

[2022]

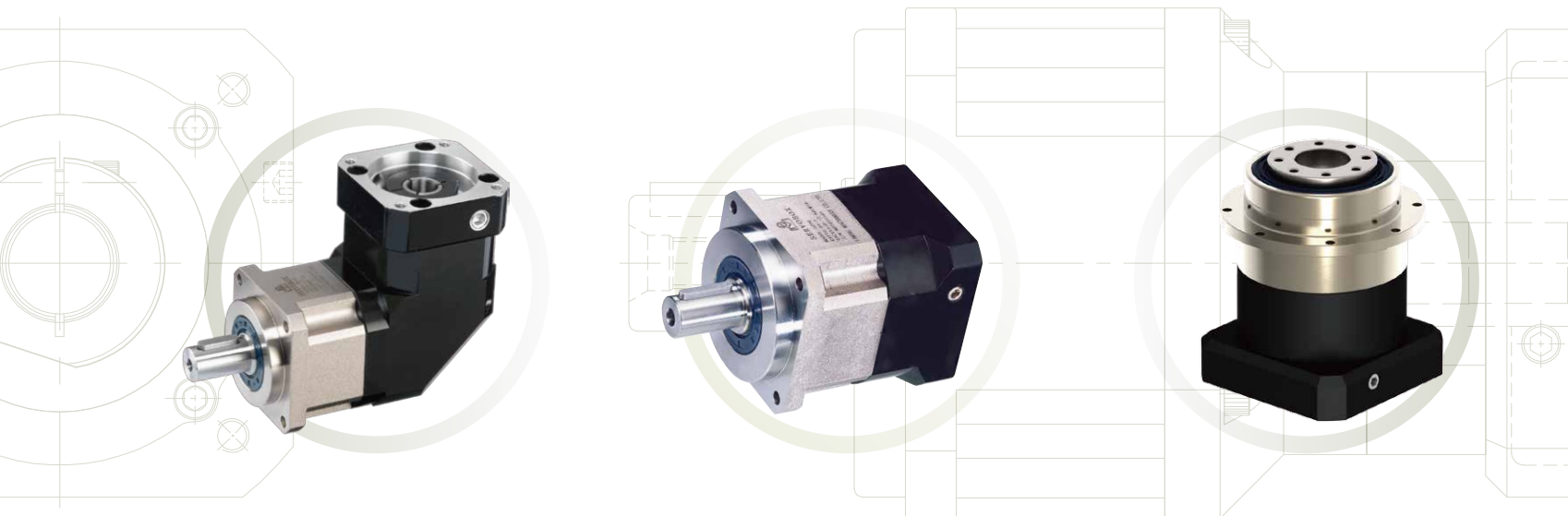
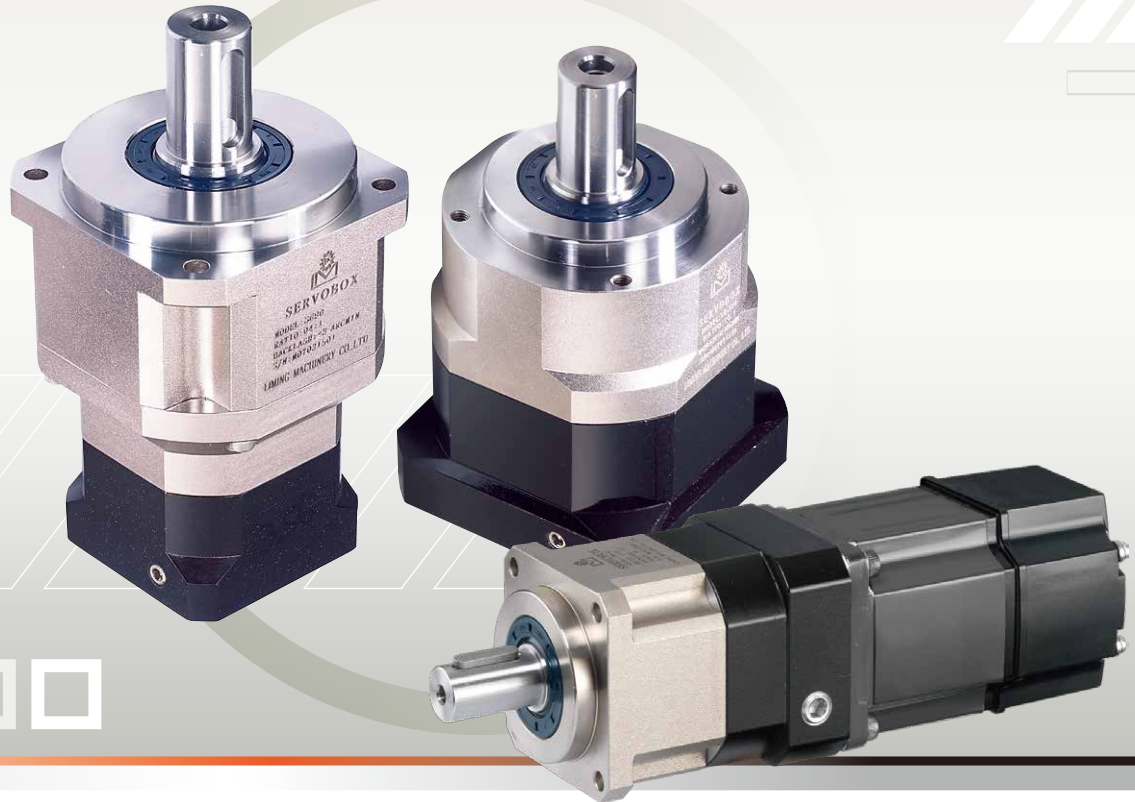


# Planetary Reducers 精密行星減速機

SERVOBOX Series

利明牌

精密行星減速機



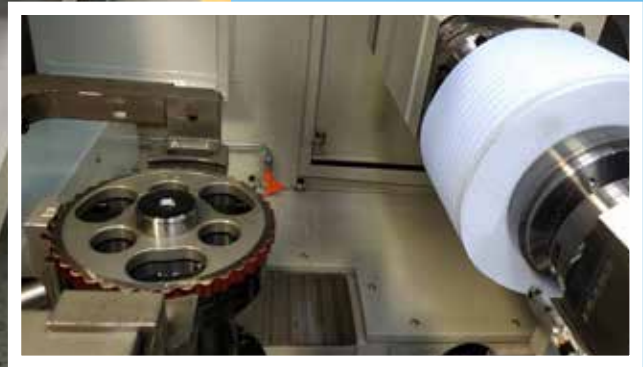
[ 傳動裝置的解決方案 / 減速機的領導品牌 ]

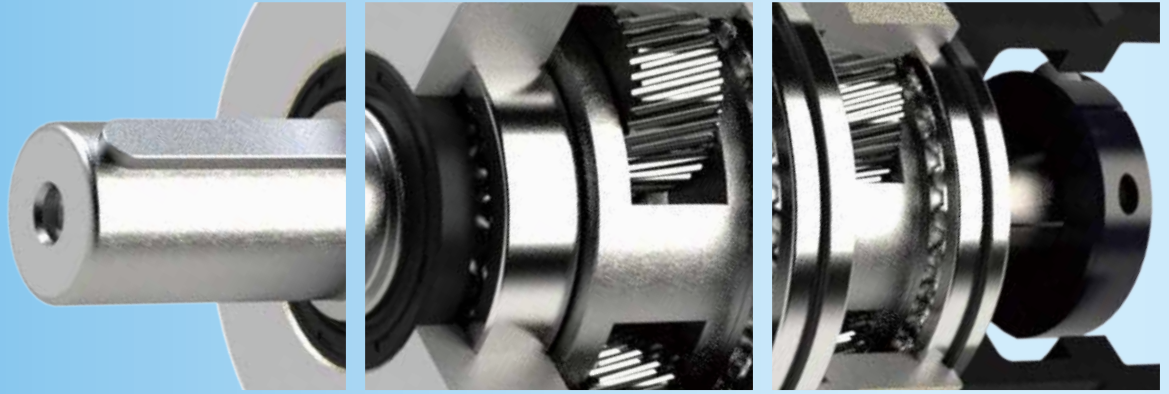
LI MING MACHINERY CO., LTD.



Quality First & Customer's Satisfaction

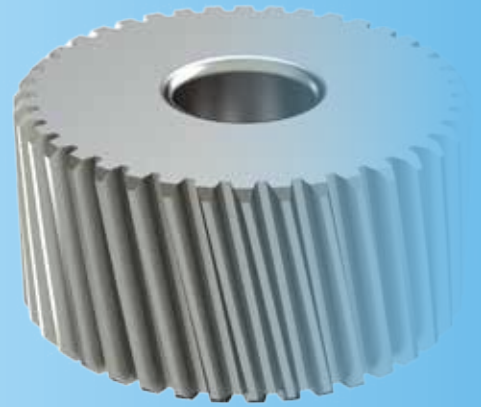
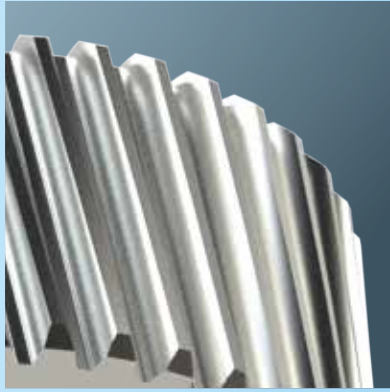
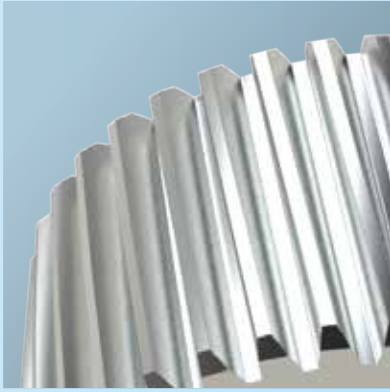






## 高精密伺服用行星減速機 High Precision Planetary Reducers

產品型號 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) Backlash (1-Stage)	1'、3'、5'、7'						≤ 6'	2'、4'、6'、8'				
背隙等級 (雙段) Backlash (2-Stage)	3'、5'、7'、9'						≤ 8'	4'、7'、9'、12'				
減速比 (單段) 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) 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) Ratio (3-Stage)	●	●	-	-			-	●	●	-	-	
齒箱表面塗裝 Surface Paint/Coat	無電解鍍 Coating											
齒輪型式 Gear Type	螺旋齒輪 Helical Gear						螺旋齒輪 & 螺旋傘齒輪 Helical Gear & Spiral Bevel Gear					
軸承型式 Bearing Type	滾珠軸承 Ball		滾錐軸承 Tapper	滾珠軸承 Ball	滾珠 / 滾錐 Ball / Tapper		滾珠軸承 Ball		滾錐 Tapper	滾珠 / 滾錐 Ball / Tapper		
減速機固定型式 Fixed Reducer	Bore-Hole	Screw	Bore-Hole	Screw	Bore-Hole		Screw	Bore-Hole	Screw	Bore-Hole		
內齒箱材質 Gearbox Material	鉻鉬合金鋼 SCM440											
額定壽命 Service Life	>30,000Hr											
輸入孔徑 Input Bore	5.65mm ~ 75mm		5.65mm ~ 55mm	6mm ~ 32mm	5.65mm ~ 55mm		10mm ~ 28mm	5.65mm ~ 55mm				
輸入功率 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 Same as SB	同 SBL Same as SBL	同 SBT 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 50、70、100 150	-	同 SB Same as SB	同 SBL 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 Helical Gear & Hypoid Gear	螺旋齒輪 & 螺旋傘齒輪 Helical Gear & Spiral Bevel Gear	螺旋齒輪 Helical Gear	螺旋齒輪 & 螺旋傘齒輪 Helical Gear & Spiral Bevel Gear			螺旋齒輪 Helical Gear			直齒輪 Spur Gear		
	滾珠 / 滾錐 Ball / Tapper	滾珠軸承 Ball	滾珠軸承 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 ~ 55mm	6mm ~ 35mm	5.65mm ~ 55mm	6mm ~ 35mm	6mm ~ 38mm	6mm ~ 24mm	6mm ~ 32mm	5.65mm ~ 55mm	6mm ~ 14mm			
	100W ~ 30kW	100W ~ 30kW	100W ~ 75kW	100W ~ 5.5kW	100W ~ 7.5kW	100W ~ 1.5kW	100W ~ 3.75kW	100W ~ 30kW	100W ~ 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。

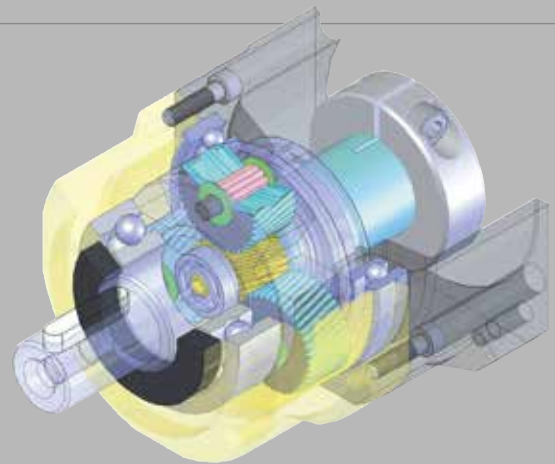
在減速機家族中，行星減速機以其體積小，承受扭力大，傳動效率高，減速範圍寬，精度高，而被廣泛應用於伺服、步進、直流等傳動系統中。在保證精密傳動的前提下，主要被用來降低轉速，增大扭矩和降低負載電機的轉動慣量比。高扭矩，低背隙及運轉安靜是 LIMING 減速機三大設計特點。LIMING 減速機一直位居市場領導地位。

# 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.





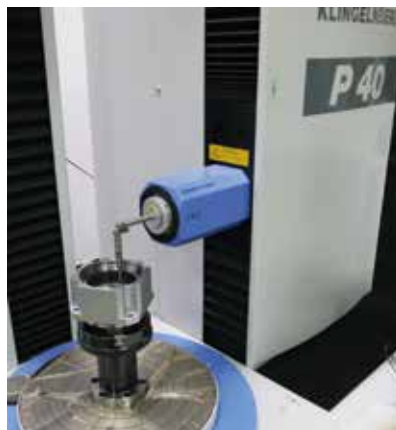
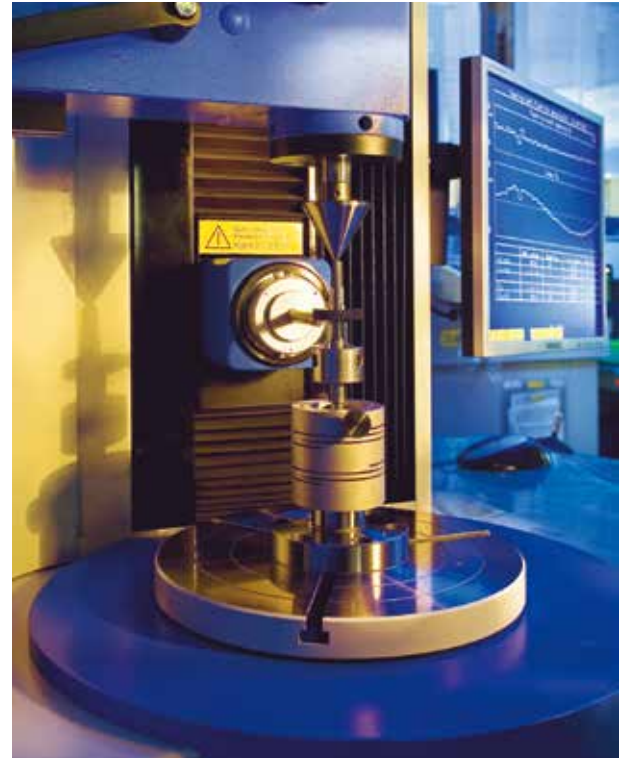
## 「全面品管」不只是口號

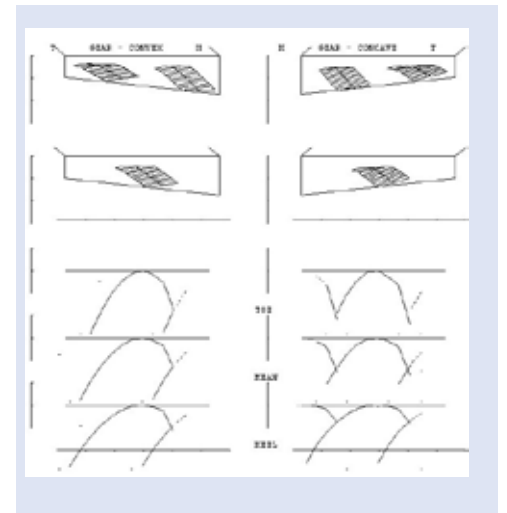
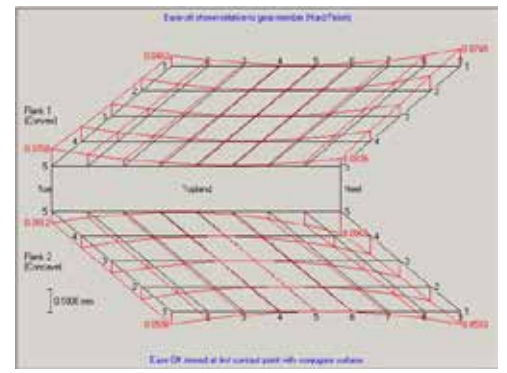
「全面品管」在利茗公司絕不是一句口號。我們對品質政策的執著，對每一個品質要求都訂有嚴格的品質標準書，迅速而確實的品質管制。每一個零件從最初的進料製程，裝配完成品的運轉等檢驗測試，鉅細靡遺，以完全符合您的要求及利茗的品質標準。品管部門有先進的檢驗設備，作精密的量測。「工欲善其事，必先利其器」，我們精密的檢驗儀器，是品質信賴的保證。



# 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

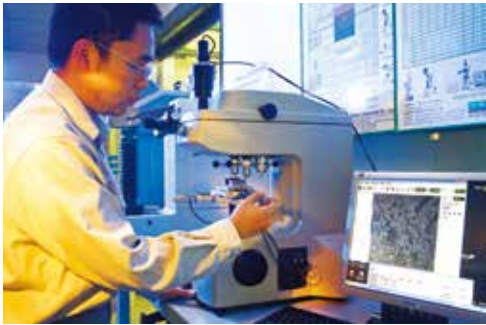
使用高端的設計軟件及世界級的高精密的加工設備，並配合全面品質管理確保設計輸入到輸出端的品質一致的閉循環 (Close Loop) 生產流程。

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

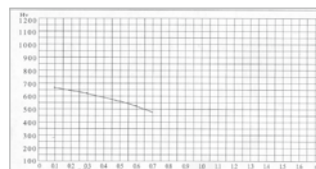


# Heat Treatment

## 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

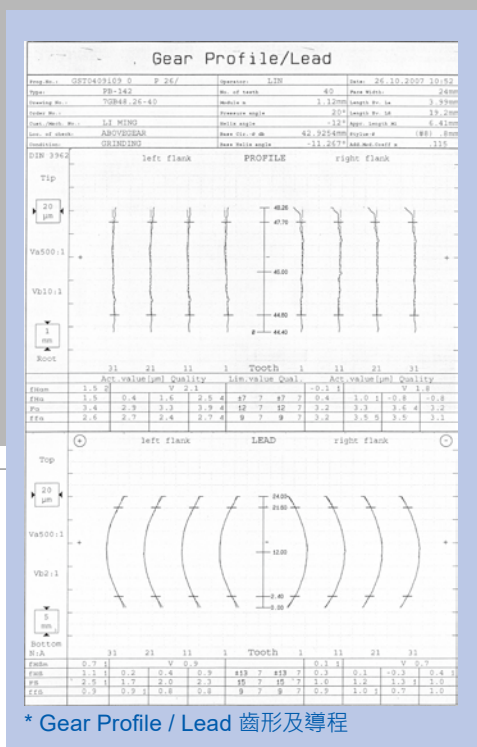
# High Precision

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。

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.

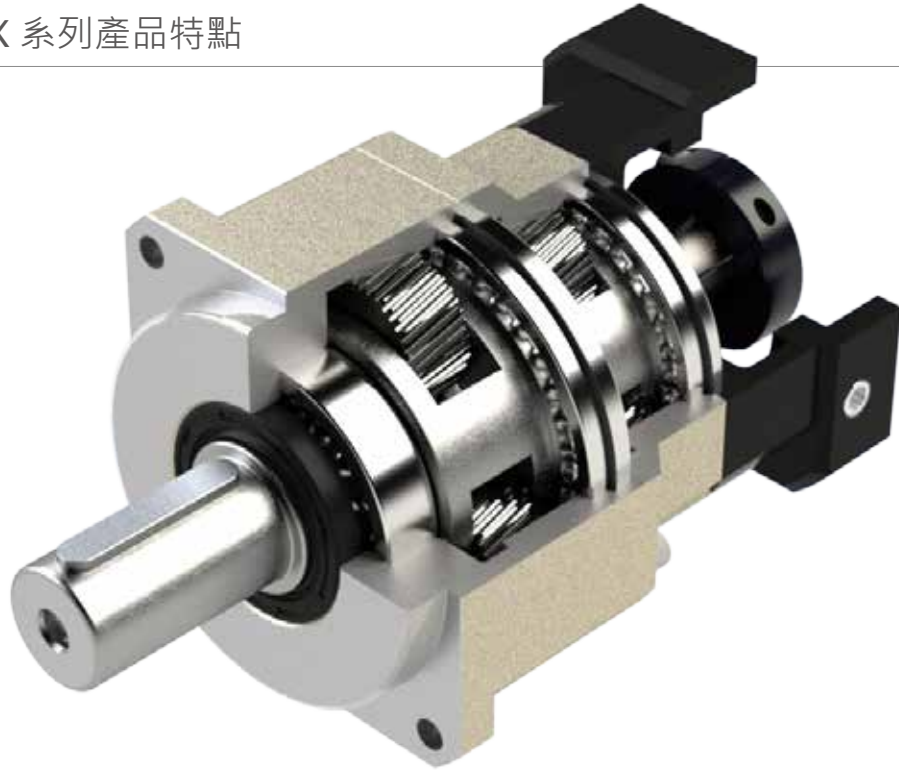


\* Gear Profile / Lead 齒形及導程



# Features of SERVBOX Series

SERVBOX 系列產品特點



- SB
- SBL
- SBT
- SE
- SEL
- SD
- SDL
- SDD
- SR
- SDH
- SF
- SFL
- SA
- PB
- PBL
- PBT
- FA
- SN
- SNL
- FB
- FE
- AD
- PE



## 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.

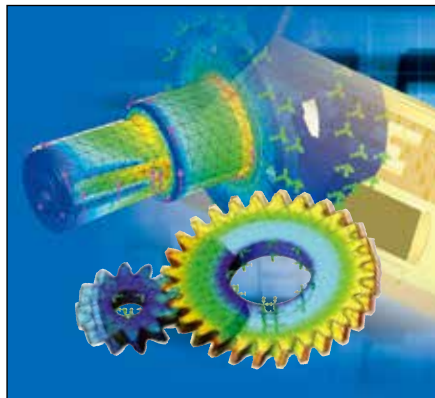


### 一體式齒輪箱本體

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.

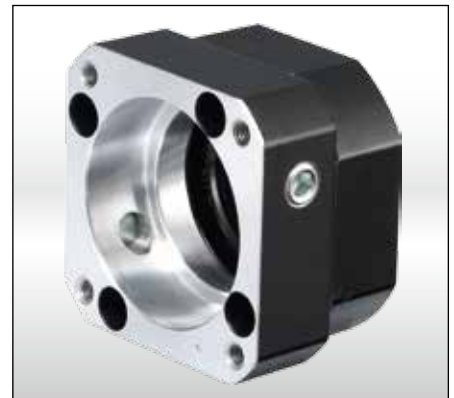


### CAE 設計分析技術

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

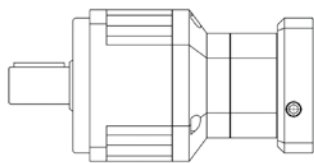
機種型號表示

SB	90	10		P1	MOTOR
減速機型 Type	型號 Model	速比 Ratio	出力軸鍵槽 Output Bearing	背隙等級 Backlash Class	馬達型號 Motor Type
SB	44	單段 1-Stage	<input type="checkbox"/> 標準品 · 有鍵槽 Standard (Keyway)	Ps	馬達製造商及型號
SE	62	3, 4, 5, 6, 7, 8, 9, 10	N: 實心軸 · 無鍵槽 Solid Output Shaft (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 2.39Nm x 50 x 94%(效率) = 112Nm

可選擇 SB-120-50

額定輸出扭矩 294Nm 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：

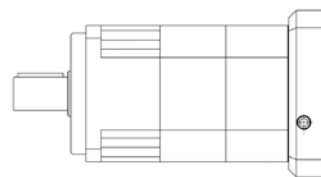
輸出扭矩為 2.39 x 100 x 94%(效率) = 224Nm

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 Nm x 50 x 94% (efficiency) = 112 Nm.

● You can select SB-120-50 with rated output torque of 294 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 x 100 x 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.

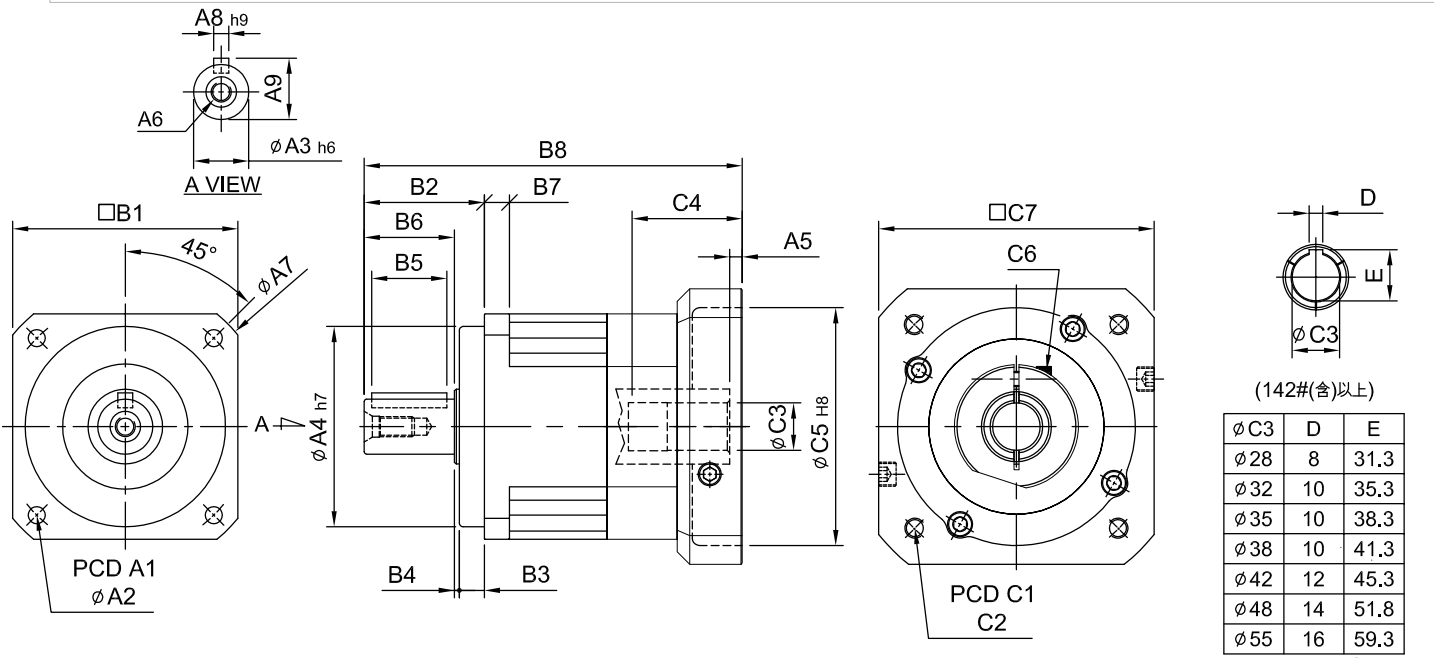
# SERVOBOX Planetary Reducers



## MODEL : SB

單段 1-Stage

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

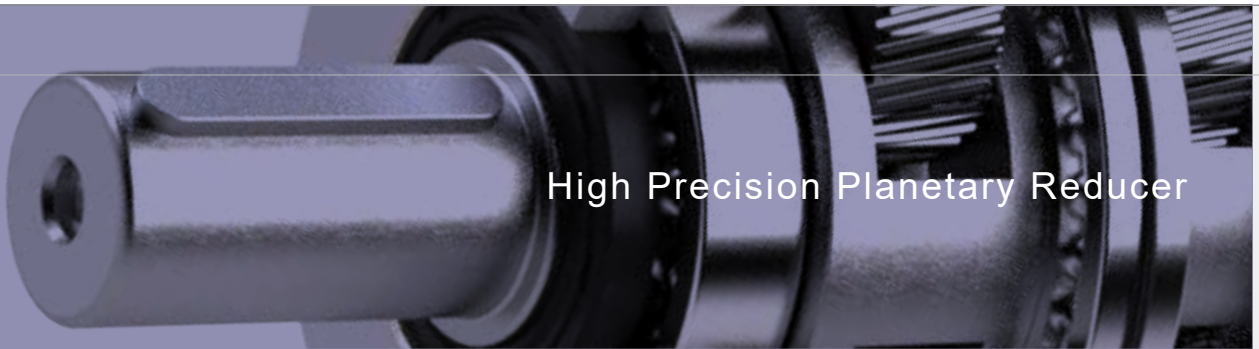


(142#(含)以上)

$\phi C3$	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
<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 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 (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 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) 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>)

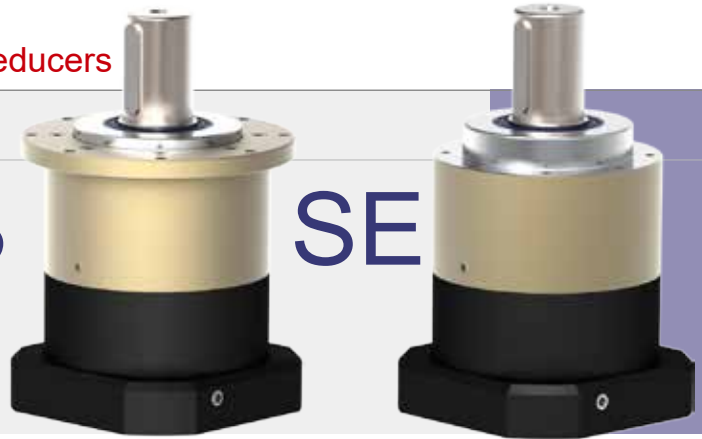
Ratio	44	62	90	120	142	180	220
3	0.03	0.16	0.61	3.25	9.21	28.98	59.61
4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
10	0.03	0.13	0.44	2.57	7.03	22.51	50.56

# SERVOBOX Planetary Reducers

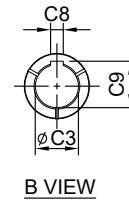
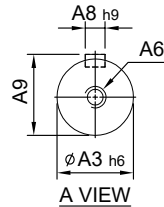
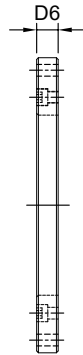
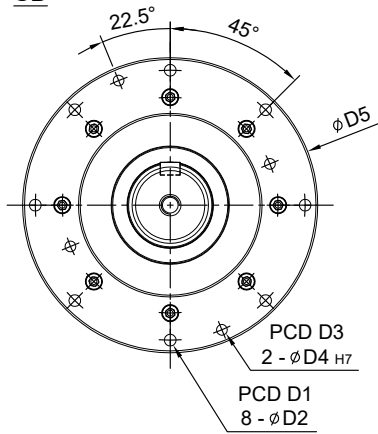
## MODEL : SB SE

單段 1-Stage

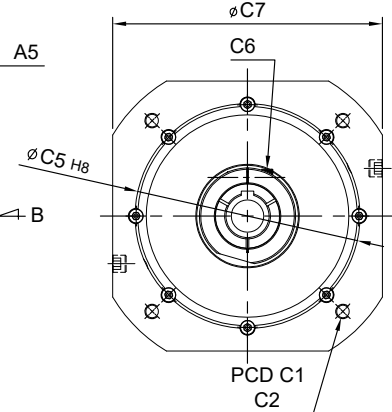
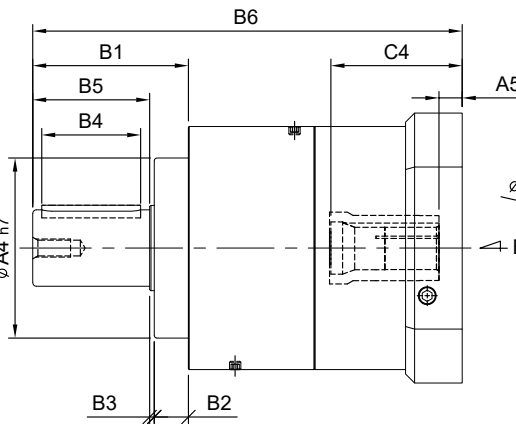
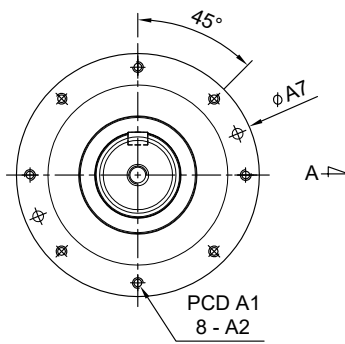
RATIO : 3, 4, 5, 7, 10



**SB**



**SE**

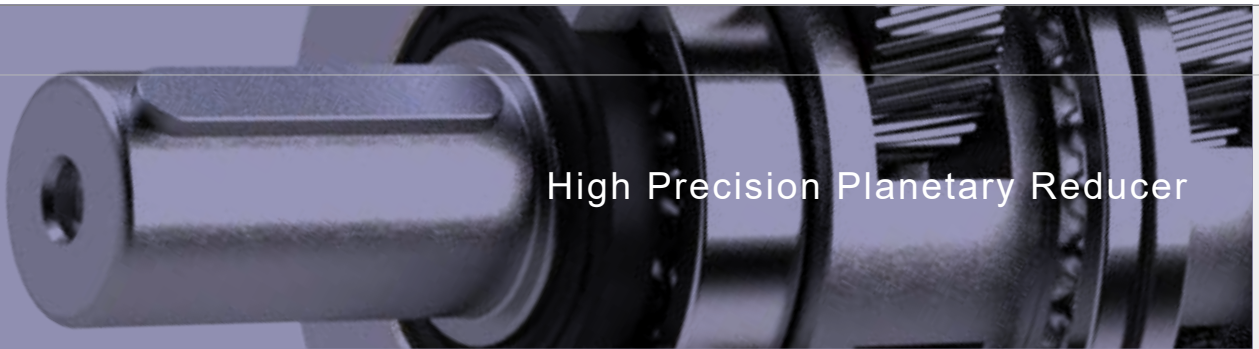


unit: mm

Model Code	270	330
A1	240	300
A2	M12 x P1.75	M16 x P2.0
A3	85	100
A4	200	250
A5	26 · 23	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	474.5 · 477.5 · 488	512 · 515

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	143 · 149	143 · 146
C5	230 · 250 · 300	230 · 250 · 300
C6	M12 x P1.75	M12 x P1.75
C7	280 · 300 · 330	280 · 300 · 330
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 Model No.	代號	單位 Unit	速比 Ratio	270	330
額定輸出扭矩 Rated Output Torque (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 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 P <sub>s</sub>		arcmin	3 ~ 10	≤ 1	≤ 1
背隙 Backlash P <sub>0</sub>		arcmin	3 ~ 10	≤ 3	≤ 3
背隙 Backlash P <sub>1</sub>		arcmin	3 ~ 10	≤ 5	≤ 5
背隙 Backlash P <sub>2</sub>		arcmin	3 ~ 10	≤ 7	≤ 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) 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	≤ 72	≤ 74
重量 Weight ±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

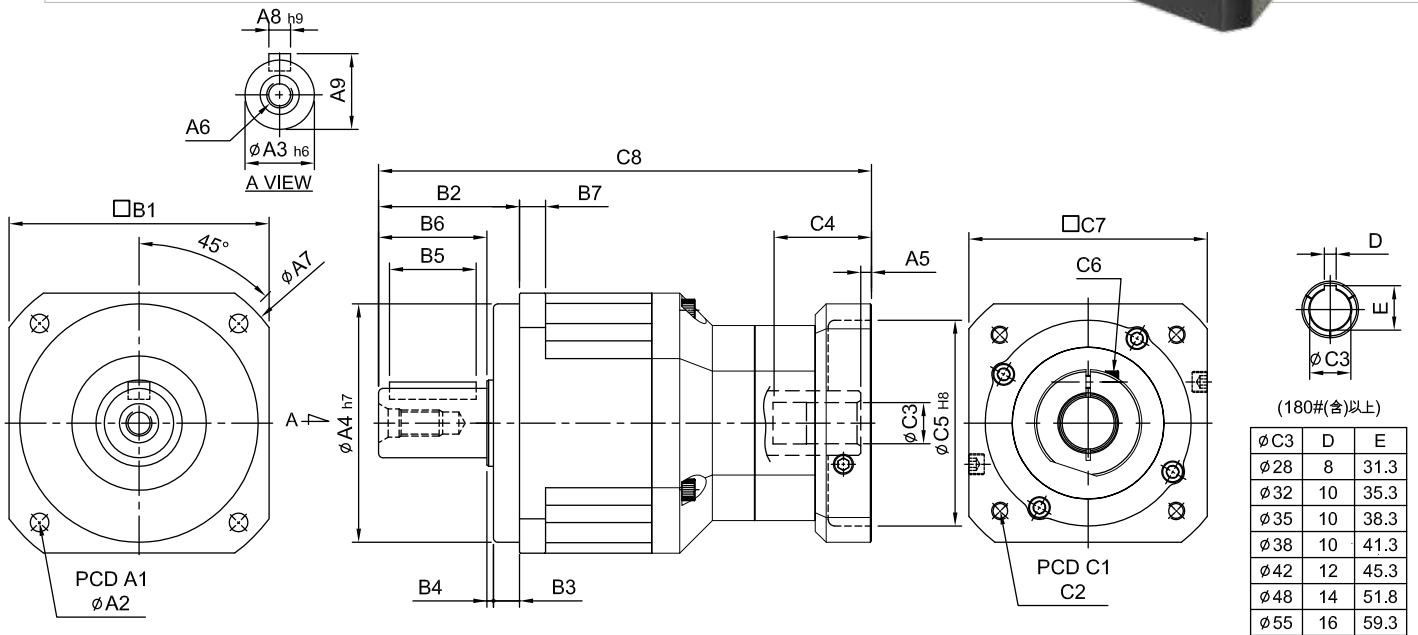
# SERVOBOX Planetary Reducers



## MODEL : SB

雙段 2-Stage

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



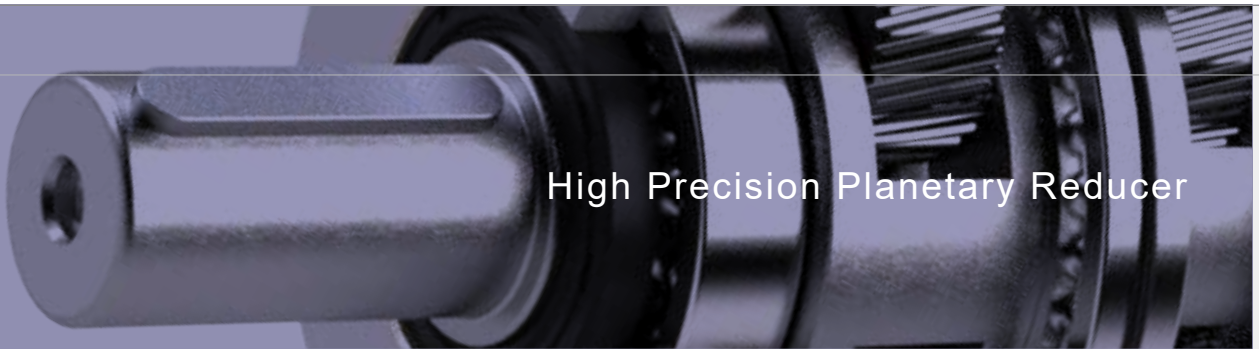
(180#(含)以上)

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 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 (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 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) 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

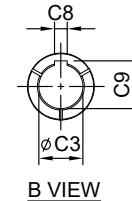
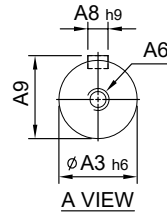
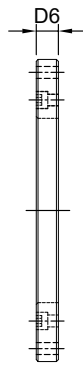
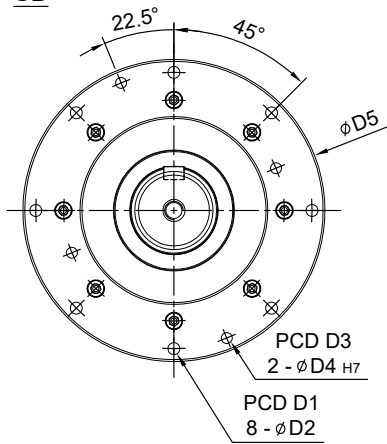
雙段 2-Stage

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

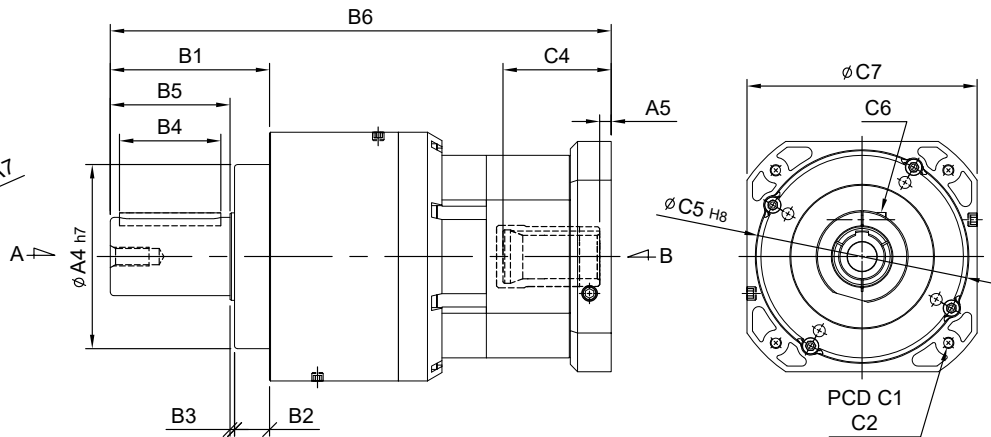
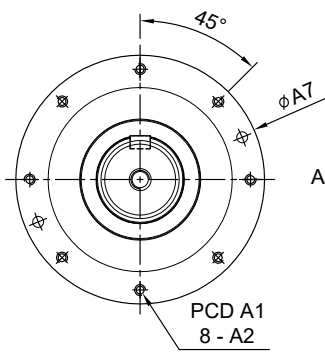


## SE

SB



SE

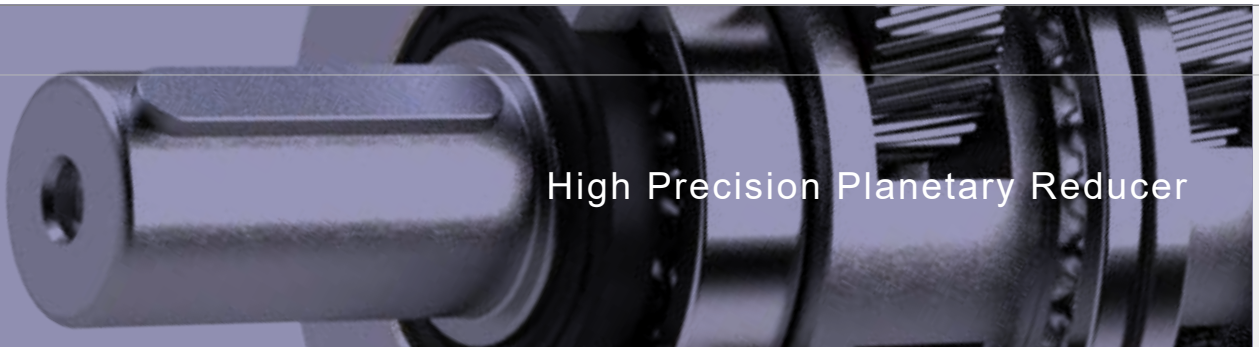


unit: mm

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



## High Precision Planetary Reducer

規格 Model No.	代號	單位 Unit	速比 Ratio	270	330
額定輸出扭矩 Rated Output Torque (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 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) 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

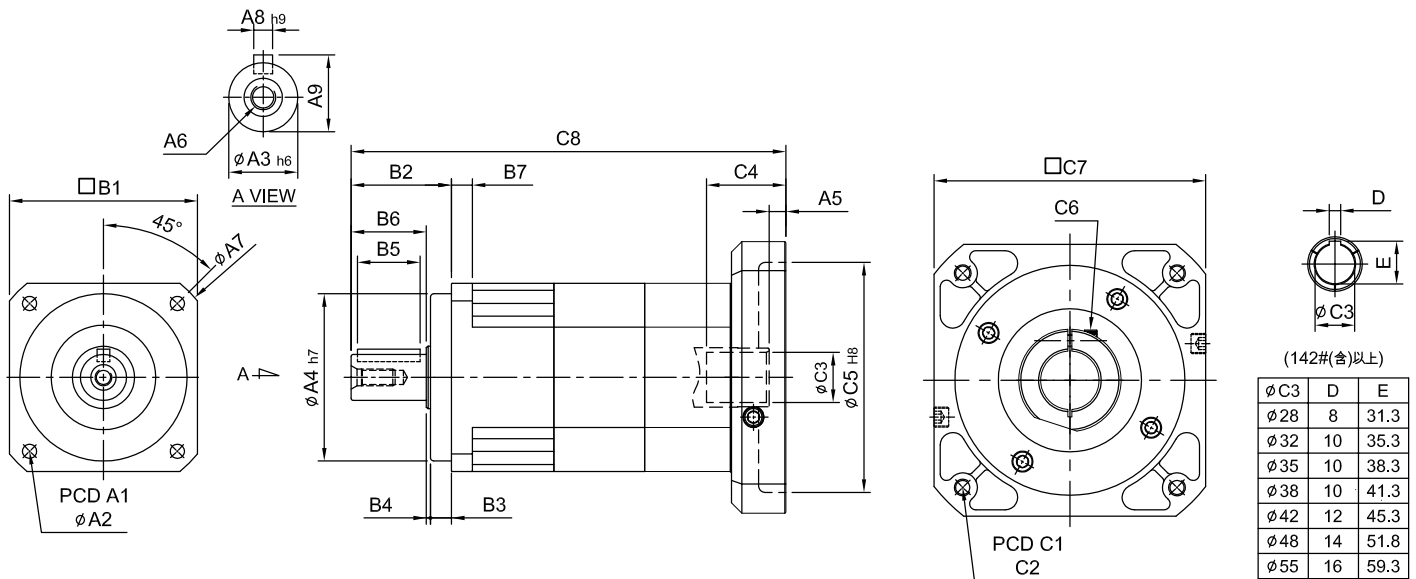
# SERVOBOX Planetary Reducers



## MODEL : SB-A

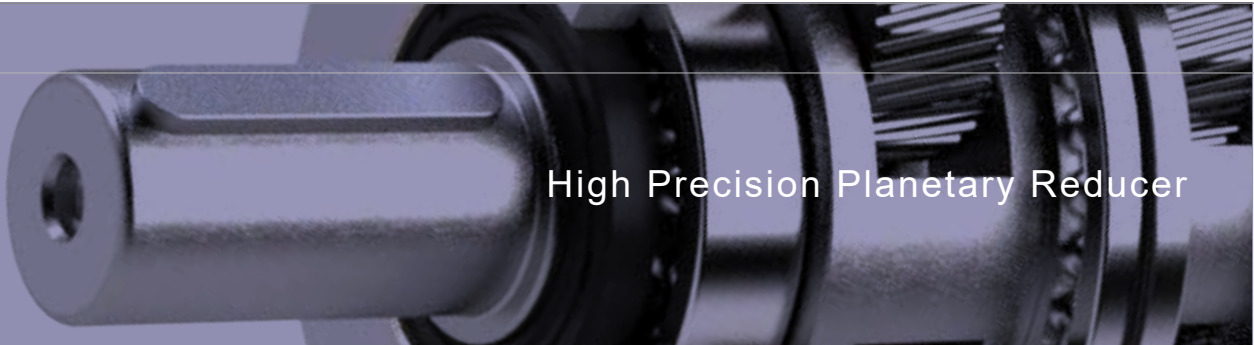
雙段 2-Stage

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 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 (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 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) 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

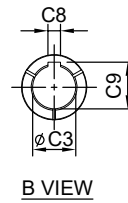
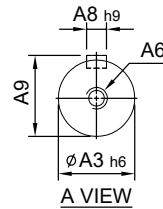
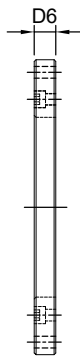
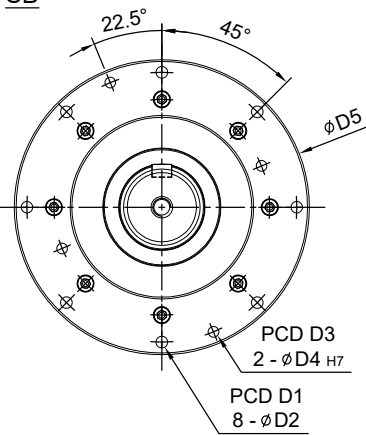
## MODEL: SB-A SE-A

雙段 2-Stage

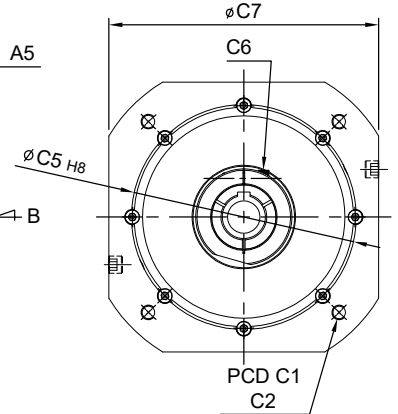
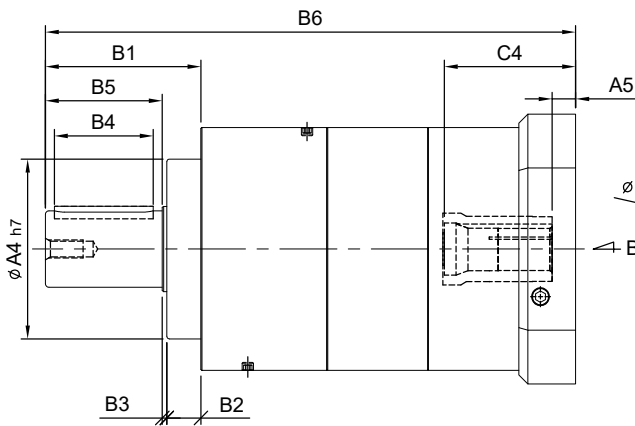
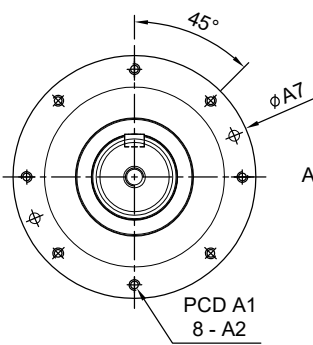
RATIO : 15, 20, 25, 30, 35,  
40, 50, 70, 100



SB



SE

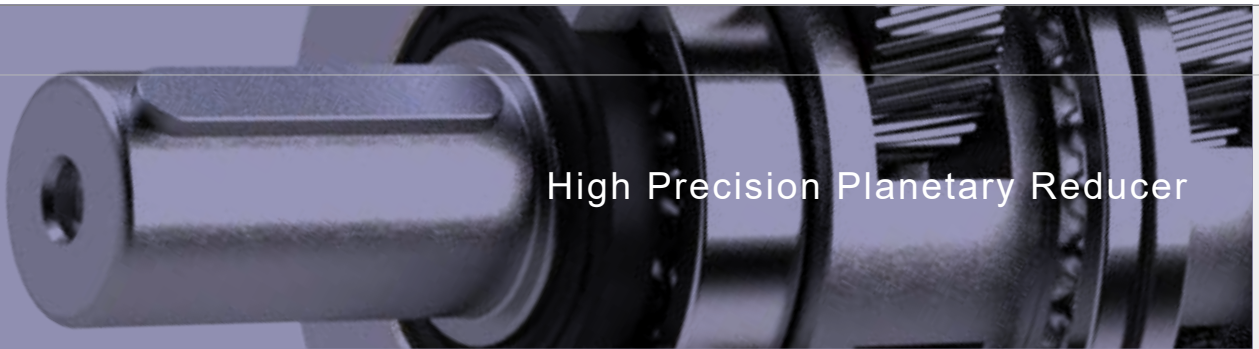


unit: mm

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 Model No.	代號	單位 Unit	速比 Ratio	270A
額定輸出扭矩 Rated Output Torque (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 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 P <sub>s</sub>		arcmin	15 ~ 100	≤ 3
背隙 Backlash P <sub>0</sub>		arcmin	15 ~ 100	≤ 5
背隙 Backlash P <sub>1</sub>		arcmin	15 ~ 100	≤ 7
背隙 Backlash P <sub>2</sub>		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) 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

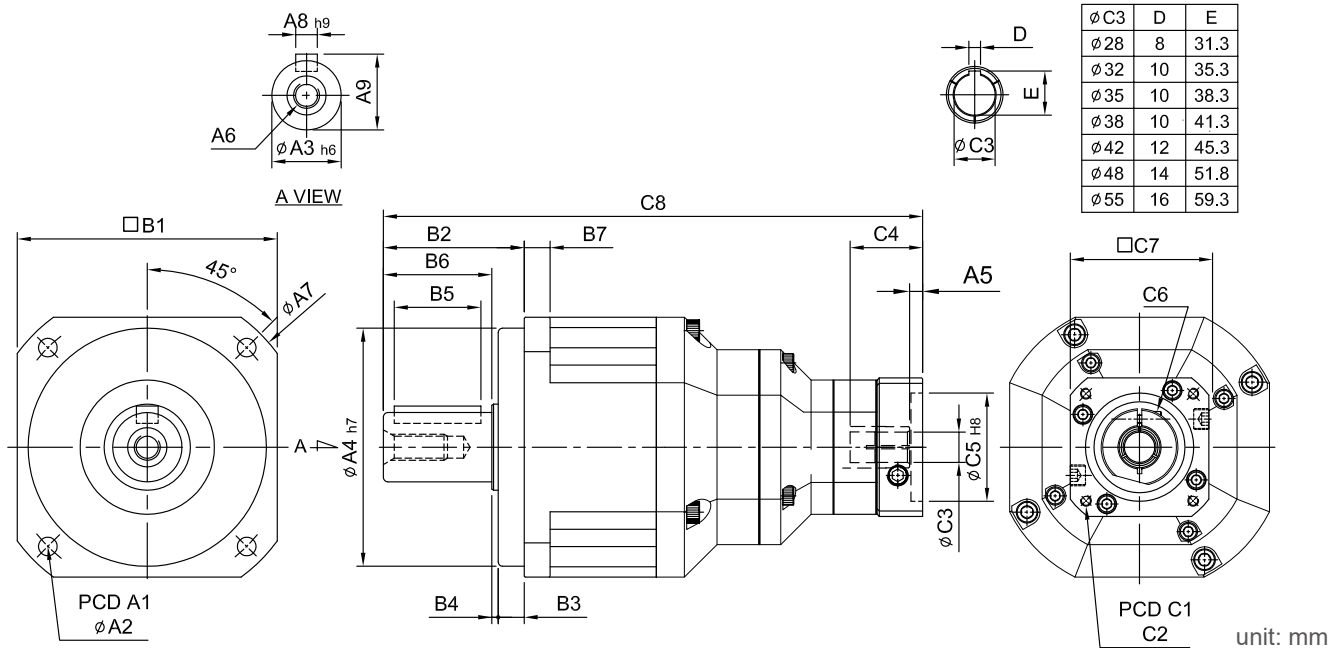


## MODEL : SB

三段 3-Stage

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

(220#)

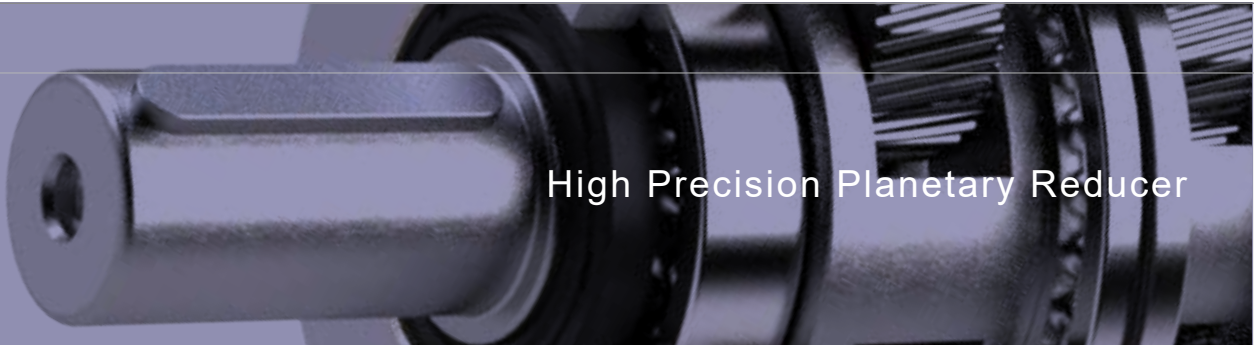


φC3	D	E
φ28	8	31.3
φ32	10	35.3
φ35	10	38.3
φ38	10	41.3
φ42	12	45.3
φ48	14	51.8
φ55	16	59.3

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 Model No.	代號	單位 Unit	速比 Ratio	90	120	142	180	220
額定輸出扭矩 Rated Output Torque (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 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) 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



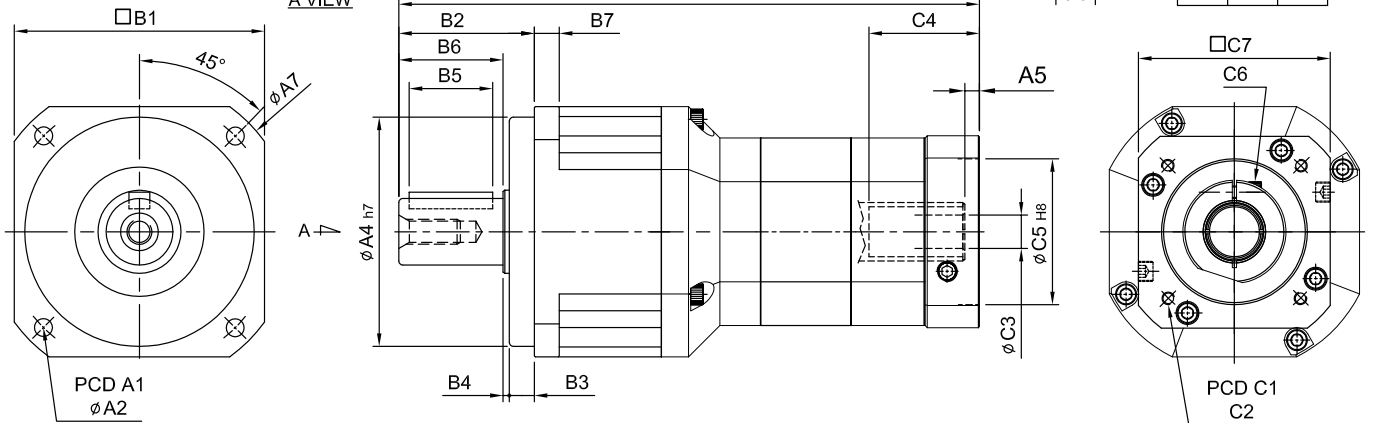
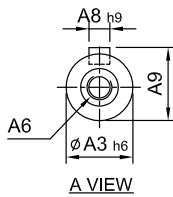
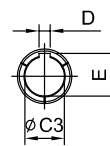
## MODEL : SB-A

三段 3-Stage

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

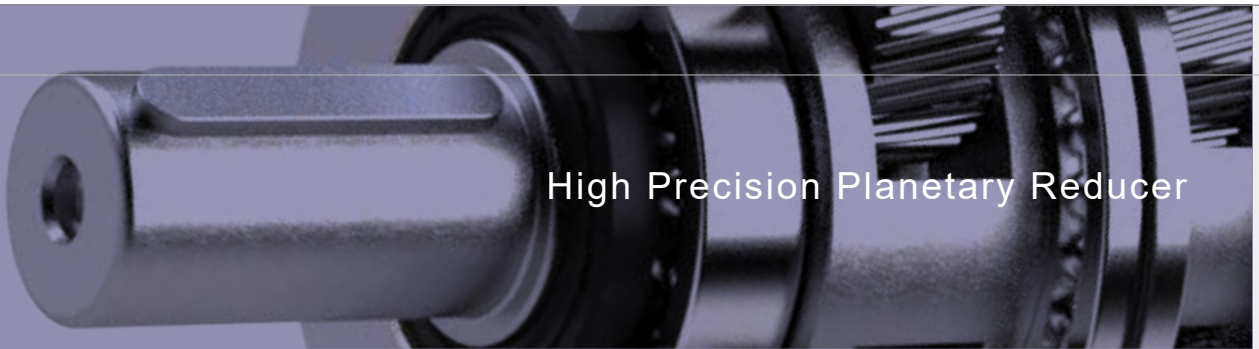
(180#(含)以上)

∅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 Model No.	代號	單位 Unit	速比 Ratio	62A	90A	120A	142A	180A	220A
額定輸出扭矩 Rated Output Torque (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				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	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) 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>)

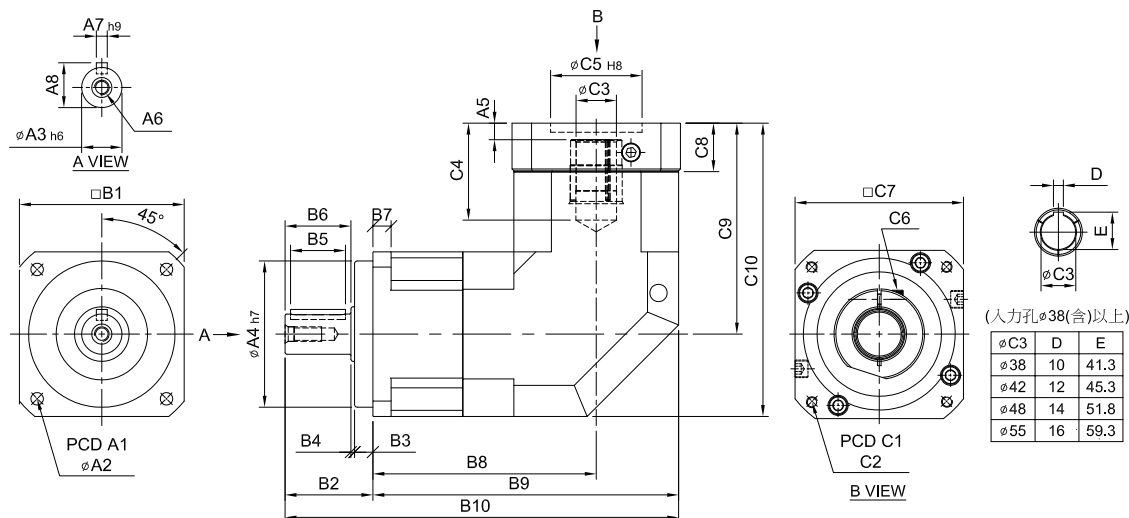
Ratio	62A	90A	120A	142A	180A	220A
125	0.01	0.01	0.04	0.71	1.42	3.29
150	0.01	0.01	0.04	0.51	0.92	2.15
175	0.01	0.01	0.04	0.40	0.83	1.26
200	0.01	0.01	0.04	0.21	0.65	0.98
250	0.01	0.01	0.04	0.11	0.52	0.82
300	0.01	0.01	0.04	0.09	0.21	0.82
350	0.01	0.01	0.04	0.09	0.21	0.82
400	0.01	0.01	0.04	0.09	0.21	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

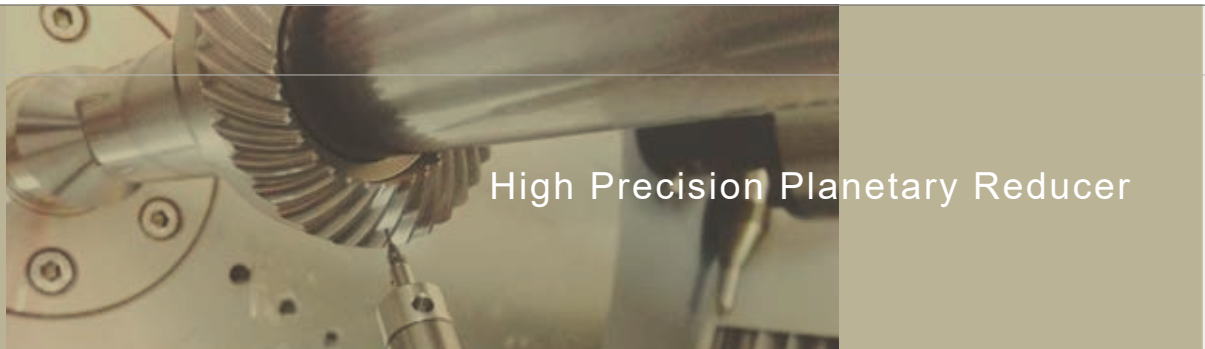
單段 1-Stage

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 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 (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 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) 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>)

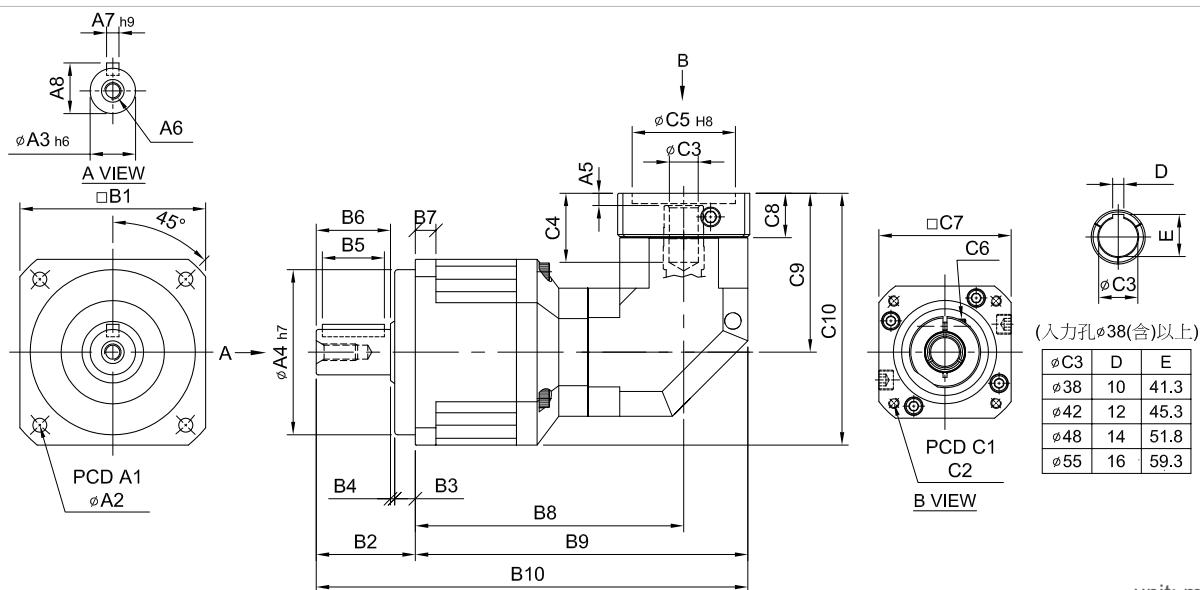
Ratio	44	62	90	120	142	180	220
3	0.09	0.36	2.28	6.85	23.5	68.2	135
4	0.09	0.36	2.28	6.85	23.5	68.2	135
5	0.09	0.36	2.28	6.85	23.5	68.2	135
6	0.09	0.36	2.28	6.85	23.5	68.2	135
7	0.09	0.36	2.28	6.85	23.5	68.2	135
8	0.09	0.36	2.28	6.85	23.5	68.2	135
9	0.09	0.36	2.28	6.85	23.5	68.2	135
10	0.09	0.36	2.28	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

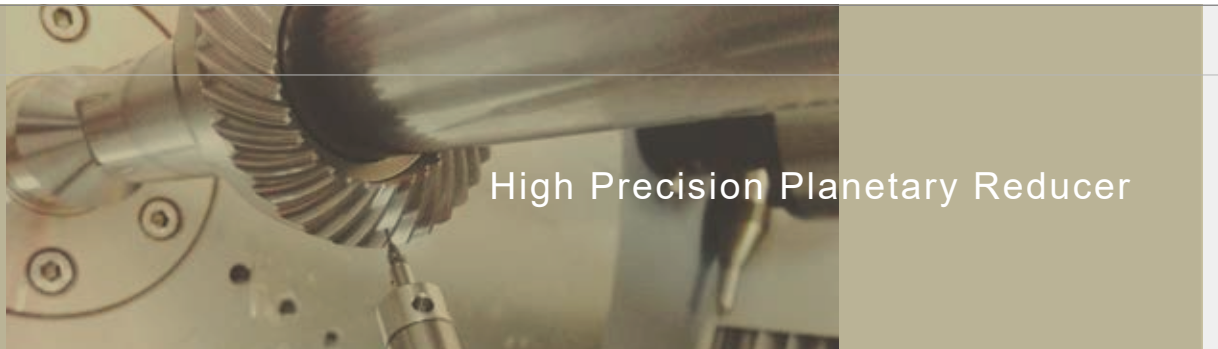
雙段 2-Stage

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
<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	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	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
<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 · 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



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 (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 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) 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>)

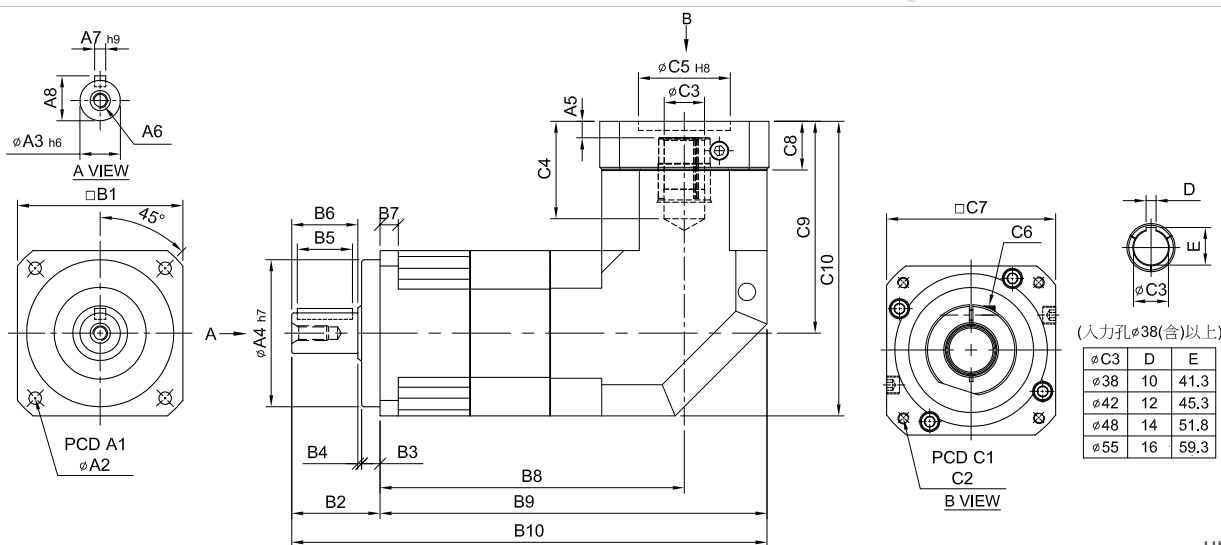
Ratio	62	90	120	142	180	220
15	0.09	0.36	2.28	6.85	26.2	70.1
20	0.09	0.36	2.28	6.85	26.2	70.1
25	0.09	0.36	2.28	6.85	23.1	68.2
30	0.09	0.36	2.28	6.85	23.1	68.2
35	0.09	0.36	2.28	6.85	23.1	68.2
40	0.09	0.36	2.28	6.85	23.1	68.2
50	0.09	0.36	2.28	6.85	23.1	68.2
60	0.09	0.36	2.28	6.85	23.1	68.2
70	0.09	0.36	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

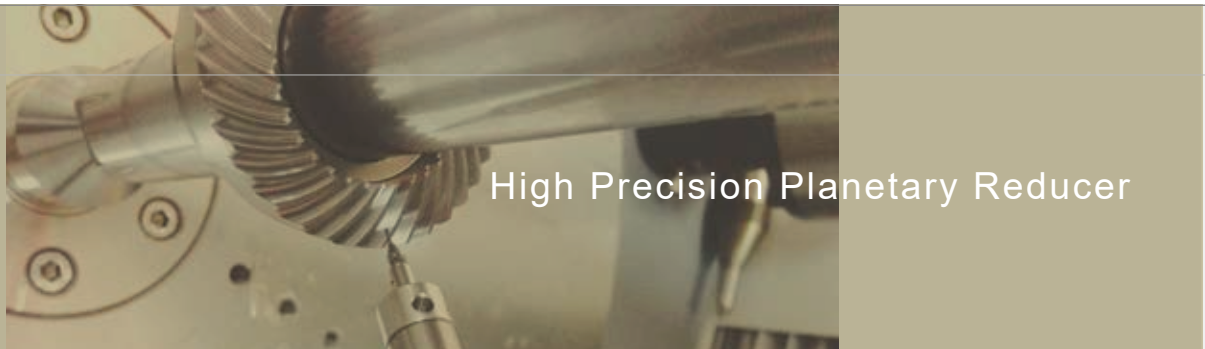
RATIO : 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200



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





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 (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 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) 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

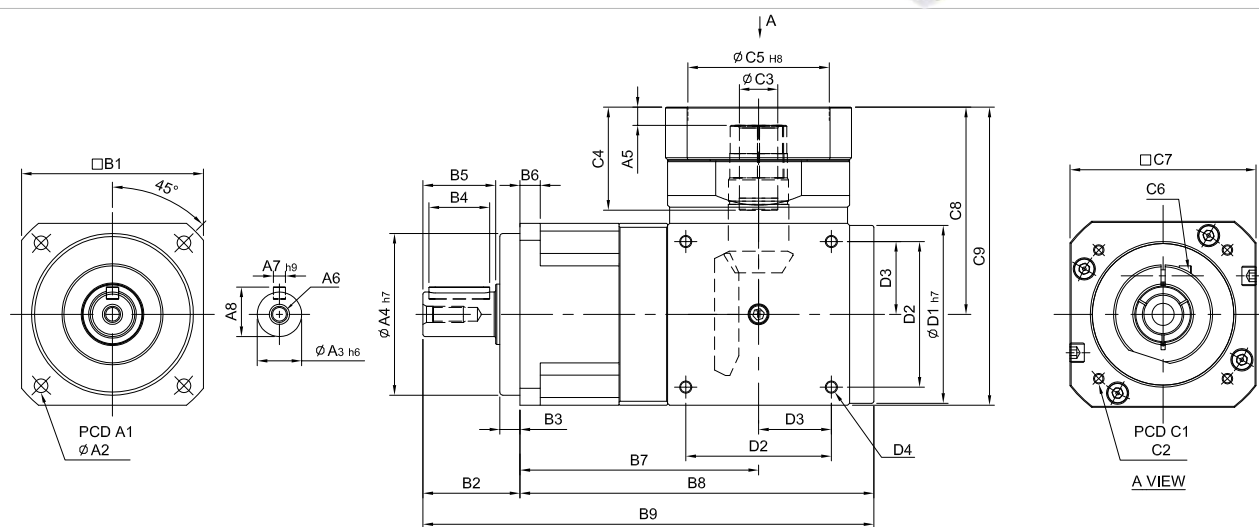
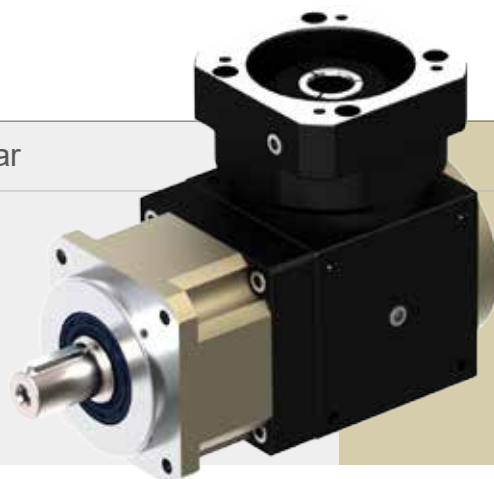
# SERVOBOX Planetary Reducers

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

## MODEL : SBT

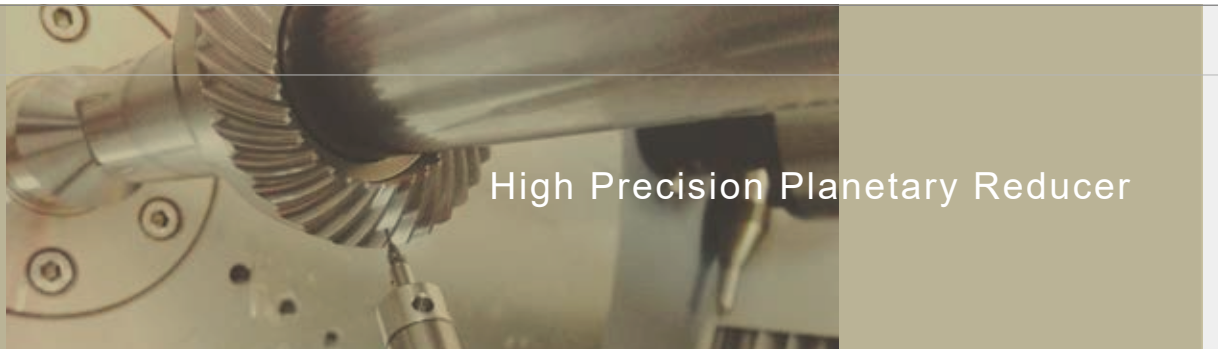
單段 1-Stage

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 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 (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) 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

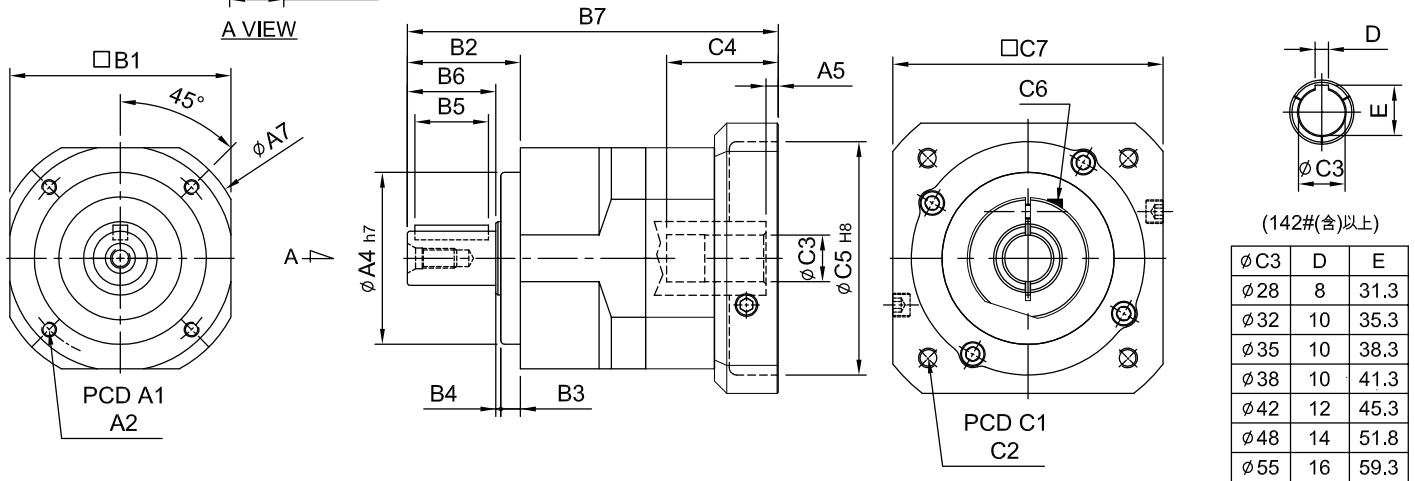
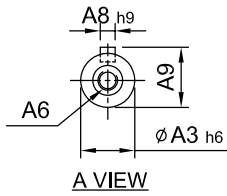
型號 Model	減速比 Ratio	法蘭盤框號 Flange Model	傘齒輪減速機 Bevel Gear Reducer Model
44		44	-
62		62	ST65
90	3·4·5·6·7 8·9·10·15·20 25·30·35·40 45·50	90	ST90
120		90	ST110
142		120	ST140
180		142	ST170
220		180	ST210

# 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
<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 · 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
<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	95	115 · 123	164.5 · 179	205 · 215	260.5	323.5 · 326.5	367.5
<b>C</b>							
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 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 (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 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) 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>)

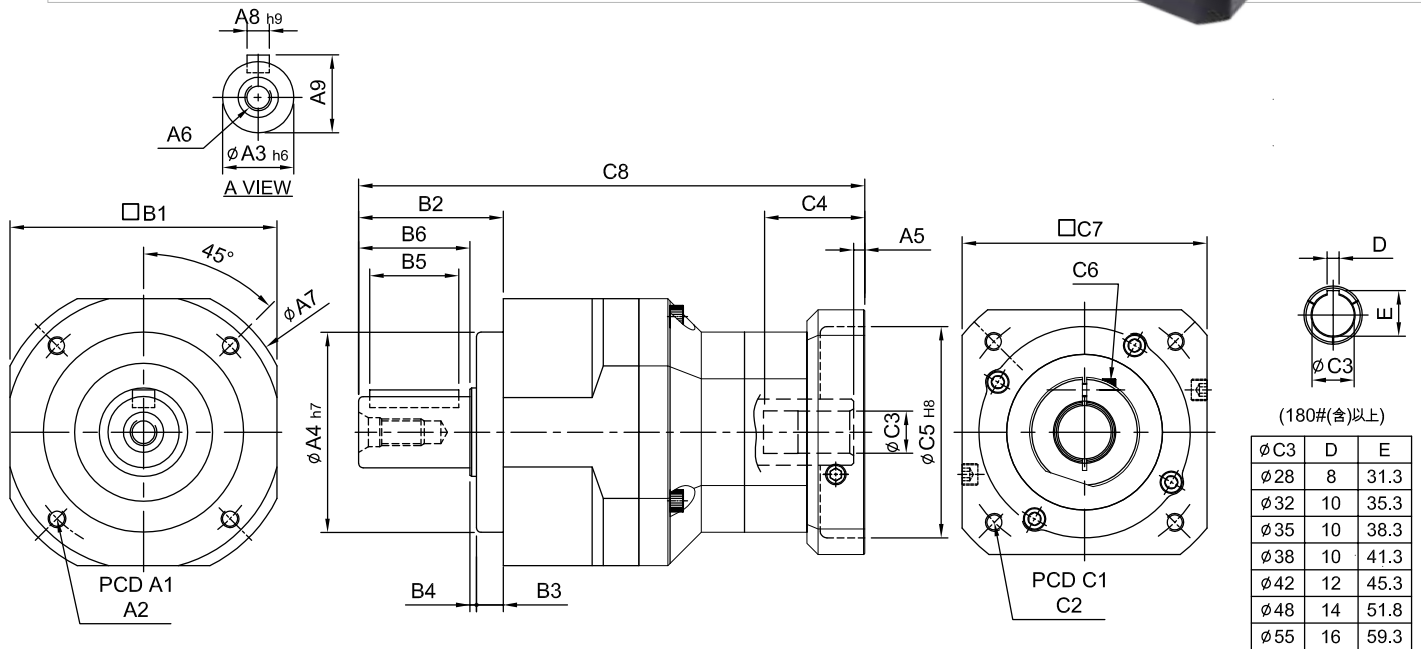
Ratio	44	62	90	120	142	180	220
3	0.03	0.16	0.61	3.25	9.21	28.98	69.61
4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
5	0.03	0.13	0.47	2.71	7.42	23.29	53.27
6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
9	0.03	0.13	0.44	2.57	7.04	22.53	50.63
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 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 (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 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) 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>)

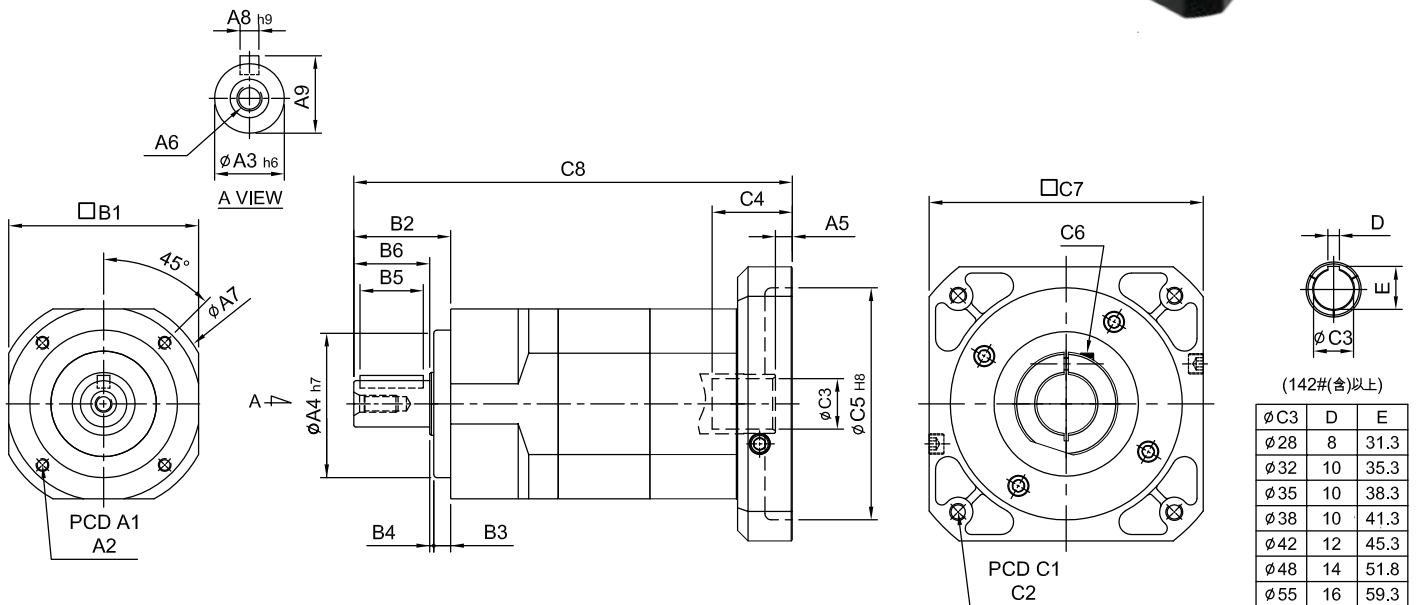
Ratio	62	90	120	142	180	220
15	0.03	0.14	0.46	2.63	7.3	22.79
20	0.03	0.14	0.46	2.63	7.3	22.79
25	0.03	0.14	0.46	2.63	7.1	22.79
30	0.03	0.14	0.46	2.43	7.1	22.59
35	0.03	0.14	0.44	2.43	7.1	22.59
40	0.03	0.14	0.44	2.43	6.92	22.59
50	0.03	0.14	0.44	2.43	6.92	22.59
60	0.03	0.14	0.43	2.39	6.72	21.83
70	0.03	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
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
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
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 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 (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 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) 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

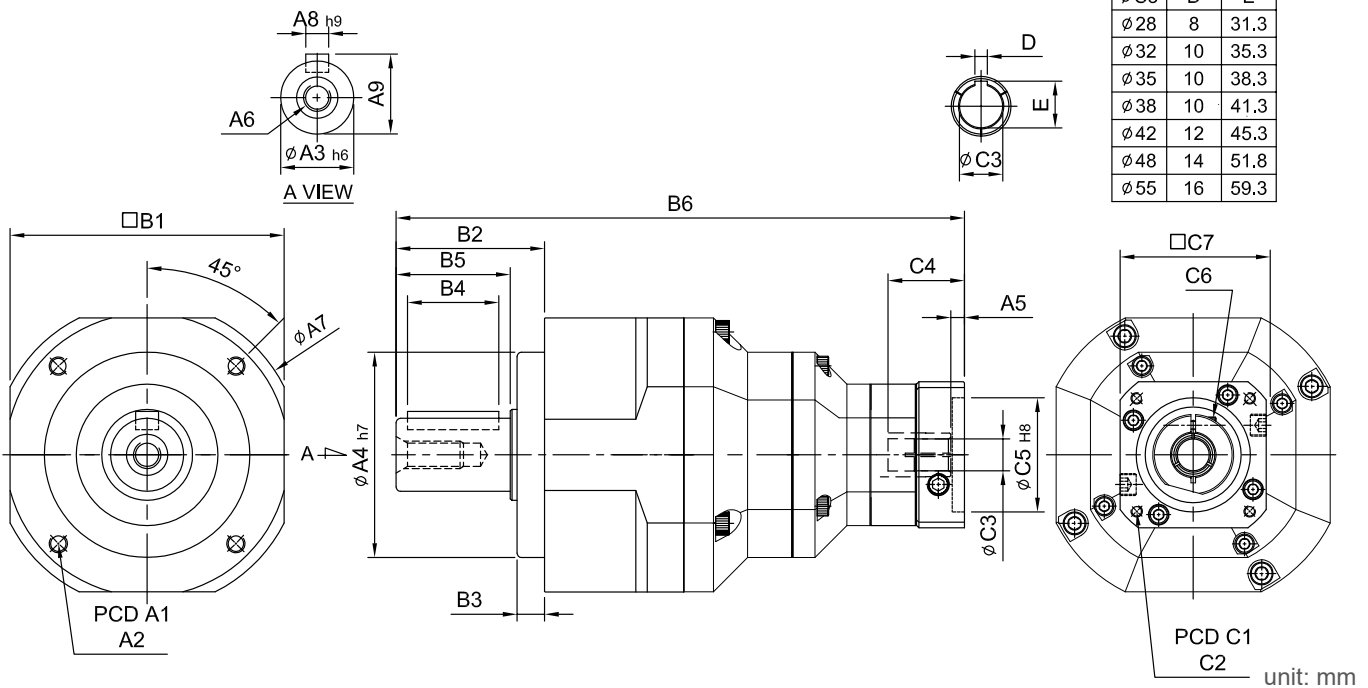
三段 3-Stage

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 Model No.	代號	單位 Unit	速比 Ratio	90	120	142	180	220
額定輸出扭矩 Rated Output Torque (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) 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

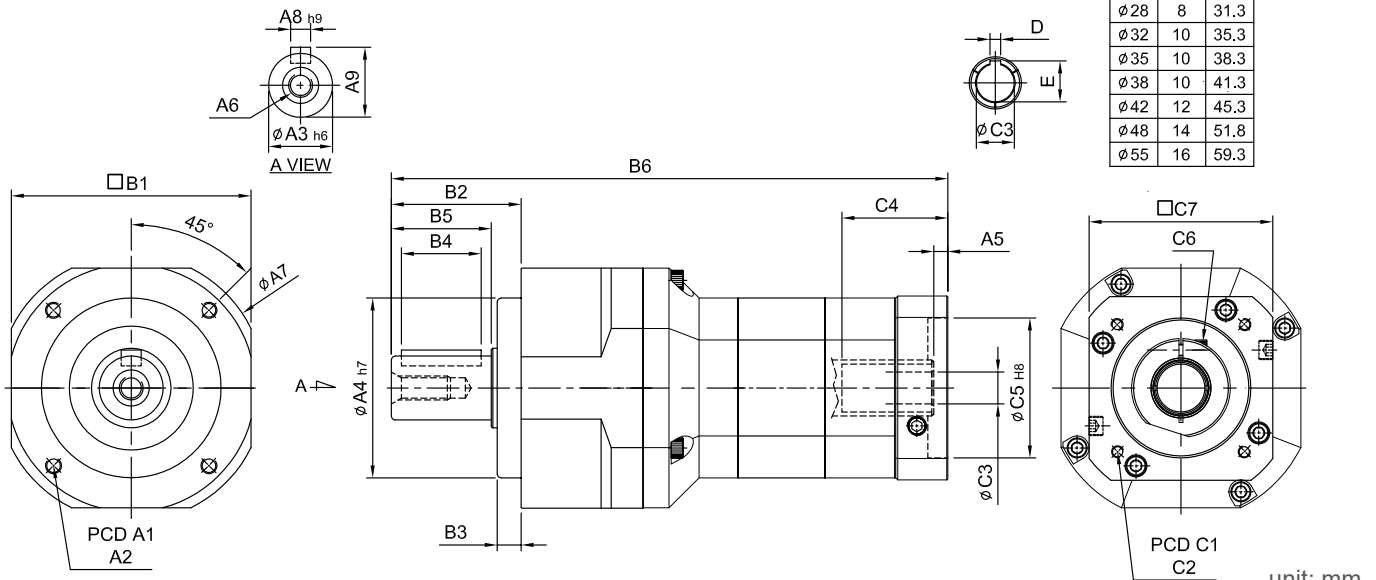
三段 3-Stage

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 Model No.	代號	單位 Unit	速比 Ratio	62A	90A	120A	142A	180A	220A
額定輸出扭矩 Rated Output Torque (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) 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

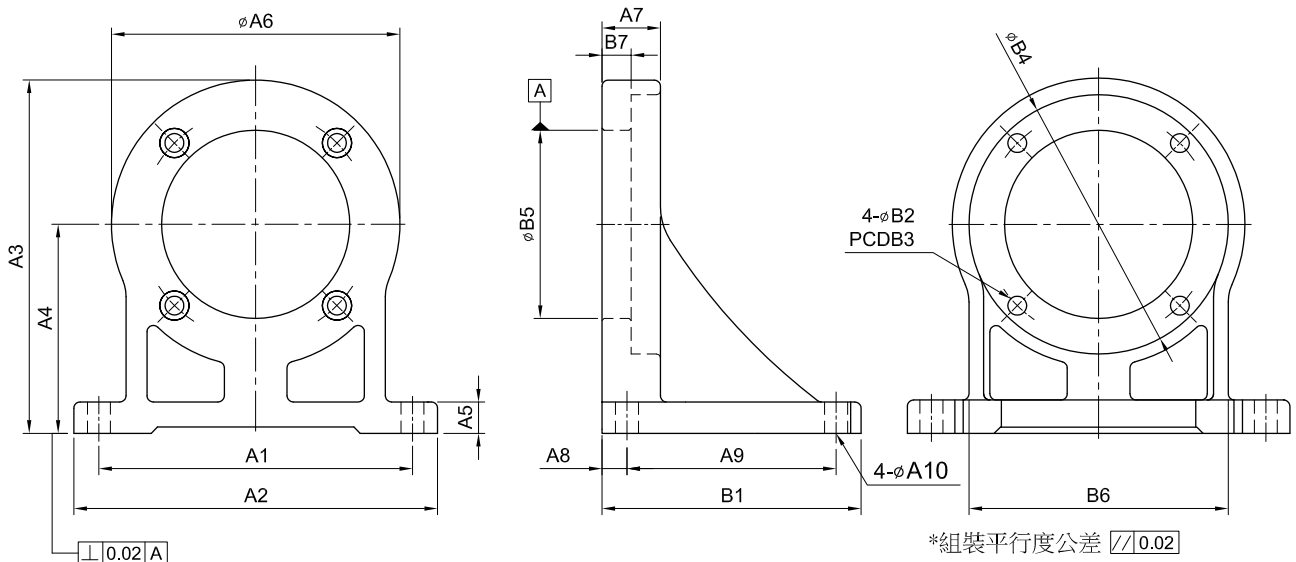
## Accessories for SE

### SE 選配件



## L Type Base Kits

L 型腳座



unit: mm

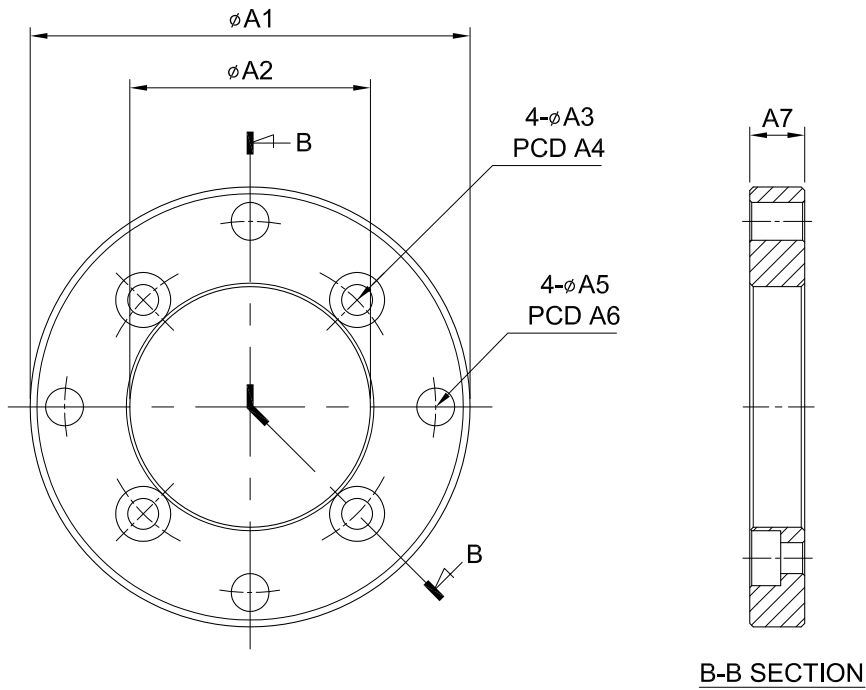
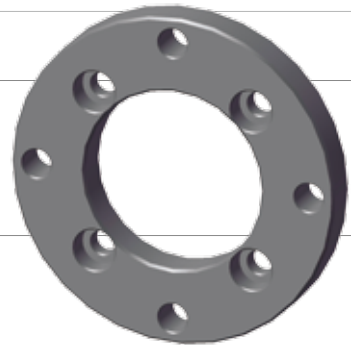
Model Code	44	62	90	120	142	180	220
<b>A</b> A1	70	90	110	150	190	240	280
A2	88	108	130	176	220	276	330
A3	75.5	95.5	127	170	207.5	274	334
A4	45	55	75	100	120	160	200
A5	8	9	11	16	19	24	30
A6	60	81	104	140	175	228	268
A7	13	16	21	28	35	45	60
A8	10	10	11	14	16	19	26
A9	40	50	75	100	120	160	200
A10	Ø7	Ø7	Ø9	Ø11	Ø13	Ø17	Ø21
<b>B</b> 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
<b>C</b> 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	

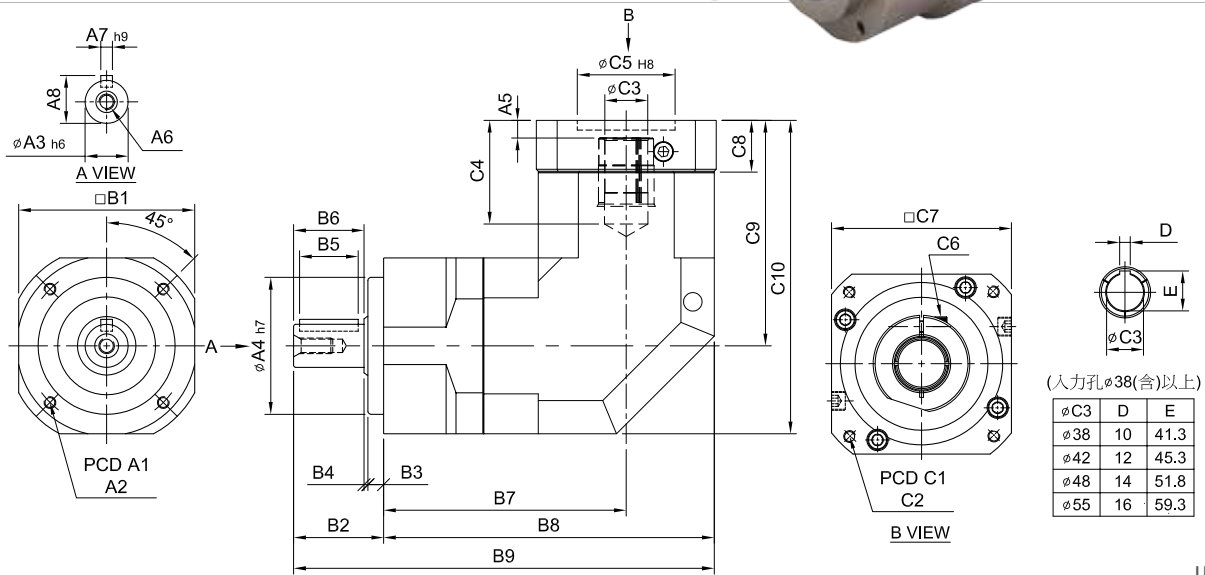
# SERVOBOX Planetary Reducers



## MODEL : SEL

單段 1-Stage

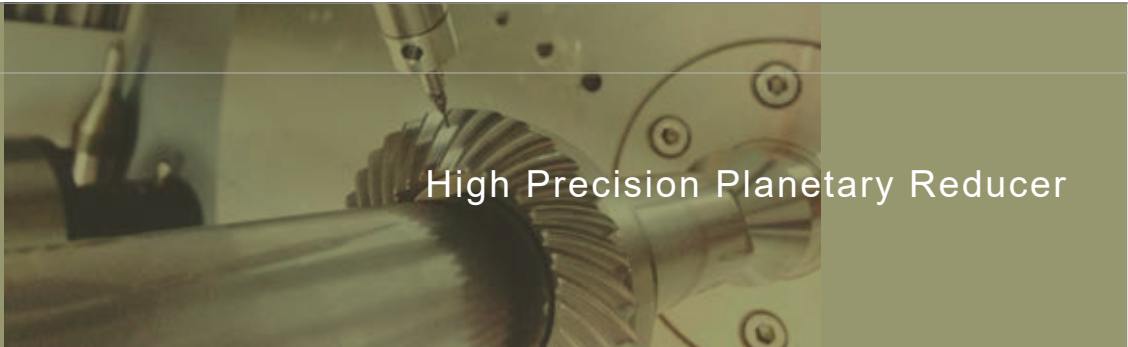
RATIO : 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20



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 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 (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 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) 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>)

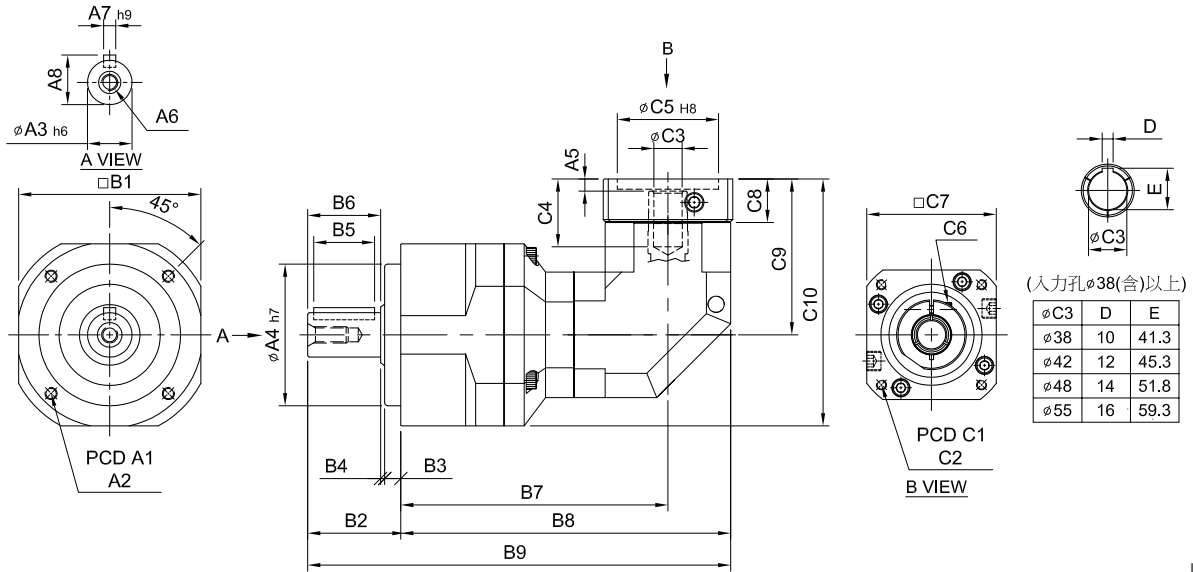
Ratio	44	62	90	120	142	180	220
3	0.09	0.36	2.28	6.85	23.5	68.2	135
4	0.09	0.36	2.28	6.85	23.5	68.2	135
5	0.09	0.36	2.28	6.85	23.5	68.2	135
6	0.09	0.36	2.28	6.85	23.5	68.2	135
7	0.09	0.36	2.28	6.85	23.5	68.2	135
8	0.09	0.36	2.28	6.85	23.5	68.2	135
9	0.09	0.36	2.28	6.85	23.5	68.2	135
10	0.09	0.36	2.28	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

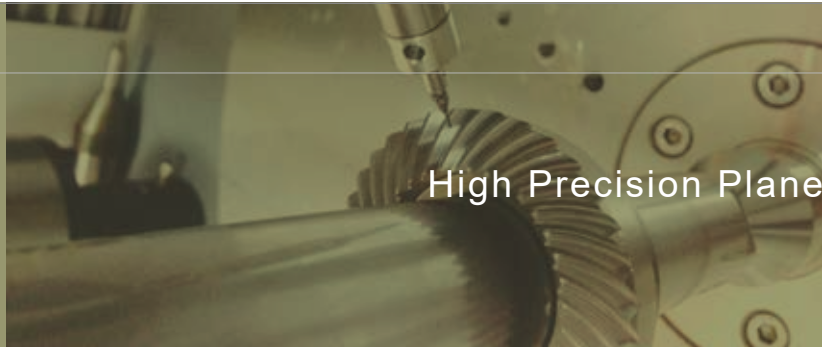
雙段 2-Stage

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 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 (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 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) 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>)

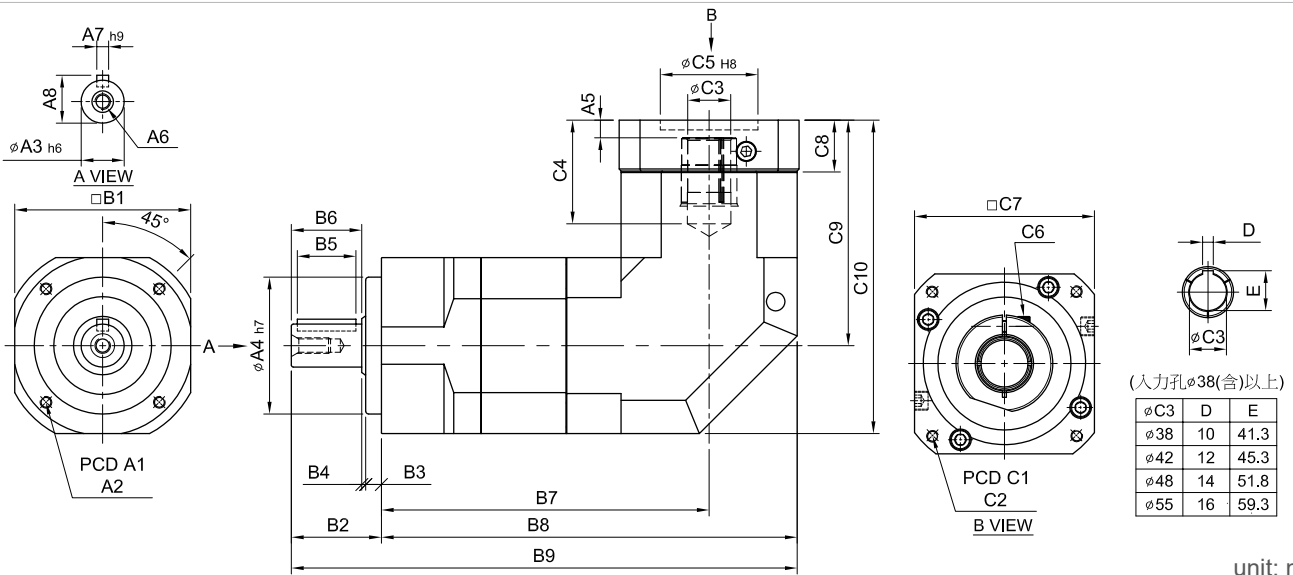
Ratio	62	90	120	142	180	220
15	0.09	0.36	6.28	6.85	26.2	70.1
20	0.09	0.36	6.28	6.85	26.2	70.1
25	0.09	0.36	2.28	6.85	23.1	68.2
30	0.09	0.36	2.28	6.85	23.1	68.2
35	0.09	0.36	2.28	6.85	23.1	68.2
40	0.09	0.36	2.28	6.85	23.1	68.2
50	0.09	0.36	2.28	6.85	23.1	68.2
60	0.09	0.36	2.28	6.85	23.1	68.2
70	0.09	0.36	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

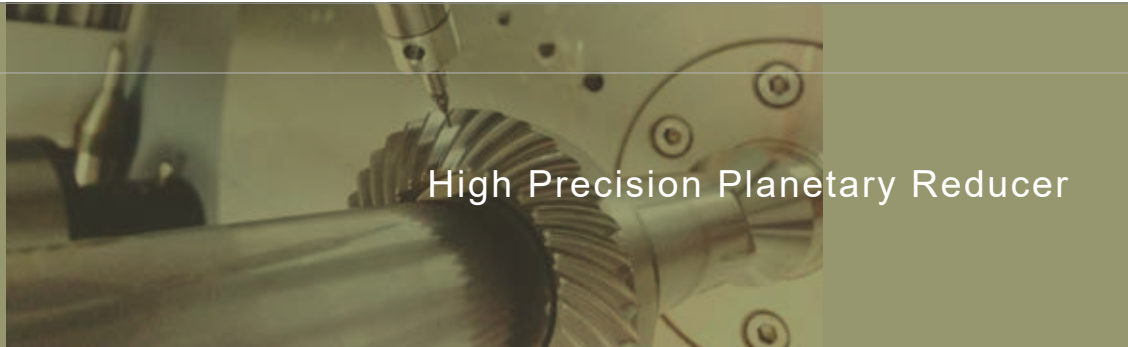
雙段 2-Stage

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 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 (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 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) 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 Type	型號 Model	速比 Ratio	出力軸承形式 Output Bearing	背隙等級 Backlash Class	馬達型號 Motor Type
SD SDL SDD	47 64 90 110 140 200 255	單段 1-Stage 4, 5, 7, 10  雙段 2-Stage 20, 25, 35, 40, 50, 70, 100	<input type="checkbox"/> 標準品・滾珠軸承 Standard (Ball Bearing) (47#~255#)  T: 滾錐軸承 Taper Bearing (90#~255#)	P <sub>s</sub> P <sub>0</sub> P <sub>1</sub> P <sub>2</sub>	馬達製造商及型號 Motor Brand & 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

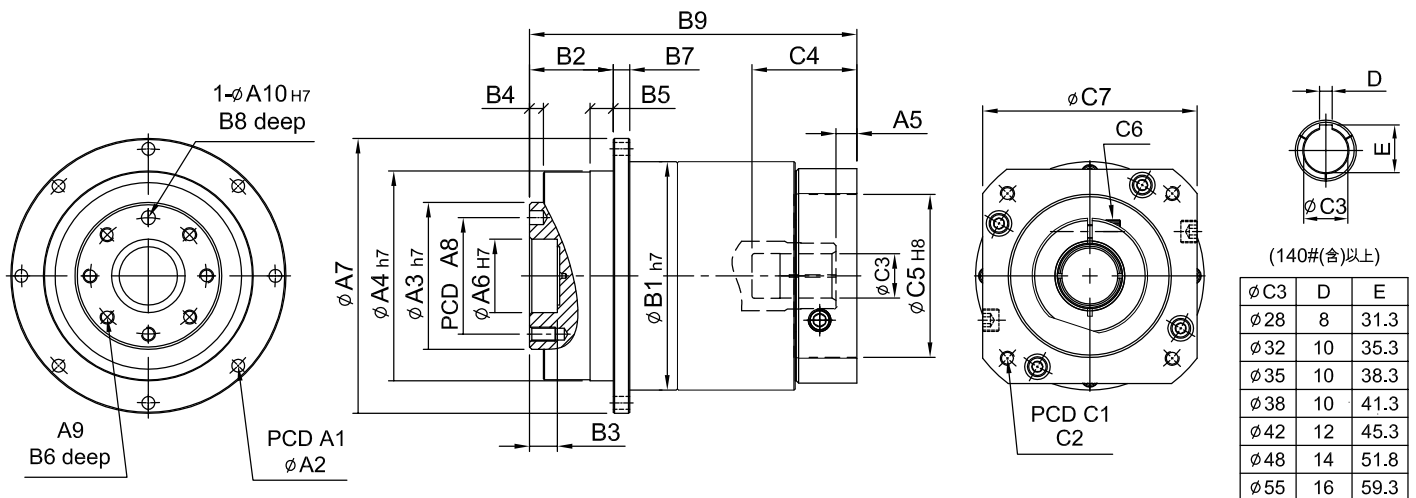
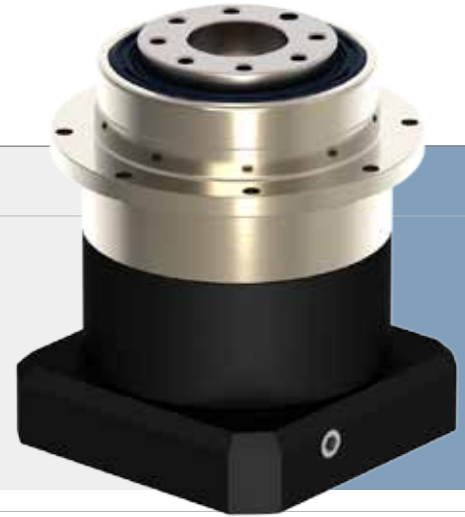
The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy. The entire structure is one-time machined for controlling accuracy in the specified tolerance.

# SERVOBOX Planetary Reducers

## MODEL : SD

單段 1-Stage

RATIO : 4, 5, 7, 10



(140#(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	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	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
<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	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
<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	24·28·32·35	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

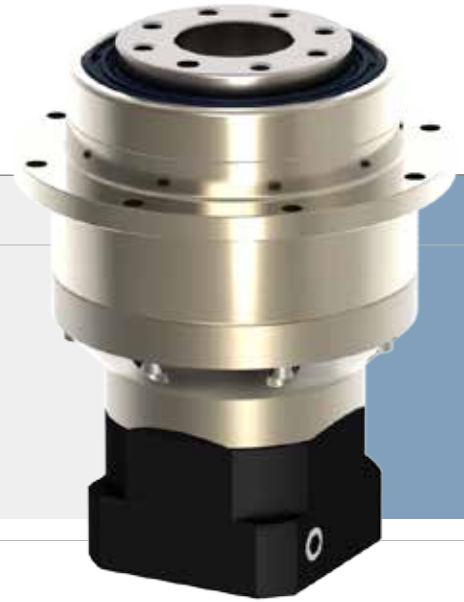
規格 Model No.	代號	單位 Unit	速比 Ratio	47	64	90	110	140	200	255
額定輸出扭矩 Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	4	22	60	160	335	650	1,200	2,020
			5	20	50	155	333	618	1,189	2,010
			7	19	47	142	309	573	1,108	1,870
			10	16	43	136	294	549	1,059	1,779
最大加速扭矩 Max. Acceleration Torque	$T_{2B}$	Nm	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 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 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 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 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 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 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 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) 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

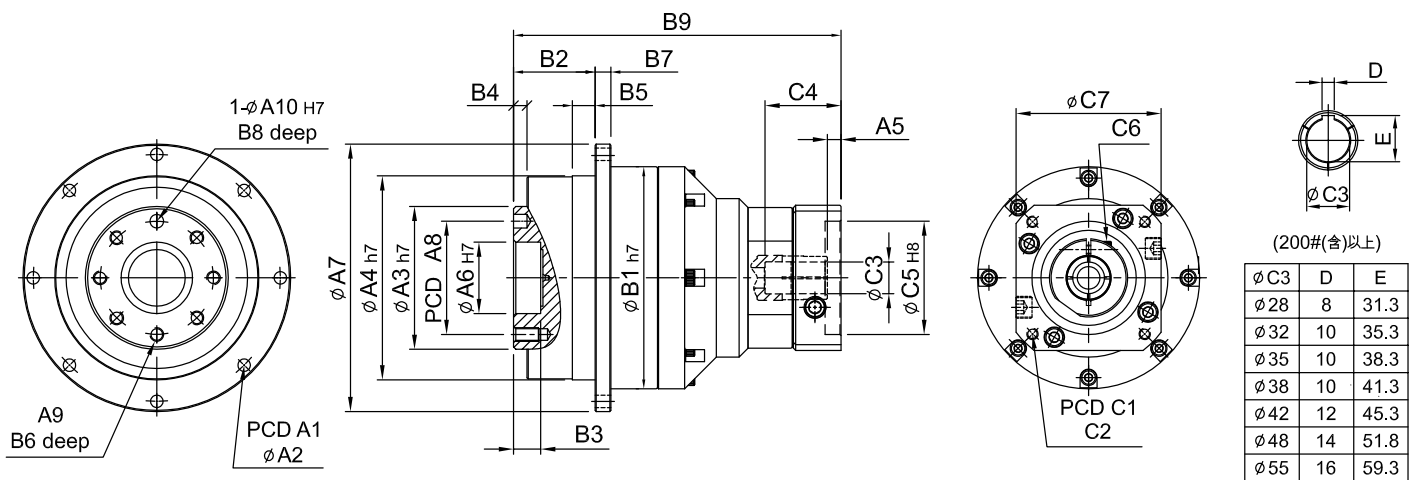
# SERVOBOX Planetary Reducers



## MODEL : SD

雙段 2-Stage

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



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	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
<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	100.7	109	144.5-152.5	189-203.5	224.5-234.5-244.5	290.5	349-351
<b>C</b> 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 Model No.	代號	單位 Unit	速比 Ratio	47	64	90	110	140	200	255
額定輸出扭矩 Rated Output Torque (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 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 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 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 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 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 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 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) 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>)

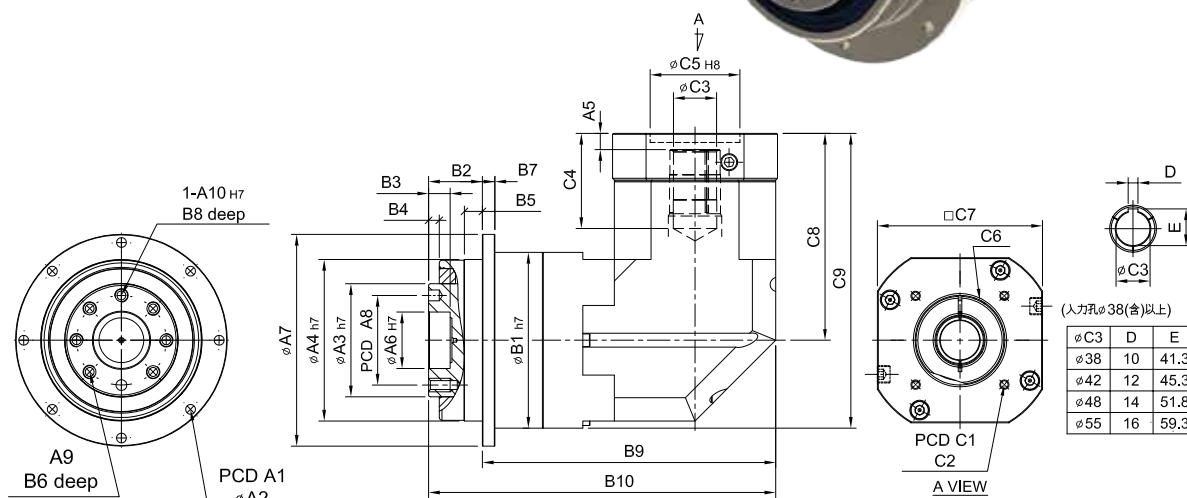
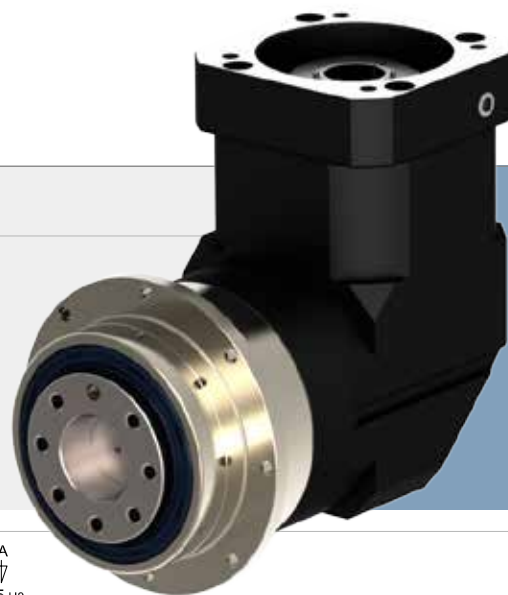
Ratio	47	64	90	110	140	200	255
20	0.03	0.03	0.15	0.45	2.7	7.22	23.22
25	0.03	0.03	0.15	0.45	2.7	7.22	23.22
35	0.03	0.03	0.15	0.45	2.7	7.22	23.22
40	0.03	0.03	0.15	0.45	2.7	7.22	23.22
50	0.03	0.03	0.14	0.4	2.6	7.05	23.07
70	0.03	0.03	0.14	0.4	2.6	7.05	23.07
100	0.03	0.03	0.14	0.4	2.6	7.01	22.67

# SERVOBOX Planetary Reducers

## MODEL : SDL

單段 1-Stage

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



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	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

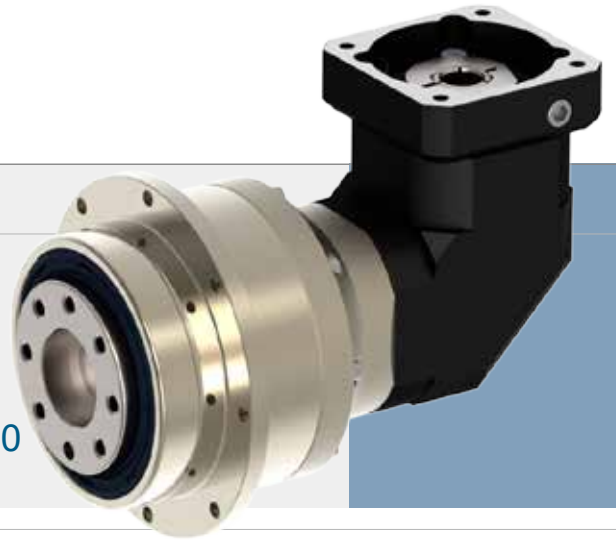
規格 Model No.	代號	單位 Unit	速比 Ratio	47	64	90	110	140	200	255
額定輸出扭矩 Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	4	22	60	160	335	650	1,200	2,020
			5	20	50	155	333	618	1,189	2,010
			7	19	47	142	309	573	1,108	1,870
			10	20	50	136	294	549	1,059	1,779
			14	19	47	142	309	573	1,108	1,870
			20	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 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 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 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 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 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 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 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) 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

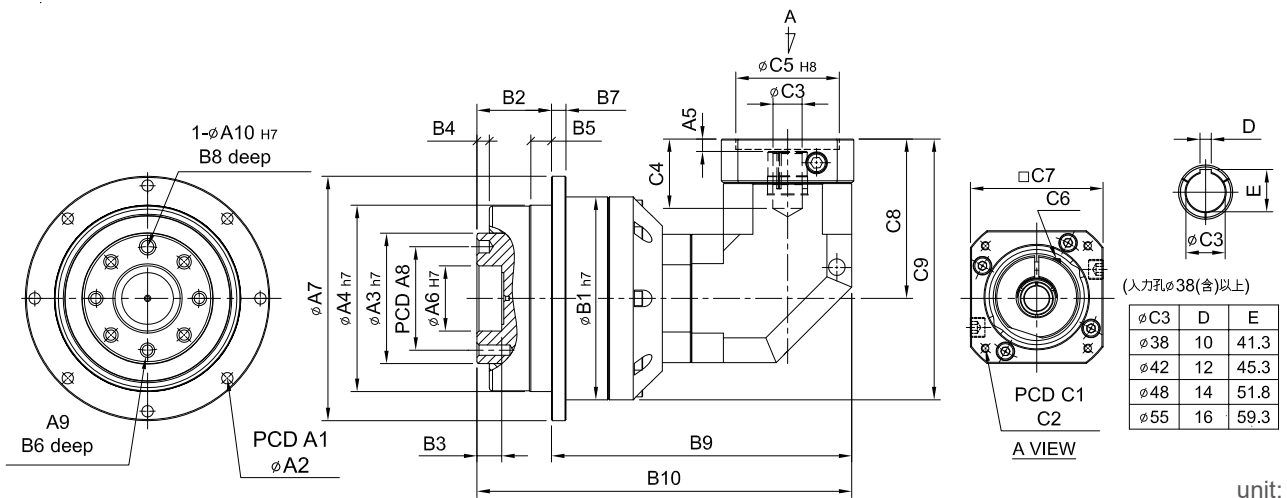
# SERVOBOX Planetary Reducers



## 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 Model No.	代號	單位 Unit	速比 Ratio	47	64	90	110	140	200	255
額定輸出扭矩 Rated Output Torque (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 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 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 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 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 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 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 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) 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>)

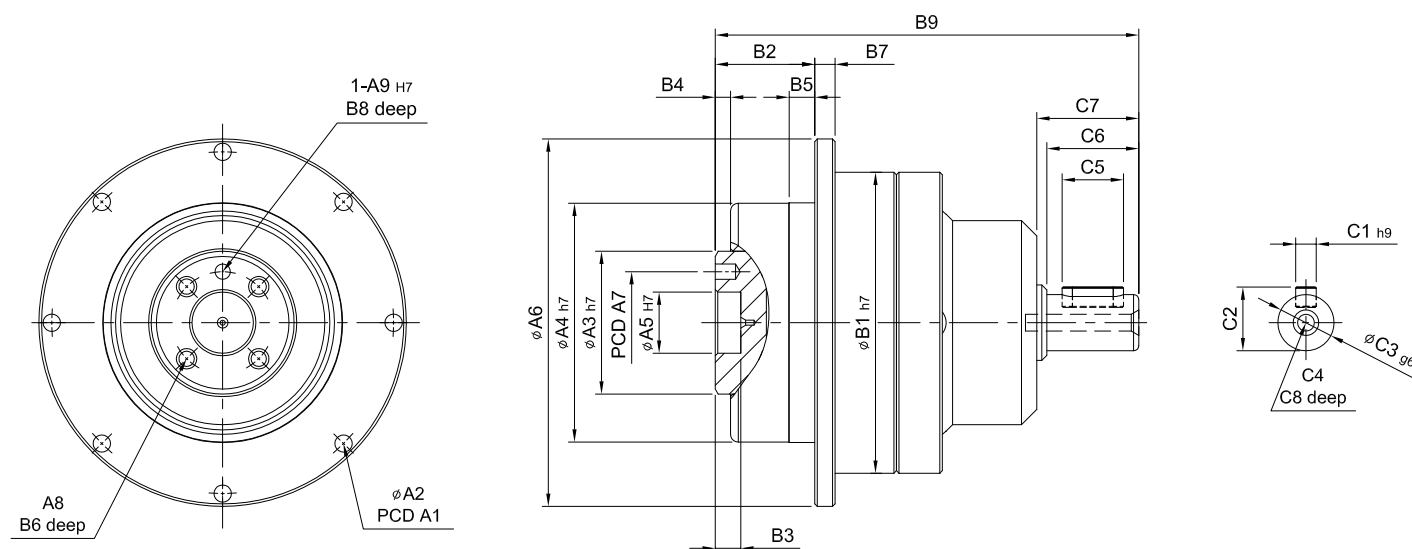
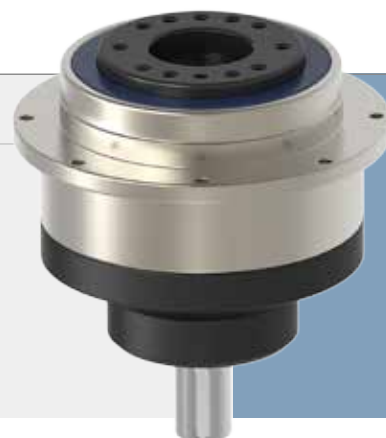
Ratio	47	64	90	110	140	200	255
20	0.09	0.36	2.28	6.85	23.5	22.8	68.2
25	0.09	0.36	2.28	6.85	23.5	22.8	68.2
35	0.09	0.36	2.28	6.85	23.5	22.8	68.2
40	0.09	0.36	2.28	6.85	23.5	22.8	68.2
50	0.09	0.36	2.28	6.85	23.5	22.8	68.2
70	0.09	0.36	2.28	6.85	23.5	22.8	68.2
100	0.09	0.36	2.28	6.85	23.5	22.8	68.2
140	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

# SERVOBOX 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 Model No.	代號	單位 Unit	速比 Ratio	47	64	90	110	140	200	255
額定輸出扭矩 Rated Output Torque (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 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 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 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 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 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 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 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) 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

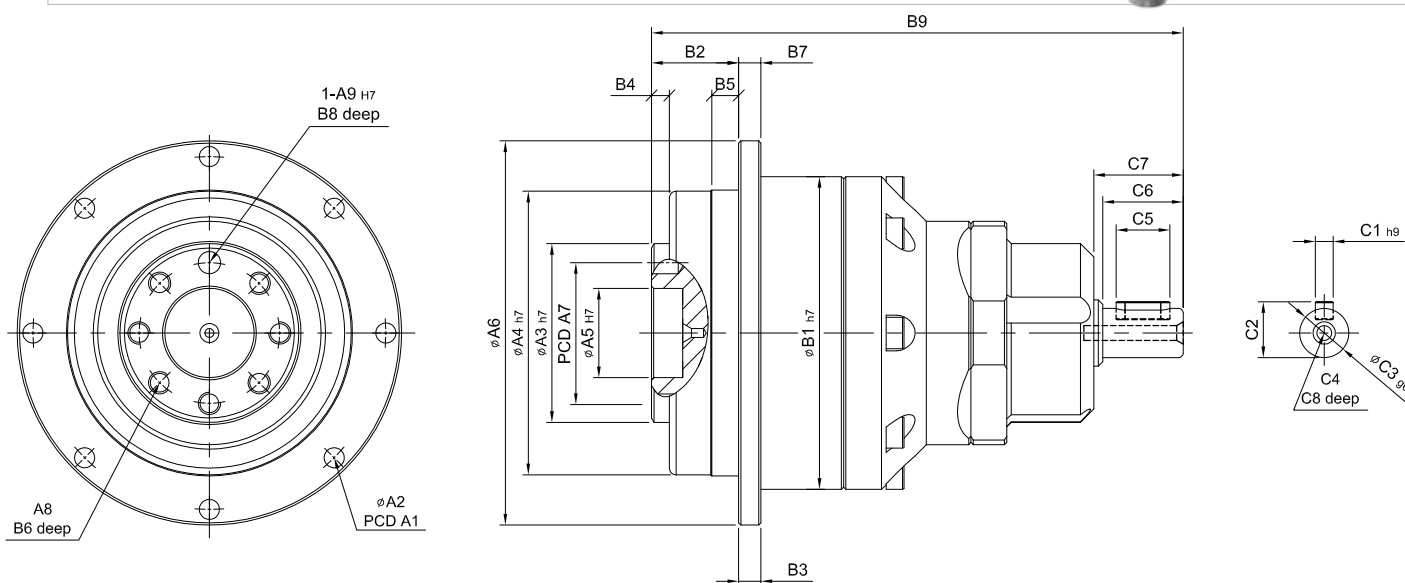
# SERVOBX Planetary Reducers



## 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
	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	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 Model No.	代號	單位 Unit	速比 Ratio	47	64	90	110	140	200	255
額定輸出扭矩 Rated Output Torque (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 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 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 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 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 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 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 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) 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>)

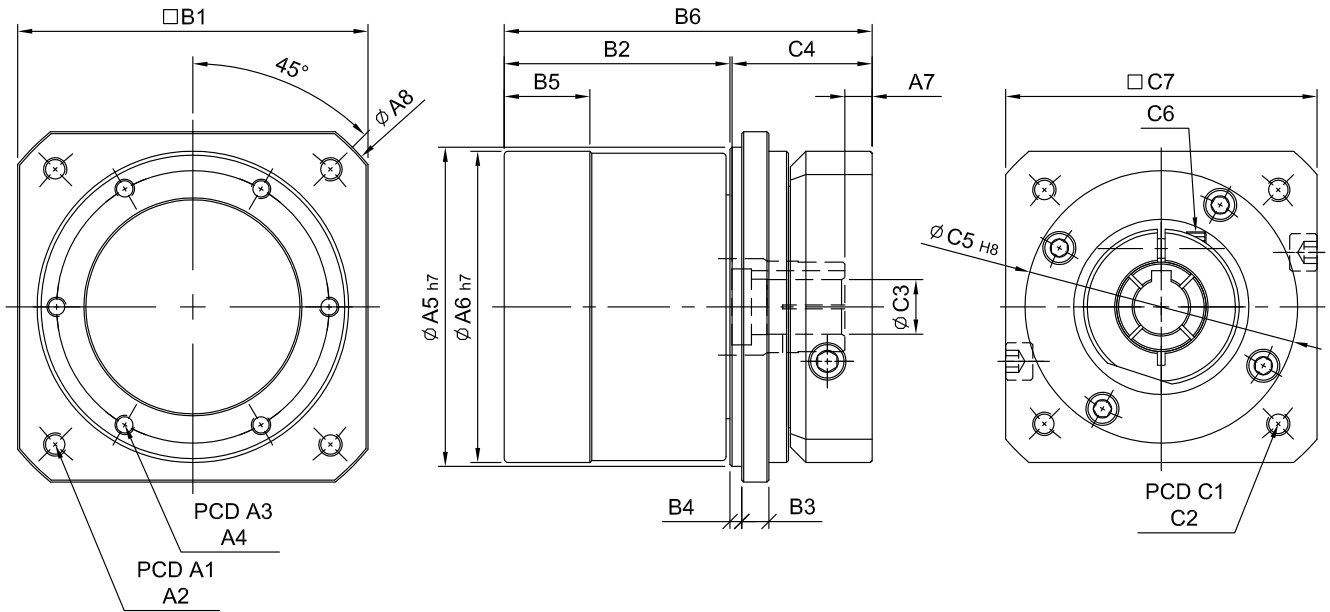
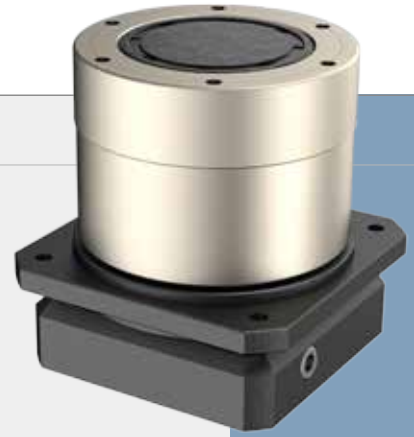
Ratio	47	64	90	110	140	200	255
20	0.03	0.03	0.15	0.45	2.7	7.22	23.22
25	0.03	0.03	0.15	0.45	2.7	7.22	23.22
35	0.03	0.03	0.15	0.45	2.7	7.22	23.22
40	0.03	0.03	0.15	0.45	2.7	7.22	23.22
50	0.03	0.03	0.14	0.4	2.6	7.05	23.07
70	0.03	0.03	0.14	0.4	2.6	7.05	23.07
100	0.03	0.03	0.14	0.4	2.6	7.01	22.67

# SERVOBOX Planetary Reducers

## MODEL : SR

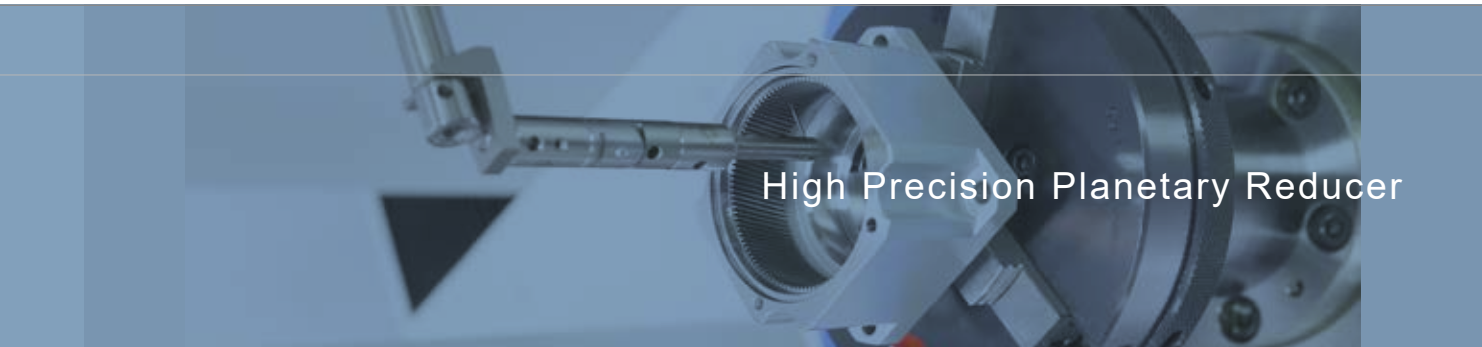
單段 1-Stage

RATIO : 2, 3, 4, 6, 9



unit: mm

Model		82	100	132
A	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	8·17	11.5
B	A8	116	139	184
	B1	90	108	140
	B2	58	63	85.5
	B3	7	9.5	12
	B4	3	3.5	4
	B5	22	24	34
C	B6	94.5	111.5	143
	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 Model No.	代號	單位 Unit	速比 Ratio	82	100	132
額定輸出扭矩 Rated Output Torque (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 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	$L_{H1}$	hr	2 ~ 9	S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs) 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		

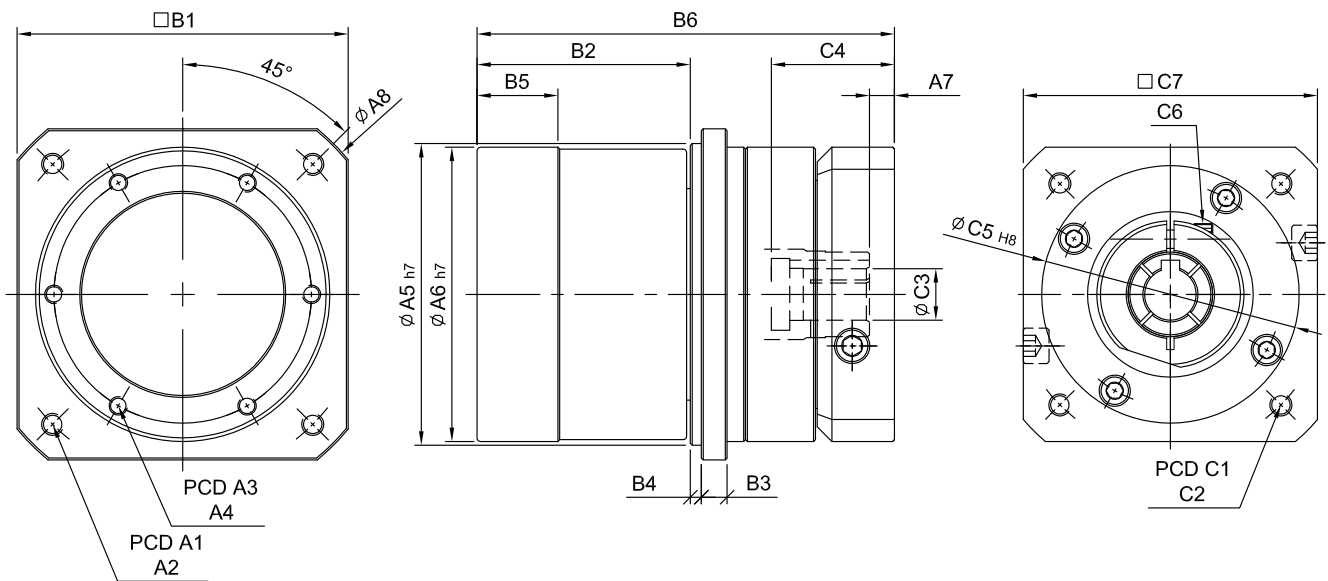
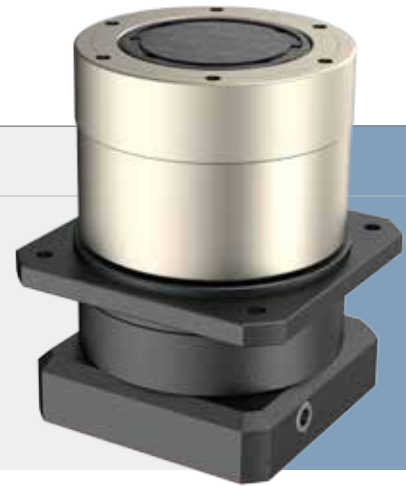
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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

## 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 Model No.	代號	單位 Unit	速比 Ratio	82	100	132
額定輸出扭矩 Rated Output Torque (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 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) 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

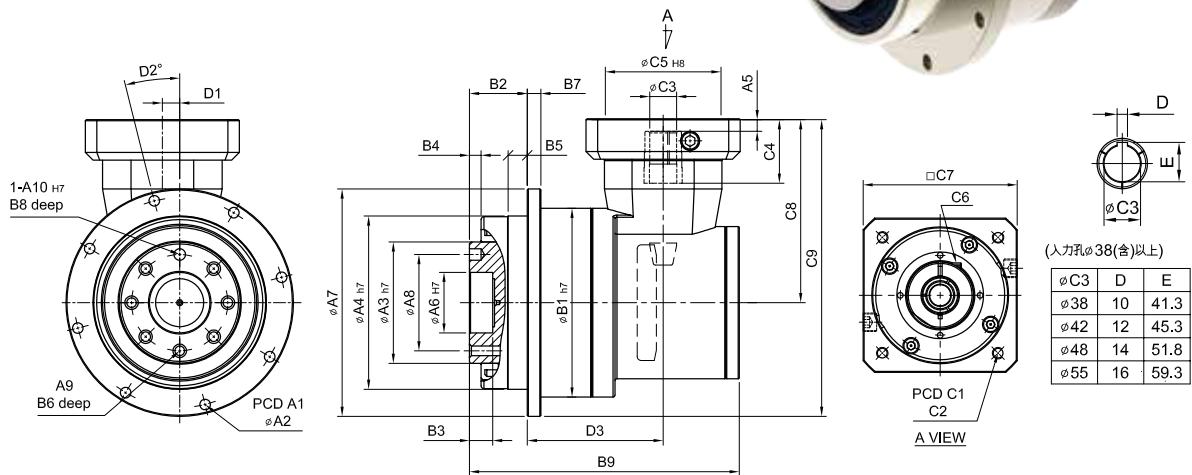
# SERVOBOX Planetary Reducers

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 Model No.	代號	單位 Unit	速比 Ratio	64	90	110	140	200	255
額定輸出扭矩 Rated Output Torque (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 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 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 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 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 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 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 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) 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.

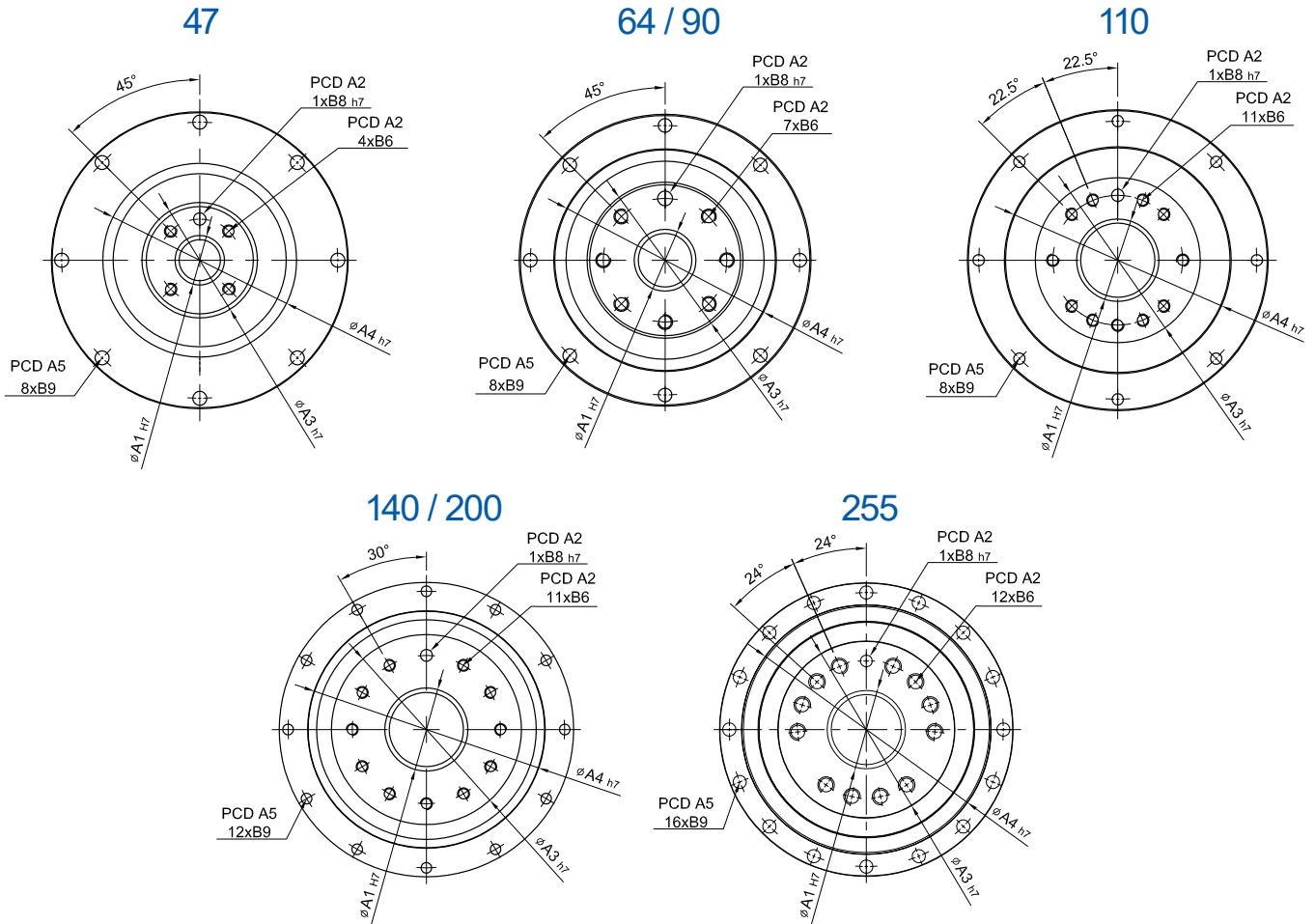
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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

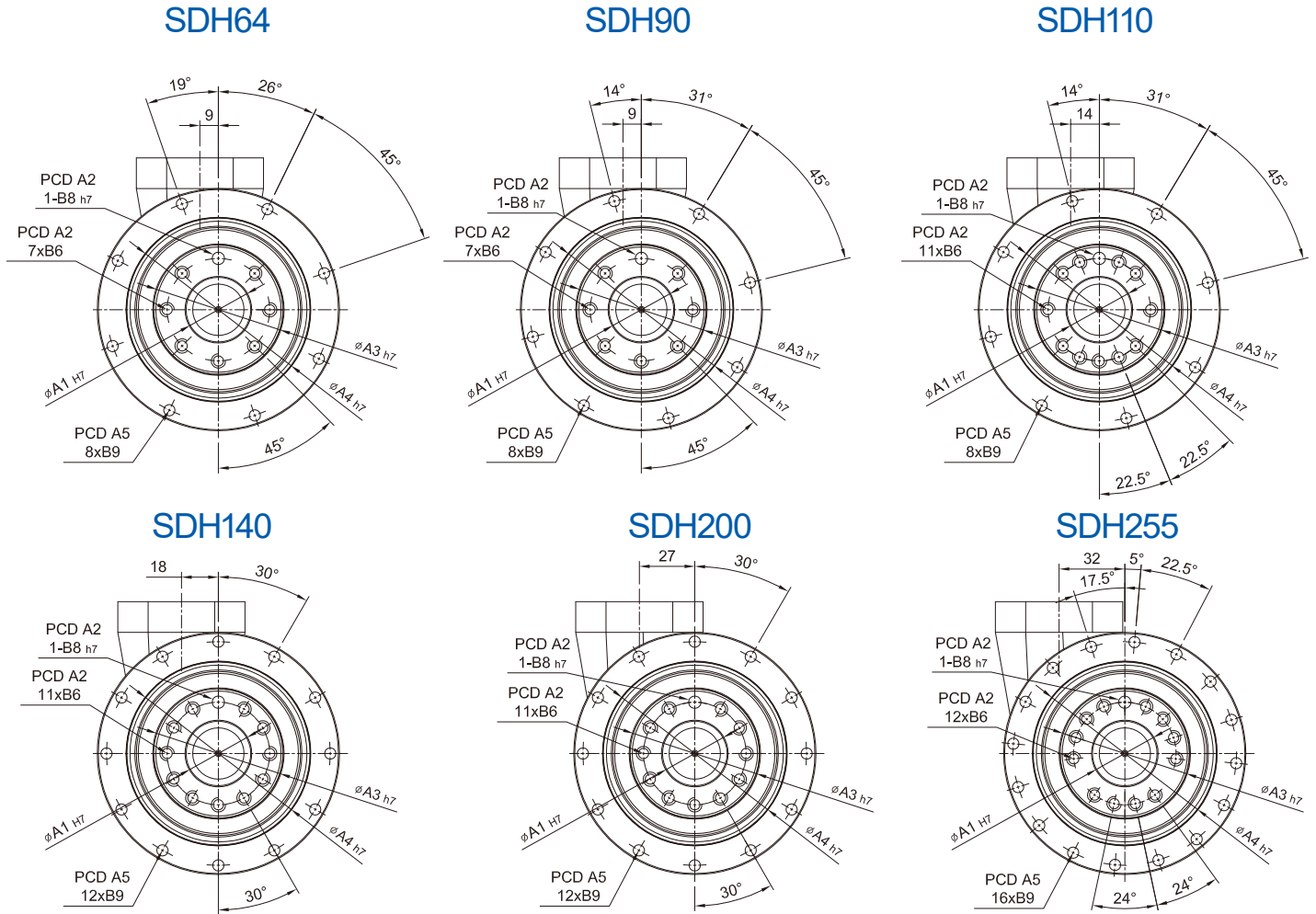
unit: mm

Model Code	47	64	90	110	140	200	255
	<b>A</b>						
A1	12	20	31.5	40	50	80	100
A2	20	31.5	50	63	80	125	140
A3	28	40	63	80	100	160	180
A4	47	64	90	110	140	200	255
A5	67	79	109	135	168	233	280
<b>B</b>							
B6	M3 x P0.5	M5 x P0.8	M6 x P1	M6 x P1	M8 x P1.25	M10 x P1.5	M16 x P2
B8	3	5	6	6	8	10	12
B9	3.4	4.5	5.5	5.5	6.6	9	13.5



# Output Frame Dimension of SDH Series

## SDH 系列出力法蘭尺寸表



### 雙段 2-Stage SDH

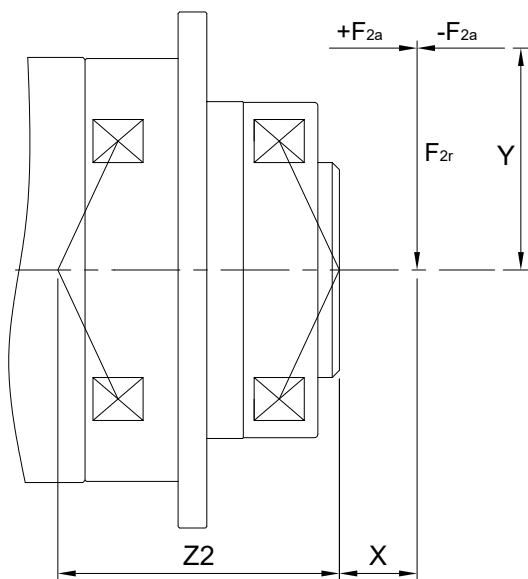
unit: mm

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 Type	型號 Model	速比 Ratio	出力軸鍵槽 Output Bearing	背隙等級 Backlash Class	馬達型號 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

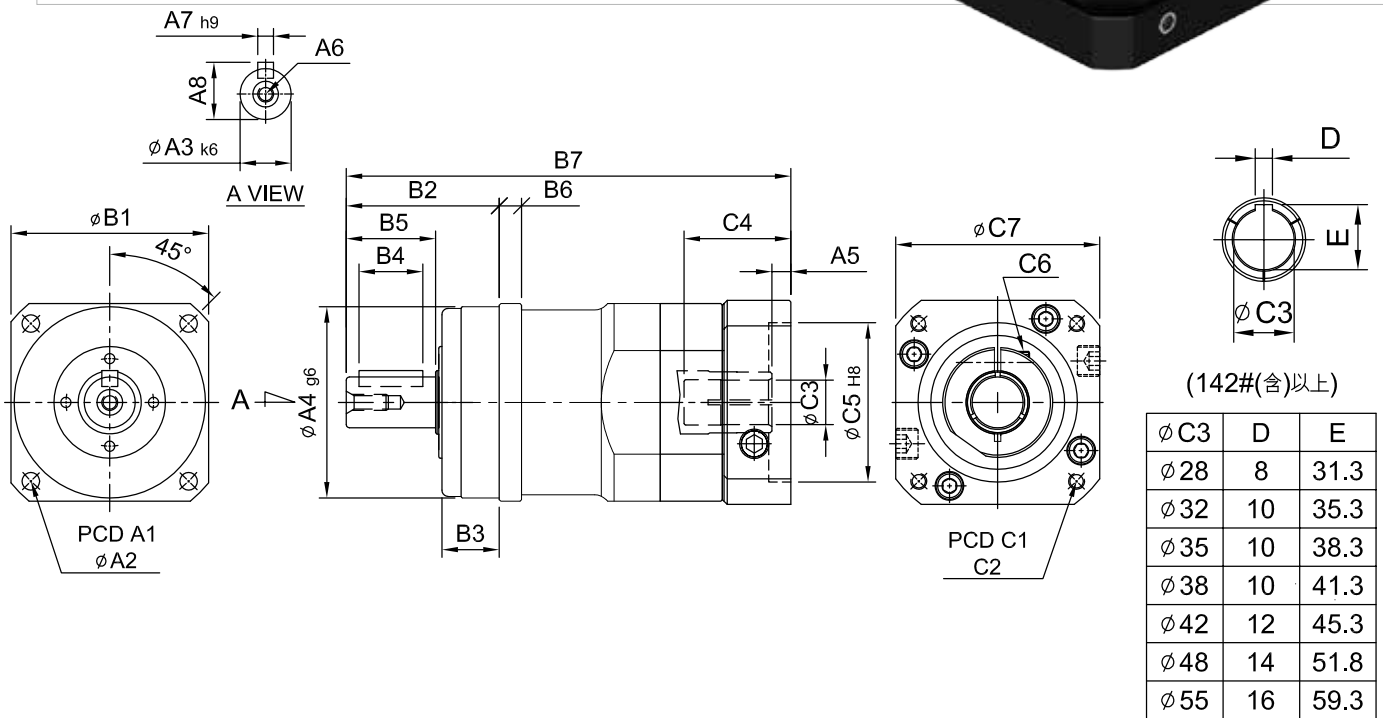
The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy.

# SERVOBOX Planetary Reducers

## MODEL : SF

單段 1-Stage

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



unit: mm

Model Code	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 Model No.	代號	單位 Unit	速比 Ratio	62	75	100	142	180
額定輸出扭矩 Rated Output Torque (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 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) 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>)

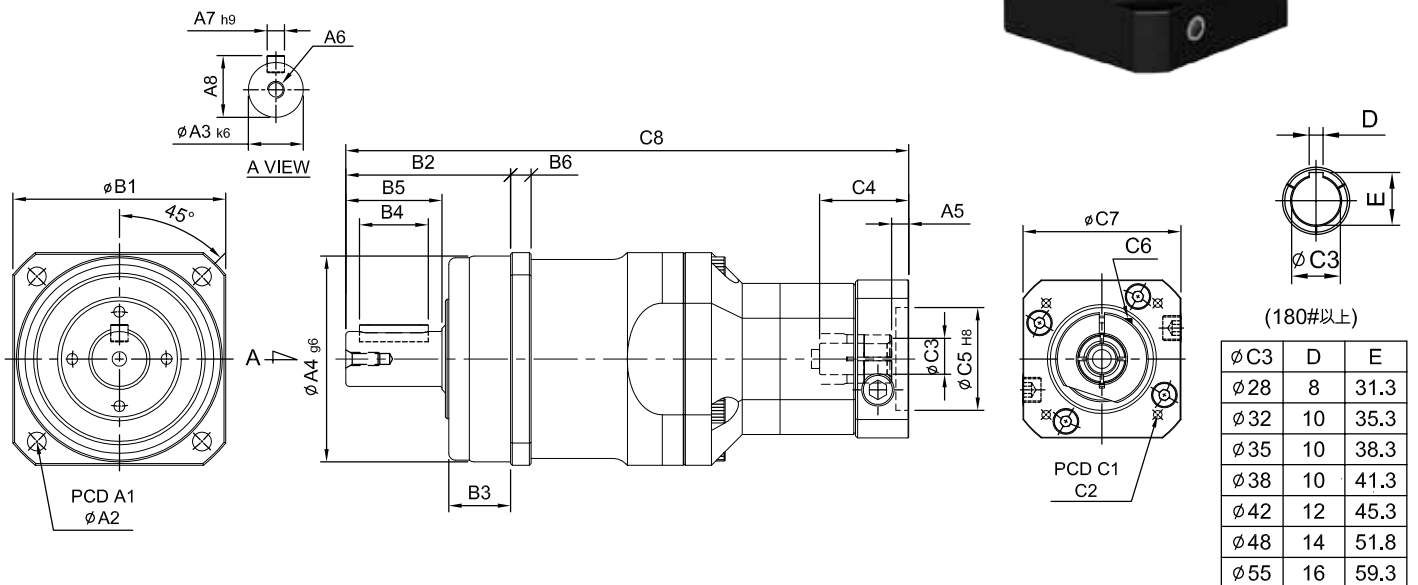
速比 Ratio	62	75	100	142	180
3	0.15	0.60	3.21	9.18	28.82
4	0.14	0.51	2.80	7.51	23.56
5	0.13	0.45	2.71	7.40	23.74
6	0.13	0.45	2.65	7.15	22.65
7	0.12	0.42	2.54	7.15	22.40
8	0.12	0.42	2.51	7.01	22.35
9	0.12	0.42	2.51	7.01	22.35
10	0.12	0.42	2.51	7.01	22.35

# 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

## 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 Rated Output Torque (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 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) 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>)

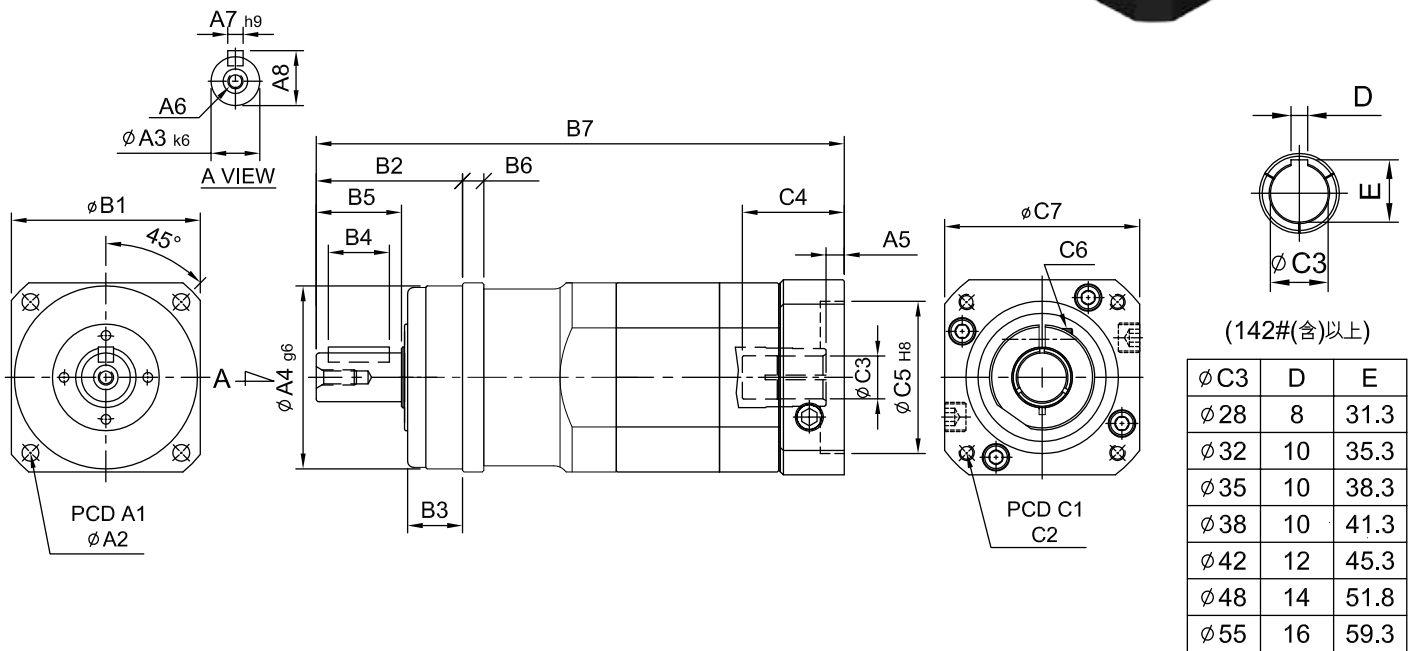
速比 Ratio	62	75	100	142	180
15	0.03	0.13	0.47	2.63	7.30
20	0.03	0.13	0.47	2.63	7.30
25	0.03	0.13	0.47	2.63	7.10
30	0.03	0.13	0.47	2.43	7.10
35	0.03	0.13	0.47	2.43	7.10
40	0.03	0.13	0.47	2.43	6.92
50	0.03	0.13	0.44	2.43	6.92
60	0.03	0.13	0.44	2.39	6.72
70	0.03	0.13	0.44	2.39	6.72
80	0.03	0.13	0.44	2.39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

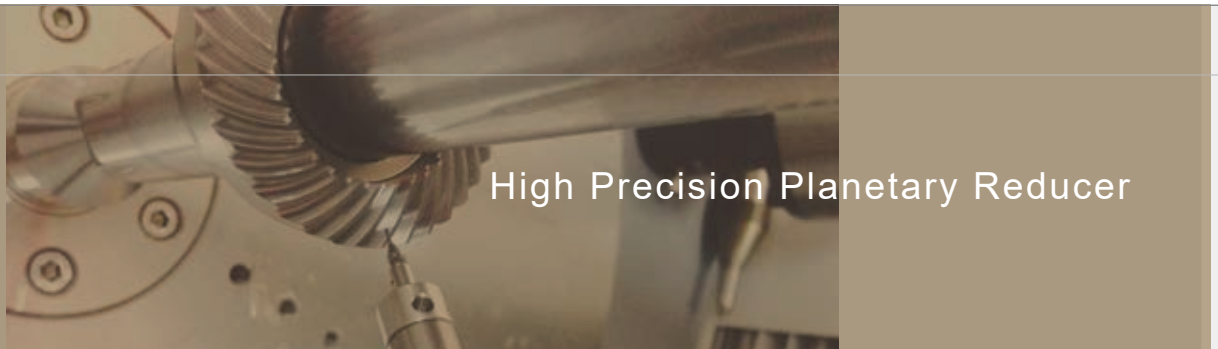
雙段 2-Stage

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



unit: mm

Model Code	unit: mm				
	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



規格 Model No.	代號	單位 Unit	速比 Ratio	62A	75A	100A	142A	180A
額定輸出扭矩 Rated Output Torque (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 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) 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>)

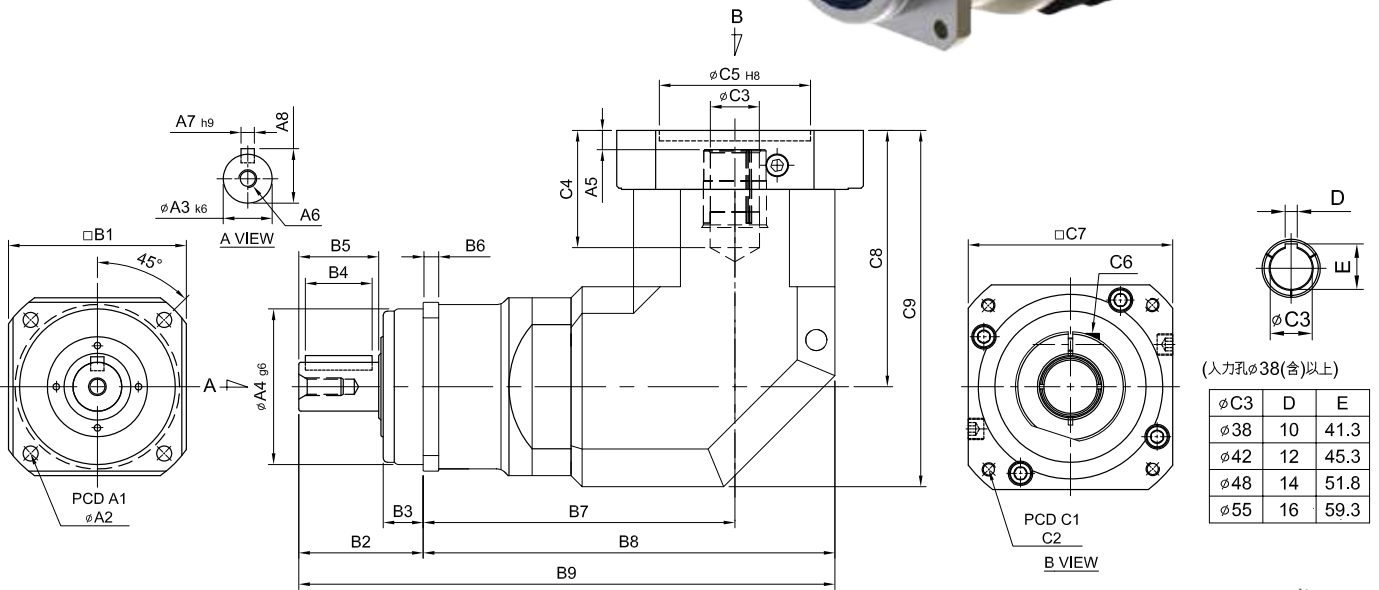
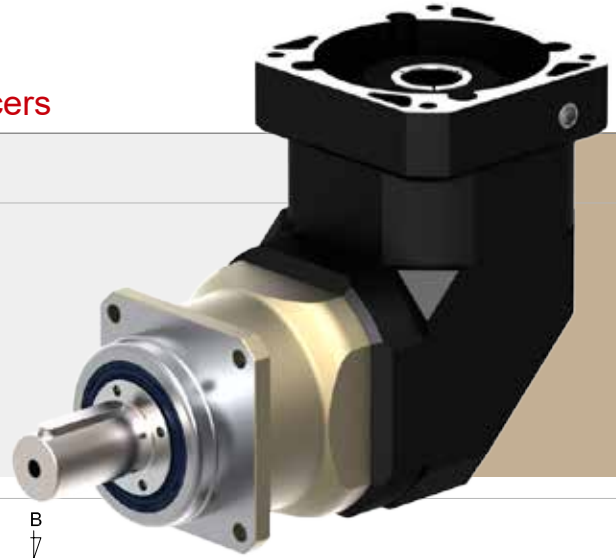
速比 Ratio	62A	75A	100A	142A	180A
15	0.15	0.60	3.21	9.18	28.82
20	0.14	0.51	2.80	7.51	23.56
25	0.13	0.45	2.71	7.40	23.24
30	0.15	0.60	3.21	9.18	28.82
35	0.12	0.42	2.54	7.15	22.40
40	0.14	0.51	2.80	7.51	23.56
50	0.13	0.45	2.71	7.40	23.24
70	0.12	0.42	2.54	7.15	22.40
100	0.12	0.42	2.51	7.01	22.35

# SERVOBOX Planetary Reducers

## MODEL : SFL

單段 1-Stage

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



(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 Code	62	75	100	142	180
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
A9	18	24.5	35	43	59
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
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



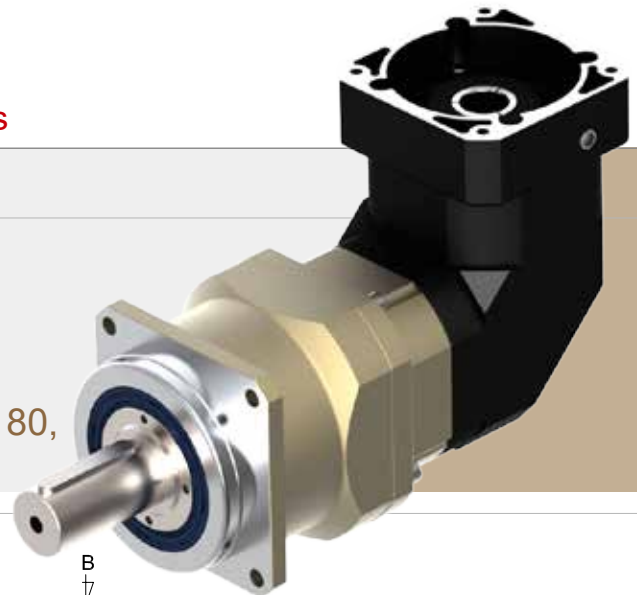
## High Precision Planetary Reducer

規格 Model No.	代號	單位 Unit	速比 Ratio	62	75	100	142	180
額定輸出扭矩 Rated Output Torque (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 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) 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

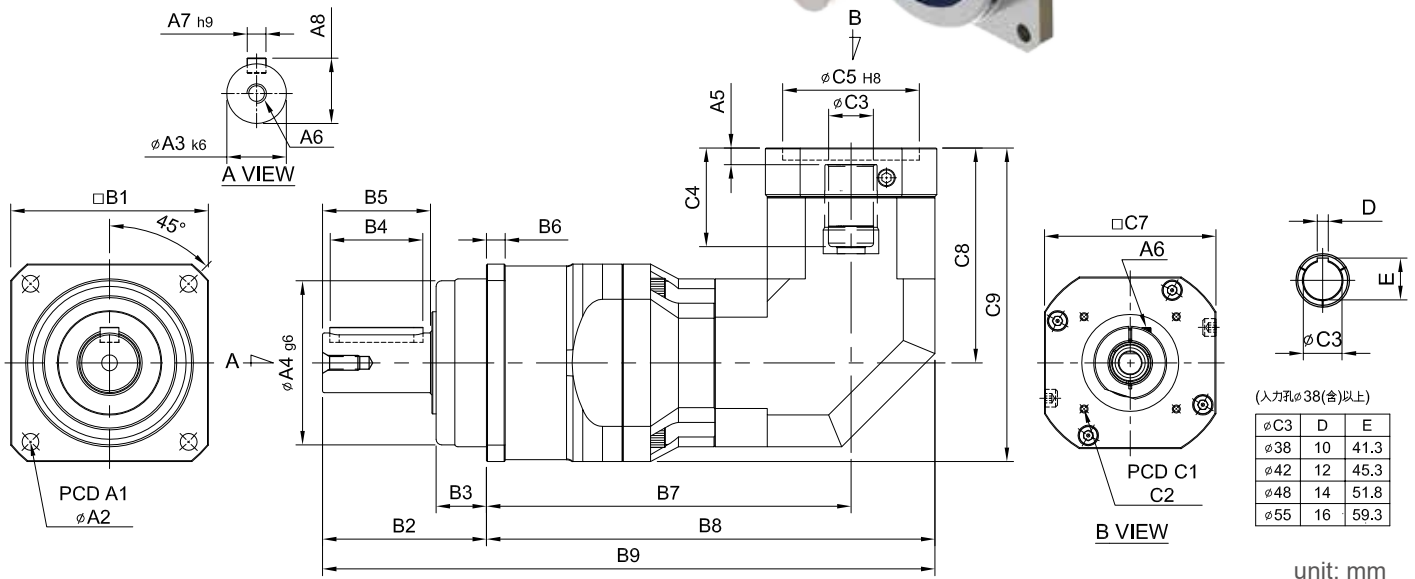
# SERVOBOX Planetary Reducers



## 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	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 Rated Output Torque (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 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) 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>)

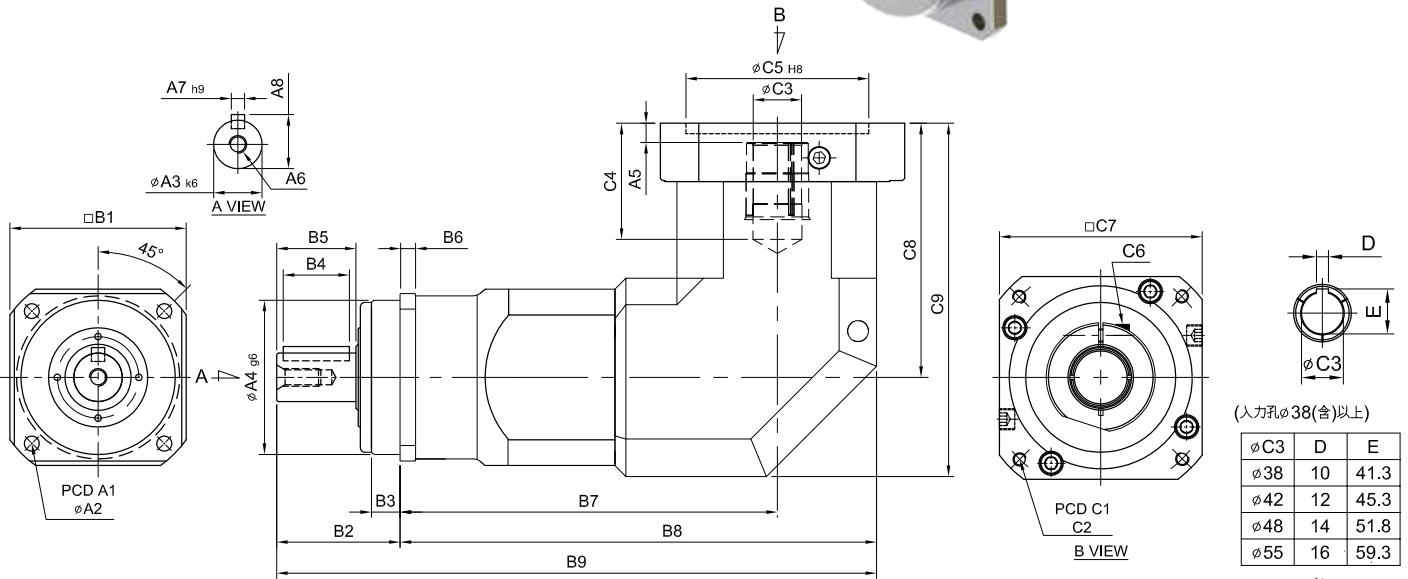
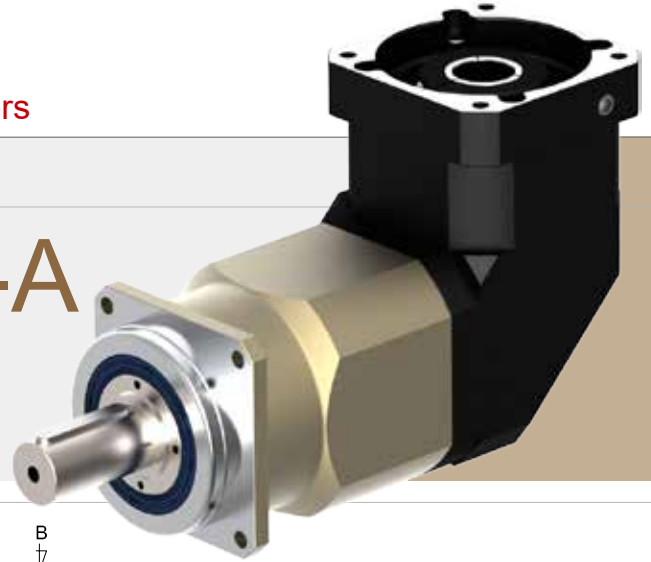
速比 Ratio	62	75	100	142	180
15	0.09	0.34	2.20	6.85	26.2
20	0.09	0.34	2.20	6.85	26.2
25	0.09	0.34	2.20	6.85	23.1
30	0.09	0.34	2.20	6.85	23.1
35	0.09	0.34	2.20	6.85	23.1
40	0.09	0.34	2.20	6.85	23.1
50	0.09	0.34	2.20	6.85	23.1
60	0.09	0.34	2.20	6.85	23.1
70	0.09	0.34	2.20	6.85	23.1
80	0.09	0.34	2.20	6.85	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

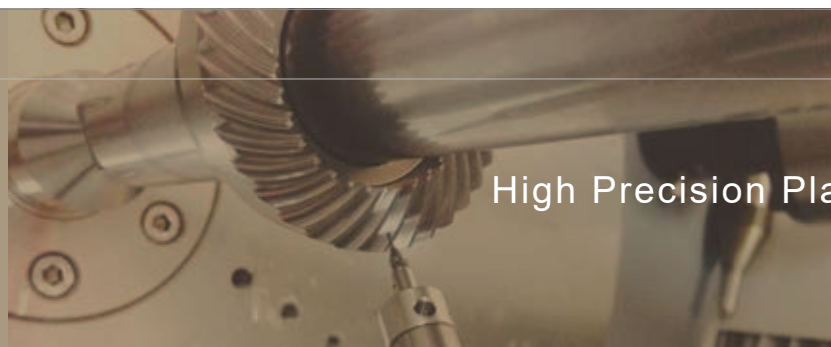


(入力孔φ38(含)以上)

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

unit: mm

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 Model No.	代號	單位 Unit	速比 Ratio	62A	75A	100A	142A	180A
額定輸出扭矩 Rated Output Torque (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 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) 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

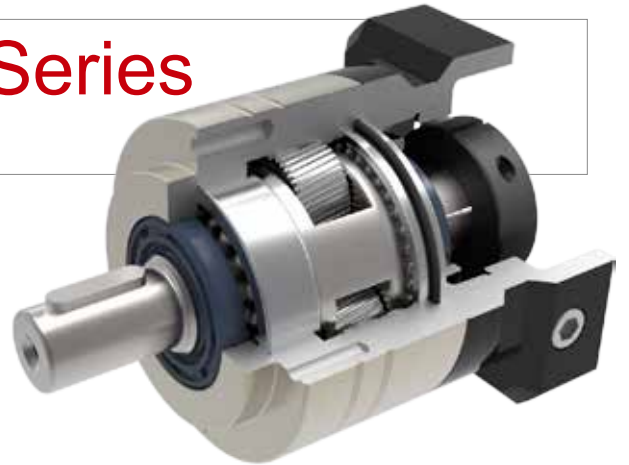
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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



### 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.

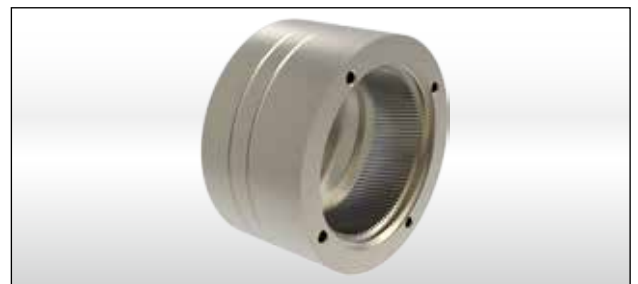


### 筒夾式連結機構

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

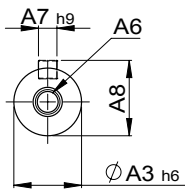
The gear box and internal ring gear are one-piece constructed to achieve high rigidity and high torque.

# SERVOBOX Planetary Reducers

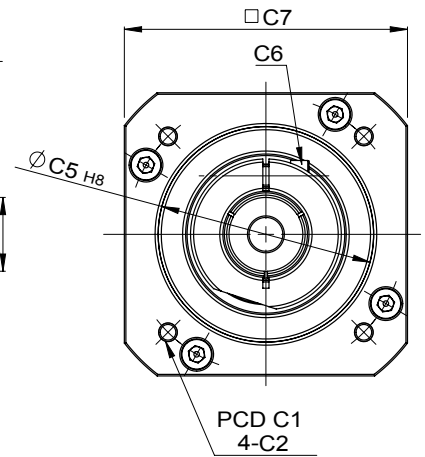
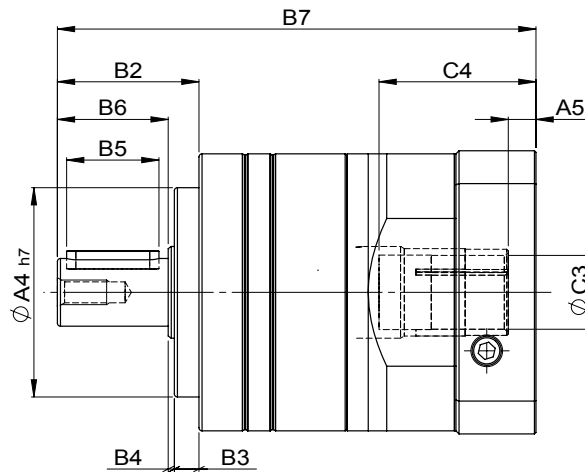
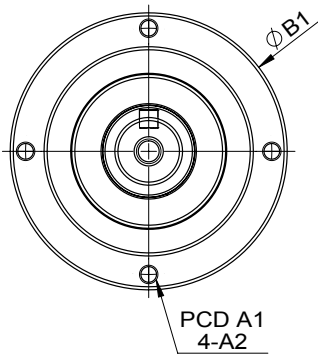
## MODEL : SA

單段 1-Stage

RATIO : 3, 4, 5, 7, 10

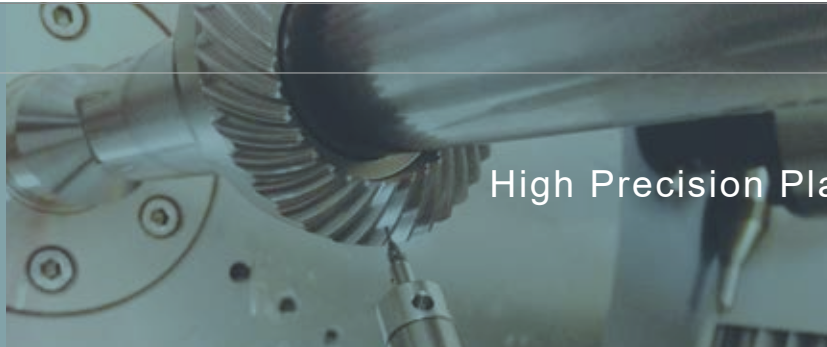


A VIEW



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 Model No.	代號	單位 Unit	速比 Ratio	50	70	90	120	160
額定輸出扭矩 Rated Output Torque (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 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) 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>)

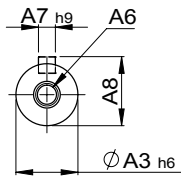
速比 Ratio	50	70	90	120	160
3	0.03	0.15	-	-	9.21
4	0.03	0.15	0.51	2.8	7.54
5	0.03	0.13	0.45	2.71	7.42
7	0.03	0.13	0.42	2.54	7.14
10	0.03	0.13	0.42	2.51	7.03

# SERVOBOX Planetary Reducers

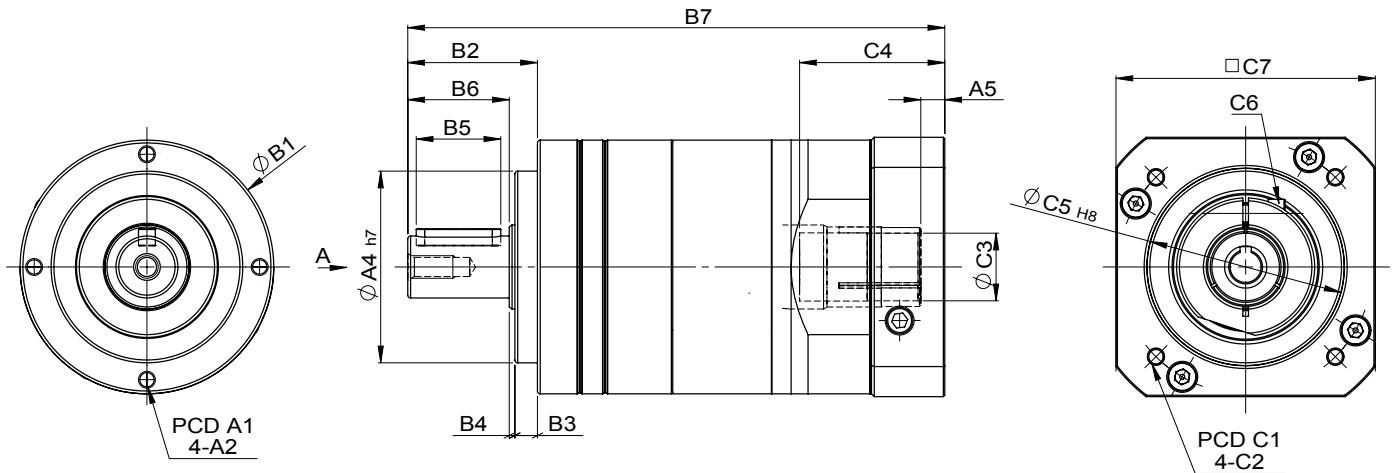
## MODEL : SA

雙段 2-Stage

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



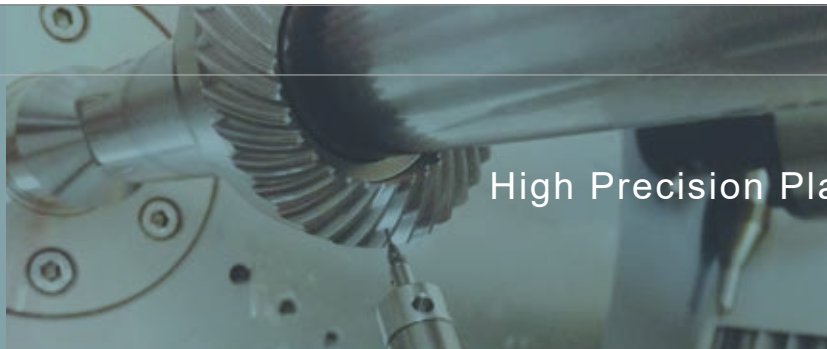
A VIEW



unit: mm

Code	Model	50	70	90	120	160
	A	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	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
C	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

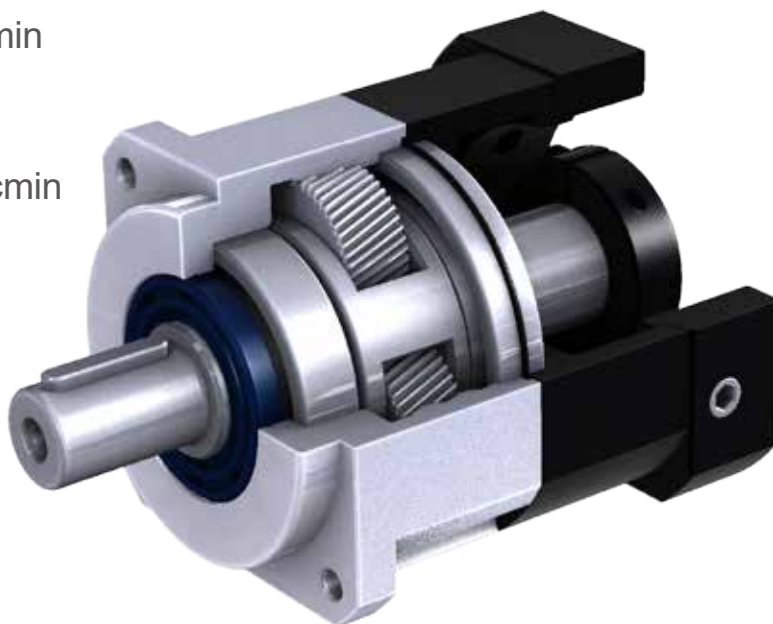
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	90	120	160
額定輸出扭矩 Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	15	17	54	-	-	625
			20	15	48	126	267	555
			25	14	45	158	296	618
			30	13	41	-	-	583
			35	13	41	128	275	573
			40	12	39	123	265	553
			50	14	45	138	296	618
			70	13	41	128	275	573
			100	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 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) 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 Type	型號 Model	速比 Ratio	出力軸鍵槽 Output Shaft Keyway	馬達型號 Motor Type
PB PB-A	44 62 90 120 142 180 220	單段 1-Stage 3, 4, 5, 6, 7, 8, 9, 10  雙段 2-Stage 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100	□ 標準品 · 有鍵槽 Standard (Keyway)  N: 實心軸 · 無鍵槽 Solid Output Shaft (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。

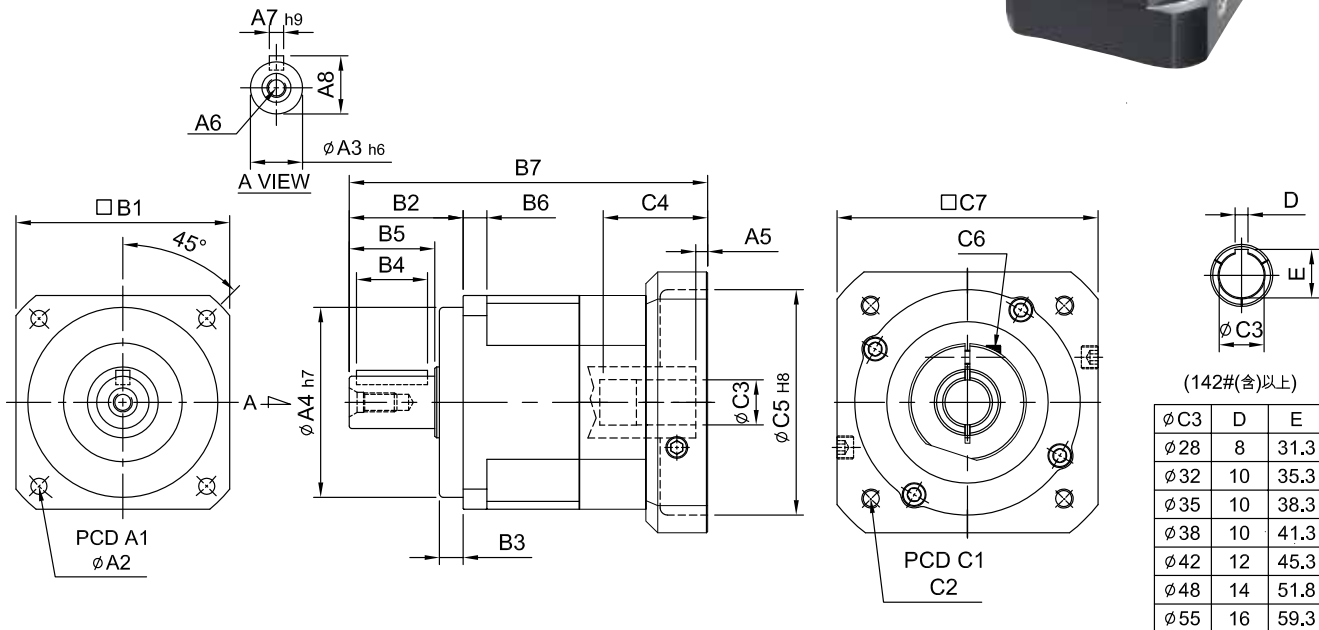
### One-piece Helical Gear Box

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



(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

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 (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 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) 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

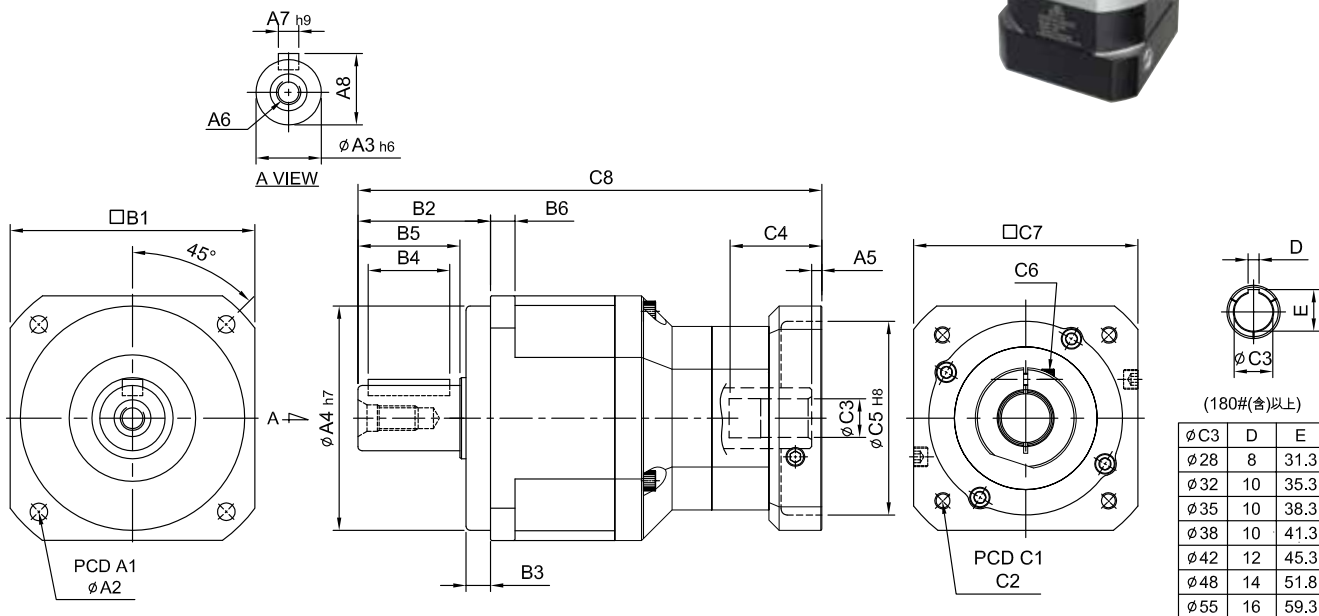
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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 (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 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) 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

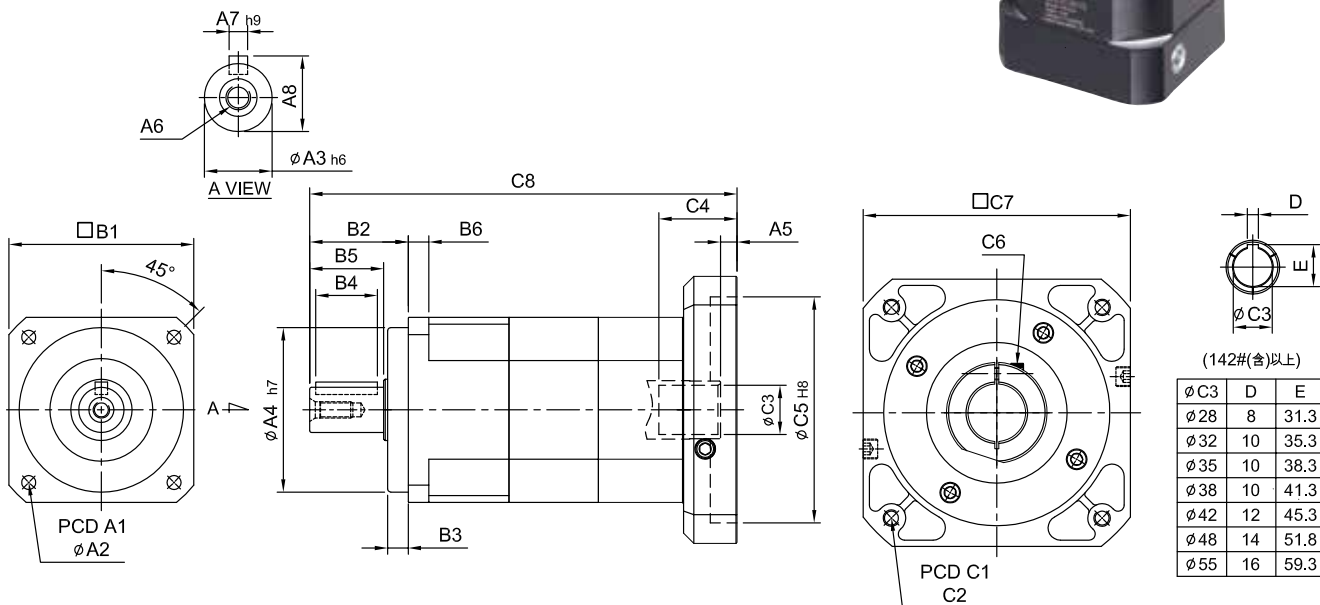
### ■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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 (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 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) 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 Type	型號 Model		速比 Ratio	出力軸鍵槽 Output Shaft Keyway		馬達型號 Motor Type
PBL	44 62 90 120 142 180 220		單段 1-Stage 3, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20  雙段 2-Stage 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200	<input type="checkbox"/> 標準品 · 有鍵槽 Standard (Keyway)  N: 實心軸 · 無鍵槽 Solid Output Shaft (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.

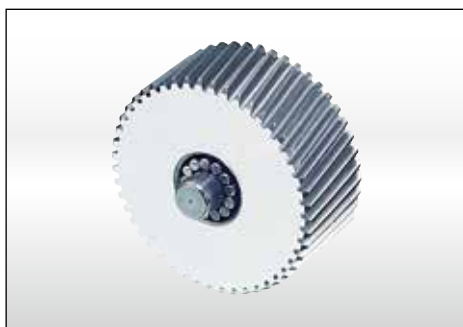


### 一體式行星臂架及雙懸臂設計

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。

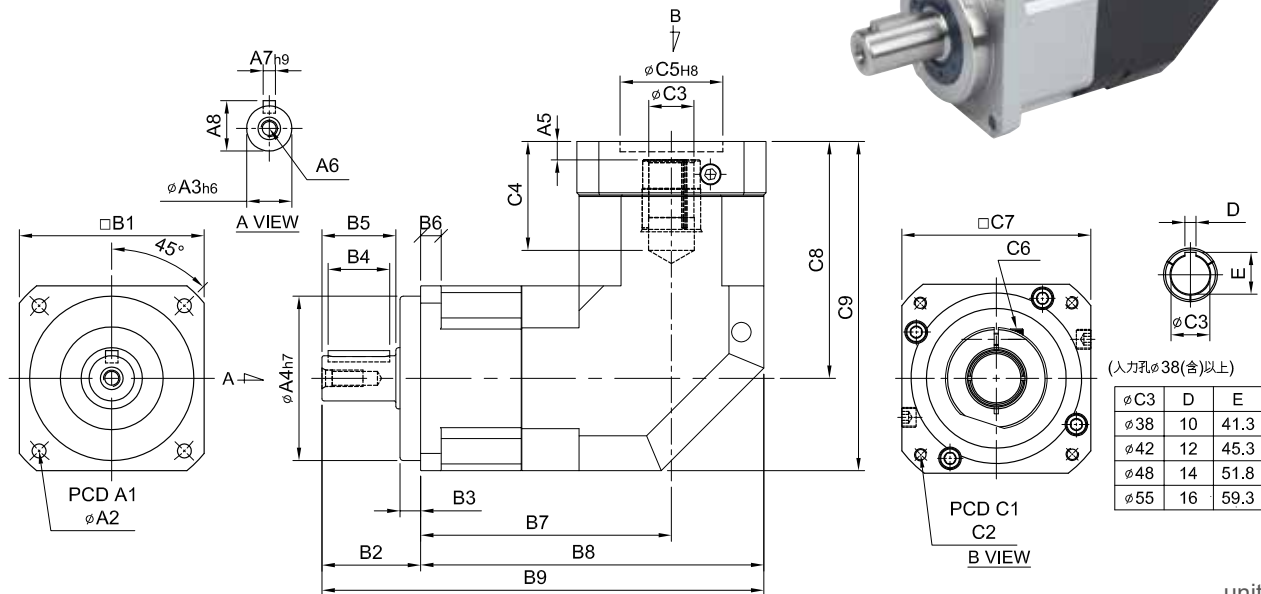
### One-piece Helical Gear Box

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

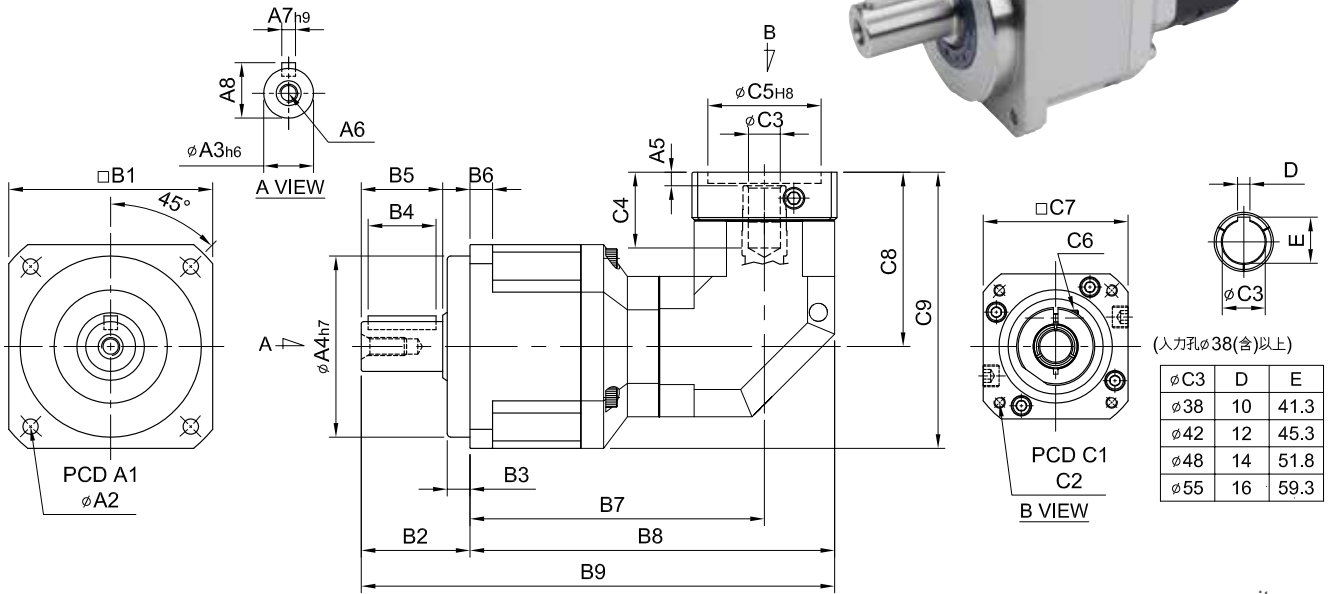
規格 Model No.	代號	單位 Unit	速比 Ratio	44	62	90	120	142	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	3	17	54	145	301	553	1,067	1,786
			4	15	48	128	269	491	940	1,587
			5	14	45	132	278	510	1,050	1,770
			6	13	41	125	252	466	985	1,680
			7	13	41	123	258	473	975	1,645
			8	12	39	115	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 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) 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

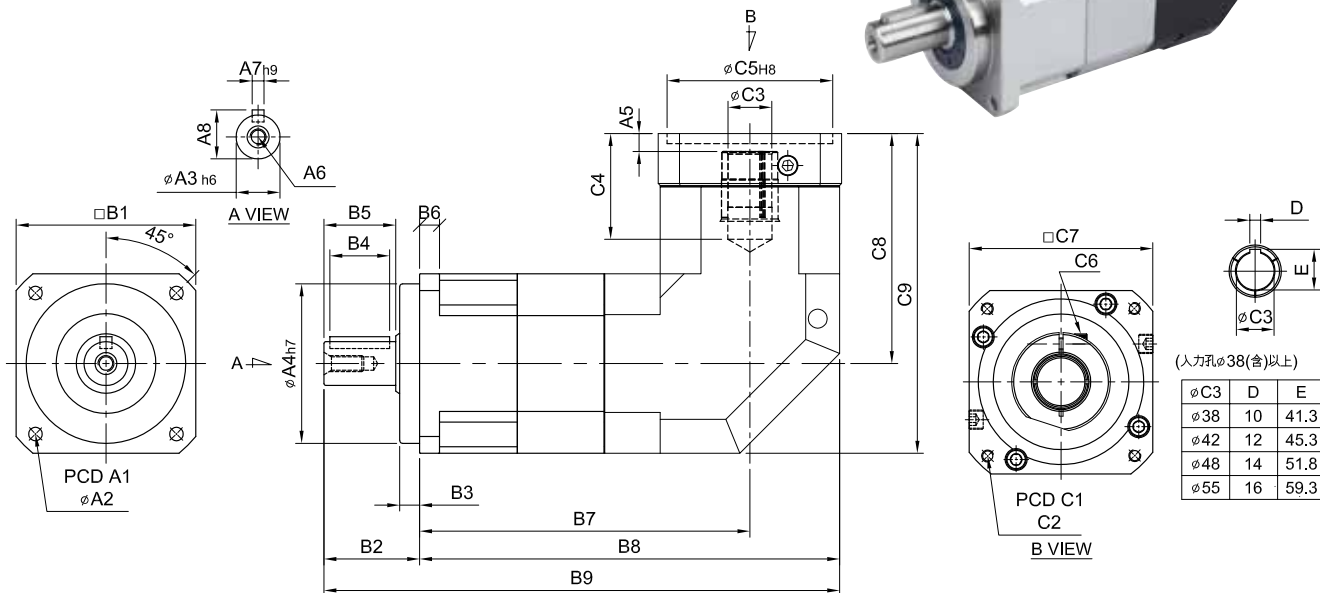
規格 Model No.	代號	單位 Unit	速比 Ratio	62	90	120	142	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	15	54	145	301	553	1,067	1,786
			20	48	128	269	491	940	1,587
			25	45	132	278	510	1,050	1,770
			30	41	125	252	466	985	1,680
			35	41	123	258	473	975	1,645
			40	39	115	241	442	942	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 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) 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
	B9	150	185.3	258.6	329	395	500.6	573.6
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	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 (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 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) 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>)

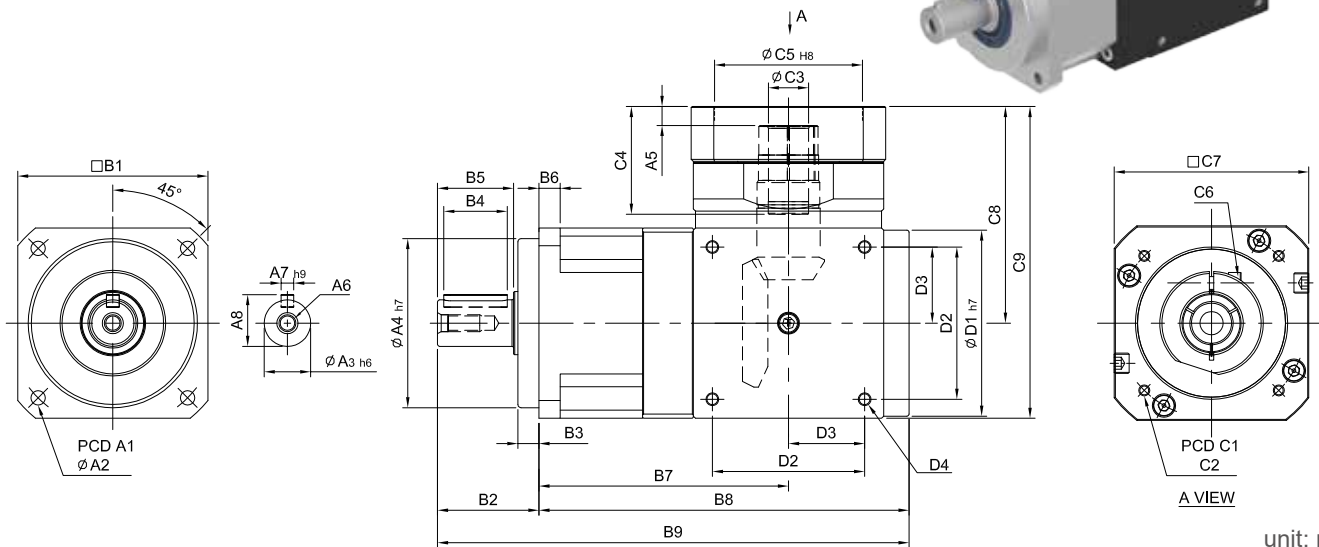
速比 Ratio	44A	62A	90A	120A	142A	180A	220A
15	0.09	0.36	2.28	6.85	23.50	55.2	80.2
20	0.09	0.36	2.28	6.85	23.50	55.2	80.2
25	0.09	0.36	2.28	6.85	23.50	50.4	76.5
30	0.09	0.36	2.28	6.85	23.50	50.4	76.5
35	0.09	0.36	2.28	6.85	23.50	50.4	76.5
40	0.09	0.36	2.28	6.85	23.50	50.4	76.5
50	0.09	0.36	2.28	6.85	23.50	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 (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 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) 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>)

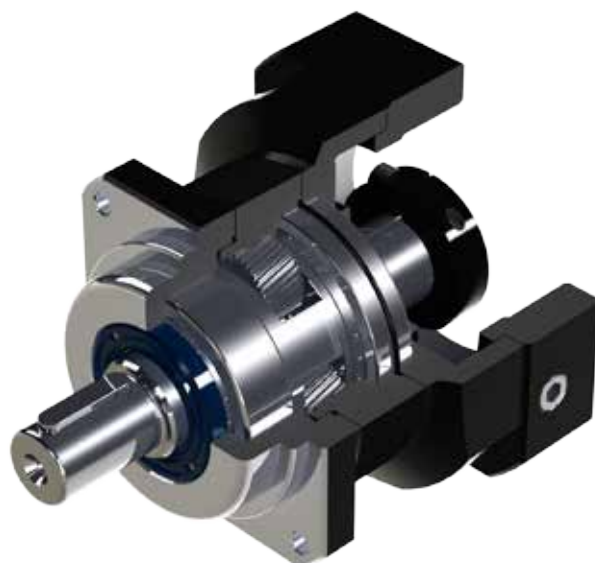
速比 Ratio	44	62	90	120	142	180	220
3	0.09	0.36	2.28	6.85	23.5	68	135
4	0.09	0.36	2.28	6.85	23.5	68	135
5	0.09	0.36	2.28	6.85	23.5	68	135
6	0.09	0.36	2.28	6.85	23.5	68	135
7	0.09	0.36	2.28	6.85	23.5	68	135
8	0.09	0.36	2.28	6.85	23.5	68	135
9	0.09	0.36	2.28	6.85	23.5	68	135
10	0.09	0.36	2.28	6.85	23.5	68	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 7·8·9·10 15·20·25 30·35·40 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 Type	型號 Model		速比 Ratio	出力軸鍵槽 Output Shaft Keyway		馬達型號 Motor Type
FA	50 70 80 90 100 120 142 180		單段 1-Stage 3, 4, 5, 7, 10  雙段 2-Stage 15, 20, 25, 30, 35, 40, 50, 70, 100	<input type="checkbox"/> 標準品 · 有鍵槽 Standard (Keyway)  <input type="checkbox"/> N: 實心軸 · 無鍵槽 Solid Output Shaft (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

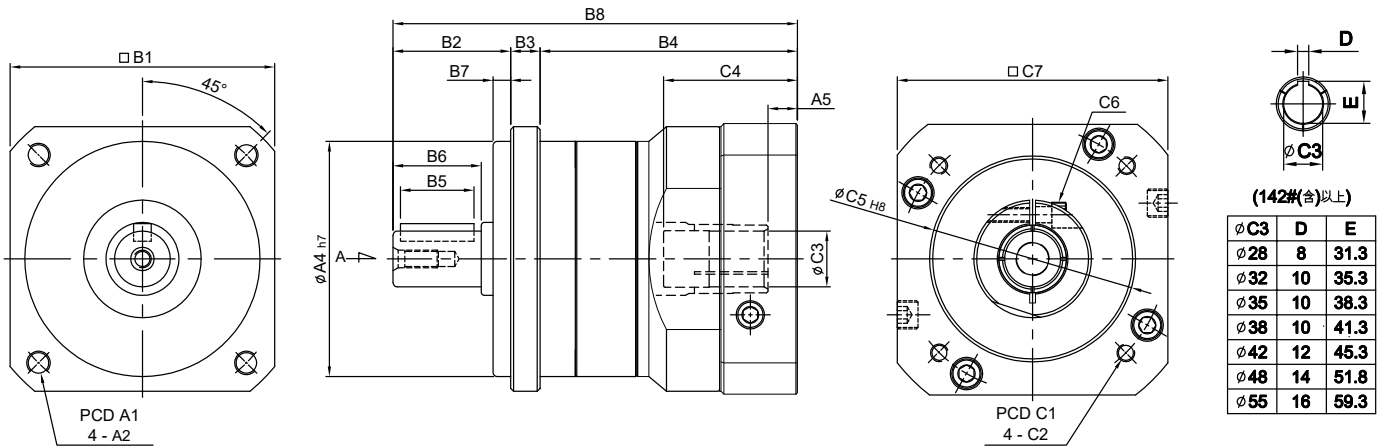
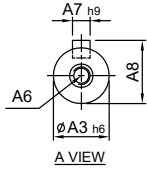
輸入端與馬達的連結採用筒夾式的鎖緊機構，並經動力平衡分析，以確保在高輸入轉速下結合介面的同心度和平衡度，及零背隙的動力傳遞。

### 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)

$\phi C3$	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	50	70	80	90	100	120	142	180	
A	A1	60	76	90	100	115	135	215	
	A2	M5 x P0.8	$\phi 5.5$	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	B1	52	70	80	90	102	120	180	
	B2	32	36	50	40	61	72	106	
	B3	6	7	11	10	13	10	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
C	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

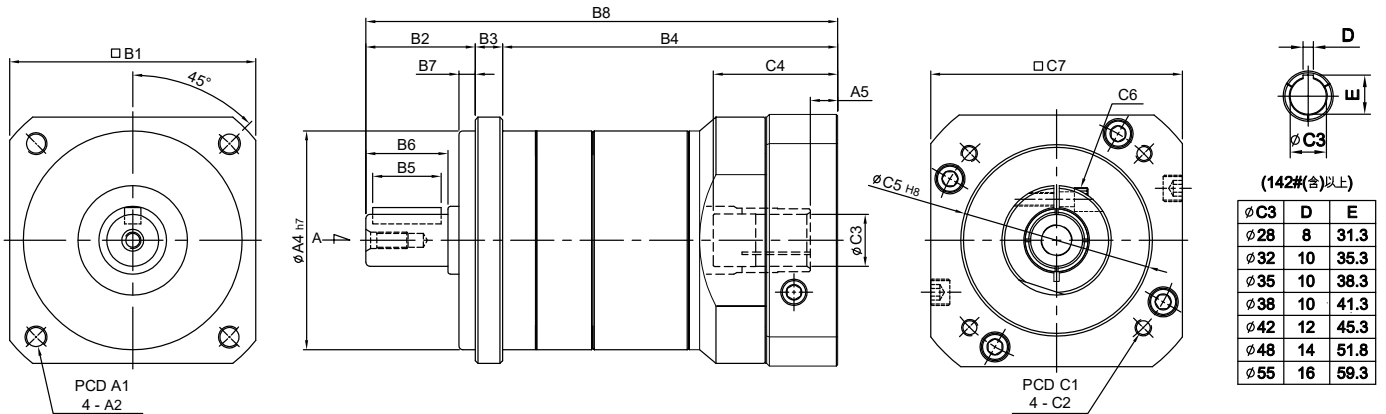
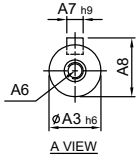
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	80	90	100	120	142	180
額定輸出扭矩 / Rated Output Torque (Nominal Output Torque)	$T_{2N}$	Nm	3	19	54	112	112	165	286	550	1,060
			4	16	48	110	110	146	255	490	940
			5	16	45	108	108	160	264	510	1,050
			7	15	41	105	105	149	245	470	970
			10	14	40	100	100	141	234	450	930
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 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) 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)

∅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	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	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 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

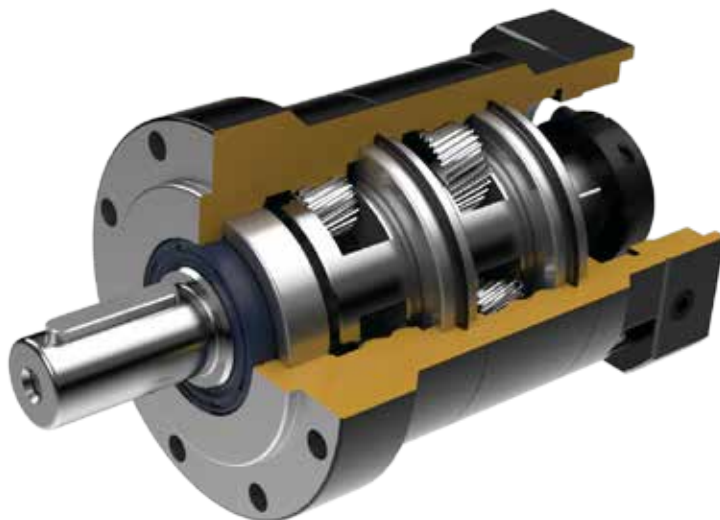
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	80	90	100	120	142	180
額定輸出扭矩 / Rated Output Torque (Nominal Output Torque)	$T_{2N}$	Nm	15	19	54	112	112	165	286	550	1,060
			20	16	48	110	110	146	255	490	940
			25	16	45	108	108	160	264	510	1,050
			30	19	41	112	112	165	286	550	1,060
			35	15	41	105	105	149	245	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 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) 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

SN	80	-	10		-	MOTOR
減速機機型 Type	型號 Model		速比 Ratio	出力軸鍵槽 Output Shaft Keyway		馬達型號 Motor Type
SN	50		單段 1-Stage	<input type="checkbox"/> 標準品 · 有鍵槽 Standard (Keyway)		
SNL	60		3, 4, 5, 7, 10			
	70		雙段 2-Stage	N: 實心軸 · 無鍵槽 Solid Output Shaft (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

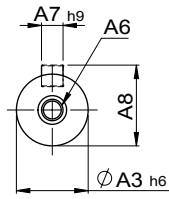
齒輪箱和內環齒輪採一體式的設計，提高結構剛性及輸出扭矩。

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

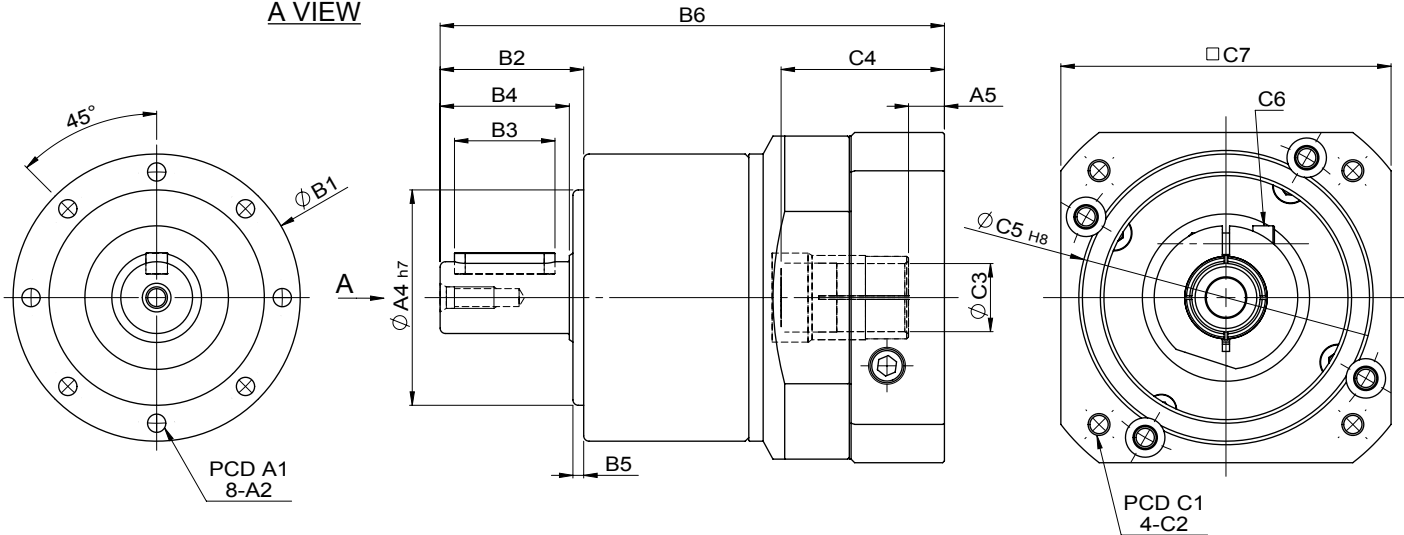
The gear box and internal ring gear are one-piece constructed to achieve high rigidity and high torque.

# 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	238.5 260.5	238.5 260.5
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	115·145·165 145·165·200	115·145·165 145·165·200
	C2	M3·M4·M5	M3·M4·M5	M5·M6	M6·M8	M6·M8	M6·M8	M6·M8·M10	M6·M8·M10 M8·M10·M12	M6·M8·M10 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 35·38	24·28·32 35·38
	C4	32	32	33.5	45.5	51·65.5	51·65.5	67·77	63 84.5	63 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	95·110·130 110·130·180	95·110·130 110·130·180
	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 M10 x P1.5	M8 x P1.25 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	122·130·150 146·150·190	122·130·150 146·150·190

# Characteristic of SN 1-Stage

## SN 單段特性

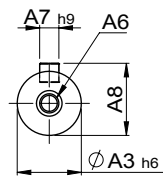
規格 Model No.	代號	單位 Unit	速比 Ratio	50	60	70	80	90	115	120	155	160
額定輸出扭矩 / Rated Output Torque (Nominal Output Torque)	$T_{2N}$	Nm	3	17	28	54	112	146	165	301	553	625
			4	15	38	48	110	144	146	269	491	555
			5	14	40	45	108	140	160	278	510	618
			7	13	35	41	105	128	149	258	473	573
			10	12	25	40	100	123	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 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) 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>)

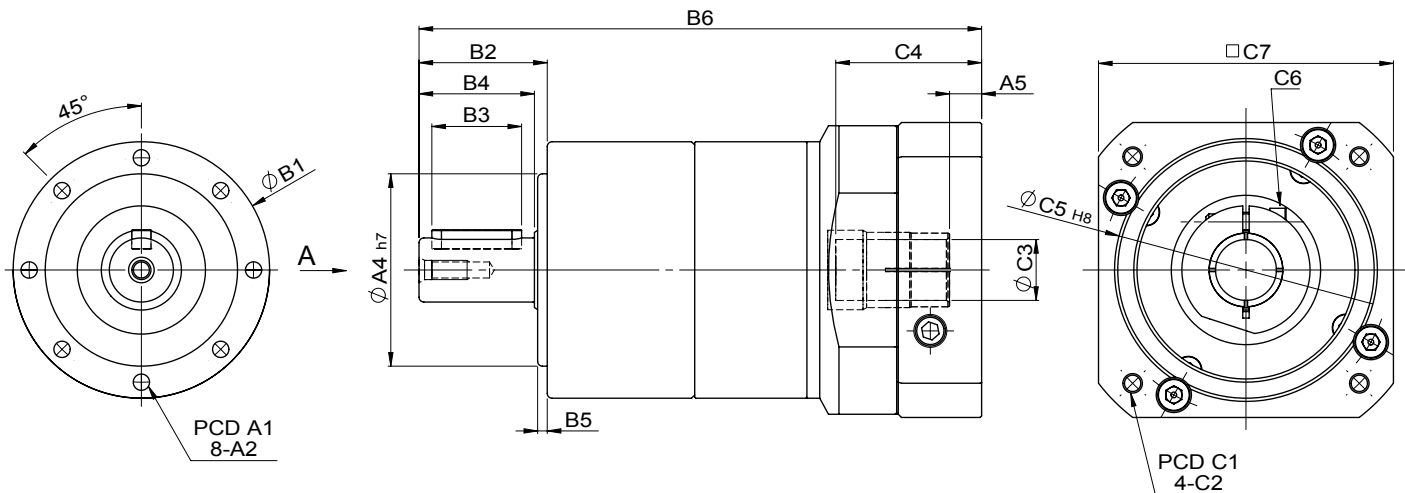
速比 Ratio	50	60	70	80	90	115	120	155	160
3	0.03	0.06	0.15	0.48	0.55	0.60	3.01	8.14	9.21
4	0.03	0.06	0.15	0.38	0.42	0.45	2.52	6.63	7.42
5	0.03	0.06	0.13	0.38	0.42	0.45	2.52	6.63	7.42
7	0.03	0.06	0.13	0.38	0.42	0.45	2.31	6.55	7.14
10	0.03	0.06	0.13	0.35	0.38	0.41	2.30	6.46	7.03

# 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

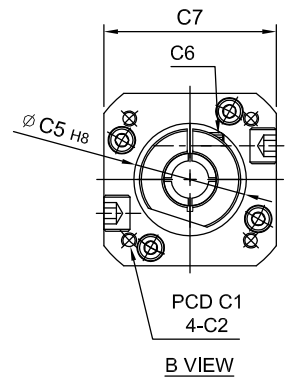
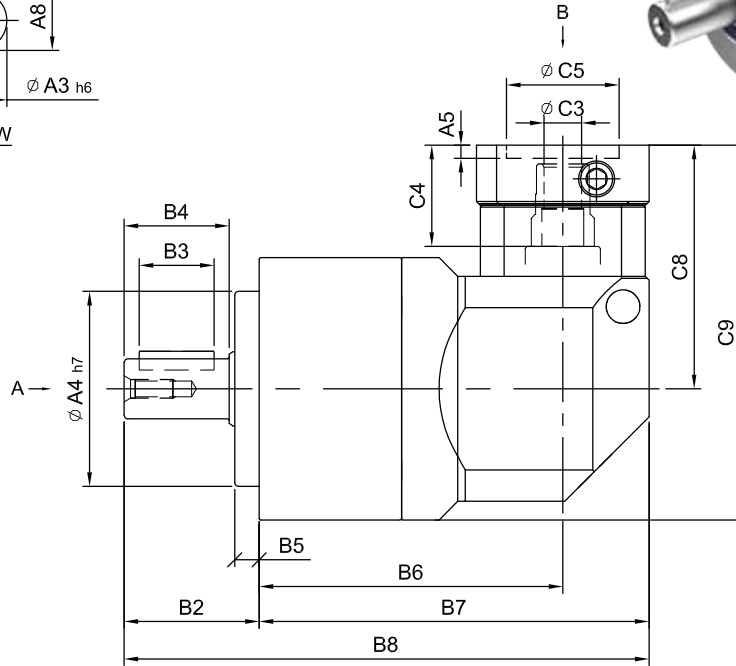
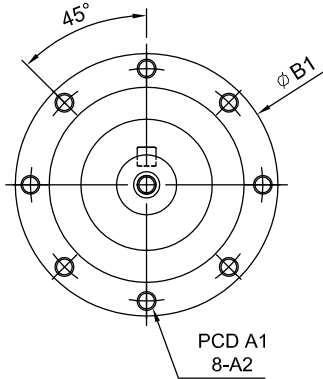
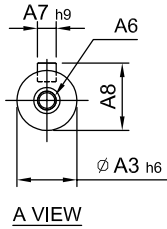
規格 Model No.	代號	單位 Unit	速比 Ratio	50	60	70	80	90	115	120	155	160
額定輸出扭矩 / Rated Output Torque (Nominal Output Torque)	$T_{2N}$	Nm	15	17	28	54	112	146	165	301	553	625
			20	15	38	48	110	144	146	269	491	555
			25	14	40	45	108	140	160	278	510	618
			30	17	28	54	112	146	165	301	553	625
			35	13	35	41	105	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 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) 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	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 (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 / 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 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) 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

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

FB  
SB  
SBL  
SBT  
SE  
SEL  
SD  
SDL  
SDD  
SR  
SDH  
SF  
SFL  
SA  
PB  
PBL  
PBT  
FA  
SN  
SNL  
FB  
FE  
AD  
PE

# 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.

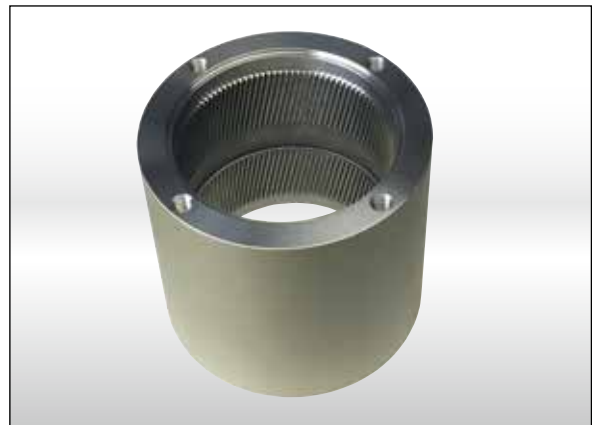


### 高精度齒輪加工

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

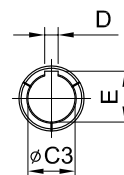
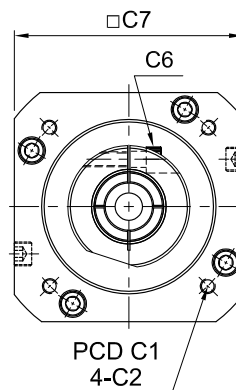
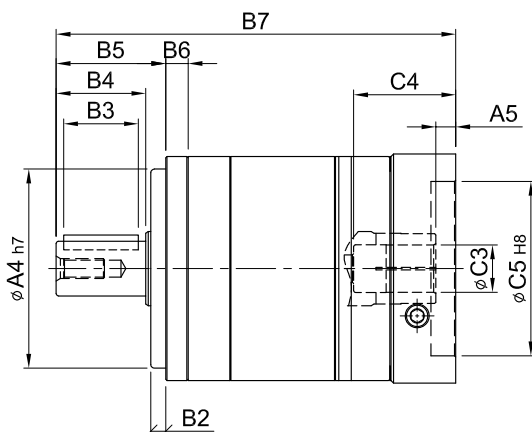
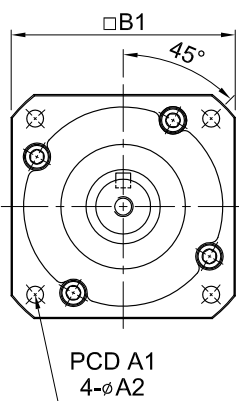
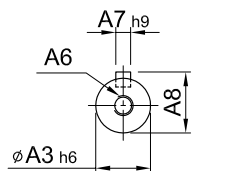
齒輪箱和內環齒輪採一體式的設計，經調質後加工，輸出扭矩大，齒輪精度達 DIN6 級，精密度高。

### 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)

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

unit: mm

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 M4 M5	M4 M5 M6	M5 M6 M8	M6 M8 M10	M8 M10 M12	M10 M12	M12 M16
	C3	8·9·11	11·14	16·19·22·24	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

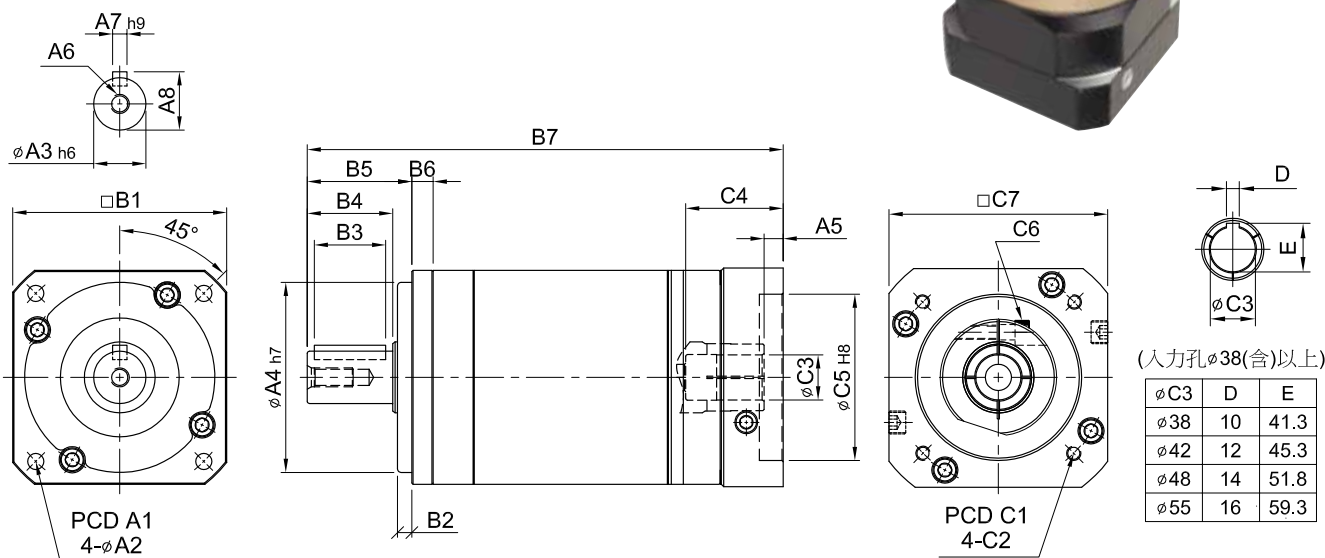
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	90	120	145	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	3	17	50	125	268	482	940	1,420
			4	15	45	111	238	426	860	1,300
			5	14	42	104	223	401	835	1,270
			7	13	39	98	208	373	790	1,180
			10	12	37	92	198	356	760	1,140
最大加速扭矩 / Max. Acceleration 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 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	$L_H$	hr	3~10	S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs) 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 M4 M5	M4 M5 M6	M5 M6 M8	M6 M8 M10	M8 M10 M12	M10 M12	M12 M16
	C3	8·9·11	11·14	16·19·22·24	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

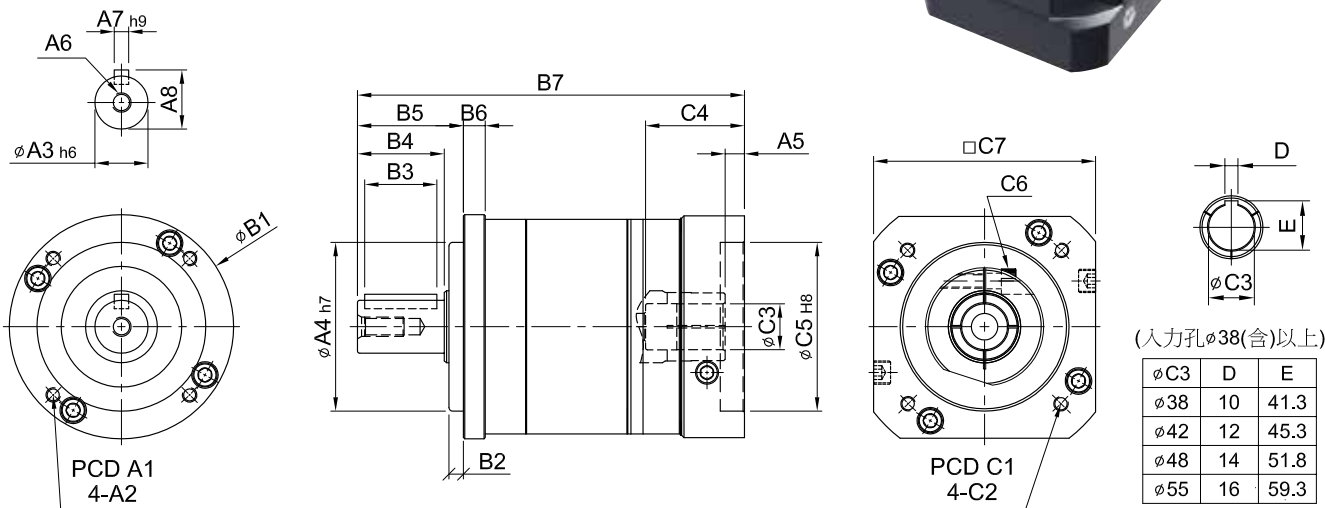
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	90	120	145	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	15	17	50	125	268	482	940	1,420
			20	15	45	111	238	426	860	1,300
			25	14	42	104	223	401	835	1,270
			30	17	50	125	268	482	940	1,420
			35	13	39	98	208	373	790	1,180
			40	15	45	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 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) 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)



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 M4 M5	M4 M5 M6	M5 M6 M8	M6 M8 M10	M8 M10 M12	M10 M12	M12 M16
C3	8·9·11	11·14	16·19·22·24	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

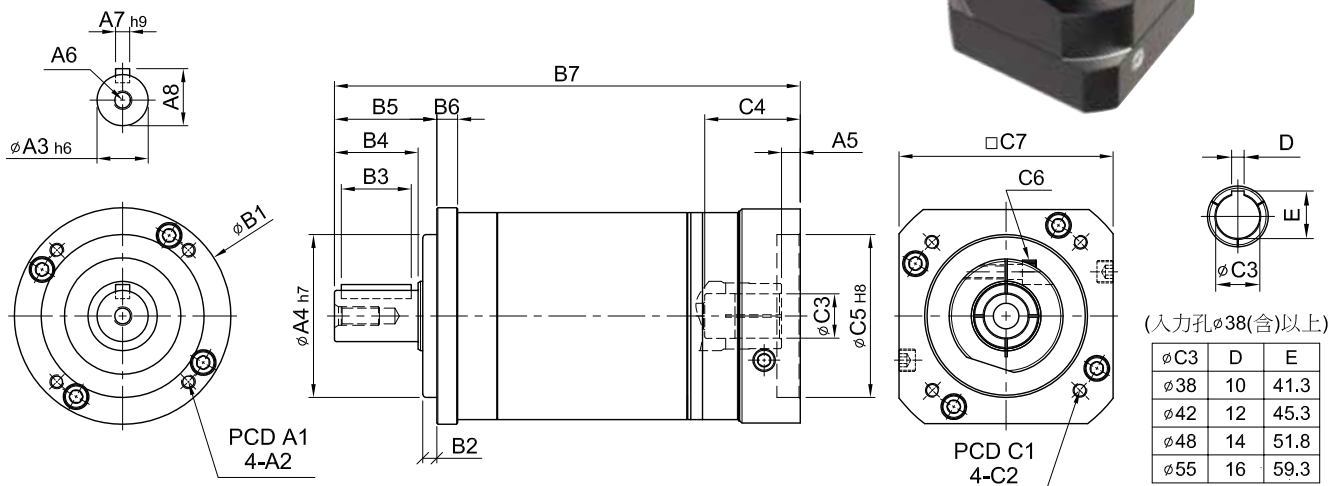
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	90	120	145	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	3	17	50	125	268	482	940	1,420
			4	15	45	111	238	426	860	1,300
			5	14	42	104	223	401	835	1,270
			7	13	39	98	208	373	790	1,180
			10	12	37	92	198	356	760	1,140
最大加速扭矩 / Max. Acceleration 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 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) 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 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 · 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

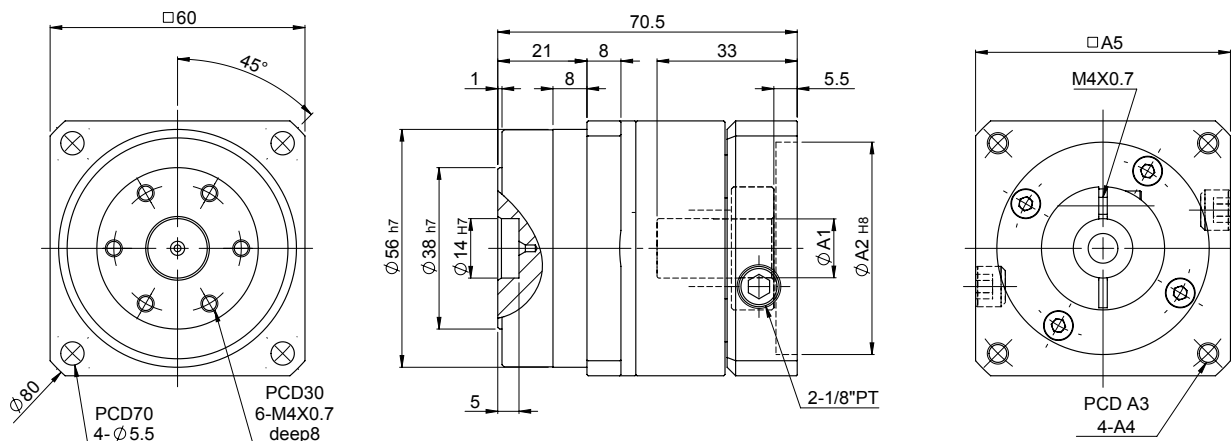
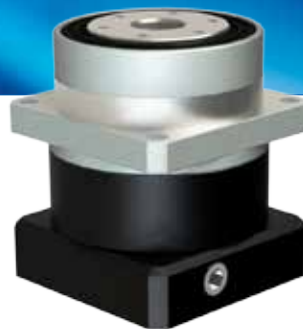
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	90	120	145	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	15	17	50	125	268	482	940	1,420
			20	15	45	111	238	426	860	1,300
			25	14	42	104	223	401	835	1,270
			30	17	50	125	268	482	940	1,420
			35	13	39	98	208	373	790	1,180
			40	15	45	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 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) 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

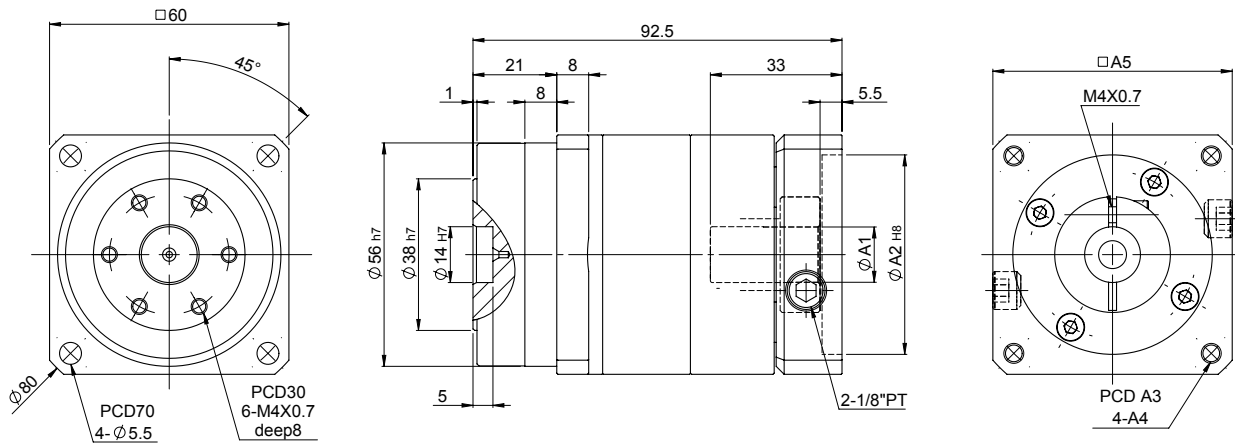
NO.	ØA1	ØA2	A3	A4	A5
1	8 · 9 · 10 · 12.7 · 14	30	45	M3	46
2		30	46	M4	46
3		30	48.5	M3	55
4		40	63	M5	55
5		50	70	M5	60

## 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 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) 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

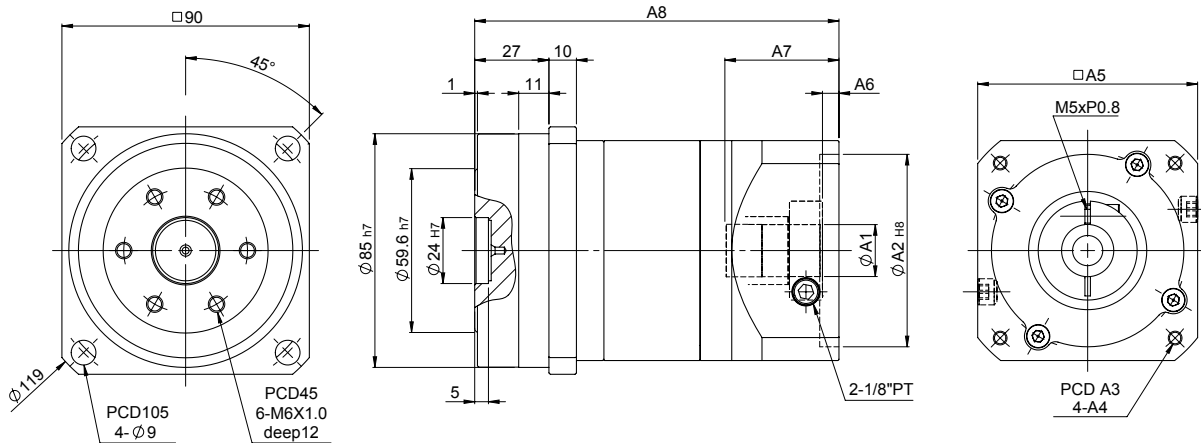
## AD60-2 特性表

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 (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 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) 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	1.24								



# 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

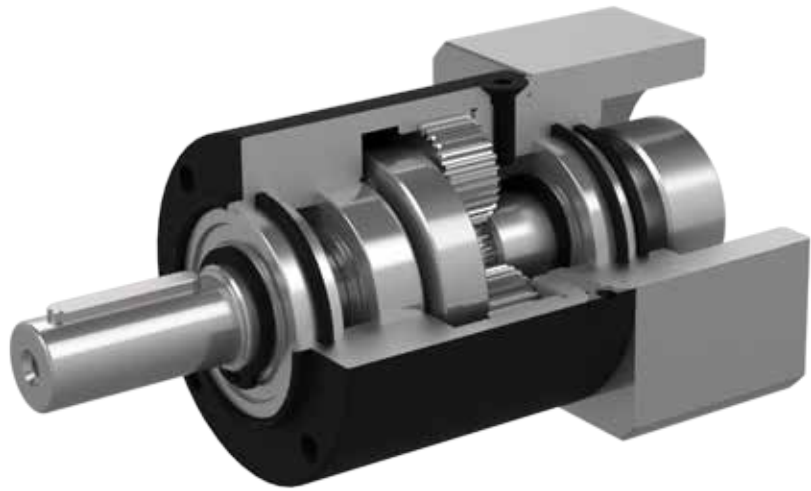
unit: mm

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 (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 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) 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

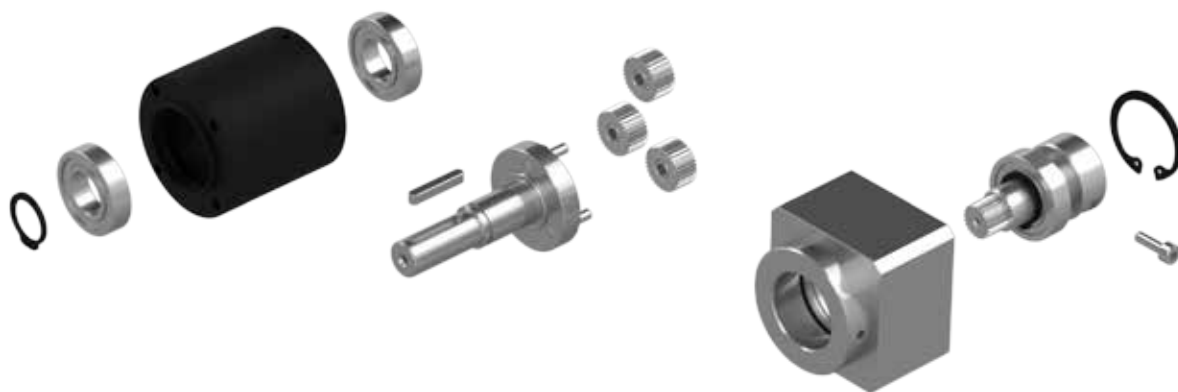
PE	60	—	10	□	—	MOTOR
減速機機型 Type	型號 Model		速比 Ratio	出力軸鍵槽 Output Shaft Keyway		馬達型號 Motor Type
PE	32 40 60 80		單段 1-Stage 3 ~ 10  雙段 2-Stage 12 ~ 64	<input type="checkbox"/> 標準品 · 有鍵槽 Standard (Keyway)  N: 實心軸 · 無鍵槽 Solid Output Shaft (No Keyway)		



# Features of PE Series

## PE 系列產品特點

- 經濟型
- 高效率
- 低噪音
- 低背隙
- 低溫升
- 使用壽命長
- 尺寸與重量極小化
- 適用於多種尺寸的馬達軸徑



# MODEL : PE

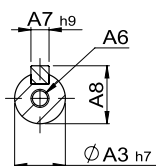
RATIO : 3, 4, 5, 7, 8, 9, 10 (單段 1-Stage)



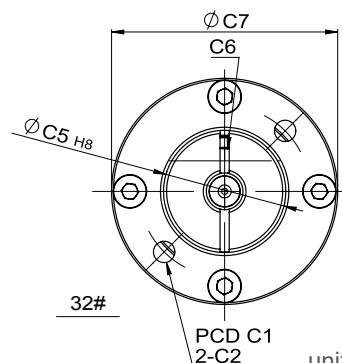
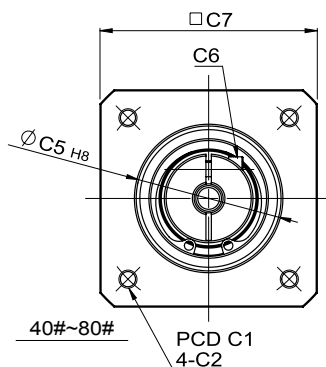
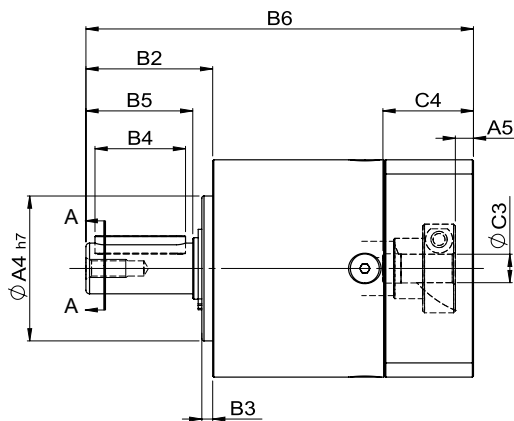
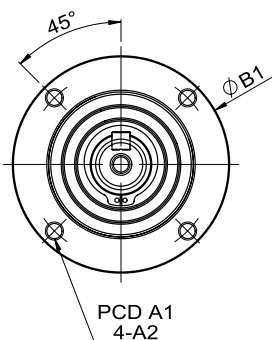
▲ 32#



▲ 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 (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 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) 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

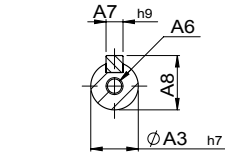
# MODEL : PE

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

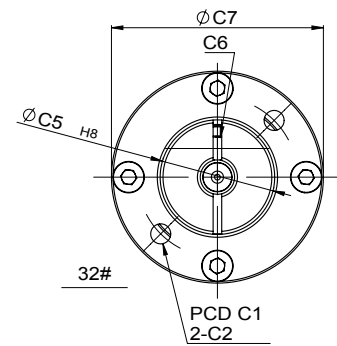
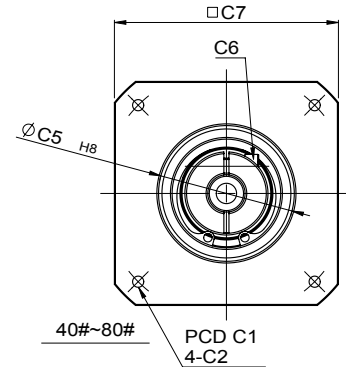
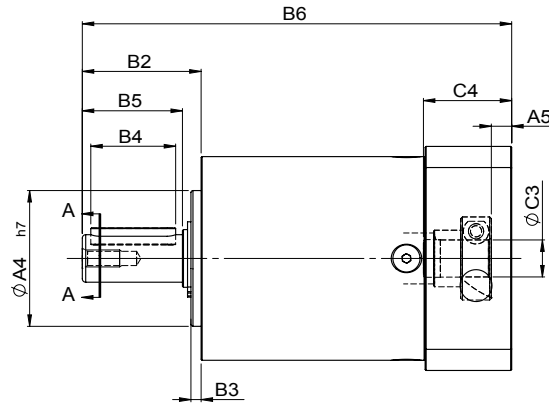
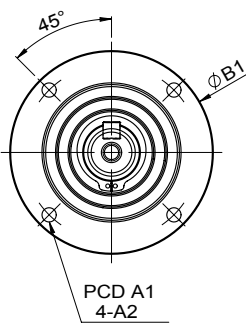


▲ 32#

▲ 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

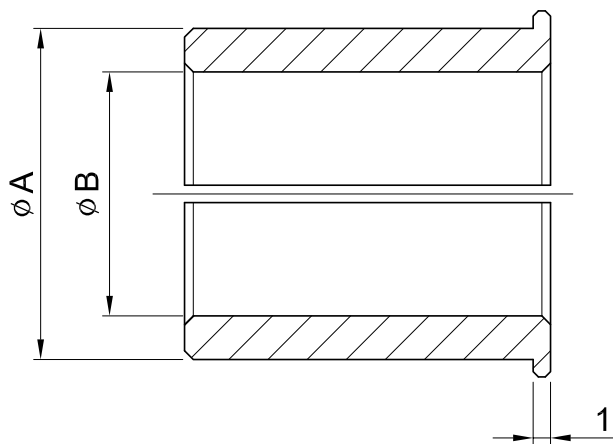
規格 Model No.	代號	單位 Unit	速比 Ratio	32	40	60	80
額定輸出扭矩 / Rated Output Torque (Nominal Output Torque)	$T_{2N}$	Nm	12	-	-	30	90
			15	8	11	30	90
			20	10	-	38	120
			25	11	17	41	130
			32	-	-	-	-
			35	9	-	32	110
			40	-	16	38	120
			45	7	-	-	-
			50	-	-	41	130
			63	9	-	-	-
			64	-	17	-	-
最大加速扭矩 / Max. Acceleration 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 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) 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 Shaft Bore ØA 軸套 孔徑 Bushing Bore ØB	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

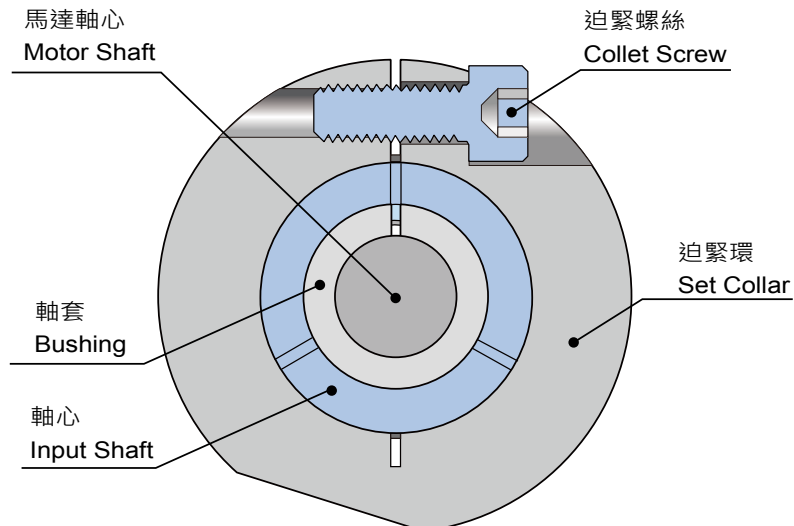
迫緊螺絲及迫緊環扭矩表 Collet Screw & Set Collar Torque Table

型號 MODEL													迫緊螺絲規格 Spec. of Collet Screw	螺絲強度等級 Screw Grade	螺絲鎖緊扭矩 Tighten Torque (Nm)	迫緊扭矩 Clench Torque (Nm)	鍵 key
SB SE	SBT PBT	SD	SR	SDH	SF	PB	FA	SN	SNL	SA	FB	PE					
44	44	47	-	64	-	44	50	50 60 70	50 60 70	50	50	32 40 60	M4 x P 0.7	12.9	4.83	87	
62	62	64	82	90	62	62	70 80 90	70 80	80 90	70	70	80	M5 x P 0.8	12.9	10	164	
90	90 120	90	100	110	75	90	100	90 115	120	90	90	-	M6 x P 1.0	12.9	16.3	233	
120	142	110	132	140	100	120	120	120 155 160	155 160	120 160	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	
180 220	-	200 255	-	255	180	180	180	-	-	-	180 220	-	M10 x P 1.5	12.9	81	678	●
270 330	-	-	-	-	-	-	-	-	-	-	-	-	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 Input Bore	Ø38	Ø42	Ø48	Ø55	Ø60	Ø75
鍵 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 Model	SB SE PB	-	-	-	44	-	-	-	62	-	90	-	120	142	-	-	-	180	220	270	330
	SB-A SE-A PB-A	-	-	-	44A	-	-	-	62A	-	90A	-	120A	142A	-	-	-	180A	220A	-	-
	SBT 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 80	-	115	-	160	-	-	-	-	-	-	-	-
	SNL	-	-	50 60	-	-	-	70	80 90	-	120	-	-	-	-	155 160	-	-	-	-	-
	SA	-	-	-	-	50	-	-	70	-	90	-	120 160	-	-	-	-	-	-	-	-
	FB、FE	-	-	-	-	50	-	-	70	-	90	-	120	-	-	145	180	-	220	-	-
	PE	32	40	-	60	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
容量 Power	入力孔徑 Input Bore	6	8	8 11	8 9 11	8 10 11 14	8 9 10 12.7 14	11 14	14 19	19 24	19 22 24	22 24	24 28 32	28 32 35	35	35 38	38 42 48	38 42 48 55	42 48 55	48 55 60 70	55 60 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 Model	SB SE PB	-	-	62	-	-	-	90	120	142	180	-	-	-	220	270	330
	SR	-	-	-	-	-	-	82 100	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 80	-	115 160	-	-	-	-	-	-	-
	SA	-	-	-	50	-	-	70	90	120 160	-	-	-	-	-	-	-
	FB FE	-	-	50	-	-	-	70	90	120	-	-	145	180	-	220	-
	PE	32	40	60	80	-	-	-	-	-	-	-	-	-	-	-	-
容量 Power	入力孔徑 Input Bore	6	8	8 9 11	8 10 11 14	8 9 10 12.7 14	14	14 19	19 22 24	24 28 32	28 32 35	28 32 38	35 38	38 42 48	38 42 48 55	42 48 55	48 55 60 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]

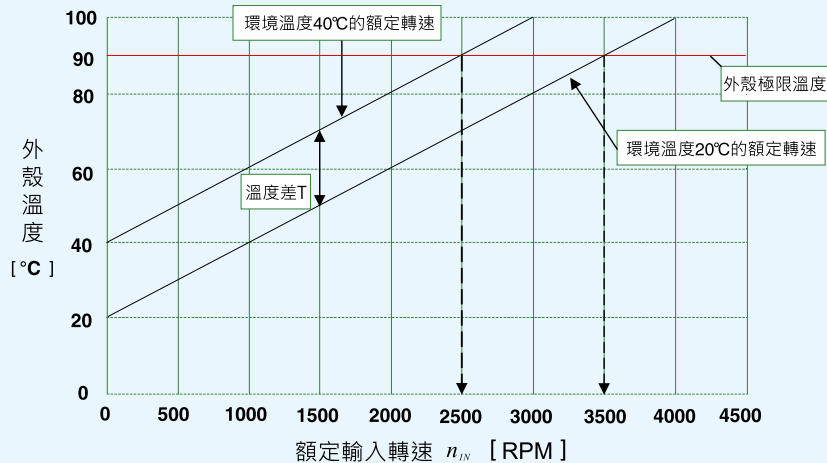
It is applied to cyclic operation (S5). Max. input speed is measured at environment temperature 20° C. If the environment temperature is higher or the temperature of gearbox surface exceeds 90° C, please lower input speed ( $n_1$ ).

### 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，減速機的温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

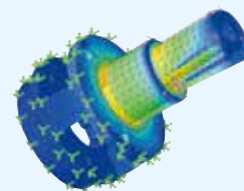
## 減速機專用名詞解釋

### 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，須考慮沖擊因素。 $T_{2B}$  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

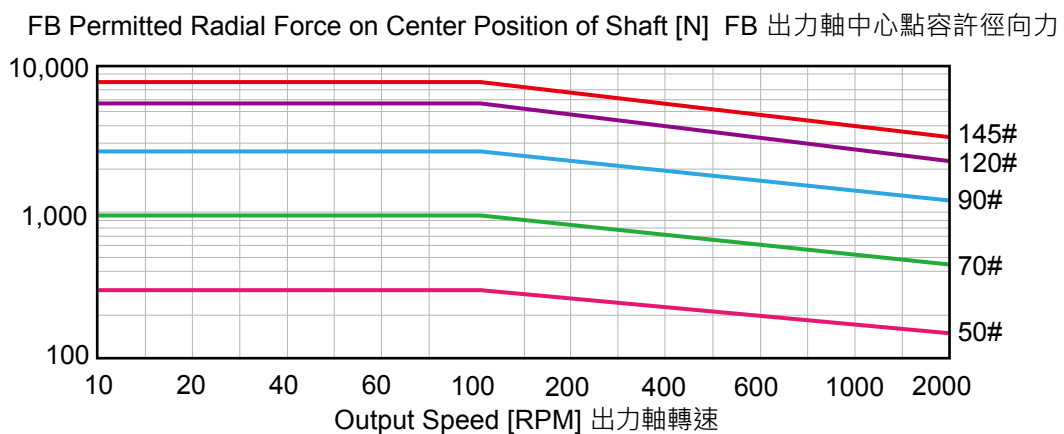
## 減速機專用名詞解釋

### 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  $\leq 5$

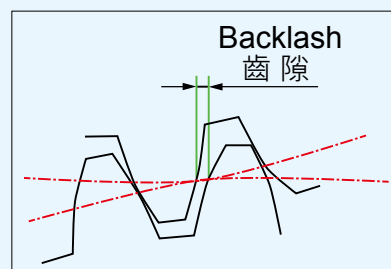
Highly dynamic applications  $\leq 1$

### 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  $b = 0.44\text{mm}$ 。

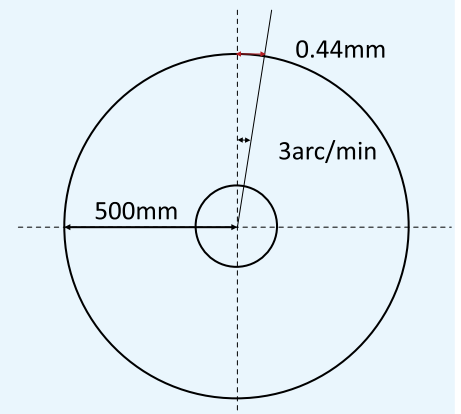
$$b = \frac{2 \cdot \pi \cdot r \cdot j_t}{21600}$$

### 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  $b = 0.44 \text{ mm}$ .

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



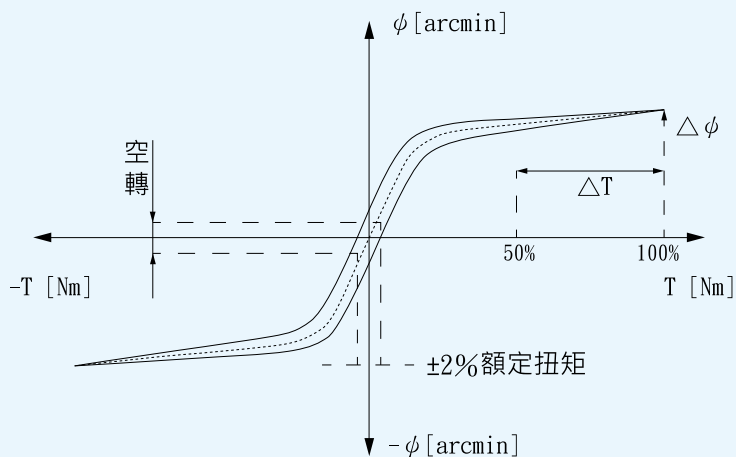
### 遲滯曲線

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

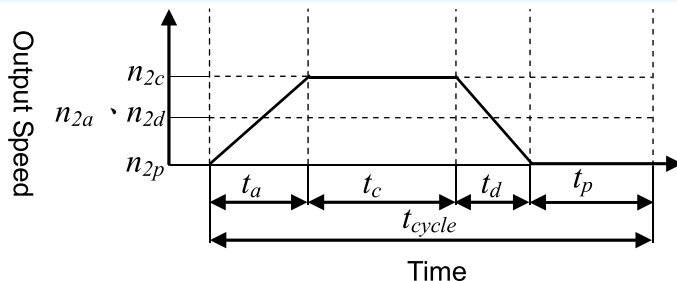
## 減速機專用名詞解釋

### 工作週期 (ED)

$t_{work} = t_{\text{加速}} + t_{\text{勻速}} + t_{\text{減速}} = t_a + t_c + t_d$   
 $t_{cycle} = t_{\text{加速}} + t_{\text{勻速}} + t_{\text{減速}} + t_{\text{暫停}} = t_a + t_c + t_d + t_p$   
 $ED[\%] = t_{work} / t_{cycle} \times 100\%$   
 $ED[\text{min}] = t_{work}$

### 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  $t_p$ .



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

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

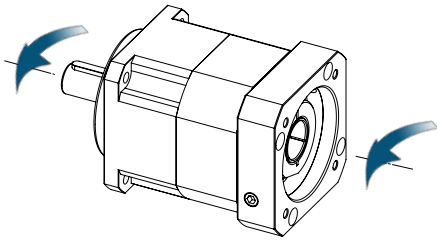
Design of connecting plate is suitable for various servo motors or others, and also easy for installation. General dimension is shown on the catalogue. Please find other dimensions from our website.



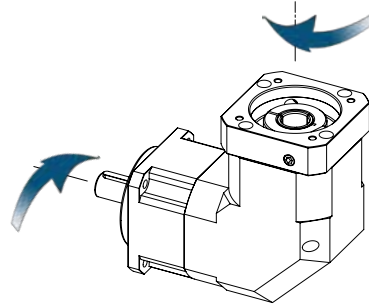
# Rotation Directions

旋轉方向

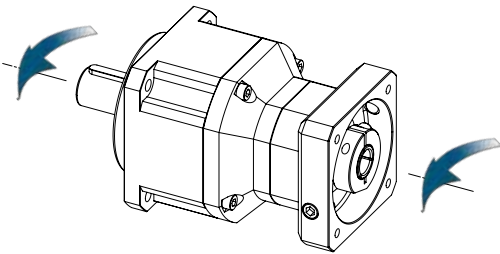
單段行星減速機  
1-Stage Planetary Reducer



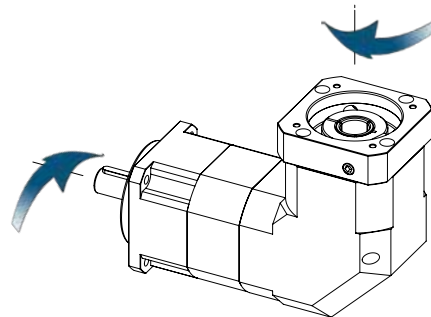
單段傘齒行星減速機  
1-Stage Spiral Bevel Gear & Planetary Reducer



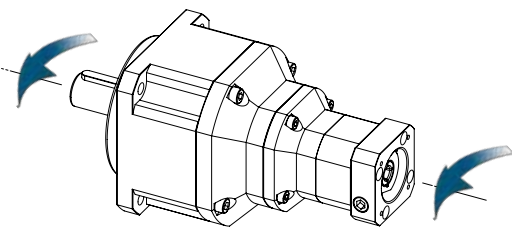
雙段行星減速機  
2-Stage Planetary Reducer



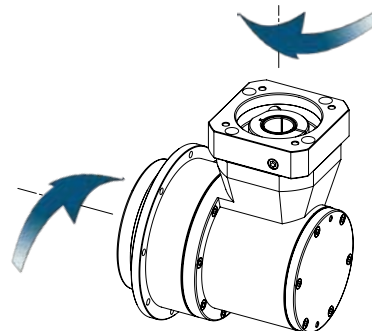
雙段傘齒行星減速機  
2-Stage Spiral Bevel Gear & Planetary Reducer

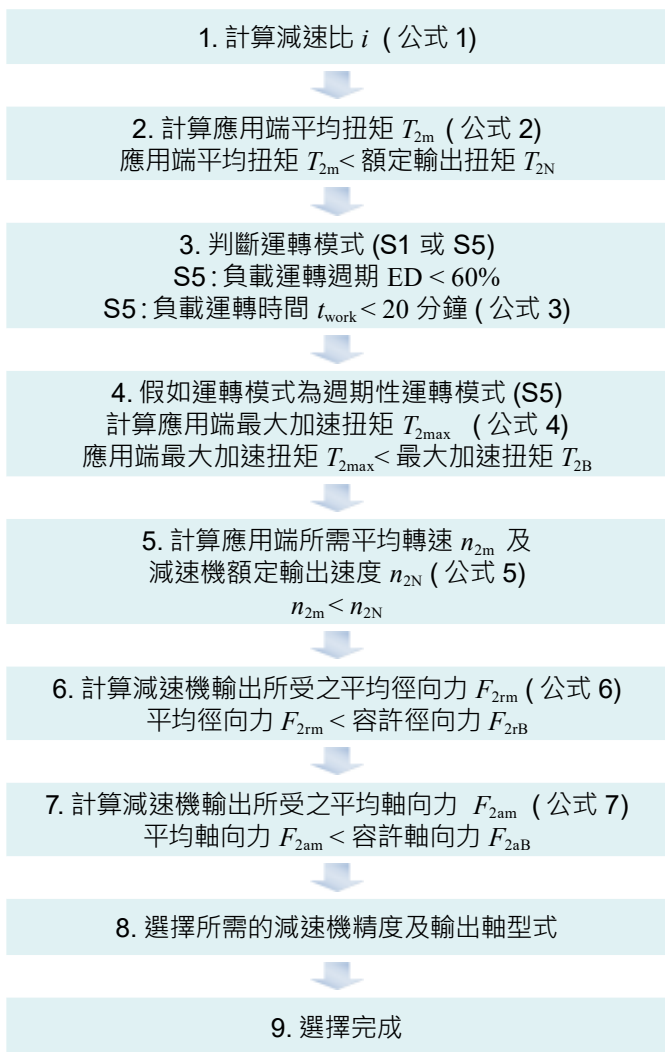


三段行星減速機  
3-Stage Planetary Reducer



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





#### 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：

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

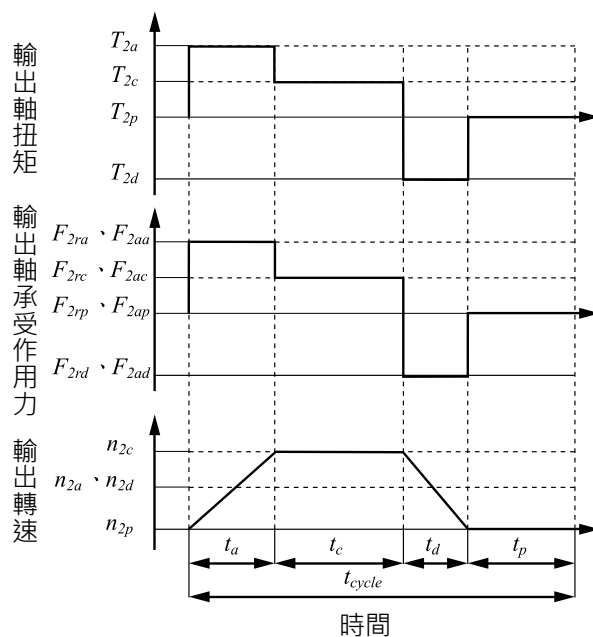
$J_L$  負載慣量 ·  $J_m$  馬達慣量

$T_{2m}$ : 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



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

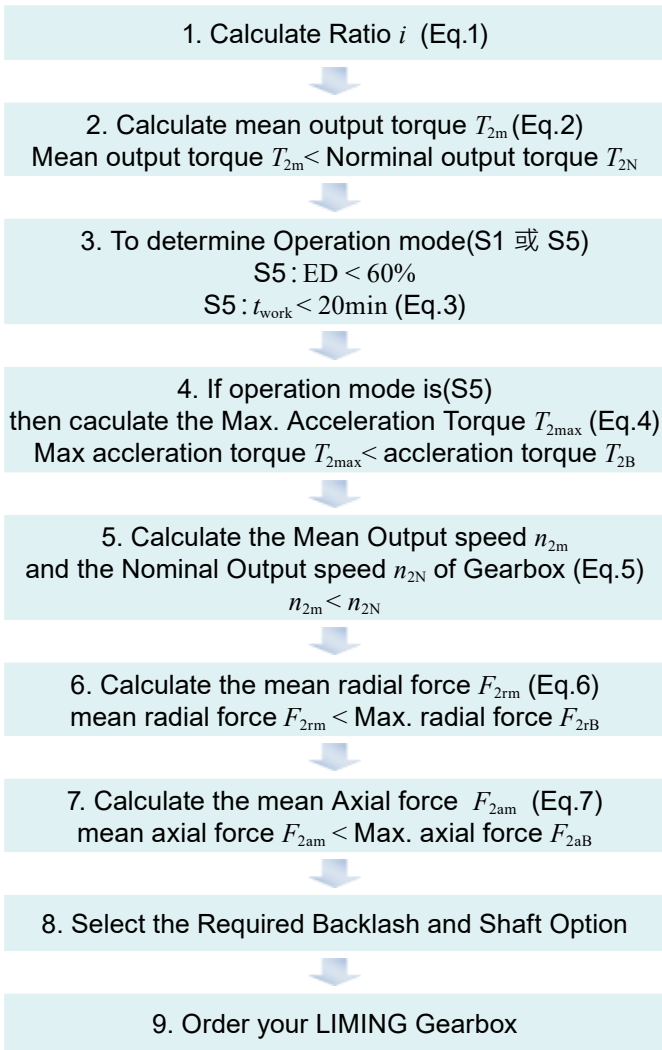
$$n_{2m} = \frac{n_{2a} \cdot t_a + n_{2c} \cdot t_c + n_{2d} \cdot t_d}{t_a + t_c + t_d}$$

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

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





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

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

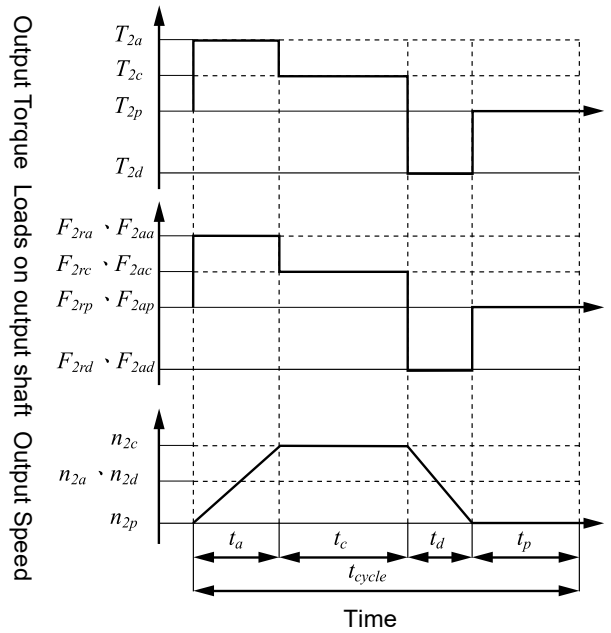
Where  $J_L$  is Load Inertia and  $J_m$  is Motor Inertia.

$T_{2n}$  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:

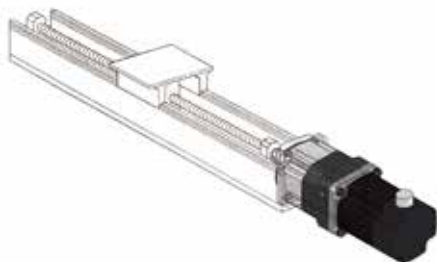
- The mounting on the machine must be stable to avoid any vibration.
- Check the correct direction of rotation of the reduction unit output shaft before fitting the unit to the machine.
- In the case of particularly lengthy periods of storage (4/6 months), if the oil seal is not immersed in the lubricant 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

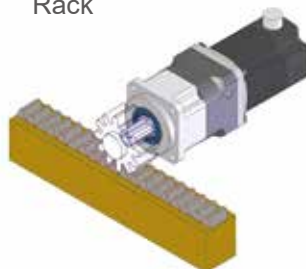
減速機應用範例

## ○ 線性動作機構 Linear Action

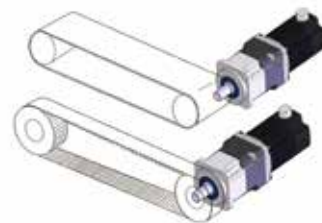
- 滾珠螺桿傳動  
Ball Screw



- 齒條傳動  
Rack

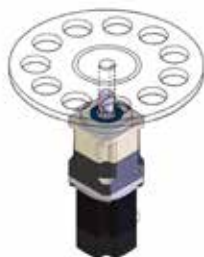


- 滾輪 / 滾筒 / 皮帶  
Roller / Belt



## ○ 回轉盤機構 Rotary Action

- 分度盤  
Index



## ○ 其他機構 Others



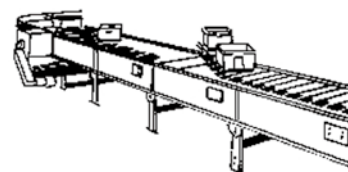
- 機器手臂  
Robot



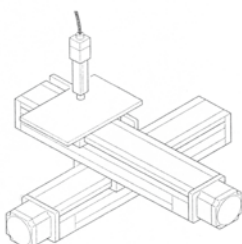
- 印刷機  
Printing Machine



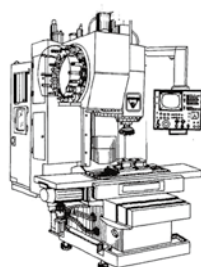
- 輸送機  
Conveyor



- 工作台  
Working Table



- CNC 主軸  
CNC Spindle



- 分割器  
Index

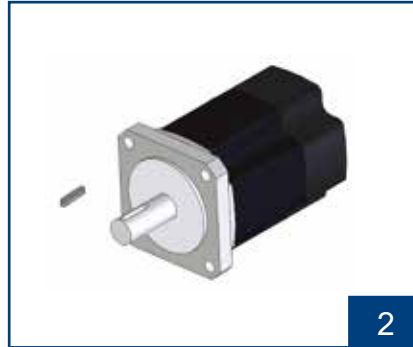


## Planetary Gearbox and Motor Mounting Instructions

### 行星減速機與馬達安裝指南



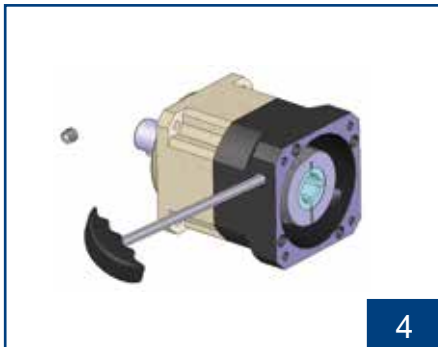
核對馬達型號與減速機規格是否正確。並將配合面擦拭乾淨。  
Confirm the motor, and gearbox size. Clean up the mounting surface.



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  $\varnothing 35$ .



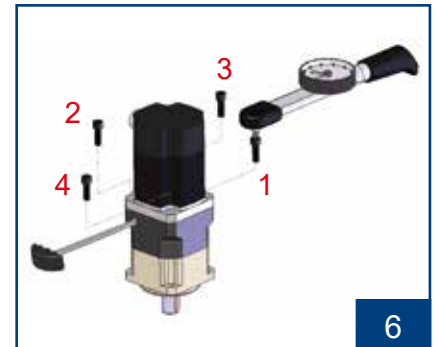
檢查馬達出力軸尺寸，如需軸套，請先裝進入力孔內。  
Check motor shaft size and insert bushing into input bore if necessary.



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.



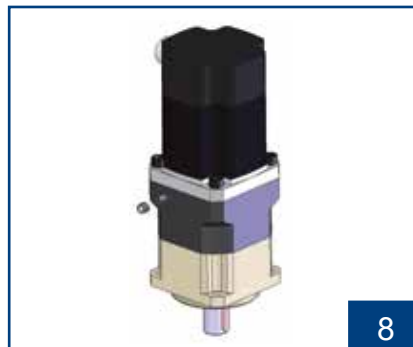
將馬達垂直裝入減速機。  
Put the motor into the gearbox vertically.



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



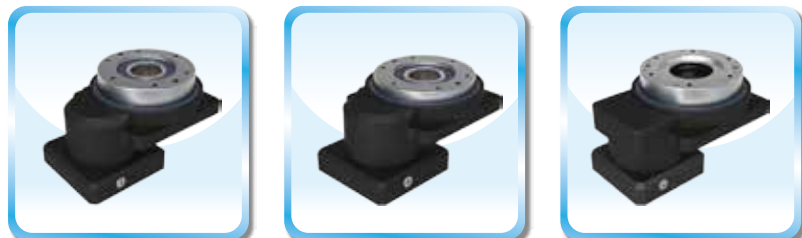
## 直交軸伺服用減速機

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

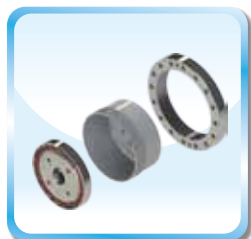


# LIMING REDUCERS

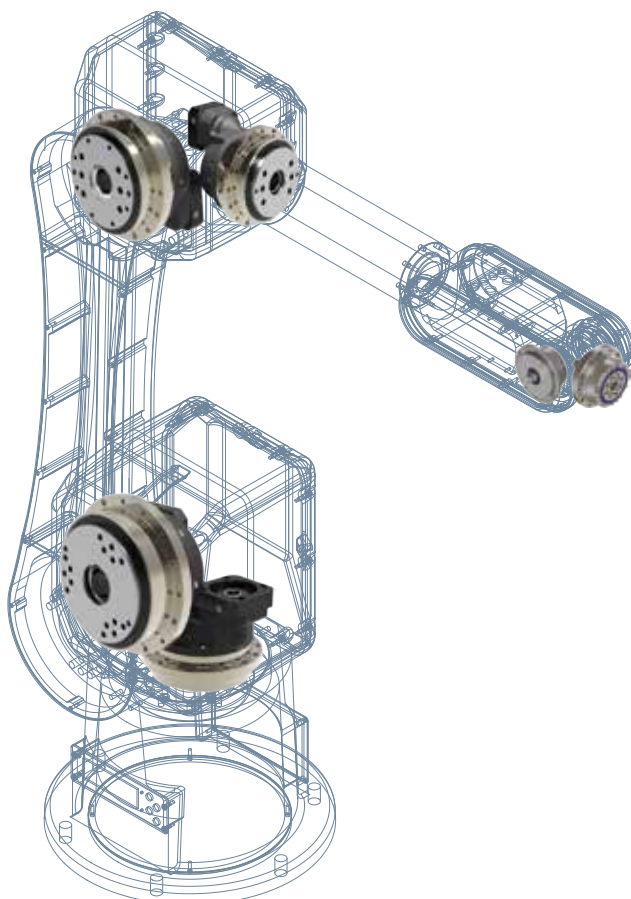
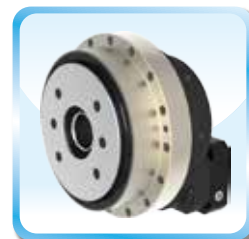
利明牌減速機系列產品

## 機械手臂減速機 Robot Reducers

### 諧波減速機 ROBONICDRIVE



### 高精密擺線減速機 CYKODRIVE





# LIMING REDUCERS

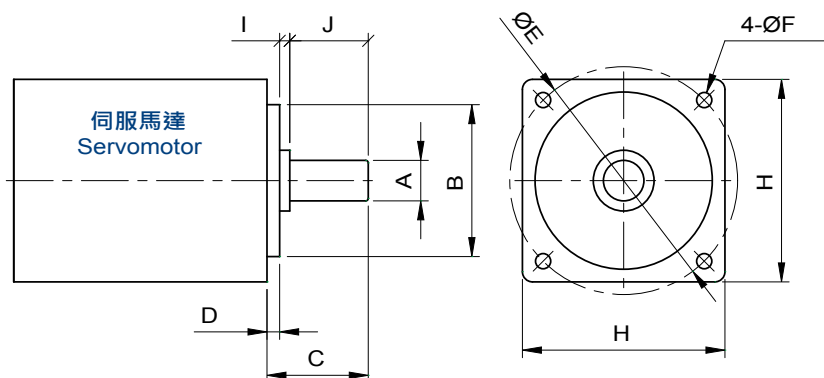
利明牌減速機系列產品

## 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 Type		型號 Model		速比 Ratio	出力軸鍵槽 Output Shaft Keyway		背隙等級 Backlash Class		馬達型號 MOTOR NO.

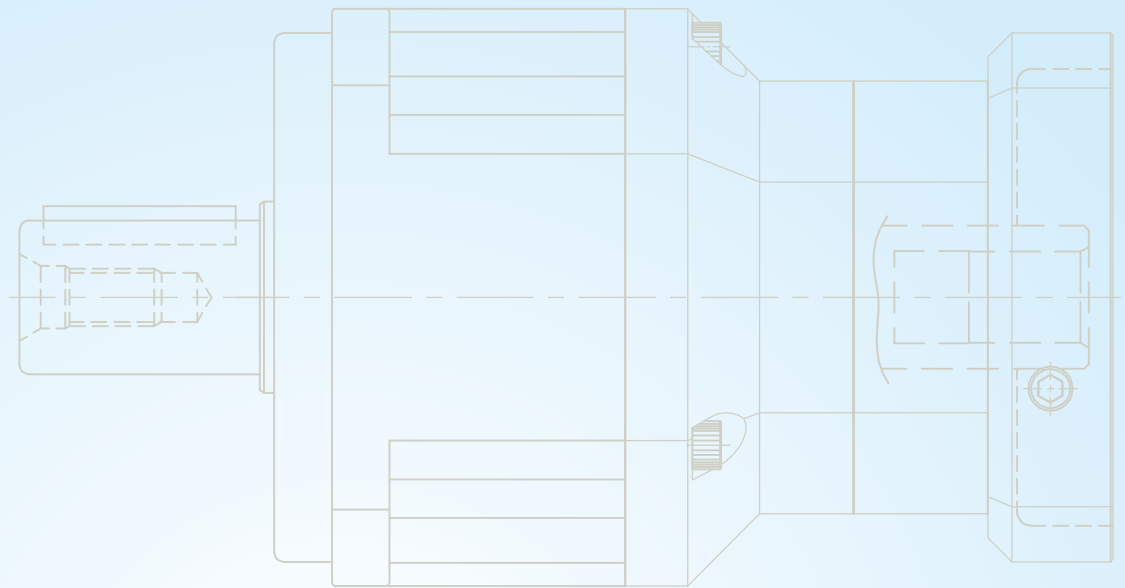
### 訂貨須知：

- ◆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 Company Name		聯絡人 Contact Person	
地址 Address			
電話 Tel	傳真 Fax	電子信箱 E-Mail	
備註 Notes			

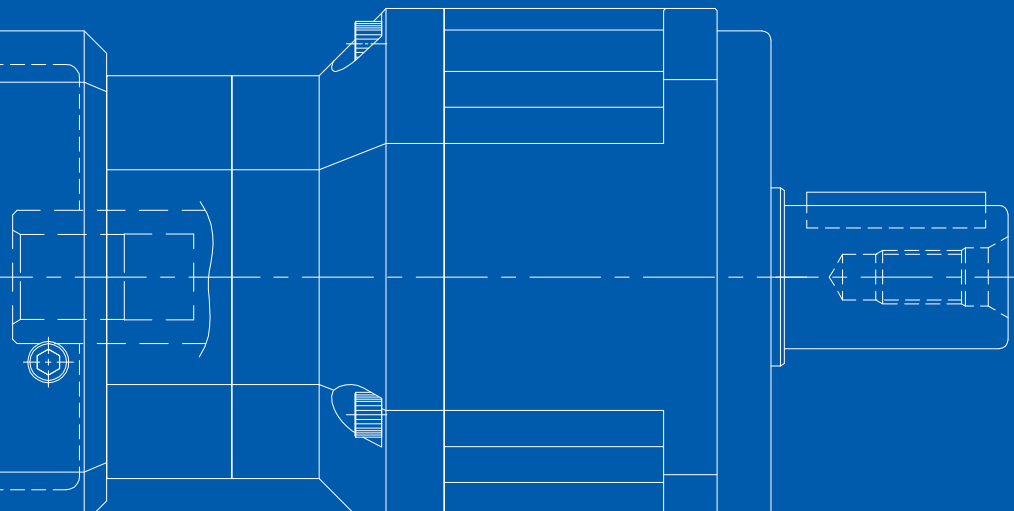


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September, 2022

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