

產品型號 MODEL	高精密伺服行星減速機 High Precision Planetary Reducers							
	SB	SE	SF	SD	SBL	SEL	SFL	SDL
頁次 Page	14	32	62	50	26	42	68	56
背隙等級 (單段) Backlash (1-Stage)	1'·3'·5'·7'			2'·4'·6'·8'				
背隙等級 (雙段) Backlash (2-Stage)	3'·5'·7'·9'			4'·7'·9'·12'				
減速比 (單段) Ratio (1-Stage)	3·4·5·6·7·8·9·10		4·5·7·10	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	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 PaintCoat	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 HelicalGear& Spiral BevelGear				
軸承型式 Bearing Type	滾珠軸承 Ball		滾錐軸承 Tapper	滾珠 / 滾錐 Ball / Tapper	滾珠軸承 Ball		滾錐軸承 Tapper	滾珠 / 滾錐 Ball / Tapper
減速機固定型式 Fixed Reducer	Bore-Hole	Screw	Bore-Hole		Screw	Bore-Hole		
內齒箱材質 Gearbox Material	鉻鉬合金鋼 SCM435							
額定壽命 Service Life	>30,000Hr							
輸入孔徑 Input Bore	5.65mm ~ 75mm		5.65mm ~ 55mm		5.65mm ~ 55mm			
輸入功率 Input Power	100w ~ 75Kw		100w ~ 30Kw		100w ~ 30Kw			

精密伺服行星減速機 Precision Planetary Reducers					
PB	PBL	FA	SN	FB	FE
76	84	92	106	118	124
<8'	<12'	<8'			
<12'	<15'	<12'			
同 SB Same as SB	同 SBL Same as SBL	3·4·5·7·10			
同 SB Same as SB	同 SBL Same as SBL	15·20·25·30·35·40·50·70·100			
-	-	-	-	-	-
烤漆 Painting		染黑 Black Processing		烤漆 Painting	
螺旋齒輪 Helical Gear	螺旋齒輪 & 螺旋傘齒輪 Helical Gear & Spiral BevelGear		螺旋齒輪 Helical Gear		直齒輪 Spur Gear
滾珠軸承 Ball					
Bore-Hole		Screw		Bore-Hole	Screw
中碳鋼 S45C					
>20,000Hr					
5.65mm ~ 55mm		6mm ~ 32mm	6mm ~ 24mm	5.65mm ~ 55mm	
100w ~ 30KW		100w ~ 3.75Kw	100w ~ 2.2Kw	100w ~ 30Kw	



# 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.

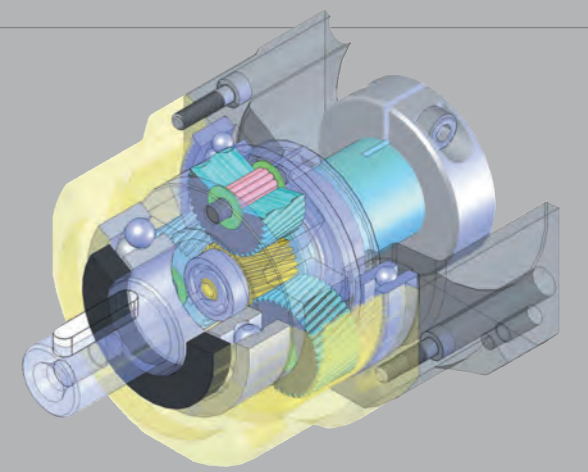
*The Art of Transmission*

## High Tech

High Precision

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。

## 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.



# Integration / Automation Machining Equipment



## 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。



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.

# Integrated

Manufacturing with  
Full Range of  
Automatic Equipment



# Automatic

Processing Equipment

# 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.

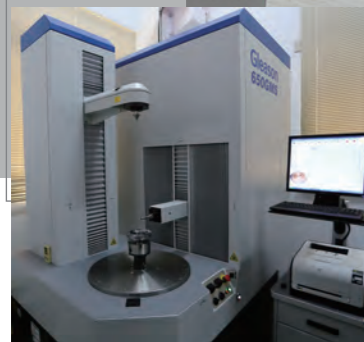
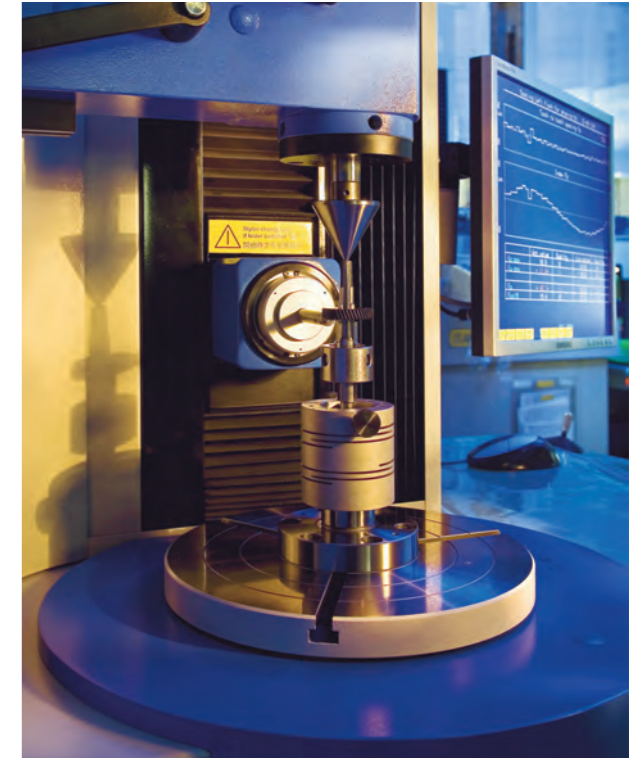


## 高精密的加工設備

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。

# 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.

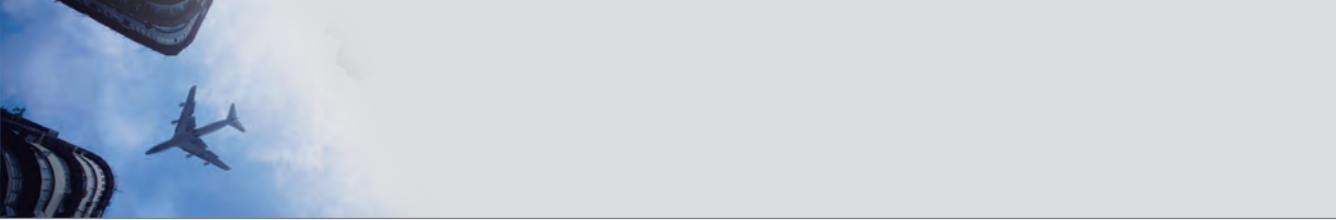


## 「全面品管」不只是口號

「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。







# SERVOBOX 系列產品特點



### 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.

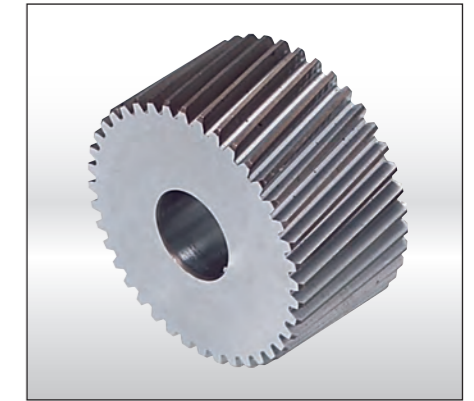


### 一體式行星臂架及雙懸臂設計

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.



### 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.

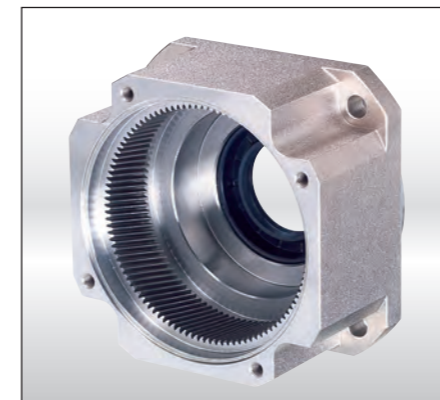


### 筒夾式連結機構

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.

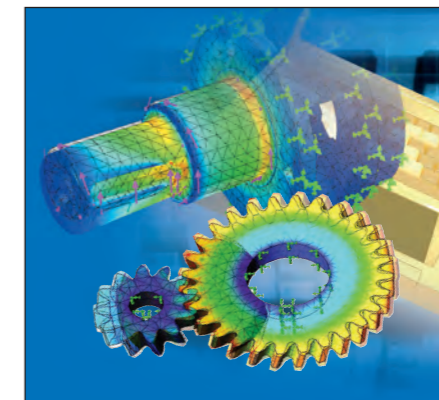


### 一體式齒輪箱本體

齒輪箱和內環齒輪採一體式的設計，材質為鉻鉬合金鋼 SCM435，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 (SCM435), 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.

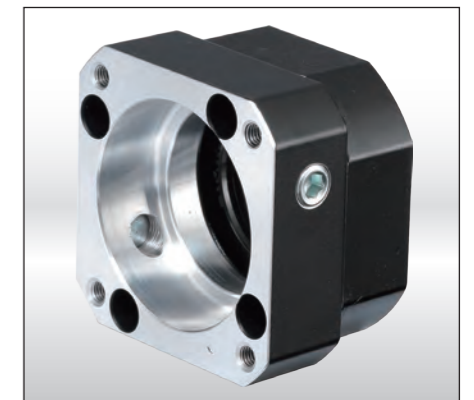


### CAE 設計分析技術

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.

SB  
SBL  
SE  
SEL  
SD  
SDL  
SF  
SFL  
PB  
PBL  
FA  
SN  
FB  
FE

# 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。

SERVBOX 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.

## Features 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 3, 4, 5, 6, 7, 8, 9, 10	□ 標準品·有鍵槽 Standard (Keyway)	單段 1-Stage Ps ≤ 1 弧分 (arcmin) P0 ≤ 3 弧分 (arcmin) P1 ≤ 5 弧分 (arcmin) P2 ≤ 7 弧分 (arcmin)	馬達製造商及型號 Motor Brand & Model No.
SE	62	雙段 2-Stage 15 ~ 100	N: 實心軸·無鍵槽 Solid Output Shaft (No Keyway)	雙段 2-Stage Ps ≤ 3 弧分 (arcmin) P0 ≤ 5 弧分 (arcmin) P1 ≤ 7 弧分 (arcmin) P2 ≤ 9 弧分 (arcmin)	
SB-A	90				
SE-A	120				
SBL	142				
SEL	180				
	220	三段 3-Stage 125 ~ 1000			
	270				
	330				

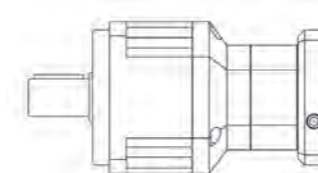
### 標準型及 A-Type 說明

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。

### 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.



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

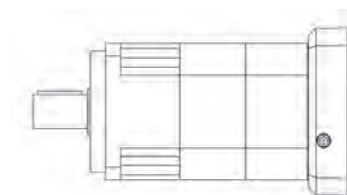
額定輸出扭矩 141Nm S.F.=1.25(降框號使用)

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



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.

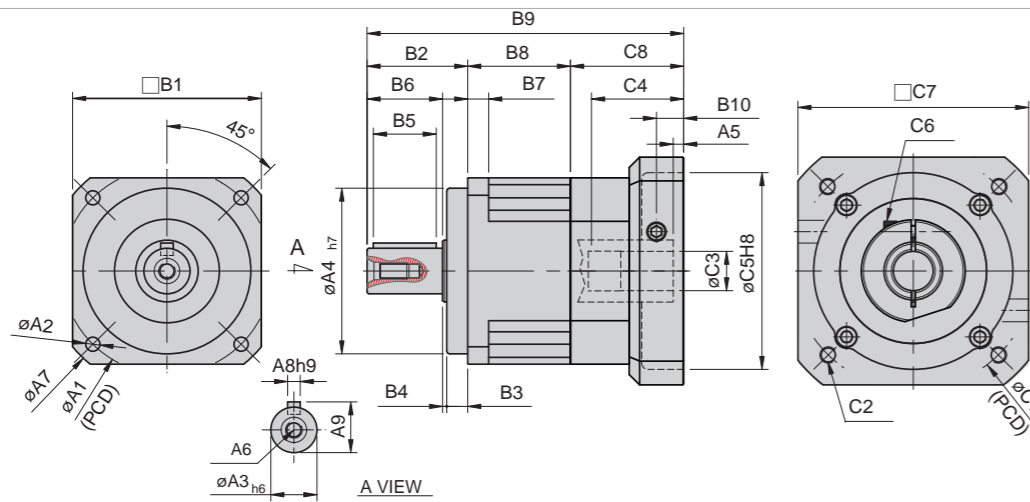
You can select SB-120-100 and S.F. = 1.3. You are not suggested to choose SB-90A-100 because of low S.F. = 0.62.



## MODEL : SB

單段 1-Stage

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



unit: mm

Model Code	44	62	90	120	142	180	220	270	330
A1	50	70	100	130	165	215	250	300	380
A2	4.5	5.5	6.8	9	11	13	17	13	17
A3	13	16	22	32	40	55	75	85	100
A4	35	50	80	110	130	160	180	200	250
A5	5	6	9·23.5	10·20	10	11.5	12.5	13·23	13·23
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	M20 x P2.5	M24 x P3.0
A7	58	80	116	148	186	238	288	328	416
A8	5	5	6	10	12	16	20	22	28
A9	15	18	24.5	35	43	59	79.5	90	106
B1	44	62	90	120	142	180	220	-	-
B2	26	36	48	65	92	106	139	149	159
B3	5	7	10	12	15	20	30	14	14
B4	1	1	2	3	3	4	5	5	5
B5	15	20	30	40	65	70	90	110	120
B6	20	28	36	50	74	82	104	130	140
B7	5	8	10	12	15	16	20	24	28
B8	31.5	38	49	61	70	85	93	164	187
B9	95	115·123	164.5·179	205·215	260.5	323.5	367.5	464.5·474.5	492·502
B10	9	11.5	16	19.5	20	23.5	23.5	26·36	26·36
C1	46·60·63	70·75·90	90·100·115·145	115·145·165	145·165·200	200·215·265	200·265·300	300·350	300·350
C2	M3·M4·M5	M4·M5·M6	M5·M6·M8	M6·M8·M10	M8·M10·M12	M10·M12·M16	M12·M16	M16·M18	M16·M18
C3	8·9·11	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55	42·48·55	48·55·60	55·60·75
C4	26	33.5·41.5	59·73.5	67·77	84.5	114.5	117.5	133·143	133·143
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	250·300	250·300
C6	M3 x P0.5	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M10 x P1.5	M10 x P1.5	M12 x P1.75	M12 x P1.75
C7	46·55	64·70·80	92·110·130	122·130·150	146·150·190	182·200·250	222·250·265	300·330	300·330
C8	37.5	41·49	67.5·82	79·89	98.5	132.5	135.5	151.5·161.5	146·156

規格 Model No.	代號	單位 Unit	速比 Ratio	44	62	90	120	142	180	220	270	330
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	4,770	8,790
			4	16	51	146	300	555	1,069	1,804	4,730	8,730
			5	16	48	160	333	618	1,189	2,010	4,680	8,660
			6	15	45	151	311	583	1,118	1,911	4,620	8,610
			7	15	45	149	309	573	1,108	1,870	4,570	8,520
			8	14	43	143	298	553	1,070	1,824	4,520	8,440
			9	13	44	145	278	516	993	1,694	4,450	8,370
10	14	43	141	294	549	1,059	1,779	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	3,000	3,000	3,000	3,000	3,000	3,000	2,000	2,000	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	3,000	3,000
背隙 Backlash Ps		arcmin	3 ~ 10	-	-	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1
背隙 Backlash P0		arcmin	3 ~ 10	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3
背隙 Backlash P1		arcmin	3 ~ 10	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5
背隙 Backlash P2		arcmin	3 ~ 10	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7
扭轉剛性 Torsional Rigidity		Nm/arcmin	3 ~ 10	3	6	14	27	60	140	240	510	980
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	107,100	224,910
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	53,550	112,455
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	≤ 72	≤ 74
重量 Weight ±3%		Kg	3 ~ 10	0.6	12.8	3.6	8	14.3	28.3	42.5		

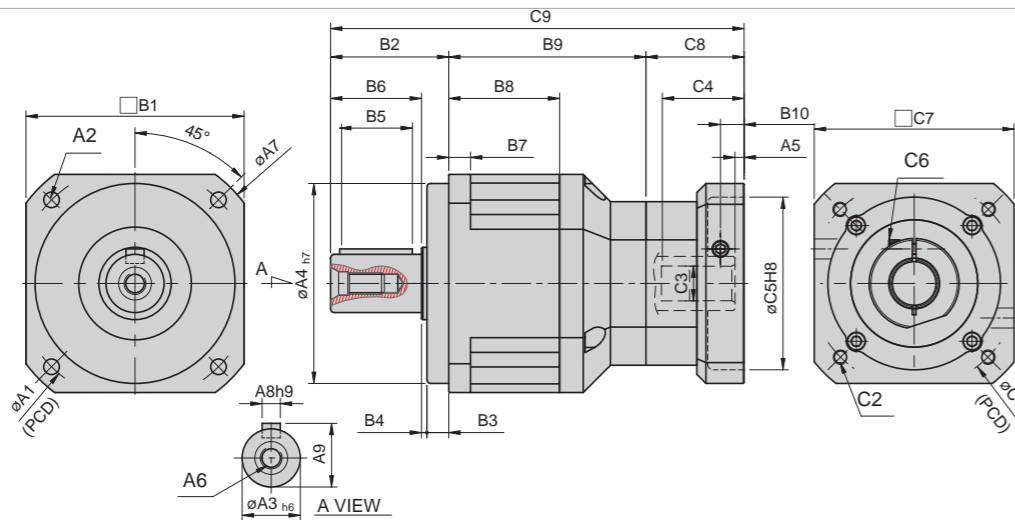
### 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

Ratio	44	62	90	120	142	180	220	270	330
3	0.03	0.16	0.61	3.25	9.21	28.98	59.61	122.20	252.96
4	0.03	0.14	0.48	2.74	7.54	23.67	54.37	111.46	230.72
5	0.03	0.13	0.47	2.71	7.42	23.29	53.27	109.20	226.05
6	0.03	0.13	0.45	2.65	7.25	22.75	51.72	106.03	219.47
7	0.03	0.13	0.45	2.62	7.14	22.48	50.97	104.49	216.29
8	0.03	0.13	0.44	2.58	7.07	22.59	50.84	104.22	215.74
9	0.03	0.13	0.44	2.57	7.04	22.53	50.63	103.79	214.85
10	0.03	0.13	0.44	2.57	7.03	22.51	50.56	103.65	214.55

# MODEL : SB

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	270	330
A1	70	100	130	165	215	250	300	380
A2	5.5	6.8	9	11	13	17	13	17
A3	16	22	32	40	55	75	85	100
A4	50	80	110	130	160	180	200	250
A5	5	6	9·23.5	10·20	10	11.5	12.5	13·23
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	M20 x P2.5	M24 x P3.0
A7	80	116	148	186	238	288	328	416
A8	5	6	10	12	16	20	22	28
A9	18	24.5	35	43	59	79.5	90	106
B1	62	90	120	142	180	220	-	-
B2	36	48	65	92	106	139	149	159
B3	7	10	12	15	20	30	14	14
B4	1	2	3	3	4	5	5	5
B5	20	30	40	65	70	90	110	120
B6	28	36	50	74	82	104	130	140
B7	8	10	12	15	16	20	24	28
B8	38	49	61	70	85	93	164	187
B9	66	83.5	108.5	127.5	154	175	259.5	294.5
B10	9	11.5	16	19.5	20	23.5	23.5	26·36
C1	46·60·63	70·75·90	90·100·115·145	115·145·165	145·165·200	200·215·265	200·265·300	300·350
C2	M3·M4·M5	M4·M5·M6	M5·M6·M8·M10	M6·M8·M10	M8·M10·M12	M10·M12	M12·M16	M16·M18
C3	8·9·11	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55	42·48·55	48·55·60
C4	26	33.5·41.5	59·73.5	67·77	84.5	114.5	117.5	133·143
C5	30·40·50	50·60·70	70·80·95·110	70·95·110·130	110·130·180	114.3·180·230	114.3·230·250	250·300
C6	M3 x P0.5	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M10 x P1.5	M10 x P1.5	M12 x P1.75
C7	46·55	64·70·80	92·110·130	122·130·150	146·180·190	182·200·250	222·250·265	300·330
C8	37.5	41·49	67.5·82	79	98.5	132.5	135.5	151.5·161.5
C9	139.5	172.5·180.5	241·255.5	298.5·308.5	358.5	446.5	544	605·615

規格 Model No.	代號	單位 Unit	速比 Ratio	62	90	120	142	180	220	270	330
額定輸出扭矩 Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	15	59	165	335	625	1,206	2,030	4,770	8,790
			20	51	146	300	555	1,069	1,804	4,730	8,730
			25	48	160	333	618	1,189	2,010	4,680	8,660
			30	45	151	311	583	1,118	1,911	4,620	8,610
			35	45	149	309	573	1,108	1,870	4,570	8,520
			40	43	143	298	553	1,070	1,824	4,520	8,440
			50	48	160	333	618	1,189	2,010	4,680	8,660
			60	45	151	311	583	1,118	1,911	4,620	8,610
			70	45	149	309	573	1,108	1,870	4,570	8,520
			80	43	143	298	553	1,070	1,824	4,520	8,440
90	44	145	278	516	993	1,694	4,450	8,370			
100	43	141	294	549	1,059	1,779	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	3,000	3,000	3,000	3,000	3,000	2,000	2,000	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	3,000	3,000
背隙 Backlash Ps		arcmin	15 ~ 100	-	-	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3
背隙 Backlash P0		arcmin	15 ~ 100	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5
背隙 Backlash P1		arcmin	15 ~ 100	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7
背隙 Backlash P2		arcmin	15 ~ 100	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9
扭轉剛性 Torsional Rigidity		Nm/arcmin	15 ~ 100	6	14	27	60	140	240	510	980
容許徑向力 Max. Radial Force	$F_{2aB}$	N	15 ~ 100	1,180	3,200	6,800	9,300	15,600	51,000	107,100	224,910
容許軸向力 Max. Axial Force	$F_{2aB}$	N	15 ~ 100	590	1,600	3,400	4,650	7,800	25,500	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	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70	≤ 72	≤ 74
重量 Weight ±3%		Kg	15 ~ 100	1.73	4.6	9.42	17.2	34.1	57.3		

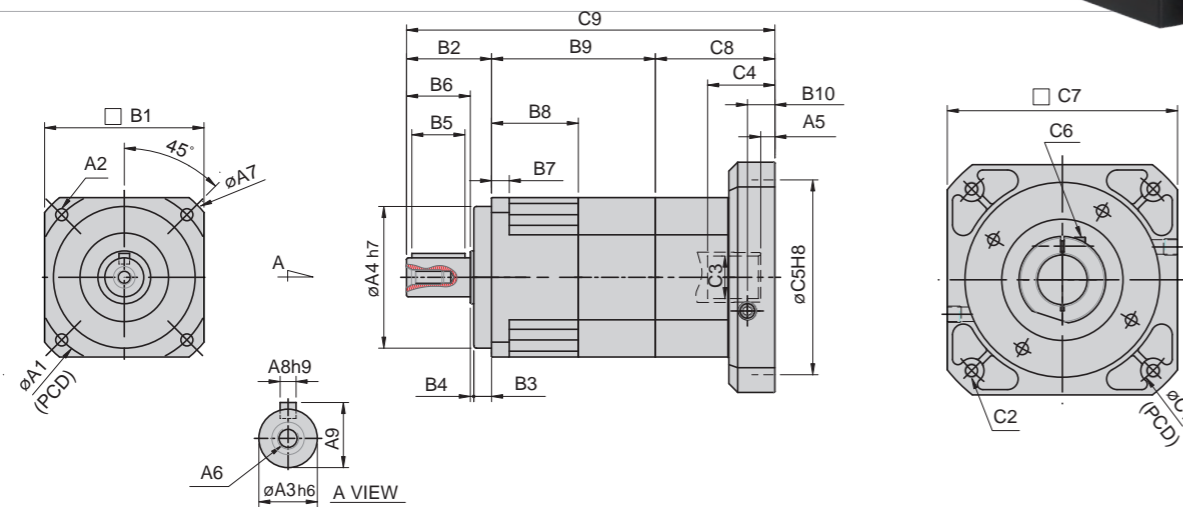
### 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

Ratio	62	90	120	142	180	220	270	330
15	0.03	0.14	0.46	2.63	7.3	22.79	63.81	185.05
20	0.03	0.14	0.46	2.63	7.3	22.79	63.81	185.05
25	0.03	0.14	0.46	2.63	7.1	22.79	63.81	185.05
30	0.03	0.14	0.46	2.43	7.1	22.59	63.25	183.43
35	0.03	0.14	0.44	2.43	7.1	22.59	63.25	183.43
40	0.03	0.14	0.44	2.43	6.92	22.59	63.25	183.43
50	0.03	0.14	0.44	2.43	6.92	22.59	63.25	183.43
60	0.03	0.14	0.43	2.39	6.72	21.83	61.12	177.26
70	0.03	0.14	0.43	2.39	6.72	21.83	61.12	177.26
80	0.03	0.14	0.43	2.39	6.72	21.83	61.12	177.26
90	0.03	0.14	0.40	2.39	6.72	21.60	60.48	175.39
100	0.03	0.14	0.40	2.39	6.72	21.60	60.48	175.39

## MODEL : SB-A

雙段 2-Stage

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



unit: mm

Model Code	44A	62A	90A	120A	142A	180A	220A
A1	50	70	100	130	165	215	250
A2	4.5	5.5	6.8	9	11	13	17
A3	13	16	22	32	40	55	75
A4	35	50	80	110	130	160	180
A5	5	6	9·23.5	10·20	10	11.5	12.5
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
B8	31.5	38	49	61	70	85	93
B9	57.5	71.8	92.5	117	136.5	166	186
B10	9	11.5	16	19.5	20	23.5	23.5
C1	46·60·63	70·75·90	90·100·115·145	115·145·165	145·165·200	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	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55	42·48·55
C4	26	33.5·41.5	59·73.5	67·77	84.5	114.5	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	M3 x P0.5	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	37.5	41·49	67.5·82	79·89	98.5	132.5	135.5
C9	121	148.8·156.8	208·222.5	261·271	327	404.5	460.5

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

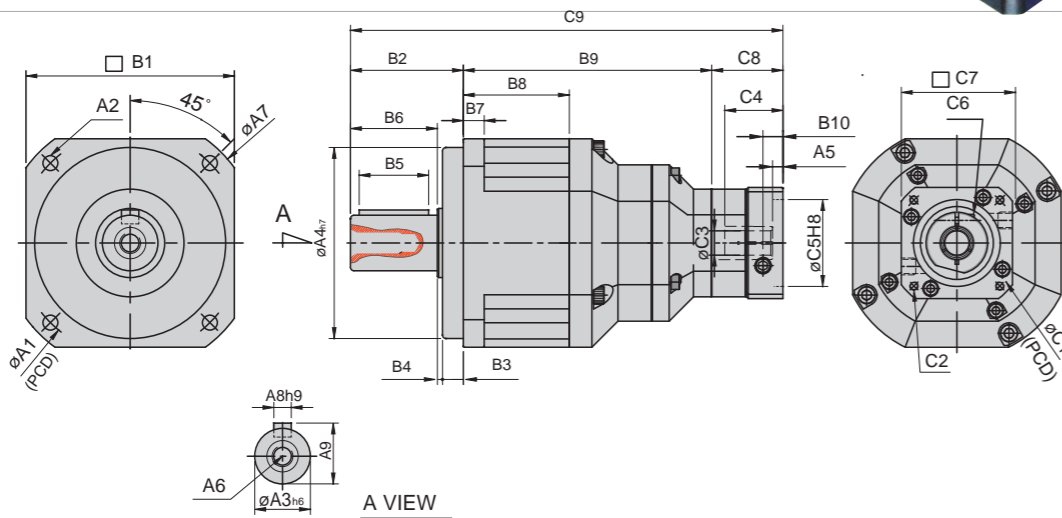
### 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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

# MODEL : SB

三段 3-Stage

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



unit: mm

Model Code	90	120	142	180	220
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
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
B8	49	61	70	85	93
B9	111.5	143	175	211.5	244
B10	9	11.5	16	19.5	20
C1	46 · 60 · 63	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200
C2	M3 · M4 · M5	M4 · M5 · M6	M5 · M6 · M8	M6 · M8 · M10	M8 · M10 · M12
C3	8 · 9 · 11	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35
C4	26	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	M3 x P0.5	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	37.5	41 · 49	67.5 · 82	79 · 89	98.5
C9	197	249 · 257	334.5 · 349	396.5 · 406.5	481.5

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
最大輸出扭矩 Max. Output Torque	$T_{2NT}$	Nm	150	165	335	625	1,206	2,030
急停扭矩 Emergency Stop Torque	$T_{2NOT}$	Nm	175	149	309	573	1,108	1,870
額定輸入轉速 Rated Input Speed	$n_{IN}$	rpm	200	146	300	555	1,069	1,804
最大輸入轉速 Max. Input Speed	$n_{IB}$	rpm	250	160	333	618	1,189	2,010
背隙 Backlash Ps		arcmin	300	151	311	583	1,118	1,911
背隙 Backlash P0		arcmin	350	149	309	573	1,108	1,870
背隙 Backlash P1		arcmin	400	143	298	553	1,070	1,824
背隙 Backlash P2		arcmin	450	145	278	516	993	1,694
扭轉剛性 Torsional Rigidity		Nm/arcmin	500	160	333	618	1,189	2,010
容許徑向力 Max. Radial Force	$F_{2rB}$	N	600	151	311	583	1,118	1,911
容許軸向力 Max. Axial Force	$F_{2aB}$	N	700	149	309	573	1,108	1,870
使用壽命 Service Life	$L_H$	hr	800	143	298	553	1,070	1,824
效率 Efficiency	$\eta$	%	900	145	278	516	993	1,694
使用溫度 Operating Temperature		°C	1000	141	294	549	1,059	1,779
潤滑 Lubrication			S5 周期運轉 : >30,000 (S1 連續運轉 : >15,000 hrs)					
防護等級 Protection Class			S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)					
安裝方向 Mounting Position			- 25° C ~ + 90° C					
噪音值 Noise Level		dB	≥ 90					
重量 Weight ±3%		Kg	全合成潤滑油脂 Synthetic Grease					
			IP65					
			任意方向 Any					
			125	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70
			150	5.2	10	18.1	35	63.7

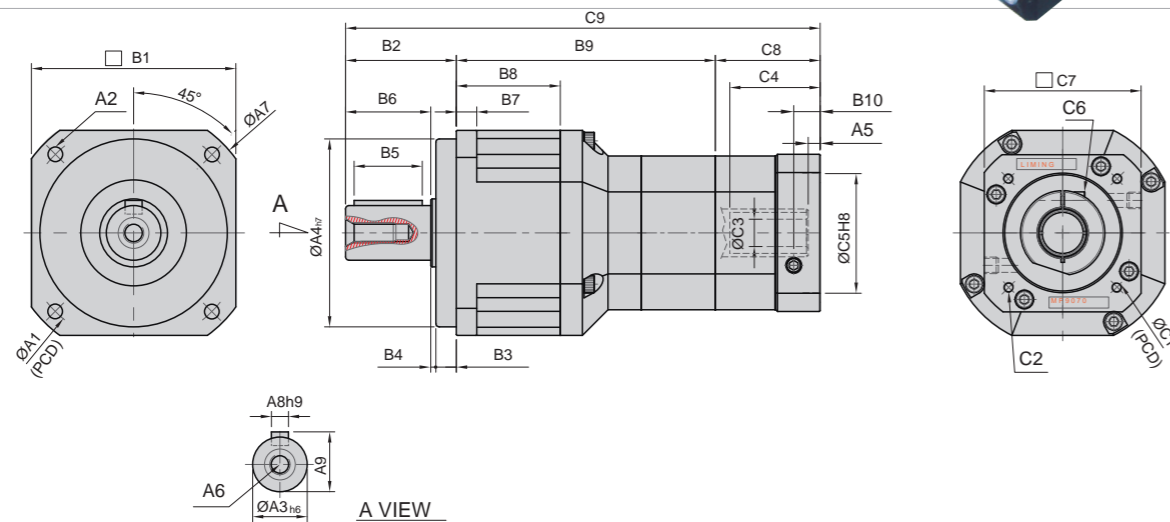
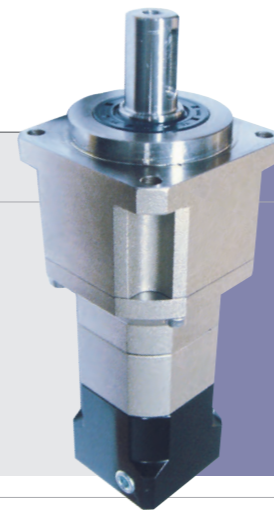
### 轉動慣量 Mass Moments of Inertia (kg·cm<sup>2</sup>)

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

# MODEL : SB-A

三段 3-Stage

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



unit: mm

Model Code	62A	90A	120A	142A	180A	220A
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
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
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	38	49	61	70	85	93
B9	92	117.5	152	183.5	220.5	256
B10	9	11.5	16	19.5	20	23.5
C1	46 · 63 · 60	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200	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	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55
C4	26	33.5 · 41.5	59 · 73.5	67 · 77	84.5	114.5
C5	30 · 40 · 50	50 · 60 · 70	70 · 80 · 95 · 110	95 · 110 · 130	110 · 130 · 180	114.3 · 180 · 230
C6	M3 x P0.5	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	37.5	41 · 49	67.5 · 82	79 · 89	98.5	132.5
C9	165.5	206.3 · 214.3	284.5 · 299	354.5 · 364.5	425	527.5

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	$n_{1N}$	rpm	125 ~ 1000	3,000	3,000	3,000	3,000	3,000	2,000
最大輸入轉速 Max. Input Speed	$n_{1B}$	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

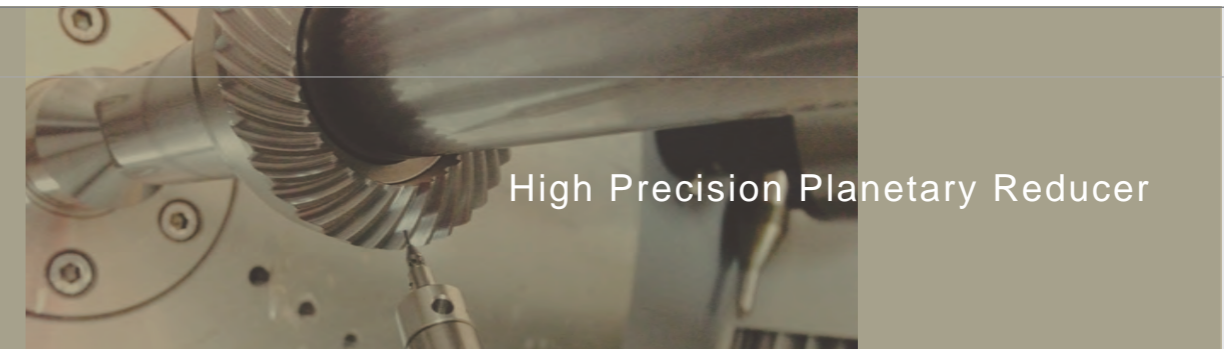
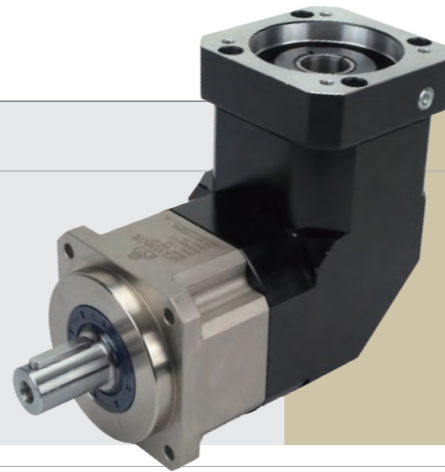
■ 轉動慣量 Mass Moments of Inertia (kg·cm<sup>2</sup>)

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

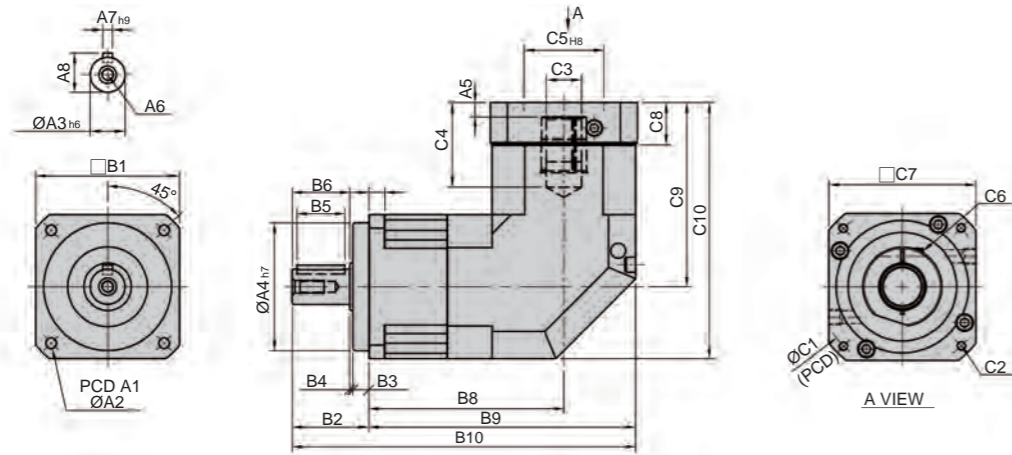
## MODEL : SBL

單段 1-Stage

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



High Precision Planetary Reducer



unit: mm

Model Code	44	62	90	120	142	180	220
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	12.5
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
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
C1	46·60·63	70·75·90	90·110·115·145	115·145·165	145·165·200	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	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55	42·48·55
C4	27	33.5	53·67.5	67·77	85	117	117
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	M3 x P0.5	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	45.5
C9	61	77	115.3·129.8	141·151	174	235	235
C10	83	108	160.3·174.8	201·211	245	325	345

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	1,179
			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	$n_{IN}$	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	$n_{IB}$	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	13.8	52.8		

### 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

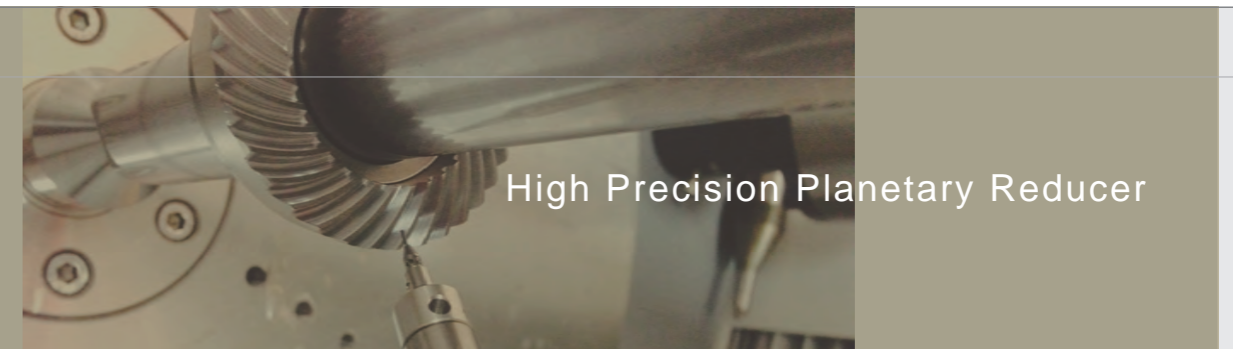
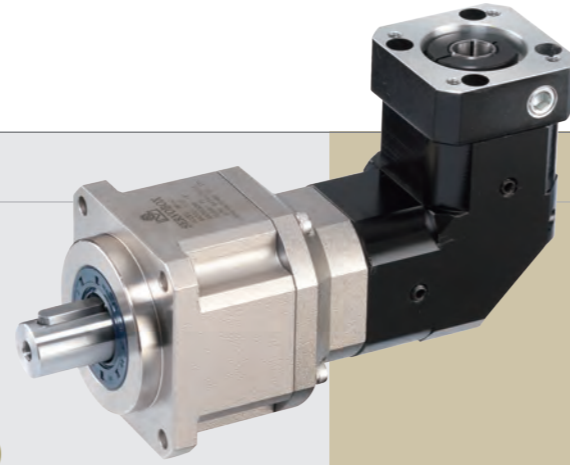
# SERVOBOX Planetary Reducers

LIMING SERVOBOX 高精行星減速機

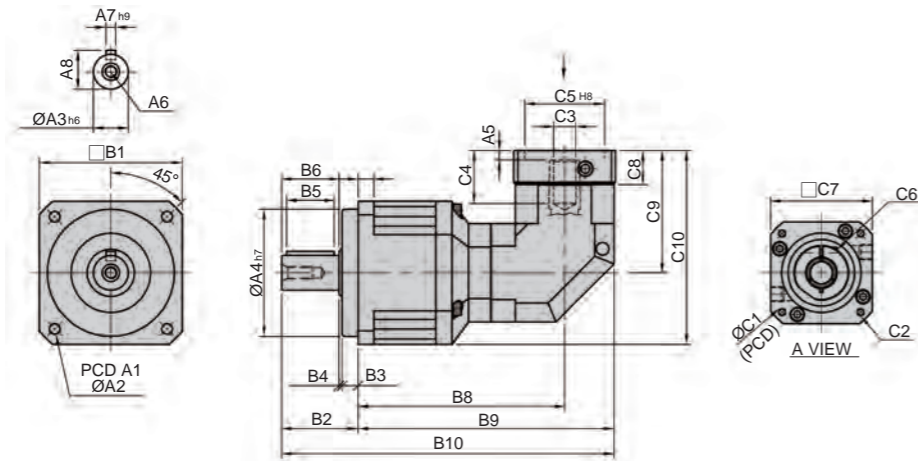
## MODEL : SBL

雙段 2-Stage

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



High Precision Planetary Reducer



unit: mm

Model Code	62	90	120	142	180	220
A1	70	100	130	165	215	250
A2	5.5	6.8	9	11	13	17
A3	16	22	32	40	55	75
A4	50	80	110	130	160	180
A5	6	6	9 · 23.5	10 · 20	10	12.5
A6	M5 x P0.8	M8 x P1.25	M10 x P1.5	M12 x P1.75	M14 x P2.0	M16 x P2.0
A7	5	6	10	12	16	20
A8	18	24.5	35	43	59	79.5
B1	62	90	120	142	180	220
B2	36	48	65	92	106	139
B3	7	10	12	15	20	30
B4	1	2	3	3	4	5
B5	20	30	40	65	70	90
B6	28	36	50	74	82	104
B7	8	10	12	15	16	20
B8	110.5	130	181.6	214.5	249.5	313.6
B9	132.5	161	266.6	274.5	320.5	403.6
B10	168.5	209	291.6	366.5	426.5	542.6
C1	46 · 60 · 63	70 · 75 · 90	90 · 110 · 115 · 145	115 · 145 · 165	145 · 165 · 200	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 · 9 · 11	14 · 19	19 · 22 · 24	24 · 82 · 32	32 · 35 · 38	38 · 42 · 48 · 55
C4	27	33.5 · 40.5	53 · 67.5	67 · 77	85	117
C5	30 · 40 · 50	50 · 60 · 70	70 · 80 · 95 · 110	95 · 110 · 130	110 · 130 · 180	114.3 · 180 · 230
C6	M3 x P0.5	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
C9	61	77	115.3 · 129.8	141 · 151	174	235
C10	92	122	175.3 · 189.8	212 · 222	264	345

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 P <sub>s</sub>		arcmin	15 ~ 200	-	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4
背隙 Backlash P <sub>0</sub>		arcmin	15 ~ 200	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7
背隙 Backlash P <sub>1</sub>		arcmin	15 ~ 200	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9
背隙 Backlash P <sub>2</sub>		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)					
效率 Efficiency	$\eta$	%	15 ~ 200	S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)					
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

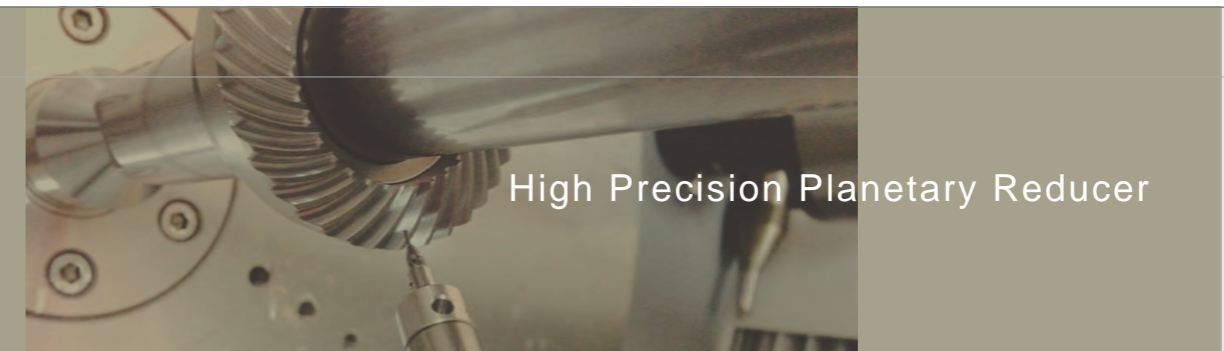
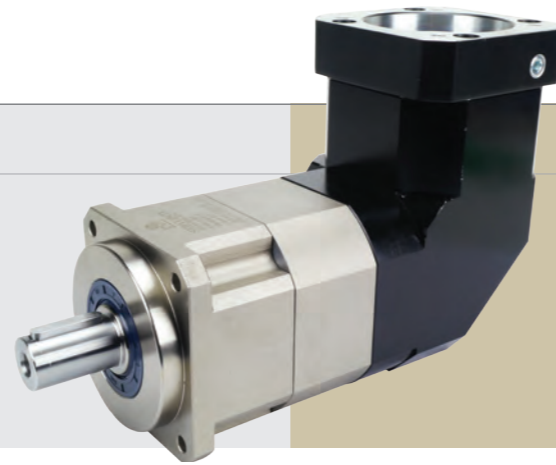
### 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

Ratio	62	90	120	142	180	220
15	0.09	0.36	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	0.10	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

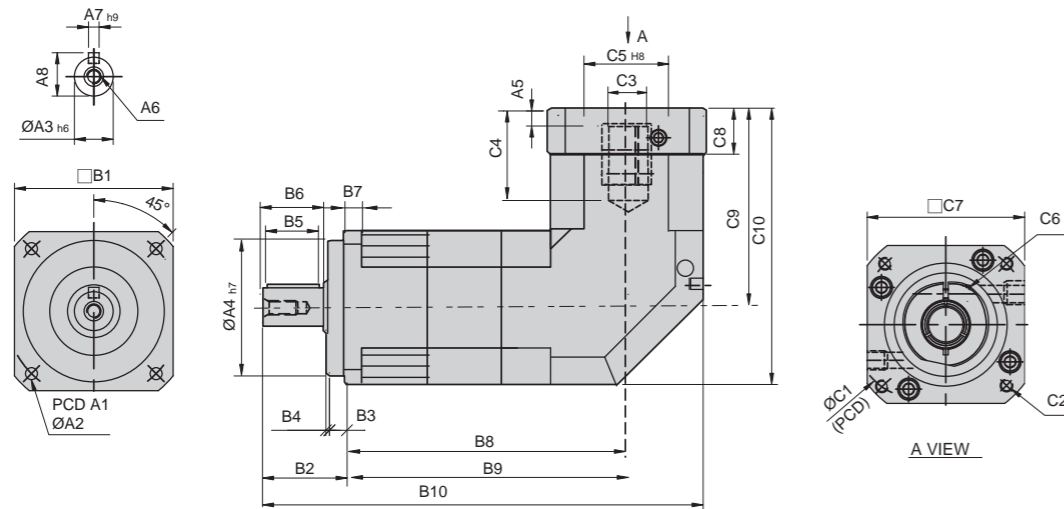
## MODEL : SBL-A

雙段 2-Stage

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



High Precision Planetary Reducer



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	6	6	9·23.5	10·20	10	12.5	12.5
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
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
C1	46·60·63	70·75·90	90·110·115·145	115·145·165	145·165·200	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	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55	42·48·55
C4	27	33.5·41.5	53·67.5	67·77	85	117	117
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	M3 x P0.5	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	45.5
C9	61	77	115.3·129.8	141·151	174	235	235
C10	83	108	160.3·174.8	201·211	245	325	345

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)						
效率 Efficiency	$\eta$	%	15 ~ 200	S5 Cycle Operation: >30,000 (S1 Continuous Operation: >15,000 hrs)						
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		3	8.2	12.5	23.2	52.4	

### 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	6.28	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



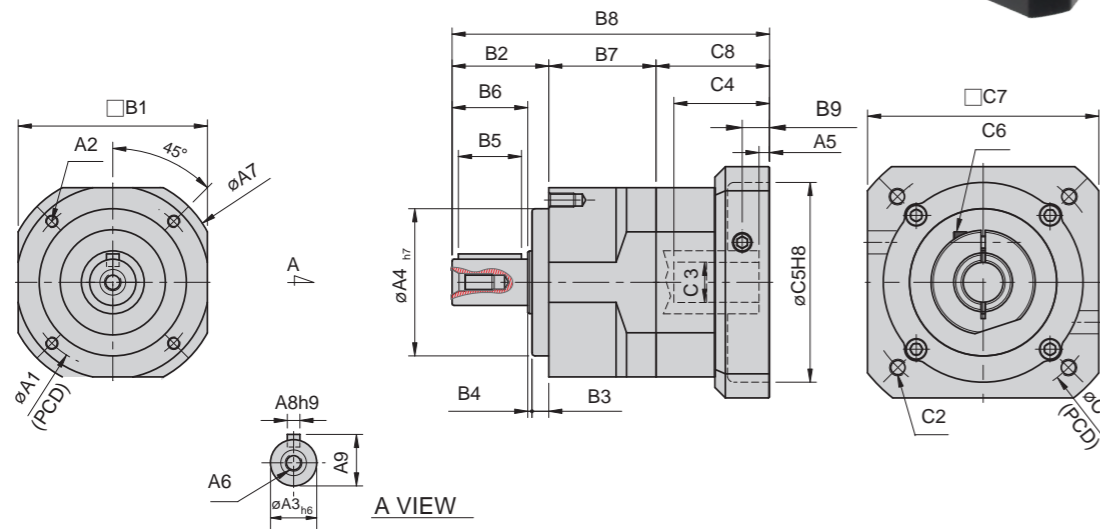
## MODEL : SE

單段 1-Stage

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



High Precision Planetary Reducer



unit: mm

Model Code	44	62	90	120	142	180	220	270	330
A1	44	62	82	110	140	184	218	240	300
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	M12 x P1.75	M16 x P2.0
A3	13	16	22	32	40	55	75	85	100
A4	35	50	70	90	120	160	180	200	250
A5	5	6	9 · 23.5	10 · 20	10	11.5	12.5	13 · 23	13 · 23
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	M20 x P2.5	M24 x P3.0
A7	50	70	102	134	166	215	252	270	336
A8	5	5	6	10	12	16	20	22	28
A9	15	18	24.5	35	43	59	79.5	90	106
B1	44	62	90	120	142	180	220	-	-
B2	26	36	46	65	92	106	139	173	187
B3	5	7	8	12	15	20	30	38	42
B4	1	1	2	3	3	4	5	5	5
B5	15	20	30	40	65	70	90	110	120
B6	20	28	36	50	74	82	104	130	140
B7	31.5	38	51	61	70	85	93	140	159
B8	95	115 · 123	164.5 · 179	205 · 215	260.5	323.5	367.5	464.5 · 474.5	492 · 502
B9	9	11.5	16	19.5	20	23.5	23.5	26 · 36	26 · 36
C1	46 · 60 · 63 · 90	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200	200 · 215 · 265	200 · 265 · 300	300 · 350	300 · 350
C2	M3 · M4 · M5	M4 · M5 · M6	M5 · M6 · M8	M6 · M8 · M10	M8 · M10 · M12	M10 · M12	M12 · M16	M16 · M18	M16 · M18
C3	8 · 9 · 11	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55	42 · 48 · 55	48 · 55 · 60	55 · 60 · 75
C4	26	33.5 · 41.5	59 · 73.5	67 · 77	84.5	114.5	117.5	133 · 143	133 · 143
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	250 · 300	250 · 300
C6	M3 x P0.5	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M10 x P1.5	M10 x P1.5	M12 x P1.75	M12 x P1.75
C7	46 · 55	64 · 70 · 80	92 · 110 · 130	122 · 130 · 150	146 · 150 · 190	182 · 200 · 250	222 · 250 · 265	300 · 330	300 · 330
C8	37.5	41 · 49	67.5 · 82	79 · 89	98.5	132.5	135.5	151.5 · 161.5	146 · 156

規格 Model No.	代號	單位 Unit	速比 Ratio	44	62	90	120	142	180	220	270	330
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	4,770	8,790
			4	16	51	146	300	555	1,069	1,804	4,730	8,730
			5	16	48	160	333	618	1,189	2,010	4,680	8,660
			6	15	45	151	311	583	1,118	1,911	4,620	8,610
			7	15	45	149	309	573	1,108	1,870	4,570	8,520
			8	14	43	143	298	553	1,070	1,824	4,520	8,440
			9	13	44	145	278	516	993	1,694	4,450	8,370
10	14	43	141	294	549	1,059	1,779	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	3,000	3,000	3,000	3,000	3,000	3,000	2,000	2,000	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	3,000	3,000
背隙 Backlash Ps		arcmin	3 ~ 10	-	-	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1
背隙 Backlash P0		arcmin	3 ~ 10	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3
背隙 Backlash P1		arcmin	3 ~ 10	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5
背隙 Backlash P2		arcmin	3 ~ 10	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7
扭轉剛性 Torsional Rigidity		Nm/arcmin	3 ~ 10	3	6	14	27	60	140	240	510	980
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	107,100	224,910
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	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	≤ 56	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70	≤ 72	≤ 74
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	270	330
3	0.03	0.16	0.61	3.25	9.21	28.98	69.61	122.20	252.96
4	0.03	0.14	0.48	2.74	7.54	23.67	54.37	111.46	230.72
5	0.03	0.13	0.47	2.71	7.42	23.29	53.27	109.20	226.05
6	0.03	0.13	0.45	2.65	7.25	22.75	51.72	106.03	219.47
7	0.03	0.13	0.45	2.62	7.14	22.48	50.97	104.49	216.29
8	0.03	0.13	0.44	2.58	7.07	22.59	50.84	104.22	215.74
9	0.03	0.13	0.44	2.57	7.04	22.53	50.63	103.79	214.85
10	0.03	0.13	0.44	2.57	7.03	22.51	50.56	103.65	214.55

# SERVOBOX Planetary Reducers

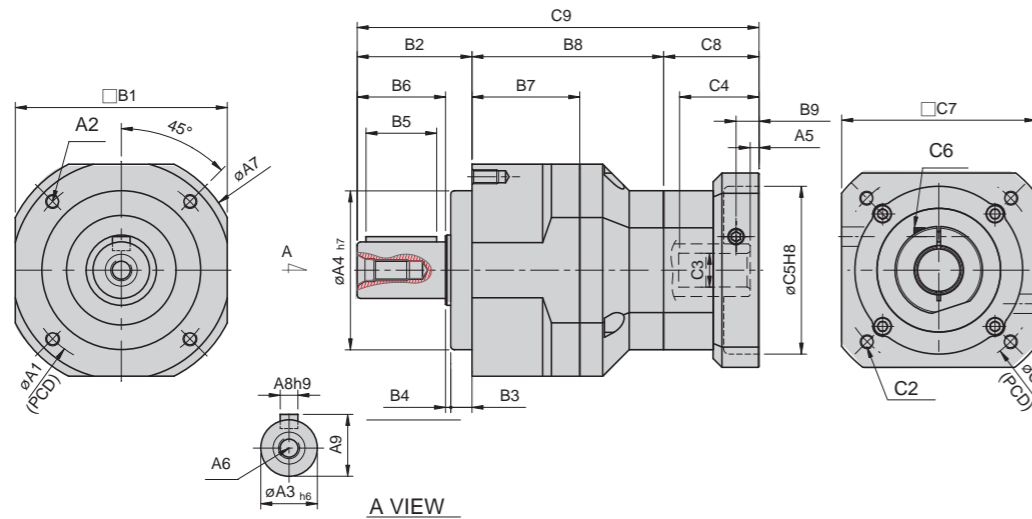
## MODEL : SE

雙段 2-Stage

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



High Precision Planetary Reducer



unit: mm

Model Code	62	90	120	142	180	220	270	330
A1	62	82	110	140	184	218	240	300
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	M12 x P1.75	M16 x P2.0
A3	16	22	32	40	55	75	85	100
A4	50	70	90	120	160	180	200	250
A5	5	6	9 · 23.5	10 · 20	10	11.5	12.5	13 · 23
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	M20 x P2.5	M24 x P3.0
A7	70	102	134	166	215	252	270	336
A8	5	6	10	12	16	20	22	28
A9	18	24.5	35	43	59	79.5	90	106
B1	62	90	120	142	180	220	-	-
B2	36	46	65	92	106	139	173	187
B3	7	8	12	15	20	30	38	42
B4	1	2	3	3	4	5	5	5
B5	20	30	40	65	70	90	110	120
B6	28	36	50	74	82	104	130	140
B7	38	51	61	70	85	93	140	159
B8	66	83.5	108.5	127.5	154	175	235.5	266.5
B9	9	11.5	16	19.5	20	23.5	23.5	26 · 36
C1	46 · 60 · 63	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200	200 · 215 · 265	200 · 265 · 300	300 · 350
C2	M3 · M4 · M5	M4 · M5 · M6	M5 · M6 · M8	M6 · M8 · M10	M8 · M10 · M12	M10 · M12	M12 · M16	M16 · M18
C3	8 · 9 · 11	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55	42 · 48 · 55	48 · 55 · 60
C4	26	33.5 · 41.5	59 · 73.5	67 · 77	84.5	114.5	117.5	133 · 143
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	250 · 300
C6	M3 x P0.5	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M10 x P1.5	M10 x P1.5	M12 x P1.75
C7	46 · 55	64 · 70 · 80	92 · 110 · 130	122 · 130 · 150	146 · 150 · 190	182 · 200 · 250	222 · 250 · 265	300 · 330
C8	37.5	41 · 49	67.5 · 82	79 · 89	98.5	132.5	135.5	151.5 · 161.5
C9	139.5	172.5 · 180.5	241 · 255.5	298.5 · 308.5	358.5	446.5	544	605 · 615

規格 Model No.	代號	單位 Unit	速比 Ratio	62	90	120	142	180	220	270	330
額定輸出扭矩 Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	15	59	165	335	625	1,206	2,030	4,770	8,790
			20	51	146	300	555	1,069	1,804	4,730	8,730
			25	48	160	333	618	1,189	2,010	4,680	8,660
			30	45	151	311	583	1,118	1,911	4,620	8,610
			35	45	149	309	573	1,108	1,870	4,570	8,520
			40	43	143	298	553	1,070	1,824	4,520	8,440
			50	48	160	333	618	1,189	2,010	4,680	8,660
			60	45	151	311	583	1,118	1,911	4,620	8,610
			70	45	149	309	573	1,108	1,870	4,570	8,520
			80	43	143	298	553	1,070	1,824	4,520	8,440
			90	44	145	278	516	993	1,694	4,450	8,370
100	43	141	294	549	1,059	1,779	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	$n_{IN}$	rpm	15 ~ 100	3,000	3,000	3,000	3,000	3,000	2,000	2,000	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	4,000	4,000
背隙 Backlash Ps		arcmin	15 ~ 100	-	-	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3	≤ 3
背隙 Backlash P0		arcmin	15 ~ 100	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5	≤ 5
背隙 Backlash P1		arcmin	15 ~ 100	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7
背隙 Backlash P2		arcmin	15 ~ 100	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9
扭轉剛性 Torsional Rigidity		Nm/arcmin	15 ~ 100	6	14	27	60	140	240	510	980
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	107,100	224,910
容許軸向力 Max. Axial Force	$F_{2aB}$	N	15 ~ 100	590	1,600	3,400	4,650	7,800	25,500	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	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70	≤ 72	≤ 74
重量 Weight ±3%		Kg	15 ~ 100	1.68	4.4	9.3	15.5	34.8	56.5		

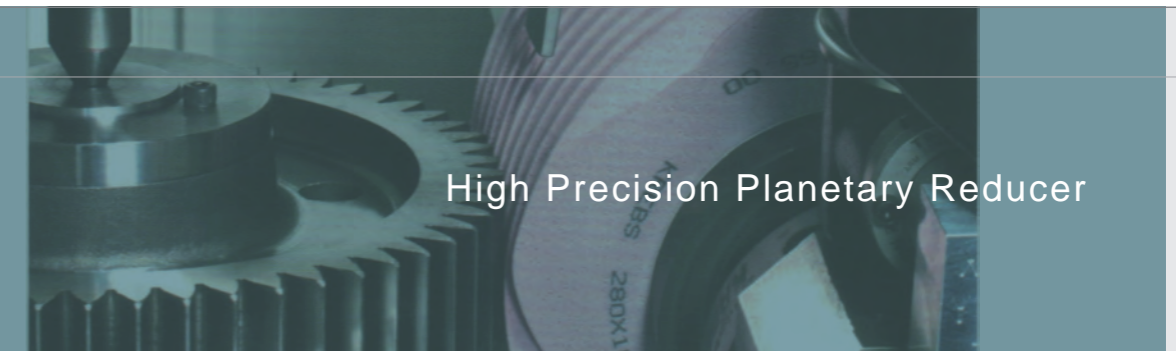
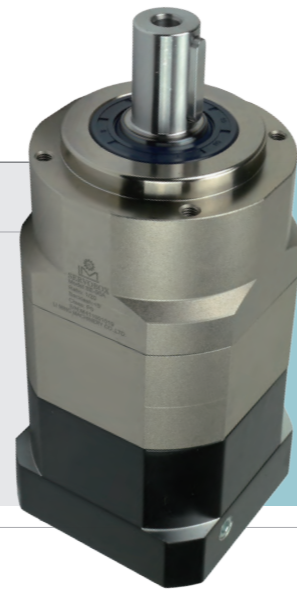
### 轉動慣量 Mass Moments of Inertia (kg·cm<sup>2</sup>)

Ratio	62	90	120	142	180	220	270	330
15	0.03	0.14	0.46	2.63	7.3	22.79	63.81	185.05
20	0.03	0.14	0.46	2.63	7.3	22.79	63.81	185.05
25	0.03	0.14	0.46	2.63	7.1	22.79	63.81	185.05
30	0.03	0.14	0.46	2.43	7.1	22.59	63.25	183.43
35	0.03	0.14	0.44	2.43	7.1	22.59	63.25	183.43
40	0.03	0.14	0.44	2.43	6.92	22.59	63.25	183.43
50	0.03	0.14	0.44	2.43	6.92	22.59	63.25	183.43
60	0.03	0.14	0.43	2.39	6.72	21.83	61.12	177.26
70	0.03	0.14	0.43	2.39	6.72	21.83	61.12	177.26
80	0.03	0.14	0.43	2.39	6.72	21.83	61.12	177.26
90	0.03	0.14	0.40	2.39	6.72	21.60	60.48	175.39
100	0.03	0.14	0.40	2.39	6.72	21.60	60.48	175.39

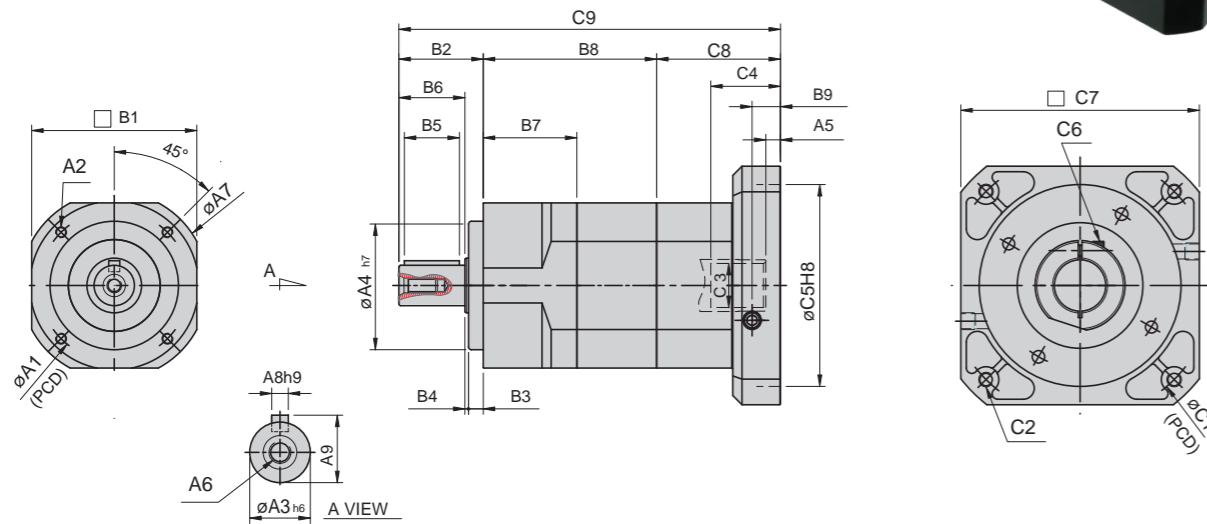
## MODEL : SE-A

雙段 2-Stage

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



High Precision Planetary Reducer



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	12.5
A6	M4 x P0.7	M5 x P0.8	M8 x P1.25	M10 x P1.5	M12 x P1.75	M14 x P2.0	M16 x P2.0
A7	50	70	102	134	166	215	252
A8	5	5	6	10	12	16	20
A9	15	18	24.5	35	43	59	79.5
B1	44	62	90	120	142	180	220
B2	26	36	46	65	92	106	139
B3	5	7	8	12	15	20	30
B4	1	1	2	3	3	4	5
B5	15	20	30	40	65	70	90
B6	20	28	36	50	74	82	104
B7	31.5	38	51	61	70	85	93
B8	57.5	71.8	92.5	117	136.5	166	186
B9	9	11.5	16	19.5	20	23.5	23.5
C1	46 · 60 · 63	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200	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	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55	42 · 48 · 55
C4	26	33.5 · 41.5	59 · 73.5	67 · 77	84.5	114.5	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	M3 x P0.5	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	37.5	41 · 49	67.5 · 82	79 · 89	98.5	132.5	135.5
C9	121	148.8 · 156.8	208 · 222.5	261 · 271	327	404.5	460.5

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	0.9	2	6	10.2	22.5	42	59

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

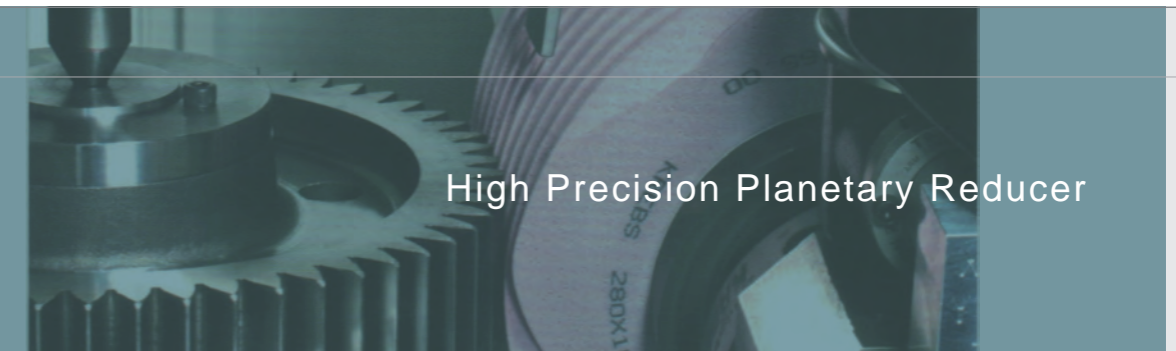
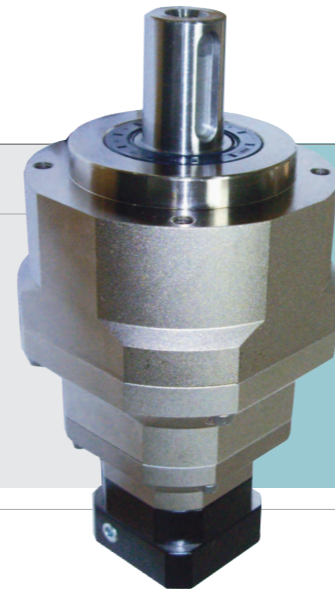
Ratio	44A	62A	90A	120A	142A	180A	220A
15	0.03	0.14	0.46	2.63	7.30	22.79	56.98
20	0.03	0.14	0.46	2.63	7.30	22.79	56.98
25	0.03	0.14	0.46	2.63	7.10	22.79	56.98
30	0.03	0.14	0.46	2.43	7.10	22.59	56.48
35	0.03	0.14	0.44	2.43	7.10	22.59	56.48
40	0.03	0.14	0.44	2.43	6.92	22.59	56.48
50	0.03	0.14	0.44	2.39	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

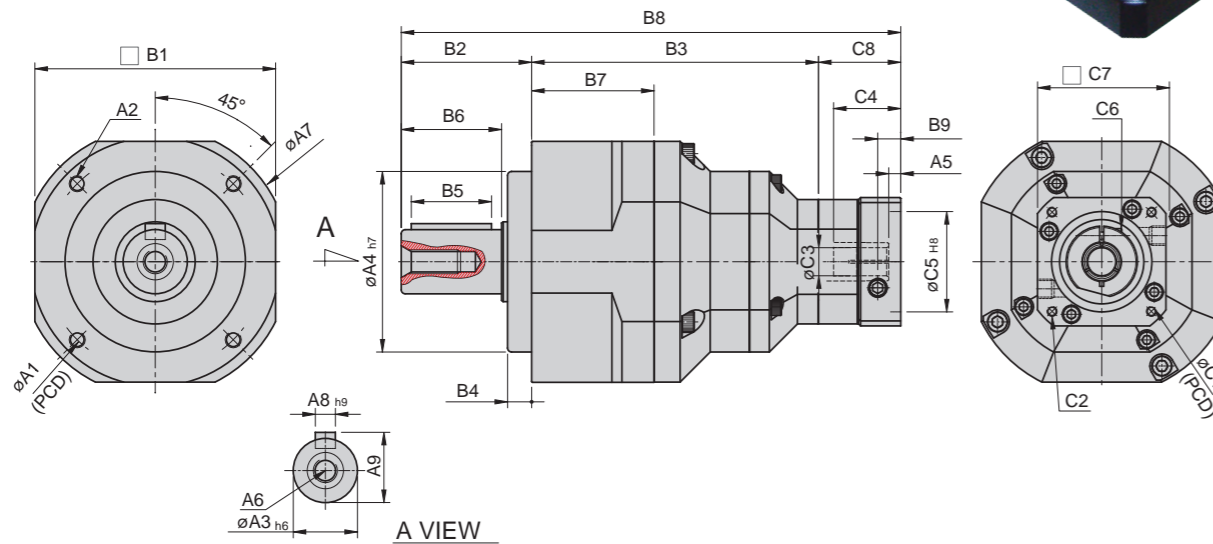
## MODEL : SE

三段 3-Stage

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



High Precision Planetary Reducer



unit: mm

Model Code	90	120	142	180	220
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
B1	90	120	142	180	220
B2	46	65	92	106	139
B3	111.5	143	175	211.5	244
B4	8	12	15	20	30
B5	30	40	65	70	90
B6	36	50	74	82	104
B7	51	61	70	85	93
B8	195	249 · 257	334.5 · 349	396.5 · 406.5	481.5
B9	9	11.5	16	19.5 · 27.5	20
C1	46 · 60 · 63	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200
C2	M3 · M4 · M5	M4 · M5 · M6	M5 · M6 · M8	M6 · M8 · M10	M8 · M10 · M12
C3	8 · 9 · 11	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35
C4	26	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	M3 x P0.5	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	37.5	41 · 49	67.5 · 82	79 · 89	98.5

規格 Model No.	代號	單位 Unit	速比 Ratio	90A	120A	142A	180A	220A
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 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	4.9	10	23	47	70

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

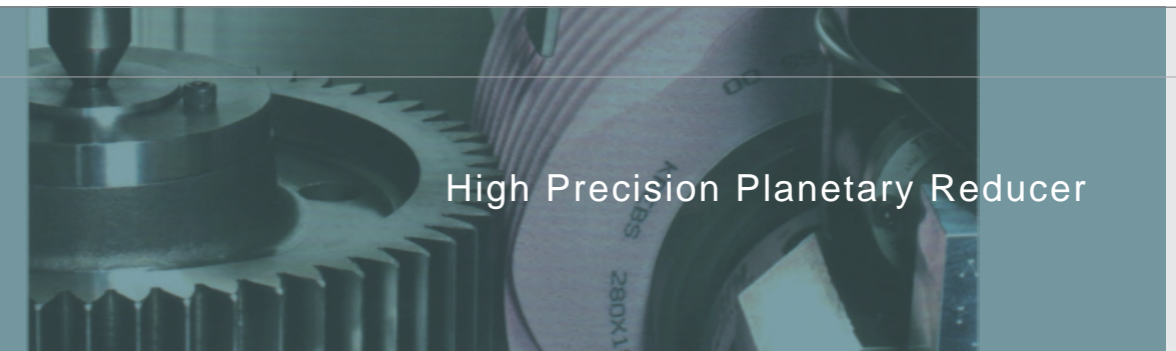
Ratio	90	120	142	180	220
125	0.01	0.04	0.71	1.42	3.29
150	0.01	0.04	0.51	0.92	2.15
175	0.01	0.04	0.40	0.83	1.26
200	0.01	0.04	0.21	0.65	0.98
250	0.01	0.04	0.11	0.52	0.82
300	0.01	0.04	0.09	0.21	0.82
350	0.01	0.04	0.09	0.21	0.82
400	0.01	0.04	0.09	0.21	0.82
450	0.01	0.04	0.09	0.21	0.51
500	0.01	0.04	0.08	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

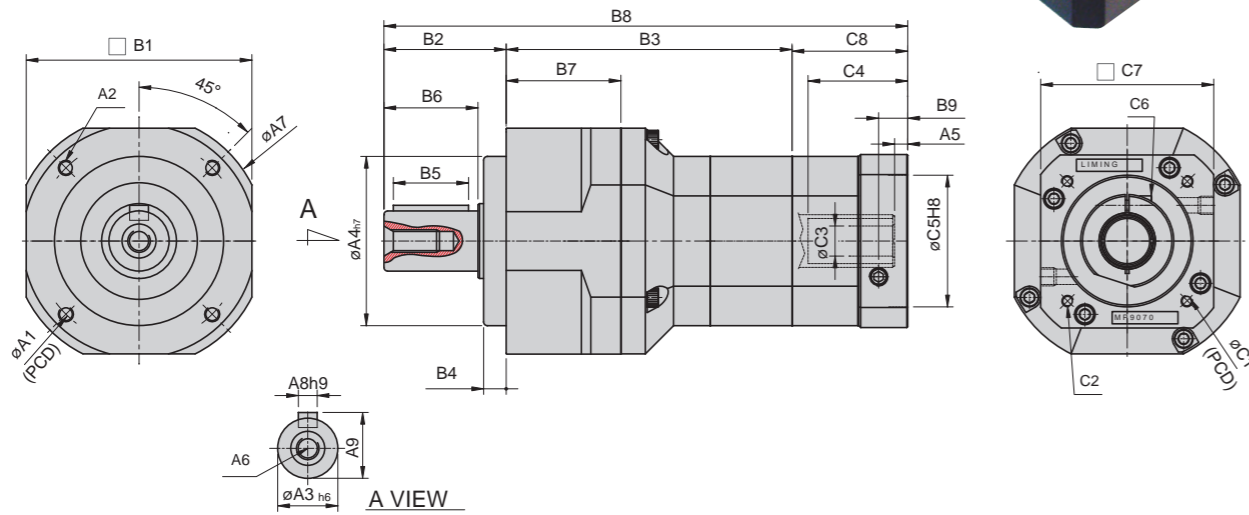
## MODEL : SE-A

三段 3-Stage

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



High Precision Planetary Reducer



unit: mm

Model Code	62A	90A	120A	142A	180A	220A
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
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	92	117.5	152	183.5	220.5	256
B4	7	8	12	15	20	30
B5	20	30	40	65	70	90
B6	28	36	50	74	82	104
B7	38	51	61	70	85	93
B8	165.5	204.5 · 212.5	284.5	354.5	425	527.5
B9	9	11.5	16	19.5	20	23.5
C1	46 · 60 · 63	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200	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	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55
C4	26	33.5 · 41.5	59 · 73.5	67 · 77	84.5	114.5
C5	30 · 40 · 50	50 · 60 · 70	70 · 80 · 95 · 110	95 · 110 · 130	110 · 130 · 180	114.3 · 180 · 230
C6	M3 x P0.5	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	37.5	41 · 49	67.5 · 82	79 · 89	98.5	132.5

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	$n_{1N}$	rpm	125 ~ 1000	3,000	3,000	3,000	3,000	3,000	2,000
最大輸入轉速 Max. Input Speed	$n_{1B}$	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>)

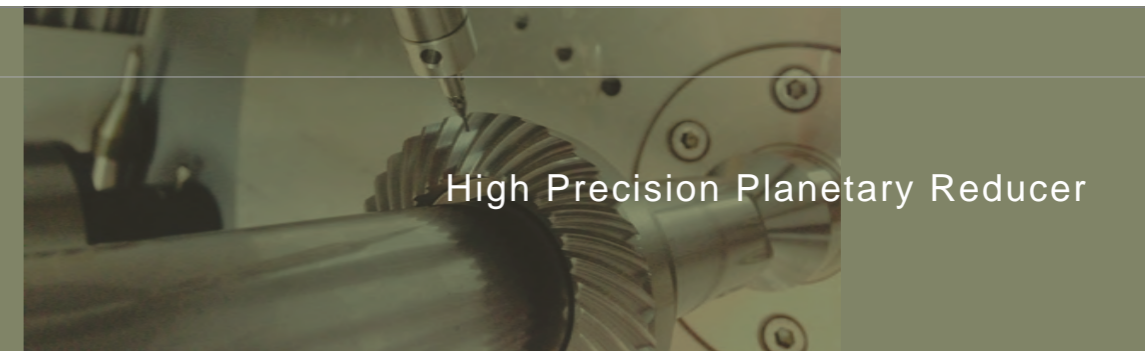
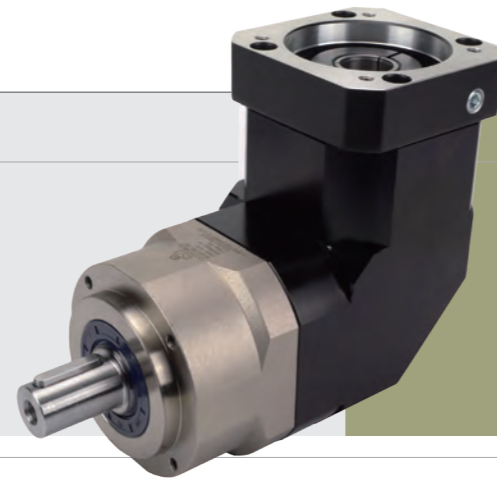
Ratio	62A	90A	120A	142A	180A	220A
125	0.01	0.01	0.04	0.71	1.42	3.29
150	0.01	0.01	0.04	0.51	0.92	2.15
175	0.01	0.01	0.04	0.4	0.83	1.26
200	0.01	0.01	0.04	0.21	0.65	0.98
250	0.01	0.01	0.04	0.11	0.52	0.82
300	0.01	0.01	0.04	0.09	0.21	0.82
350	0.01	0.01	0.04	0.09	0.21	0.82
400	0.01	0.01	0.04	0.09	0.21	0.82
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

# SERVOBOX Planetary Reducers

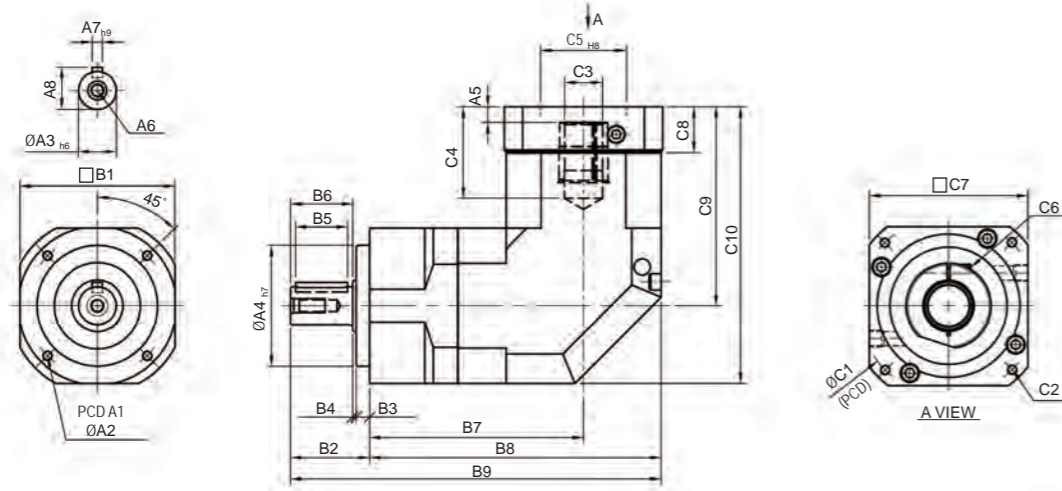
## MODEL : SEL

單段 1-Stage

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



High Precision Planetary Reducer



unit: mm

Model Code	44	62	90	120	142	180	220
A1	44	62	82	110	140	184	218
A2	M4 x P0.7	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M12 x P1.75	M16 x P2.0
A3	13	16	22	32	40	55	75
A4	35	50	70	90	120	160	180
A5	6	6	9 · 23.5	10 · 20	10	12.5	12.5
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
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
C1	46 · 60 · 63	70 · 75 · 90	90 · 110 · 115 · 145	115 · 145 · 165	145 · 165 · 200	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	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55	42 · 48 · 55
C4	27	33.5 · 41.5	53 · 67.5	67 · 77	85	117	117
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	M3 x P0.5	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	45.5
C9	61	77	115.3 · 129.8	141 · 151	174	235	235
C10	83	108	160.3 · 174.8	201 · 211	245	325	345

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	$L_{H1}$	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	

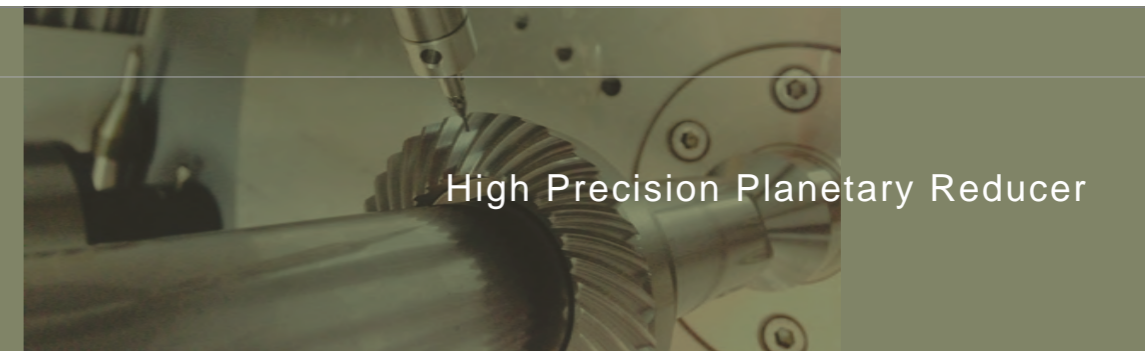
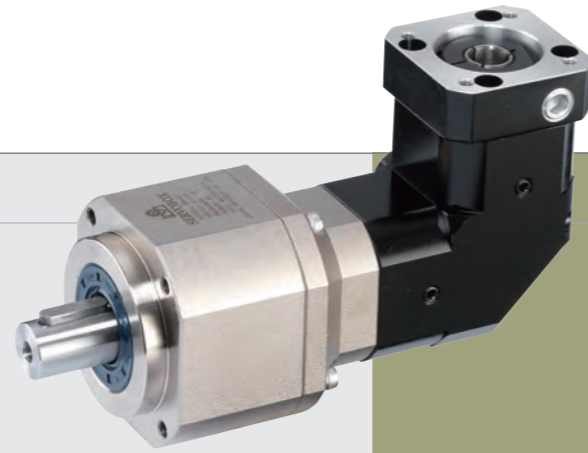
### 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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

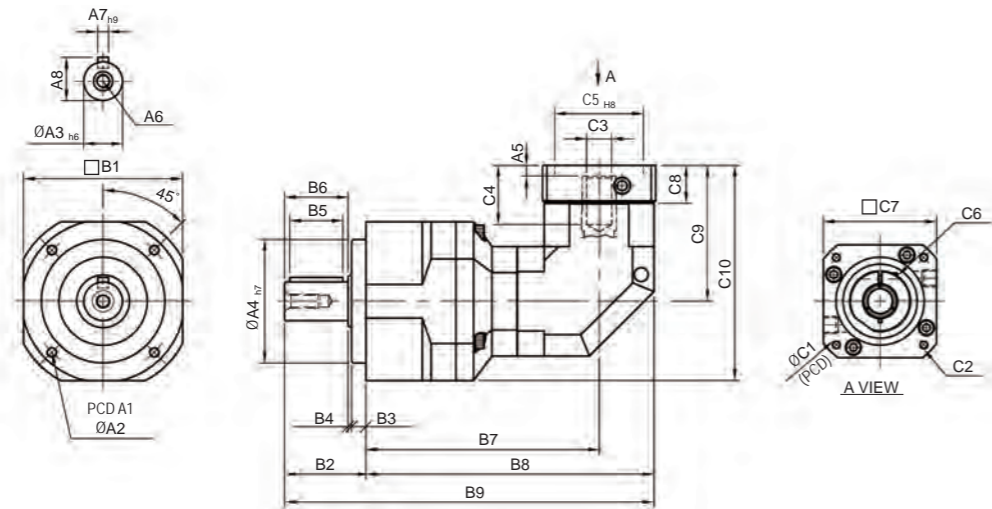
## MODEL : SEL

雙段 2-Stage

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



High Precision Planetary Reducer



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	6	6	9 · 23.5	10 · 20	10	12.5
A6	M5 x P0.8	M8 x P1.25	M10 x P1.5	M12 x P1.75	M14 x P2.0	M16 x P2.0
A7	5	6	10	12	16	20
A8	18	24.5	35	43	59	79.5
B1	62	90	120	142	180	220
B2	36	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
C1	46 · 60 · 63	70 · 75 · 90	90 · 110 · 115 · 145	115 · 145 · 165	145 · 165 · 200	200 · 215 · 265
C2	M3 · M4 · M5	M4 · M5 · M6	M5 · M6 · M8	M6 · M8 · M10	M8 · M10 · M12	M12 · M16
C3	8 · 9 · 11	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55
C4	27	33.5 · 41.5	53 · 67.5	67 · 77	85	117
C5	30 · 40 · 50	50 · 60 · 70	70 · 80 · 95 · 110	95 · 110 · 130	110 · 130 · 180	114.3 · 180 · 200 · 230 · 250
C6	M3 x P0.5	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
C9	61	77	115.3 · 129.8	141 · 151	174	235
C10	92	122	175.3 · 189.8	212 · 222	264	345

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 P <sub>s</sub>		arcmin	15 ~ 200	-	≤ 4	≤ 4	≤ 4	≤ 4	≤ 4
背隙 Backlash P <sub>0</sub>		arcmin	15 ~ 200	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7	≤ 7
背隙 Backlash P <sub>1</sub>		arcmin	15 ~ 200	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9	≤ 9
背隙 Backlash P <sub>2</sub>		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>)

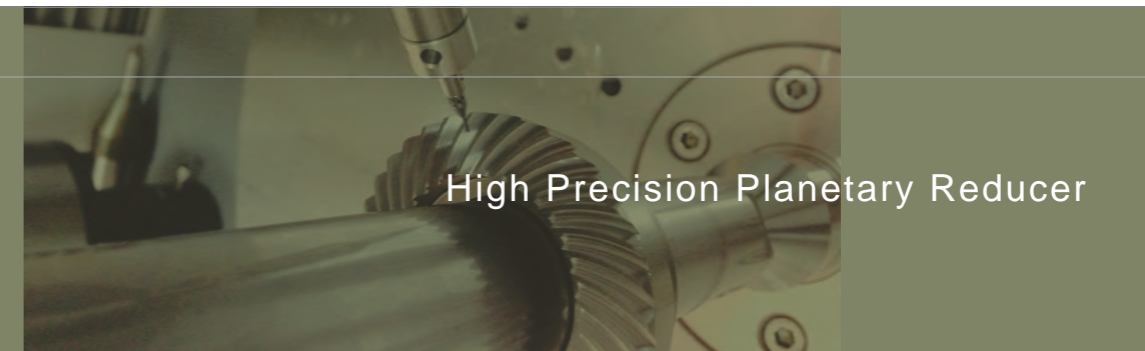
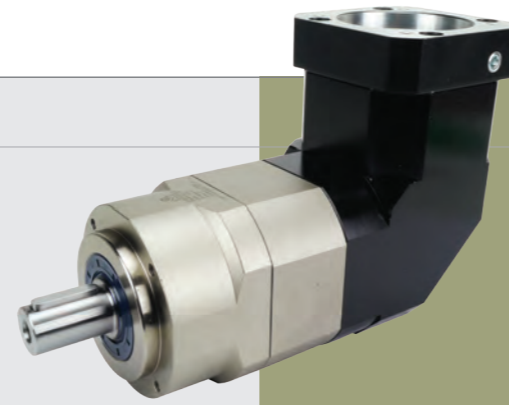
Ratio	62	90	120	142	180	220
15	0.09	0.36	6.28	6.85	26.2	70.1
20	0.09	0.36	6.28	6.85	26.2	70.1
25	0.09	0.36	2.28	6.85	23.1	68.2
30	0.09	0.36	2.28	6.85	23.1	68.2
35	0.09	0.36	2.28	6.85	23.1	68.2
40	0.09	0.36	2.28	6.85	23.1	68.2
50	0.09	0.36	2.28	6.85	23.1	68.2
60	0.09	0.36	2.28	6.85	23.1	68.2
70	0.09	0.36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

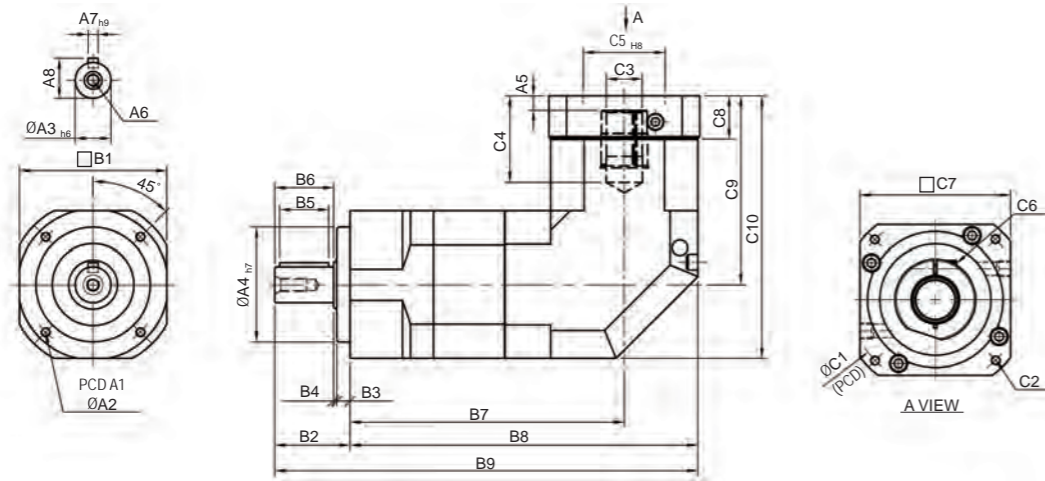
## MODEL : SEL-A

雙段 2-Stage

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



High Precision Planetary Reducer



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	6	6	9 · 23.5	10 · 20	10	12.5	12.5
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
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
C1	46 · 60 · 63	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200	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	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55	42 · 48 · 55
C4	27	33.5 · 41.5	53 · 67.5	67 · 77	85	117	117
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	M3 x P0.5	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	45.5
C9	61	77	115.3 · 129.8	141 · 151	174	235	235
C10	83	108	160.3 · 174.8	201 · 211	245	325	345

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	$T_{2NOT}$	Nm	15 ~ 200	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	$n_{1N}$	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		2.9	8	12	22.6	51.7	

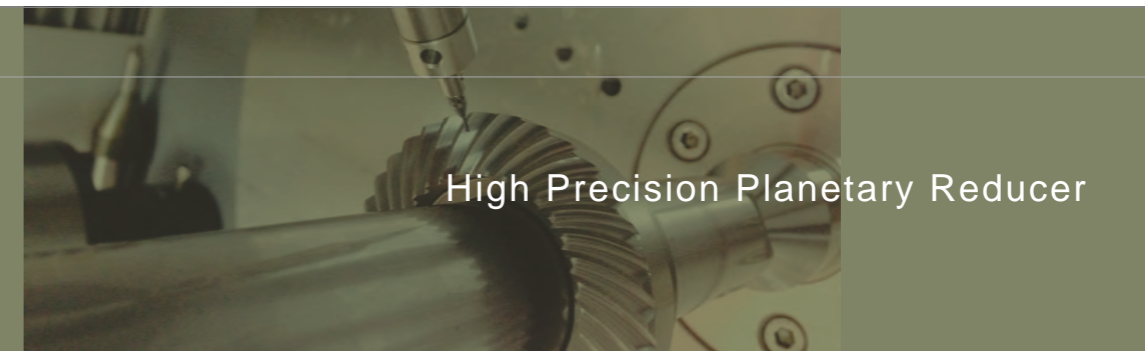
### 轉動慣量 Mass Moments of Inertia (kg·cm<sup>2</sup>)

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



# Accessories for SE

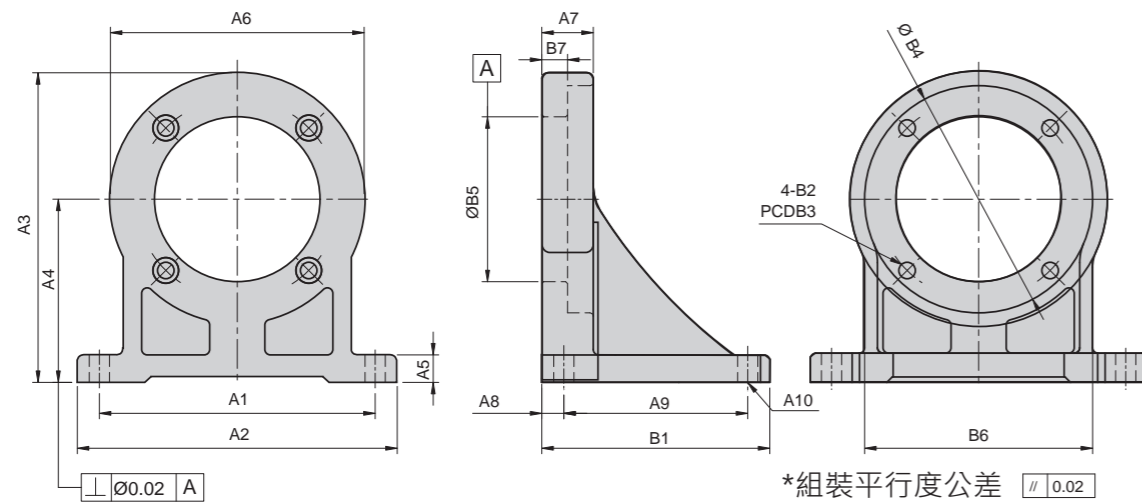
## SE 選配件



High Precision Planetary Reducer

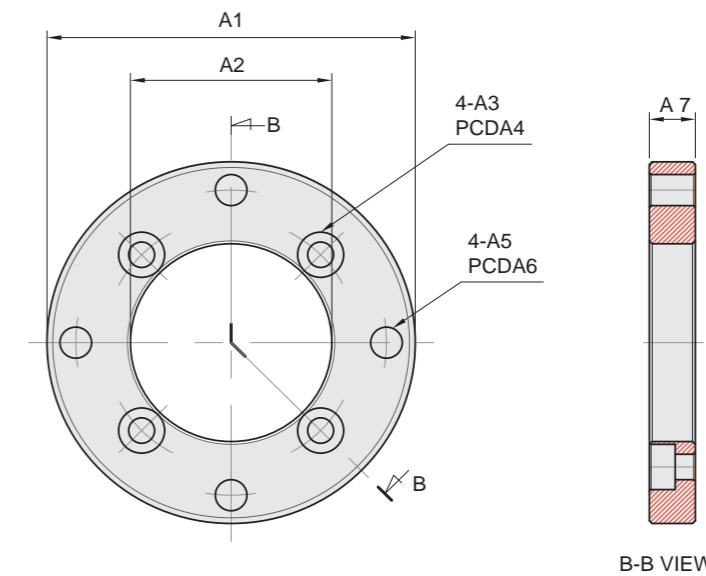
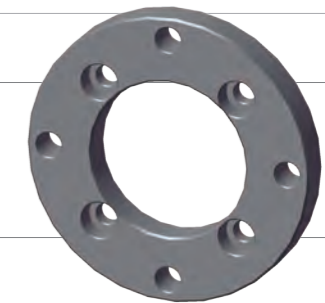
## L Type Base Kits

L 型腳座



## Connecting Plate

連接板



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	4-Ø7	4-Ø7	4-Ø9	4-Ø11	4-Ø13	4-Ø17	4-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

unit: mm

Model Code	44	62	90	120	142	180	220
<b>A</b> 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

※重量誤差 3%

# SERVOBOX Planetary Reducers

## Features 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

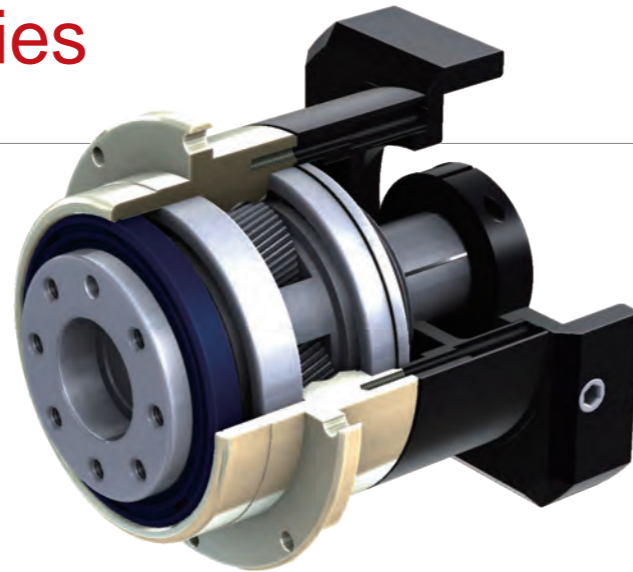
Backlash  $\leq 3$  arc-min reaches precision alignment.

#### 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	出力軸鍵槽 Output Bearing	背隙等級 Backlash Class	馬達型號 Motor Type
SD SDL	47 64 90 110 140 200 255	單段 1-Stage 4, 5, 7, 10  雙段 2-Stage 20, 35, 25, 40, 50, 70, 100	□標準品·滾珠軸承 Standard (Ball Bearing)  T: 滾錐軸承 Taper Bearing	單段 1-Stage Ps $\leq 1$ 弧分 (arcmin) P0 $\leq 3$ 弧分 (arcmin) P1 $\leq 5$ 弧分 (arcmin) P2 $\leq 7$ 弧分 (arcmin) 雙段 2-Stage Ps $\leq 3$ 弧分 (arcmin) P0 $\leq 5$ 弧分 (arcmin) P1 $\leq 7$ 弧分 (arcmin) P2 $\leq 9$ 弧分 (arcmin)	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.

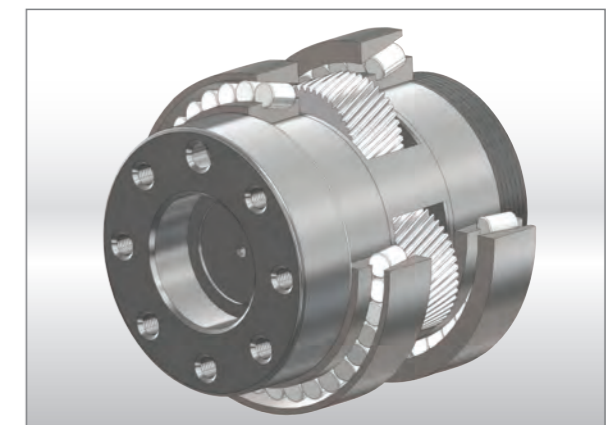


#### 筒夾式連結機構

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

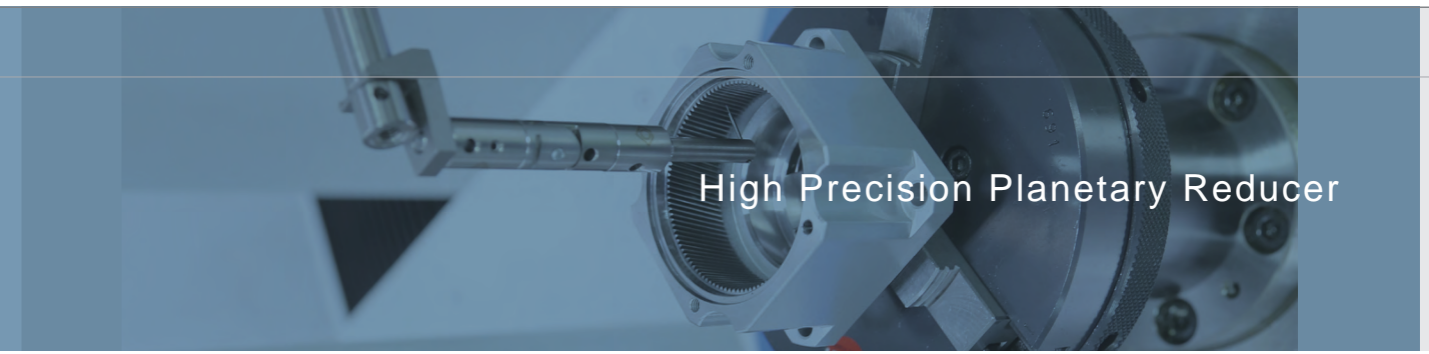
行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度，並使用一次加工完成，控制精度在公差之內。

#### Integrated Planetary Arm Bracket

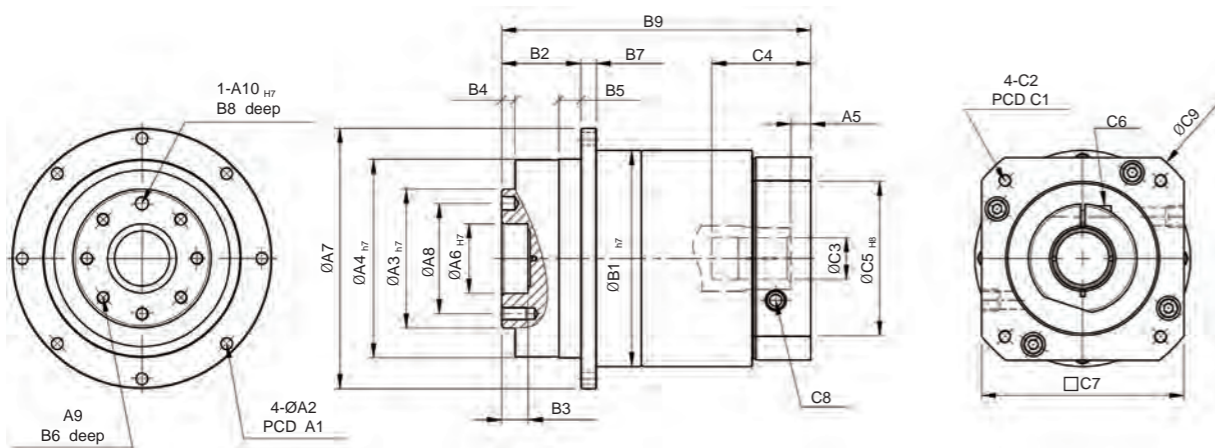
The planetary arm bracket and the output shaft are one-piece constructed to increase torsional rigidity and accuracy. The entire structure is one-time machined for controlling accuracy in the specified tolerance.

# MODEL : SD

單段 1-Stage  
RATIO : 4, 5, 7, 10



High Precision Planetary Reducer



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 h7	28	40	63	80	100	160	180
A4 h7	47	64	90	110	140	200	255
A5	6	6.5	8.5-23	10-20	10	11.5	12.5
A6 H7	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 H7	3	5	6	6	8	10	12
B1 h7	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	10	12	12	16	22	32
B7	4	5	7	8	10	12	16
B8	4	6	6	7	7	10	10
B9	73	84.5	133-147.5	153-163	186.5	250.5	263
C1	46-60-63	70-75-90	90-110-115-145	115-145-165	145-165-200	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	14-19	19-22-24	24-28-32	28-32-35	38-42-48-55	42-48-55
C4	30.5	34	58.5-73	67-77	84.5	114.5	113.5
C5 H8	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	M3 x P0.5	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	1/8"PT	1/8"PT	1/8"PT	1/4"PT	1/4"PT	3/8"PT	3/8"PT
C9	58-74	80-90-105	116-140-165	138-165-190	170-190-245	230-250-300	254-300-340

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
使用壽命 Service Life	$L_{H1}$	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		

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

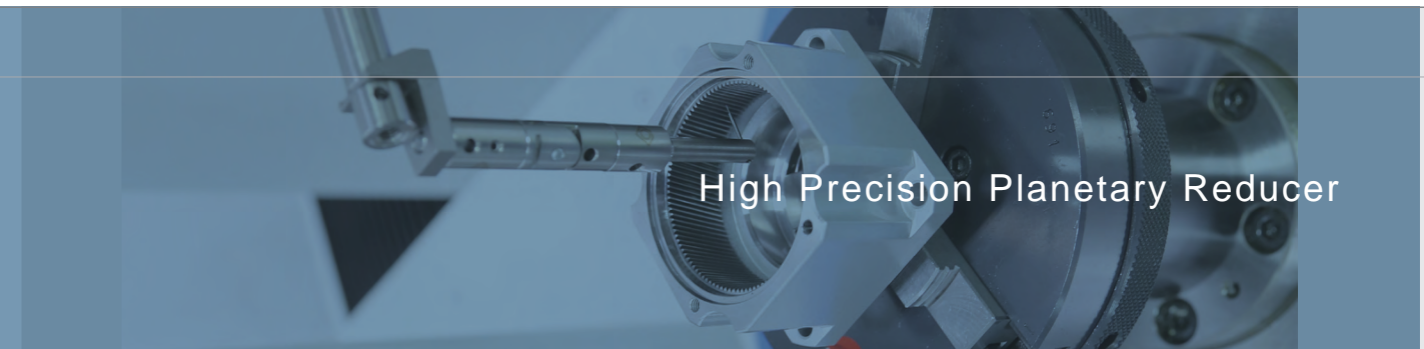
Ratio	47	64	90	110	140	200	255
4	0.03	0.13	0.47	2.75	7.46	24.00	55
5	0.03	0.12	0.45	2.70	7.41	23.23	53.19
7	0.03	0.12	0.45	2.64	7.12	22.11	50.78
10	0.03	0.12	0.43	2.56	7.01	22.21	50.50

# SERVOBOX Planetary Reducers

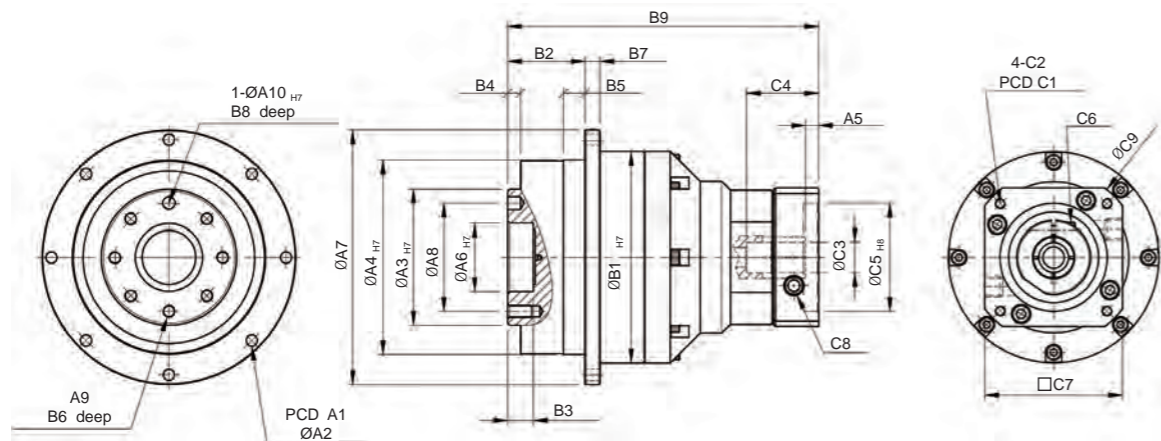
## MODEL : SD

雙段 2-Stage

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



High Precision Planetary Reducer



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	12-6.8	12-9.0	16-13.5
A3 h7	28	40	63	80	100	160	180
A4 h7	47	64	90	110	140	200	255
A5	5	5	6	9·23	10·20	10	11.5
A6 H7	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 H7	3	5	6	6	8	10	12
B1 h7	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	10	12	12	16	22	30.5
B7	4	5	7	8	10	12	18
B8	4	6	6	7	7	10	10
B9	99	109	144.5	189·203.5	224.5·234.5	290.5	349
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	8·9·11	8·9·11	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55
C4	30.5	32	33.5	59·73.5	67·77	84.5	114.5
C5 H8	30·40·50	30·40·50	50·60·70	70·80·95·110	95·110·130	110·130·180	114.3·180·230
C6	M3 x P0.5	M3 x P0.5	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
C8	1/8"PT	1/8"PT	1/8"PT	1/8"PT	1/4"PT	1/4"PT	3/8"PT
C9	58·74	58·74	80·90·105	116·140·165	138·165·190	170·190·245	230·250·300

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	1126
容許軸向力 Max. Axial Force 滾珠軸承 Ball Bearing	$F_{2aB}$	N	20 ~ 100	1,020	1,260	4,230	6,360	7,035	17,600	19,800
容許軸向力 Max. Axial Force 滾珠軸承 Taper Bearing	$F_{2aB}$	N	20 ~ 100	-	-	7,330	11,500	18,600	36,800	53,600
使用壽命 Service Life	$L_{H1}$	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		

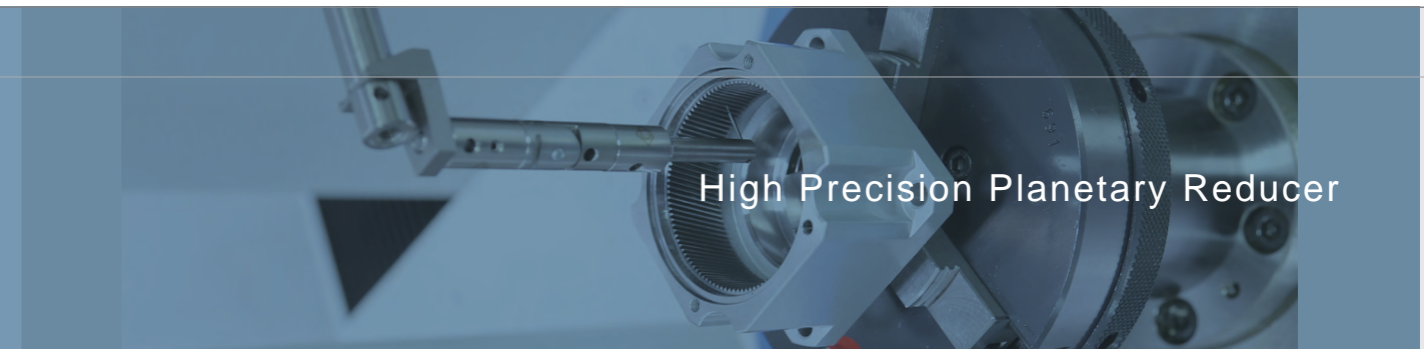
### 轉動慣量 Mass Moments of Inertia (kg·cm<sup>2</sup>)

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

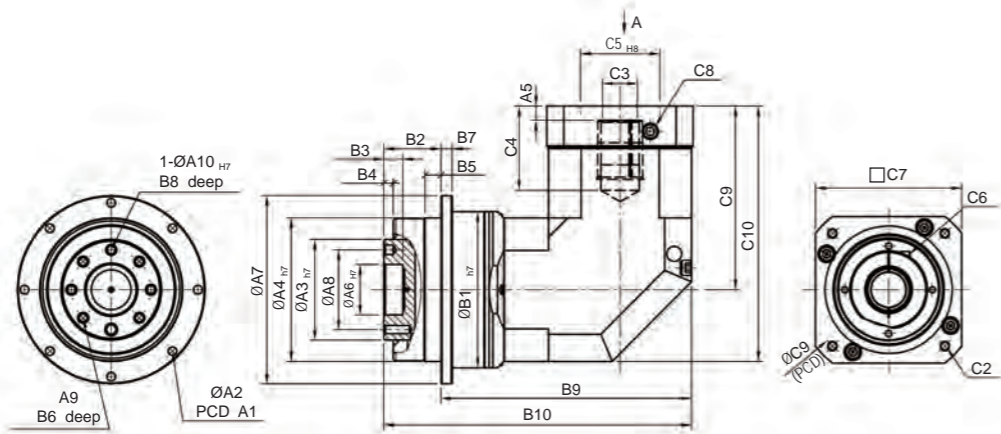
# MODEL : SDL

單段 1-Stage

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



High Precision Planetary Reducer



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 h7	28	40	63	80	100	160	180
A4 h7	47	64	90	110	140	200	255
A5	6	6.5	8.5 · 23	10 · 20	10	12.5	12.5
A6 H7	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 H7	3	5	6	6	8	10	12
B1 h7	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	10	12	12	16	22	32
B7	4	5	7	8	10	12	16
B8	4	6	6	7	7	10	10
B9	82.5	105.5	163.6	203	227.5	313	332.5
B10	102	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 · 200	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	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55	42 · 48 · 55
C4	27	33.5	53 · 67.5	67 · 77	85	132	132
C5 H8	30 · 40 · 50	50 · 60 · 70	70 · 80 · 95 · 110	95 · 110 · 130	110 · 130 · 180	114.3 · 180 · 230	220 · 250 · 265
C6	M3 x P0.5	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	1/8"PT	1/8"PT	1/8"PT	1/4"PT	1/4"PT	3/8"PT	3/8"PT
C9	61	77	115.3 · 129.8	141 · 151	174	235	235
C10	83	108	160.3 · 174.8	201 · 211	245	325	345

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	$n_{1N}$	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	$n_{1B}$	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	1126
容許軸向力 Max. Axial Force 滾珠軸承 Ball Bearing	$F_{2aB}$	N	4 ~ 20	1,020	1,260	4,230	6,360	7,035	17,600	19,800
容許軸向力 Max. Axial Force 滾珠軸承 Taper Bearing	$F_{2aB}$	N	4 ~ 20	-	-	7,330	11,500	18,600	36,800	53,600
使用壽命 Service Life	$L_{H1}$	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	≤ 61	≤ 63	≤ 65	≤ 68	≤ 70	≤ 72	≤ 74
重量 Weight ±3%		Kg	4 ~ 20	1.1	2.3	6.9	13.4	23		

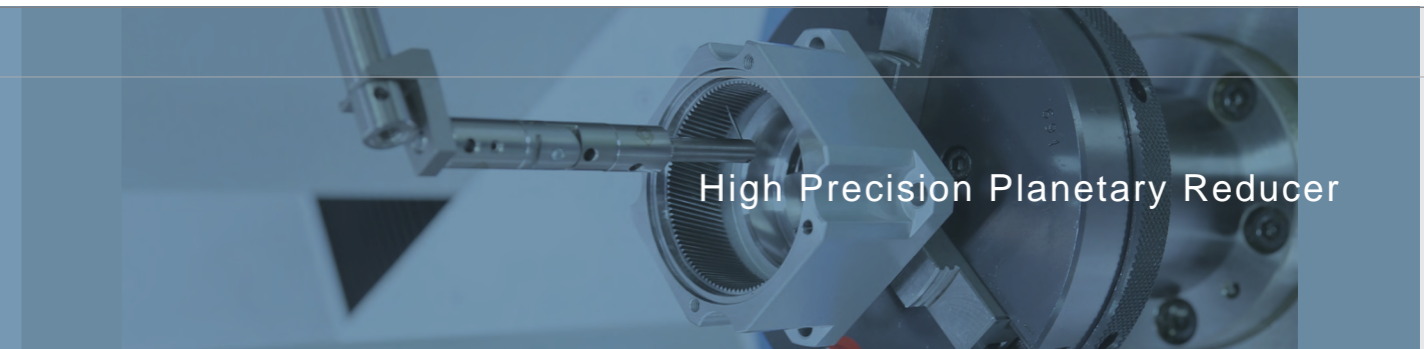
■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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

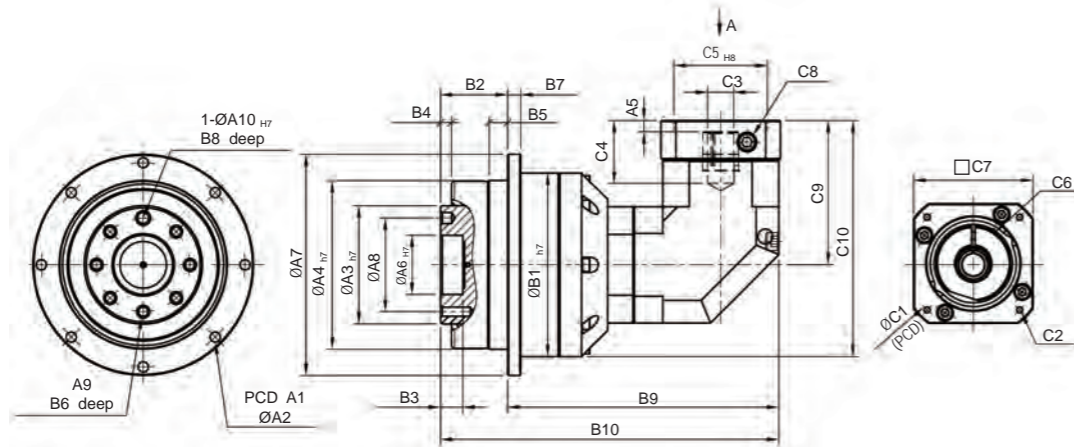
# MODEL : SDL

雙段 2-Stage

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



High Precision Planetary Reducer



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 h7	28	40	63	80	100	160	180
A4 h7	47	64	90	110	140	200	255
A5	6	6.5	8.5·23	10·20	10	12.5	12.5
A6 H7	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 H7	3	5	6	6	8	10	12
B1 h7	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	10	12	12	16	22	32
B7	4	5	7	8	10	12	16
B8	4	6	6	7	7	10	10
B9	108.5	118.5	151	210.6	254.5	306.5	379.1
B10	128	138	181	239.6	292.5	356.5	445.1
C1	46·60·63	46·60·63	70·75·90	90·110·115·145	115·145·165	145·165·200	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	14·19	19·22·24	24·28·32	32·35·38	38·42·48·55
C4	27	27	33.5·40.5	53·67.5	67·77	85	117
C5 H8	30·40·50	30·40·50	50·60·70	70·80·95·110	95·110·130	110·130·180	114.3·180·230
C6	M3 x P0.5	M3 x P0.5	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	1/8"PT	1/8"PT	1/8"PT	1/8"PT	1/4"PT	3/8"PT	3/8"PT
C9	61	61	77	115.3·129.8	141·151	174	235
C10	90.5	96	123.5·133	177.8·192.3	219·229	280	362.5

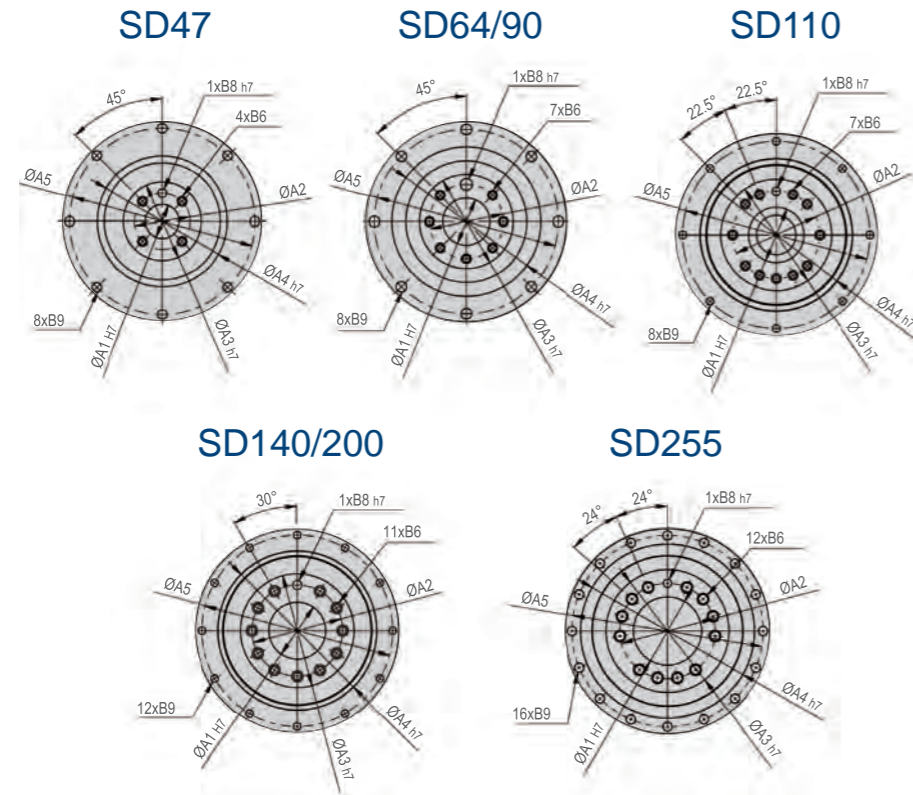
規格 Model No.	代號	單位 Unit	速比 Ratio	47	64	90	110	140	200	255
額定輸出扭矩 Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	20	22	60	160	335	650	1,200	2,020
			25	20	50	155	333	618	1,189	2,010
			35	19	47	142	309	573	1,108	1,870
			40	22	60	160	335	650	1,200	2,020
			50	20	50	155	333	618	1,189	2,010
			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	1126
容許軸向力 Max. Axial Force 滾珠軸承 Ball Bearing	$F_{2rB}$	N	20 ~ 200	1,020	1,260	4,230	6,360	7,035	17,600	19,800
容許軸向力 Max. Axial Force 滾錐軸承 Taper Bearing	$F_{2aB}$	N	20 ~ 200	-	-	7,330	11,500	18,600	36,800	53,600
使用壽命 Service Life	$L_{H1}$	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	≤ 56	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67	≤ 70
重量 Weight ±3%		Kg	20 ~ 200		2	6	11.8	22.3		

■ 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

# SD Output Frame Dimension

SD 出力法蘭寸表



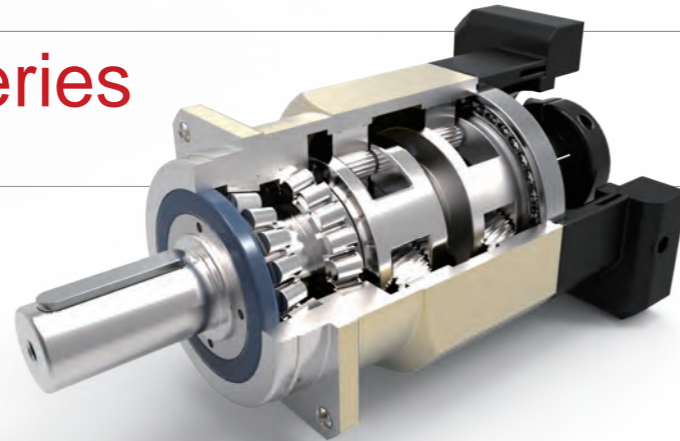
unit: mm

Model Code	SD47	SD64	SD90	SD110	SD140	SD220	SD255
	<b>A</b>						
A1 H7	12	20	31.5	40	50	80	100
A2	20	31.5	50	63	80	80	140
A3 h7	28	40	63	80	100	160	180
A4 h7	47	64	90	110	140	200	255
A5	67	79	109	135	168	233	280
<b>B</b>							
B6	M3 x 0.5P	M5 x 0.8P	M6 x 1P	M6 x 1P	M8 x 1.25P	M10 x 1.5P	M16 x 2P
B8	3	5	6	6	8	10	12
B9	3.4	4.5	5.5	5.5	6.6	9	13.5

# SERVOBOX Planetary Reducers

## Features 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.

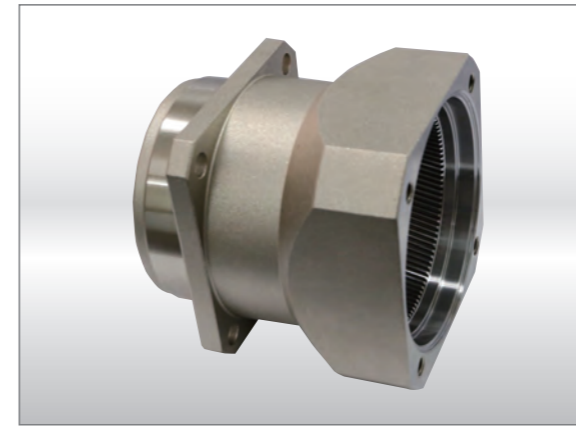
## Indication of Model Numbers

機種型號表示

<b>SF</b>	<b>142</b>	<b>10</b>		<b>P1</b>	<b>MOTOR</b>
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 3, 4, 5, 6, 7, 8, 9, 10	<input type="checkbox"/> 標準品，有鍵槽 Standard (Keyway)	Ps	馬達製造商及型號 Motor Brand & Model No.
SF-A	75			P0	
SFL	100		<input type="checkbox"/> N: 實心軸，無鍵槽 Solid Output Shaft (No Keyway)	P1	
SFL-A	142	雙段 2-Stage 15 ~ 100		P2	
	180				

## 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.



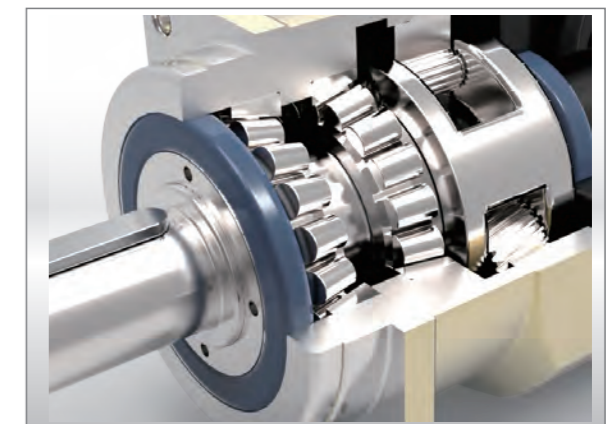
**滿針滾針軸承設計**  
行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

**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.

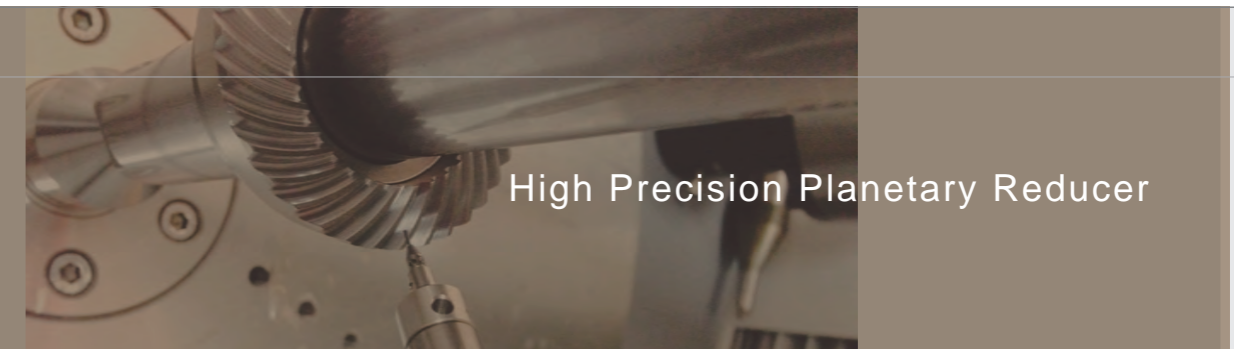
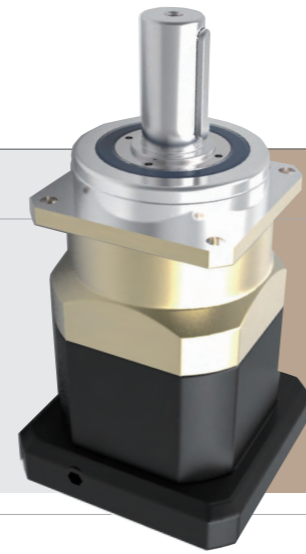


# SERVOBOX Planetary Reducers

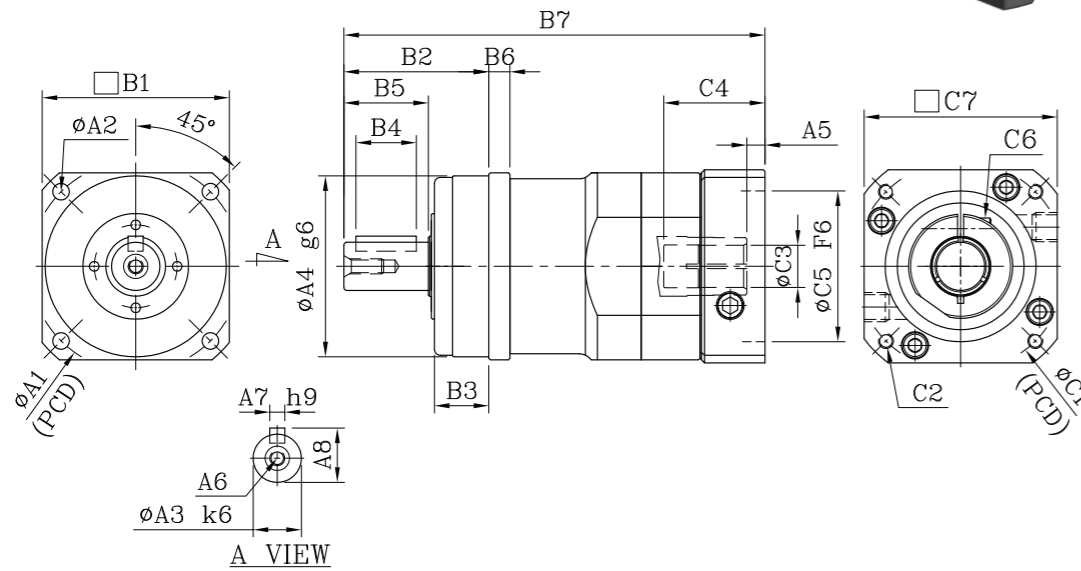
## MODEL : SF

單段 1-Stage

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



High Precision Planetary Reducer



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
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	191	242.5	306	360
<b>C</b>					
C1	70 · 75 · 90	90 · 110 · 115 · 145	115 · 145 · 165	145 · 165 · 200	200 · 215 · 265
C2	M4 · M5 · M6	M5 · M6 · M8	M6 · M8 · M10	M8 · M10 · M12	M10 · M12 · M16
C3	14	19 · 22 · 24	24 · 28 · 32	32 · 35 · 38 · 42	38 · 42 · 48 · 55
C4	33.5	59.2	67.5	84.5	114.5
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	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	44	141	305	553	1,070
			9	44	140	293	551	1,060
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	≤ 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	$L_{H1}$	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	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67
重量 Weight ±3%		Kg	3 ~ 10	1.7	4.5	8.3	16.7	34.3

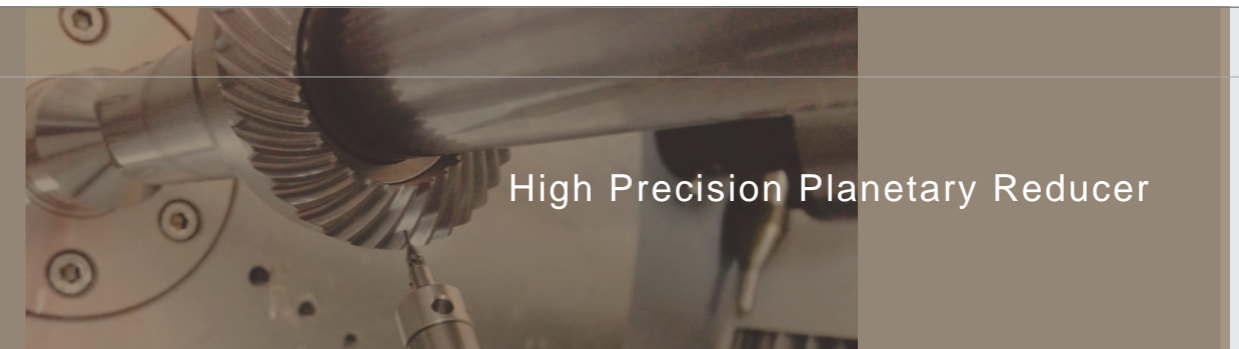
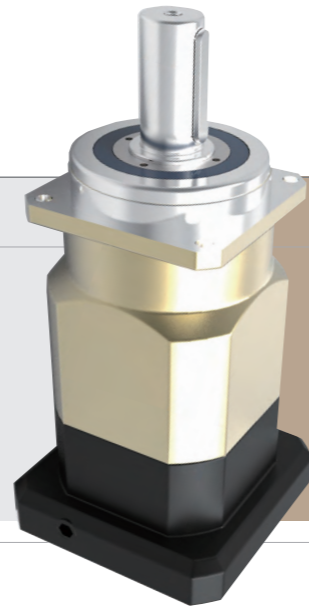
### 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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

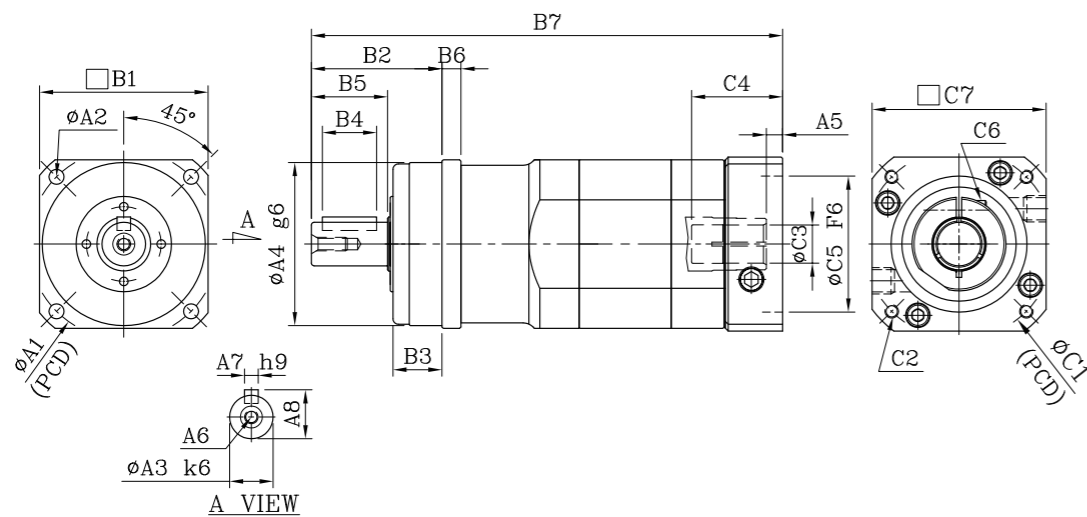
# MODEL : SF-A

雙段 2-Stage

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



High Precision Planetary Reducer



unit: mm

Model Code	62A	75A	100A	142A	180A
<b>A</b>					
A1	68	85	120	165	215
A2	5.5	6.8	9	11	13
A3	16	22	32	40	55
A4	60	70	90	130	160
A5	6	8	10.5	10	11.5
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	214	282.5	373	441
<b>C</b>					
C1	70 · 75 · 90	90 · 110 · 115 · 145	115 · 145 · 165	145 · 165 · 200	200 · 215 · 265
C2	M4 · M5 · M6	M5 · M6 · M8	M6 · M8 · M10	M8 · M10 · M12	M10 · M12 · M16
C3	14	19 · 22 · 24	24 · 28 · 32	32 · 35 · 38 · 42	38 · 42 · 48 · 55
C4	33.5	51	67.5	84.5	114.5
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	291	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	≤ 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	$L_{H1}$	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	≤ 58	≤ 60	≤ 63	≤ 65	≤ 67
重量 Weight ±3%		Kg	15 ~ 100	2.6	8.2	11.5	21	43

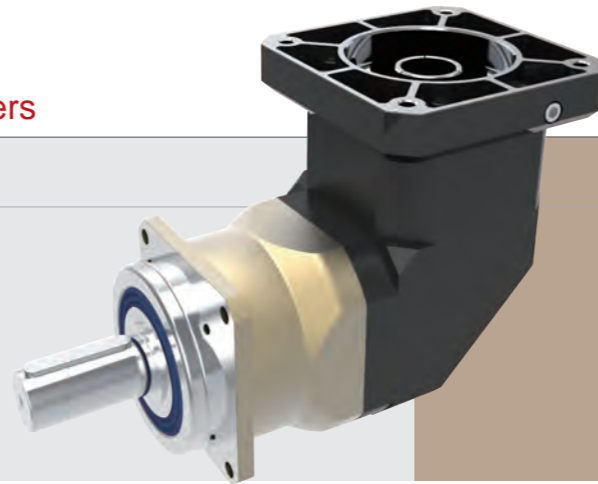
■ 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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

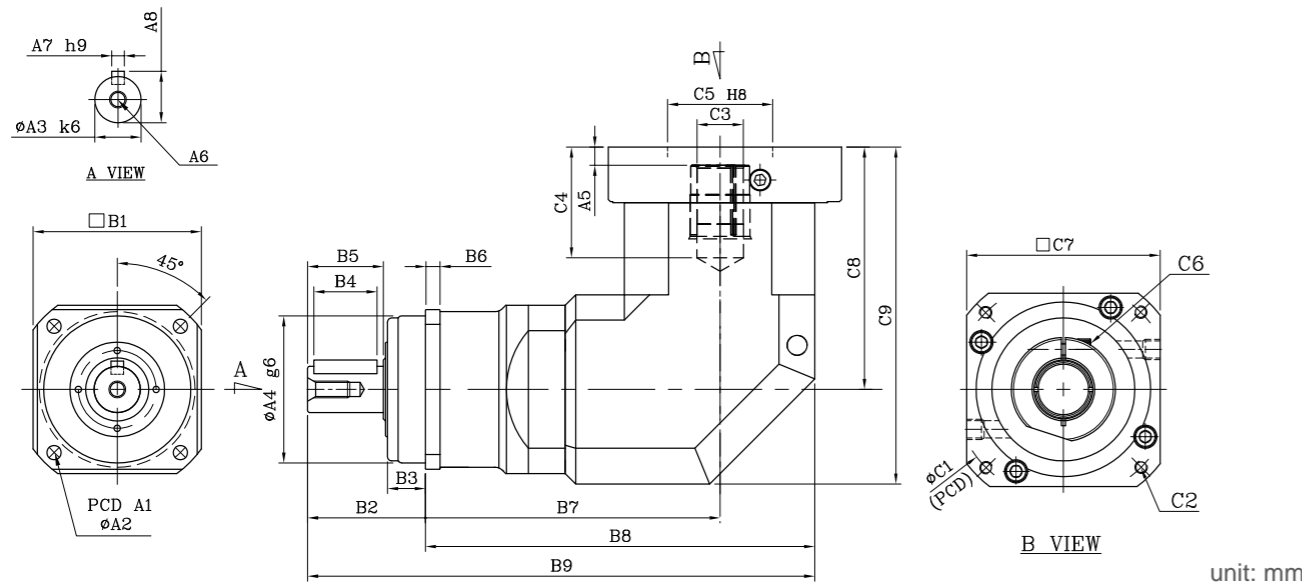
## MODEL : SFL

單段 1-Stage

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



High Precision Planetary Reducer



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
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
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 · 200	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	53 · 67.5	67 · 77	85	117
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	115.3	141	165.7	235
C9	108	160.3	201	236.7	325

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	44	141	305	553	1,070
			9	44	140	293	551	1,060
			10	43	138	291	549	1,059
			12	45	150	315	583	1,118
			14	45	142	309	573	1,108
			16	44	141	305	553	1,070
18	44	140	293	551	1,060			
20	43	138	291	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	≤ 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	≤ 63	≤ 65	≤ 68	≤ 70	≤ 72
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>)

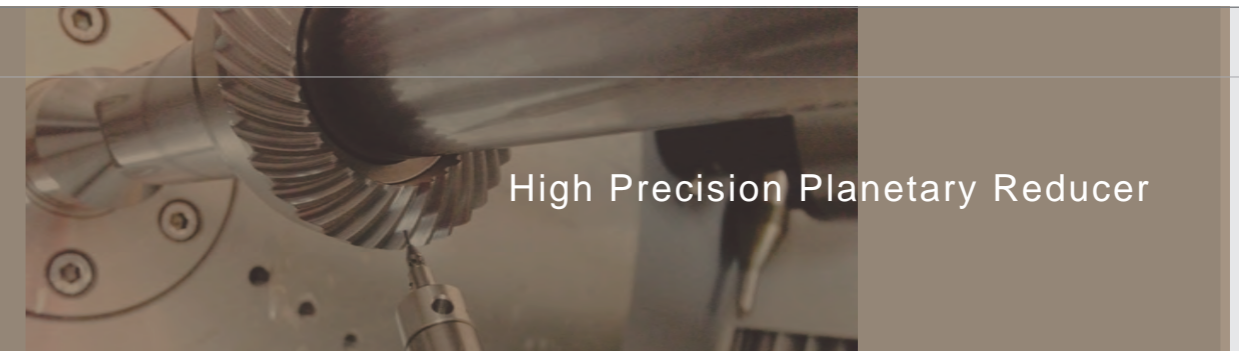
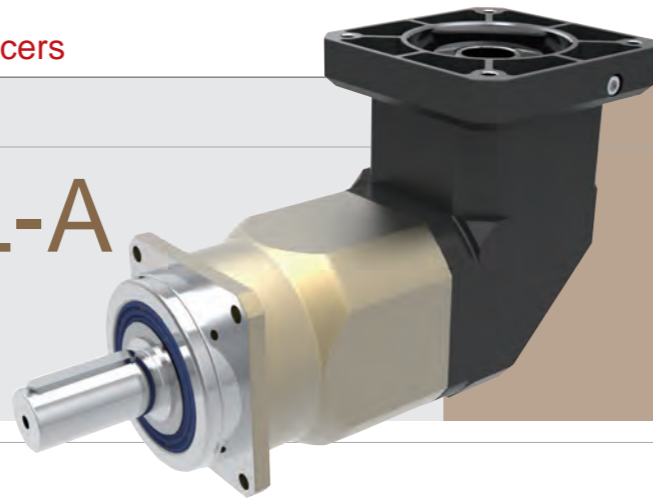
速比 Ratio	62	75	100	142	180
3	0.30	2.11	6.42	18.36	57.65
4	0.28	2.02	5.61	18.02	56.17
5	0.26	2.01	5.42	17.21	55.05
6	0.24	2.00	5.33	16.50	53.44
7	0.24	1.97	5.09	15.85	51.10
8	0.24	1.94	5.06	14.94	49.03
9	0.24	1.94	5.04	14.61	48.08
10	0.24	1.94	5.02	14.02	41.33
12	0.22	1.94	4.98	13.86	41.12
14	0.22	1.94	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

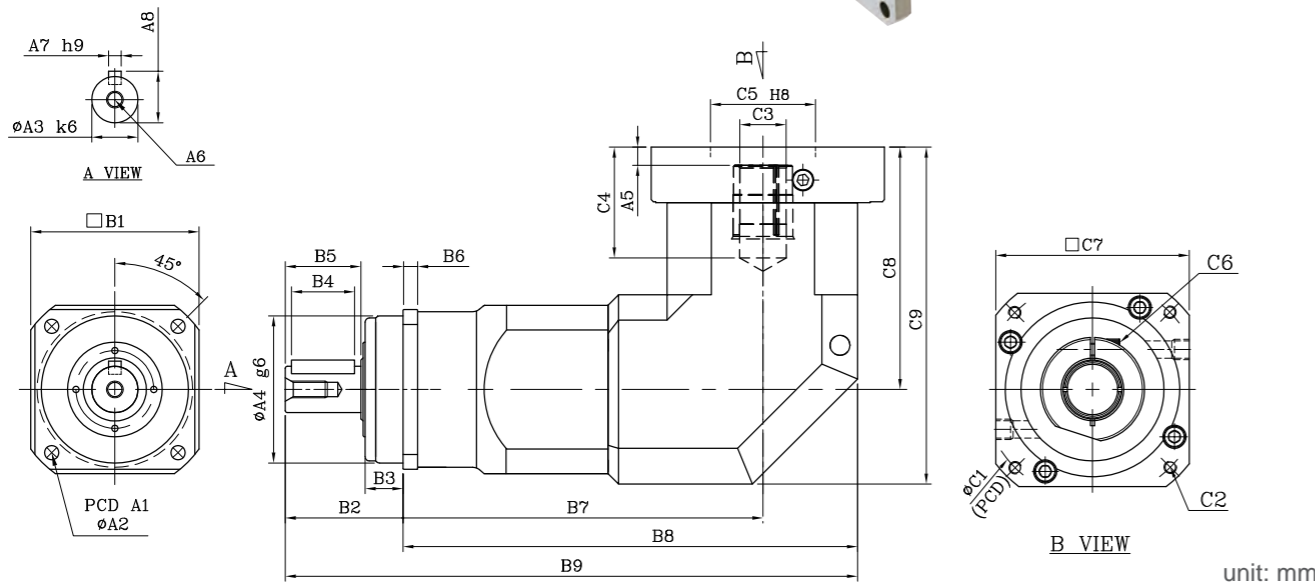
## MODEL : SFL-A

雙段 2-Stage

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



High Precision Planetary Reducer



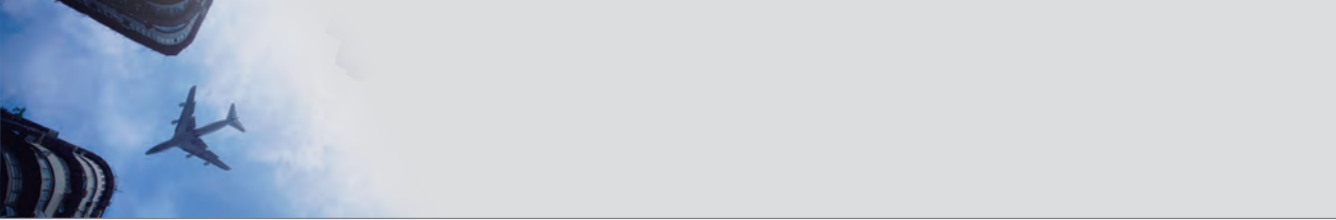
unit: mm

Model Code	62A	75A	100A	142A	180A
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
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
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
C1	70 · 75 · 90	90 · 110 · 115 · 145	115 · 145 · 165	145 · 165 · 200	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	53 · 67.5	67 · 77	85	117
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	115.3	141	165.7	235
C9	108	160.3	201	236.7	325

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	122	208	555	1,069
			50	48	155	333	618	1,189
			60	45	150	315	583	1,118
			70	45	142	309	573	1,108
			80	51	146	208	555	1,069
			100	48	155	333	618	1,189
140	45	142	309	573	1,108			
200	43	138	291	549	1,059			
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	$T_{2NOT}$	Nm	15 ~ 200	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	$n_{1N}$	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	≤ 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	≤ 63	≤ 65	≤ 68	≤ 70	≤ 72
重量 Weight ±3%		Kg	15 ~ 200	3.5	11.1	16.8	29.9	66.1

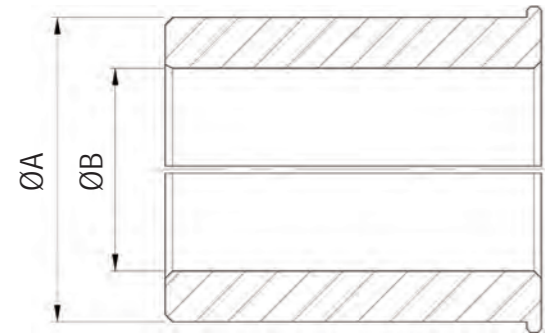
### 轉動慣量 Mass Moments of Inertia (kg.cm<sup>2</sup>)

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



# 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	8	11	14	19	22	24	28	35	38	42	48	55	60	75
6	●		●											
6.35	●		●											
8		●	●											
9		●	●											
10			●	●										
11			●	●										
12			●	●										
12.7				●										
14				●		●								
16						●								
19					●	●	●							
22						●	●	●						
24							●	●						
25							●	●						
25.4								●						
28								●	●	●				
32								●	●	●				
35									●	●	●			
38										●	●			
42											●			
48														
55														
60														

# Collet Screw & Set Collar Torque Table

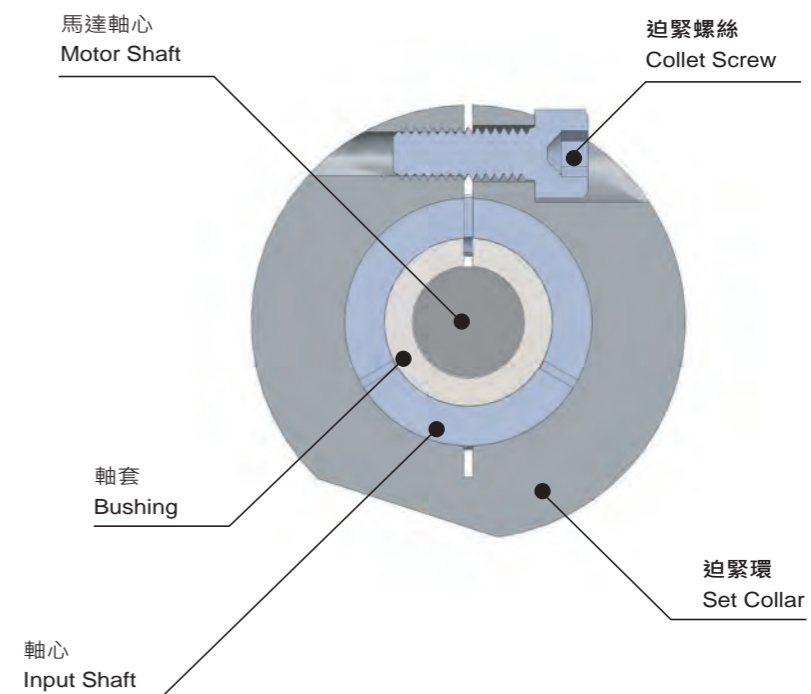
迫緊螺絲及迫緊環扭矩表

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	SD	SF					
44	47	-	M3 x P 0.5	12.9	2.2	58	
62	-	62	M5 x P 0.8	12.9	10	164	
64	64	-	M5 x P 0.8	12.9	10	164	
90	90	75	M6 x P 1.0	12.9	16.3	233	
120	110	100	M8 x P 1.25	12.9	41	423	
142	140	142	M10 x P 1.5	12.9	81	678	
180	200	180	M10 x P 1.5	12.9	81	678	●
220	255	-	M10 x P 1.5	12.9	81	678	●
270	-	-	M12 x P 1.75	12.9	110	813	●
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



## SERVOBOX Series Reference Selection Table of Motor

### SERVOBOX 馬達選用參考表

單段 1-Stage SB·SE·SD·SF 雙段 2-Stage SB-A·SE-A·SF-A

型號 Model	SB·SE	44	62	90	120	142	180	220	270	330
	SB-A·SE-A	44A	62A	90A	120A	142A	180A	220A	-	-
	SD	47	64	90	110	140	200	255	-	-
	SF	-	62	75	100	142	180	-	-	-
容量 Power	入力孔徑 Input Bore	5.65 ~ 11	6.35 ~ 19	14 ~ 24	19 ~ 32	22 ~ 38	38 ~ 55	42 ~ 55	48 ~ 60	55 ~ 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										●

雙段 2-Stage SB·SE·SD·SF

型號 Model	SB·SE	62	90	120	142	180	220	270	330
	SD	47·64	90	110	140	200	255	-	-
	SF	62	75	100	142	180	-	-	-
容量 Power	入力孔徑 Input Bore	5.65 ~ 11	6.35 ~ 19	14 ~ 24	19 ~ 32	22 ~ 38	38 ~ 55	42 ~ 55	48 ~ 60
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									●

※ 以上表格僅供參考·選用時仍須以『額定輸出扭矩』為依據

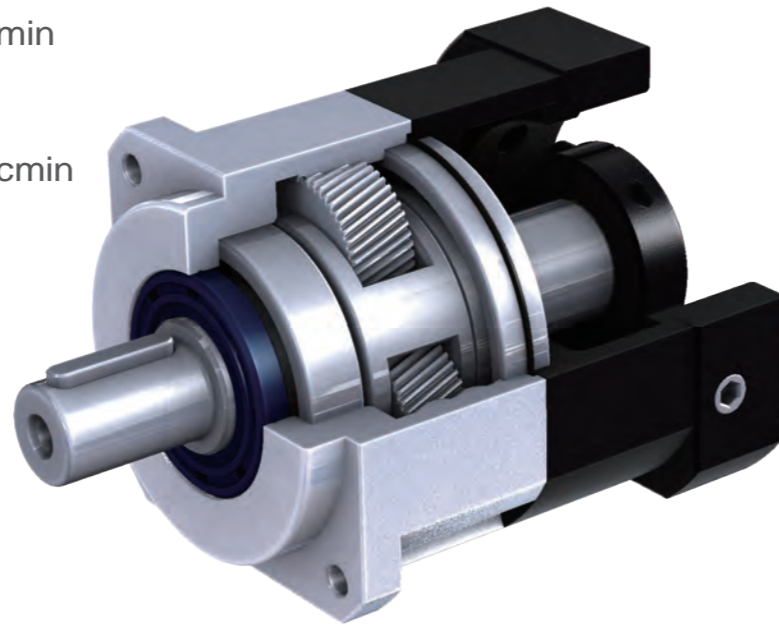
The table is for reference. The selected model shall be based on rated output torque.

# PB series

# Features of PB Series

## PB 系列產品特性

- 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



### 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.

## 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	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	<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。

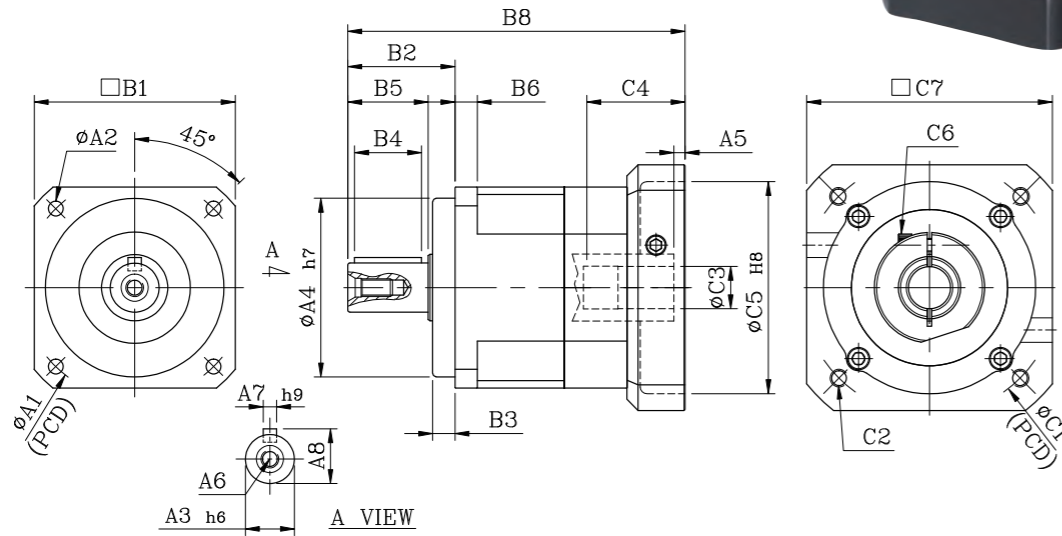
### High Efficiency

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

# MODEL : PB

單段 1-Stage

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



unit : mm

Model Code	44	62	90	120	142	180	220
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	12.5
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
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	367.5
C1	46·60·63	70·75·90	90·100·115·145	115·145·165	145·165·200	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	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55	42·48·55
C4	26	33.5·41.5	59·73.5	67·77	84.5	114.5	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	M3 × P0.5	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

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	$n_{1N}$	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
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	$L_H$	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	$\geq 97\%$						
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

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

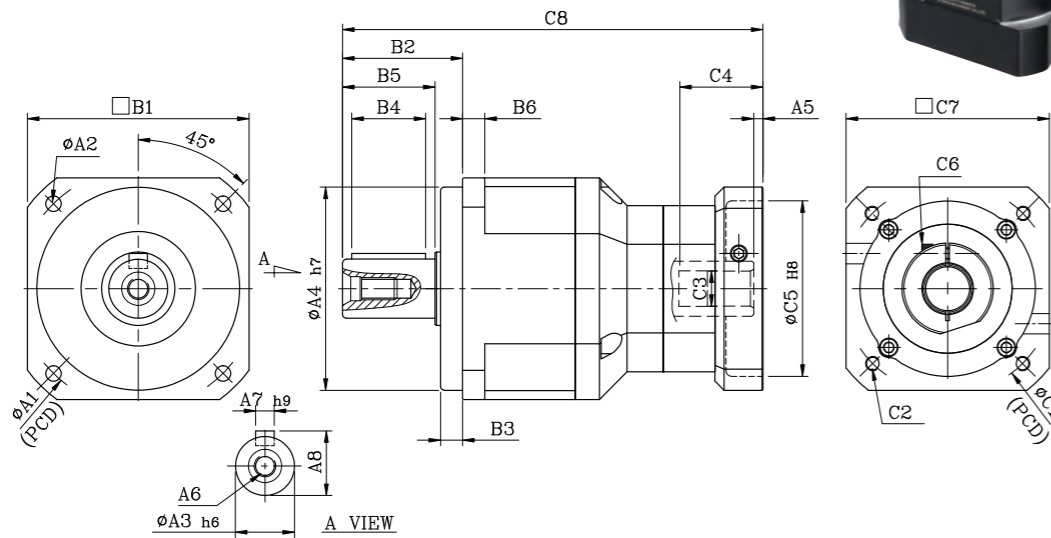
速比 Ratio	44	62	90	120	142	180	220
3	0.03	0.16	0.61	3.25	9.21	28.98	59.61
4	0.03	0.14	0.48	2.74	7.54	23.67	54.37
5	0.03	0.13	0.47	2.74	7.42	23.29	53.27
6	0.03	0.13	0.45	2.65	7.25	22.75	51.72
7	0.03	0.13	0.45	2.62	7.14	22.48	50.97
8	0.03	0.13	0.44	2.58	7.07	22.59	50.84
9	0.03	0.13	0.44	2.57	7.04	22.53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

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
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>B</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
<b>C</b>						
C1	46·60·63	70·75·90	90·100·115·145	115·145·165	145·165·200	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	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55
C4	26	33.5·41.5	59·73.5	67·77	84.5	114.5
C5	30·40·50	50·60·70	70·80·95·110	70·95·110·130	110·130·180	114.3·180·230
C6	M3 × P0.5	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

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	$L_{H1}$	hr	15~100	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	$\eta$	%	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

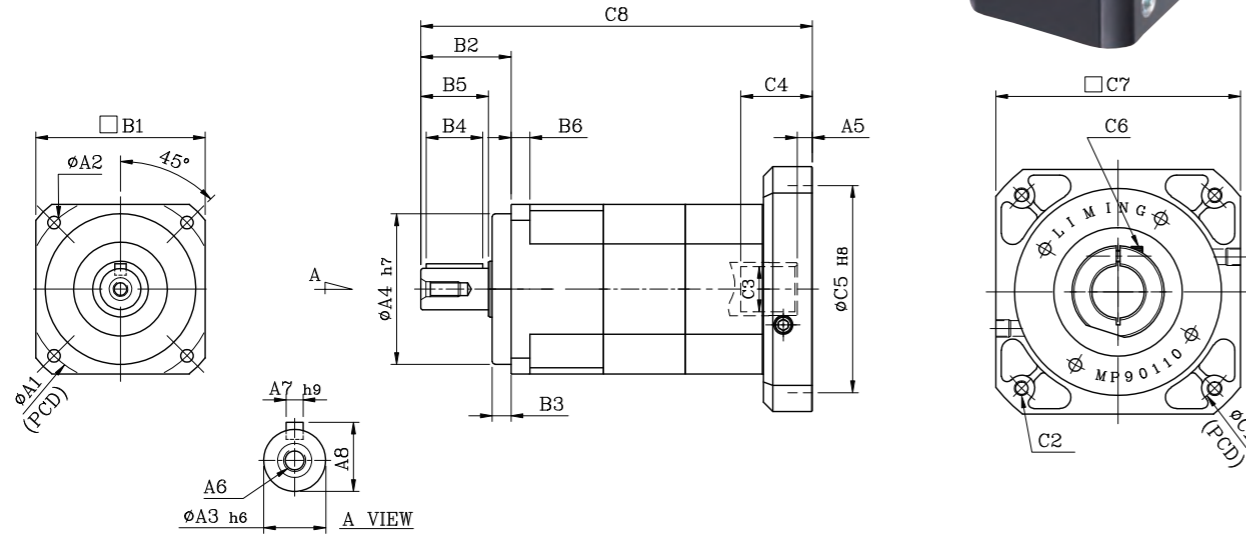
### Mass Moments of Inertia (kg.cm<sup>2</sup>)

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	12.5
	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	145·165·200	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	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55	42·48·55
	C4	26	33.5·41.5	59·73.5	67·77	84.5	114.5	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	M3 × P0.5	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	156.8·148.8	208·222.5	261·271	327	404.5	460.5

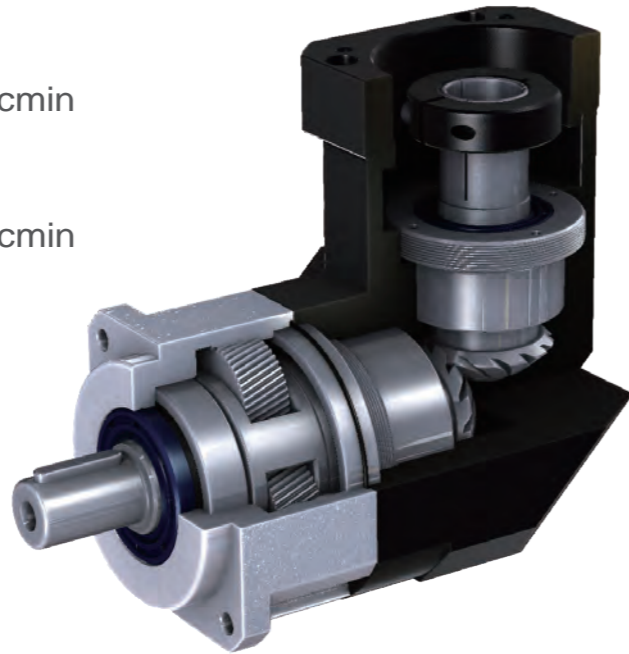
規格 Model No.	代號	單位 Unit	速比 Ratio	44A	62A	90A	120A	142A	180A	220A
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	15	17	54	145	301	553	1,067	1,786
			20	15	48	128	269	491	940	1,587
			25	14	45	132	278	510	1,050	1,770
			30	13	41	125	252	466	985	1,680
			35	13	41	123	258	473	975	1,645
			40	12	39	115	241	442	942	1,605
			50	14	45	132	278	510	1050	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 : >20,000 (S1 連續運轉 : >10,000 hrs) S5 Cycle Operation : >20,000 (S1 Continuous Operation : >10,000 hrs)						
效率 / Efficiency	$\eta$	%	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

### 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  $\leq 12$  弧分  
1-Stage Backlash  $\leq 12$  arcmin
- 全系列雙段背隙  $\leq 15$  弧分  
2-Stage Backlash  $\leq 15$  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)  <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.

**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

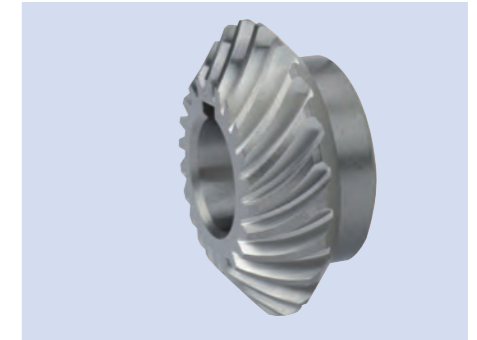
### PBL 系列產品特性

#### 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

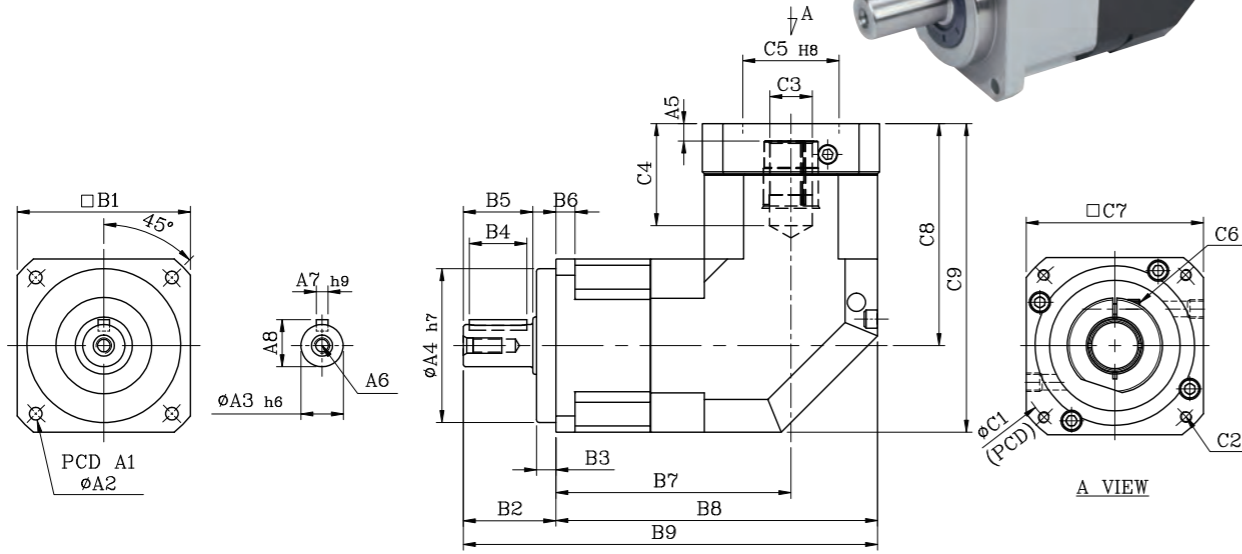
The gear box and internal ring gear are one-piece constructed. The speed reduction mechanism employs helical gears, which provides two times meshing rate of teeth when comparing with regular spur gears. In addition, it also has features of extremely smooth running, low noise, high output torque and low 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	12.5
	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
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 · 200	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	14 · 19	19 · 22 · 24	24 · 28 · 32	28 · 32 · 35	38 · 42 · 48 · 55	42 · 48 · 55
	C4	27	33.5 · 41.5	53 · 67.5	67 · 77	85	117	117
	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	M3 × P0.5	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	115.3 · 129.8	141 · 151	174	235	235
	C9	83	108	160.3 · 174.8	201 · 211	245	325	345

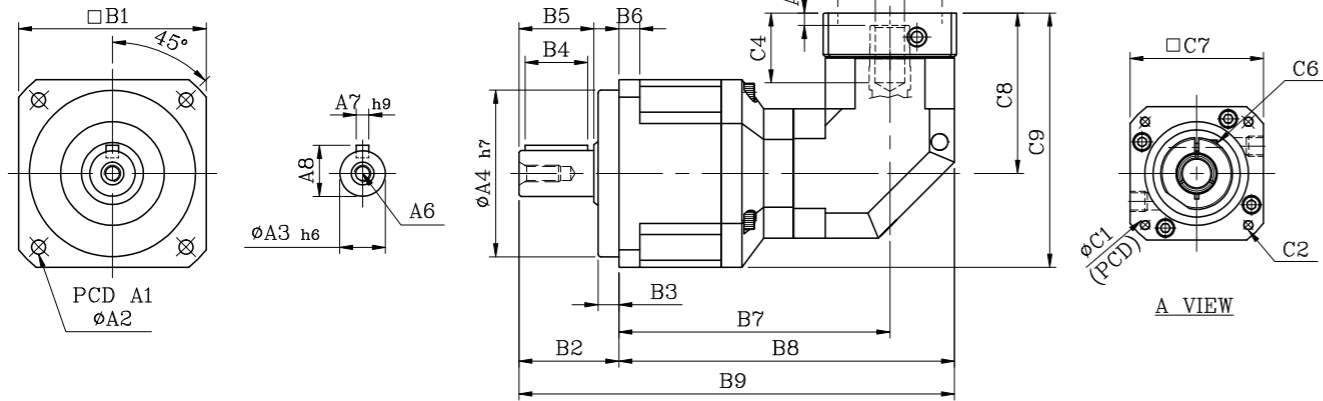
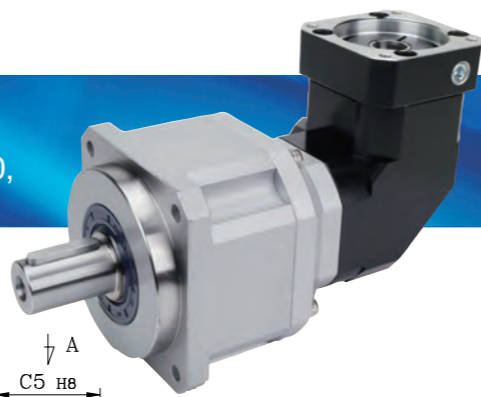
規格 Model No.	代號	單位 Unit	速比 Ratio	44	62	90	120	142	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	T <sub>2N</sub>	Nm	3	17	54	145	301	553	1,067	1,786
			4	15	48	128	269	491	940	1,587
			5	14	45	132	278	510	1,050	1,770
			6	13	41	125	252	466	985	1,680
			7	13	41	123	258	473	975	1,645
			8	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 <sub>2B</sub>	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 <sub>2NOT</sub>	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 <sub>IN</sub>	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 <sub>IB</sub>	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 <sub>2rB</sub>	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 <sub>2aB</sub>	N	3~20	180	560	1,520	3,230	4,410	7,410	24,225
使用壽命 / Service Life	L <sub>H</sub>	hr	3~20	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	η	%	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	≤ 60	≤ 62	≤ 65	≤ 67	≤ 69	≤ 71	≤ 73
重量 / Weight ±3%		Kg	3~20	0.99	2.1	6.88	12.5	23.16	51	

### 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 1-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
	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
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	145·165·200	200·215·265
	C2	M3·M4·M5	M4·M5·M6	M5·M6·M8·M10	M6·M8·M10	M8·M10·M12	M10·M12·M16
	C3	8·9·11	14·19	19·22·24	24·28·32	32·35·38	38·42·48·55
	C4	27	33.5·41.5	53·67.5	67·77	85	117
	C5	30·40·50	50·60·70	70·80·95·110	70·95·110·130	110·130·180	114.3·180·230
	C6	M3 × P0.5	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	115.3·129.8	141·151	174	235
	C9	92	122	175.3·189.8	212·222	264	345

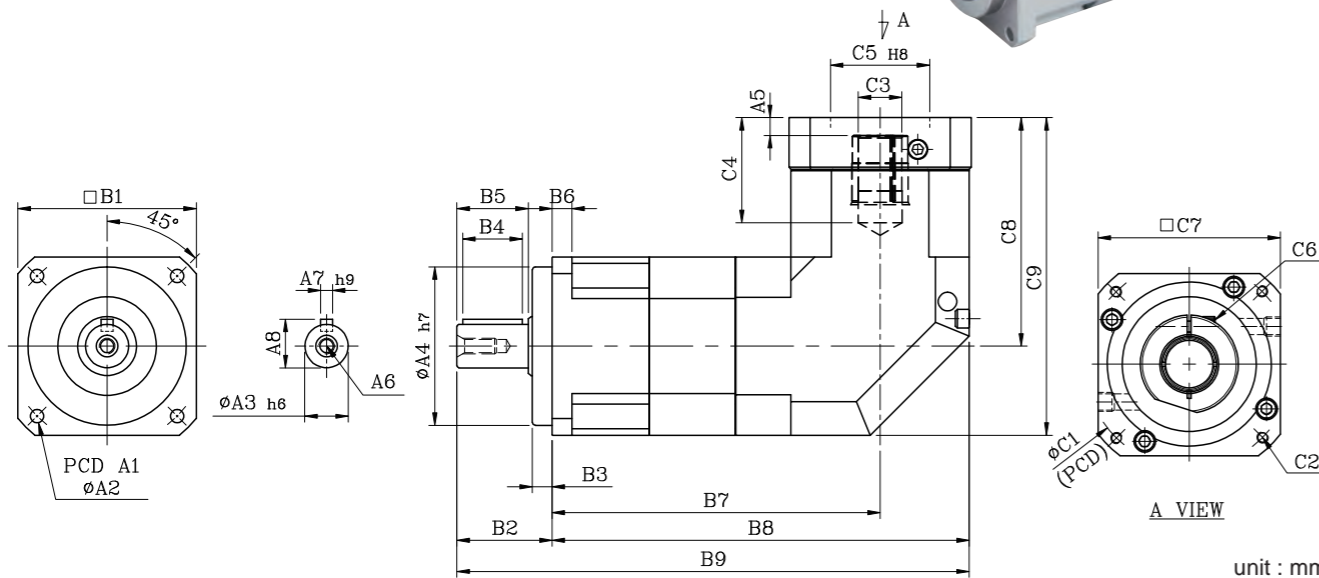
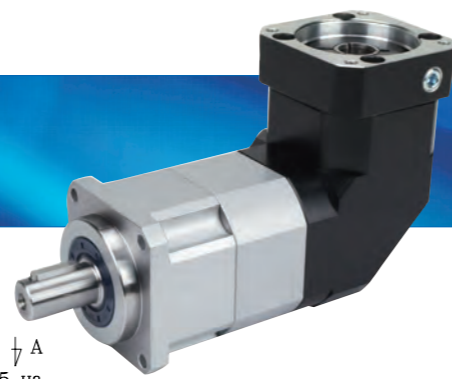
規格 Model No.	代號	單位 Unit	速比 Ratio	62	90	120	142	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	T <sub>2N</sub>	Nm	15	54	145	301	553	1,067	1,786
			20	48	128	269	491	940	1,587
			25	45	132	278	510	1,050	1,770
			30	41	125	252	466	985	1,680
			35	41	123	258	473	975	1,645
			40	39	115	241	442	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 <sub>2B</sub>	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 <sub>2NOT</sub>	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 <sub>IN</sub>	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 <sub>IB</sub>	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 <sub>2rB</sub>	N	15~200	1,120	3,040	6,460	8,830	14,820	48,450
容許軸向力 / Max. Axial Force	F <sub>2aB</sub>	N	15~200	560	1,520	3,230	4,410	7,410	24,225
使用壽命 / Service Life	L <sub>H</sub>	hr	15~200	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	η	%	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	≤ 62	≤ 65	≤ 67	≤ 69	≤ 71	≤ 73
重量 / Weight ±3%		Kg	15~200	2	6.1	12.5	23.2	41.4	

### 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 : 5, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 140, 160, 180, 200 ( 雙段 1-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	12.5
	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
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	145·165·200	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	14·19	19·22·24	24·28·32	28·32·35	38·42·48·55	42·48·55
	C4	27	33.5·41.5	53·67.5	67·77	85	117	117
	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	M3 × P0.5	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	115.3·129.8	141·151	174	235	235
	C9	83	108	160.3·174.8	201·211	245	325	345

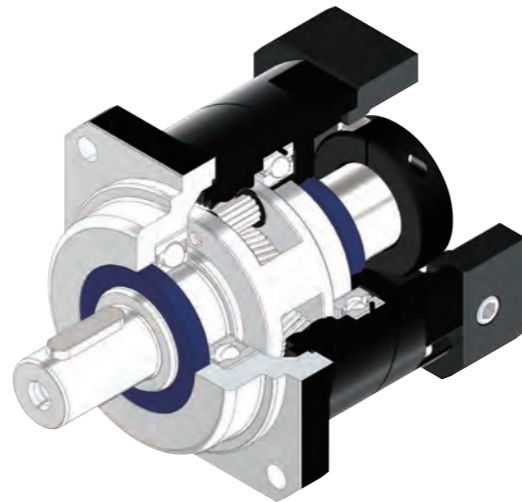
規格 Model No.	代號	單位 Unit	速比 Ratio	44A	62A	90A	120A	142A	180A	220A
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	T <sub>2N</sub>	Nm	15	17	54	145	301	553	1,067	1,786
			20	15	48	128	269	491	940	1,587
			25	14	45	132	278	510	1,050	1,770
			30	13	41	125	252	466	985	1,680
			35	13	41	123	258	473	975	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 <sub>2B</sub>	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 <sub>2NOT</sub>	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 <sub>1N</sub>	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 <sub>1B</sub>	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 <sub>2B</sub>	N	15~200		1,120	3,040	6,460	8,830	14,820	48,450
容許軸向力 / Max. Axial Force	F <sub>2aB</sub>	N	15~200		560	1,520	3,230	4,410	7,410	24,225
使用壽命 / Service Life	L <sub>H</sub>	hr	15~200	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	η	%	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	≤ 62	≤ 62	≤ 65	≤ 67	≤ 69	≤ 71	≤ 73
重量 / Weight ±3%		Kg	15~200	1.5	3	8.15	13.9	29.4	52.4	

### 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


# 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

<b>FA</b>	<b>80</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
FA	50 70 80 90 100 120	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)	

**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 FA Series

FA 系列產品特性



### 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 carbunized 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.

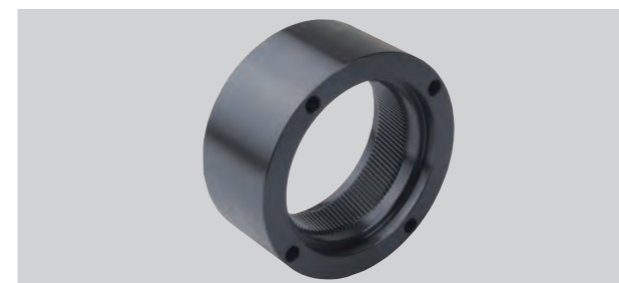


### 一體式行星臂架

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

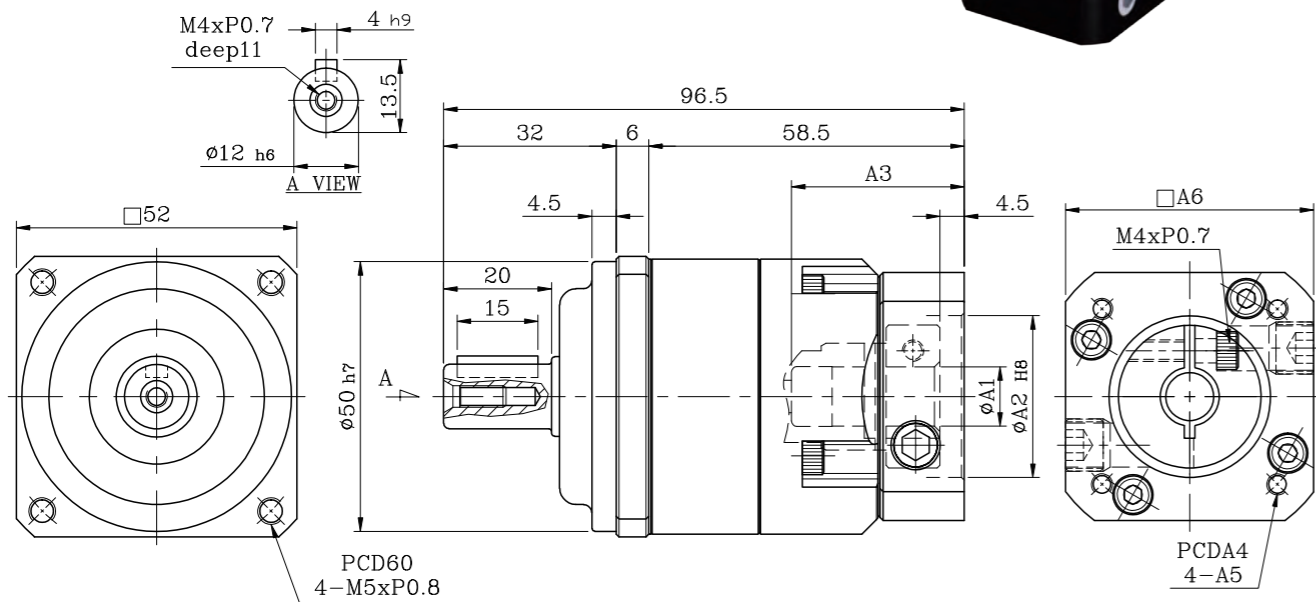
輸入端與馬達的連結採用筒夾式的鎖緊機構 · 並經動平衡分析 · 以確保在高輸入轉速下結合介面的同心度和平衡度 · 及零背隙的動力傳遞。

### 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 : FA50

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



入力法蘭尺寸表 Dimension of Input Flange

unit:mm

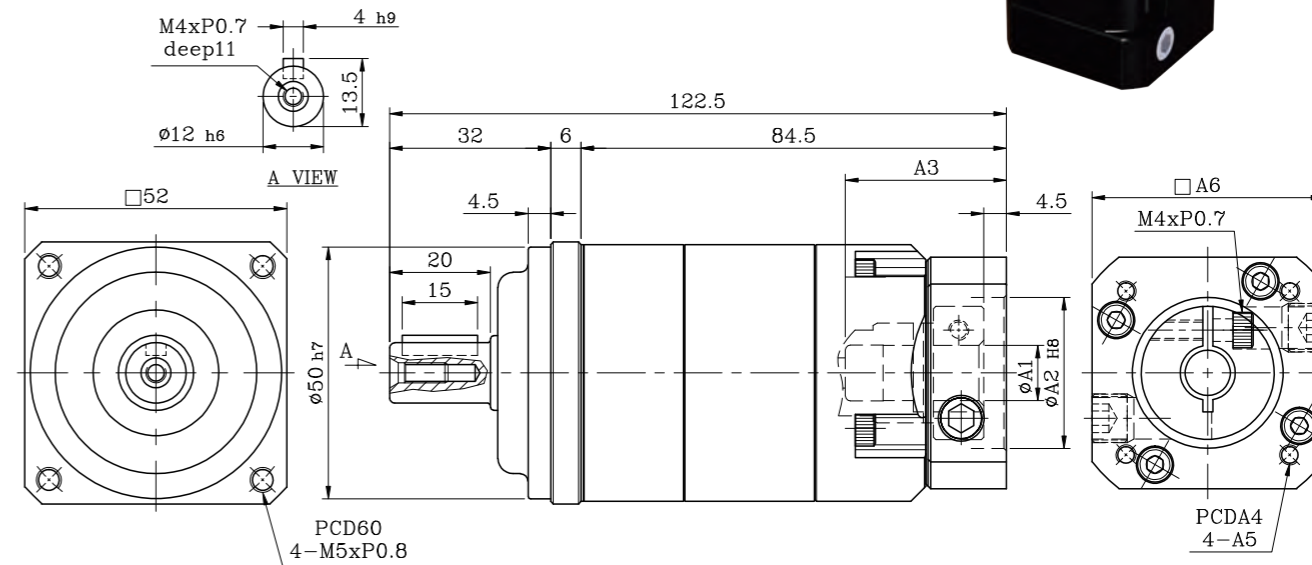
NO.	ØA1	ØA2	A3	A4	A5	A6
1		30	32	45	M3	46
2	8	30	32	46	M4	46
3	1	30	32	48.5	M3	55
4	14	40	32	63	M5	55
5		50	32	70	M5	60

## FA50-1 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	19	16	16	15	14
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	34	29	29	27	25
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.03	0.03	0.03	0.03	0.03
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000				
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000				
扭轉剛性 / Torsional Rigidity		Nm/arcmin	3				
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	350				
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	180				
使用壽命 / Service Life	$L_{H1}$	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	$\eta$	%	≥ 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	0.64				

# MODEL : FA50

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
1		30	32	45	M3	46
2	8	30	32	46	M4	46
3	1	30	32	48.5	M3	55
4	14	40	32	63	M5	55
5		50	32	70	M5	60

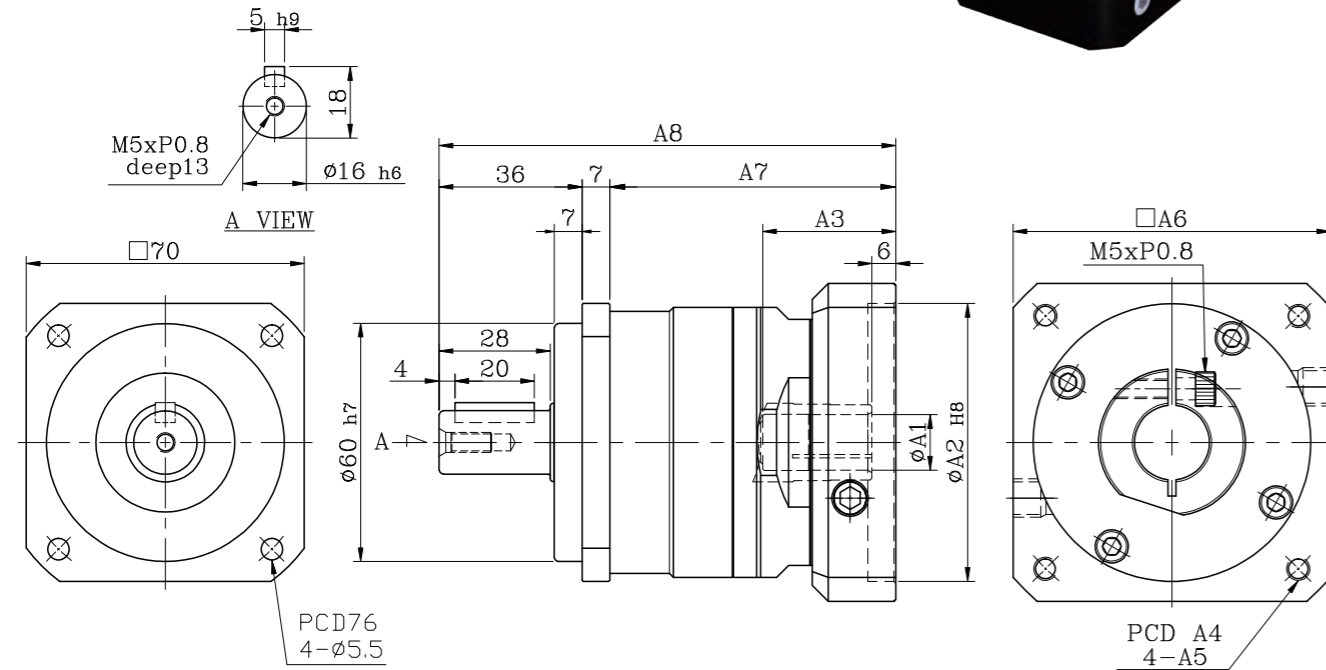
## FA50-2 特性表

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	19	16	16	19	15	16	16	15	14
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	34	29	29	34	27	29	29	27	25
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000								
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	3								
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	350								
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	180								
使用壽命 / Service Life	$L_{H1}$	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	≤ 60 dB								
重量 / Weight ±2%		Kg	0.96								



# MODEL : FA70

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



入力法蘭尺寸表 Dimension of Input Flange

unit:mm

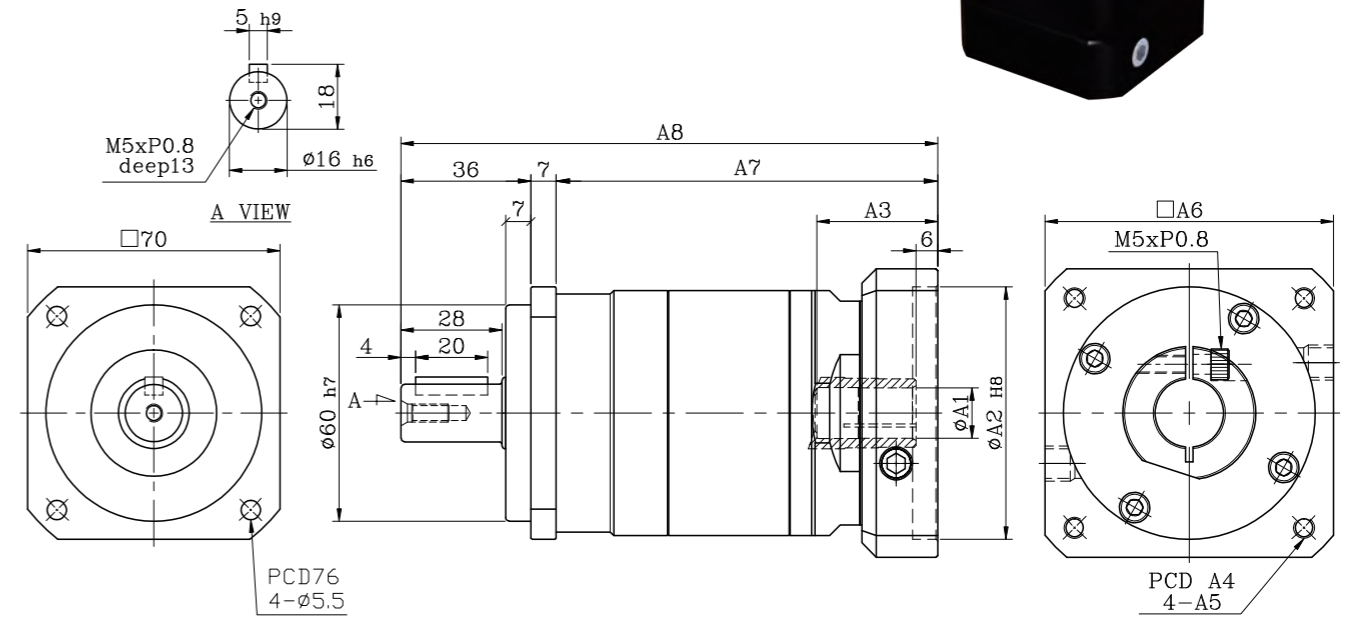
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1	14	50	33.5	70	M5	64	72	115
2	1	60	33.5	75	M6	70	72	115
3	19	70	33.5	85	M6	80	72	115

## FA70-1 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	54	48	45	41	40
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	97	86	81	74	72
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.16	0.14	0.13	0.13	0.13
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000				
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000				
扭轉剛性 / Torsional Rigidity		Nm/arcmin	5				
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	800				
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	400				
使用壽命 / Service Life	$L_{H1}$	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	$\eta$	%	≥ 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					

# MODEL : FA70

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

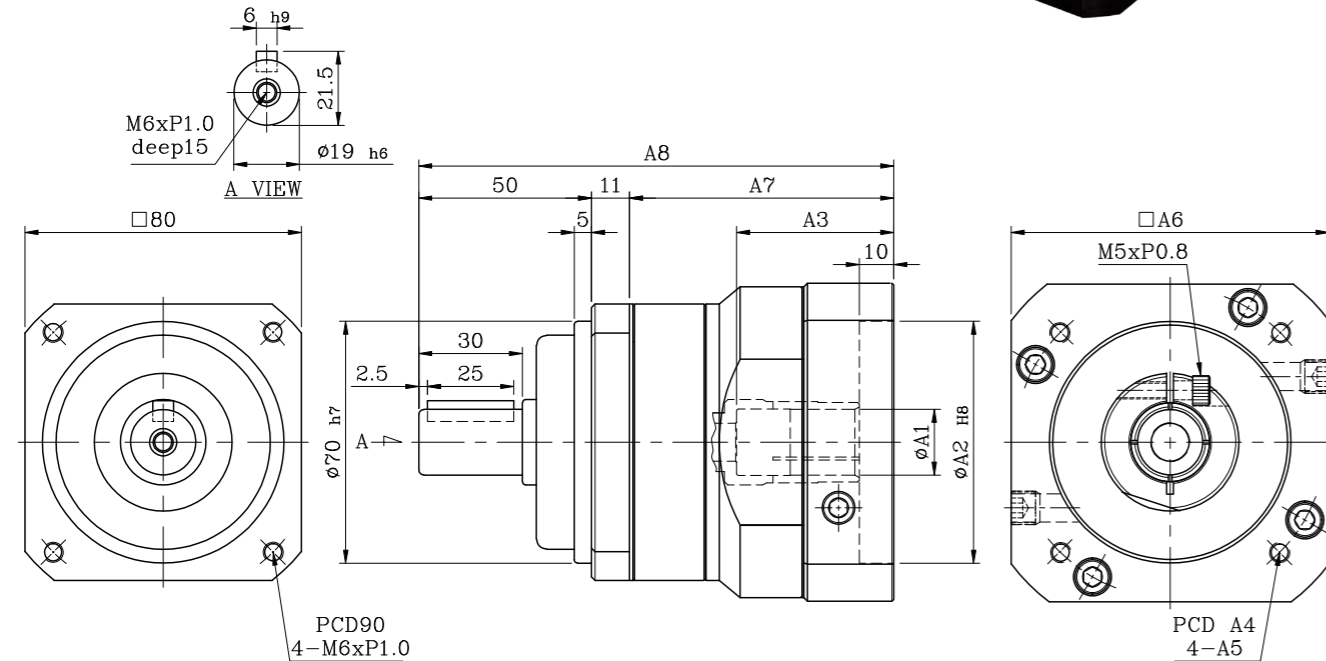
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1	14	50	33.5	70	M5	64	105.8	148.8
2	1	60	33.5	75	M6	70	105.8	148.8
3	19	70	33.5	85	M6	80	105.8	148.8

## FA70-2 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	54	48	45	41	41	39	45	41	40
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	97	86	81	74	74	70	81	74	72
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000								
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	5								
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	800								
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	400								
使用壽命 / Service Life	$L_{H1}$	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	≤ 60 dB								
重量 / Weight ±2%		Kg	2.1								

# MODEL : FA80

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



入力法蘭尺寸表 Dimension of Input Flange

unit:mm

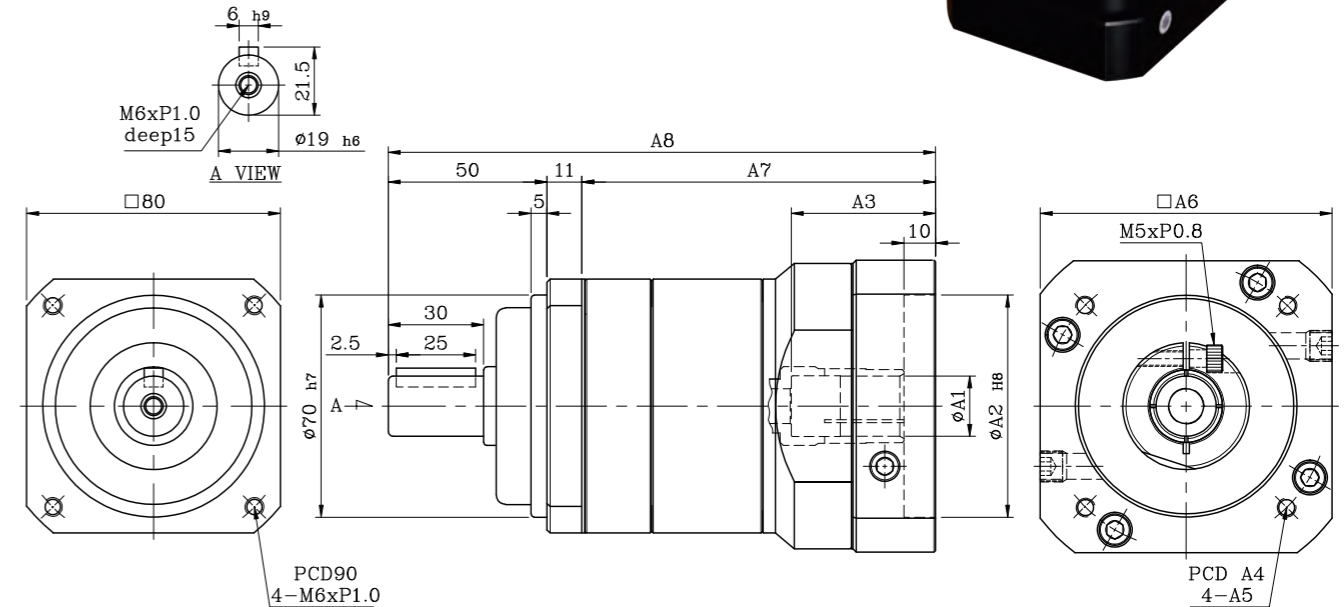
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1		50	33.5	70	M5	80	64.5	125.5
2	14	70	45.5	90	M6	92	76.5	137.5
3	19	80	45.5	100	M6	92	76.5	137.5
4		95	45.5	115	M6	110	76.5	137.5

## FA80-1 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 <sub>2N</sub>	Nm	112	110	108	105	100
最大加速扭矩 / Max. Acceleration Torque	T <sub>2B</sub>	Nm	202	198	194	189	180
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.48	0.38	0.38	0.38	0.35
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	T <sub>2NOT</sub>	Nm	3 倍額定輸出扭矩 3 Times of Rated Output Torque				
額定輸入轉速 / Rated Input Speed	n <sub>1N</sub>	rpm	3,000				
最大輸入轉速 / Max. Input Speed	n <sub>1B</sub>	rpm	5,000				
扭轉剛性 / Torsional Rigidity		Nm/arcmin	12				
容許徑向力 / Max. Radial Force	F <sub>2rB</sub>	N	1,200				
容許軸向力 / Max. Axial Force	F <sub>2aB</sub>	N	600				
使用壽命 / Service Life	L <sub>H</sub>	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	η	%	≥ 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	≤ 60 dB				
重量 / Weight ±2%		Kg	1.6				

# MODEL : FA80

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

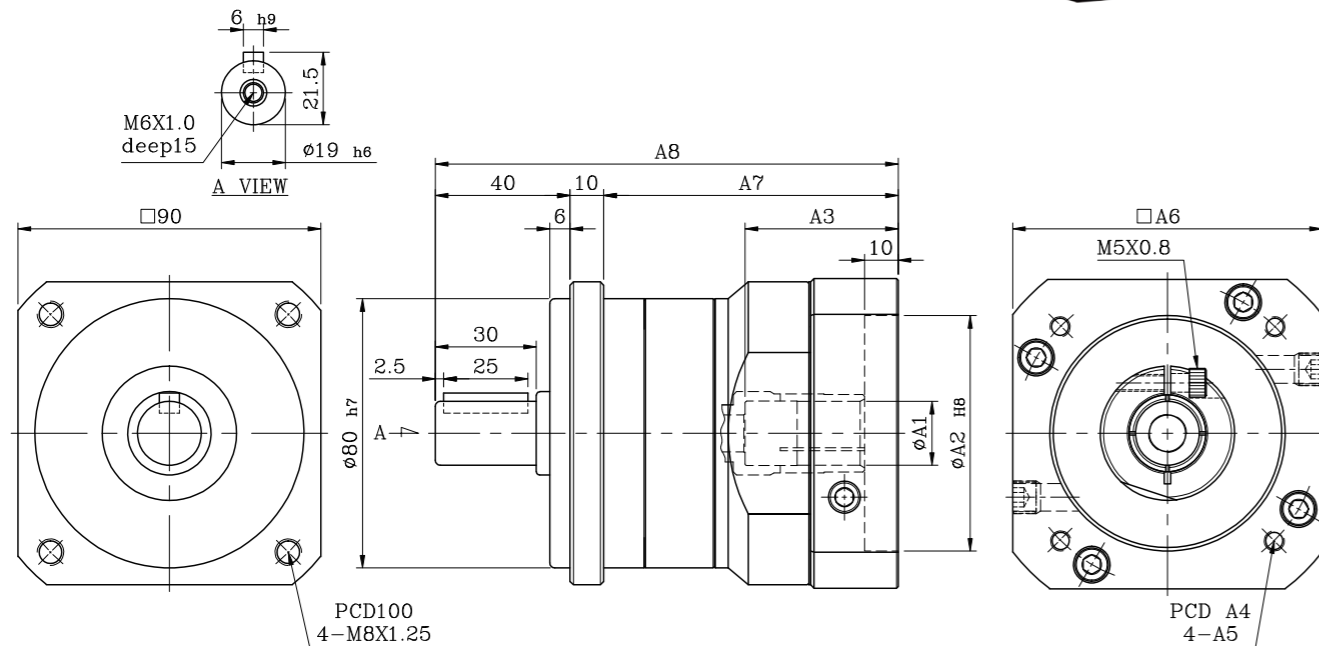
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1		50	33.5	70	M5	80	99.5	160.5
2	14	70	45.5	90	M6	92	111.5	172.5
3	19	80	45.5	100	M6	92	111.5	172.5
4		95	45.5	115	M6	110	111.5	172.5

## FA80-2 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 <sub>2N</sub>	Nm	112	110	108	112	105	110	108	105	100
最大加速扭矩 / Max. Acceleration Torque	T <sub>2B</sub>	Nm	202	198	194	202	189	198	194	189	180
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.41	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	T <sub>2NOT</sub>	Nm	3 倍額定輸出扭矩 3 Times of Rated Output Torque								
額定輸入轉速 / Rated Input Speed	n <sub>1N</sub>	rpm	3,000								
最大輸入轉速 / Max. Input Speed	n <sub>1B</sub>	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	12								
容許徑向力 / Max. Radial Force	F <sub>2rB</sub>	N	1,200								
容許軸向力 / Max. Axial Force	F <sub>2aB</sub>	N	600								
使用壽命 / Service Life	L <sub>H</sub>	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	η	%	≥ 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	2.8								

# MODEL : FA90

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



入力法蘭尺寸表 Dimension of Input Flange

unit:mm

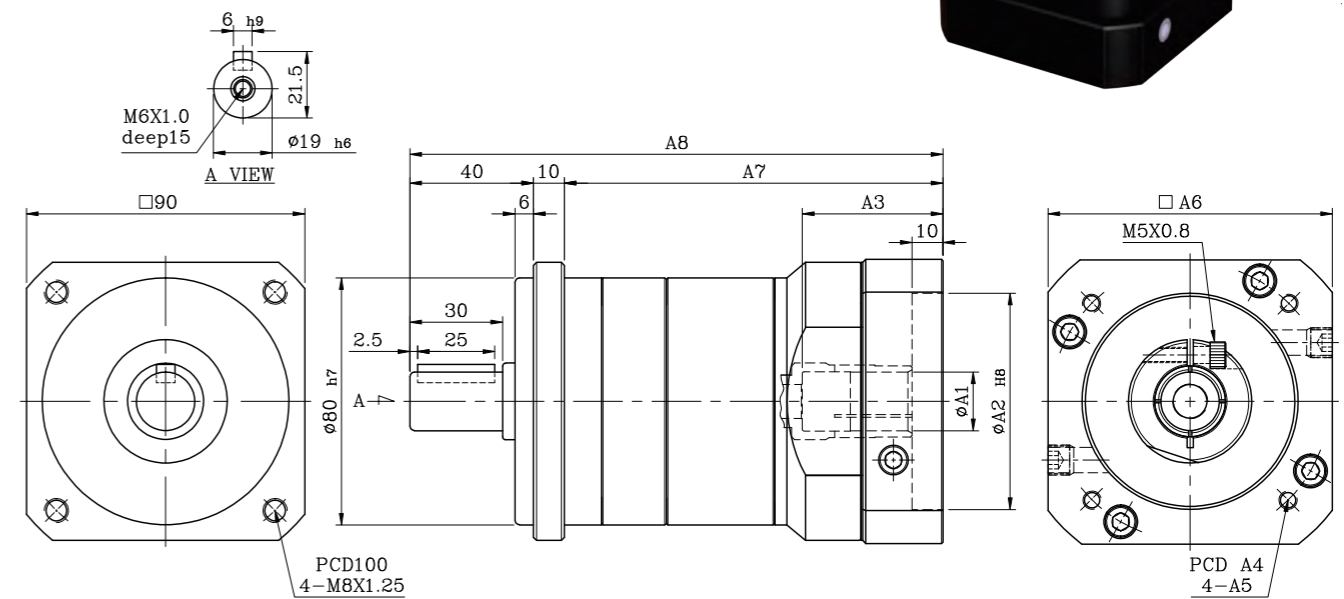
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1	14	70	45.5	90	M6	92	87.5	137.5
2	14	80	45.5	100	M6	92	87.5	137.5
3	19	95	45.5	115	M6	110	87.5	137.5
4	19	110	45.5	145	M8	130	87.5	137.5

## FA90-1 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 <sub>2N</sub>	Nm	112	110	108	105	100
最大加速扭矩 / Max. Acceleration Torque	T <sub>2B</sub>	Nm	202	198	194	189	180
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.48	0.38	0.38	0.38	0.35
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	T <sub>2NOT</sub>	Nm	3 倍額定輸出扭矩 3 Times of Rated Output Torque				
額定輸入轉速 / Rated Input Speed	n <sub>1N</sub>	rpm	3,000				
最大輸入轉速 / Max. Input Speed	n <sub>1B</sub>	rpm	5,000				
扭轉剛性 / Torsional Rigidity		Nm/arcmin	12				
容許徑向力 / Max. Radial Force	F <sub>2rB</sub>	N	1,200				
容許軸向力 / Max. Axial Force	F <sub>2aB</sub>	N	600				
使用壽命 / Service Life	L <sub>HI</sub>	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	η	%	≥ 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	≤ 60 dB				
重量 / Weight ±2%		Kg	1.96				

# MODEL : FA90

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

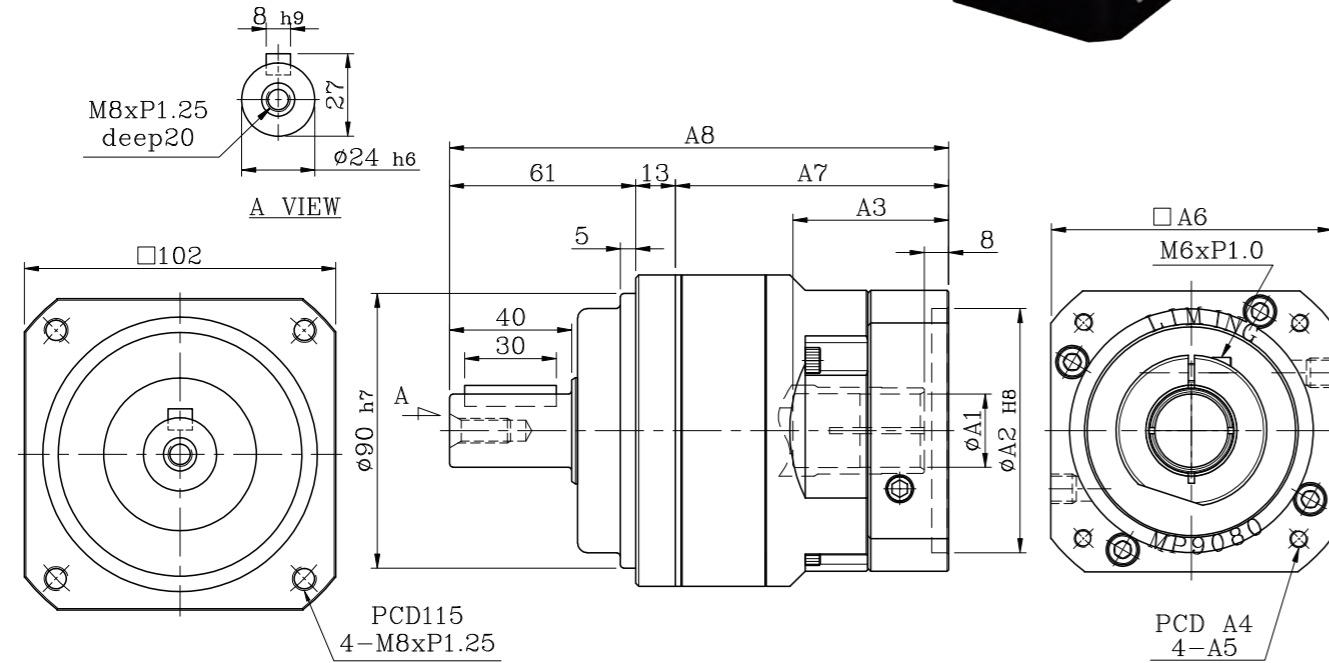
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1	14	70	45.5	90	M6	92	122.5	172.5
2	14	80	45.5	100	M6	92	122.5	172.5
3	19	95	45.5	115	M6	110	122.5	172.5
4	19	110	45.5	145	M8	130	122.5	172.5

## FA90-2 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 <sub>2N</sub>	Nm	112	110	108	112	105	110	108	105	100
最大加速扭矩 / Max. Acceleration Torque	T <sub>2B</sub>	Nm	202	198	194	202	189	198	194	189	180
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.41	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	T <sub>2NOT</sub>	Nm	3 倍額定輸出扭矩 3 Times of Rated Output Torque								
額定輸入轉速 / Rated Input Speed	n <sub>1N</sub>	rpm	3,000								
最大輸入轉速 / Max. Input Speed	n <sub>1B</sub>	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	12								
容許徑向力 / Max. Radial Force	F <sub>2rB</sub>	N	1,200								
容許軸向力 / Max. Axial Force	F <sub>2aB</sub>	N	600								
使用壽命 / Service Life	L <sub>HI</sub>	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	η	%	≥ 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	3.06								

# MODEL : FA100

RATIO : 3, 4, 5, 7, 10 ( 單段 1-Stage)



入力法蘭尺寸表 Dimension of Input Flange unit:mm

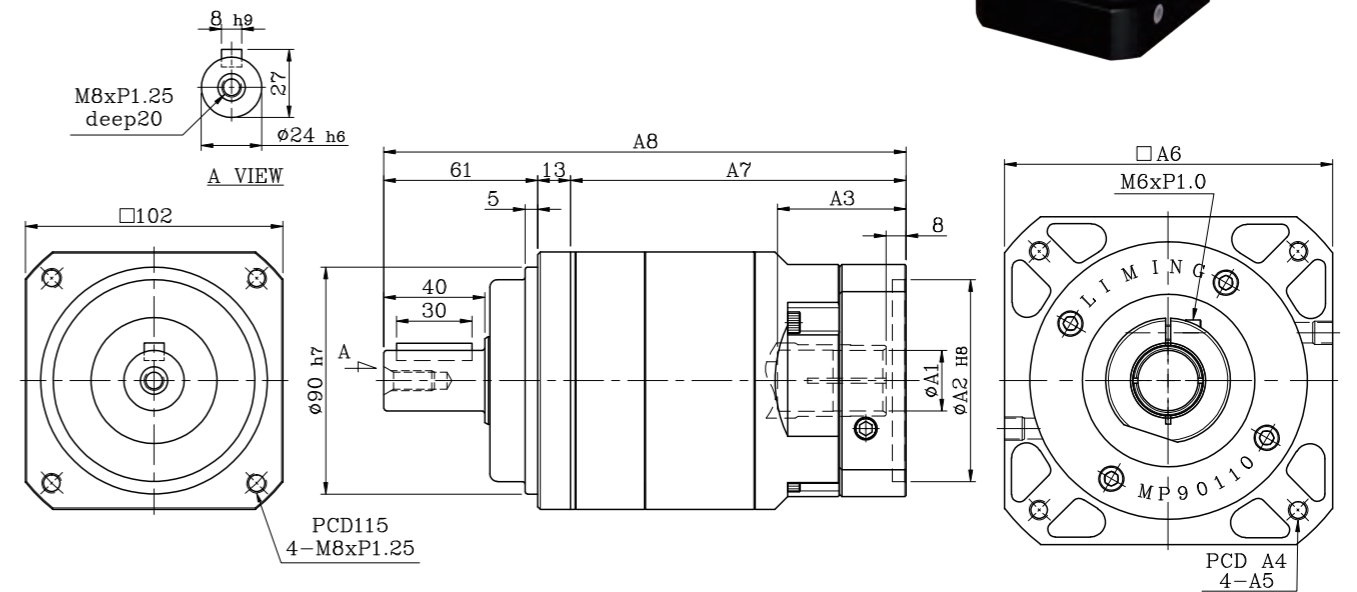
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1	19 24	70	51	90	M6	92	89.5	163.5
2		80	51	100	M6	92	89.5	163.5
3		95	51	115	M6	110	89.5	163.5
4		95	51	115	M8	110	89.5	163.5
5		110	51	145	M8	130	89.5	163.5
6		110	65.5	145	M8	130	104	178

## FA100-1 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 <sub>2N</sub>	Nm	165	146	160	149	141	
最大加速扭矩 / Max. Acceleration Torque	T <sub>2B</sub>	Nm	297	263	288	268	254	
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.6	0.45	0.45	0.45	0.41	
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	T <sub>2NOT</sub>	Nm	3 倍額定輸出扭矩 3 Times of Rated Output Torque					
額定輸入轉速 / Rated Input Speed	n <sub>1N</sub>	rpm	3,000					
最大輸入轉速 / Max. Input Speed	n <sub>1B</sub>	rpm	5,000					
扭轉剛性 / Torsional Rigidity		Nm/arcmin	14					
容許徑向力 / Max. Radial Force	F <sub>2rB</sub>	N	3,200					
容許軸向力 / Max. Axial Force	F <sub>2aB</sub>	N	1,600					
使用壽命 / Service Life	L <sub>H</sub>	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	η	%	≥ 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	≤ 65 dB					
重量 / Weight ±2%		Kg	3.76					

# MODEL : FA100

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

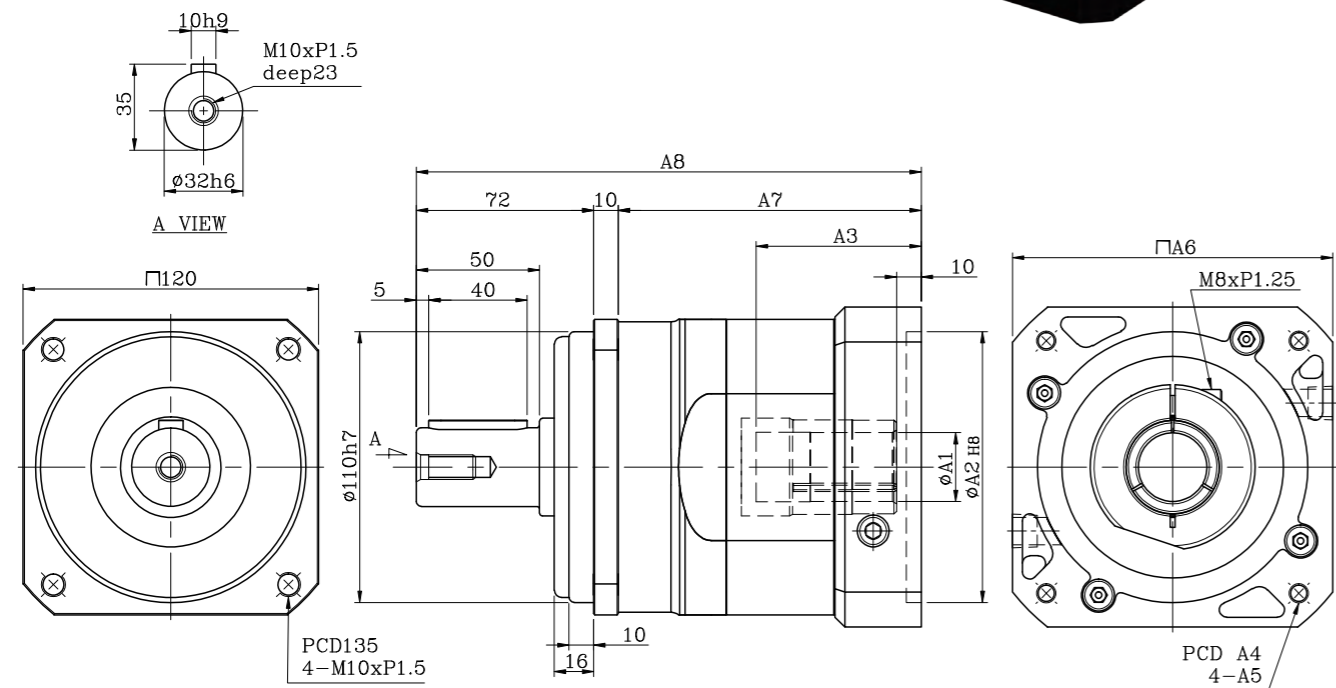
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1	19 24	70	51	90	M6	92	133	207
2		80	51	100	M6	92	133	207
3		95	51	115	M6	110	133	207
4		95	51	115	M8	110	133	207
5		110	51	145	M8	130	133	207
6		110	65.5	145	M8	130	147.5	221.5

## FA100-2 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 <sub>2N</sub>	Nm	165	146	160	165	149	146	160	149	141
最大加速扭矩 / Max. Acceleration Torque	T <sub>2B</sub>	Nm	297	263	288	297	268	263	288	268	254
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	T <sub>2NOT</sub>	Nm	3 倍額定輸出扭矩 3 Times of Rated Output Torque								
額定輸入轉速 / Rated Input Speed	n <sub>1N</sub>	rpm	3,000								
最大輸入轉速 / Max. Input Speed	n <sub>1B</sub>	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	14								
容許徑向力 / Max. Radial Force	F <sub>2rB</sub>	N	3,200								
容許軸向力 / Max. Axial Force	F <sub>2aB</sub>	N	1,600								
使用壽命 / Service Life	L <sub>H</sub>	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	η	%	≥ 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	≤ 67 dB								
重量 / Weight ±2%		Kg	5.92								

# MODEL : FA120

RATIO : 5, 7, 10 (單段 1-Stage)



入力法蘭尺寸表 Dimension of Input Flange

unit:mm

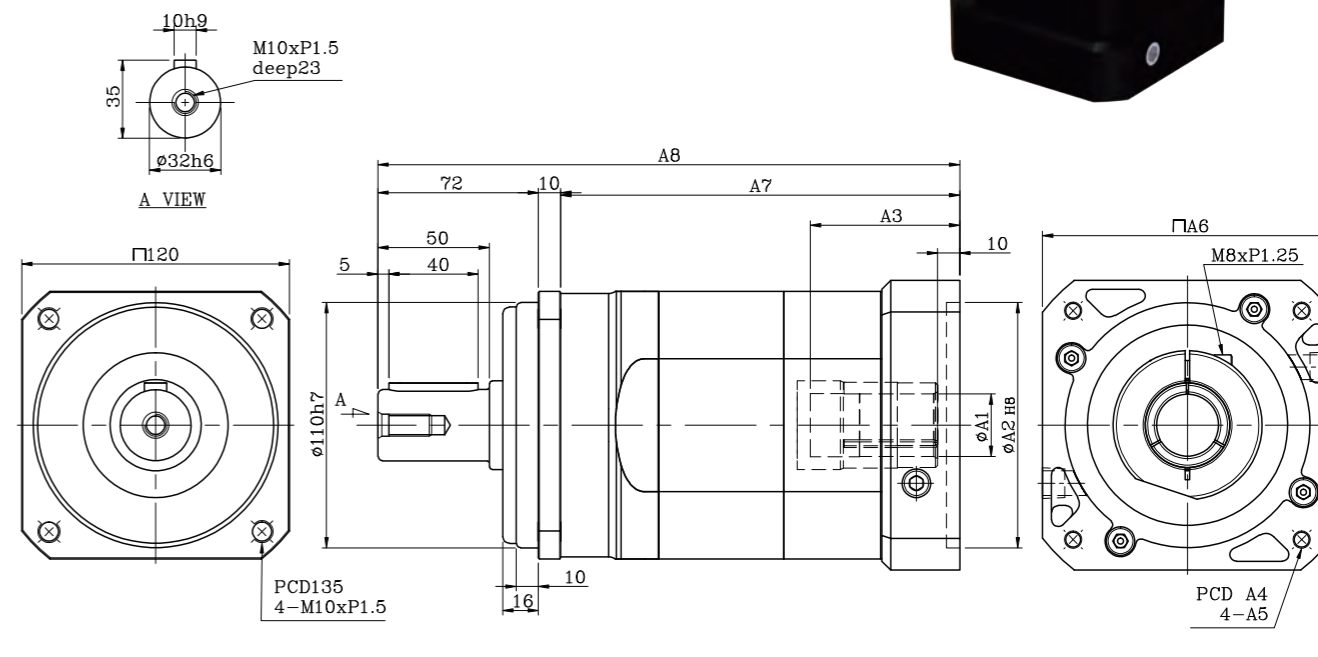
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1		95	67	115	M6	122	123	205
2	24	95	67	115	M8	122	123	205
3	28	110	67	145	M8	130	123	205
4	32	110	77	145	M8	130	133	215
5		130	67	165	M10	150	123	205

## FA120-1 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	286	255	264	245	234	
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	515	459	475	441	421	
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	3.21	2.64	2.64	2.62	2.51	
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000					
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000					
扭轉剛性 / Torsional Rigidity		Nm/arcmin	23					
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	5,220					
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	2,600					
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	$\eta$	%	$\geq 97\%$					
使用溫度 / Operating Temperature		°C	-25°C ~ +90°C					
潤滑 / Lubrication			全合成潤滑油脂 Synthetic Grease					
防護等級 / Protection Class			IP 65					
安裝方向 / Mounting Position			任意 Any					
噪音值 / Noise Level		dB	$\leq 67$ dB					
重量 / Weight $\pm 2\%$		Kg	7.43					

# MODEL : FA120

RATIO : 25, 35, 50, 70, 100 (雙段 2-Stage)



入力法蘭尺寸表 Dimension of Input Flange

unit:mm

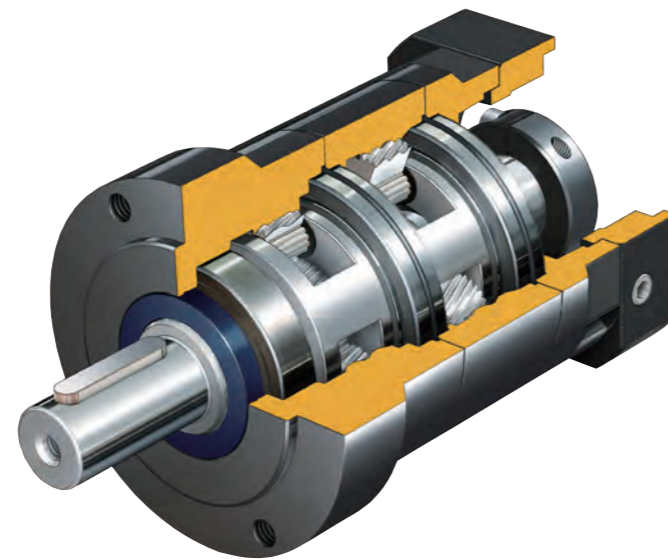
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1		95	67	115	M6	122	123	205
2	24	95	67	115	M8	122	123	205
3	28	110	67	145	M8	130	123	205
4	32	110	77	145	M8	130	133	215
5		130	67	165	M10	150	123	205

## FA120-2 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	286	255	264	286	245	255	264	245	234
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	518	459	475	514	441	459	475	441	421
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	2.64	2.64	2.64	2.64	2.64	2.64	0.51	0.51	0.51
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000								
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	23								
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	5,220								
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	2,600								
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	$\eta$	%	$\geq 95\%$								
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	$\leq 69$ dB								
重量 / Weight $\pm 2\%$		Kg	10.3								

# 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	<input type="checkbox"/>	-	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 60 70 80 115		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)		

**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 系列產品特性



### 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.

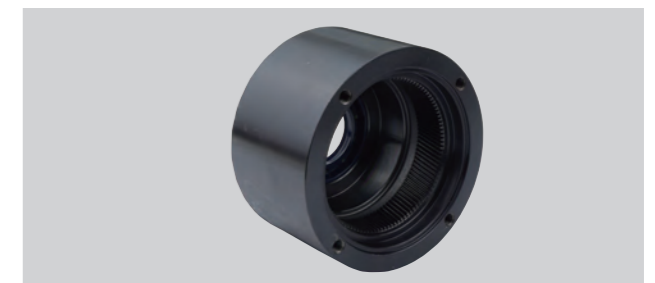


### 筒夾式連結機構

輸入端與馬達的連結採用筒夾式的鎖緊機構 · 並經過平衡分析 · 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

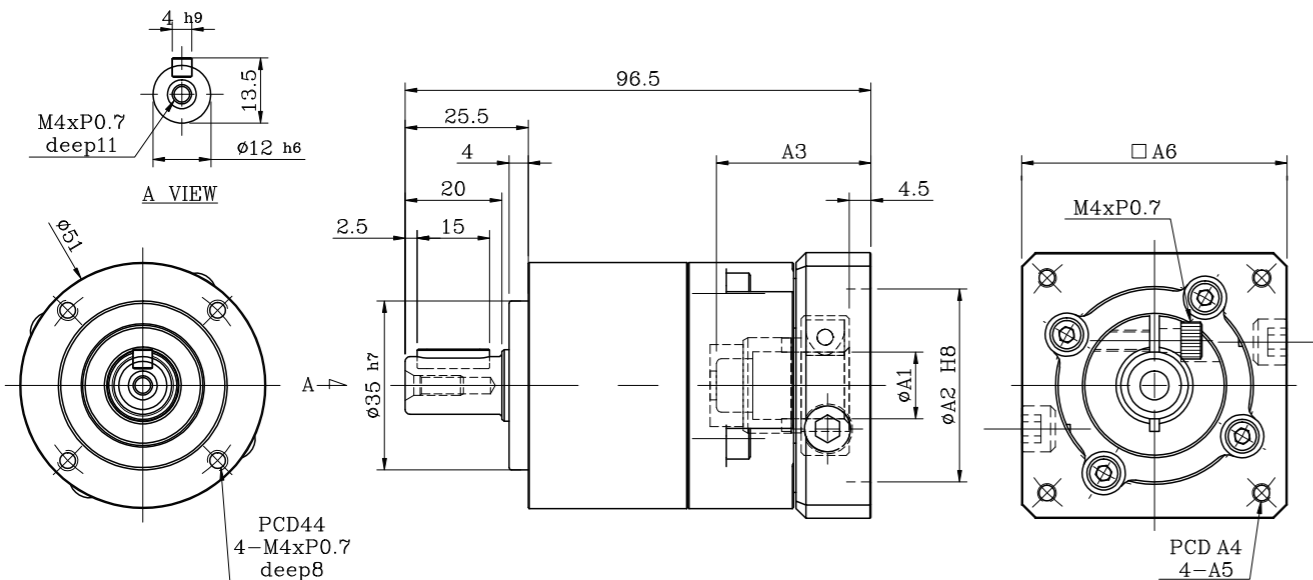
齒輪箱和內環齒輪採一體式的設計 · 提高結構剛性及輸出扭矩。

### 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 : SN50

RATIO : 3, 4, 5, 7, 10 ( 單段 1-Stage)

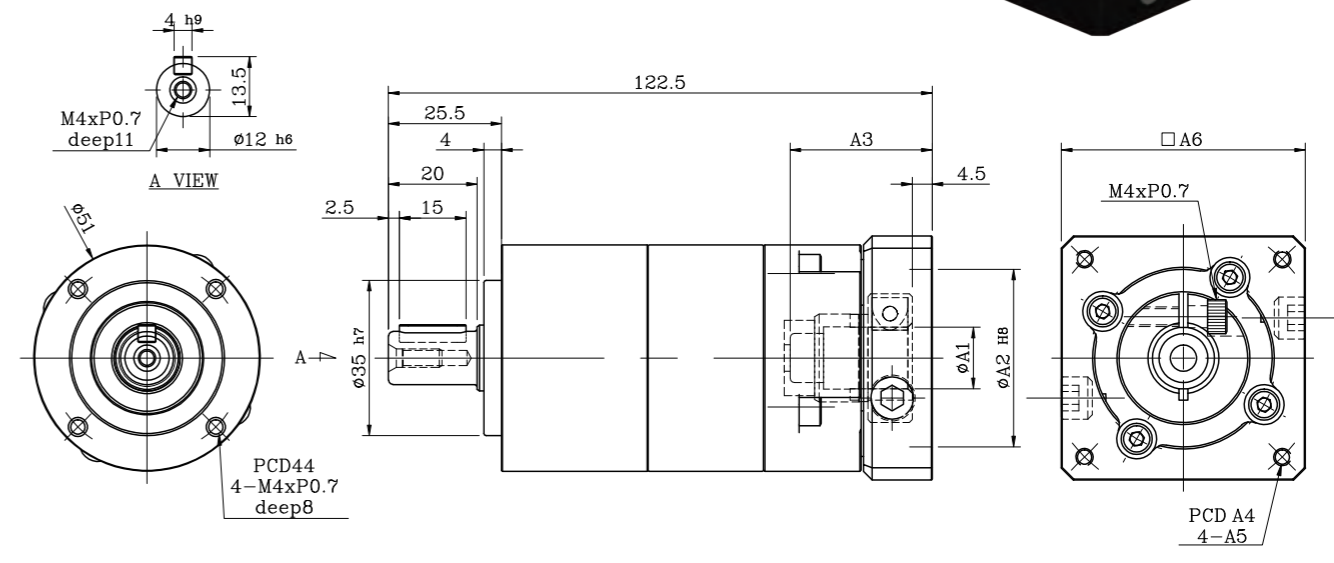


入力法蘭尺寸表 Dimension of Input Flange unit:mm

NO.	ØA1	ØA2	A3	A4	A5	A6
1		30	32	45	M3	46
2	8	30	32	46	M4	46
3	∅	30	32	48.5	M3	55
4	14	40	32	63	M5	55
5		50	32	70	M5	60

# MODEL : SN50

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
1		30	32	45	M3	46
2	8	30	32	46	M4	46
3	∅	30	32	48.5	M3	55
4	14	40	32	63	M5	55
5		50	32	70	M5	60

## SN50-1 特性表

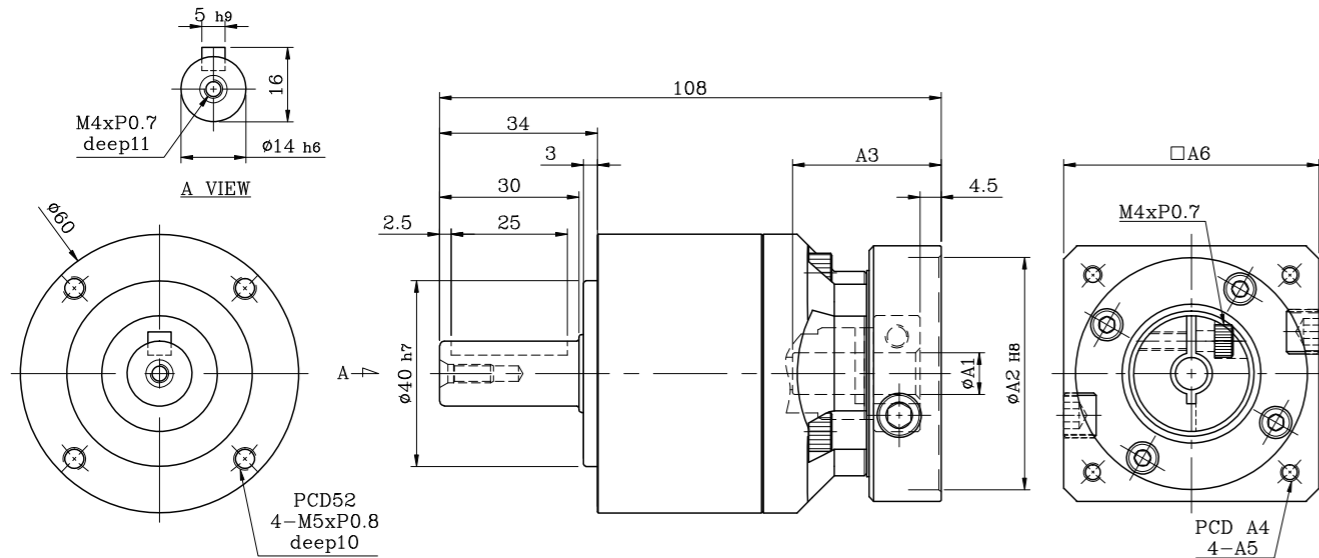
減速比 Ratio	代號	單位 Unit	3	4	5	7	10
額定輸出扭矩 / Rated Output Torque (Nominal Output Torque)	$T_{2N}$	Nm	17	15	14	13	12
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	31	27	25	23	22
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.03	0.03	0.03	0.03	0.03
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000				
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000				
扭轉剛性 / Torsional Rigidity		Nm/arcmin	3				
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	320				
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	160				
使用壽命 / Service Life	$L_{H1}$	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	$\eta$	%	≥ 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	0.73				

## SN50-2 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	17	15	14	13	13	12	14	13	12
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	31	27	25	23	23	22	25	23	22
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000								
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	3								
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	320								
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	160								
使用壽命 / Service Life	$L_{H1}$	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	≤ 60 dB								
重量 / Weight ±2%		Kg	1.05								

# MODEL : SN60

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



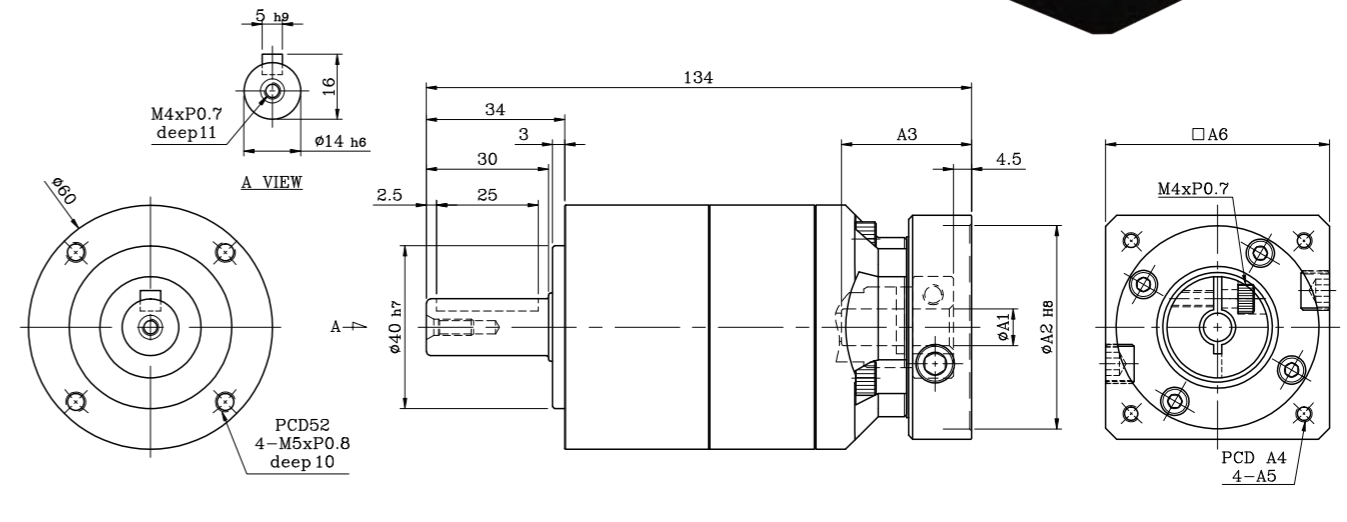
入力法蘭尺寸表 Dimension of Input Flange

unit:mm

NO.	$\phi A1$	$\phi A2$	A3	A4	A5	A6
1		30	32	45	M3	46
2	11	30	32	46	M4	46
3	1	30	32	48.5	M3	55
4	14	40	32	63	M5	55
5		50	32	70	M5	60

# MODEL : SN60

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.	$\phi A1$	$\phi A2$	A3	A4	A5	A6
1		30	32	45	M3	46
2	11	30	32	46	M4	46
3	1	30	32	48.5	M3	55
4	14	40	32	63	M5	55
5		50	32	70	M5	60

## SN60-1 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	72	63	45
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.06	0.06	0.06	0.06	0.06
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000				
最大輸入轉速 / Max. Input Speed	$n_{1B}$	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	$L_{H1}$	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	$\eta$	%	$\geq 97\%$				
使用溫度 / Operating Temperature		°C	-25°C ~ +90°C				
潤滑 / Lubrication			全合成潤滑油脂 Synthetic Grease				
防護等級 / Protection Class			IP 65				
安裝方向 / Mounting Position			任意 Any				
噪音值 / Noise Level		dB	$\leq 58$ dB				
重量 / Weight $\pm 2\%$		Kg	0.99				

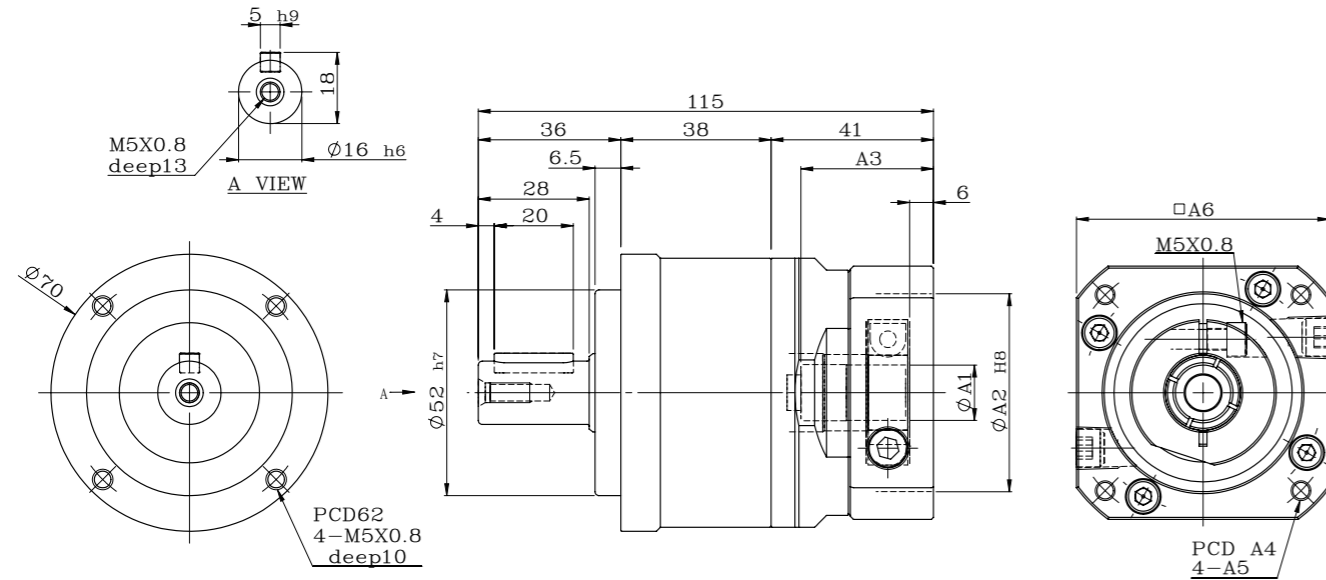
## SN60-2 特性表

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	28	38	40	28	35	38	40	35	25	
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	50	68	72	50	63	68	72	63	45	
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000									
最大輸入轉速 / Max. Input Speed	$n_{1B}$	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	$L_{H1}$	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	$\eta$	%	$\geq 95\%$									
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	$\leq 60$ dB									
重量 / Weight $\pm 2\%$		Kg	1.46									



# MODEL : SN70

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)

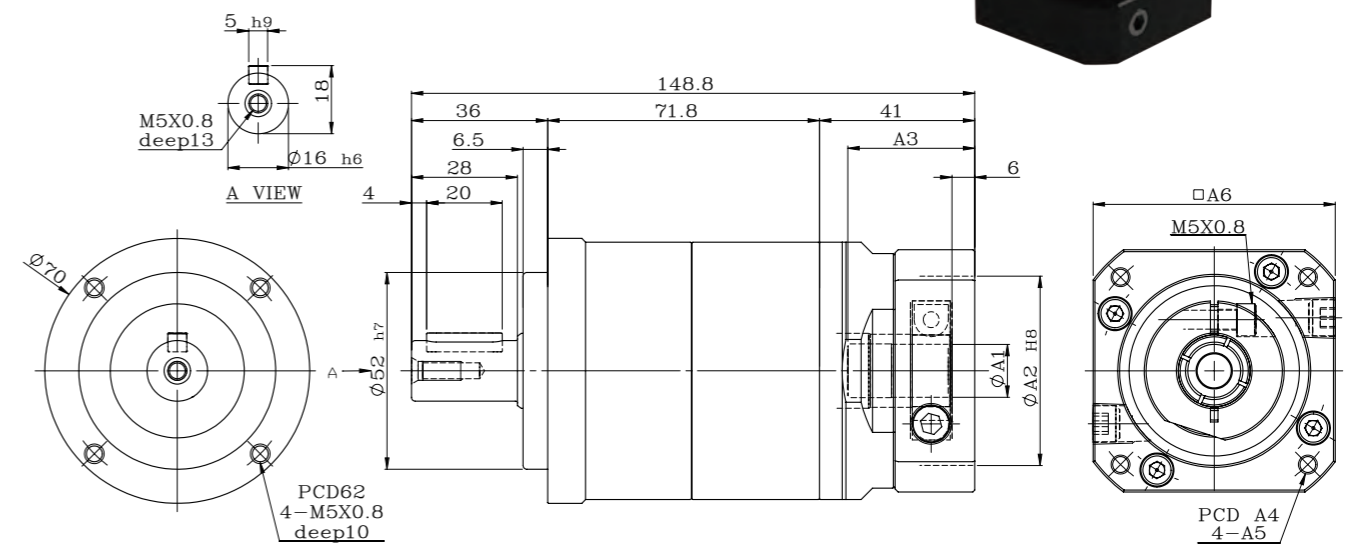


入力法蘭尺寸表 Dimension of Input Flange unit:mm

NO.	$\phi A1$	$\phi A2$	A3	A4	A5	A6
1	14	50	33.5	70	5	70
2	1	60	33.5	75	6	75
3	19	70	33.5	90	6	80

# MODEL : SN70

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.	$\phi A1$	$\phi A2$	A3	A4	A5	A6
1	14	50	33.5	70	5	70
2	1	60	33.5	75	6	75
3	19	70	33.5	90	6	80

## SN70-1 特性表

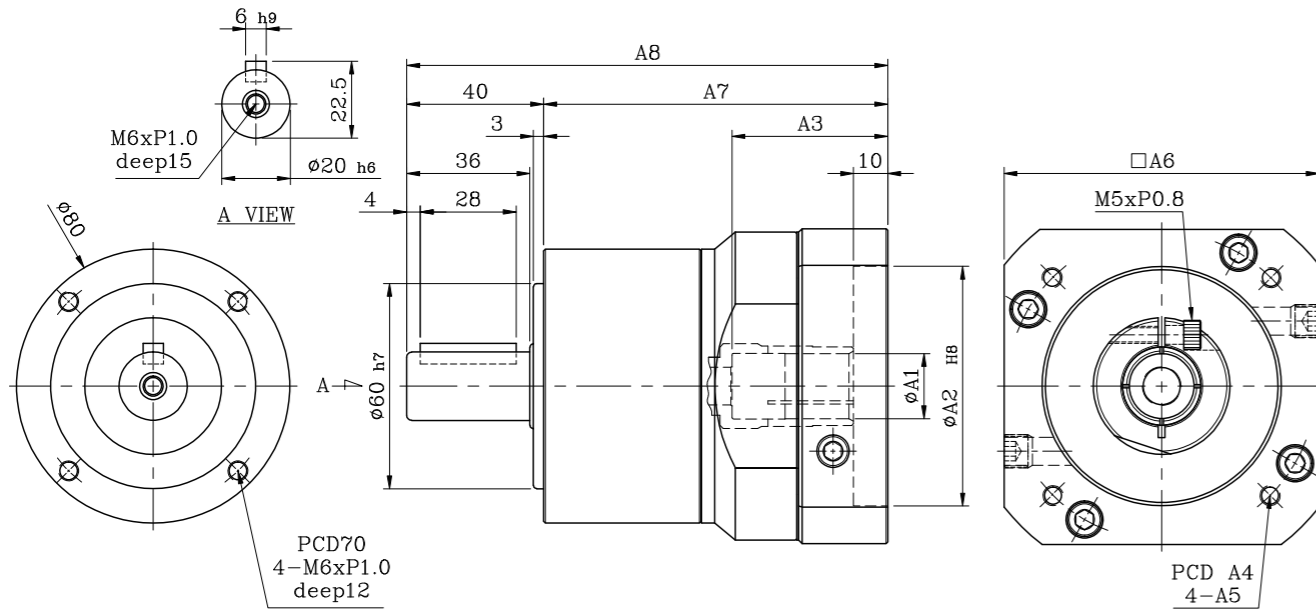
減速比 Ratio	代號	單位 Unit	3	4	5	7	10
額定輸出扭矩 / Rated Output Torque (Nominal Output Torque)	$T_{2N}$	Nm	54	48	45	41	40
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	97	86	81	74	72
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.15	0.15	0.13	0.13	0.13
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000				
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000				
扭轉剛性 / Torsional Rigidity		Nm/arcmin	5				
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	800				
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	400				
使用壽命 / Service Life	$L_{H1}$	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	$\eta$	%	$\geq 97\%$				
使用溫度 / Operating Temperature		°C	-25°C ~ +90°C				
潤滑 / Lubrication			全合成潤滑油脂 Synthetic Grease				
防護等級 / Protection Class			IP 65				
安裝方向 / Mounting Position			任意 Any				
噪音值 / Noise Level		dB	$\leq 58$ dB				
重量 / Weight $\pm 2\%$		Kg	1.25				

## SN70-2 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	54	48	45	41	41	39	45	41	40
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	97	86	81	74	74	70	81	74	72
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000								
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	5								
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	800								
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	400								
使用壽命 / Service Life	$L_{H1}$	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	$\eta$	%	$\geq 95\%$								
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	$\leq 60$ dB								
重量 / Weight $\pm 2\%$		Kg	1.9								

# MODEL : SN80

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



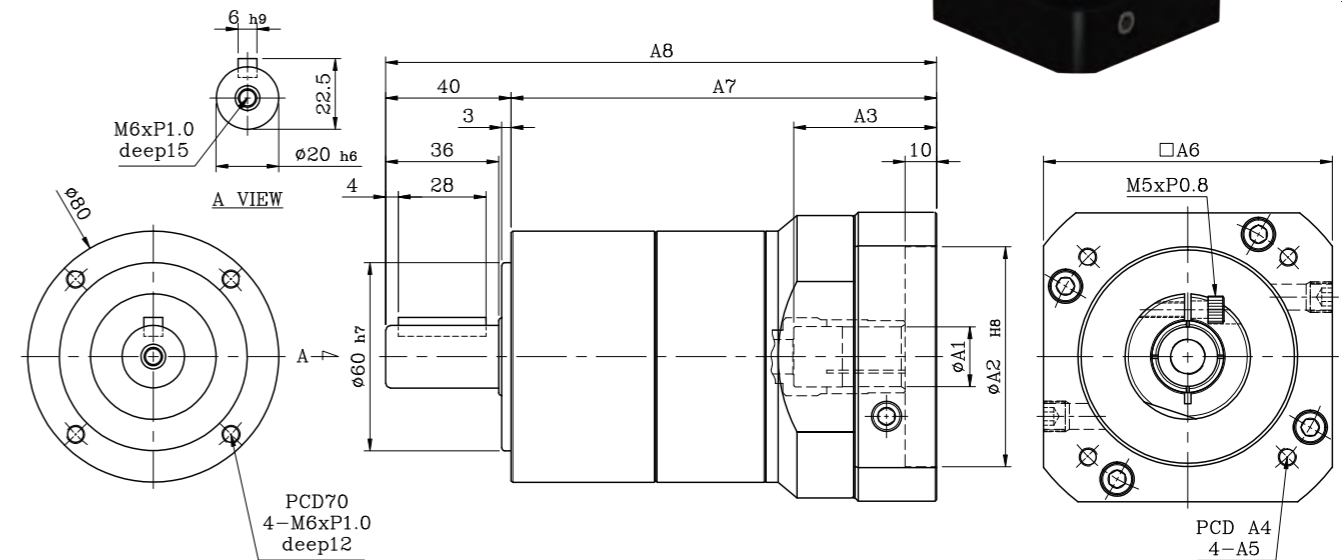
入力法蘭尺寸表 Dimension of Input Flange

unit:mm

NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1		70	45.5	90	M6	92	100.5	140.5
2	14	80	45.5	100	M6	92	100.5	140.5
3	'	95	45.5	115	M6	110	100.5	140.5
4	19	110	45.5	145	M8	130	100.5	140.5

# MODEL : SN80

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		70	45.5	90	M6	92	135.5	175.5
2	14	80	45.5	100	M6	92	135.5	175.5
3	'	95	45.5	115	M6	110	135.5	175.5
4	19	110	45.5	145	M8	130	135.5	175.5

## SN80-1 特性表

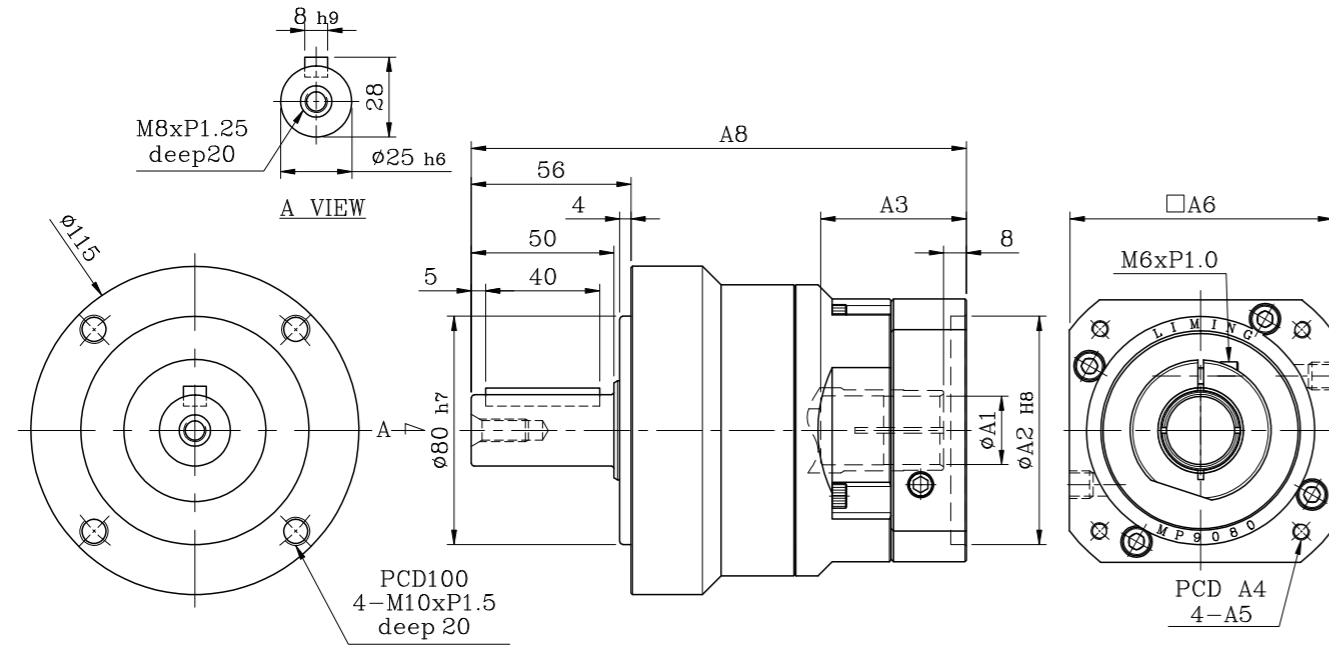
減速比 Ratio	代號	單位 Unit	3	4	5	7	10	
額定輸出扭矩 / Rated Output Torque (Nominal Output Torque)	$T_{2N}$	Nm	112	110	108	105	100	
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	202	198	194	189	180	
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.48	0.38	0.38	0.38	0.35	
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000					
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000					
扭轉剛性 / Torsional Rigidity		Nm/arcmin	12					
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	1,300					
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	660					
使用壽命 / Service Life	$L_{H1}$	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	$\eta$	%	$\geq 97\%$					
使用溫度 / Operating Temperature		°C	-25°C ~ +90°C					
潤滑 / Lubrication			全合成潤滑油脂 Synthetic Grease					
防護等級 / Protection Class			IP 65					
安裝方向 / Mounting Position			任意 Any					
噪音值 / Noise Level		dB	$\leq 60$ dB					
重量 / Weight $\pm 2\%$		Kg	2.1					

## SN80-2 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	202	198	194	202	189	198	194	189	180
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.41	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000								
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	12								
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	1,300								
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	660								
使用壽命 / Service Life	$L_{H1}$	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	$\eta$	%	$\geq 95\%$								
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	$\leq 62$ dB								
重量 / Weight $\pm 2\%$		Kg	3.2								

# MODEL : SN115

RATIO : 3, 4, 5, 7, 10 (單段 1-Stage)



入力法蘭尺寸表 Dimension of Input Flange unit:mm

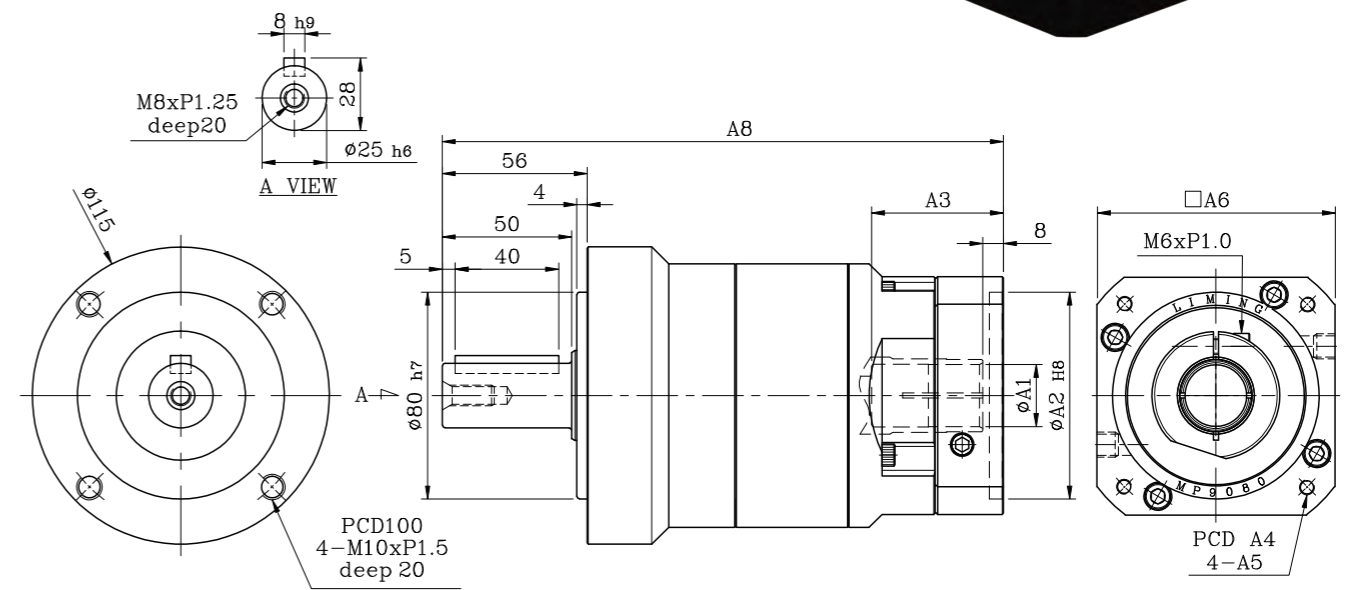
NO.	ØA1	ØA2	A3	A4	A5	A6	A7	A8
1		70	51	90	M6	92	60	173.5
2	19	80	51	100	M6	92	60	173.5
3	∅	95	51	115	M6	110	60	173.5
4	24	95	51	115	M8	110	60	173.5
5		110	51	145	M8	130	60	173.5
6		110	65.5	145	M8	130	74.5	188

## SN115-1 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	165	146	160	149	141
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	297	263	288	268	254
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.6	0.45	0.45	0.45	0.41
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000				
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000				
扭轉剛性 / Torsional Rigidity		Nm/arcmin	14				
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	3,200				
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	1,600				
使用壽命 / Service Life	$L_{H1}$	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	$\eta$	%	$\geq 97\%$				
使用溫度 / Operating Temperature		°C	-25°C ~ +90°C				
潤滑 / Lubrication			全合成潤滑油脂 Synthetic Grease				
防護等級 / Protection Class			IP 65				
安裝方向 / Mounting Position			任意 Any				
噪音值 / Noise Level		dB	$\leq 65$ dB				
重量 / Weight $\pm 2\%$		Kg	4.98				

# MODEL : SN115

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		70	51	90	M6	92	103.5	217
2	19	80	51	100	M6	92	103.5	217
3	∅	95	51	115	M6	110	103.5	217
4	24	95	51	115	M8	110	103.5	217
5		110	51	145	M8	130	103.5	217
6		110	65.5	145	M8	130	118	231.5

## SN115-2 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	165	146	160	165	149	146	160	149	141
最大加速扭矩 / Max. Acceleration Torque	$T_{2B}$	Nm	297	263	288	297	268	263	288	268	254
轉動慣量 / Mass Moments of Inertia		kg.cm <sup>2</sup>	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
最大輸出扭矩 / Max. Output Torque 急停扭矩 / Emergency Stop Torque	$T_{2NOT}$	Nm	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	3,000								
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	5,000								
扭轉剛性 / Torsional Rigidity		Nm/arcmin	14								
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	3,200								
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	1,600								
使用壽命 / Service Life	$L_{H1}$	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	$\eta$	%	$\geq 95\%$								
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	$\leq 67$ dB								
重量 / Weight $\pm 2\%$		Kg	6.92								

# FB series

# Features of FB Series


## FB 系列產品特性



- 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)	



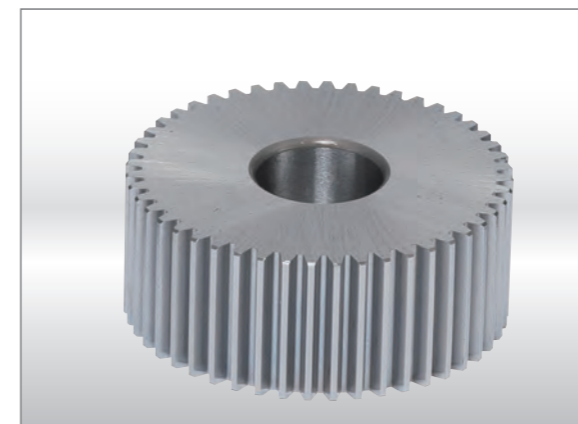
**一體式的行星臂架及雙軸承加大跨距設計**  
行星臂架與輸出軸採一體式的結構設計，以確保提高扭轉剛性及精確度。並採用滾珠軸承大跨距配置設計，增加輸出軸之徑向負載。

**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.



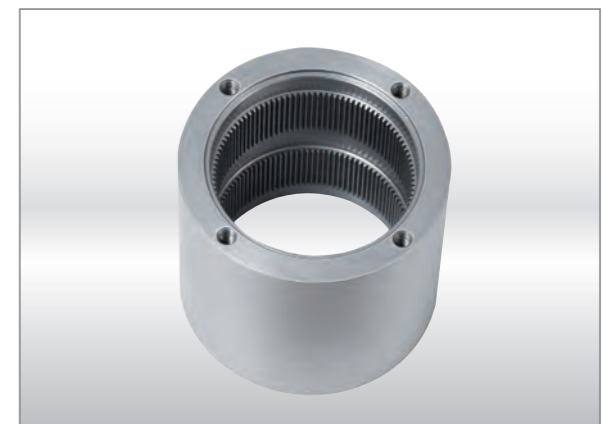
**滿針滾針軸承設計**  
行星齒輪的傳動介面採用不含保持器之滿針滾針軸承，增加接觸面積以提高結構剛性及使用壽命。

**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 (SNCM220)，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 (SNCM220), precision machined and carburizing heat treatment to hardness 57-60 HRC. Precision teeth grinding or skiving assures gear accuracy reaches DIN6 class.

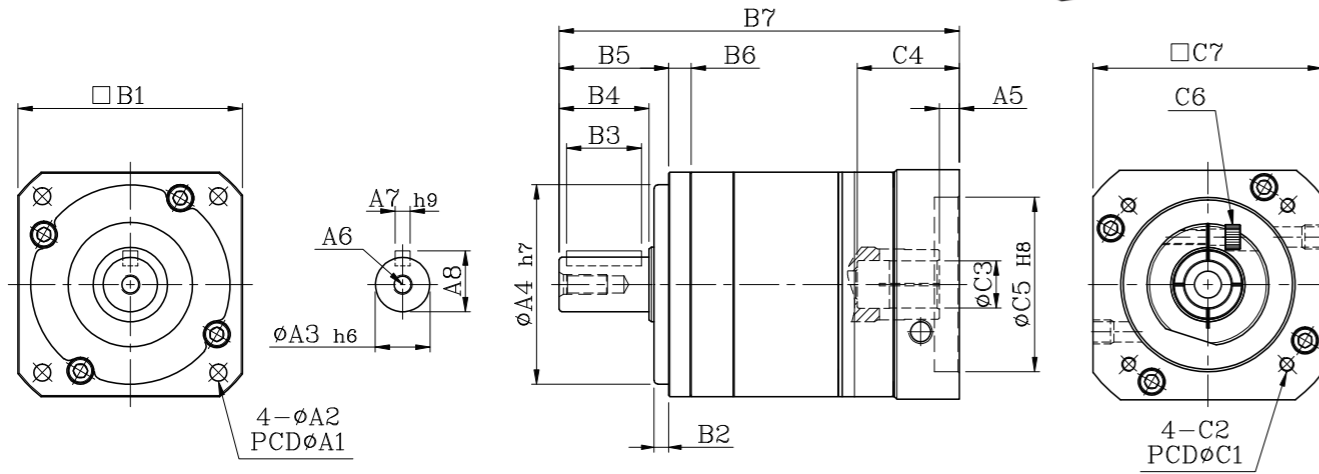


**一體式齒輪箱本體**  
齒輪箱和內環齒輪採一體式的設計，經調質後加工，輸出扭矩大，齒輪精度達 DIN6 級，精密度高。

**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)



unit : mm

Model Code	50	70	90	120	145	180	220	
A	A1	Ø50	Ø70	Ø100	Ø130	Ø165	Ø215	Ø250
	A2	Ø4.5	Ø6	Ø6.8	Ø9	Ø11	Ø13	Ø17
	A3	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55	Ø75
	A4	Ø35	Ø50	Ø80	Ø110	Ø130	Ø160	Ø180
	A5	5	6	9·23.5	10·20	10	13	13.5
	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	50	70	90	120	145	180	220
	B2	4	5	6	8	10	20	220
	B3	15	20	30	40	65	70	5
	B4	20	28	36	50	74	82	90
	B5	25	34	44	60	87	106	104
	B6	25	34	44	60	87	106	104
	B7	100.5	132.5	170.5·185	227.5	291	325	86
C	C1	46·60·63	70·75·90	90·100·115·145	115·145·165	145·165·200	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	14·19	19·22·24	24·28·32	35·38	38·42·48	42·48·55
	C4	26	33.5	51·65.5	63·73	81.5	115	118
	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	M3 x P0.5	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

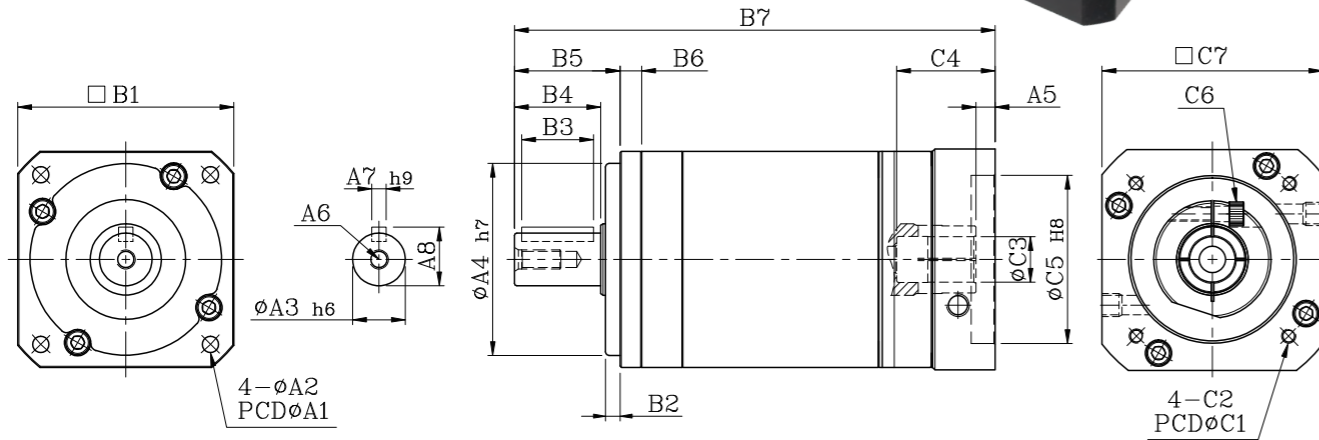
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	90	120	145	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	3	17	50	125	268	482	940	1,420
			4	15	45	111	238	426	860	1,300
			5	14	42	104	223	401	835	1,270
			7	13	39	98	208	373	790	1,180
			10	12	37	92	198	356	760	1,140
最大加速扭矩 / Max. Acceleration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

### 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

Model Code	50	70	90	120	145	180	220	
A	A1	Ø50	Ø70	Ø100	Ø130	Ø165	Ø215	
	A2	Ø4.5	Ø6	Ø6.8	Ø9	Ø11	Ø13	
	A3	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55	
	A4	Ø35	Ø50	Ø80	Ø110	Ø130	Ø160	
	A5	5	6	9·23.5	10·20	10	13	
	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	
	A8	15	18	24.5	35	43	59	
B	B1	50	70	90	120	145	180	
	B2	4	5	6	8	10	20	
	B3	15	20	30	40	65	70	
	B4	20	28	36	50	74	82	
	B5	25	34	44	60	87	106	
	B6	6	8	9	12	15	16	
	B7	126.7	166.5	210.2·224.7	281.5·291.5	354.7	394.5	
C	C1	46·60·63	70·75·90	90·100·115·145	115·145·165	145·165·200	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	14·19	19·22·24	24·28·32	35·38	38·42·48	
	C4	26	33.5	51·65.5	63·73	81.5	115	
	C5	30·40·50	40·50·60	70·80·95·110	95·110·130	110·130·180	114.3·180·230	
	C6	M3 x P0.5	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	

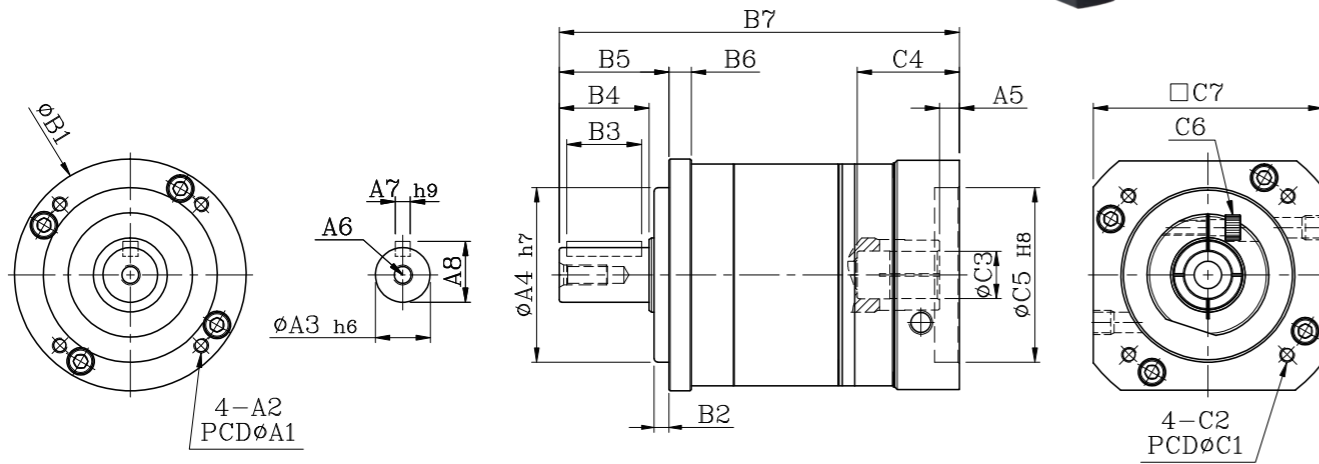
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	90	120	145	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	15	17	50	125	268	482	940	1,420
			20	15	45	111	238	426	860	1,300
			25	14	42	104	223	401	835	1,270
			30	17	50	125	268	482	940	1,420
			35	13	39	98	208	373	790	1,180
			40	15	45	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	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8
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 : >20,000 (S1 連續運轉 : >10,000 hrs) S5 Cycle Operation: >20,000 (S1 Continuous Operation: >10,000 hrs)						
效率 / Efficiency	$\eta$	%	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

### 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 Code	50	70	90	120	145	180	220
A	A1	Ø42	Ø60	Ø80	Ø105	Ø130	Ø184
	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
	A3	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55
	A4	Ø35	Ø50	Ø70	Ø90	Ø110	Ø160
	A5	5	6	9 · 23.5	10 · 20	10	13
	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
	A7	5	5	6	10	12	16
	A8	15	18	24.5	35	43	59
B	B1	Ø50	Ø70	Ø93	Ø122	Ø148	Ø205
	B2	4	5	6	8	10	20
	B3	15	20	30	40	65	70
	B4	20	28	36	50	74	82
	B5	25	34	44	60	87	106
	B6	6	8	9	12	15	21.5
	B7	100.5	132.5 · 140.5	170.5 · 185	227.5 · 237.5	291	325
C	C1	46 · 60 · 63	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200	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	14 · 19	19 · 22 · 24	24 · 28 · 32	35 · 38	38 · 42 · 48
	C4	26	33.5	51 · 65.5	63 · 73	81.5	115
	C5	30 · 40 · 50	40 · 50 · 60	70 · 80 · 95 · 110	95 · 110 · 130	110 · 130 · 180	114.3 · 180 · 230
	C6	M3 x P0.5	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

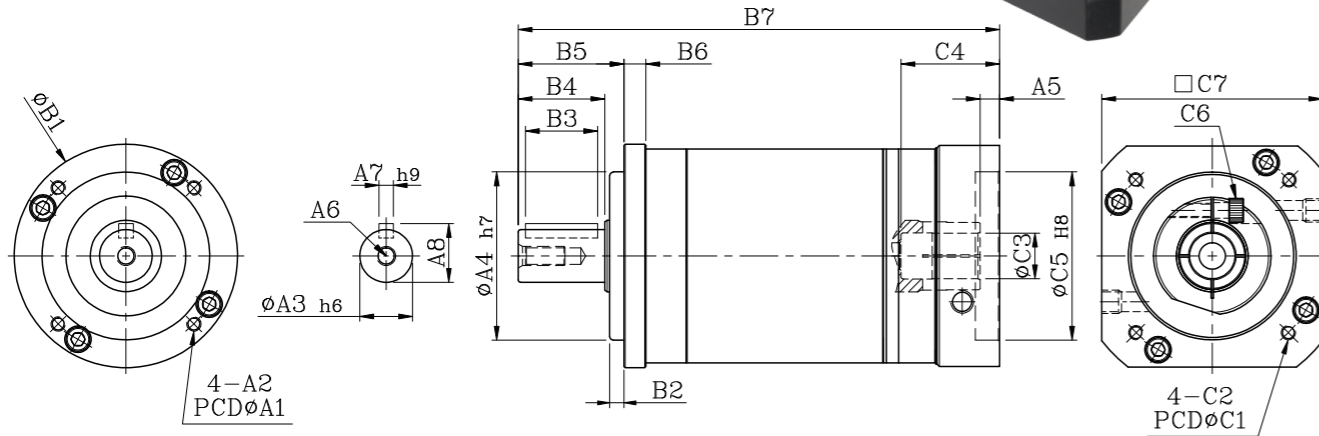
規格 Model No.	代號	單位 Unit	速比 Ratio	50	70	90	120	145	180	220
額定輸出扭矩 / Rated Output Torque (Nominal output torque)	$T_{2N}$	Nm	3	17	50	125	268	482	940	1,420
			4	15	45	111	238	426	860	1,300
			5	14	42	104	223	401	835	1,270
			7	13	39	98	208	373	790	1,180
			10	12	37	92	198	356	760	1,140
最大加速扭矩 / Max. Acceleration 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	$n_{1N}$	rpm	3~10	3,000	3,000	3,000	3,000	3,000	2,000	2,000
最大輸入轉速 / Max. Input Speed	$n_{1B}$	rpm	3~10	5,000	5,000	5,000	5,000	5,000	3,000	3,000
背隙 / Backlash		arcmin	3~10	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8	≤ 8
扭轉剛性 / Torsional Rigidity		Nm/arcmin	3~10	2.3	5	15	45	69	140	220
容許徑向力 / Max. Radial Force	$F_{2rB}$	N	3~10	750	1,180	3,000	6,500	9,100	11,150	35,000
容許軸向力 / Max. Axial Force	$F_{2aB}$	N	3~10	325	590	1,500	3,250	4,550	5,575	17,500
使用壽命 / Service Life	$L_H$	hr	3~10	S5 周期運轉 : >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	≥ 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

### 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

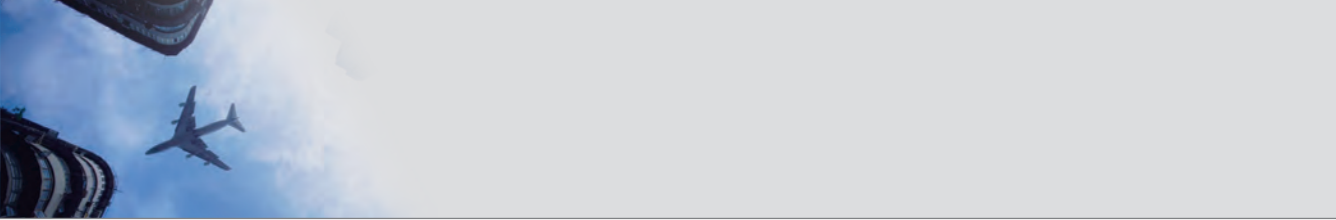
Model Code	50	70	90	120	145	180	220
A1	Ø42	Ø60	Ø80	Ø105	Ø130	Ø184	Ø218
A2	M4 x P0.7	M5 x P0.8	M6 x P1.0	M8 x P1.25	M10 x P1.5	M12 x P1.75	M16 x P2.0
A3	Ø13	Ø16	Ø22	Ø32	Ø40	Ø55	Ø75
A4	Ø35	Ø50	Ø70	Ø90	Ø110	Ø160	Ø180
A5	5	6	9 · 23.5	10 · 20	10	13	13.5
A6	M4 x P0.7	M5 x P0.8	M8 x P1.25	M10 x P1.5	M12 x P1.75	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
B1	Ø50	Ø70	Ø93	Ø122	Ø148	Ø205	Ø242
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	210.2 · 224.7	281.5 · 291.5	354.7	394.5	463.5
C1	46 · 60 · 63	70 · 75 · 90	90 · 100 · 115 · 145	115 · 145 · 165	145 · 165 · 200	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	14 · 19	19 · 22 · 24	24 · 28 · 32	35 · 38	38 · 42 · 48	42 · 48 · 55
C4	26	33.5	51 · 65.5	63 · 73	81.5	115	118
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	M3 x P0.5	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

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	$n_{IN}$	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	$n_{IB}$	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 : >20,000 (S1 連續運轉 : >10,000 hrs) S5 Cycle Operation: >20,000 (S1 Continuous Operation: >10,000 hrs)						
效率 / Efficiency	$\eta$	%	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

### 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





# Selection Table of Motor for Reference

馬達選用參考表

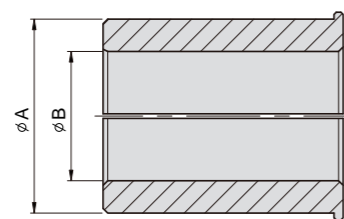
型號 Model	PB	44	62	90	120	142	180	220
	FA	50	70、80、90	100	120			
Input Bore 入力孔徑	SN	50、60	70、80	90	120	145	180	220
	FB	50	70	90	120	145	180	220
容量 Power	Input Bore 入力孔徑	8、9、11	14、16、19	19、24	24、28、32	35、38	38、42、48	42、48、55
100w		●	●					
200w			●					
400w			●	●				
750w				●	●			
1kw				●	●			
1.5kw				●	●	●		
2.2kw					●	●	●	
3.75kw					●	●	●	
5.5kw						●	●	●
7.5kw							●	●
11kw								●
15kw								●
22kw								●

※ 以上表格僅供參考，選用時仍須以『額定輸出扭距』為依據。  
The table is for reference. The selected model shall be based on rated output torque.

# Bushing

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	8	11	14	19	22	24	28	35	38	42	48
6	●		●								
6.35	●		●								
8		●	●								
9		●	●								
10			●	●							
11			●	●							
12			●	●							
12.7				●	●						
14				●	●	●					
16				●	●	●	●				
19					●	●	●	●			
22						●	●	●	●		
24							●	●	●		
25							●	●	●		
25.4								●	●	●	
28								●	●	●	
32								●	●	●	
35									●	●	●
38										●	●
42											●

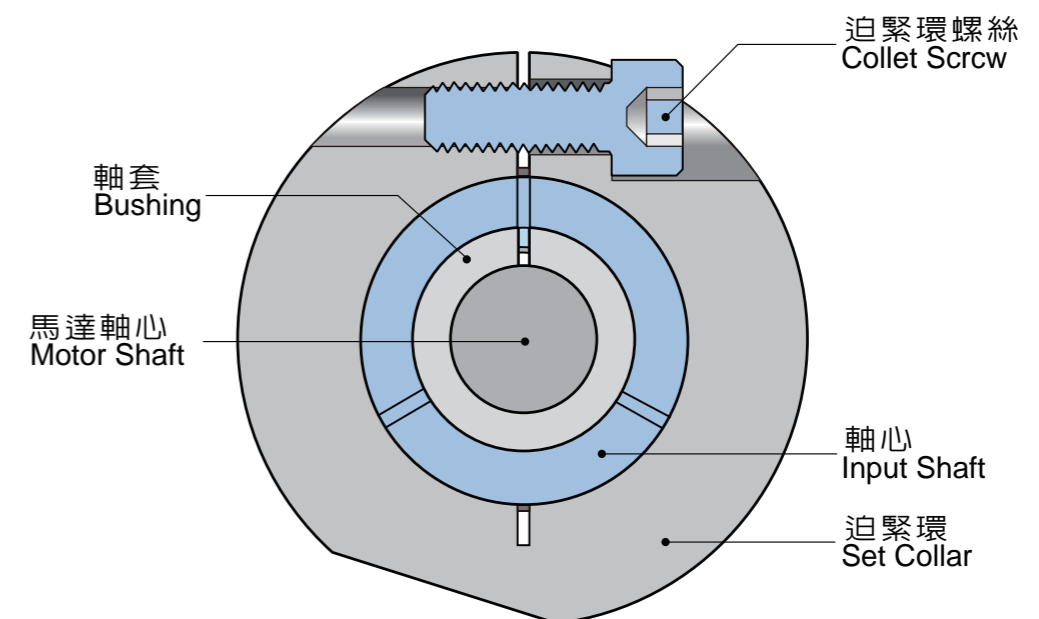
# Collet Screw & Set Collar Torque Table

迫緊螺絲及迫緊環扭矩表

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
PB	FA	SN	FB					
44	50	50 60	50	M3 x P0.5	12.9	2.2	58	
62	70 80 90	70 80	70	M5 x P0.8	12.9	10	164	
90	100	115	90	M6 x P1.0	12.9	16.3	233	
120	120		120	M8 x P1.25	12.9	41	423	
142			145	M10 x P1.5	12.9	81	678	
180			180	M10 x P1.5	12.9	81	678	●
220			220	M10 x P1.5	12.9	81	678	●

※ 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
鍵 Key	10 x 8	12 x 8	14 x 9	16 x 10



# 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:  $i = 10$ ).

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

### 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 25° 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  $n_1$ 。

### 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 25° C. If the environment temperature is higher or the temperature of gearbox surface exceeds 90° 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 25° 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]

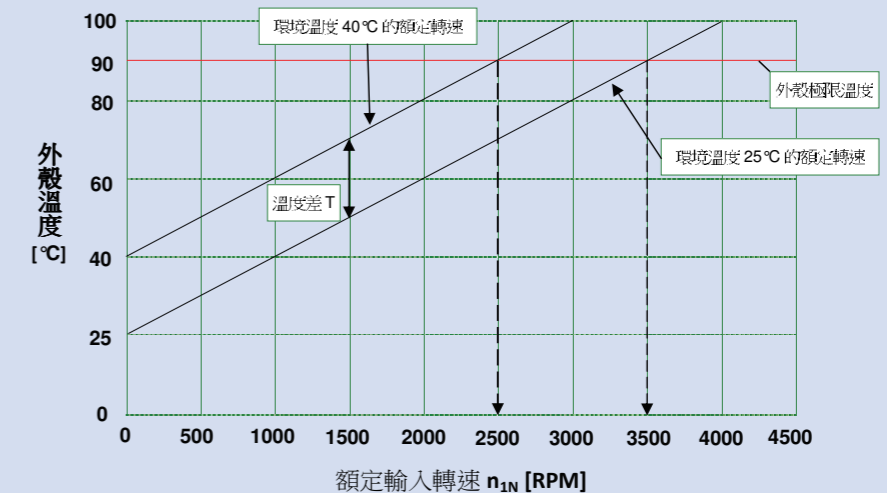
It is applied to cyclic operation (S5). Max. input speed is measured at environment temperature 25° C. If the environment temperature is higher or the temperature of gearbox surface exceeds 90° C, please lower input speed ( $n_1$ ).

### 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·減速機的溫度也提前達到額定溫度·換句話說·在環境溫度高時必須降低轉速。

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

Two speeds are of relevance when selecting a gearbox: the maximum speed and the nominal speed at the input. The maximum permissible speed  $n_{1B}$  must not be exceeded because it serves as the basis at cyclic operation. The nominal speed  $n_{1N}$  must not be exceeded at continuous operation. The housing temperature limits the nominal speed, which must not exceed 90° C. The nominal input speed specified in the catalogue applies to an ambient temperature of 25° 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

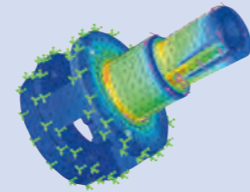
### 減速機專用名詞解釋

#### 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。(備注: 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

## 徑向力 $F_{2R}$ [N]

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

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

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

從減速機出力軸連接鏈條齒輪等傳動機構時 · 會承受徑向力 · 徑向力。

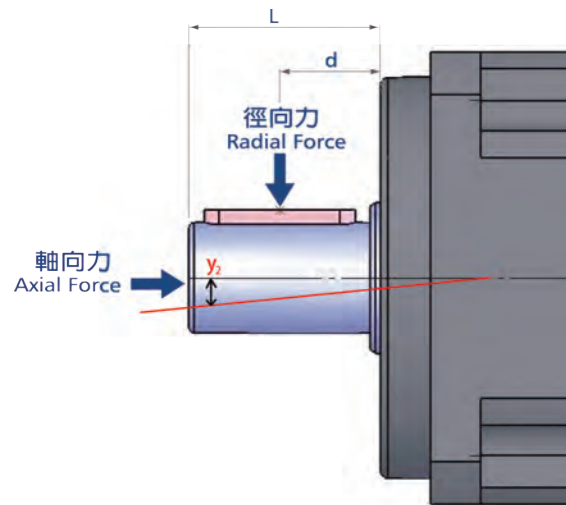
$$OHL = \frac{T \cdot s \cdot f \cdot p}{R}$$

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

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

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

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



## 軸伸徑向載荷、軸向載荷

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

負荷系數表 (s) Service factor table

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

驅動方式載重系數  
Driven Coefficient (f)

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

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

# Glossary

減速機專用名詞解釋

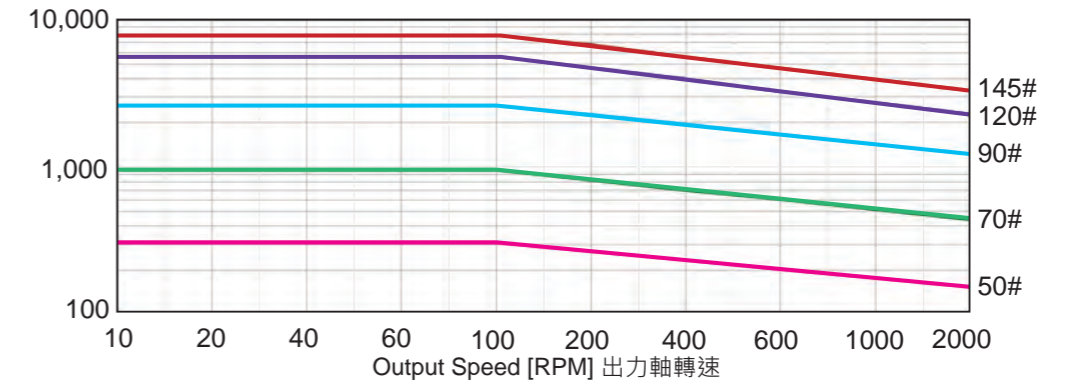
## 容許徑向力 $F_{2rB}$ [N]

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

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

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

FB Permitted Radial Force On Center Position of Shaft [N] FB 出力軸中心點容許徑向力



## 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  $\leq 5$

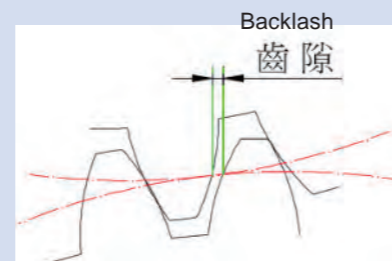
Highly dynamic applications  $\leq 1$

### 回程間隙 $j_i$ [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 ( $j_i$ ) [arcmin]

Torsional backlash  $j_i$  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  $1/60^\circ$ 。

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  $j_i = 3'$  時·減速機轉一圈的偏差為  $b = 0.44\text{mm}$ 。

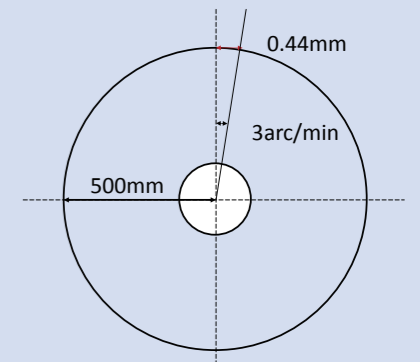
$$b = \frac{2 \cdot \pi \cdot r \cdot j_i}{21600}$$

### 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  $1/60^\circ$ . The repercussions for the actual application are determined by the arc length.

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

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



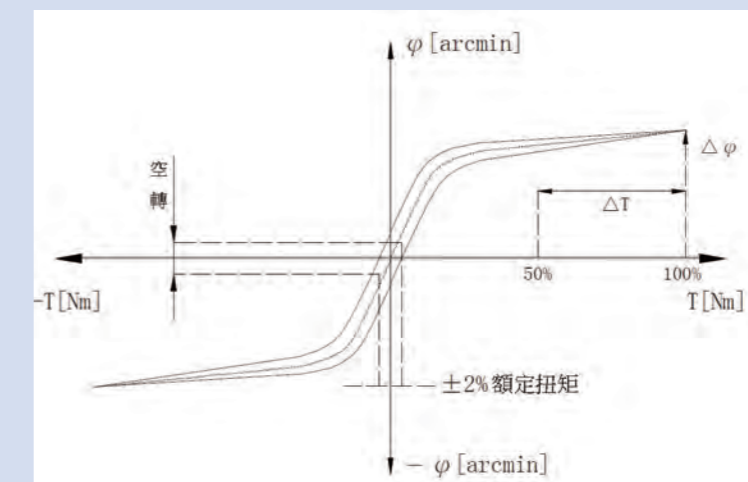
### 遲滯曲線

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 ( $j_i$ ) 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)

連續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)

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

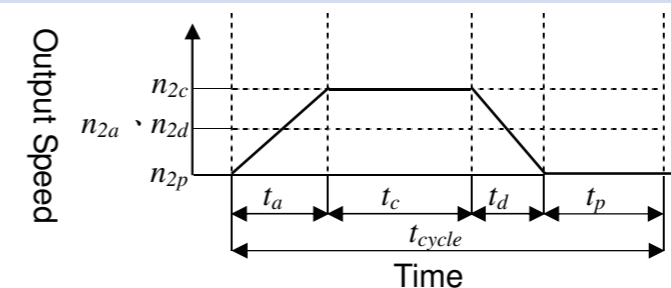
$t_{cycle} = t_{加速} + t_{勻速} + t_{減速} + t_{暫停} = t_a + t_c + t_d + t_p$

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

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

#### 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,

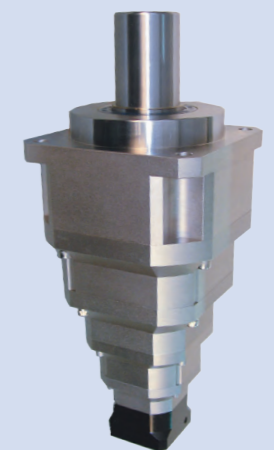
$t_d$  Deceleration,  $t_p$  Pause

#### 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 $\phi$	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 $\phi$	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 $\phi$	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 $\phi$	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° C ~ +90° C 度環境下工作。考慮工作溫升·環境溫度應在 -25° C ~ +45° C 之間。

## Operating Temperature

The Operating Temperature indicates the allowable temperature of gearbox at continuous and cyclic operation. SERVOBOX series work in -25° C ~ +90° C.

Consider working temperature, ambient temperature should be in -25° C ~ +45° 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.

參數值 Value	單位 Unit
輸出功率 Output Power	0.5 W
額定力矩 Rated Torque	1.59 NM
最大力矩 Max. Torque	4.77 NM
額定轉速 Rated Speed	3000 RPM
最大轉速 Max. Speed	3000 RPM
轉動慣量 Inertia	0.6 kg·cm <sup>2</sup>
軸徑 Shaft Dia.	24 mm
外徑 Diameter	110 mm
凸緣	110 mm
PCD	145 mm

STEP1 STEP2 STEP3 STEP4

1-1. 輸入減速機之減速比 Input GEAR Ratio: 3

1-2. 輸入伺服馬達軸徑 Motor Shaft Dia. A: 10

1. 下一步 Next Step



# Glossary

減速機專用名詞解釋



1. 計算減速比  $i$  (公式 1)
2. 計算應用端平均扭矩  $T_{2m}$  (公式 2)  
應用端平均扭矩  $T_{2m} < 額定輸出扭矩 T_{2N}$
3. 判斷運轉模式 (S1 或 S5)  
S5: 負載運轉週期 ED < 60%  
S5: 負載運轉時間  $t_{work} < 20$  分鐘 (公式 3)
4. 假如運轉模式為週期性運轉模式 (S5)  
計算應用端最大加速扭矩  $T_{2max}$  (公式 4)  
應用端最大加速扭矩  $T_{2max} < 最大加速扭矩 T_{2B}$
5. 計算應用端所需平均轉速  $n_{2m}$  及  
減速機額定輸出速度  $n_{2N}$  (公式 5)  
 $n_{2m} < n_{2N}$
6. 計算減速機輸出所受之平均徑向力  $F_{2rm}$  (公式 6)  
平均徑向力  $F_{2rm} < 容許徑向力 F_{2rB}$
7. 計算減速機輸出所受之平均軸向力  $F_{2am}$  (公式 7)  
平均軸向力  $F_{2am} < 容許軸向力 F_{2aB}$
8. 選擇所需的減速機精度及輸出軸型式
9. 選擇完成

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:

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

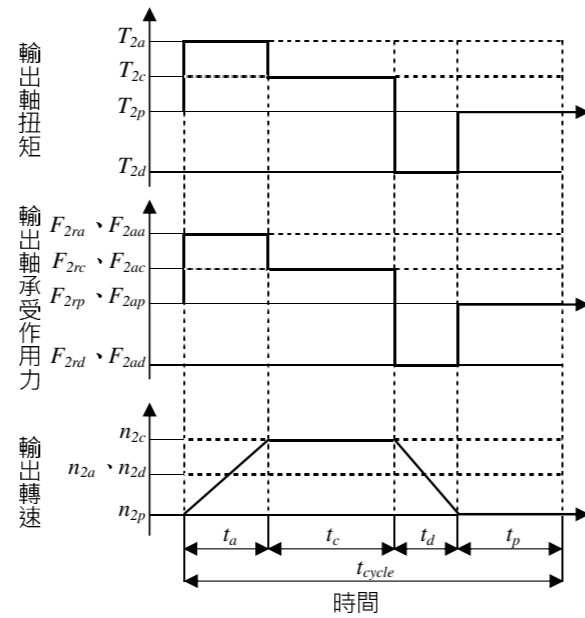
$J_L$  負載慣量,  $J_m$  馬達慣量

$T_{2m}$ : 請參考目錄「額定輸出扭矩」

$F_{2rB}$ : 請參考目錄「容許徑向力」

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

$n_m$ : 馬達輸出速度,  $n_{work}$ : 實際應用速度



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

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

$t_a$ : 加速,  $t_c$ : 等速,  $t_d$ : 減速,  $t_p$ : 停止

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

$T_{mB}$ : 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

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

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

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

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

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

1. Calculate Ratio  $i$  (Eq.1)
2. Calculate mean output torque  $T_{2m}$  (Eq.2)  
Mean output torque  $T_{2m} < \text{Nominal output torque } T_{2N}$
3. To determine Operation mode (S1 或 S5)  
S5: ED < 60%  
S5:  $t_{work} < 20$  min (Eq.3)
4. If operation mode is (S5)  
then calculate the Max. Acceleration Torque  $T_{2max}$  (Eq.4)  
Max acceleration torque  $T_{2max} < \text{acceleration torque } T_{2B}$
5. Calculate the Mean Output speed  $n_{2m}$   
and the Nominal Output speed  $n_{2N}$  of Gearbox (Eq.5)  
 $n_{2m} < n_{2N}$
6. Calculate the mean radial force  $F_{2rm}$  (Eq.6)  
mean radial force  $F_{2rm} < \text{Max. radial force } F_{2rB}$
7. Calculate the mean Axial force  $F_{2am}$  (Eq.7)  
mean axial force  $F_{2am} < \text{Max. axial force } F_{2aB}$
8. Select the Required Backlash and Shaft Option
9. Order your LIMING Gearbox

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.

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

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

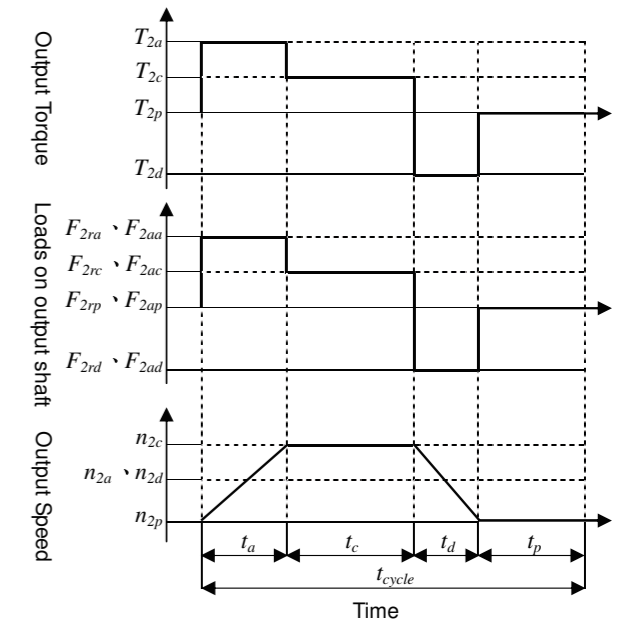
$$\text{Eq.1 } ED = \frac{t_a + t_c + t_d}{t_{cycle}}, t_{work} = t_a + t_c + t_d$$

$t_a$  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.

$$\text{Eq.2 } i \cong \frac{n_m}{n_{work}}$$

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



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

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

$T_{mB}$  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

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

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

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

$$\text{Eq.6}$$

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

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

## 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 ( 渦輪、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:

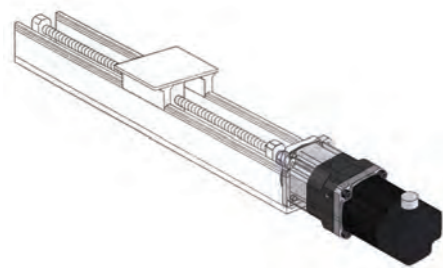
- The mounting on the machine must be stable to avoid any vibration.
- Check the correct direction of rotation of the reduction unit output shaft before fitting the unit to the machine.
- In the case of particularly lengthy periods of storage (4/6 months), if the oil seal is not immersed in the lubricant 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° C or > +45° 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

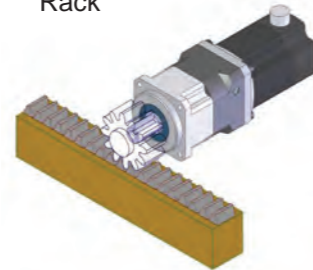
減速機應用範例

## ○ 線性動作機構 Linear Action

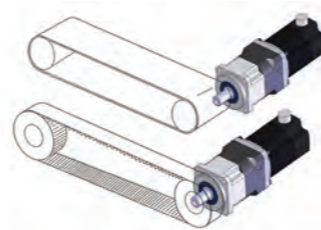
● 滾珠螺桿傳動  
Ball Screw



● 齒條傳動  
Rack

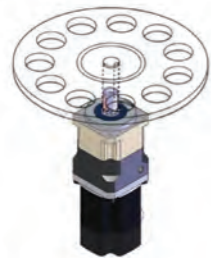


● 滾輪 / 滾筒 / 皮帶  
Roller / Belt

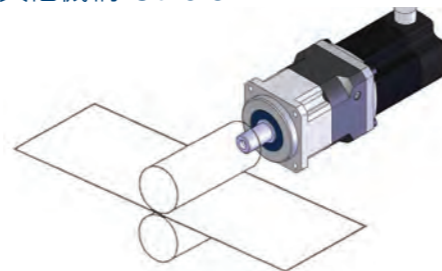


## ○ 回轉盤機構 Rotary Action

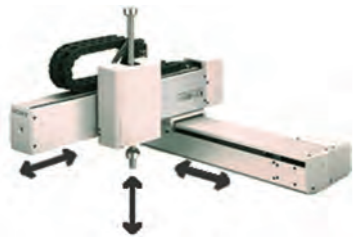
● 分度盤  
Index



## ○ 其他機構 Others



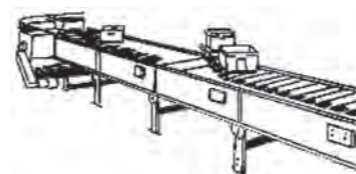
● 機器手臂  
Robot



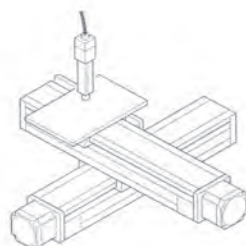
● 印刷機  
Printing Machine



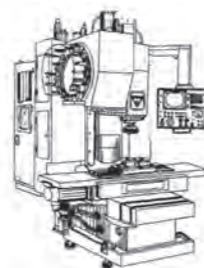
● 輸送機  
Conveyor



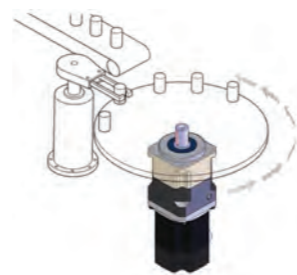
● 工作台  
Working Table



● CNC 主軸  
CNC Spindle



● 分割器  
Index

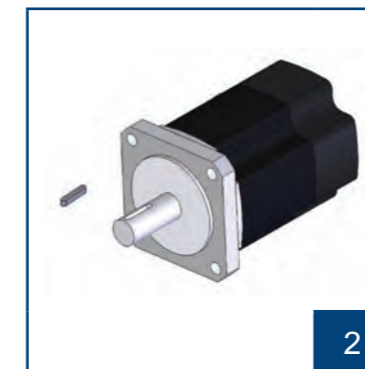


# Planetary Gearbox and Motor Mounting Instructions

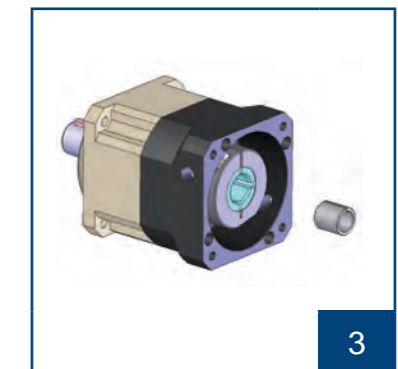
行星減速機與馬達安裝指南



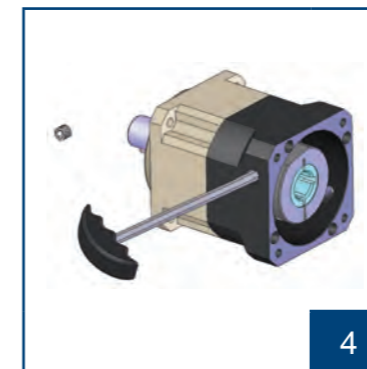
核對馬達型號與減速機規格是否正確。並將配合面擦拭乾淨。  
Confirm the motor, and gearbox size. Clean up the mounting surface.



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



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



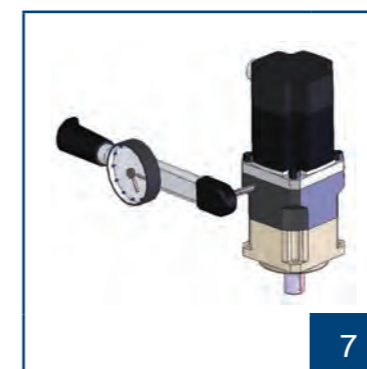
取出塞頭，使用六角板手將迫緊環螺絲鬆開。並將螺絲對準孔位。  
Remove the plug on the adapter plate. Rotate the set collar till the bolt is line up.



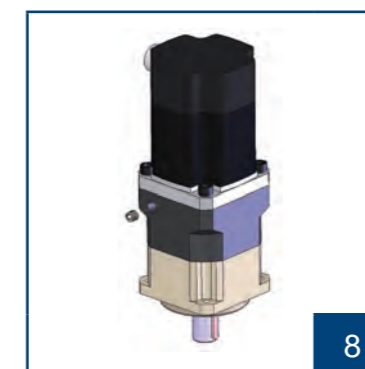
將馬達垂直裝入減速機。  
Put the motor into the gearbox vertically.



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



使用扭力板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

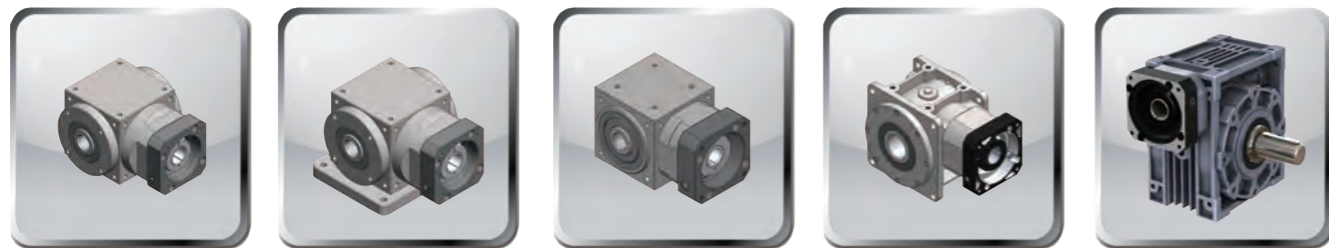
利明牌減速機系列產品

## 伺服用減速機 Reducers for Servo Motor

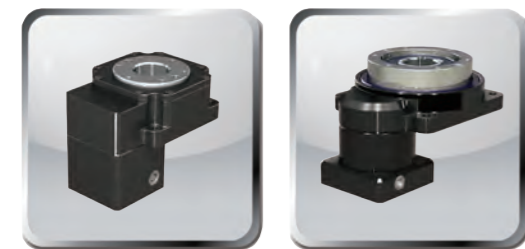
高精度行星減速機 High Precision Planetary Reducers



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

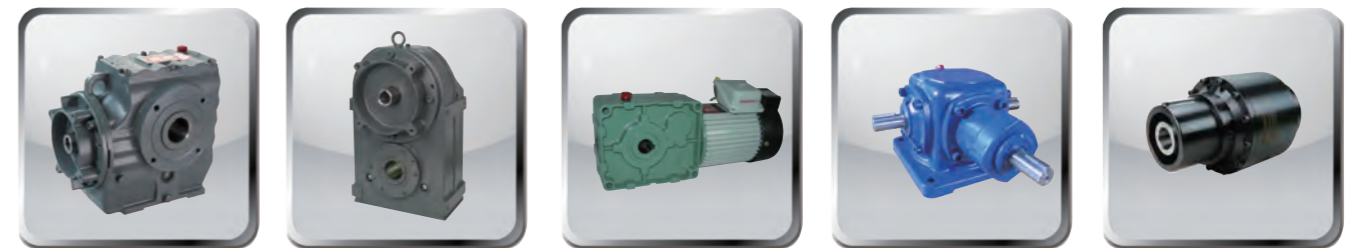
齒輪減速機 Gear Reducers



蝸輪減速機 Worm Gear Reducers



一般傳動減速機 Reducers

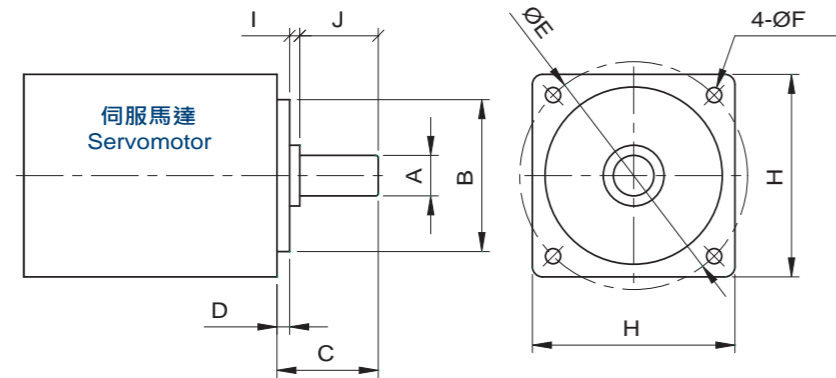


傳動軸用減速機 Gearbox for Power Transmission



# 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



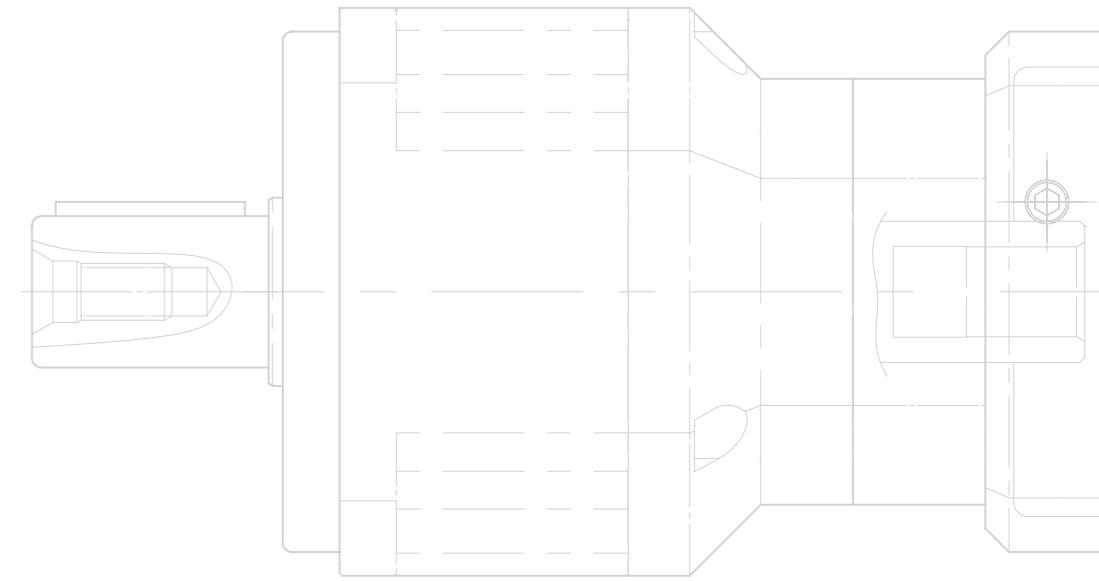
### 訂貨須知:

- ◆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			



2014 年 8 月版

- 由於產品改良，未經通告變更印刷製品規格，請諒察。
- 由於印刷特性與拍攝技術的關係，印刷顏色與實物稍有差異，請諒察。
- 產品專利及版權所有，非經本公司同意，不得轉載本刊任何圖文或仿冒商品。
- 本目錄於製作時已力求完美，但因機種繁多，校稿疏失在所難免，請於訂貨時與業務人員進行確認。

August, 2014

- We ask for your understanding if due to product improvements and the product in this catalogue have not yet been updated.
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