | 10   | □   | MOTOR              |
| 減速機機型<br>Type | 型號<br>Model                                | 速比<br>Ratio  | 出力軸鍵槽<br>Output Shaft Keyway  | 馬達型號<br>Motor Type |
| FB<br>FE      | 50<br>70<br>90<br>120<br>145<br>180<br>220 | 單段 1-Stage<br>3, 4, 5, 7, 10<br><br>雙段 2-Stage<br>15, 20, 25, 30,<br>35, 40, 50, 70, 100 | □ 標準品 · 有鍵槽<br>Standard (Keyway)<br><br>N: 實心軸 · 無鍵槽<br>Solid Output Shaft<br>(No Keyway) |                    |

# Features of FB Series

## FB 系列產品特點



### 一體式行星臂架及雙軸承加大跨距設計

行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。並採用滾珠軸承大跨距配置設計，增加輸出軸之徑向負載。

### Integrated Planetary Arm Bracket

The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy. The entire structure is integrated machined for controlling accuracy in the specified tolerance.



### 滿針滾針軸承設計

行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

### Full Needle Roller Bearings Design

The planetary gear transmission employs full needle roller bearings without retainer to increase the contact surface, which greatly upgrades structural rigidity and service life.

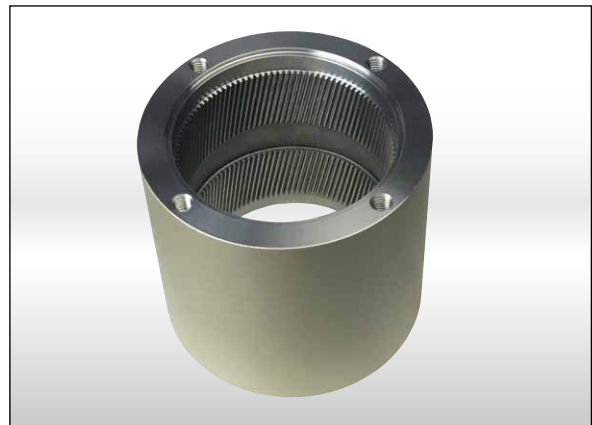


### 高精度齒輪加工

行星齒輪及太陽齒輪材料採用高級之鎳鉻鉬合金鋼 (SNM220)，切削加工後，經滲碳熱處理至硬度 57~62HRC，再進行 2 次加工 (Skiving)，或經研磨加工，確保齒輪精度在 DIN6 級以內。

### High Precision Gear Machining

The planetary gear and sun gear are manufactured from high quality Ni-Cr-Mo alloy steel (SNM220), precision machined and carburizing heat treatment to hardness 57-60 HRC. Precision teeth grinding or skiving assures gear accuracy reaches DIN6 class.



### 一體式齒輪箱本體

齒輪箱和內環齒輪採一體式的設計，經調質後加工，輸出扭矩大，齒輪精度達 DIN6 級，精密度高。

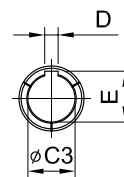
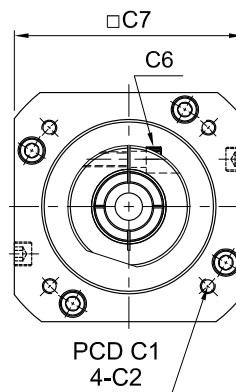
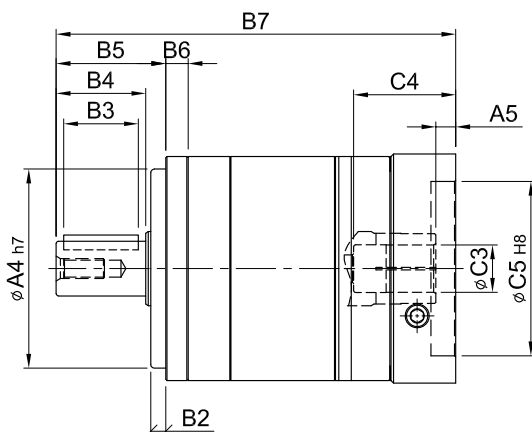
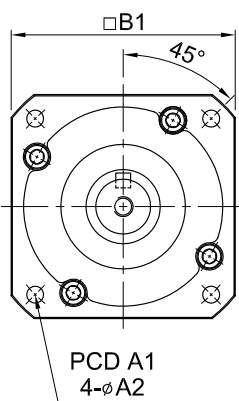
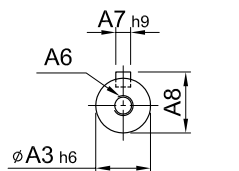
### One-piece Gearbox Housing

The gearbox and internal ring gear are one-piece constructed. High gear accuracy meets DIN6 class.



# MODEL : FB

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



(入力孔φ38(含)以上)

| φC3 | D  | E    |
|-----|----|------|
| φ38 | 10 | 41.3 |
| φ42 | 12 | 45.3 |
| φ48 | 14 | 51.8 |
| φ55 | 16 | 59.3 |

unit: mm

| Code | Model | 50             | 70             | 90             | 120             | 145              | 180           | 220           |
|------|-------|----------------|----------------|----------------|-----------------|------------------|---------------|---------------|
| A    | A1    | 50             | 70             | 100            | 130             | 165              | 215           | 250           |
|      | A2    | 4.5            | 6              | 6.8            | 9               | 11               | 13            | 17            |
|      | A3    | 13             | 16             | 22             | 32              | 40               | 55            | 75            |
|      | A4    | 35             | 50             | 80             | 110             | 130              | 160           | 180           |
|      | A5    | 5              | 6              | 9·23.5         | 10·20           | 10               | 13·15         | 13.5·15.5     |
|      | A6    | M4 x P0.7      | M5 x P0.8      | M8 x P1.25     | M10 x P1.5      | M12 x P1.75      | M14 x P2.0    | M16 x P2.0    |
|      | A7    | 5              | 5              | 6              | 10              | 12               | 16            | 20            |
|      | A8    | 15             | 18             | 24.5           | 35              | 43               | 59            | 81            |
| B    | B1    | 50             | 70             | 90             | 120             | 145              | 180           | 220           |
|      | B2    | 4              | 5              | 8              | 8               | 10               | 20            | 20            |
|      | B3    | 15             | 20             | 30             | 40              | 65               | 70            | 90            |
|      | B4    | 20             | 28             | 36             | 50              | 74               | 82            | 104           |
|      | B5    | 25             | 34             | 44             | 60              | 87               | 106           | 129           |
|      | B6    | 6              | 8              | 9              | 12              | 15               | 16            | 24            |
|      | B7    | 100.5          | 132.5·140.5    | 170.5·185      | 227.5           | 284              | 325·327       | 377·379       |
| C    | C1    | 46·60·63       | 70·75·90       | 90·100·115·145 | 115·145·165     | 145·165·215      | 200·215·265   | 200·265·300   |
|      | C2    | M3<br>M4<br>M5 | M4<br>M5<br>M6 | M5<br>M6<br>M8 | M6<br>M8<br>M10 | M8<br>M10<br>M12 | M10<br>M12    | M12<br>M16    |
|      | C3    | 8·9·11         | 11·14          | 16·19·22·24    | 24·28·32        | 28·32·35·38      | 35·38·42·48   | 42·48·55      |
|      | C4    | 26             | 33.5·41.5      | 51·65.5        | 63·73           | 81.5             | 115·117       | 118·120       |
|      | C5    | 30·40·50       | 40·50·60       | 70·80·95·110   | 95·110·130      | 110·130·180      | 114.3·180·230 | 114.3·230·250 |
|      | C6    | M4 x P0.7      | M5 x P0.8      | M6 x P1.0      | M8 x P1.25      | M10 x P1.5       | M10 x P1.5    | M10 x P1.5    |
|      | C7    | 46·55          | 64·70·80       | 92·110·130     | 122·130·150     | 146·150·190      | 182·200·250   | 222·250·265   |

# Characteristic of FB 1-Stage

## FB 單段特性

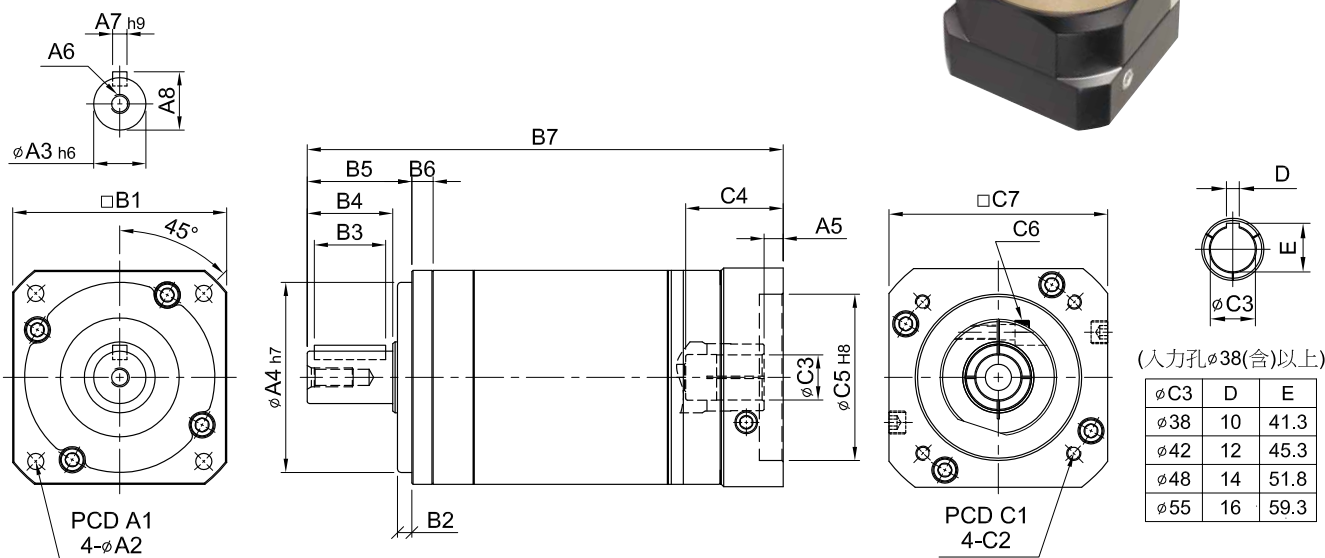
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 50  | 70    | 90    | 120   | 145   | 180    | 220    |
|---|------------|-----------|----------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 3        | 17  | 50    | 125   | 268   | 482   | 940    | 1,420  |
|   |            |           | 4        | 15  | 45    | 111   | 238   | 426   | 860    | 1,300  |
|   |            |           | 5        | 14  | 42    | 104   | 223   | 401   | 835    | 1,270  |
|   |            |           | 7        | 13  | 39    | 98    | 208   | 373   | 790    | 1,180  |
|   |            |           | 10       | 12  | 37    | 92    | 198   | 356   | 760    | 1,140  |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 3~10     | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 3~10     | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 3~10     | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 2,000  | 2,000  |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 3~10     | 5,000   | 5,000 | 5,000 | 5,000 | 5,000 | 3,000  | 3,000  |
| 背隙 / Backlash   |            | arcmin    | 3~10     | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8    | ≤ 8    |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 3~10     | 2.3   | 5     | 15    | 45    | 69    | 140    | 220    |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 3~10     | 750   | 1,180 | 3,000 | 6,500 | 9,100 | 11,150 | 35,000 |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 3~10     | 325   | 590   | 1,500 | 3,250 | 4,550 | 5,575  | 17,500 |
| 使用壽命 / Service Life   | $L_H$      | hr        | 3~10     | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 / Efficiency   | $\eta$     | %         | 3~10     | ≥ 97%   |       |       |       |       |        |        |
| 使用溫度 / Operating Temperature                                |            | °C        | 3~10     | -25° C ~ +90° C   |       |       |       |       |        |        |
| 潤滑 / Lubrication  |            |           | 3~10     | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 / Protection Class                                     |            |           | 3~10     | IP65  |       |       |       |       |        |        |
| 安裝方向 / Mounting Position                                    |            |           | 3~10     | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 / Noise Level   |            | dB        | 3~10     | ≤ 62  | ≤ 62  | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 70   | ≤ 70   |
| 重量 / Weight ±3%   |            | Kg        | 3~10     | 0.63  | 1.57  | 3.22  | 8     | 16    | 33     | 54     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 50   | 70   | 90   | 120  | 145  | 180   | 220   |
|----------|------|------|------|------|------|-------|-------|
| 3        | 0.04 | 0.14 | 0.61 | 3.25 | 8.75 | 24.63 | 50.67 |
| 4        | 0.04 | 0.13 | 0.48 | 2.74 | 7.16 | 20.12 | 46.21 |
| 5        | 0.04 | 0.11 | 0.47 | 2.74 | 6.84 | 19.80 | 45.28 |
| 7        | 0.04 | 0.11 | 0.44 | 2.58 | 6.78 | 19.21 | 43.32 |
| 10       | 0.04 | 0.11 | 0.44 | 2.57 | 6.68 | 19.13 | 42.98 |

# MODEL : FB

RATIO : 15, 20, 25, 30, 35, 40, 50, 70, 100 ( 雙段 2-Stage )



unit: mm

| Code | Model | 50             | 70             | 90             | 120             | 145              | 180           | 220           |
|------|-------|----------------|----------------|----------------|-----------------|------------------|---------------|---------------|
| A    | A1    | 50             | 70             | 100            | 130             | 165              | 215           | 250           |
|      | A2    | 4.5            | 6              | 6.8            | 9               | 11               | 13            | 17            |
|      | A3    | 13             | 16             | 22             | 32              | 40               | 55            | 75            |
|      | A4    | 35             | 50             | 80             | 110             | 130              | 160           | 180           |
|      | A5    | 5              | 6              | 9·23.5         | 10·20           | 10               | 13·15         | 13.5·15.5     |
|      | A6    | M4 x P0.7      | M5 x P0.8      | M8 x P1.25     | M10 x P1.5      | M12 x P1.75      | M14 x P2.0    | M16 x P2.0    |
|      | A7    | 5              | 5              | 6              | 10              | 12               | 16            | 20            |
|      | A8    | 15             | 18             | 24.5           | 35              | 43               | 59            | 81            |
| B    | B1    | 50             | 70             | 90             | 120             | 145              | 180           | 220           |
|      | B2    | 4              | 5              | 6              | 8               | 10               | 20            | 20            |
|      | B3    | 15             | 20             | 30             | 40              | 65               | 70            | 90            |
|      | B4    | 20             | 28             | 36             | 50              | 74               | 82            | 104           |
|      | B5    | 25             | 34             | 44             | 60              | 87               | 106           | 129           |
|      | B6    | 6              | 8              | 9              | 12              | 15               | 16            | 24            |
|      | B7    | 126.7          | 166.5          | 206.5·221      | 281.5·291.5     | 340.5            | 394.5·396.5   | 464           |
| C    | C1    | 46·60·63       | 70·75·90       | 90·100·115·145 | 115·145·165     | 145·165·215      | 200·215·265   | 200·265·300   |
|      | C2    | M3<br>M4<br>M5 | M4<br>M5<br>M6 | M5<br>M6<br>M8 | M6<br>M8<br>M10 | M8<br>M10<br>M12 | M10<br>M12    | M12<br>M16    |
|      | C3    | 8·9·11         | 11·14          | 16·19·22·24    | 24·28·32        | 28·32·35·38      | 35·38·42·48   | 42·48·55      |
|      | C4    | 26             | 33.5           | 51·65.5        | 63·73           | 81.5             | 115·117       | 118·120       |
|      | C5    | 30·40·50       | 40·50·60       | 70·80·95·110   | 95·110·130      | 110·130·180      | 114.3·180·230 | 114.3·230·250 |
|      | C6    | M4 x P0.7      | M5 x P0.8      | M6 x P1.0      | M8 x P1.25      | M10 x P1.5       | M10 x P1.5    | M10 x P1.5    |
|      | C7    | 46·55          | 64·70·80       | 92·110·130     | 122·130·150     | 146·150·190      | 182·200·250   | 222·250·265   |

# Characteristic of FB 2-Stage

## FB 雙段特性

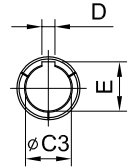
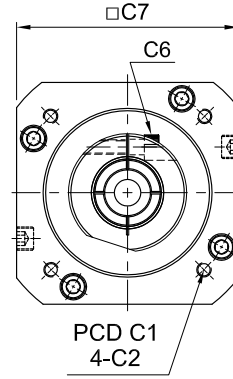
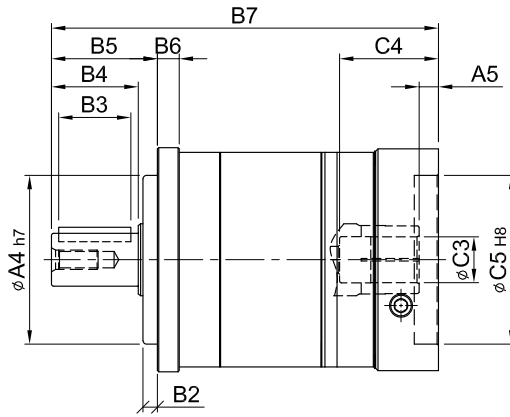
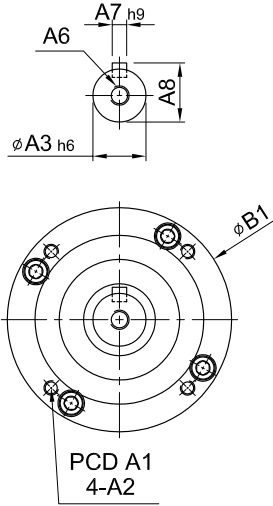
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 50  | 70    | 90    | 120   | 145   | 180    | 220    |
|---|------------|-----------|----------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 15       | 17  | 50    | 125   | 268   | 482   | 940    | 1,420  |
|   |            |           | 20       | 15  | 45    | 111   | 238   | 426   | 860    | 1,300  |
|   |            |           | 25       | 14  | 42    | 104   | 223   | 401   | 835    | 1,270  |
|   |            |           | 30       | 17  | 50    | 125   | 268   | 482   | 940    | 1,420  |
|   |            |           | 35       | 13  | 39    | 98    | 208   | 373   | 790    | 1,180  |
|   |            |           | 40       | 15  | 45    | 111   | 238   | 427   | 860    | 1,300  |
|   |            |           | 50       | 14  | 42    | 104   | 223   | 402   | 835    | 1,270  |
|   |            |           | 70       | 13  | 40    | 98    | 208   | 373   | 790    | 1,180  |
| 100   | 12         | 37        | 92       | 198   | 357   | 760   | 1,100 |       |        |        |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 15~100   | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 15~100   | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 15~100   | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 2,000  | 2,000  |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 15~100   | 5,000   | 5,000 | 5,000 | 5,000 | 5,000 | 3,000  | 3,000  |
| 背隙 / Backlash   |            | arcmin    | 15~100   | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12   | ≤ 12   |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 15~100   | 2.3   | 5     | 15    | 45    | 69    | 140    | 220    |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 15~100   | 750   | 1,180 | 3,000 | 6,500 | 9,100 | 11,150 | 35,000 |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 15~100   | 325   | 590   | 1,500 | 3,250 | 4,550 | 5,575  | 17,500 |
| 使用壽命 / Service Life   | $L_{H1}$   | hr        | 15~100   | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 / Efficiency   | $\eta$     | %         | 15~100   | ≥ 94%   |       |       |       |       |        |        |
| 使用溫度 / Operating Temperature                                |            | °C        | 15~100   | -25° C ~ +90° C   |       |       |       |       |        |        |
| 潤滑 / Lubrication  |            |           | 15~100   | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 / Protection Class                                     |            |           | 15~100   | IP65  |       |       |       |       |        |        |
| 安裝方向 / Mounting Position                                    |            |           | 15~100   | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 / Noise Level   |            | dB        | 15~100   | ≤ 65  | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 72   | ≤ 72   |
| 重量 / Weight ±3%   |            | Kg        | 15~100   | 0.9   | 2.24  | 4.59  | 11.22 | 22.5  | 46.4   | 75     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 50   | 70   | 90   | 120  | 145  | 180   | 220   |
|----------|------|------|------|------|------|-------|-------|
| 15       | 0.04 | 0.14 | 0.61 | 3.25 | 8.75 | 24.63 | 50.67 |
| 20       | 0.04 | 0.13 | 0.48 | 2.74 | 7.16 | 20.12 | 46.21 |
| 25       | 0.04 | 0.11 | 0.47 | 2.74 | 6.84 | 19.80 | 45.28 |
| 30       | 0.04 | 0.14 | 0.61 | 3.25 | 8.75 | 24.63 | 50.67 |
| 35       | 0.04 | 0.11 | 0.44 | 2.58 | 6.78 | 19.21 | 43.32 |
| 40       | 0.04 | 0.11 | 0.48 | 2.74 | 7.16 | 20.12 | 46.21 |
| 50       | 0.04 | 0.11 | 0.47 | 2.74 | 6.84 | 19.80 | 45.28 |
| 70       | 0.04 | 0.11 | 0.44 | 2.58 | 6.78 | 19.21 | 43.32 |
| 100      | 0.04 | 0.11 | 0.44 | 2.57 | 6.68 | 19.13 | 42.98 |

# MODEL : FE

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



(入力孔 $\phi 38$ (含)以上)

| $\phi C3$ | D  | E    |
|-----------|----|------|
| $\phi 38$ | 10 | 41.3 |
| $\phi 42$ | 12 | 45.3 |
| $\phi 48$ | 14 | 51.8 |
| $\phi 55$ | 16 | 59.3 |

unit: mm

| Model    | 50             | 70             | 90             | 120             | 145              | 180           | 220           |
|----------|----------------|----------------|----------------|-----------------|------------------|---------------|---------------|
| <b>A</b> |                |                |                |                 |                  |               |               |
| A1       | 42             | 60             | 80             | 105             | 130              | 184           | 218           |
| A2       | M4 x P0.7      | M5 x P0.8      | M6 x P1.0      | M8 x P1.25      | M10 x P1.5       | M12 x P1.75   | M16 x P2.0    |
| A3       | 13             | 16             | 22             | 32              | 40               | 55            | 75            |
| A4       | 35             | 50             | 70             | 90              | 110              | 160           | 180           |
| A5       | 5              | 6              | 9·23.5         | 10·20           | 10               | 13·15         | 13.5·15.5     |
| A6       | M4 x P0.7      | M5 x P0.8      | M8 x P1.25     | M10 x P1.5      | M12 x P1.75      | M14 x P2.0    | M16 x P2.0    |
| A7       | 5              | 5              | 6              | 10              | 12               | 16            | 20            |
| A8       | 15             | 18             | 24.5           | 35              | 43               | 59            | 79.5          |
| <b>B</b> |                |                |                |                 |                  |               |               |
| B1       | $\phi 50$      | $\phi 70$      | $\phi 93$      | $\phi 122$      | $\phi 148$       | $\phi 205$    | $\phi 242$    |
| B2       | 4              | 5              | 6              | 8               | 10               | 20            | 20            |
| B3       | 15             | 20             | 30             | 40              | 65               | 70            | 90            |
| B4       | 20             | 28             | 36             | 50              | 74               | 82            | 104           |
| B5       | 25             | 34             | 44             | 60              | 87               | 106           | 129           |
| B6       | 6              | 8              | 9              | 12              | 15               | 21.5          | 30            |
| B7       | 100.5          | 132.5·140.5    | 170.5·185      | 227.5·237.5     | 284              | 325·327       | 376.5·378.5   |
| <b>C</b> |                |                |                |                 |                  |               |               |
| C1       | 46·60·63       | 70·75·90       | 90·100·115·145 | 115·145·165     | 145·165·215      | 200·215·265   | 200·265·300   |
| C2       | M3<br>M4<br>M5 | M4<br>M5<br>M6 | M5<br>M6<br>M8 | M6<br>M8<br>M10 | M8<br>M10<br>M12 | M10<br>M12    | M12<br>M16    |
| C3       | 8·9·11         | 11·14          | 16·19·22·24    | 24·28·32        | 28·32·35·38      | 35·38·42·48   | 42·48·55      |
| C4       | 26             | 33.5·41.5      | 51·65.5        | 63·73           | 81.5             | 115·117       | 118·120       |
| C5       | 30·40·50       | 40·50·60       | 70·80·95·110   | 95·110·130      | 110·130·180      | 114.3·180·230 | 114.3·230·250 |
| C6       | M4 x P0.7      | M5 x P0.8      | M6 x P1.0      | M8 x P1.25      | M10 x P1.5       | M10 x P1.5    | M10 x P1.5    |
| C7       | 46·55          | 64·70·80       | 92·110·130     | 122·130·150     | 146·150·190      | 182·200·250   | 222·250·265   |



# Characteristic of FE 1-Stage

## FE 單段特性

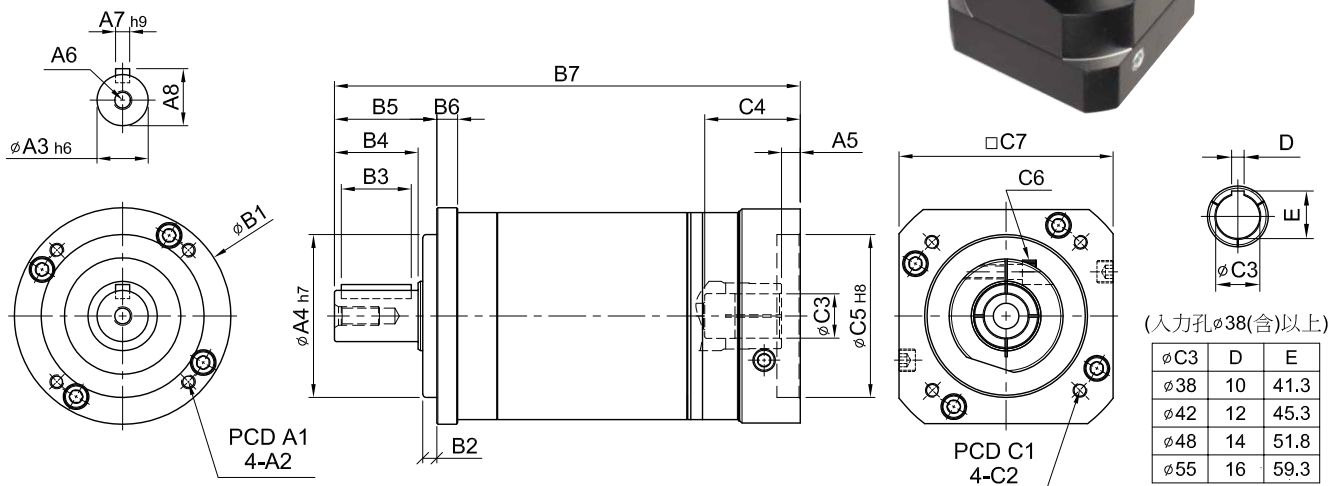
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 50  | 70    | 90    | 120   | 145   | 180    | 220    |
|---|------------|-----------|----------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 3        | 17  | 50    | 125   | 268   | 482   | 940    | 1,420  |
|   |            |           | 4        | 15  | 45    | 111   | 238   | 426   | 860    | 1,300  |
|   |            |           | 5        | 14  | 42    | 104   | 223   | 401   | 835    | 1,270  |
|   |            |           | 7        | 13  | 39    | 98    | 208   | 373   | 790    | 1,180  |
|   |            |           | 10       | 12  | 37    | 92    | 198   | 356   | 760    | 1,140  |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 3~10     | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 3~10     | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{IN}$   | rpm       | 3~10     | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 2,000  | 2,000  |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{IB}$   | rpm       | 3~10     | 5,000   | 5,000 | 5,000 | 5,000 | 5,000 | 3,000  | 3,000  |
| 背隙 / Backlash   |            | arcmin    | 3~10     | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8   | ≤ 8    | ≤ 8    |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 3~10     | 2.3   | 5     | 15    | 45    | 69    | 140    | 220    |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 3~10     | 750   | 1,180 | 3,000 | 6,500 | 9,100 | 11,150 | 35,000 |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 3~10     | 325   | 590   | 1,500 | 3,250 | 4,550 | 5,575  | 17,500 |
| 使用壽命 / Service Life   | $L_{H1}$   | hr        | 3~10     | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 / Efficiency   | $\eta$     | %         | 3~10     | ≥ 97%   |       |       |       |       |        |        |
| 使用溫度 / Operating Temperature                                |            | °C        | 3~10     | -25° C ~ +90° C   |       |       |       |       |        |        |
| 潤滑 / Lubrication  |            |           | 3~10     | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 / Protection Class                                     |            |           | 3~10     | IP65  |       |       |       |       |        |        |
| 安裝方向 / Mounting Position                                    |            |           | 3~10     | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 / Noise Level   |            | dB        | 3~10     | ≤ 62  | ≤ 62  | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 70   | ≤ 70   |
| 重量 / Weight ±3%   |            | Kg        | 3~10     | 0.63  | 1.57  | 3.22  | 8     | 16    | 33     | 54     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 50   | 70   | 90   | 120  | 145  | 180   | 220   |
|----------|------|------|------|------|------|-------|-------|
| 3        | 0.04 | 0.14 | 0.61 | 3.25 | 8.75 | 24.63 | 50.67 |
| 4        | 0.04 | 0.13 | 0.48 | 2.74 | 7.16 | 20.12 | 46.21 |
| 5        | 0.04 | 0.11 | 0.47 | 2.74 | 6.84 | 19.80 | 45.28 |
| 7        | 0.04 | 0.11 | 0.44 | 2.58 | 6.78 | 19.21 | 43.32 |
| 10       | 0.04 | 0.11 | 0.44 | 2.57 | 6.68 | 19.13 | 42.98 |

# MODEL : FE

RATIO : 15, 20, 25, 30, 35, 40, 50, 70, 100 ( 雙段 2-Stage)



unit: mm

| Model Code | 50 | 70             | 90             | 120                  | 145             | 180               | 220               |                   |
|------------|----|----------------|----------------|----------------------|-----------------|-------------------|-------------------|-------------------|
| A          | A1 | 42             | 60             | 80                   | 105             | 130               | 184               | 218               |
|            | A2 | M4 x P0.7      | M5 x P0.8      | M6 x P1.0            | M8 x P1.25      | M10 x P1.5        | M12 x P1.75       | M16 x P2.0        |
|            | A3 | 13             | 16             | 22                   | 32              | 40                | 55                | 75                |
|            | A4 | 35             | 50             | 70                   | 90              | 110               | 160               | 180               |
|            | A5 | 5              | 6              | 9 · 23.5             | 10 · 20         | 10                | 13 · 15           | 13.5 · 15.5       |
|            | A6 | M4 x P0.7      | M5 x P0.8      | M8 x P1.25           | M10 x P1.5      | M12 x P1.75       | M14 x P2.0        | M16 x P2.0        |
|            | A7 | 5              | 5              | 6                    | 10              | 12                | 16                | 20                |
|            | A8 | 15             | 18             | 24.5                 | 35              | 43                | 59                | 79.5              |
| B          | B1 | $\phi$ 50      | $\phi$ 70      | $\phi$ 93            | $\phi$ 122      | $\phi$ 148        | $\phi$ 205        | $\phi$ 242        |
|            | B2 | 4              | 5              | 6                    | 8               | 10                | 20                | 20                |
|            | B3 | 15             | 20             | 30                   | 40              | 65                | 70                | 90                |
|            | B4 | 20             | 28             | 36                   | 50              | 74                | 82                | 104               |
|            | B5 | 25             | 34             | 44                   | 60              | 87                | 106               | 129               |
|            | B6 | 6              | 8              | 9                    | 12              | 15                | 21.5              | 30                |
|            | B7 | 126.7          | 166.5          | 206.5 · 221          | 281.5 · 291.5   | 340.5             | 394.5 · 396.5     | 463.5 · 465.5     |
| C          | C1 | 46 · 60 · 63   | 70 · 75 · 90   | 90 · 100 · 115 · 145 | 115 · 145 · 165 | 145 · 165 · 215   | 200 · 215 · 265   | 200 · 265 · 300   |
|            | C2 | M3<br>M4<br>M5 | M4<br>M5<br>M6 | M5<br>M6<br>M8       | M6<br>M8<br>M10 | M8<br>M10<br>M12  | M10<br>M12        | M12<br>M16        |
|            | C3 | 8 · 9 · 11     | 11 · 14        | 16 · 19 · 22 · 24    | 24 · 28 · 32    | 28 · 32 · 35 · 38 | 35 · 38 · 42 · 48 | 42 · 48 · 55      |
|            | C4 | 26             | 33.5           | 51 · 65.5            | 63 · 73         | 81.5              | 115 · 117         | 118 · 120         |
|            | C5 | 30 · 40 · 50   | 40 · 50 · 60   | 70 · 80 · 95 · 110   | 95 · 110 · 130  | 110 · 130 · 180   | 114.3 · 180 · 230 | 114.3 · 230 · 250 |
|            | C6 | M4 x P0.7      | M5 x P0.8      | M6 x P1.0            | M8 x P1.25      | M10 x P1.5        | M10 x P1.5        | M10 x P1.5        |
|            | C7 | 46 · 55        | 64 · 70 · 80   | 92 · 110 · 130       | 122 · 130 · 150 | 146 · 150 · 190   | 182 · 200 · 250   | 222 · 250 · 265   |

# Characteristic of FE 2-Stage

## FE 雙段特性

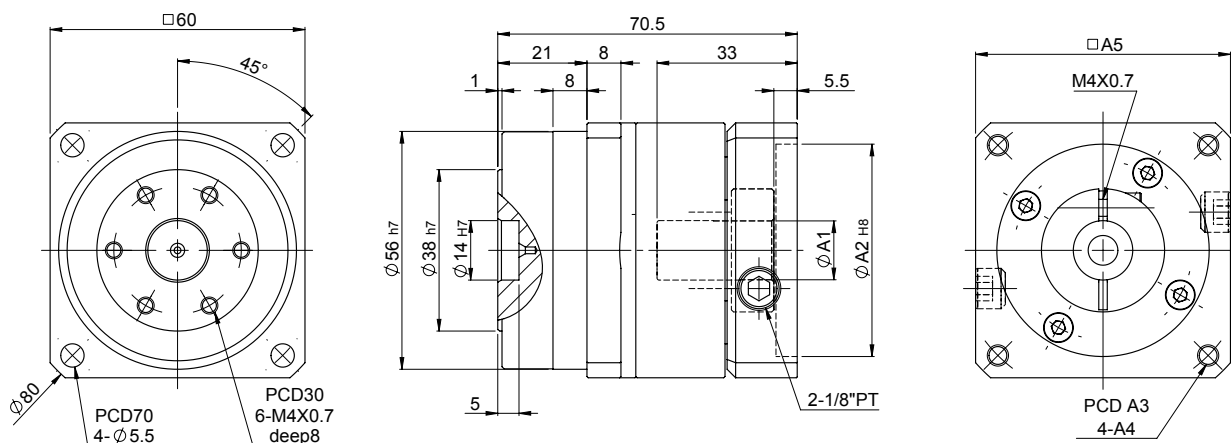
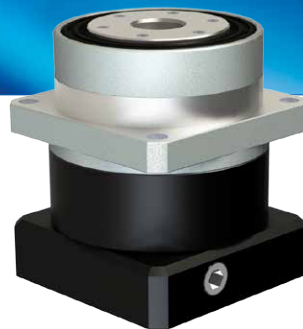
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 50  | 70    | 90    | 120   | 145   | 180    | 220    |
|---|------------|-----------|----------|---|-------|-------|-------|-------|--------|--------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal output torque)     | $T_{2N}$   | Nm        | 15       | 17  | 50    | 125   | 268   | 482   | 940    | 1,420  |
|   |            |           | 20       | 15  | 45    | 111   | 238   | 426   | 860    | 1,300  |
|   |            |           | 25       | 14  | 42    | 104   | 223   | 401   | 835    | 1,270  |
|   |            |           | 30       | 17  | 50    | 125   | 268   | 482   | 940    | 1,420  |
|   |            |           | 35       | 13  | 39    | 98    | 208   | 373   | 790    | 1,180  |
|   |            |           | 40       | 15  | 45    | 111   | 238   | 427   | 860    | 1,300  |
|   |            |           | 50       | 14  | 42    | 104   | 223   | 402   | 835    | 1,270  |
|   |            |           | 70       | 13  | 40    | 98    | 208   | 373   | 790    | 1,180  |
|   |            |           | 100      | 12  | 37    | 92    | 198   | 357   | 760    | 1,100  |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 15~100   | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |       |       |       |       |        |        |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 15~100   | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |       |       |       |       |        |        |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 15~100   | 3,000   | 3,000 | 3,000 | 3,000 | 3,000 | 2,000  | 2,000  |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 15~100   | 5,000   | 5,000 | 5,000 | 5,000 | 5,000 | 3,000  | 3,000  |
| 背隙 / Backlash   |            | arcmin    | 15~100   | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12  | ≤ 12   | ≤ 12   |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 15~100   | 2.3   | 5     | 15    | 45    | 69    | 140    | 220    |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 15~100   | 750   | 1,180 | 3,000 | 6,500 | 9,100 | 11,150 | 35,000 |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 15~100   | 325   | 590   | 1,500 | 3,250 | 4,550 | 5,575  | 17,500 |
| 使用壽命 / Service Life   | $L_{Ht}$   | hr        | 15~100   | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |       |       |       |       |        |        |
| 效率 / Efficiency   | $\eta$     | %         | 15~100   | ≥ 94%   |       |       |       |       |        |        |
| 使用溫度 / Operating Temperature                                |            | °C        | 15~100   | -25° C ~ +90° C   |       |       |       |       |        |        |
| 潤滑 / Lubrication  |            |           | 15~100   | 全合成潤滑油脂 Synthetic Grease  |       |       |       |       |        |        |
| 防護等級 / Protection Class                                     |            |           | 15~100   | IP65  |       |       |       |       |        |        |
| 安裝方向 / Mounting Position                                    |            |           | 15~100   | 任意方向 Any  |       |       |       |       |        |        |
| 噪音值 / Noise Level   |            | dB        | 15~100   | ≤ 65  | ≤ 65  | ≤ 68  | ≤ 70  | ≤ 72  | ≤ 72   | ≤ 72   |
| 重量 / Weight ±3%   |            | Kg        | 15~100   | 0.9   | 2.24  | 4.59  | 11.22 | 22.5  | 46.4   | 75     |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 50   | 70   | 90   | 120  | 142  | 180   | 220   |
|----------|------|------|------|------|------|-------|-------|
| 15       | 0.04 | 0.14 | 0.61 | 3.25 | 8.75 | 24.63 | 50.67 |
| 20       | 0.04 | 0.13 | 0.48 | 2.74 | 7.16 | 20.12 | 46.21 |
| 25       | 0.04 | 0.11 | 0.47 | 2.74 | 6.84 | 19.80 | 45.28 |
| 30       | 0.04 | 0.14 | 0.61 | 3.25 | 8.75 | 24.63 | 50.67 |
| 35       | 0.04 | 0.11 | 0.44 | 2.58 | 6.78 | 19.21 | 43.32 |
| 40       | 0.04 | 0.11 | 0.48 | 2.74 | 7.16 | 20.12 | 46.21 |
| 50       | 0.04 | 0.11 | 0.47 | 2.74 | 6.84 | 19.80 | 45.28 |
| 70       | 0.04 | 0.11 | 0.44 | 2.58 | 6.78 | 19.21 | 43.32 |
| 100      | 0.04 | 0.11 | 0.44 | 2.57 | 6.68 | 19.13 | 42.98 |

# MODEL : AD60

RATIO : 3, 4, 5, 7, 10 ( 單段 1-Stage)



入力法蘭尺寸表 Dimension of Input Flange

unit: mm

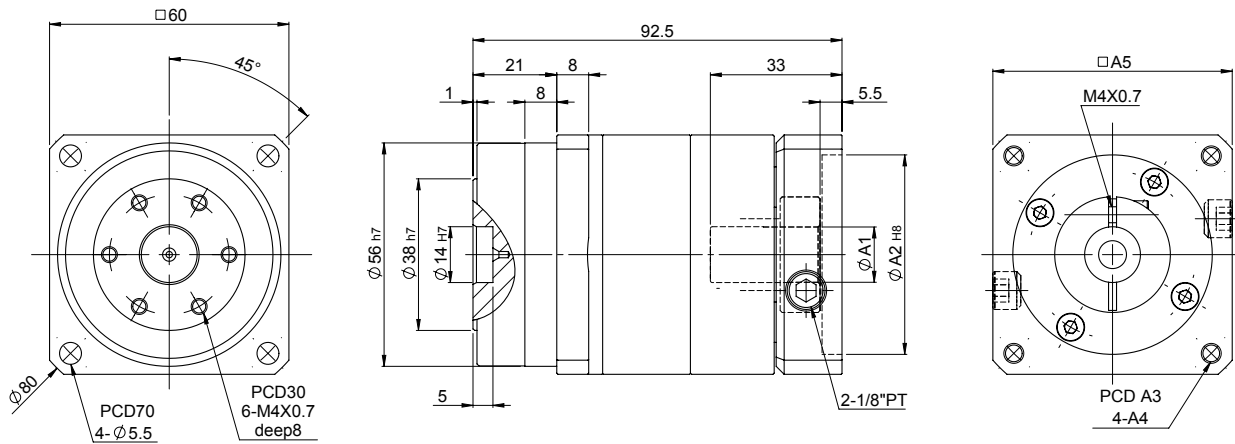
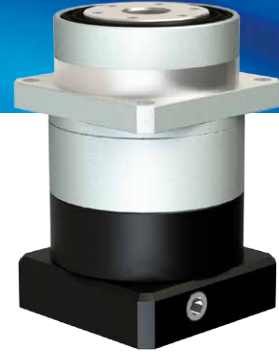
| NO. | ØA1                    | ØA2 | A3   | A4 | A5 |
|-----|------------------------|-----|------|----|----|
| 1   | 8 · 9 · 10 · 12.7 · 14 | 30  | 45   | M3 | 46 |
| 2   |                        | 30  | 46   | M4 | 46 |
| 3   |                        | 30  | 48.5 | M3 | 55 |
| 4   |                        | 40  | 63   | M5 | 55 |
| 5   |                        | 50  | 70   | M5 | 60 |

## AD60-1 特性表

| 減速比 Ratio   | 代號         | 單位 Unit            | 3   | 4    | 5    | 7    | 10   |
|---|------------|--------------------|---|------|------|------|------|
| 額定輸出扭矩 / Rated Output Torque (Nominal Output Torque)        | $T_{2N}$   | Nm                 | 28  | 38   | 40   | 35   | 25   |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm                 | 50  | 68   | 22   | 63   | 45   |
| 轉動慣量 / Mass Moments of Inertia                              |            | kg.cm <sup>2</sup> | 0.16  | 0.12 | 0.10 | 0.08 | 0.06 |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm                 | 2 倍額定輸出扭矩 2 Times of Rated Output Torque  |      |      |      |      |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{IN}$   | rpm                | 3,000   |      |      |      |      |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{IB}$   | rpm                | 5,000   |      |      |      |      |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin          | 4   |      |      |      |      |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N                  | 460   |      |      |      |      |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N                  | 230   |      |      |      |      |
| 使用壽命 / Service Life   | $L_H$      | hr                 | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |      |      |      |      |
| 效率 / Efficiency   | $\eta$     | %                  | ≥ 97%   |      |      |      |      |
| 使用溫度 / Operating Temperature                                |            | °C                 | - 25° C ~ + 90° C   |      |      |      |      |
| 潤滑 / Lubrication  |            |                    | 全合成潤滑油脂 Synthetic Grease  |      |      |      |      |
| 防護等級 / Protection Class                                     |            |                    | IP 65   |      |      |      |      |
| 安裝方向 / Mounting Position                                    |            |                    | 任意 Any  |      |      |      |      |
| 噪音值 / Noise Level   |            | dB                 | ≤ 58 dB   |      |      |      |      |
| 重量 / Weight ±2%   |            | Kg                 | 0.88  |      |      |      |      |

# MODEL : AD60

RATIO : 15, 20, 25, 30, 35, 40, 50, 70, 100 ( 雙段 2-Stage)



入力法蘭尺寸表 Dimension of Input Flange

unit: mm

| NO. | ØA1            | ØA2 | A3   | A4 | A5 |
|-----|----------------|-----|------|----|----|
| 1   |                | 30  | 45   | M3 | 46 |
| 2   |                | 30  | 46   | M4 | 46 |
| 3   | 8・9・10・12.7・14 | 30  | 48.5 | M3 | 55 |
| 4   |                | 40  | 63   | M5 | 55 |
| 5   |                | 50  | 70   | M5 | 60 |

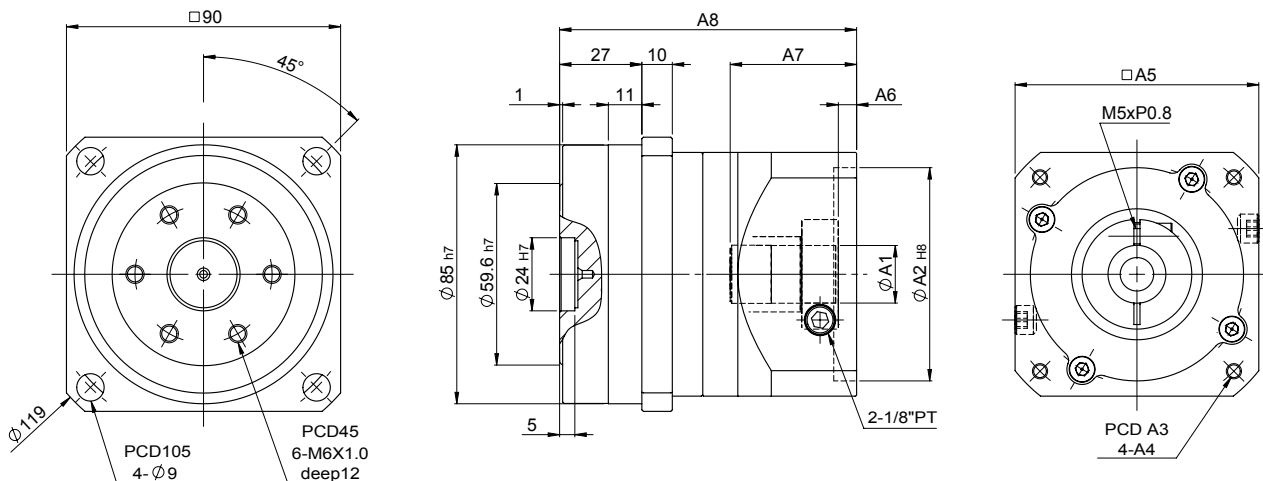
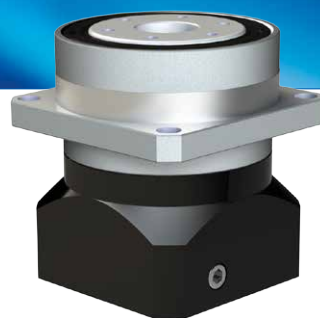
## AD60-2 特性表

| 減速比 Ratio   | 代號         | 單位 Unit            | 3   | 4  | 5  | 3  | 7  | 4  | 5  | 7  | 10  |
|---|------------|--------------------|---|----|----|----|----|----|----|----|-----|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm                 | 15  | 20 | 25 | 30 | 35 | 40 | 50 | 70 | 100 |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm                 | 28  | 38 | 40 | 28 | 35 | 38 | 40 | 35 | 25  |
| 轉動慣量 / Mass Moments of Inertia                              |            | kg.cm <sup>2</sup> | 50  | 68 | 22 | 50 | 63 | 68 | 72 | 63 | 45  |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm                 | 2 倍額定輸出扭矩 2 Times of Rated Output Torque  |    |    |    |    |    |    |    |     |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{IN}$   | rpm                | 3,000   |    |    |    |    |    |    |    |     |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{IB}$   | rpm                | 5,000   |    |    |    |    |    |    |    |     |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin          | 4   |    |    |    |    |    |    |    |     |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N                  | 460   |    |    |    |    |    |    |    |     |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N                  | 230   |    |    |    |    |    |    |    |     |
| 使用壽命 / Service Life   | $L_H$      | hr                 | S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)<br>S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs) |    |    |    |    |    |    |    |     |
| 效率 / Efficiency   | $\eta$     | %                  | $\geq 97\%$   |    |    |    |    |    |    |    |     |
| 使用溫度 / Operating Temperature                                |            | °C                 | - 25° C ~ + 90° C   |    |    |    |    |    |    |    |     |
| 潤滑 / Lubrication  |            |                    | 全合成潤滑油脂 Synthetic Grease  |    |    |    |    |    |    |    |     |
| 防護等級 / Protection Class                                     |            |                    | IP 65   |    |    |    |    |    |    |    |     |
| 安裝方向 / Mounting Position                                    |            |                    | 任意 Any  |    |    |    |    |    |    |    |     |
| 噪音值 / Noise Level   |            | dB                 | $\leq 58$ dB  |    |    |    |    |    |    |    |     |
| 重量 / Weight $\pm 2\%$                                       |            | Kg                 | 1.24  |    |    |    |    |    |    |    |     |



# MODEL : AD90

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



入力法蘭尺寸表 Dimension of Input Flange

unit: mm

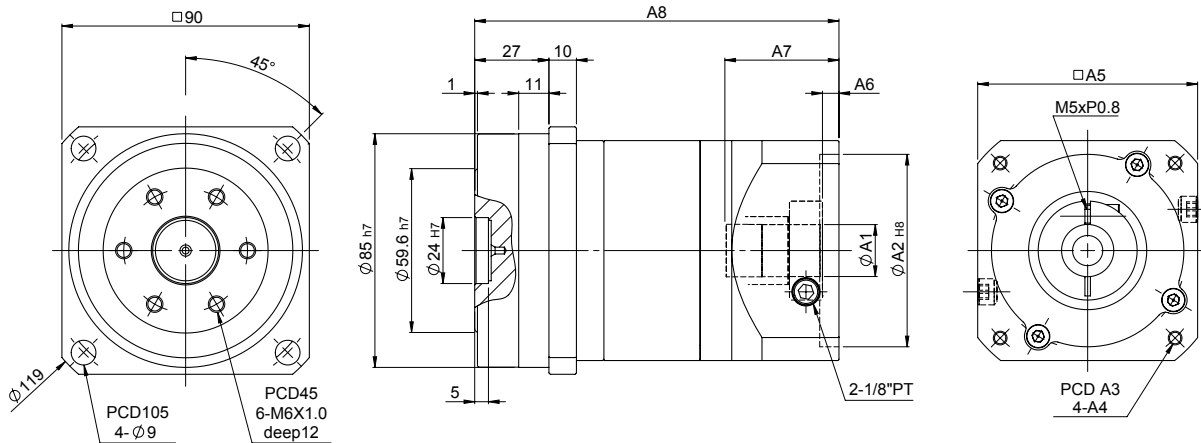
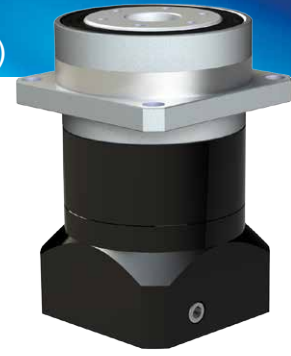
| NO. | ØA1     | ØA2 | A3 | A4 | A5 | A6  | A7   | A8   |
|-----|---------|-----|----|----|----|-----|------|------|
| 1   | 14 · 19 | 50  | 70 | M5 | 80 | 5.5 | 33.5 | 89.5 |
| 2   |         | 70  | 90 | M6 | 80 | 6   | 41.5 | 97.5 |

## AD90-1 特性表

| 減速比 Ratio   | 代號         | 單位 Unit            | 3   | 4    | 5    | 7    | 10   |  |
|---|------------|--------------------|---|------|------|------|------|--|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm                 | 112   | 110  | 108  | 105  | 100  |  |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm                 | 168   | 165  | 162  | 158  | 150  |  |
| 轉動慣量 / Mass Moments of Inertia                              |            | kg.cm <sup>2</sup> | 0.48  | 0.45 | 0.40 | 0.35 | 0.32 |  |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm                 | 2 倍額定輸出扭矩 2 Times of Rated Output Torque  |      |      |      |      |  |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{IN}$   | rpm                | 3,000   |      |      |      |      |  |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{IB}$   | rpm                | 5,000   |      |      |      |      |  |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin          | 12  |      |      |      |      |  |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N                  | 1,400   |      |      |      |      |  |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N                  | 660   |      |      |      |      |  |
| 使用壽命 / Service Life   | $L_H$      | hr                 | S5 周期運轉 : >20,000 (S1 連續運轉 : >10,000 hrs)<br>S5 Cycle Operation: >20,000 (S1 Continuous Operation: >10,000 hrs) |      |      |      |      |  |
| 效率 / Efficiency   | $\eta$     | %                  | ≥ 97%   |      |      |      |      |  |
| 使用溫度 / Operating Temperature                                |            | °C                 | - 20° C ~ + 90° C   |      |      |      |      |  |
| 潤滑 / Lubrication  |            |                    | 全合成潤滑油脂 Synthetic Grease  |      |      |      |      |  |
| 防護等級 / Protection Class                                     |            |                    | IP 65   |      |      |      |      |  |
| 安裝方向 / Mounting Position                                    |            |                    | 任意 Any  |      |      |      |      |  |
| 噪音值 / Noise Level   |            | dB                 | ≤ 60 dB   |      |      |      |      |  |
| 重量 / Weight ±2%   |            | Kg                 | 2.3   |      |      |      |      |  |

# MODEL : AD90

RATIO : 15, 20, 25, 30, 35, 40, 50, 70, 100 ( 雙段 2-Stage)



入力法蘭尺寸表 Dimension of Input Flange

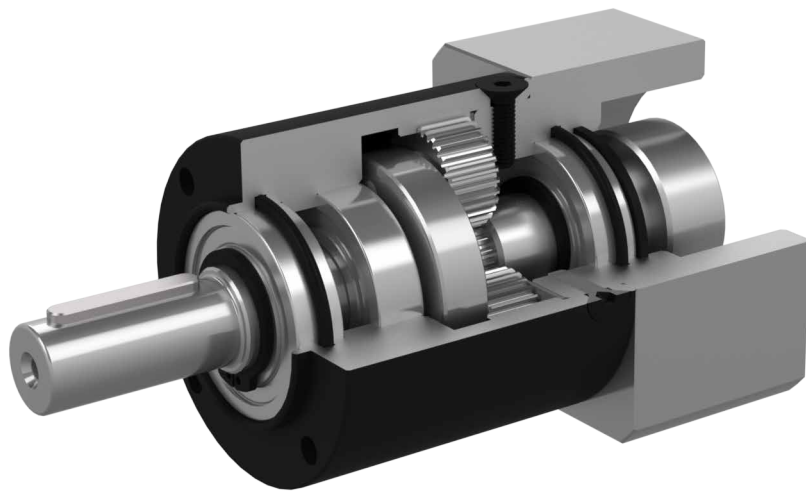
unit: mm

| NO. | ØA1     | ØA2 | A3 | A4 | A5 | A6  | A7   | A8    |
|-----|---------|-----|----|----|----|-----|------|-------|
| 1   | 14 · 19 | 50  | 70 | M5 | 80 | 5.5 | 33.5 | 124.5 |
| 2   |         | 70  | 90 | M6 | 80 | 6   | 41.5 | 132.5 |

## AD90-2 特性表

| 減速比 Ratio   | 代號         | 單位 Unit            | 15  | 20   | 25   | 30   | 35   | 40   | 50   | 70   | 100  |
|---|------------|--------------------|---|------|------|------|------|------|------|------|------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm                 | 112   | 110  | 108  | 112  | 105  | 110  | 108  | 105  | 100  |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm                 | 168   | 165  | 162  | 202  | 158  | 165  | 162  | 158  | 150  |
| 轉動慣量 / Mass Moments of Inertia                              |            | kg.cm <sup>2</sup> | 0.45  | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm                 | 2 倍額定輸出扭矩 2 Times of Rated Output Torque  |      |      |      |      |      |      |      |      |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{IN}$   | rpm                | 3,000   |      |      |      |      |      |      |      |      |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{IB}$   | rpm                | 5,000   |      |      |      |      |      |      |      |      |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin          | 12  |      |      |      |      |      |      |      |      |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N                  | 1,400   |      |      |      |      |      |      |      |      |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N                  | 660   |      |      |      |      |      |      |      |      |
| 使用壽命 / Service Life   | $L_H$      | hr                 | S5 周期運轉 : >20,000 (S1 連續運轉 : >10,000 hrs)<br>S5 Cycle Operation: >20,000 (S1 Continuous Operation: >10,000 hrs) |      |      |      |      |      |      |      |      |
| 效率 / Efficiency   | $\eta$     | %                  | ≥ 95%   |      |      |      |      |      |      |      |      |
| 使用溫度 / Operating Temperature                                |            | °C                 | - 25° C ~ + 90° C   |      |      |      |      |      |      |      |      |
| 潤滑 / Lubrication  |            |                    | 全合成潤滑油脂 Synthetic Grease  |      |      |      |      |      |      |      |      |
| 防護等級 / Protection Class                                     |            |                    | IP 65   |      |      |      |      |      |      |      |      |
| 安裝方向 / Mounting Position                                    |            |                    | 任意 Any  |      |      |      |      |      |      |      |      |
| 噪音值 / Noise Level   |            | dB                 | ≤ 62 dB   |      |      |      |      |      |      |      |      |
| 重量 / Weight ±2%   |            | Kg                 | 3.3   |      |      |      |      |      |      |      |      |

# PE series



## Indication of Model Numbers

### 機種型號表示

|               |                      |   |   |  |   |                    |
|---------------|----------------------|---|---|--|---|--------------------|
| <b>PE</b>     | <b>60</b>            | — | <b>10</b>   | □  | — | <b>MOTOR</b>       |
| 減速機機型<br>Type | 型號<br>Model          |   | 速比<br>Ratio                                       | 出力軸鍵槽<br>Output Shaft Keyway   |   | 馬達型號<br>Motor Type |
| PE            | 32<br>40<br>60<br>80 |   | 單段 1-Stage<br>3 ~ 10<br><br>雙段 2-Stage<br>12 ~ 64 | <input type="checkbox"/> 標準品 · 有鍵槽<br>Standard (Keyway)<br><br>N: 實心軸 · 無鍵槽<br>Solid Output Shaft<br>(No Keyway) |   |                    |



# MODEL : PE

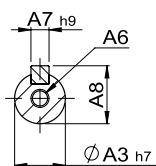
RATIO : 3, 4, 5, 7, 8, 9, 10 (單段 1-Stage)



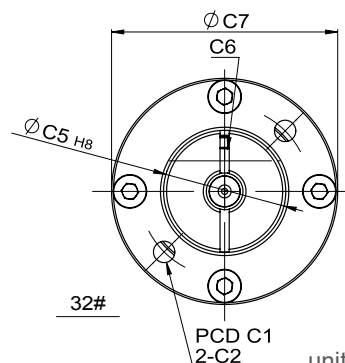
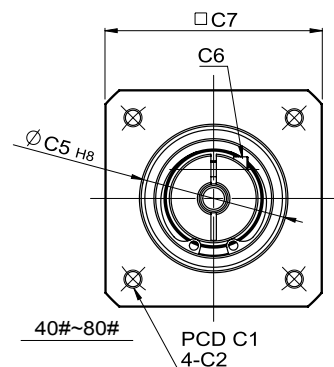
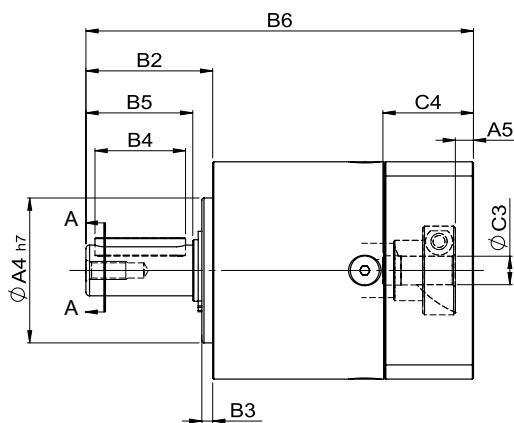
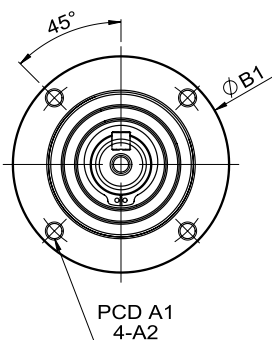
▲ 32#



▲ 40#~80#



A-A SECTION



unit: mm

| Model Code | 32 | 40       | 60       | 80       |          |
|------------|----|----------|----------|----------|----------|
| A          | A1 | 26       | 34       | 52       | 70       |
|            | A2 | M3 x 0.5 | M4 x 0.7 | M5 x 0.8 | M6 x 1.0 |
|            | A3 | 8        | 10       | 14       | 20       |
|            | A4 | 20       | 26       | 40       | 60       |
|            | A5 | 5.5      | 5        | 5        | 5        |
|            | A6 | /        | M3 x 0.5 | M5 x 0.8 | M6 x 1.0 |
|            | A7 | 3        | 3        | 5        | 6        |
|            | A8 | 9        | 11       | 16       | 22.5     |
| B          | B1 | 32       | 40       | 60       | 80       |
|            | B2 | 20.5     | 26.5     | 35       | 40       |
|            | B3 | 2        | 2        | 3        | 3        |
|            | B4 | 12       | 18       | 25       | 28       |
|            | B5 | 16       | 23       | 29.5     | 35.5     |
|            | B6 | 71       | 92       | 107      | 134      |
| C          | C1 | 28       | 46       | 63       | 100      |
|            | C2 | 3.5      | M4 x 0.7 | M5 x 0.8 | M6 x 1.0 |
|            | C3 | 6        | 8        | 8-11     | 14       |
|            | C4 | 19.5     | 26       | 25       | 32       |
|            | C5 | 20       | 30       | 40       | 80       |
|            | C6 | M4 x 0.7 | M4 x 0.7 | M4 x 0.7 | M5 x 0.8 |
|            | C7 | 37       | 40       | 60       | 90       |



# Characteristic of PE 1-Stage

## PE 單段特性

| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 32  | 40        | 60        | 80        |
|---|------------|-----------|----------|---|-----------|-----------|-----------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm        | 3        | 8   | 12        | 30        | 90        |
|   |            |           | 4        | 10  | 16        | 38        | 120       |
|   |            |           | 5        | 11  | 17        | 41        | 130       |
|   |            |           | 7        | 9   | -         | 32        | 110       |
|   |            |           | 8        | -   | 12        | -         | -         |
|   |            |           | 9        | 7   | -         | -         | -         |
|   |            |           | 10       | -   | 10        | 25        | 80        |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 3~10     | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |           |           |           |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 3~10     | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |           |           |           |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 3~10     | 3,000   |           |           |           |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 3~10     | 5,000   |           |           |           |
| 背隙 / Backlash   |            | arcmin    | 3~10     | < 12  |           |           |           |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 3~10     | 0.8   | 1         | 2.3       | 6         |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 3~10     | 130   | 300       | 680       | 1,750     |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 3~10     | 65  | 150       | 340       | 875       |
| 使用壽命 / Service Life   | $L_H$      | hr        | 3~10     | S5 周期運轉 : >20,000 (S1 連續運轉 : >10,000 hrs)<br>S5 Cycle Operation: >20,000 (S1 Continuous Operation: >10,000 hrs) |           |           |           |
| 效率 / Efficiency   | $\eta$     | %         | 3~10     | $\geq 96\%$   |           |           |           |
| 使用溫度 / Operating Temperature                                |            | °C        | 3~10     | -25°C ~ +90°C   |           |           |           |
| 潤滑 / Lubrication  |            |           | 3~10     | 全合成潤滑油脂 Synthetic Grease  |           |           |           |
| 安裝方向 / Mounting Position                                    |            |           | 3~10     | 任意 Any  |           |           |           |
| 噪音值 / Noise Level   |            | dB        | 3~10     | $\leq 56$   | $\leq 58$ | $\leq 58$ | $\leq 60$ |
| 重量 / Weight $\pm 2\%$                                       |            | Kg        | 3~10     | 0.2   | 0.35      | 0.9       | 2.1       |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 32    | 40    | 60    | 80   |
|----------|-------|-------|-------|------|
| 3        | 0.012 | 0.031 | 0.135 | 0.77 |
| 4        | 0.012 | 0.022 | 0.093 | 0.52 |
| 5        | 0.010 | 0.019 | 0.078 | 0.45 |
| 7        | 0.010 | -     | 0.072 | 0.42 |
| 8        | -     | 0.017 | -     | -    |
| 9        | 7     | -     | -     | -    |
| 10       | -     | 0.016 | 0.064 | 0.39 |

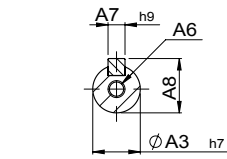
# MODEL : PE

RATIO : 12, 15, 20, 25, 32, 35, 40, 45, 50, 63, 64 ( 雙段 2-Stage)

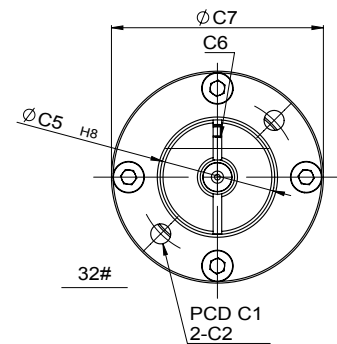
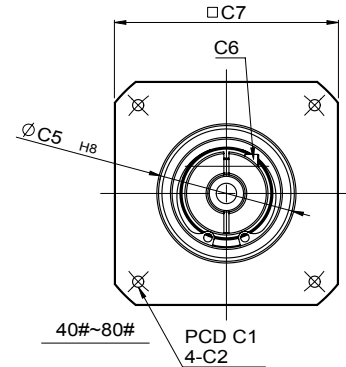
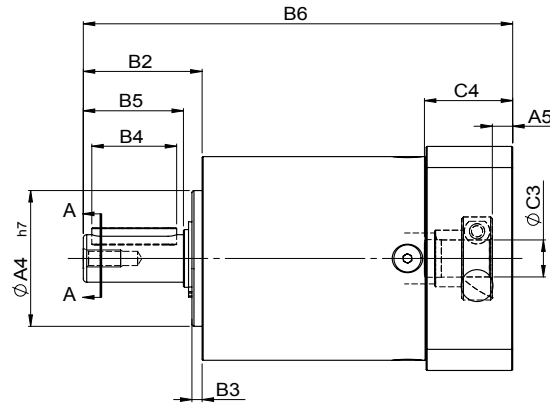
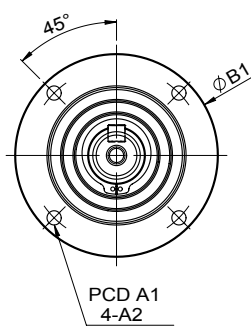


▲ 32#

▲ 40#~80#



A-A SECTION



unit: mm

| Model Code | 32 | 40       | 60       | 80       |          |
|------------|----|----------|----------|----------|----------|
| A          | A1 | 26       | 34       | 52       | 70       |
|            | A2 | M3 x 0.5 | M4 x 0.7 | M5c0.8   | M6 x 1.0 |
|            | A3 | 8        | 10       | 14       | 20       |
|            | A4 | 20       | 26       | 40       | 60       |
|            | A5 | 5.5      | 5        | 5        | 5        |
|            | A6 | -        | M3 x 0.5 | M5 x 0.8 | M6 x 1.0 |
|            | A7 | 3        | 3        | 5        | 6        |
|            | A8 | 16       | 11       | 16       | 22.5     |
| B          | B1 | 32       | 40       | 60       | 80       |
|            | B2 | 20.5     | 26.5     | 35       | 40       |
|            | B3 | 2        | 2        | 3        | 3        |
|            | B4 | 12       | 18       | 25       | 28       |
|            | B5 | 16       | 23       | 29.5     | 35.5     |
|            | B6 | 86       | 110      | 125.5    | 155.5    |
| C          | C1 | 28       | 46       | 63       | 100      |
|            | C2 | 3.5      | M4 x 0.7 | M5 x 0.8 | M6 x 1.0 |
|            | C3 | 6        | 8        | 8、11     | 14       |
|            | C4 | 19.5     | 26       | 25       | 32       |
|            | C5 | 20       | 40       | 40       | 80       |
|            | C6 | M4 x 0.7 | M4 x 0.7 | M4 x 0.7 | M5 x 0.8 |
|            | C7 | 37       | 40       | 60       | 90       |

# Characteristic of PE 2-Stage

## PE 雙段特性

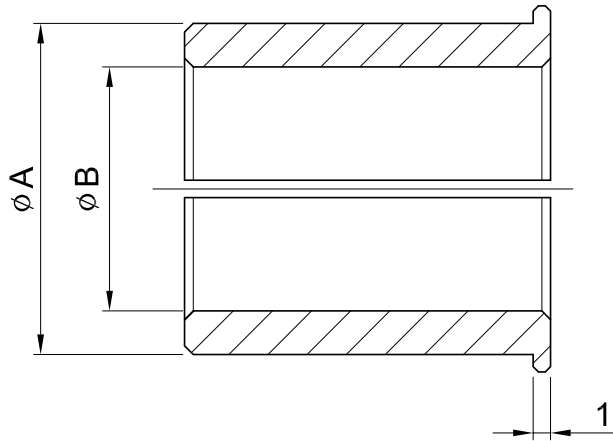
| 規格 Model No.  | 代號         | 單位 Unit   | 速比 Ratio | 32  | 40           | 60           | 80           |
|---|------------|-----------|----------|---|--------------|--------------|--------------|
| 額定輸出扭矩 / Rated Output Torque<br>(Nominal Output Torque)     | $T_{2N}$   | Nm        | 12       | -   | -            | 30           | 90           |
|   |            |           | 15       | 8   | 11           | 30           | 90           |
|   |            |           | 20       | 10  | -            | 38           | 120          |
|   |            |           | 25       | 11  | 17           | 41           | 130          |
|   |            |           | 32       | -   | -            | -            | -            |
|   |            |           | 35       | 9   | -            | 32           | 110          |
|   |            |           | 40       | -   | 16           | 38           | 120          |
|   |            |           | 45       | 7   | -            | -            | -            |
|   |            |           | 50       | -   | -            | 41           | 130          |
|   |            |           | 63       | 9   | -            | -            | -            |
|   |            |           | 64       | -   | 17           | -            | -            |
| 最大加速扭矩 / Max. Acceleration Torque                           | $T_{2B}$   | Nm        | 12~64    | 1.8 倍額定輸出扭矩 1.8 Times of Rated Output Torque  |              |              |              |
| 最大輸出扭矩 / Max. Output Torque<br>急停扭矩 / Emergency Stop Torque | $T_{2NOT}$ | Nm        | 12~64    | 3 倍額定輸出扭矩 3 Times of Rated Output Torque  |              |              |              |
| 額定輸入轉速 / Rated Input Speed                                  | $n_{1N}$   | rpm       | 12~64    | 3,000   |              |              |              |
| 最大輸入轉速 / Max. Input Speed                                   | $n_{1B}$   | rpm       | 12~64    | 5,000   |              |              |              |
| 背隙 / Backlash   |            | arcmin    | 12~64    | < 20  |              |              |              |
| 扭轉剛性 / Torsional Rigidity                                   |            | Nm/arcmin | 12~64    | 0.8   | 1.1          | 2.5          | 6.5          |
| 容許徑向力 / Max. Radial Force                                   | $F_{2rB}$  | N         | 12~64    | 130   | 300          | 680          | 1,750        |
| 容許軸向力 / Max. Axial Force                                    | $F_{2aB}$  | N         | 12~64    | 65  | 150          | 340          | 875          |
| 使用壽命 / Service Life   | $L_H$      | hr        | 12~64    | S5 周期運轉 : >20,000 (S1 連續運轉 : >10,000 hrs)<br>S5 Cycle Operation: >20,000 (S1 Continuous Operation: >10,000 hrs) |              |              |              |
| 效率 / Efficiency   | $\eta$     | %         | 12~64    | $\geq 94\%$   |              |              |              |
| 使用溫度 / Operating Temperature                                |            | °C        | 12~64    | -25°C ~+90°C  |              |              |              |
| 潤滑 / Lubrication  |            |           | 12~64    | 全合成潤滑油脂 Synthetic Grease  |              |              |              |
| 安裝方向 / Mounting Position                                    |            |           | 12~64    | 任意 Any  |              |              |              |
| 噪音值 / Noise Level   |            | dB        | 12~64    | $\leq 58$ dB  | $\leq 60$ dB | $\leq 60$ dB | $\leq 62$ dB |
| 重量 / Weight $\pm 2\%$                                       |            | Kg        | 12~64    | 0.3   | 0.45         | 1.1          | 2.6          |

### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

| 速比 Ratio | 32   | 40    | 60    | 80   |
|----------|------|-------|-------|------|
| 12       | -    | 0.029 | 0.127 | 0.72 |
| 15       | 0.01 | 0.023 | 0.077 | 0.71 |
| 20       | 0.01 | 0.019 | 0.075 | 0.44 |
| 25       | 0.01 | 0.019 | 0.075 | 0.44 |
| 32       | -    | 0.017 | -     | -    |
| 35       | 0.01 | -     | 0.075 | 0.42 |
| 40       | -    | 0.016 | 0.064 | 0.39 |
| 45       | 0.01 | -     | -     | -    |
| 50       | -    | -     | 0.075 | 0.36 |
| 63       | 0.01 | -     | -     | -    |
| 64       | -    | 0.016 | -     | -    |

# Bushing

軸套



軸套內徑為所使用伺服馬達的輸出軸軸徑。  
下表中沒有的情況下需要插入軸套，在您所使用的輸出軸軸徑的近似值中選擇大值。

| 連接軸 孔徑<br>Shaft Bore<br>$\phi A$<br>軸套 孔徑<br>Bushing Bore<br>$\phi B$ | 8 | 11 | 14 | 19 | 22 | 24 | 28 | 32 | 35 |
|---|---|----|----|----|----|----|----|----|----|
| 6   | • | •  |    |    |    |    |    |    |    |
| 6.35  | • |    |    |    |    |    |    |    |    |
| 8   |   | •  |    |    |    |    |    |    |    |
| 9   |   | •  |    |    |    |    |    |    |    |
| 10  |   |    | •  |    |    |    |    |    |    |
| 11  |   |    | •  |    |    |    |    |    |    |
| 12  |   |    | •  |    |    |    |    |    |    |
| 12.7  |   |    | •  |    |    |    |    |    |    |
| 14  |   |    |    | •  |    |    |    |    |    |
| 15.85   |   |    |    | •  |    |    |    |    |    |
| 16  |   |    |    | •  |    | •  | •  |    |    |
| 19  |   |    |    |    | •  | •  | •  |    |    |
| 22  |   |    |    |    |    | •  | •  | •  |    |
| 24  |   |    |    |    |    |    | •  |    | •  |
| 28  |   |    |    |    |    |    |    | •  | •  |
| 32  |   |    |    |    |    |    |    |    | •  |

# Collet Locking Mechanism

筒夾式連結機構

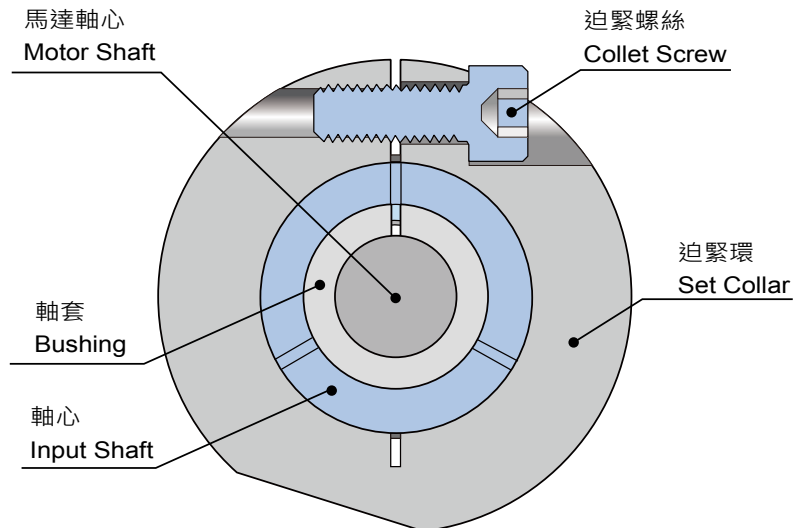
迫緊螺絲及迫緊環扭矩表 Collet Screw & Set Collar Torque Table

| 型號 MODEL   |            |            |     |     |     |     |                |                   |                |            |            |                | 迫緊螺絲規格<br>Spec. of<br>Collet Screw | 螺絲強度等級<br>Screw Grade | 螺絲鎖緊扭矩<br>Tighten Torque<br>(Nm) | 迫緊扭矩<br>Clench Torque<br>(Nm) | 鍵<br>key |
|------------|------------|------------|-----|-----|-----|-----|----------------|-------------------|----------------|------------|------------|----------------|------------------------------------|-----------------------|----------------------------------|-------------------------------|----------|
| SB<br>SE   | SBT<br>PBT | SD         | SR  | SDH | SF  | PB  | FA             | SN                | SNL            | SA         | FB         | PE             |                                    |                       |                                  |                               |          |
| 44         | 44         | 47         | -   | 64  | -   | 44  | 50             | 50<br>60<br>70    | 50<br>60<br>70 | 50         | 50         | 32<br>40<br>60 | M4 x P 0.7                         | 12.9                  | 4.83                             | 87                            |          |
| 62         | 62         | 64         | 82  | 90  | 62  | 62  | 70<br>80<br>90 | 70<br>80          | 80<br>90       | 70         | 70         | 80             | M5 x P 0.8                         | 12.9                  | 10                               | 164                           |          |
| 90         | 90<br>120  | 90         | 100 | 110 | 75  | 90  | 100            | 90<br>115         | 120            | 90         | 90         | -              | M6 x P 1.0                         | 12.9                  | 16.3                             | 233                           |          |
| 120        | 142        | 110        | 132 | 140 | 100 | 120 | 120            | 120<br>155<br>160 | 155<br>160     | 120<br>160 | 120        | -              | M8 x P 1.25                        | 12.9                  | 41                               | 423                           |          |
| 142        | 180        | 140        | -   | 200 | 142 | 142 | 142            | -                 | -              | -          | 145        | -              | M10 x P 1.5                        | 12.9                  | 81                               | 678                           |          |
| 180<br>220 | -          | 200<br>255 | -   | 255 | 180 | 180 | 180            | -                 | -              | -          | 180<br>220 | -              | M10 x P 1.5                        | 12.9                  | 81                               | 678                           | ●        |
| 270<br>330 | -          | -          | -   | -   | -   | -   | -              | -                 | -              | -          | -          | -              | M12 x P 1.75                       | 12.9                  | 110                              | 813                           | ●        |

※ 馬達扭矩超過迫緊扭矩時，可能導致打滑。

It will cause slip when motor torque exceeds clench torque.

| 孔徑<br>Input Bore | Ø38    | Ø42    | Ø48    | Ø55     | Ø60     | Ø75     |
|------------------|--------|--------|--------|---------|---------|---------|
| 鍵<br>Key         | 10 x 8 | 12 x 8 | 14 x 9 | 16 x 10 | 18 x 11 | 20 x 12 |





# Reference Selection Table of Motor

## 馬達選用參考表

### 單段 1-Stage

| 型號<br>Model | SB<br>SE<br>PB        | -  | -  | -        | 44           | -                   | -                          | -        | 62       | -        | 90             | -        | 120            | 142            | -   | -          | -              | 180            | 220                  | 270            | 330 |
|-------------|-----------------------|----|----|----------|--------------|---------------------|----------------------------|----------|----------|----------|----------------|----------|----------------|----------------|-----|------------|----------------|----------------|----------------------|----------------|-----|
|             | SB-A<br>SE-A<br>PB-A  | -  | -  | -        | 44A          | -                   | -                          | -        | 62A      | -        | 90A            | -        | 120A           | 142A           | -   | -          | -              | 180A           | 220A                 | -              | -   |
|             | SBT<br>PBT            | -  | 44 | -        | -            | -                   | -                          | 62       | -        | 90       | -              | 120      | -              | 142            | 180 | -          | -              | -              | -                    | -              | -   |
|             | SD                    | -  | -  | -        | 47           | -                   | -                          | -        | 64       | -        | 90             | -        | 110            | 140            | -   | -          | -              | 200            | 255                  | -              | -   |
|             | SR                    | -  | -  | -        | -            | -                   | -                          | -        | 82       | 100      | -              | -        | 132            | -              | -   | -          | -              | -              | -                    | -              | -   |
|             | SF                    | -  | -  | -        | -            | -                   | -                          | -        | 62       | -        | 75             | -        | 100            | -              | -   | 142        | -              | 180            | -                    | -              | -   |
|             | SF-A                  | -  | -  | -        | -            | -                   | -                          | -        | 62A      | -        | 75A            | -        | 100A           | -              | -   | 142A       | -              | 180A           | -                    | -              | -   |
|             | FA                    | -  | -  | -        | -            | 50                  | -                          | -        | 80       | -        | 100            | -        | 120            | -              | -   | 142        | -              | 180            | -                    | -              | -   |
|             | SN                    | -  | -  | -        | -            | 50                  | 60                         | -        | 70<br>80 | -        | 115            | -        | 160            | -              | -   | -          | -              | -              | -                    | -              | -   |
|             | SNL                   | -  | -  | 50<br>60 | -            | -                   | -                          | 70       | 80<br>90 | -        | 120            | -        | -              | -              | -   | 155<br>160 | -              | -              | -                    | -              | -   |
|             | SA                    | -  | -  | -        | -            | 50                  | -                          | -        | 70       | -        | 90             | -        | 120<br>160     | -              | -   | -          | -              | -              | -                    | -              | -   |
|             | FB、FE                 | -  | -  | -        | -            | 50                  | -                          | -        | 70       | -        | 90             | -        | 120            | -              | -   | 145        | 180            | -              | 220                  | -              | -   |
|             | PE                    | 32 | 40 | -        | 60           | 80                  | -                          | -        | -        | -        | -              | -        | -              | -              | -   | -          | -              | -              | -                    | -              | -   |
| 容量<br>Power | 入力孔徑<br>Input<br>Bore | 6  | 8  | 8<br>11  | 8<br>9<br>11 | 8<br>10<br>11<br>14 | 8<br>9<br>10<br>12.7<br>14 | 11<br>14 | 14<br>19 | 19<br>24 | 19<br>22<br>24 | 22<br>24 | 24<br>28<br>32 | 28<br>32<br>35 | 35  | 35<br>38   | 38<br>42<br>48 | 42<br>48<br>55 | 48<br>55<br>60<br>70 | 55<br>60<br>75 |     |
| 100 W       | ●                     | ●  | ●  | ●        | ●            | ●                   |                            |          |          |          |                |          |                |                |     |            |                |                |                      |                |     |
| 200 W       |                       |    | ●  | ●        | ●            | ●                   |                            |          |          |          |                |          |                |                |     |            |                |                |                      |                |     |
| 400 W       |                       |    |    |          | ●            | ●                   | ●                          | ●        |          |          |                |          |                |                |     |            |                |                |                      |                |     |
| 750 W       |                       |    |    |          |              |                     |                            | ●        | ●        | ●        |                |          |                |                |     |            |                |                |                      |                |     |
| 1 kW        |                       |    |    |          |              |                     |                            |          |          | ●        | ●              |          |                |                |     |            |                |                |                      |                |     |
| 1.5 kW      |                       |    |    |          |              |                     |                            |          | ●        | ●        | ●              | ●        |                |                |     |            |                |                |                      |                |     |
| 2.2 kW      |                       |    |    |          |              |                     |                            |          |          |          |                | ●        | ●              |                |     |            |                |                |                      |                |     |
| 3.75 kW     |                       |    |    |          |              |                     |                            |          |          |          |                | ●        | ●              | ●              | ●   |            |                |                |                      |                |     |
| 5.5 kW      |                       |    |    |          |              |                     |                            |          |          |          |                |          | ●              | ●              | ●   | ●          | ●              |                |                      |                |     |
| 7.5 kW      |                       |    |    |          |              |                     |                            |          |          |          |                |          |                | ●              | ●   | ●          |                |                |                      |                |     |
| 11 kW       |                       |    |    |          |              |                     |                            |          |          |          |                |          |                |                |     | ●          | ●              | ●              |                      |                |     |
| 15 kW       |                       |    |    |          |              |                     |                            |          |          |          |                |          |                |                |     | ●          | ●              | ●              |                      |                |     |
| 22 kW       |                       |    |    |          |              |                     |                            |          |          |          |                |          |                |                |     | ●          | ●              | ●              | ●                    |                |     |
| 30 kW       |                       |    |    |          |              |                     |                            |          |          |          |                |          |                |                |     |            | ●              | ●              | ●                    | ●              |     |
| 37 kW       |                       |    |    |          |              |                     |                            |          |          |          |                |          |                |                |     |            |                |                |                      | ●              |     |
| 45 kW       |                       |    |    |          |              |                     |                            |          |          |          |                |          |                |                |     |            |                |                |                      | ●              |     |
| 55 kW       |                       |    |    |          |              |                     |                            |          |          |          |                |          |                |                |     |            |                |                |                      | ●              |     |
| 75 kW       |                       |    |    |          |              |                     |                            |          |          |          |                |          |                |                |     |            |                |                |                      | ●              |     |

※ 以上表格僅供參考·選用時仍須以『額定輸出扭矩』為依據

The table is for reference. The selected model shall be based on rated output torque.

# Reference Selection Table of Motor

## 馬達選用參考表

### 雙段 2-Stage

| 型號<br>Model | SB<br>SE<br>PB        | -  | -  | 62           | -                   | -                          | -  | 90        | 120            | 142            | 180            | -              | -        | -              | 220                  | 270            | 330                  |
|-------------|-----------------------|----|----|--------------|---------------------|----------------------------|----|-----------|----------------|----------------|----------------|----------------|----------|----------------|----------------------|----------------|----------------------|
|             | SR                    | -  | -  | -            | -                   | -                          | -  | 82<br>100 | 132            | -              | -              | -              | -        | -              | -                    | -              | -                    |
|             | SDH                   | -  | -  | 64           | -                   | -                          | 90 | -         | 110            | 140            | -              | 200            | -        | -              | -                    | 255            | -                    |
|             | SF                    | -  | -  | 62           | -                   | -                          | -  | 75        | 100            | 142            | -              | -              | 180      | -              | -                    | -              | -                    |
|             | FA                    | -  | -  | -            | 50                  | -                          | -  | 80        | 100            | 120            | -              | -              | 142      | -              | 180                  | -              | -                    |
|             | SN                    | -  | -  | -            | 50                  | 60                         | -  | 70<br>80  | -              | 115<br>160     | -              | -              | -        | -              | -                    | -              | -                    |
|             | SA                    | -  | -  | -            | 50                  | -                          | -  | 70        | 90             | 120<br>160     | -              | -              | -        | -              | -                    | -              | -                    |
|             | FB<br>FE              | -  | -  | 50           | -                   | -                          | -  | 70        | 90             | 120            | -              | -              | 145      | 180            | -                    | 220            | -                    |
|             | PE                    | 32 | 40 | 60           | 80                  | -                          | -  | -         | -              | -              | -              | -              | -        | -              | -                    | -              | -                    |
| 容量<br>Power | 入力孔徑<br>Input<br>Bore | 6  | 8  | 8<br>9<br>11 | 8<br>10<br>11<br>14 | 8<br>9<br>10<br>12.7<br>14 | 14 | 14<br>19  | 19<br>22<br>24 | 24<br>28<br>32 | 28<br>32<br>35 | 28<br>32<br>38 | 35<br>38 | 38<br>42<br>48 | 38<br>42<br>48<br>55 | 42<br>48<br>55 | 48<br>55<br>60<br>70 |
| 100 W       | ●                     | ●  | ●  | ●            | ●                   |                            |    |           |                |                |                |                |          |                |                      |                |                      |
| 200 W       |                       |    | ●  | ●            | ●                   |                            |    |           |                |                |                |                |          |                |                      |                |                      |
| 400 W       |                       |    |    | ●            | ●                   | ●                          | ●  |           |                |                |                |                |          |                |                      |                |                      |
| 750 W       |                       |    |    |              |                     |                            | ●  | ●         |                |                |                |                |          |                |                      |                |                      |
| 1 kW        |                       |    |    |              |                     |                            |    | ●         |                |                |                |                |          |                |                      |                |                      |
| 1.5 kW      |                       |    |    |              |                     |                            |    | ●         | ●              |                |                |                |          |                |                      |                |                      |
| 2.2 kW      |                       |    |    |              |                     |                            |    |           | ●              | ●              | ●              |                |          |                |                      |                |                      |
| 3.75 kW     |                       |    |    |              |                     |                            |    |           | ●              | ●              | ●              | ●              |          |                |                      |                |                      |
| 5.5 kW      |                       |    |    |              |                     |                            |    |           |                | ●              | ●              | ●              | ●        | ●              | ●                    |                |                      |
| 7.5 kW      |                       |    |    |              |                     |                            |    |           |                |                | ●              | ●              | ●        | ●              | ●                    |                |                      |
| 11 kW       |                       |    |    |              |                     |                            |    |           |                |                |                |                | ●        | ●              | ●                    |                |                      |
| 15 kW       |                       |    |    |              |                     |                            |    |           |                |                |                |                | ●        | ●              | ●                    |                |                      |
| 22 kW       |                       |    |    |              |                     |                            |    |           |                |                |                |                | ●        | ●              | ●                    | ●              |                      |
| 30 kW       |                       |    |    |              |                     |                            |    |           |                |                |                |                |          | ●              | ●                    | ●              |                      |

※ 以上表格僅供參考·選用時仍須以『額定輸出扭矩』為依據

The table is for reference. The selected model shall be based on rated output torque.

# Glossary

## 減速機專用名詞解釋

### 速比 $i$

輸出轉速與輸入轉速的比值·減速比 = 輸入轉速 ÷ 輸出轉速。

例如：減速機輸入端轉速  $n_1=3000\text{RPM}$ ·輸入扭矩  $T_1=20\text{Nm}$ ·減速比為 10·或稱  $i=10$ ·

輸出端轉速  $n_2 = \text{輸入轉速 } n_1 / i=300\text{RPM}$ ·

輸出端扭矩  $T_2 = \text{輸入扭矩 } T_1 \cdot i=200\text{Nm}$  (不考慮效率時)

輸出端慣量  $J_2 = \text{輸入端慣量 } J_1 \cdot i^2$

### Gear Ratio ( $i$ )

The gear ratio  $i$  indicates the factor by which the gearhead transforms the three relevant parameters of motion (speed, torque and mass moment of inertia). The factor is a result of the geometry of the gearing elements (Example:  $i = 10$ ).

$$\begin{array}{lcl}
 n_1 = 3000 \text{ rpm} & \xrightarrow{\quad :i \quad} & n_2 = 300 \text{ rpm} \\
 T_1 = 20 \text{ Nm} & \xrightarrow{\quad :i \quad} & T_2 = 200 \text{ Nm} \\
 J_2 = 10 \text{ kgm}^2 & \xrightarrow{\quad :i^2 \quad} & J_1 = 0.10 \text{ kgm}^2
 \end{array}$$

### 輸入轉速 $n_1$ [rpm]

減速機的驅動速度·如減速機與電機直接相連·則轉速值與電機轉速相同。

### Input Speed ( $n_1$ ) [rpm]

Input Speed is same as motor speed, if the motor direct connected gearbox.

### 輸出轉速 $n_2$ [rpm]

輸出轉速按照下列公式通過輸入轉速  $n_1$  和傳動比  $i$  計算出來。

### Output Speed ( $n_2$ ) [rpm]

The output speed is calculated by the formula related to input speed  $n_1$  and reduction ratio  $i$ .

$$n_2 = \frac{n_1}{i}$$

### 額定輸入轉速 $n_{1N}$ [rpm]

連續運轉模式 (S1)·輸入轉速須小於等於額定輸入轉速·本目錄中的額定輸入轉速是在環境溫度為  $20^\circ\text{C}$  的條件下測得的·環境溫度較高時·或齒箱表面溫度超過  $90^\circ\text{C}$  請降低輸入轉速  $n_1$ 。

### Nominal Input Speed ( $n_{1N}$ ) [rpm]

Input speed of gearbox shall be less than nominal input speed in the model of continuous operation (S1). Nominal input speed ( $n_{1N}$ ) is measured at environment temperature  $20^\circ\text{C}$ . If the environment temperature is higher or the temperature of gearbox surface exceeds  $90^\circ\text{C}$ , please lower input speed ( $n_1$ ).

# Glossary

## 減速機專用名詞解釋

### 最大輸入轉速 $n_{1B}$ [rpm]

適用間歇工作制模式 (S5)。本目錄中的最大輸入轉速是在環境溫度為 20° C 的條件下測得的。環境溫度較高時，或齒箱表面溫度超過 90° C 請降低輸入轉速  $n_1$ 。

### Max Input Speed ( $n_{1B}$ ) [rpm]

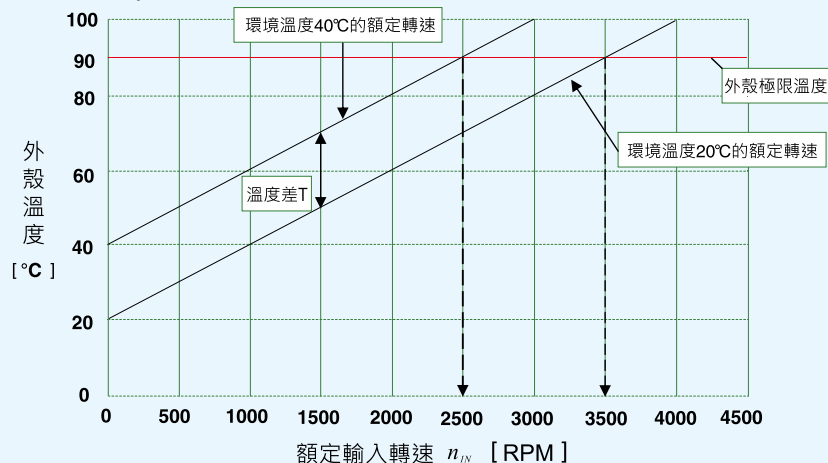
It is applied to cyclic operation (S5). Max. input speed is measured at environment temperature 20° C. If the environment temperature is higher or the temperature of gearbox surface exceeds 90° C, please lower input speed ( $n_1$ ).

### 轉速 $n$ [rpm]

減速機選型時必須要考慮的兩個轉速是最大輸入轉速和額定輸入轉速。為間歇工作制選用減速機時，要考慮不能超過最大輸入轉速  $n_{1B}$ 。為連續工作制選用減速機時，要考慮不能超出額定輸入轉速  $n_{1N}$ 。額定轉速受到減速機外殼溫度的限制，這個溫度不能超過 90° C。從下圖中可以看出，環境溫度越高時，減速機溫度也提前達到額定溫度。換句話說，在環境溫度高時必須降低轉速。

### Speed ( $n$ ) [rpm]

Two speeds are of relevance when selecting a gearbox: the maximum speed and the nominal speed at the input. The maximum permissible speed  $n_{1B}$  must not be exceeded because it serves as the basis at cyclic operation. The nominal speed  $n_{1N}$  must not be exceeded at continuous operation. The housing temperature limits the nominal speed, which must not exceed 90° C. The nominal input speed specified in the catalogue applies to an ambient temperature of 20° C. As can be seen in the diagram below, the temperature limit is reached more quickly in the presence of an elevated outside temperature. In other words, the nominal input speed must be reduced if the ambient temperature is high. The values applicable to your gearbox are available from LIMING on request.



背隙等級 P2, 背隙 <8ArcMin, 額定轉矩輸出

- 背隙愈小、溫升愈高、背隙 P0(<3ArcMin) 時平均上升 3~5 度。
- 背隙為 Ps 時 (<1ArcMin) 時平均上升 5~10 度。
- 背隙為 Ps、P0 時適用於 S5 間歇運轉模式，背隙 P2 可用於 S1 連續運轉模式。
- 背隙為 Ps、P0 時，入力轉速應在額定輸入轉速 (Rated Input Speed) 以內。
- 輸入轉速為最大輸入轉速 (Max Input Speed) 適用於 S5 間歇運轉模式。
- 特殊運用場合請與本公司連繫。

# Glossary

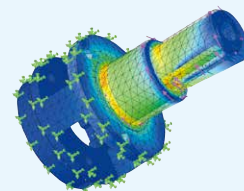
## 減速機專用名詞解釋

### 額定輸出扭矩 $T_{2N}$ [Nm]

指減速機長時間 (連續工作制) 可以加載的扭矩 (無磨損)。

### Nominal torque (Rated Output Torque) ( $T_{2N}$ ) [Nm]

The nominal torque  $T_{2N}$  is the torque continuously transmitted by a gearbox during a long period of time, i.e. in continuous operation (without wear).



CAE 分析 CAE Analysis

### 急停扭矩 (最大輸出扭矩) $T_{2NOT}$ [Nm]

指減速機輸出端所能加載的最大扭矩。這個扭矩可在減速機壽命期內加載 1000 次。超過 1000 次可能會造成內部零件的破壞。(備註: SERVOBOX 系列機型為  $T_{2NOT} = 3 \cdot T_{2B}$ ; 即 3 倍額定輸出扭矩)。

### Emergency Stop Torque (Max. Output Torque) ( $T_{2NOT}$ ) [Nm]

The emergency stop torque  $T_{2NOT}$  is the maximum permissible torque at the gearbox output end and must not be reached more than 1000 times during the service life of the gearbox. It must never be exceeded to prevent inside parts from damage. LIMING SERVOBOX  $T_{2NOT} = 3 \cdot T_{2B}$  (3 times of rated output torque)

### 加速扭矩 $T_{2B}$ [Nm]

指工作周期每小時少於 1000 次時允許短時間加載到輸出端的最大扭矩。工作周期每小時大於 1000 次時，須考慮衝擊因素。 $T_{2B}$  是周期工作制選型時的最大值，實際使用中的加速扭矩 ( $T_{2b}$ ) 必須小於  $T_{2B}$ 。否則會縮短減速機的壽命。

### Acceleration Torque ( $T_{2B}$ ) [Nm]

The acceleration torque  $T_{2B}$  is the maximum permissible torque that can briefly be transmitted at the gearbox output end under the duty cycle  $< 1000/h$  cycles. For  $> 1000/h$  cycles, the impact factor must be taken into account.  $T_{2B}$  is the max. parameter in cyclic operation. Application acceleration torque ( $T_{2b}$ ) shall be smaller than  $T_{2B}$ ; otherwise the gearbox service life will be reduced.

### 空載扭矩 $T_{012}$ [Nm]

指加載到減速機上以克服齒輪箱內的摩擦力的扭矩。

### No Load Running Torque ( $T_{012}$ ) [Nm]

The no load running torque is the torque which must be applied to a gearbox in order to overcome the internal friction; it is therefore considered lost torque.

### 逆轉扭矩 [Nm]

從出力軸端施力，開始旋轉時的最小扭矩，較大的型號或較高的減速比需要較大的扭矩來逆轉。

### Back Driving Torque [Nm]

The back driving torque is the minimum torque to start the rotation from the output side of gearbox. A larger size or a higher ratio gearbox requires greater back driving torque.



# Glossary

## 減速機專用名詞解釋

### 平均壽命 [h]

指減速機在週期運轉、額定負載下、額定輸入轉速時的工作時間。連續運轉使用時降低使用壽命 1/2。平均壽命，不是任何具體的減速機實際使用壽命的保證，它是一個平均「計算壽命」，衍生自產業公式（註），專有的計算和假設，和其他因素，例如實際測試結果或模擬軟件（CAE）。這些因素考慮到金屬材料、熱處理、齒輪和軸承的設計等。實際的使用壽命，根據客戶的應用及實際現場條件，可能與標稱的使用壽命有差異。

### Average Service Life [h]

Average service life is the working time of gearbox running at rated loading and nominal input speed at cyclic operation.

The service life is not a guarantee of the actual service life of the gear reducer. It is an average calculated life derived from industry formulas (\*), and other factors such as running test results, CAE (Computer Aided Engineering) software and so on. These factors take into consideration the metal composition, heat treatment, the design of the gearing and bearings, as well as calculated loads. Service life calculations are not based on actual field conditions or applications, and do not represent a guarantee with respect to expected life, performance, or other characteristics of gear reducer in any given application or use. The actual service life could vary substantially from the nominal service life.

註：產業公式參考以下組織所訂之標準：

\*: Industry formula Refer to the following standardization organization  
GB/T 3480-1997, ISO 6336-1~6336-3:1996

ISO: 國際標準組織 International Organization for Standardization

GB: 中華人民共和國國家標準 (國標 GB) Guobiao standards (Chinese National Standards)

DIN: 德國標準 Deutsches Institut für Normung : (German Institute for Standardization)

AGMA: 美國齒輪製造協會 American Gear Manufacturers Association

JIS: 日本標準協會 Japanese Standards Association

### 軸向力 $F_{2A}$ [N]

是指平行於軸心的一個力，它平行於輸出軸，它的作用點與輸出軸端有一定的軸向偏 ( $y_2$ ) 時，會形成一個額外的彎撓扭矩。軸向力超過樣本所示的額定值時，須用聯軸器來抵消這種彎撓力。

### Axial Force ( $F_{2A}$ ) [N]

The axial force  $F_{2A}$  acting on a gearbox runs parallel to its output shaft. The force runs perpendicular to its output shaft. It may be applied with axial offset via a lever arm  $y_2$  under certain circumstances, in which case it also generates a bending moment. If the axial force exceeds the permissible catalogue values, additional design features (e.g. couplings) must be implemented to absorb these forces.

# Glossary

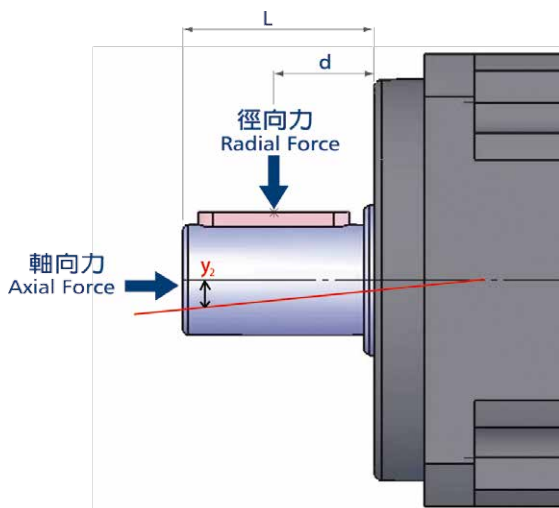
## 減速機專用名詞解釋

### 徑向力 $F_{2R}$ [N]

指垂直作用於軸向力的一個力。它的作用點與軸端有一定的軸向距離 (d)，這個點成一個槓桿點，橫向力形成一個彎撓扭矩。

### Radial Force ( $F_{2R}$ ) [N]

The radial force is the force acting at right angles to axial force. It acts perpendicular to the axial force and can assume an axial distance of (d) in relation to the shaft end, which acts as a lever arm. The radial force produces a bending moment.



從減速機出力軸連接鏈條齒輪等傳動機構時，會承受徑向力，徑向力。

OHL 的計算公式如下：
$$OHL = \frac{T \cdot s \cdot f \cdot p}{R}$$

$T$  = 機構端扭力  
 $s$  = 負荷系數  
 $f$  = 驅動方式的載重系數  
 $R$  = 皮帶輪或鏈輪半徑  
 $p$  = 位置系數：負載點小於等於  $d$  時  $p=1$   
 負載點大於  $d$  時  $p=1.5$

The gearbox will bear radial force while its output shaft connected with transmission machinery, such as chain pulley. The O.H.L. formula of radial force is as below :

$$OHL = \frac{T \cdot s \cdot f \cdot p}{R}$$

$T$  = Torque of transmission machinery  
 $s$  = Service factor  
 $f$  = Driven Coefficient  
 $R$  = Radius of pulley or chain wheel  
 $p$  = Position Factor: loading position less than  $d$ ,  $p=1$   
 loading position larger than  $d$ ,  $p=1.5$

### 軸伸徑向載荷、軸向載荷

選擇減速機的附加依據是輸出軸伸出端上的徑向載荷和軸向載荷。軸的強度和軸承的承載能力決定了許用軸伸的徑向載荷。產品樣本中給出的最大允許值是指在最不利的方向作用在軸伸出端中點 (即  $1/2L$  處) 的力。當作用力不在中點時，越接近軸肩，允許的徑向載荷就越大；相反，作用點離軸肩越遠，允許的徑向載荷就越小。

負荷系數表 (s) Service factor table

| 傳動機負荷等級<br>Loading classification | 每日使用時間 Running per Day |      |         |          |
|-----------------------------------|------------------------|------|---------|----------|
|                                   | 0.50 hr                | 2 hr | 8-10 hr | 10-24 hr |
| 均一負荷 Uniform                      | 0.80                   | 0.90 | 1.00    | 1.25     |
| 中衝擊 Medium shock                  | 0.90                   | 1.00 | 1.25    | 1.50     |
| 重衝擊 Heavy shock                   | 1.00                   | 1.25 | 1.50    | 1.75     |

驅動方式載重系數  
Driven Coefficient (f)

| 驅動方式 Driving mode       | (f)  |
|-------------------------|------|
| 鏈條、齒型皮帶<br>Chain pulley | 1.00 |
| 齒輪 Gear                 | 1.25 |
| V 型皮帶 V-belt            | 1.50 |
| 平皮帶 Flat-belt           | 2.50 |

- 正轉、逆轉或起動、停止，1 小時內達 10 次以上者，請將右表的值乘以 1.2。  
 CW/CCW operation or start-up/stop reaches 10 times or more within 1 hour, please multiply by 1.2.

# Glossary

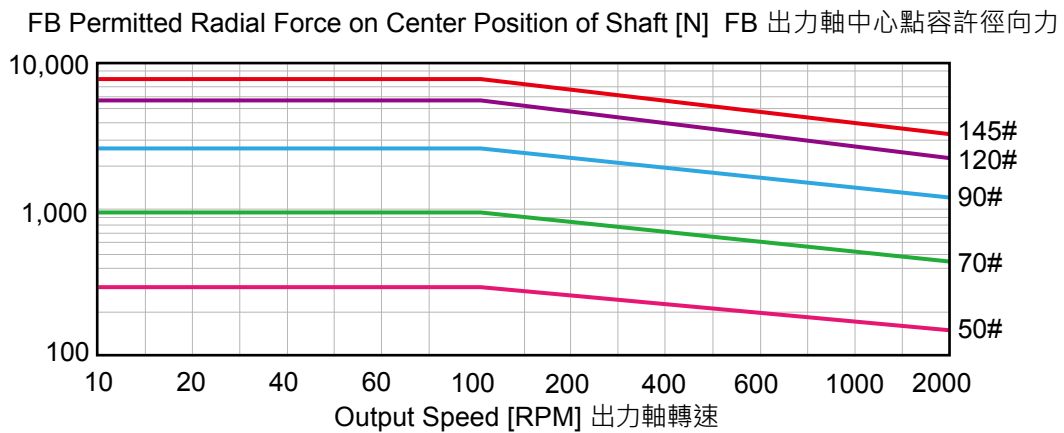
## 減速機專用名詞解釋

### 容許徑向力 $F_{2rB}$ [N]

當輸出轉速為 100RPM · 徑向作用力在出力軸 1/2 處時所容許之最大力 · 轉速增加時遞減。

### Permitted Radial Force ( $F_{2rB}$ ) [N]

The maximum allowed radial force in the 1/2 position of output shaft in the condition of output speed 100 RPM. This value is decreasing when the running speed is increasing.



### 容許軸向力 $F_{2aB}$ [N]

當輸出轉速為 100RPM 時 · 最大容許之軸向作用力。

### Permitted Axial Force ( $F_{2aB}$ ) [N]

The maximum allowed axial force in the condition of output speed 100 RPM.

### 傳動效率 $\eta$ [%]

由於摩擦引起的損失總是使有效率小於 1 · 也就是少於 100% · 樣本上的效率是齒輪箱在額定負載情況下 · 減速機的傳輸效率。

### Transmission efficiency $\eta$ [%]

Efficiency ( $\eta$ ) is the ratio of output power to input power. Power lost through friction reduces efficiency to less than 1 or 100%.

$$\eta = \frac{P_{out}}{P_{in}} = \frac{P_{in} - P_{lost}}{P_{in}}$$

# Glossary

## 減速機專用名詞解釋

### 噪音 [dB]

樣本上的數值是輸入轉速為 3000rpm·減速比  $i=10$ ·或  $i=100$ (2 段時)·不帶負載·離減速機一米距離時測量的。一般而言電機轉速越高時·噪音越高;負載越大時·噪音越大。

### Noise Level [dB]

The operating noise specified in our catalog relates to gearboxes with the ratio  $i=10$  or  $i=100$  (2 stage) at input speed 3,000 rpm and no loading running. Noise level is measured at 1M distance from the gearbox. Higher speed results to higher noise level; higher loading results to higher noise level.

### 轉動慣量 $J$ [Kg.cm<sup>2</sup>]

表示一個物體盡力保持自己轉動狀態(或靜止或轉動)特性的一個值。樣本中的值均指輸入端。

### Mass moment of inertia ( $J$ ) [Kg.cm<sup>2</sup>]

The mass moment of inertia  $J$  is a measurement of the effort applied by an object to maintain its momentary condition (at rest or moving).

### 慣量比 $\lambda$

是指負載慣量與傳動系統慣量(電機加上減速機)之間的比值。這個比值決定了系統的可控性。 $\lambda$  值越大·也就是各轉動慣量差值越大·高動態的動作過程就越難精確控制·建議盡可能將入值控制在  $< 5$ 。減速機可以將負載慣量降低  $1/i^2$ 。

### Rate of mass moment of inertia ( $\lambda$ )

The ratio of mass moment of inertia  $\lambda$  is the ratio of external inertia (application side) to internal inertia (motor and gearbox). It is an important parameter determining the controllability of an application. Accurate control of dynamic processes becomes more difficult with differing mass moments of inertia and as  $\lambda$  becomes greater. LIMING recommends that a guideline value of  $\lambda < 5$  is maintained. A gearbox reduces the external mass moment of inertia by a factor of  $1/i^2$ .

Simple applications  $\leq 10$

Dynamic applications  $\leq 5$

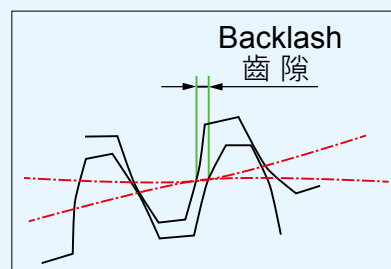
Highly dynamic applications  $\leq 1$

### 回程間隙 $j_t$ [arcmin]

指減速機輸出軸與輸入端的最大偏差角·測量時先將齒輪輸入端固定住·然後在輸出軸加載額定扭矩的 2% 扭矩·減速機輸出端有一個微小的角位移·此角位移即為回程間隙。單位是"弧分"·即一度的六十分之一度。

### Torsional Backlash ( $j_t$ ) [arcmin]

Torsional backlash  $j_t$  is the maximum angle of torsion of the output shaft in relation to the input. Torsional backlash is measured with the input shaft locked. The output is then loaded with a defined test torque (2% rated output torque) in order to overcome the internal gearhead friction. The main factor affecting torsional backlash is the face clearance between the gear teeth.



# Glossary

## 減速機專用名詞解釋

### 弧分 [Arcmin]

一個圓有 360 度，1 度可分為 60 弧分，即一個圓有 21600 弧分，如回程間隙標為 1 arcmin 時，意思是說減速機轉一圈，輸出端的角偏差 1 / 60°。

在實際應用中，這個角偏差與軸直徑及轉盤大小有關。

例如：輸出端轉盤半徑為 500mm 時，齒輪箱精度為  $j_t = 3'$  時，減速機轉一圈的偏差為  $b = 0.44\text{mm}$ 。

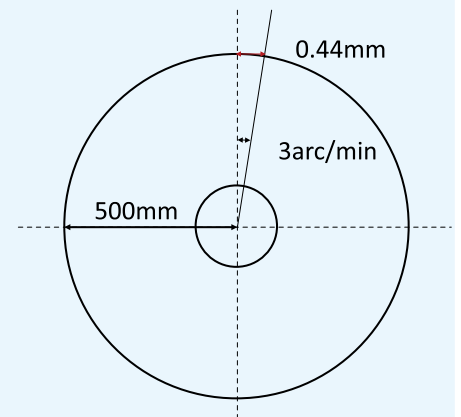
$$b = \frac{2 \cdot \pi \cdot r \cdot j_t}{21600}$$

### Angular minute [Arcmin]

A degree is subdivided into 60 angular minutes (= 60 arcmin = 60'). In other words, if the torsional backlash is specified as 1 arcmin, for example, the output can be turned 1/60°. The repercussions for the actual application are determined by the arc length.

EX: A pinion with a radius  $r = 500 \text{ mm}$  on a gearhead with standard torsional backlash  $j_t = 3'$  can be turned  $b = 0.44 \text{ mm}$ .

$$b = \frac{2 \cdot \pi \cdot r \cdot j_t}{21600}$$



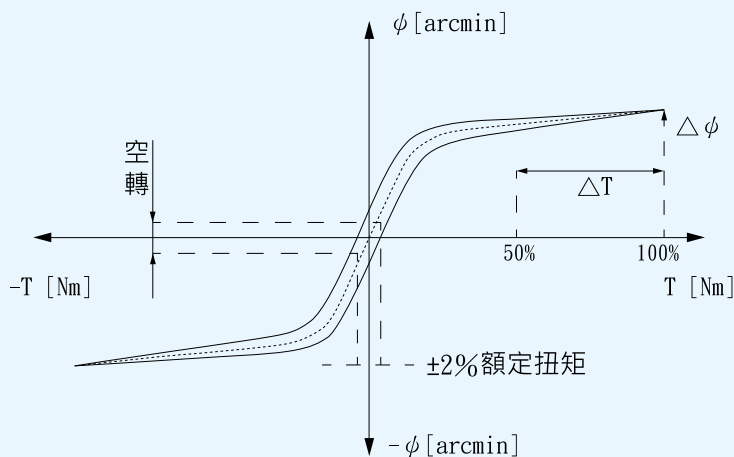
### 遲滯曲線

遲滯檢測是為了得出減速機的扭轉剛度，通過檢測得到遲滯曲線。檢測時，先將減速機輸入端固定住，然後在輸出端的兩個旋轉方向分別持續地加載到  $T_{2B}$  最大加速扭矩，繼而逐步卸載，用儀器記錄下扭矩的仿差角，得到的曲線是一條閉合曲線，從中可以計算出減速機的回程間隙 ( $j_t$ ) 和扭轉剛度 ( $C_{t21}$ )。

### Hysteresis Curve

The hysteresis is measured to determine the torsional rigidity of a gearbox. The result of this measurement is known as the hysteresis curve. If the input shaft is locked, the gearhead is loaded with a torque that increases continuously up to  $T_{2B}$  and is then relieved at the output in both directions. The torsional angle is plotted against the torque. This yields a closed curve from which the torsional backlash and torsional rigidity can be calculated.

$$C_{t21} = \frac{\Delta T}{\Delta \phi}$$





# Glossary

## 減速機專用名詞解釋

### 扭轉剛度 $C_{t21}$ [Nm/Arcmin]

由加載力距和所產生的扭轉角之間的比率來定義。
$$C_{t21} = \frac{\Delta T}{\Delta \phi}$$

它說明需要用多大的扭矩才能把輸出軸轉動一弧分。扭轉剛度是從遲滯曲線得出的。在曲線圖上只需要關注  $T_{2B}$  的 50% 和 100% 這個範圍。這個範圍內，曲線可看成是一條直線。

### Torsional rigidity ( $C_{t21}$ ) [Nm/Arcmin]

Torsional rigidity is defined as the quotient of applied torque and generated torsion angle.

$$C_{t21} = \frac{\Delta T}{\Delta \phi}$$

It consequently shows the torque required to turn the output shaft by one angular minute. The torsional rigidity can be determined from the hysteresis curve. Only the area between 50% and 100% of  $T_{2B}$  is considered because this area of the curve profile can be considered linear.

### 運轉模式

選擇減速機時必需考慮運轉的模式。(連續運轉 S1·週期運轉模式 S5)

### Operating modes

(continuous operation S1 and cyclic operation S5)

When selecting a gearbox, it is important to consider whether the motion profile is characterized by frequent acceleration and deceleration phases in cyclic operation (S5) as well as pauses, or whether it is designed for continuous operation (S1), i.e. with long phases of constant motion.

### 連續運轉模式 (S1)

連續運轉模式有工作週期所定義。假如工作週期 ED 大於 60%·或連續運轉時間大於 20 分鐘·則為連續運轉模式 (S1)。

### Continuous operation (S1)

Continuous operation is defined by the duty cycle. If the duty cycle is greater than 60% or longer than 20 minutes, this qualifies as continuous operation.

### 週期運轉模式 (S5)

週期運轉模式有工作週期所定義。假如工作週期 ED 小於 60%·或連續運轉時間小於 20 分鐘·則為週期運轉模式 (S5)。

### Cyclic operation (S5)

Cyclic operation is defined by the duty cycle. If the duty cycle is less than 60% and shorter than 20 minutes, it qualified as cyclic operation.

# Glossary

## 減速機專用名詞解釋

### 工作週期 (ED)

$$t_{\text{work}} = t_{\text{加速}} + t_{\text{勻速}} + t_{\text{減速}} = t_a + t_c + t_d$$

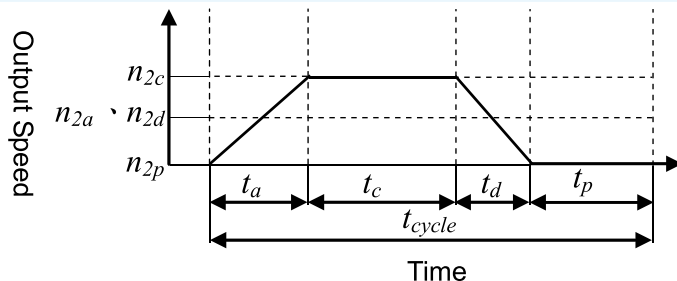
$$t_{\text{cycle}} = t_{\text{加速}} + t_{\text{勻速}} + t_{\text{減速}} + t_{\text{暫停}} = t_a + t_c + t_d + t_p$$

$$ED[\%] = t_{\text{work}} / t_{\text{cycle}} \times 100\%$$

$$ED[\text{min}] = t_{\text{work}}$$

### Duty cycle (ED)

The duty cycle ED is determined by one cycle. The times for acceleration ( $t_a$ ), constant travel if applicable ( $t_c$ ) and deceleration ( $t_d$ ) combined yield the duty cycle in minutes. The duty cycle is expressed as a percentage with inclusion of the pause time  $t_p$ .



$$ED = \frac{t_a + t_c + t_d}{t_{\text{cycle}}}, t_{\text{work}} = t_a + t_c + t_d$$

$t_a$  Acceleration ,  $t_c$  Constant ,

$t_d$  Deceleration ,  $t_p$  Pause

### 段數 (級數)

太陽輪及行星輪構成獨立的減速輪系·如減速機內只一個輪系·稱 1 段 (級)·SERVOBOX 系列行星減速機·1 段 (級) 減速比從 1/3~1/10·2 段 (級) 減速比從 1/15~1/100·為得到較大減速比·須多段 (級) 傳動·透過模組化設計·可結合多個輪系·減速比可達 100~100000 以上。

### Stage

The sun gear and planetary gear forms an independent speed reduction gear system. If there is only one gear system in the gear reducer, it is defined as one stage transmission. In order to achieve higher speed reduction ratio, multiple stages transmission is required. LIMING's standard gear reducers are classified into one stage and two-stage transmission. Speed reduction ratio range is from 3 to 100. The modular construction combined with multiple stages transmission allows speed reduction ratio 100~100,000 and over.



# Glossary

## 減速機專用名詞解釋

### 防護等級 (IP)

本公司產品採用密封式全油封設計，確保潤滑油脂不洩漏 (IP65)。

防護等級 (IP) 是由 IEC 60529 標準所制訂，其二位數，分別代表固體顆粒與液體的侵入防護等級。

### Degree of protection (IP)

The protective class IP65 sealed design avoids leakage problem.

The various degrees of protection are defined in IEC 60529 "Degrees of protection offered by enclosure (IP code)". The IP degree of protection (IP stands for International Protection) is represented by two digits. The first digit indicates the protection against the ingress of impurities and the second the protection against the ingress of water.



● 金屬工業研究發展中心 IP65 測試報告

IP65 Test Report by Metal Industries & Development Center.

| 固體物件防護<br>Protection against contact and<br>against solid foreign objects. |  | 液體防護<br>Protection against ingress of water. |   |
|--|--|--|---|
| 第一位數<br>1st numeral  | 說明<br>Description  | 第二位數<br>2nd numeral                          | 說明<br>Description   |
| 0  | 無防護<br>Non-protected   | 0  | 無防護<br>Non-protected  |
| 1  | 可阻擋大於 50mm 的物體<br>Protected against solid foreign objects of >50mm $\varnothing$     | 1  | 可阻擋垂直落下的液體<br>Protected against vertically falling water drops  |
| 2  | 可阻擋大於 12.5mm 的物體<br>Protected against solid foreign objects of >12.5mm $\varnothing$ | 2  | 可阻擋垂直到 15 度角的噴灑液體<br>Protected against vertically falling water drops when enclosure tilted up to 15° |
| 3  | 可阻擋大於 2.5mm 的物體<br>Protected against solid foreign objects of >2.5mm $\varnothing$   | 3  | 可阻擋垂直到 60 度角的噴灑液體<br>Protected against spraying water when enclosure tilted up to 60°                 |
| 4  | 可阻擋大於 1mm 的物體<br>Protected against solid foreign objects of >1.0mm $\varnothing$     | 4  | 可阻擋到所有角度的噴灑液體<br>Protected against splashing water  |
| 5  | 防塵 (無可構成損壞的堆積)<br>Protected against ingress of dust (dust-protected)                 | 5  | 可阻擋低壓水柱<br>Protected against water jets   |
| 6  | 無塵<br>Protected against ingress of dust by underpressure (dust-tight)                | 6  | 可阻擋高壓水柱<br>Protected against powerful water jets  |
|  |  | 7  | 防護短時進水<br>Protected against the effects of temporary immersion in water                               |
|  |  | 8  | 防護長期進水<br>Protected against the effects of continuous immersion in water                              |

# Glossary

## 減速機專用名詞解釋

### 工作溫度

是指減速機在連續工作和週期工作狀態下所能允許的溫度。目前 SERVOBOX 系列的減速機能在  $-25^{\circ}\text{C} \sim +90^{\circ}\text{C}$  度環境下工作。考慮工作溫升，環境溫度應在  $-25^{\circ}\text{C} \sim +45^{\circ}\text{C}$  之間。

### Operating Temperature

The Operating Temperature indicates the allowable temperature of gearbox at continuous and cyclic operation. SERVOBOX series work in  $-25^{\circ}\text{C} \sim +90^{\circ}\text{C}$ .

Consider working temperature, ambient temperature should be in  $-25^{\circ}\text{C} \sim +45^{\circ}\text{C}$ .

### 潤滑

行星減速機在整個使用期間無需更換潤滑油。本公司標準品使用全合成潤滑脂 (0 號)，可視情況選用其他潤滑油。

### Lubrication

It's no essential to replace lubricant during the service life. Lubrication of standard products uses synthetic grease (0#). It depends on the application, there are other grease available.

### 筒夾式鎖緊機構

利用摩擦力連接馬達軸心及減速機，並經動平衡分析，以確保在高輸入轉速下結合面的同心度和零背隙的動力傳遞。

### Collet Clamping

The Collet Clamping ensure a frictional between motor shaft and gearbox. It has passed dynamical balance analysis to assure concentricity and no backlash at high input speed operation.

### 軸套

當馬達軸徑比減速機入力孔小時，需要一個軸套去補償尺寸才能夾緊。

### Bushing

If the motor shaft diameter is smaller than the input bore of gearbox, a bushing is used to compensate the difference in diameter.

# Glossary

## 減速機專用名詞解釋

### 連接版設計

適合各種廠牌伺服馬達及其它馬達安裝，安裝最容易。本型錄只列出一般尺寸，需要其它尺寸時，請上本公司網站查詢。

### Design of connecting plate

Design of connecting plate is suitable for various servo motors or others, and also easy for installation. General dimension is shown on the catalogue. Please find other dimensions from our website.



馬達品牌 Motor Brand: MITSUBISHI  
馬達型號 Motor Model: HC-SF553

| 參數值 Value         | 單位 Unit                |
|-------------------|------------------------|
| 輸出功率 Output Power | 0.5 Kw                 |
| 額定力矩 Rated Torque | 1.59 NM                |
| 最大力矩 Max. Torque  | 4.77 NM                |
| 額定轉速 Rated Speed  | 3000 RPM               |
| 最大轉速 Max. Speed   | 3000 RPM               |
| 轉動慣量 Inertia      | 6.6 kg/cm <sup>2</sup> |
| 軸徑 Shaft Dia.     | 24 mm                  |
| 外径 Diameter       | 130 mm                 |
| 凸緣                | 110 mm                 |
| PCD               | 145 mm                 |

1-1. 輸入減速機之減速比 Input GEAR Ratio: 10  
1-2. 輸入減速機之 TYPE: SB



STEP1 STEP2 STEP3 STEP4

1-1. 輸入減速機之減速比 Input GEAR Ratio: 3  
1-2. 輸入伺服馬達軸徑 Motor Shaft D/A, A: 19  
1. 下一步 Next Step



伺服馬達 SERVO MOTOR

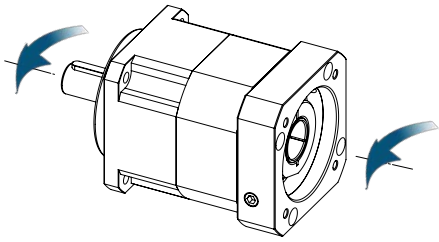




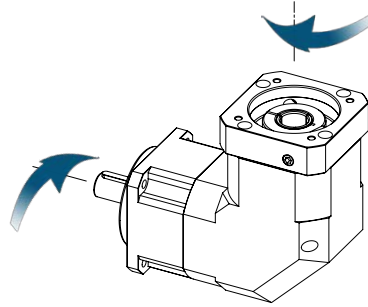
# Rotation Directions

旋轉方向

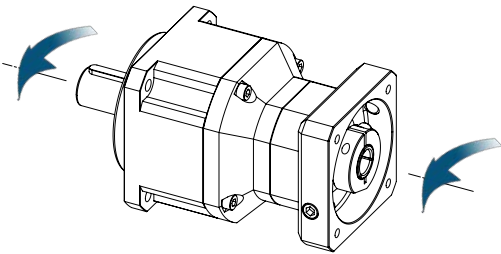
單段行星減速機  
1-Stage Planetary Reducer



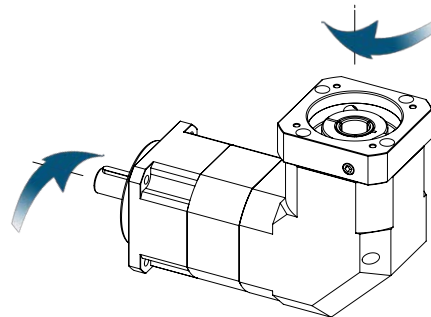
單段傘齒行星減速機  
1-Stage Spiral Bevel Gear & Planetary Reducer



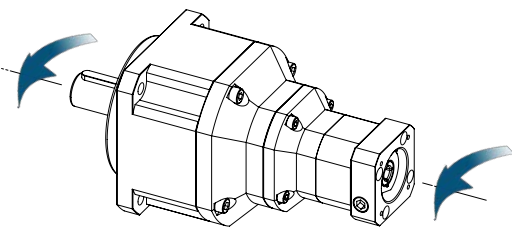
雙段行星減速機  
2-Stage Planetary Reducer



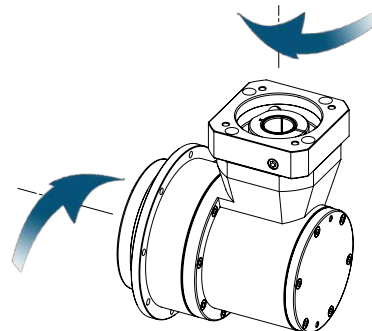
雙段傘齒行星減速機  
2-Stage Spiral Bevel Gear & Planetary Reducer

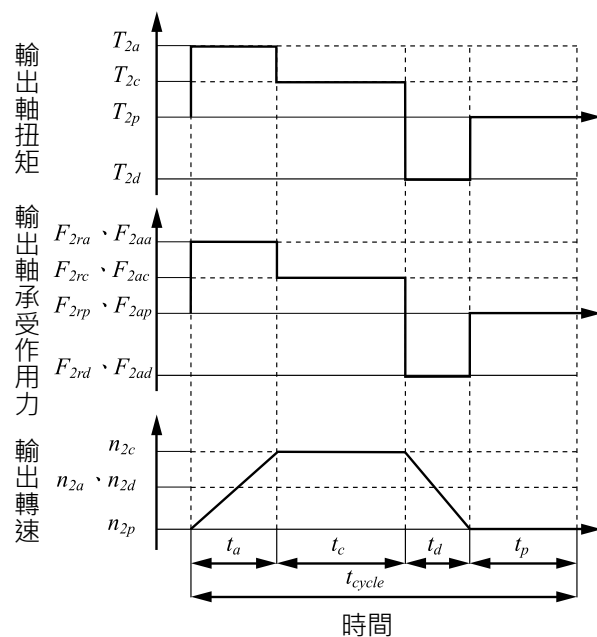
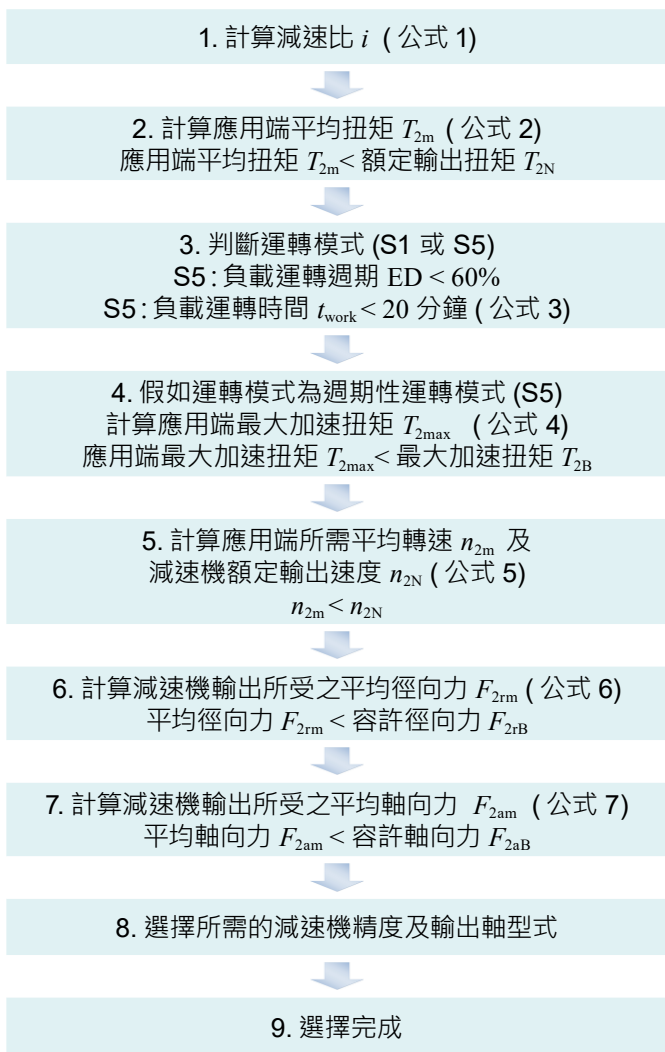


三段行星減速機  
3-Stage Planetary Reducer



單段戟齒輪行星減速機  
1-Stage Hypoid Gear & Planetary Reducer





公式 2. 
$$T_{2m} = \sqrt[3]{\frac{n_{2a} \cdot t_a \cdot T_{2a}^3 + n_{2c} \cdot t_c \cdot T_{2c}^3 + n_{2d} \cdot t_d \cdot T_{2d}^3}{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d}}$$

公式 3. 
$$ED = \frac{t_a + t_c + t_d}{t_{cycle}}, t_{work} = t_a + t_c + t_d$$
  
 $t_a$ : 加速,  $t_c$ : 等速,  $t_d$ : 減速,  $t_p$ : 停止

公式 4. 
$$T_{2max} = T_{mB} \cdot i \cdot k_s \cdot \eta$$

$T_{mB}$ : 馬達最大輸出扭矩,  $\eta$ : 減速機運轉效率

$K_s$  負載係數

| $K_s$ | 週期次數 / 小時     |
|-------|---------------|
| 1.0   | 0 ~ 1,000     |
| 1.1   | 1,000 ~ 1,500 |
| 1.3   | 1,500 ~ 2,000 |
| 1.6   | 2,000 ~ 3,000 |
| 1.8   | 3,000 ~ 5,000 |

公式 5. 
$$n_{2a} = n_{2d} = \frac{n_{2c}}{2}$$

$$n_{2m} = \frac{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d}{t_a + t_c + t_d}$$

$$n_{2N} = \frac{n_{1N}}{i}$$

公式 6. 
$$F_{2rm} = \sqrt[3]{\frac{n_{2a} \cdot t_a \cdot F_{2ra}^3 + n_{2c} \cdot t_c \cdot F_{2rc}^3 + n_{2d} \cdot t_d \cdot F_{2rd}^3}{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d}}$$

公式 7. 
$$F_{2am} = \sqrt[3]{\frac{n_{2a} \cdot t_a \cdot F_{2aa}^3 + n_{2c} \cdot t_c \cdot F_{2ac}^3 + n_{2d} \cdot t_d \cdot F_{2ad}^3}{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d}}$$

### S5 週期運轉之建議事項

一般的應用慣量須符合以下公式：

$$\frac{J_L}{i^2} \leq 4 \cdot J_m$$

最適當的應用慣量須符合以下公式：

$$\frac{J_L}{i^2} \cong J_m$$

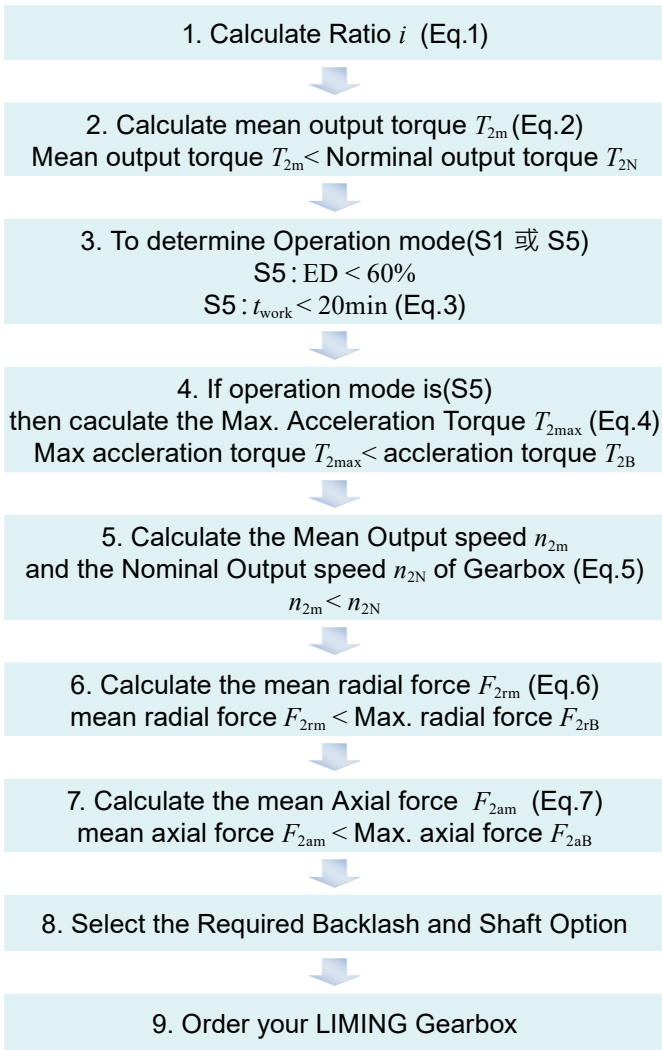
$J_L$  負載慣量 ·  $J_m$  馬達慣量

$T_{2m}$ : 請參考目錄「額定輸出扭矩」

$F_{2rB}$ : 請參考目錄「容許徑向力」

公式 1. 
$$i \cong \frac{n_m}{n_{work}}$$

$n_m$ : 馬達輸出速度 ·  $n_{work}$ : 實際應用速度



Recommended (for S5 Cyclic Operation)

The general design is given for

$$\frac{J_L}{i^2} \leq 4 \cdot J_m$$

The optimal design is given for

$$\frac{J_L}{i^2} \cong J_m$$

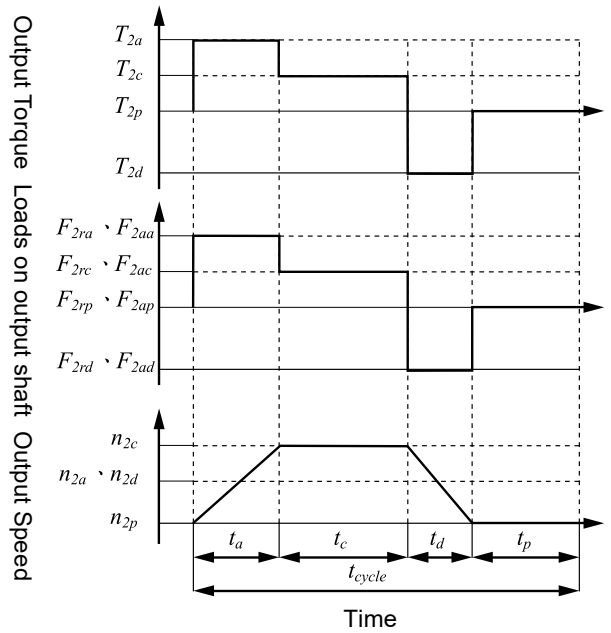
Where  $J_L$  is Load Inertia and  $J_m$  is Motor Inertia.

$T_{2n}$  please reference catalog 「Rated Output Torque」

$F_{2rB}$  please reference catalog 「Max. Radial Force」

$$\text{Eq.1 } i \cong \frac{n_m}{n_{work}}$$

$n_m$  is output speed of the motor,  $n_{work}$  is working speed



$$\text{Eq.2 } T_{2m} = \sqrt[3]{\frac{n_{2a} \cdot t_a \cdot T_{2a}^3 + n_{2c} \cdot t_c \cdot T_{2c}^3 + n_{2d} \cdot t_d \cdot T_{2d}^3}{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d}}$$

$$\text{Eq.3 } ED = \frac{t_a + t_c + t_d}{t_{cycle}}, t_{work} = t_a + t_c + t_d$$

$t_a$  is the time for acceleration,  $t_c$  is constant travel,  $t_d$  is the time for deceleration and  $t_p$  is the time for pause.

$$\text{Eq.4 } T_{2max} = T_{mB} \cdot i \cdot k_s \cdot \eta$$

$T_{mB}$  is the Max. output torque of the motor and  $\eta$  is the efficiency of the gearbox

| $K_s$ service factor |                    |
|----------------------|--------------------|
| $K_s$                | No. of Cycles / hr |
| 1.0                  | 0 ~ 1,000          |
| 1.1                  | 1,000 ~ 1,500      |
| 1.3                  | 1,500 ~ 2,000      |
| 1.6                  | 2,000 ~ 3,000      |
| 1.8                  | 3,000 ~ 5,000      |

$$\text{Eq.5 } n_{2a} = n_{2d} = \frac{n_{2c}}{2}$$

$$n_{2m} = \frac{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d}{t_a + t_c + t_d}$$

$$n_{2N} = \frac{n_{1N}}{i}$$

$$\text{Eq.6 } F_{2rm} = \sqrt[3]{\frac{n_{2a} \cdot t_a \cdot F_{2ra}^3 + n_{2c} \cdot t_c \cdot F_{2rc}^3 + n_{2d} \cdot t_d \cdot F_{2rd}^3}{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d}}$$

$$\text{Eq.7 } F_{2am} = \sqrt[3]{\frac{n_{2a} \cdot t_a \cdot F_{2aa}^3 + n_{2c} \cdot t_c \cdot F_{2ac}^3 + n_{2d} \cdot t_d \cdot F_{2ad}^3}{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d}}$$

# Installation & Critical Applications

## 安裝與操作限制

### 操作限制

如果須使用其它的安裝方式或者特殊的輸入轉數時，請與本公司連絡。

此外，當使用者遇到下面所列的任何情況時也必須跟原廠技術人員聯繫：

- 使用條件超出額定轉速時。
- 使用條件超出額定扭矩時。
- 當減速機出現故障時有可能導致使用者受傷的情況時。
- 將安裝於旋轉慣性特別大的設備上時。
- 將用於起重的捲揚機上 ( 需要逆止特性 ) 時。
- 當減速機外殼會承受高度動態的負載時。
- 當工作環境超過攝氏 -25 度到 +45 度的範圍內時。
- 將安裝於有腐蝕性化學品的環境中。
- 將安裝在鹽份濕度較高的環境中。
- 輻射性高的環境中。
- 安裝於氣壓異於正常大氣壓力的環境中。

避免把減速機 ( 整臺或部分 ) 浸在水裡或其它液體中。

實際使用時的最高負載扭矩 (\*) 絕對不能超過性能表上的額定扭矩的三倍。

(\*) 所述的參數是指能承受瞬間短暫的過載，這種情況常出現在滿載啟動、剎車、震動或其它動態操作環境中。

### Critical applications

For other mounting positions and/or particular input speeds, please contact our technical person.

It is also necessary to take due consideration of and carefully assess the following applications by calling our Technical Service:

- The maximum input speed exceeds nominal input speed.
- The maximum output torque exceeds rated output torque.
- Use in services that could be hazardous for people if the reduction unit fails.
- Applications with especially high inertia.
- Use as a lifting winch.
- Applications with high dynamic strain on the case of the reduction unit.
- Ambient temperature under -25° C or over 45° C.
- Use in chemically aggressive environments.
- Use in a salty environment.
- Use in radioactive environments.
- Use in environments pressures other than atmospheric pressure.

Avoid applications where even partial immersion of the reduction unit is required.

The maximum torque (\*) that the gear reducer can support must not exceed three times the nominal torque .

(\*) intended for momentary overloads due to starting at full load, braking, shocks or other causes, particularly those that are dynamic.

# Installation & Critical Applications

## 安裝與操作限制

### 安裝注意事項

當安裝減速機時，請注意下列的事項：

- 減速機必須牢固地安裝在機器上，避免有任何鬆動或振動的情況。
- 將減速機安裝到機器上之前，必須再次確認減速機的輸出軸旋轉方向是否正確。
- 如果減速機在使用前已經放置了一段時間（4 到 6 個月），而油封又沒有浸在潤滑油中或給予應有之保護措施，建議應該把油封更換，因為有可能油封已經黏在軸上，甚至可能失去彈性而不能發揮正常之功能。
- 請盡量避免把減速機放置及安裝在強烈陽光之下，或者在極端惡劣的環境之下，如有可能盡量給予減速機防護措施，以增加使用壽命。
- 盡量為馬達的散熱風扇提供足夠的流通空氣，以免影響散熱的效率。
- 減速機的標準工作環境是從攝氏 -25 度到 +45 度，如超過這範圍時，請與原廠技術人員聯繫。
- 各種零件（滑輪、齒輪、聯軸器、軸等）必須安裝在實心或空心軸上，該用專用的螺紋孔或其它工具以確保正確安裝而不會損壞軸承或減速器外端的所有零件。並以潤滑油來潤滑接觸表面避免卡死或氧化。
- 啟動時必須逐漸啟動，不要立即把負載提到最高，該逐步增加。
- 如有任何在減速機旁的零件、物體或材料會因漏出的油而遭損壞時，應安裝特別的保護或遮擋。

### Installation

To install the reduction unit, it is necessary to note the following recommendations:

- The mounting on the machine must be stable to avoid any vibration.
- Check the correct direction of rotation of the reduction unit output shaft before fitting the unit to the machine.
- In the case of particularly lengthy periods of storage (4/6 months), if the oil seal is not immersed in the lubricant inside the unit, it is recommended to change it since the rubber could stick to the shaft or may even have lost the elasticity it needs to function properly.
- Whenever possible, protect the reduction unit against solar radiation and bad weather.
- Ensure the motor cools correctly by assuring good passage of air from the fan side.
- In the case of ambient temperatures  $< -25^{\circ}\text{C}$  or  $> +45^{\circ}\text{C}$  call the Technical Services.
- The various parts (pulleys, gear wheels, couplings, shafts, etc.) must be mounted on the solid or hollow shafts using special threaded holes or other systems that anyhow ensure correct operation without risking damage to the bearings or external parts of the units. Lubricate the surfaces in contact to avoid seizure or oxidation.
- Starting must take place gradually, without immediately applying the maximum load.
- When there are parts, objects or materials under the motor drive that can be damaged by even limited spillage of oil, special protection should be fitted.

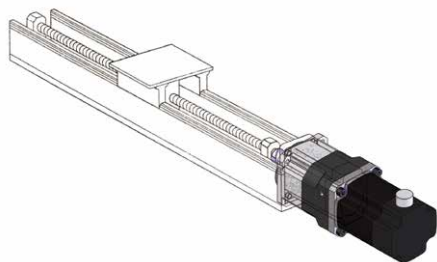


# Applications

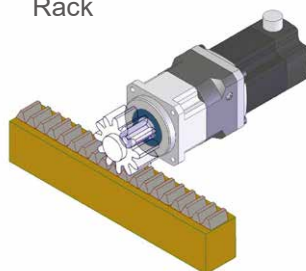
## 減速機應用範例

### ○ 線性動作機構 Linear Action

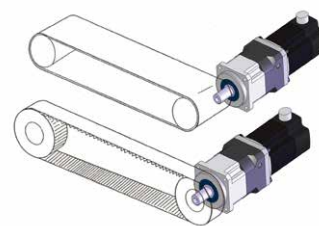
- 滾珠螺桿傳動  
Ball Screw



- 齒條傳動  
Rack

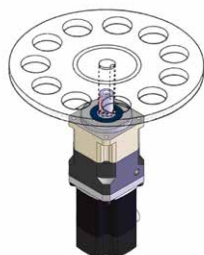


- 滾輪 / 滾筒 / 皮帶  
Roller / Belt

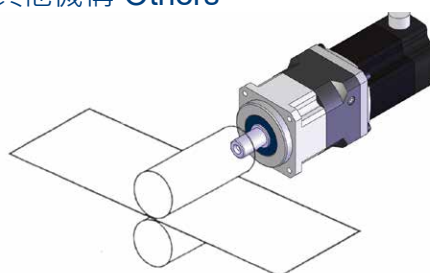


### ○ 回轉盤機構 Rotary Action

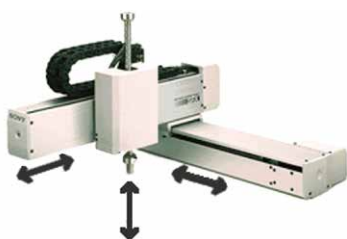
- 分度盤  
Index



### ○ 其他機構 Others



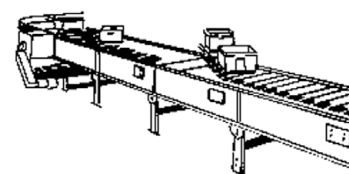
- 機器手臂  
Robot



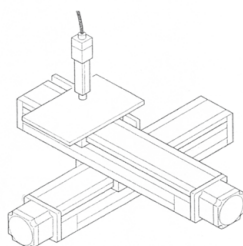
- 印刷機  
Printing Machine



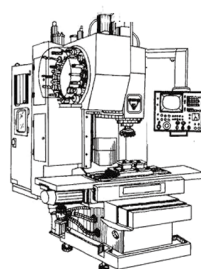
- 輸送機  
Conveyor



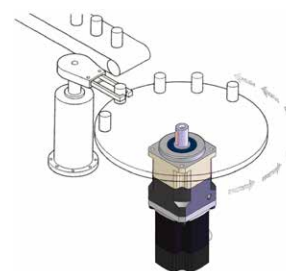
- 工作台  
Working Table



- CNC 主軸  
CNC Spindle

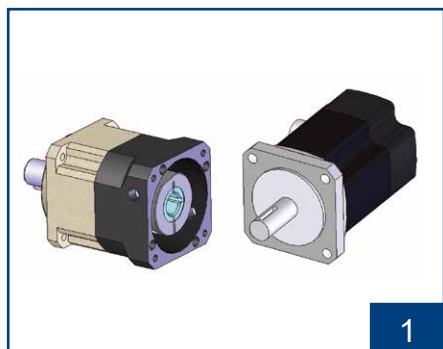


- 分割器  
Index

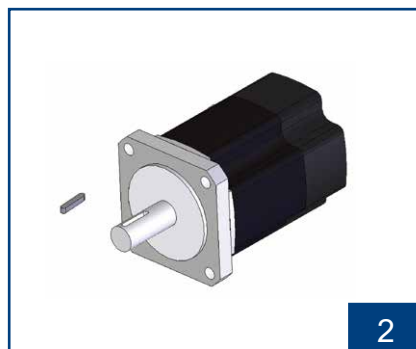


## Planetary Gearbox and Motor Mounting Instructions

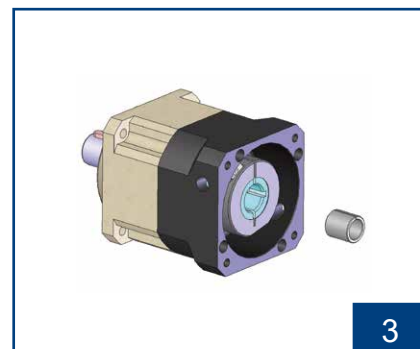
### 行星減速機與馬達安裝指南



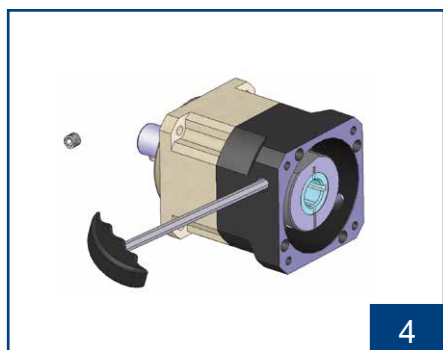
核對馬達型號與減速機規格是否正確。並將配合面擦拭乾淨。  
Confirm the motor, and gearbox size. Clean up the mounting surface.



如馬達軸徑在  $\varnothing 35$  以下，請將馬達軸上的鍵拿掉。  
Remove the motor key if the diameter of motor shaft is under  $\varnothing 35$ .



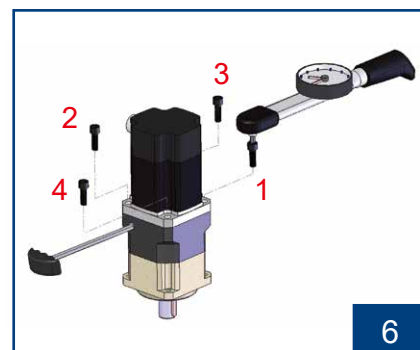
檢查馬達出力軸尺寸，如需軸套，請先裝進入力孔內。  
Check motor shaft size and insert bushing into input bore if necessary.



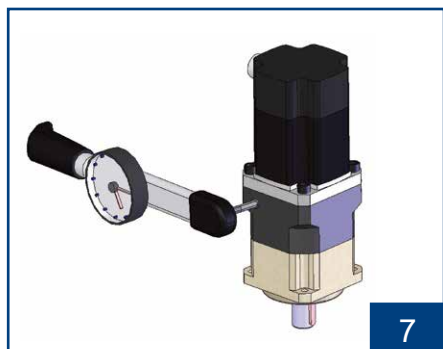
取出塞頭，使用六角扳手將迫緊環螺絲鬆開。並將螺絲對準孔位。  
Remove the plug on the adapter plate. Rotate the set collar till the bolt is line up.



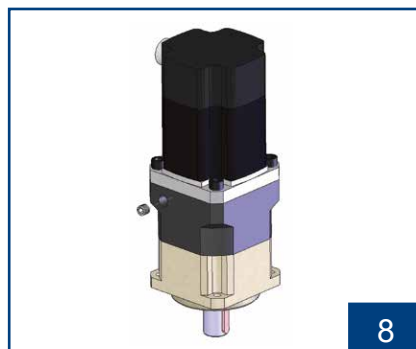
將馬達垂直裝入減速機。  
Put the motor into the gearbox vertically.



依序 1~4 使用扭力扳手鎖上外六角螺絲。  
Tighten the mounting bolt in 1~4 order with torque wrench.



使用扭力扳手將迫緊環螺絲鎖緊。  
Tighten the set collar bolt with torque wrench.



裝回塞頭。  
Tighten back the screw plug.

1. 務必先鎖緊馬達，才能鎖緊馬達軸心迫緊環。

To be sure to tighten motor first and then to tighten the set collar on motor shaft.

2. 請依步驟順序組裝，尤其步驟 6、7 不可顛倒。

Please assembly in order according to above steps, especially for step 6 and step 7.

# LIMING REDUCERS

利明牌減速機系列產品

## 伺服用減速機 Reducers for Servo Motor

高精密行星減速機 High Precision Planetary Reducers



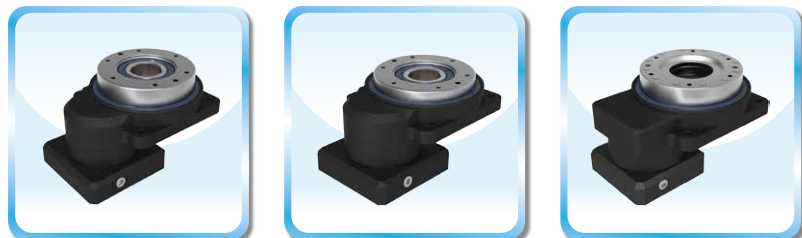
## 直交軸伺服用減速機

High Precision Right Angle Reducers



## 伺服用中空旋轉平台減速機

Hollow Rotary Actuator Reducers





# LIMING REDUCERS

利明牌減速機系列產品

## 一般傳動減速機 General Speed Reducers

### 齒輪減速機 Gear Reducers



### 蝸輪減速機 Worm Gear Reducers



### 一般傳動減速機 Reducers



### 傳動軸用減速機 Gearbox for Power Transmission



# LIMING REDUCERS

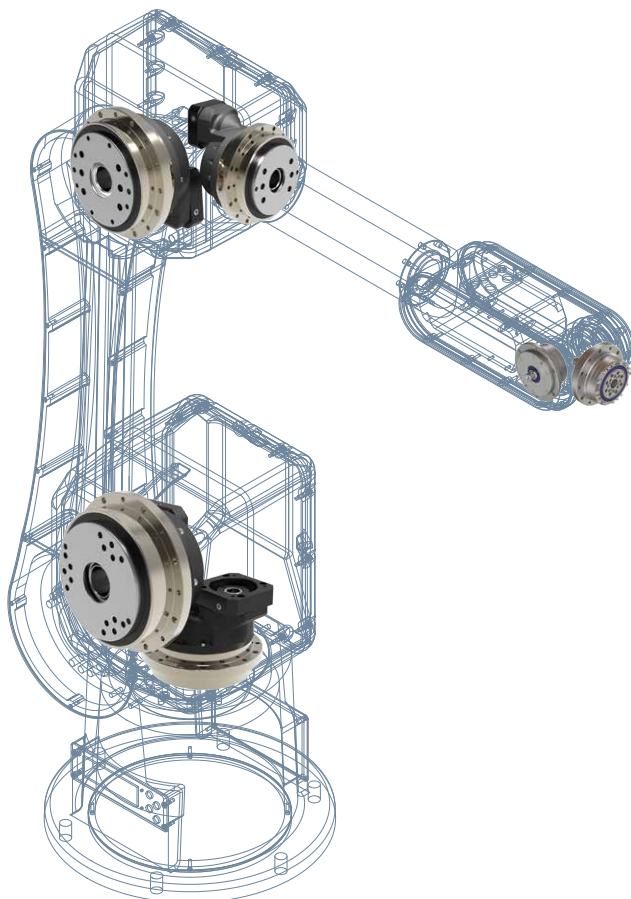
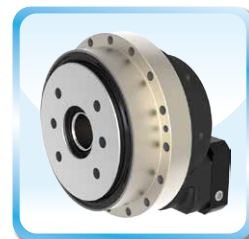
利明牌減速機系列產品

## 機械手臂減速機 Robot Reducers

### 諧波減速機 ROBONICDRIVE



### 高精度擺線減速機 CYKODRIVE





# LIMING REDUCERS

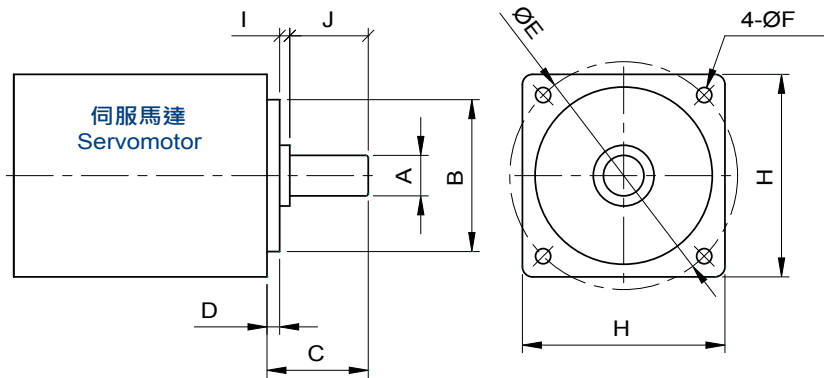
利明牌減速機系列產品

## 小型齒輪減速機 Small Gear Reducers



# Inquiry Information

顧客詢問資料



| A | B | C | D | E | F | H | I | J |
|---|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |   |   |

## 行星速機訂購編號

|                      |   |                      |   |                      |                                 |   |                        |   |                      |
|----------------------|---|----------------------|---|----------------------|---------------------------------|---|------------------------|---|----------------------|
| <input type="text"/> | — | <input type="text"/> | — | <input type="text"/> | <input type="text"/>            | — | <input type="text"/>   | — | <input type="text"/> |
| 減速機型<br>Type         |   | 型號<br>Model          |   | 速比<br>Ratio          | 出力軸鍵槽<br>Output Shaft<br>Keyway |   | 背隙等級<br>Backlash Class |   | 馬達型號<br>MOTOR NO.    |

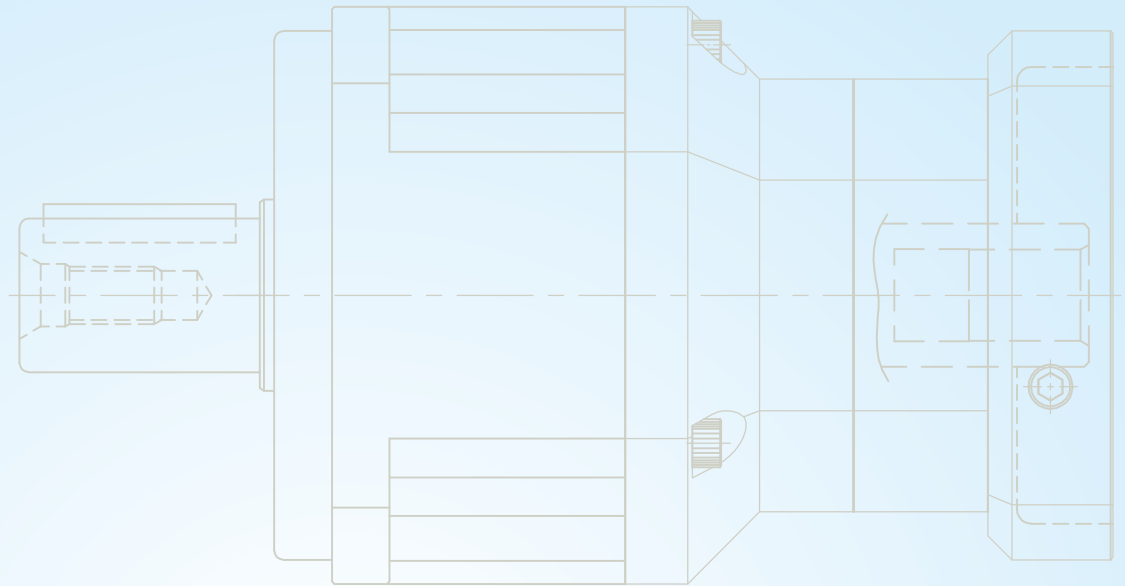
### 訂貨須知：

- ◆機種、型號、馬力
- ◆減速比或每分鐘回轉數
- ◆荷重狀況及聯結方式
- ◆數量及被安裝的機械名稱
- ◆入力方式和入力轉速
- ◆馬達廠牌型號或法蘭及馬達軸尺寸

### General Notices:

- ◆ Type, model and horsepower
- ◆ Speed ratio or R.P.M of output shaft
- ◆ Method of connection and loading
- ◆ Quantity and applied mechanism
- ◆ Input connection method and input speed
- ◆ Motor band Model no or frame & motor shaft dimension

|                      |           |                       |  |
|----------------------|-----------|-----------------------|--|
| 公司名稱<br>Company Name |           | 聯絡人<br>Contact Person |  |
| 地址<br>Address        |           |                       |  |
| 電話<br>Tel            | 傳真<br>Fax | 電子信箱<br>E-Mail        |  |
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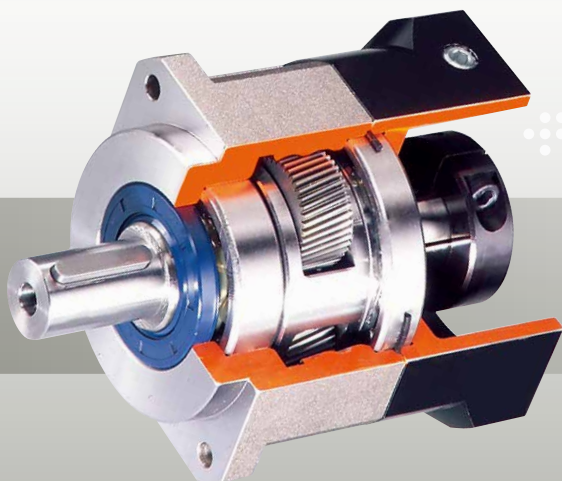
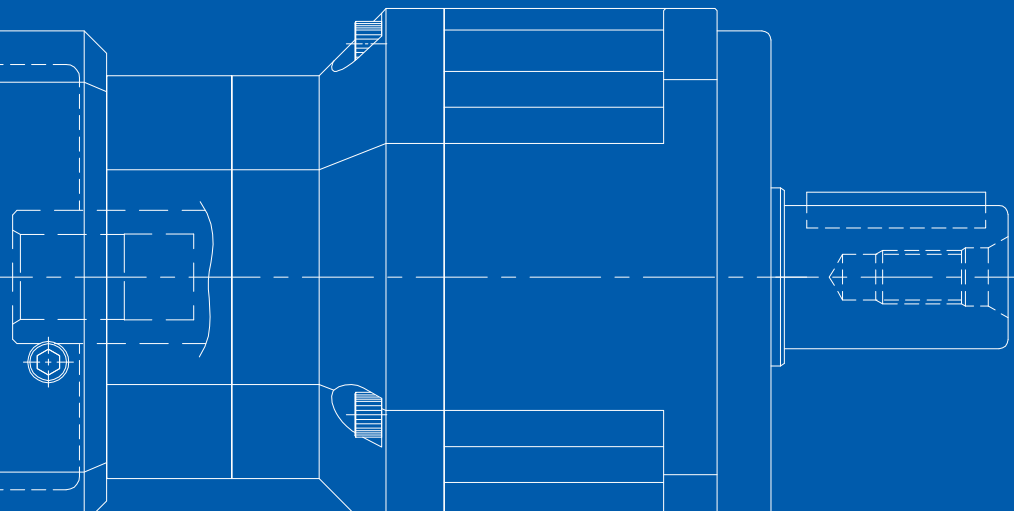


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