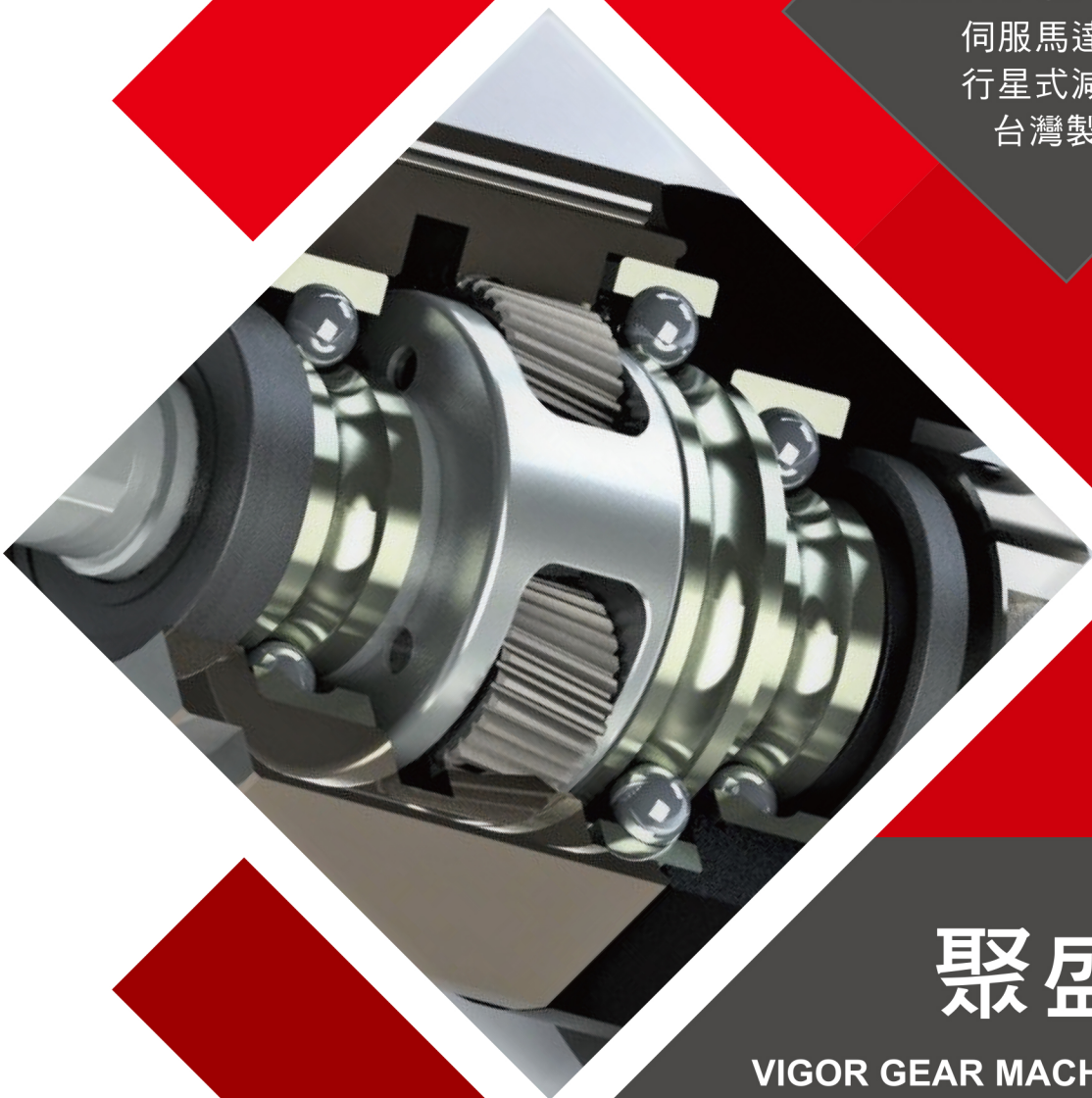


# VGM<sup>®</sup>

FOR  
SERVOMOTOR OF  
PLANETARY GEAR REDUCER  
伺服馬達專用  
行星式減速機  
台灣製造



## 聚盛工業

VIGOR GEAR MACHINERY CO, Ltd

[http:// www.dgdiren.com](http://www.dgdiren.com)

目錄  
CONTENTS

MF-H SERIES 系列產品 ————— 03 

MF-X SERIES 系列產品 ————— 13 

MF-S SERIES 系列產品 ————— 23 

P (PG, PF, PX) SERIES 系列產品 ——— 31 

MFL SERIES 系列產品 ————— 41 

MFT SERIES 系列產品 ————— 49 

MOUNTING INSTRUCTION 安裝說明 60-61

GEAR REDUCER QUICK SELECTIONS METHOD 減速機快速選型表 62-63

---

## 聚盛工業

聚盛工業創立於 1990 年，以製造渦輪減速機起家。1997 年，我們在台灣開發出第一台伺服馬達專用的行星式減速機。因應行業的發展，聚盛工業開始生產高精度行星減速機。

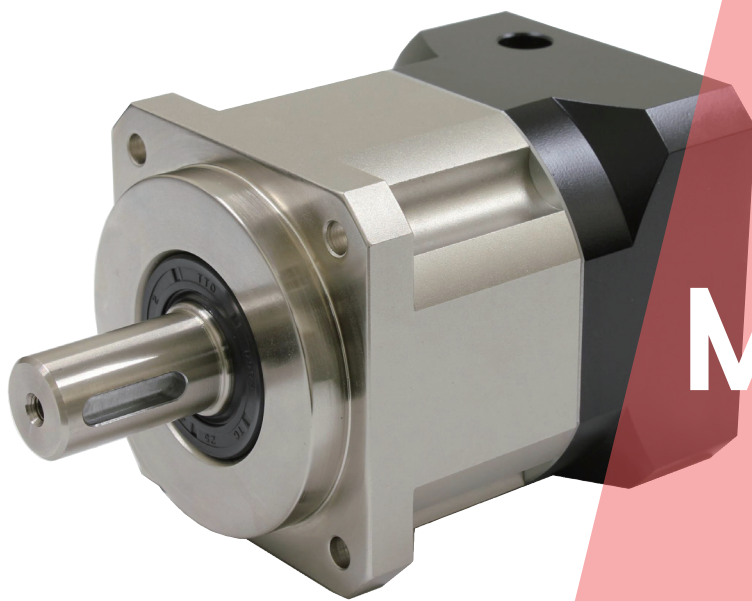
聚盛工業在台灣累積了 20 多年專業生產行星減速機的經驗。我們擁有強大的內部研發團隊，不斷創新和開發產品，設計和製造高精度的產品，以滿足不同產業的客戶需求。

## VIGOR GEAR MACHINERY

---

VIGOR GEAR MACHINERY founded in 1990, started up with the worm gear. In 1997, we developed the first planetary gearbox in Taiwan. VGM took step into the high-precision planetary gearboxes for servomotors which meets the advancement of the industry.

VGM Brand, now “VIGOR GEAR MACHINERY” accumulated more than 20 years' experience of producing planetary reducer in Taiwan. We have strong in-house R&D team for the continuous innovation and development of products; can design and manufacture products with high accuracy to suit customer requirements.



# MF-H 系列

最高標準精度、低背隙背隙減速機

The Highest level of Precision

Low Backlash Planetary Gearbox

- 一段背隙： $\leq 3$  弧分
- 減數比：3-1000
- 一段負載時效率達 98%
- 1 Stage-Minimal backlash:  $\leq 3$  arc-min
- Ratio: 3-1000
- 1 Stage-High efficiency: 98%



# 產品結構特點

## COMPONENT CHARACTERISTICS

### 行星齒

選用鎳鉻鉬合金鋼，齒面經滲碳熱處理，耐磨性高及耐高衝擊，齒型精修處理，能提升齒輪精度及降低噪音，內孔使用滿針滾針軸，具高耐磨與高強度。

### Planetary Gear

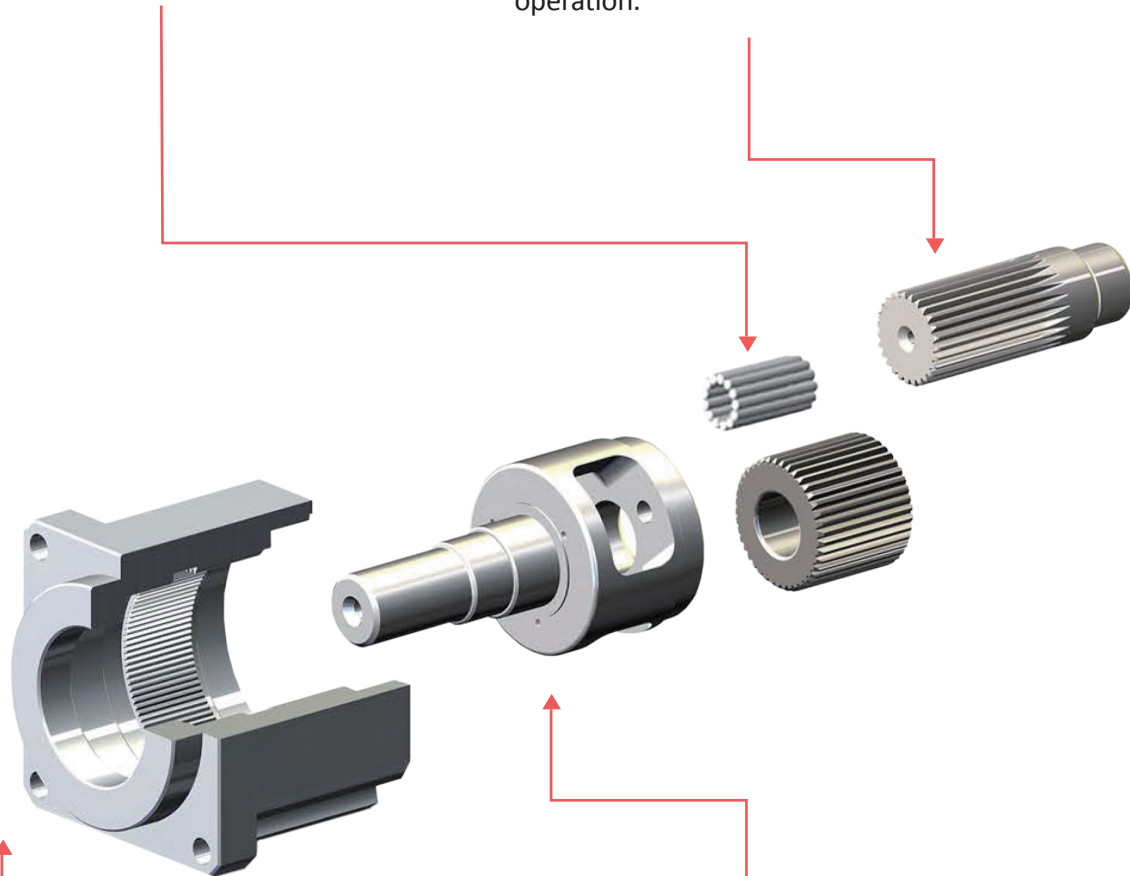
Nickel chromium molybdenum alloy steel gear is manufactured with carburizing heat treatment for high abrasion resistance and impact toughness and by honing process to increase gear precision and low noise operation. Internal gear bore uses needle roller to obtain higher abrasion resistance and strength.

### 太陽齒

選用鎳鉻鉬合金鋼，齒面經滲碳熱處理，耐磨性高及耐高衝擊。齒型精修處理，能提升齒輪精度及降低噪音。

### Sun Gear

Nickel chromium molybdenum alloy steel gear is manufactured with carburizing heat treatment for high abrasion resistance and impact toughness and by honing process to increase gear precision and low noise operation.



### 本體

採用鉻鉬合金鋼及一體成型設計，精密度高及輸出扭矩大，表面處理採電鍍化學鎳，具有高抗蝕效果。

### Ring Gear

With Cr-Mo alloy steel and one-piece construction for internal gear to deliver high precision and large output torque. Gearbox surface is coated with nickel electroplating for high resistance to corrosion.

### 出力軸

使用鉻鉬合金鋼，採一體成型設計確保大扭力輸出之結構剛性，表面用無電解鎳處理，具備高防鏽蝕的功能。

### Output Shaft

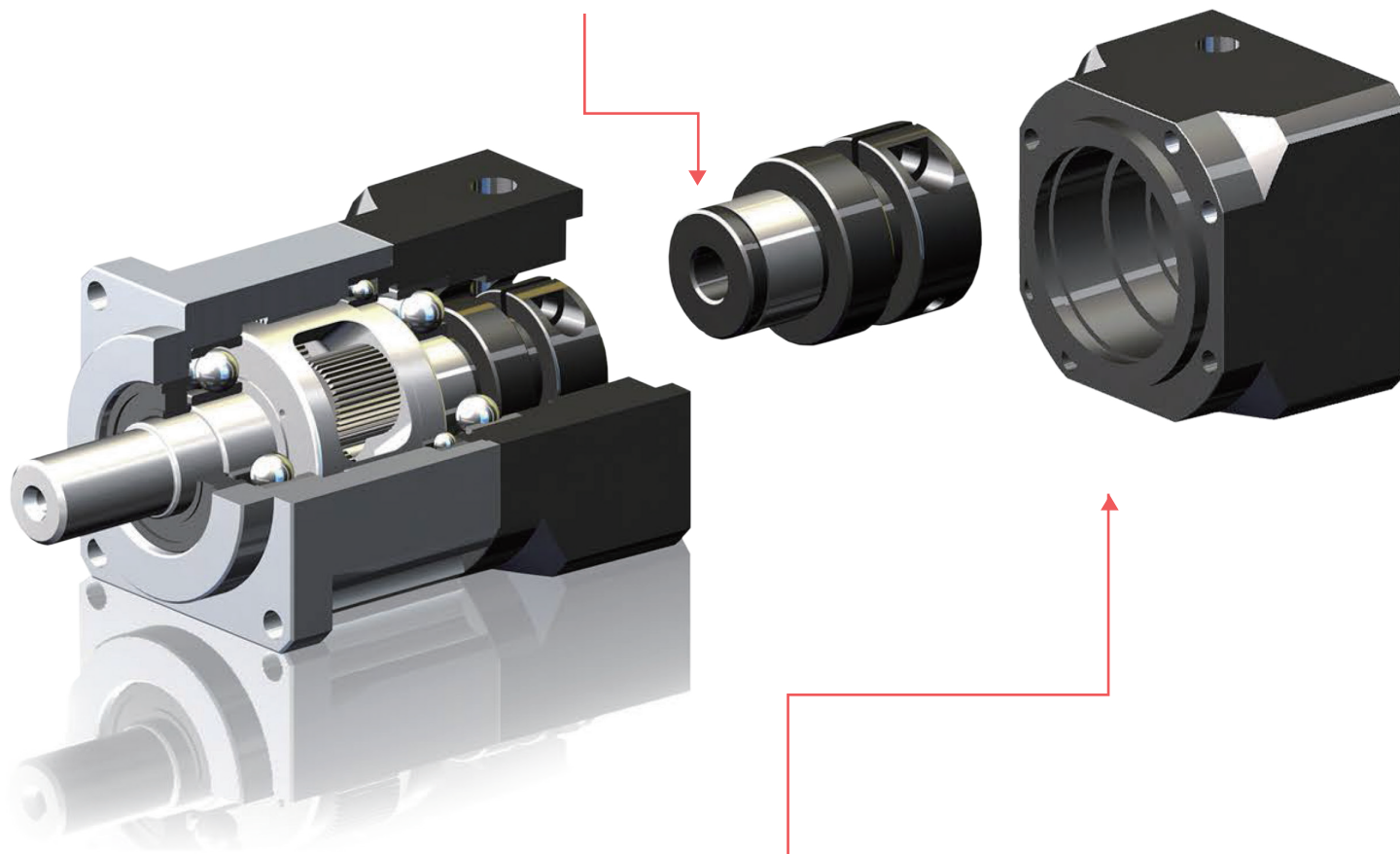
Cr-Mo alloy steel shaft with one-piece design and structural rigidity to ensure large torque output. Surface coated with electroless nickel plating for high resistance to corrosion.

### 入力軸

採用模組化設計，能搭配各廠牌，伺服馬達出力軸，表面染黑處理。

### Input Shaft

Modularized design can be used for various dimensions of servo motors. Shaft surface is coated with black oxide finishing.



### 連接法蘭

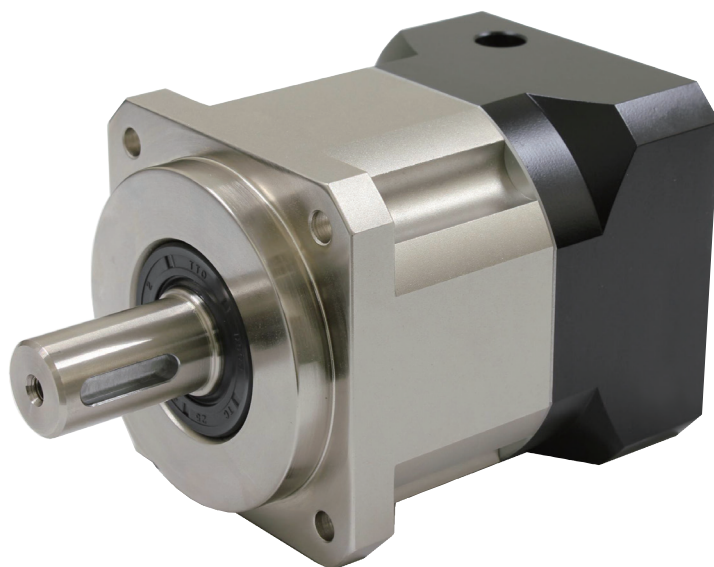
採用模組化設計，適合各式伺服馬達組裝，表面採用噴砂陽極技術處理，提高防氧化效果。

### Connecting Flange

Modularized design can be used for various dimensions of servo motors. Sandblasting and Anodizing painting on surface to improve the anti-corrosion capacity.

# 機型代碼

## MF-H SERIES ORDERING CODE



### MF40H - L1 - 10 - M - K - Motor

型號  
Model

MF40H  
MF60H  
MF90H  
MF120H  
MF150H  
MF180H

段數  
Stage

L1: (Ratio 3-10)  
L2: (Ratio 12-100)  
L3: (Ratio 120-1000)

馬達  
Motor

馬達廠牌、型號  
Motor Brand & Model

減速比  
Ratio

請參閱目錄第 8 頁，減速比組成表。  
Please refer to page 8 "Ratio Composition Table".

背隙  
Backlash

M: 標準背隙  
Standard  
H: 精密背隙  
Precision

出力軸  
Output shaft

K: 軸帶鍵  
With Key  
S: 光軸  
Without Key

# 輸出軸之容許徑向力

## PERMITTED RADIAL & AXIAL LOADS ON OUTPUT SHAFT OF THE GEARBOX

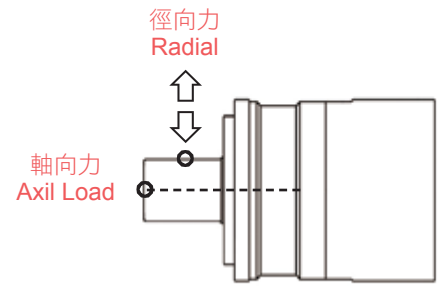
容許徑向力：垂直於軸心的力量

容許軸向力：平行於軸心的力量

容許徑和容許軸向力與減速機的出力軸轉速及施力點的距離相關。

轉速越快，容許徑向力會降低。

負載的距離越遠，容許的徑向力也隨之降低。



\* Permitted Radial Load :The force exerts perpendicular to output shaft

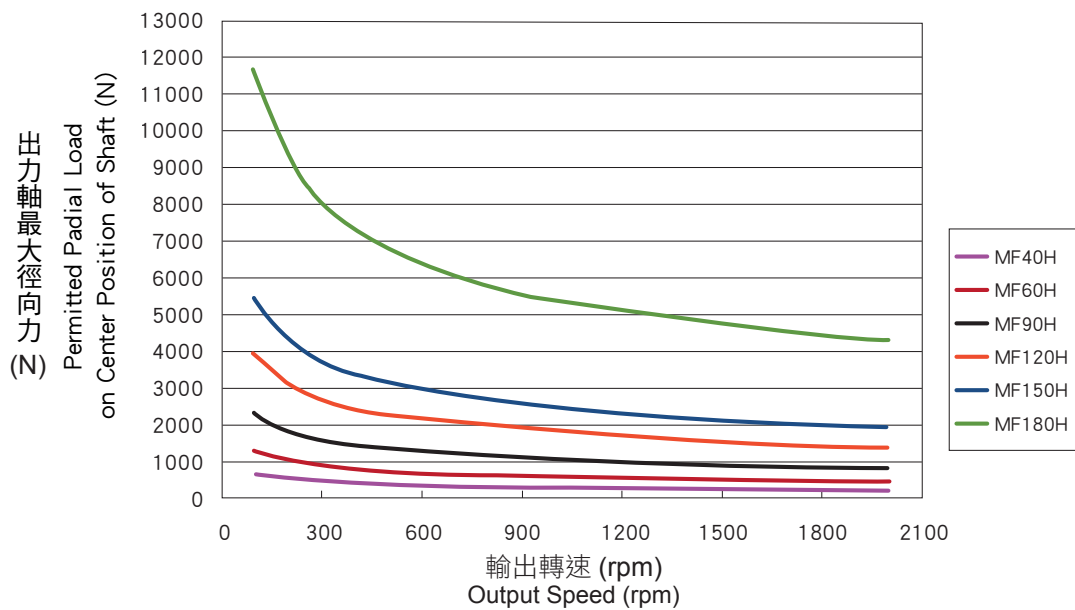
\* Permitted Axial Load :The force exerts parallel to output shaft

The radial & axial loads are related to the speed and application point on output shaft.

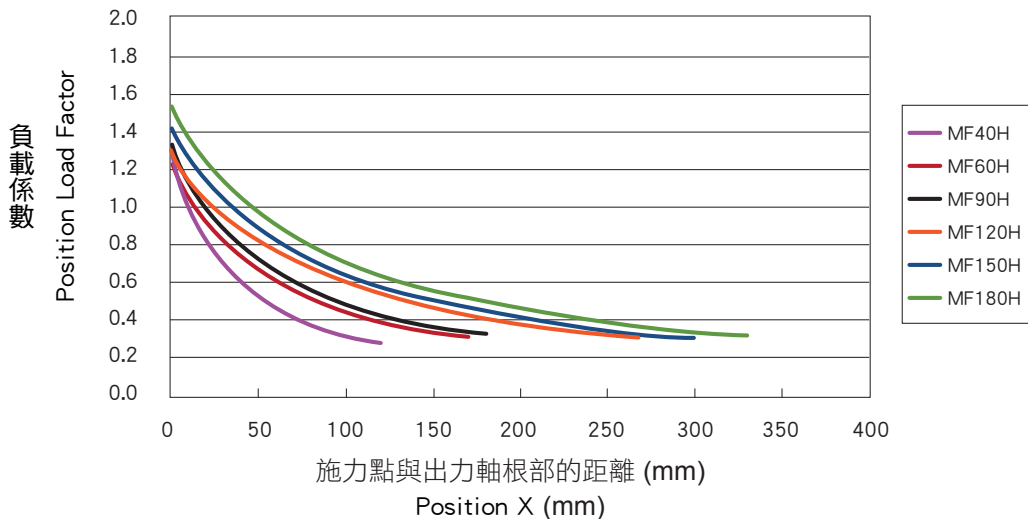
The radial & axial loads are decreased when the output shaft runs faster.

The radial & axial loads are decreased when the application points away from root segment of shaft.

徑向負荷表  
Radial Load Chart (MF-H)



負載係數表  
Load Factor Chart (MF-H)



# 馬達功率、減速比選用

## SELECTION REFERENCE TABLE & RATIO SELECTION TABLE

MF-H 系列減速機選用參考表 (依據伺服馬達輸出功率選擇) MF-H Series Selection Reference (Based on The Motor Output Torque)																					
馬達功率 Motor Output Power	減速機型號 Model	比數 Ratio																			
		1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/15	1/20	1/25	1/30	1/35	1/40	1/50	1/60	1/70	1/80	1/90	1/100
50W	MF40H	●	●	●	●	●	●		●	●	●	●	●	●	●						
100W	MF40H	●	●	●	●	●	●		●												
	MF60H	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●	●	●
200W	MF60H	●	●	●	●	●		●	●	●	●	●	●	●	●	●					
	MF90H	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
400W	MF60H	●	●	●	●	●		●	●	●	●	●	●	●	●						
	MF90H	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
500W	MF90H	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	MF120H	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
750W	MF90H	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	MF120H	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.0KW	MF120H	●	●	●	●	●		●	●	●	●	●	●	●	●	●					
	MF150H	●	●	●		●			●	●	●	●	●	●	●	●	●	●	●	●	●
1.5KW	MF120H	●	●	●	●	●		●	●	●	●	●	●	●	●						
	MF150H	●	●	●		●			●	●	●	●	●	●	●	●	●				
	MF180H	●	●	●		●			●	●	●	●	●	●	●	●	●	●	●	●	●
2.0KW	MF150H	●	●	●		●			●	●	●	●	●	●	●	●					
	MF180H	●	●	●		●			●	●	●	●	●	●	●	●	●	●	●	●	●
3.5KW	MF150H	●	●	●		●			●	●	●	●	●	●	●						
	MF180H	●	●	●		●			●	●	●	●	●	●	●	●	●	●	●	●	●
5.0KW	MF150H	●	●	●		●			●	●	●										
	MF180H	●	●	●		●			●	●	●	●	●	●	●	●					
7.0KW	MF150H	●	●	●		●			●												
	MF180H	●	●	●		●			●	●	●										
11KW	MF180H	●	●	●		●			●												

備註：

1. 可以依馬達輸出功率選用該比數有 '●' 記號之減速機型號。
2. 當應用於扭矩或慣性矩較大之場合，必須選用較大一級減速機。
3. 上表未列出之比數，如有需要請洽詢業務工程師。

Note：

1. By the motor output power, select the suitable gearbox models with '●' mark in above table.
2. When applied to a bigger torque or torsional rigidity mechanism, we suggest using a larger size gearbox.
3. Please contact us at vgm@vgmgear.com for ratios not being listed in above table.

MF-H 系列比數組成 MF-H Series Ratio Composition Table			
減速機型號 Model	減速機各段可選擇基本減速比數 Ratio Table for Each Stage		
	一段式比數 Stage (L1)	二段式比數 Stage (L2)	三段式比數 Stage (L2)
MF40H	3, 4, 5, 6, 7, 8, 10	15, 20, 25, 30, 35, 40, 50	
MF60H	3, 4, 5, 6, 7, 9, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 45, 50, 60, 70, 90, 100	120, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 900, 1000
MF90H	3, 4, 5, 6, 7, 8, 9, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100	120, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000
MF120H	3, 4, 5, 6, 7, 8, 9, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100	120, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000
MF150H	3, 4, 5, 7, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 50, 70, 100	120, 150, 200, 250, 300, 350, 400, 500, 600, 700, 1000
MF180H	3, 4, 5, 6, 7, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 50, 60, 70, 100	120, 150, 200, 250, 300, 350, 400, 500, 600, 700, 1000

MF-H 系列轉動慣量表									
	段數	比數	MF40H	MF60H	MF90H	MF120H	MF150H	MF180H	
轉動慣量表 kg x cm <sup>2</sup>	L1	3	0.02	0.12	1.05	2.38	10.76	26.48	
		4	0.01	0.09	0.94	1.99	8.89	21.51	
		5	0.01	0.08	0.91	1.91	8.55	20.60	
		6	0.01	0.08	0.90	1.87	8.47	20.39	
		7	0.01	0.08	0.89	1.86	8.42	20.26	
		8	0.01	—	0.89	1.84	—	—	
		9	—	0.08	0.89	1.84	—	—	
		10	0.01	0.08	0.89	1.84	8.38	20.15	
		L2	15	0.01	0.08	0.89	1.87	8.51	20.50
			20	0.01	0.08	0.89	1.87	8.51	20.50
	25		0.01	0.08	0.89	1.87	8.51	20.50	
	30		0.01	0.08	0.89	1.85	8.51	20.50	
	35		0.01	0.08	0.88	1.84	8.40	20.20	
	40		0.01	0.08	0.88	1.83	8.37	20.13	
	45		—	0.08	0.88	1.83	—	—	
	50		0.01	0.08	0.88	1.83	8.37	20.13	
	60		—	0.08	0.88	1.83	8.37	20.13	
	70		—	0.08	0.88	1.83	8.37	20.13	
	80	—	—	0.88	1.83	—	—		
	90	—	0.08	0.88	1.83	—	—		
100	—	0.08	0.88	1.83	8.37	20.13			

MF-H Series Reducer Moment of Inertia Table									
	Stage	Ratio	MF40H	MF60H	MF90H	MF120H	MF150H	MF180H	
Moment of inertia Table kg x cm <sup>2</sup>	L1	3	0.02	0.12	1.05	2.38	10.76	26.48	
		4	0.01	0.09	0.94	1.99	8.89	21.51	
		5	0.01	0.08	0.91	1.91	8.55	20.60	
		6	0.01	0.08	0.90	1.87	8.47	20.29	
		7	0.01	0.08	0.89	1.86	8.42	20.26	
		8	0.01	—	0.89	1.86	—	—	
		9	—	0.08	0.89	1.84	—	—	
		10	0.01	0.08	0.89	1.84	8.38	20.15	
		L2	15	0.01	0.08	0.89	1.87	8.51	20.50
			20	0.01	0.08	0.89	1.87	8.51	20.50
	25		0.01	0.08	0.89	1.87	8.51	20.50	
	30		0.01	0.08	0.89	1.85	8.51	20.50	
	35		0.01	0.08	0.88	1.84	8.40	20.50	
	40		0.01	0.08	0.88	1.83	8.37	20.13	
	45		—	0.08	0.88	1.83	—	—	
	50		0.01	0.08	0.88	1.83	8.37	20.13	
	60		—	0.08	0.88	1.83	8.37	20.13	
	70		—	0.08	0.88	1.83	8.37	20.13	
	80	—	—	0.88	1.83	—	—		
	90	—	0.08	0.88	1.83	—	—		
100	—	0.08	0.88	1.83	8.37	20.13			



# 技術規格表

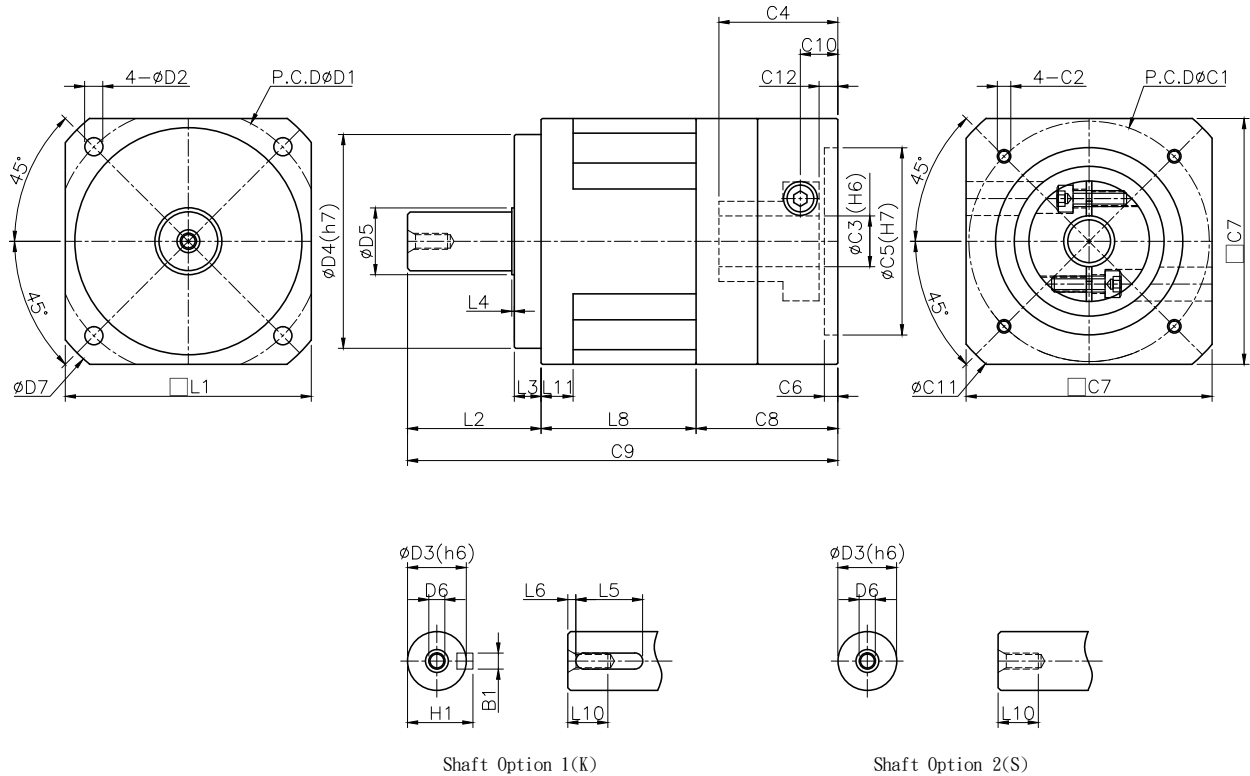
## TECHNICAL SPECIFICATIONS TABLE

MF-H 系列技術規格 Technical Specifications										
規格 Specification	單位 Unit	段數 Stage	比數 Ratio	MF40H	MF60H	MF90H	MF120H	MF150H	MF180H	
額定輸出扭矩 $T_{2N}$ Normal Output Torque	Nm	L1	3	16	50	125	248	500	1,000	
			4	17	43	136	286	580	1,090	
			5	17	52	152	320	660	1,215	
			6	16	52	145	308	—	1,060	
			7	15	46	136	306	540	1,135	
			8	13	—	118	240	—	—	
			9	—	35	94	225	—	—	
			10	13	35	94	225	460	935	
		L2	15	13	50	128	210	500	1,000	
			20	14	46	142	285	530	1,090	
			25	13	58	158	320	660	1,215	
			30	14	52	146	308	610	1,200	
			35	13	48	136	306	540	1,135	
			40	11	43	118	252	530	1,090	
			45	—	36	98	225	—	—	
			50	12	56	156	320	660	1,215	
			60	—	53	148	308	—	1,060	
			70	—	46	135	306	540	1,135	
80	—	—	116	—	—	—				
90	—	35	94	225	—	—				
100	—	35	94	225	460	935				
急停扭矩 Emergency Stop Torque	Nm	L1, L2	3-100	3倍額定輸出扭矩 3 Times of Nominal Output Torque						
額定輸入轉速 $n_{iN}$ Normal Input Speed	rpm	L1, L2	3-100	3,000	3,000	3,000	2,500	2,500	2,500	
最大輸入轉速 $n_{iB}$ Max. Input Speed	rpm	L1, L2	3-100	6,000	6,000	6,000	5,000	5,000	5,000	
精密背隙 H Precision Backlash	Arcmin	L1	3-10	≤5	≤3	≤3	≤3	≤3	≤3	
		L2	15-100	≤8	≤5	≤5	≤5	≤5	≤5	
標準背隙 M Standard Backlash	Arcmin	L1	3-10	≤8	≤5	≤5	≤5	≤5	≤5	
		L2	15-100	≤10	≤8	≤8	≤8	≤8	≤8	
扭轉剛性 Torsional Rigidity	Nm/arcmin	L1, L2	3-100	2.6	7	15	28	51	142	
容許徑向力 $F_{aB}$ Max. Radial Load	N	L1, L2	3-100	750	1,530	3,000	6,200	9,000	14,200	
容許軸向力 $F_{tB}$ Max. Axial Load	N	L1, L2	3-100	375	765	1,500	3,100	4,500	7,100	
平均使用壽命 Average Life Time	hr	L1, L2	3-100	20,000						
全負載時效率 $\eta$ Efficiency of Full Load	%	L1	3-10	≥98%						
		L2	15-100	≥95%						
淨重 Net Weight	Kg	L1	3-10	0.53	1.55	4.37	9.56	17.7	28.75	
		L2	15-100	0.7	2	5.52	11.21	22.3	37.8	
使用溫度 Operating Temp	°C	L1, L2	3-100	-10°C ~ +90°C						
潤滑 Lubrication		L1, L2	3-100	鋰基複合全合成潤滑油脂 Lithium Complex Synthetic Lubrication						
安裝方向 Mounting Position		L1, L2	3-100	任意方向 All Directions						
防護等級 Degree of Protection		L1, L2	3-100	IP65						
噪音值 Running Noise	dBA	L1, L2	3-100	≤65	≤65	≤65	≤68	≤68	≤70	

1. 上述單段減速機(未指定比數)相關規格，主要為使用各型號5比減速機所測得之數據。
2. 減速比：i = 輸入轉速/輸出轉速。
3. 背隙值：為在2%額定輸出扭矩下測試所得之數據。
4. 最大徑向力及最大軸向力：施力於出力軸中心位置，週期負載時間50%，轉速100rpm，條件下所測得之數據。
5. 運轉負載週期<60%狀況下，平均使用壽命如列表數據值；負載週期≥60%之連續運轉狀況下，平均使用壽命可能會降低至正常值的50%以下。
6. 噪音值：距離1公尺，空載運轉，額定輸入轉速，條件下所測得之數據。

1. Above relative specifications of each model most are measured on 5 : 1 gear ratio
2. Ratios : i = Nin / Nout
3. Backlash : Measured on 2% of nominal output torque
4. Max. Radial and Axial Load : Applied to the output shaft center, and 50% of duty time and at 100 rpm
5. Duty Cycle < 60%, Average Lifetime = List Value; Duty Cycle ≥ 60%, Average Lifetime < 50% List value
6. Noise Level : Numeric measured on idle running in 1m distance, and at nominal input speed

# 尺寸圖 DRAWING & DEMENSION



(單位：mm)  
(Unit：mm)

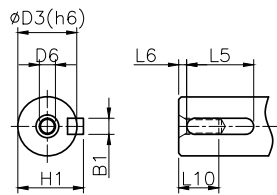
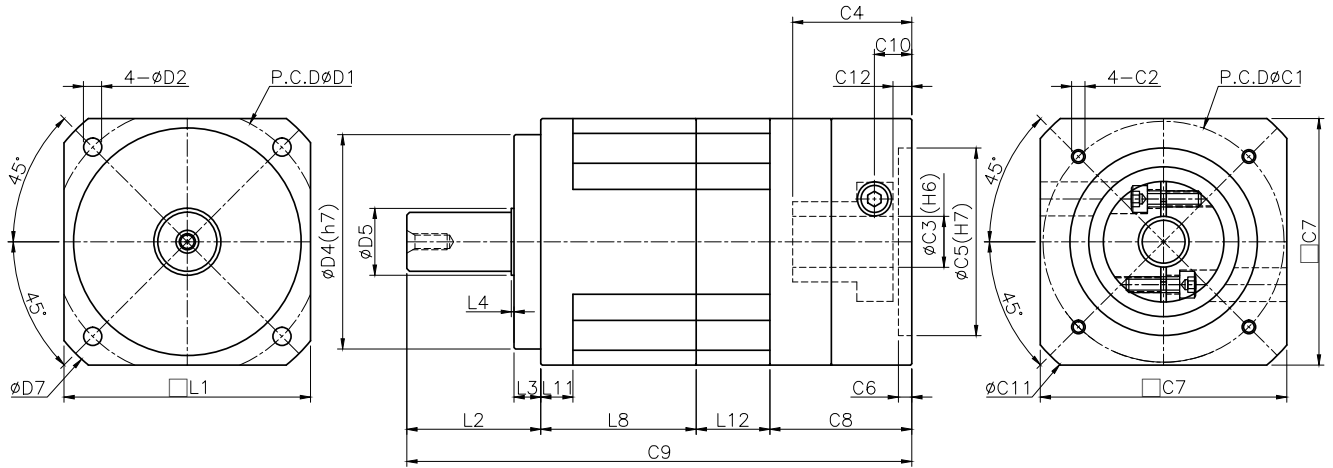
尺寸 Size	MF40H-L1	MF60H-L1	MF90H-L1	MF120H-L1	MF150H-L1	MF180H-L1
D1	50	70	100	130	165	215
D2	3.5	5.5	6.8	8.7	11	13
D3	13	16	22	32	38(40)	50(55)
D4	35	50	80	110	130	160
D5	15	18	25	35	40(45)	60
D6	M4×0.7P	M5×0.8P	M6×1.0P	M8×1.25P	M12×1.75P	M12×1.75P(M20×2.5P)
D7	55	80	118	158	190	245
L1	42	60	92	120	142	182
L2	25.5	35.5	50	65	86	105
L3	5.5	7.5	10	12	15	20
L4	0.5	1.5	1	1	3	2
L5	15	20	25	40	45	70
L6	2	3	5	3	5	6
L8	33.5	49	58	69	79	85.5
L10	8	12	15	20	32	42
L11	7	10	12	15	12	15
C1	46	70	90	145	200	200
C2	M4x0.7P(MAX)	M5x0.8P(MAX)	M6x1.0P(MAX)	M8x1.25P(MAX)	M12x1.75P(MAX)	M12x1.75P(MAX)
C3	5-8	6-14	14-19	16-24	19-42	19-42
C4	28	33	39	65	88	85
C5	30	50	70	110	114.3	114.3
C6	4	4	5	7	6	7
C7	42	62	92	120	176	182
C8	34	39.5	49	78	98	100
C9	93	124	157	212	263	290.5
C10	12.5	13	15	28.5	47	33.5
C11	56	80	120	160	230	240
C12	7.5	7	7	20	35	17
B1	4	5	6	10	10(12)	14(16)
H1	14.5	18	24.5	35	41(43)	53.5(59)

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

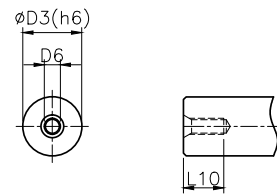
\* Note：C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.

# 尺寸圖

## DRAWING & DEMENSION



Shaft Option 1(K)



Shaft Option 2(S)

(單位：mm)  
(Unit：mm)

尺寸Size	MF40H-L2	MF60H-L2	MF90H-L2	MF120H-L2	MF150H-L2	MF180H-L2
D1	50	70	100	130	165	215
D2	3.5	5.5	6.8	8.7	11	13
D3	13	16	22	32	38(40)	50(55)
D4	35	50	80	110	130	160
D5	15	18	25	35	40(45)	60
D6	M4×0.7P	M5×0.8P	M6×1.0P	M8×1.25P	M12×1.75P	M12×1.75P(M20×2.5P)
D7	55	80	118	158	190	245
L1	42	60	92	120	142	182
L2	25.5	35.5	50	65	86	105
L3	5.5	7.5	10	12	15	20
L4	0.5	1.5	1	1	3	2
L5	15	20	25	40	45	70
L6	2	3	5	3	5	6
L8	33.5	49	58	69	79	85.5
L10	8	12	15	20	32	42
L11	7	10	12	15	12	15
L12	19	16	27.5	33.2	46	51.5
C1	46	70	90	145	200	200
C2	M4x0.7P(MAX)	M5x0.8P(MAX)	M6x1.0P(MAX)	M8x1.25P(MAX)	M12x1.75P(MAX)	M12x1.75P(MAX)
C3	5-8	6-14	14-19	16-24	19-42	19-42
C4	28	33	39	65	88	85
C5	30	50	70	110	114.3	114.3
C6	4	4	5	7	6	7
C7	42	62	92	120	176	182
C8	34	39.5	49	78	98	100
C9	112	140	184.5	245.2	309	342
C10	12.5	13	15	28.5	47	33.5
C11	56	80	120	160	230	240
C12	7.5	7	7	20	35	17
B1	4	5	6	10	10(12)	14(16)
H1	14.5	18	24.5	35	41(43)	53.5(59)

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note：C1-C6 are metric standard specific dimensions of motor. Please contact us at [vgm@vgmgear.com](mailto:vgm@vgmgear.com) for other specification or customize product.



# MF-X 系列

標準背隙、經濟型減速機

Standard Backlash, Economy Planetary Gearbox

- 一段背隙：6-8 弧分
- 減數比：3-1000
- 一段負載時效率達 98%
- 1 Stage-Minimal backlash: 6-8 arc-min
- Ratio: 3-1000
- 1 Stage-High efficiency: 98%

# 產品結構特點

## COMPONENT CHARACTERISTICS

### 行星齒

選用鎳鉻鉬合金鋼，齒面經滲碳熱處理，耐磨性高及耐高衝擊，齒型精修處理，能提升齒輪精度及降低噪音，內孔使用滿針滾針軸，具高耐磨與高強度。

### Planetary Gear

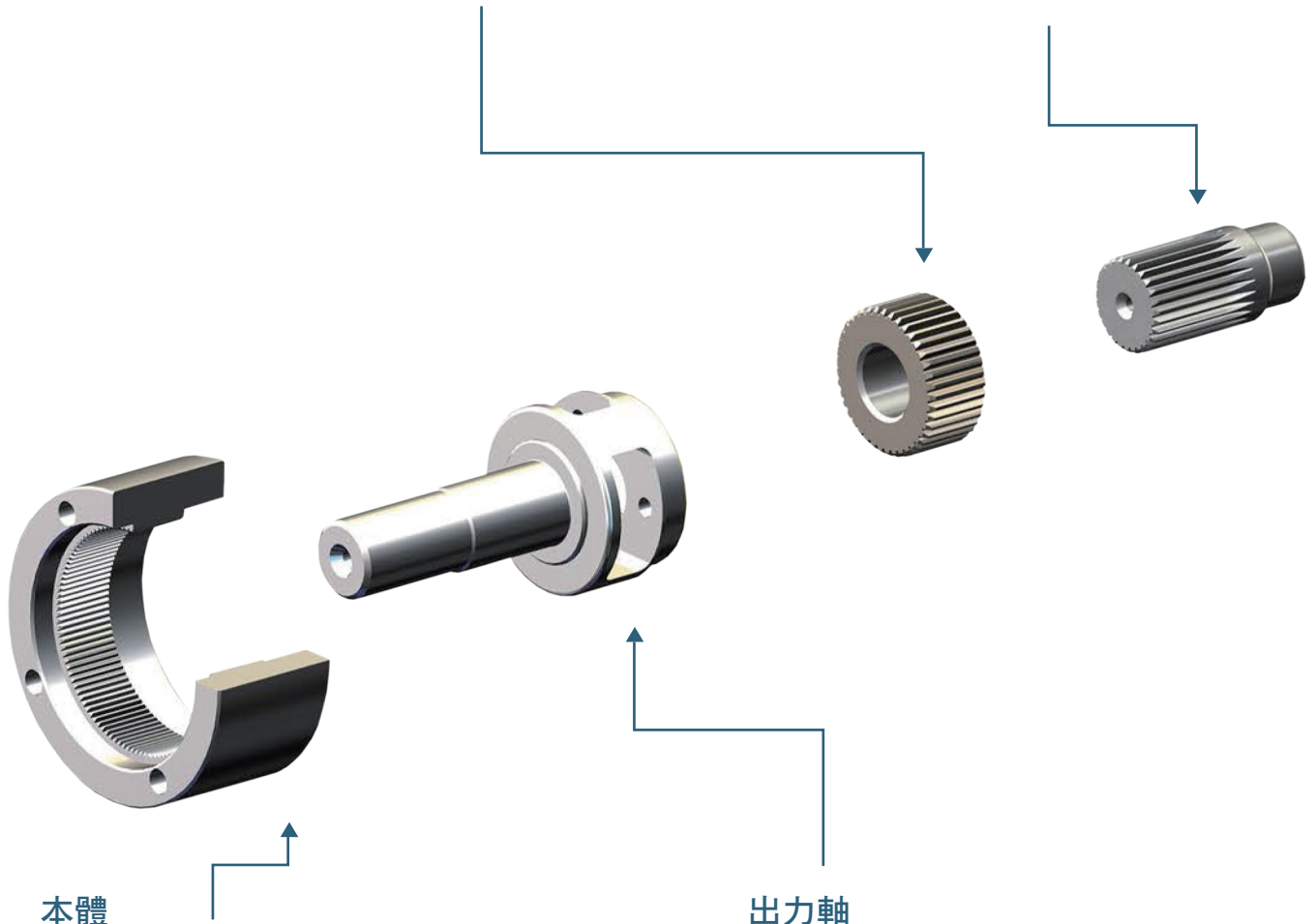
Nickel chromium molybdenum alloy steel gear is manufactured with carburizing heat treatment for high abrasion resistance and impact toughness and by honing process to increase gear precision and low noise operation. Internal gear bore uses needle roller to obtain higher abrasion resistance and strength.

### 太陽齒

選用鎳鉻鉬合金鋼，齒面經滲碳熱處理，耐磨性高及耐高衝擊。齒型精修處理，能提升齒輪精度及降低噪音。

### Sun Gear

Nickel chromium molybdenum alloy steel gear is manufactured with carburizing heat treatment for high abrasion resistance and impact toughness and by honing process to increase gear precision and low noise operation



### 本體

採用鉻鉬合金鋼及一體成型設計，精密度高及輸出扭矩大，表面處理採電鍍化學鎳，具有高抗蝕效果。

### Ring Gear

With Cr-Mo alloy steel and one-piece construction for internal gear to deliver high precision and large output torque. Gearbox surface is coated with nickel electroplating for high resistance to corrosion.

### 出力軸

使用鉻鉬合金鋼，採一體成型設計確保大扭力輸出之結構剛性，表面用無電解鎳處理，具備高防鏽蝕的功能

### Output Shaft

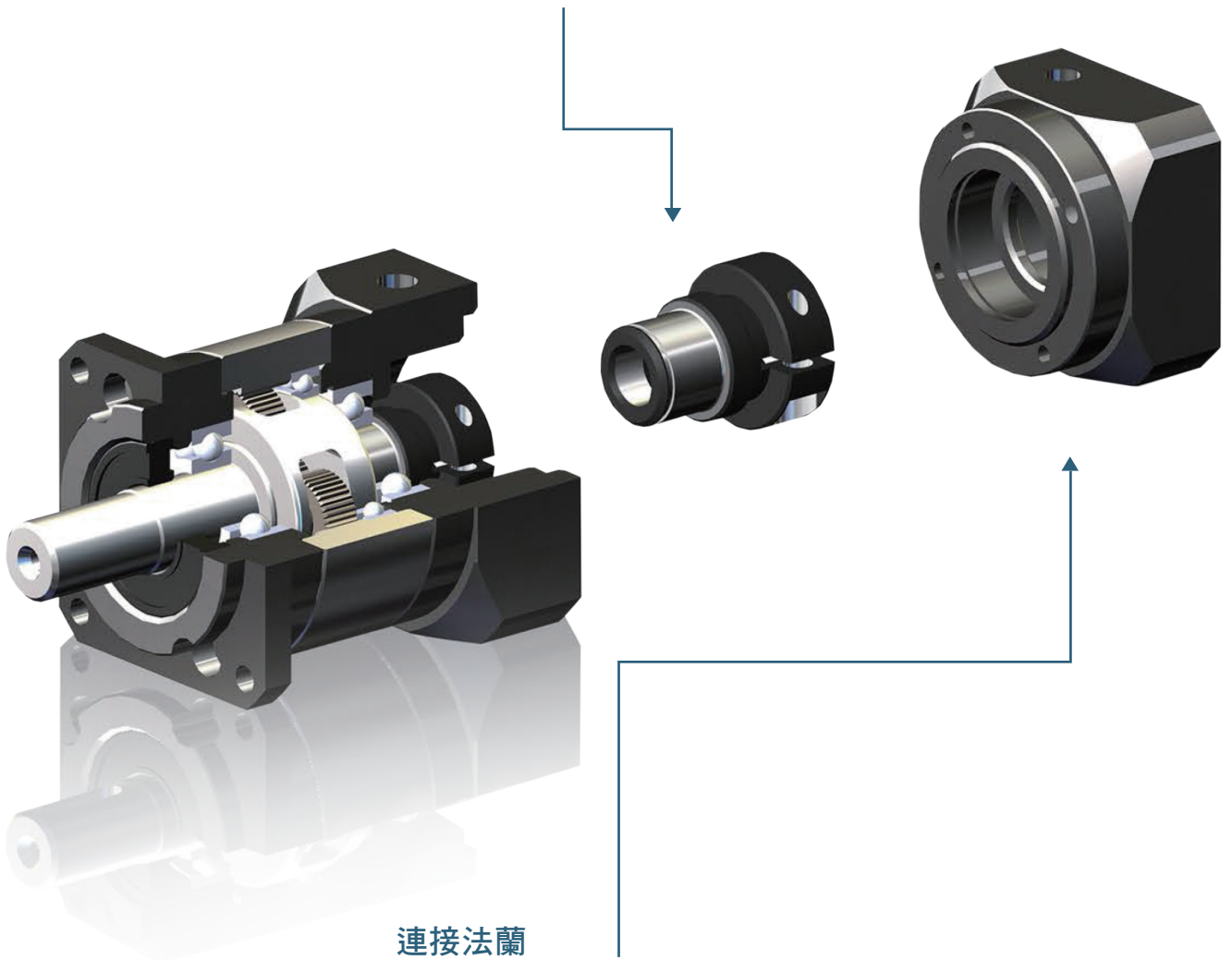
Cr-Mo alloy steel shaft with one-piece design and structural rigidity to ensure large torque output. Surface coated with electroless nickel plating for high resistance to corrosion.

## 入力軸

採用模組化設計，能搭配各廠牌，伺服馬達出力軸，表面染黑處理。

## Input Shaft

Modularized design can be used for various dimensions of servo motors. Shaft surface is coated with black oxide finishing.



## 連接法蘭

採用模組化設計，適合各式伺服馬達組裝，表面採用噴砂陽極技術處理，提高防氧化效果。

## Connecting Flange

Modularized design can be used for various dimensions of servo motors. Sandblasting and Anodizing painting on surface to improve the anti-corrosion capacity.



# 機型代碼

## MF-X SERIES ORDERING CODE



### MF40X - L1 - 10 - K - Motor

型號 Model
MF40X
MF60X
MF90X
MF120X
MF150X
MF180X
MF220X

段數 Stage
L1: (Ratio 3-10)
L2: (Ratio 15-100)
L3: (Ratio 120-1000)

馬達 Motor
馬達廠牌、型號 Motor Brand & Model

減速比 Ratio
請參閱目錄第 18 頁，減速比組成表。 Please refer to page 18 "Ratio Composition Table".

出力軸 Output shaft	
K:	軸帶鍵 With Key
S:	光軸 Without Key

# 輸出軸之容許徑向力

## PERMITTED RADIAL & AXIAL LOADS ON OUTPUT SHAFT OF THE GEARBOX

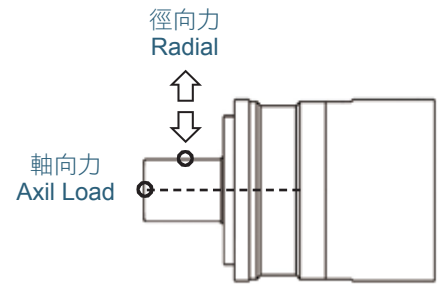
容許徑向力：垂直於軸心的力量

容許軸向力：平行於軸心的力量

容許徑和容許軸向力與減速機的出力軸轉速及施力點的距離相關。

轉速越快，容許徑向力會降低。

負載的距離越遠，容許的徑向力也隨之降低。



\* Permitted Radial Load :The force exerts perpendicular to output shaft

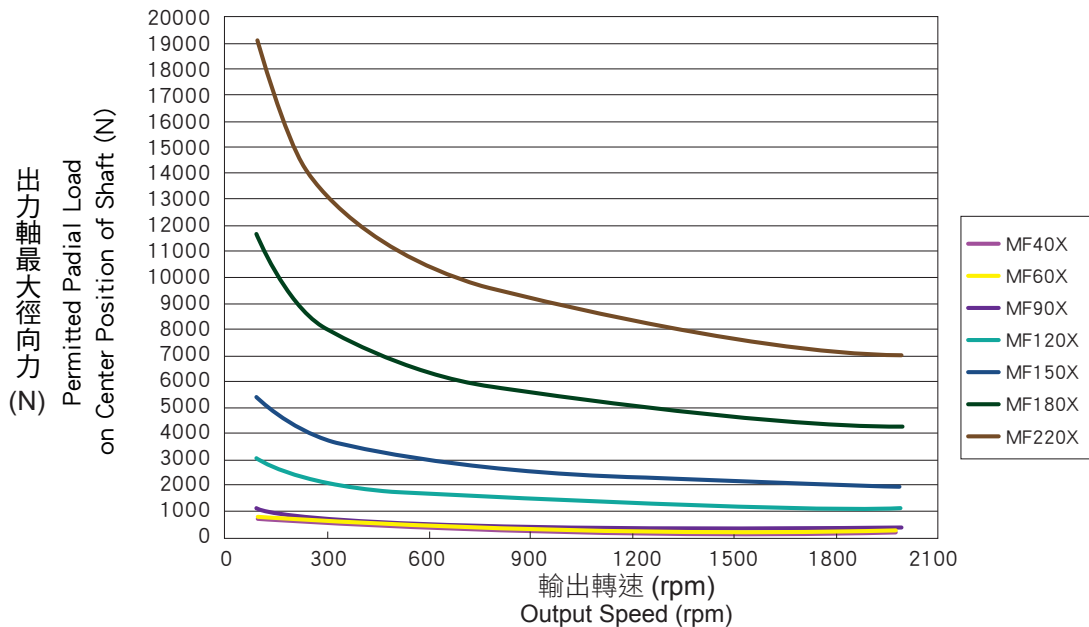
\* Permitted Axil Load :The force exerts parallel to output shaft

The radial & axial loads are related to the speed and application point on output shaft.

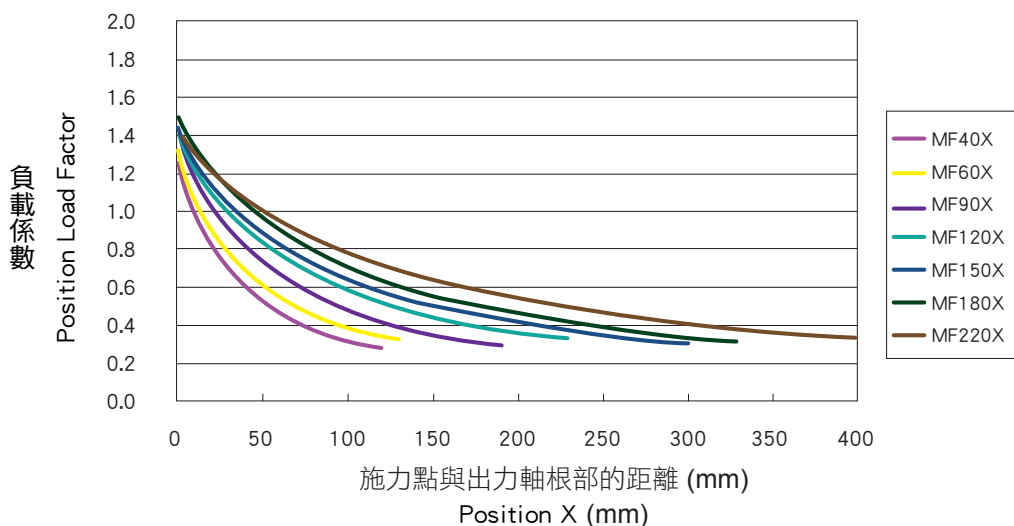
The radial & axial loads are decreased when the output shaft runs faster.

The radial & axial loads are decreased when the application points away from root segment of shaft.

徑向負荷表  
Radial Load Chart (MF-X)



負載係數表  
Load Factor Chart (MF-X)



# 馬達功率、減速比選用

## SELECTION REFERENCE TABLE & RATIO SELECTION TABLE

		MF-X 系列減速機選用參考表 (依據伺服馬達輸出功率選擇) MF-X Series Selection Reference (Based on The Motor Output Torque)																
馬達功率 Motor Output Power	減速機型號 Model	比數 Ratio																
		1/3	1/4	1/5	1/6	1/7	1/8	1/10	1/15	1/20	1/25	1/30	1/35	1/40	1/50	1/60	1/70	1/100
50W	MF40X	●	●	●	●	●	●	●	●	●	●	●	●	●				
100W	MF40X	●	●	●	●	●	●	●	●	●	●	●	●	●				
	MF60X	●	●	●		●		●	●	●	●	●	●	●	●		●	●
200W	MF60X	●	●	●		●		●	●	●	●	●	●	●	●			
	MF90X	●	●	●		●		●	●	●	●	●	●	●	●		●	●
400W	MF60X	●	●	●		●		●	●	●	●	●	●	●				
	MF90X	●	●	●		●		●	●	●	●	●	●	●	●		●	
500W	MF90X	●	●	●		●		●	●	●	●	●	●	●				
	MF120X	●	●	●		●		●	●	●	●	●	●	●	●		●	●
750W	MF90X	●	●	●		●		●	●	●	●							
	MF120X	●	●	●		●		●	●	●	●	●	●	●	●			
1.0KW	MF120X	●	●	●		●		●	●	●	●	●	●	●	●			
	MF150X	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●
1.5KW	MF120X	●	●	●		●		●	●	●	●	●	●	●				
	MF150X	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●
2.0KW	MF150X	●	●	●	●	●		●	●	●	●	●	●	●	●			
	MF180X	●	●	●		●		●	●	●	●	●	●	●	●		●	●
3.5KW	MF150X	●	●	●	●	●		●	●	●	●	●						
	MF180X	●	●	●		●		●	●	●	●	●	●	●	●			
5.0KW	MF150X	●	●	●	●	●		●	●	●								
	MF180X	●	●	●		●		●	●	●	●	●	●	●				
7.0KW	MF180X	●	●	●		●		●	●	●								
	MF220X		●	●		●		●		●	●	●						
11.0KW	MF180X	●	●	●		●		●										
	MF220X		●	●		●		●		●								
12.0KW	MF220X		●	●		●		●										
15.0KW	MF220X		●	●		●		●										

備註：

1. 可以依馬達輸出功率選用該比數有 '●' 記號之減速機型號。
2. 當應用於扭矩或慣性矩較大之場合，必須選用較大一級減速機。
3. 上表未列出之比數，如有需要請洽詢業務工程師。

Note：

1. By the motor output power, select the suitable gearbox models with '●' mark in above table.
2. When applied to a bigger torque or torsional rigidity mechanism, we suggest using a larger size gearbox.
3. Please contact us at vgm@vgmgear.com for ratios not being listed in above table.

MF-X 系列比數組成 MF-X Series Ratio Composition Table			
減速機各段可選擇基本減速比數 Ratio Table for Each Stage			
減速機型號 Model	一段式比數 Stage (L1)	二段式比數 Stage (L2)	三段式比數 Stage (L3)
MF40X	3, 4, 5, 6, 7, 8, 10	15, 20, 25, 30, 35, 40, 50	
MF60X	3, 4, 5, 7, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 50, 70, 100	120, 150, 200, 250, 300, 350, 400, 500, 700, 1000
MF90X	3, 4, 5, 7, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 50, 70, 100	120, 150, 200, 250, 300, 350, 400, 500, 700, 1000
MF120X	3, 4, 5, 7, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 50, 70, 100	120, 150, 200, 250, 300, 350, 400, 500, 700, 1000
MF150X	3, 4, 5, 6, 7, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 50, 60, 70, 100	120, 150, 200, 250, 300, 350, 400, 500, 700, 1000
MF180X	3, 4, 5, 6, 7, 10	12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 50, 60, 70, 100	120, 150, 200, 250, 300, 350, 400, 500, 700, 1000
MF220X	4, 5, 7, 10	16, 20, 25, 28, 35, 40, 50, 70, 100	

MF-X 系列轉動慣量表										
	段數	比數	MF40X	MF60X	MF90X	MF120X	MF150X	MF180X	MF220X	
轉動慣量表 kg x cm <sup>2</sup>	L1	3	0.02	0.05	0.93	2.34	10.76	26.48	—	
		4	0.01	0.05	0.93	1.95	8.89	21.51	75.08	
		5	0.01	0.05	0.9	1.88	8.55	20.6	75.91	
		6	0.01	—	—	—	8.47	20.39	—	
		7	0.01	0.05	0.88	1.83	8.42	20.26	74.73	
		8	0.01	—	—	—	—	—	—	
		9	—	—	—	—	—	—	—	
		10	0.01	0.05	0.88	1.82	8.38	20.15	74.85	
		L2	15	0.01	0.05	0.89	1.86	8.51	20.5	—
			20	0.01	0.05	0.89	1.86	8.51	20.5	75.11
	25		0.01	0.05	0.89	1.86	8.51	20.5	75.11	
	30		0.01	0.05	0.89	1.83	8.51	20.5	—	
	35		0.01	0.05	0.88	1.82	8.4	20.2	80.46	
	40		0.01	0.05	0.88	1.82	8.37	20.13	75.95	
	45		—	—	—	—	—	—	—	
	50		0.01	0.05	0.88	1.82	8.37	20.13	75.11	
	60		—	—	—	—	8.37	20.13	—	
	70		—	0.05	0.88	1.82	8.37	20.13	74.68	
	80	—	—	—	—	—	—	—		
	90	—	—	—	—	—	—	—		
100	—	0.05	0.88	1.82	8.37	20.13	74.68			

MF-X Series Reducer Moment of Inertia Table										
	Stage	Ratio	MF40X	MF60X	MF90X	MF120X	MF150X	MF180X	MF220X	
Moment of inertia Table kg x cm <sup>2</sup>	L1	3	0.02	0.05	0.93	2.34	10.76	26.48	—	
		4	0.01	0.05	0.93	1.95	8.89	21.51	75.08	
		5	0.01	0.05	0.9	1.88	8.55	20.6	75.91	
		6	0.01	—	—	—	8.47	20.39	—	
		7	0.01	0.05	0.88	1.83	8.42	20.26	74.73	
		8	0.01	—	—	—	—	—	—	
		9	—	—	—	—	—	—	—	
		10	0.01	0.05	0.88	1.82	8.38	20.15	74.85	
		L2	15	0.01	0.05	0.89	1.86	8.51	20.5	—
			20	0.01	0.05	0.89	1.86	8.51	20.5	75.11
	25		0.01	0.05	0.89	1.86	8.51	20.5	75.11	
	30		0.01	0.05	0.89	1.83	8.51	20.5	—	
	35		0.01	0.05	0.88	1.82	8.4	20.2	80.46	
	40		0.01	0.05	0.88	1.82	8.37	20.13	75.95	
	45		—	—	—	—	—	—	—	
	50		0.01	0.05	0.88	1.82	8.37	20.13	75.11	
	60		—	—	—	—	8.37	20.13	—	
	70		—	0.05	0.88	1.82	8.37	20.13	74.68	
	80	—	—	—	—	—	—	—		
	90	—	—	—	—	—	—	—		
100	—	0.05	0.88	1.82	8.37	20.13	74.68			

# 技術規格表

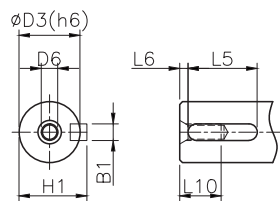
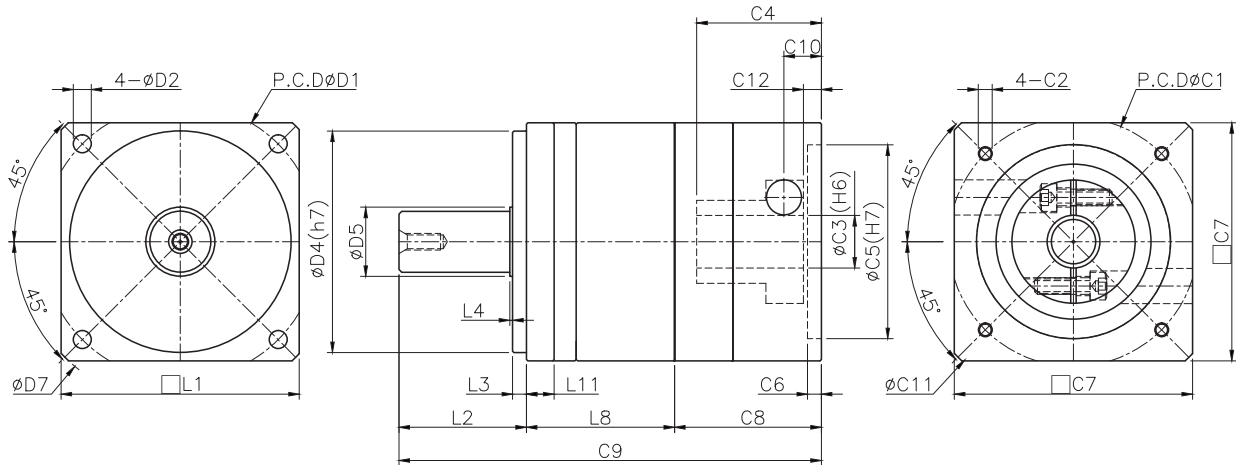
## TECHNICAL SPECIFICATIONS TABLE

MF-X 系列技術規格 Technical Specifications											
規格 Specification	單位 Unit	段數 Stage	比數 Ratio	MF40X	MF60X	MF90X	MF120X	MF150X	MF180X	MF220X	
額定輸出扭矩 $T_{2N}$ Normal Output Torque	Nm	L1	3	16	50	125	235	500	1,000	—	
			4	17	35	136	225	580	1,090	1,530	
			5	17	42	152	256	660	1,215	1,900	
			6	16	—	—	—	610	1,060	—	
			7	15	46	136	306	540	1,135	1,620	
			8	13	—	—	—	—	—	—	
		L2	10	13	25	94	225	460	935	1,500	—
			15	13	35	125	210	500	1,000	—	
			20	14	35	142	285	530	1,090	1,530	
			25	13	42	158	320	660	1,215	1,900	
			30	14	42	146	308	610	1,200	—	
			35	13	42	136	306	540	1,135	1,620	
			40	11	25	118	252	530	1,090	1,530	
			45	—	—	—	—	—	—	—	
			50	12	25	156	320	660	1,215	1,500	
			60	—	—	—	—	610	1,060	—	
			70	—	46	135	306	540	1,135	1,620	
			80	—	—	—	—	—	—	—	
90	—	—	—	—	—	—	—				
100	—	25	94	225	460	935	1,500				
急停扭矩 Emergency Stop Torque	Nm	L1, L2	3-100	3倍額定輸出扭矩 3 Times of Nominal Output Torque							
額定輸入轉速 $n_{1N}$ Normal Input Speed	rpm	L1, L2	3-100	3,000	3,000	3,000	2,500	2,500	2,500	2,000	
最大輸入轉速 $n_{1B}$ Max. Input Speed	rpm	L1, L2	3-100	6,000	6,000	6,000	5,000	5,000	5,000	4,000	
標準背隙 Standard Backlash	arcmin	L1	3-10	≤10	≤10	≤8	≤8	≤6	≤6	≤6	
		L2	15-100	≤15	≤15	≤12	≤12	≤10	≤10	≤10	
扭轉剛性 Torsional Rigidity	Nm/arcmin	L1, L2	3-100	3	6	12	25	51	142	215	
容許徑向力 $F_{rB}$ Max. Radial Load	N	L1, L2	3-100	750	1,200	2,500	5,600	9,000	14,200	48,000	
容許軸向力 $F_{aB}$ Max. Axial Load	N	L1, L2	3-100	375	600	1,250	2,800	4,500	7,100	24,000	
平均使用壽命 Average Life Time	hr	L1, L2	3-100	20,000							
全負載時效率 $\eta$ Efficiency of Full Load	%	L1	3-10	≥98%							
		L2	15-100	≥95%							
淨重 Net Weight	kg	L1	3-10	0.5	1.05	2.9	7.46	15.1	26	50.3	
		L2	15-100	0.69	1.34	3.75	9.44	18.9	34.33	66.1	
使用溫度 Operating Temp	°C	L1, L2	3-100	-10°C ~ +90°C							
潤滑 Lubrication		L1, L2	3-100	鋰基複合全合成潤滑油脂 Lithium Complex Synthetic Lubrication							
安裝方向 Mounting Position		L1, L2	3-100	任意方向 All Directions							
防護等級 Degree of Protection		L1, L2	3-100	IP65							
噪音值 Running Noise	dBA	L1, L2	3-100	≤65	≤65	≤65	≤68	≤68	≤70	≤72	

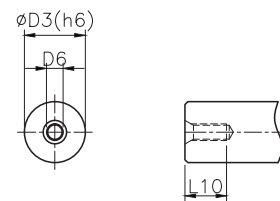
- 上述單段減速機(未指定比數)相關規格，主要為使用各型號5比減速機所測得之數據。
- 減速比：i = 輸入轉速/輸出轉速。
- 背隙值：為在2%額定輸出扭矩下測試所得之數據。
- 最大徑向力及最大軸向力：施力於出力軸中心位置，週期負載時間50%，轉速100rpm，條件下所測得之數據。
- 運轉負載週期<60%狀況下，平均使用壽命如列表數據值；負載週期≥60%之連續運轉狀況下，平均使用壽命可能會降低至正常值的50%以下。
- 噪音值：距離1公尺，空載運轉，額定輸入轉速，條件下所測得之數據。

- Above relative specifications of each model most are measured on 5 : 1 gear ratio
- Ratios : i = Nin / Nout
- Backlash : Measured on 2% of nominal output torque
- Max. Radial and Axial Load : Applied to the output shaft center, and 50% of duty time and at 100 rpm
- Duty Cycle < 60%, Average Lifetime = List Value; Duty Cycle ≥ 60%, Average Lifetime < 50% List value
- Noise Level : Numeric measured on idle running in 1m distance, and at nominal input speed

# 尺寸圖 DRAWING & DEMENSION



Shaft Option 1(K)



Shaft Option 2(S)

(單位 : mm)  
(Unit : mm)

尺寸Size	MF40X-L1	MF60X-L1	MF90X-L1	MF120X-L1	MF150X-L1	MF180X-L1	MF220X-L1
D1	50	70	100	145(130)	165	215	250
D2	3.5	5.5	6.5	8.8	11	13	17
D3	13	16	22	32	38(40)	50(55)	75
D4	35	50	80	110	130	160	180
D5	15	17	25	35	40(45)	60	80
D6	M4×0.7P	M5×0.8P	M6×1.0P	M8×1.25P	M12×1.75P	M12×1.75P(M20×2.5P)	M20×2.5P
D7	60	80	118	160	190	245	292
L1	46	62	86	120	142	182	220
L2	26	33	46	69.5	75	95	123
L3	5.5	5	5	10	4	10	15
L4	1	1.5	1	0.5	3	2	3
L5	15	20	25	40	45	70	90
L6	2	3	3	3	5	6	7
L8	33	43	53.5	70.5	90	95.5	123.5
L10	8	12	15	20	32	42	52
L11	9.5	10	10	15	15	15	20
C1	46	70	90	145	200	200	235
C2	M4x0.7P(MAX)	M5x0.8P(MAX)	M8x1.0P(MAX)	M8x1.25P(MAX)	M12x1.75P(MAX)	M12x1.75P(MAX)	M12x1.75P(MAX)
C3	5-8	6-14	14-19	16-24	19-42	19-42	35-55
C4	26	31	41	66	88	85	128
C5	30	50	70	110	114.3	114.3	200
C6	4	3.5	5	7	6	7	10
C7	46	62	86	120	176	182	220
C8	32.5	37	49.5	77	98	100	148
C9	91.5	113	149	217	263	290.5	394.5
C10	11	12	15	28.5	47	33.5	44
C11	60	80	118	160	240	240	292
C12	6	6	7	20	35	17	27.5
B1	4	5	6	10	10(12)	14(16)	20
H1	14.5	18	24.5	35	41(43)	53.5(59)	79.5

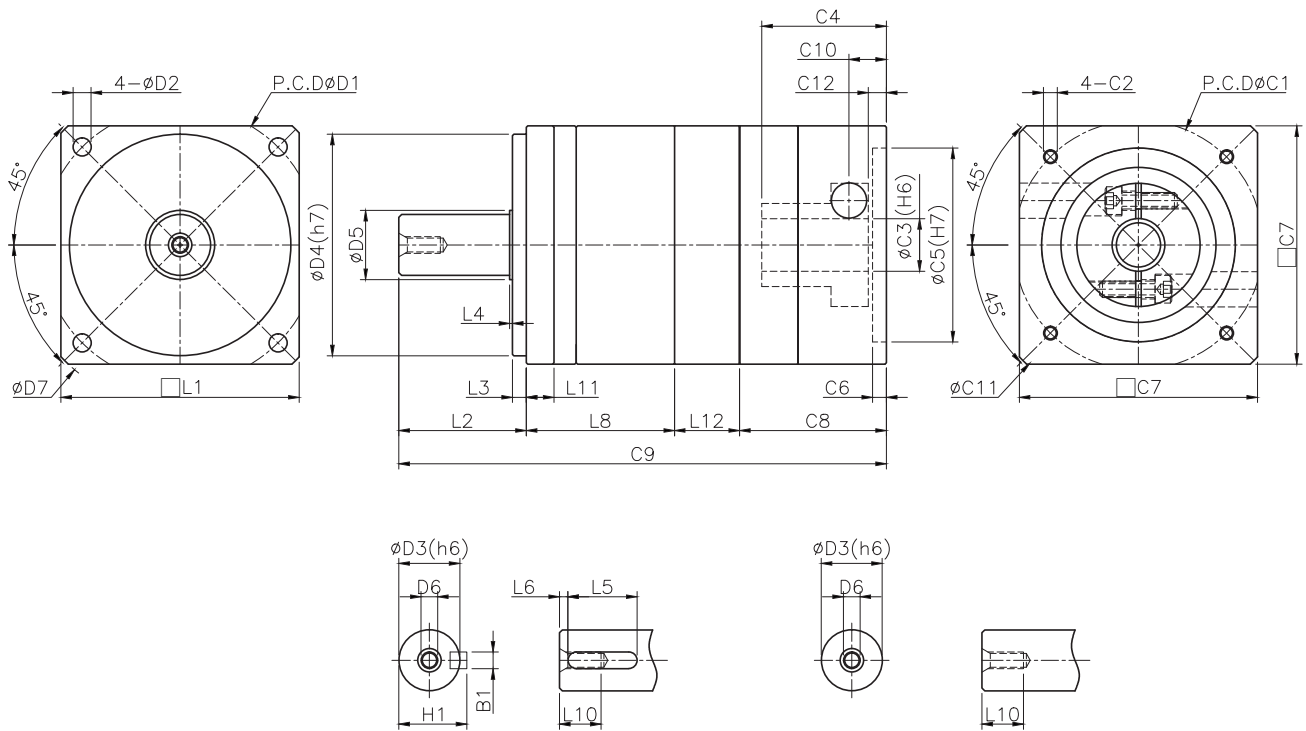
\* 註 : C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note : C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.



# 尺寸圖

## DRAWING & DEMENSION



Shaft Option 1(K)

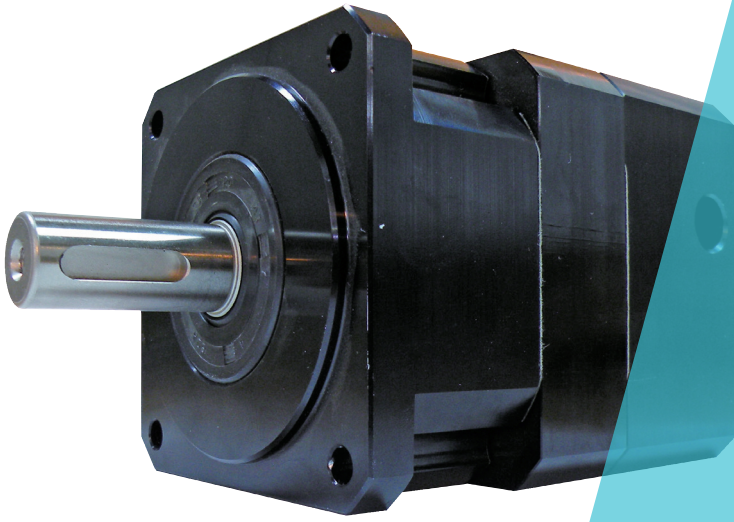
Shaft Option 2(S)

(單位：mm)  
(Unit：mm)

尺寸Size	MF40X-L2	MF60X-L2	MF90X-L2	MF120X-L2	MF150X-L2	MF180X-L2	MF220X-L2
D1	50	70	100	145(130)	165	215	250
D2	3.5	5.5	6.5	8.8	11	13	17
D3	13	16	22	32	38(40)	50(55)	75
D4	35	50	80	110	130	160	180
D5	15	17	25	35	40(45)	60	80
D6	M4×0.7P	M5×0.8P	M6×1.0P	M8×1.25P	M12×1.75P	M12×1.75P(M20×2.5P)	M20×2.5P
D7	60	80	118	160	190	245	292
L1	46	62	86	120	142	182	220
L2	26	33	46	69.5	75	95	123
L3	5.5	5	5	10	4	10	15
L4	1	1.5	1	0.5	3	2	3
L5	15	20	25	40	45	70	90
L6	2	3	3	3	5	6	7
L8	33	43	53.5	70.5	90	95.5	123.5
L10	8	12	15	20	32	42	52
L11	9.5	10	10	15	15	15	20
L12	19	16	23.5	27.2	46	51.5	56.5
C1	46	70	90	145	200	200	235
C2	M4x0.7P(MAX)	M5x0.8P(MAX)	M6x1.0P(MAX)	M8x1.25P(MAX)	M8x1.75P(MAX)	M12x1.75P(MAX)	M12x1.75P(MAX)
C3	5-8	6-14	14-19	16-24	19-42	19-42	35-55
C4	26	31	41	66	88	85	128
C5	30	50	70	110	114.3	114.3	200
C6	4	3.5	5	7	6	7	10
C7	46	62	86	120	176	182	220
C8	32.5	37	49.5	77	98	100	148
C9	110.5	129	172.5	244.2	309	342	451
C10	11	12	15	28.5	47	33.5	44
C11	60	80	118	160	240	240	292
C12	6	6	7	20	35	17	27.5
B1	4	5	6	10	10(12)	14(16)	20
H1	14.5	18	24.5	35	41(43)	53.5(59)	79.5

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note: C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.



# MF-S 系列

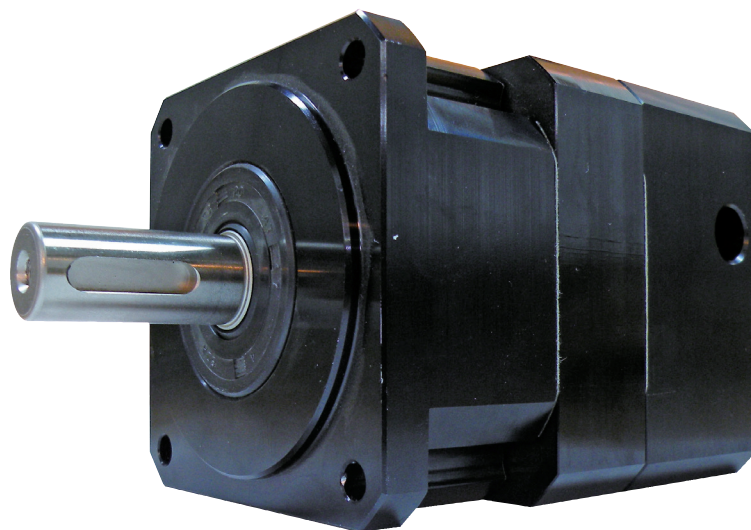
## 強力型減速機

### Compact & Powerful Planetary Gearbox

- 一段背隙：6-14 弧分
- 減數比：3-100
- 一段負載時效率達 96%
- 1 Stage-Minimal backlash: 6-14 arc-min
- Ratio: 3-100
- 1 Stage-High efficiency: 96%

# 機型代碼

## MF-S SERIES ORDERING CODE



**MF070S**

**- L1**

**- 10**

**-**

**Motor**

型號  
Model

MF070S  
MF090S  
MF120S  
MF150S  
MF180S

段數  
Stage

L1: (Ratio 3-10)  
L2: (Ratio 9-100)  
L3: (Ratio 27-1000)

馬達  
Motor

馬達廠牌、型號  
Motor Brand & Model

減速比  
Ratio

請參閱目錄第 26 頁，減速比組成表。  
Please refer to page 26 " Ratio Composition Table

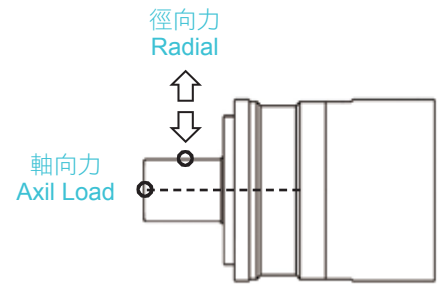
容許徑向力：垂直於軸心的力量

容許軸向力：平行於軸心的力量

容許徑和容許軸向力與減速機的出力軸轉速及施力點的距離相關。

轉速越快，容許徑向力會降低。

負載的距離越遠，容許的徑向力也隨之降低。



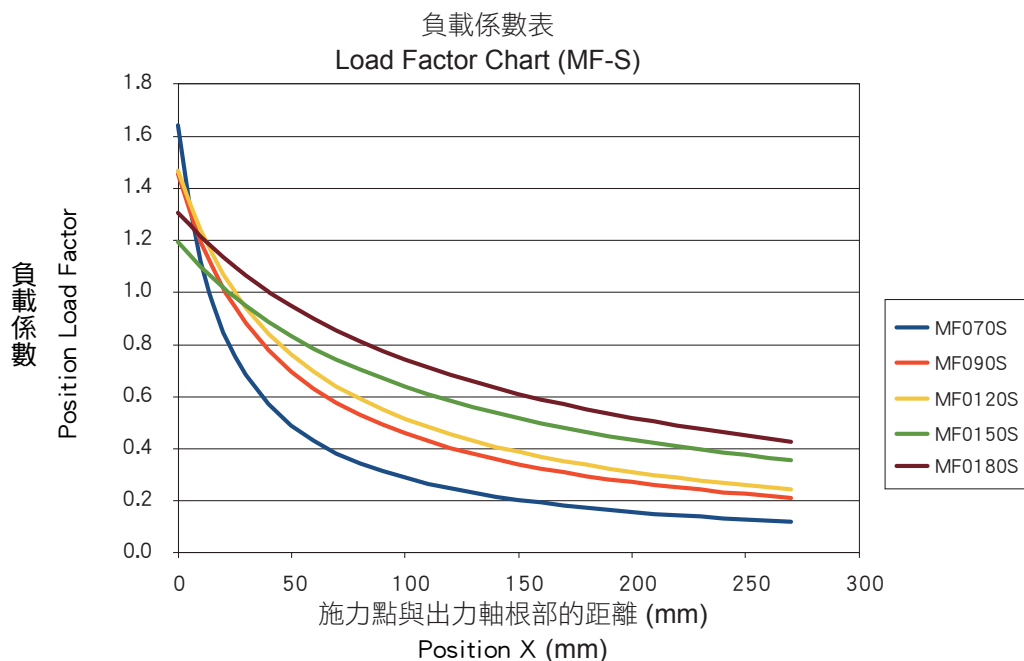
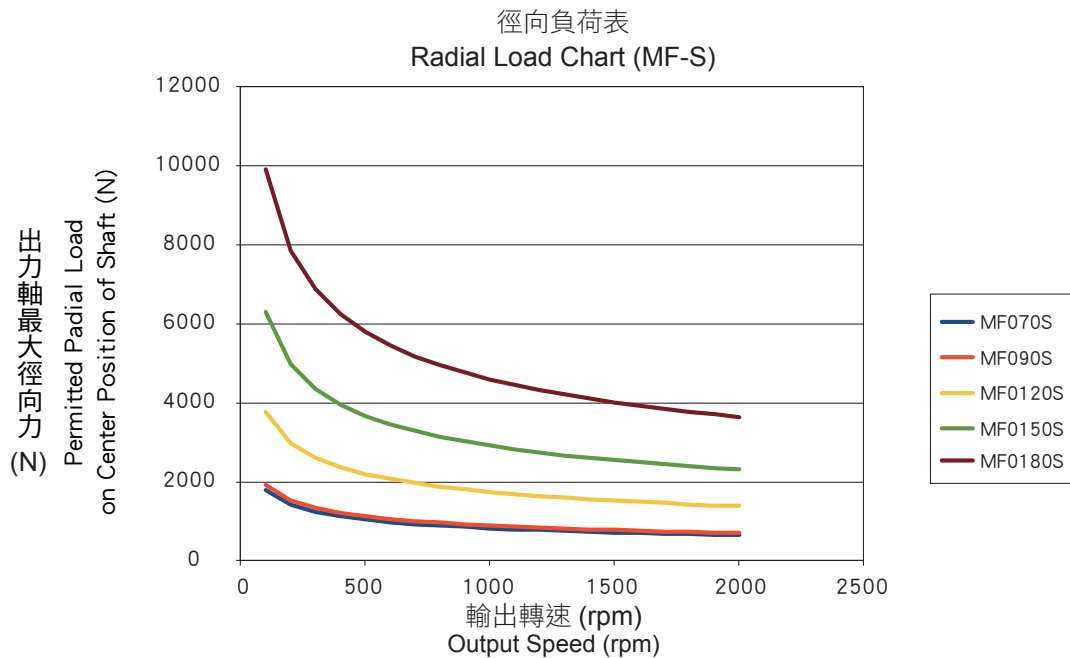
\* Permitted Radial Load :The force exerts perpendicular to output shaft

\* Permitted Axial Load :The force exerts parallel to output shaft

The radial & axial loads are related to the speed and application point on output shaft.

The radial & axial loads are decreased when the output shaft runs faster.

The radial & axial loads are decreased when the application points away from root segment of shaft.



# 馬達功率、減速比選用

## SELECTION REFERENCE TABLE & RATIO SELECTION TABLE

		MF-S系列減速機選用參考表(依據伺服馬達輸出功率選擇) MF-S Series Selection Reference (Based on The Motor Output Torque)																			
		比數 Ratio																			
馬達功率 Motor Output Power	減速機型號 Model	1/3	1/4	1/5	1/7	1/9	1/10	1/12	1/15	1/16	1/20	1/21	1/25	1/28	1/30	1/35	1/40	1/49	1/50	1/70	1/100
400W	MF070S	●	●	●	●	●		●	●	●	●	●	●	●		●					
	MF090S	●	●	●	●	●		●	●	●	●	●	●	●		●		●			
500W	MF090S	●	●	●	●	●		●	●	●	●	●	●	●		●					
	MF120S	●	●	●	●	●		●	●	●	●	●	●	●		●		●			●
750W	MF090S	●	●	●	●	●		●	●	●	●	●	●	●							
	MF120S	●	●	●	●	●		●	●	●	●	●	●	●		●		●			
1KW	MF120S	●	●	●	●	●		●	●	●	●	●	●	●		●		●			
	MF150S	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.5KW	MF120S	●	●	●	●	●		●	●	●	●	●	●	●		●					
	MF150S	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2.0KW	MF150S	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	MF180S	●		●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●
3.5KW	MF150S	●	●	●	●	●	●	●	●	●	●	●	●	●	●						
	MF180S	●		●	●	●	●	●	●		●	●	●	●	●	●	●	●	●		
5.0KW	MF150S	●	●	●	●	●	●	●	●	●	●	●									
	MF180S	●		●	●	●	●	●	●		●	●	●	●	●	●	●				
7.0KW	MF180S	●		●	●	●	●	●	●		●	●	●	●	●						

備註：

1. 可以依馬達輸出功率選用該比數有 '●' 記號之減速機型號。
2. 當應用於扭矩或慣性矩較大之場合，必須選用較大一級減速機。
3. 上表未列出之比數，如有需要請洽詢業務工程師。

Note：

1. By the motor output power, select the suitable gearbox models with '●' mark in above table.
2. When applied to a bigger torque or torsional rigidity mechanism, we suggest using a larger size gearbox.
3. Please contact us at vgm@vgmgear.com for ratios not being listed in above table.

MF-S 系列比數選擇 MF-S Series Ratio Composition Table			
減速機各段可選擇基本減速比數 Ratio Table of each Stage			
減速機型號 Model	一段式比數 Stage (L1)	二段式比數 Stage (L2)	三段式比數 Stage (L3)
MF070S	3, 4, 5, 7	9, 12, 15, 16, 20, 21, 25, 28, 35, 49	27, 36, 45, 48, 60, 75, 80, 100
MF090S	3, 4, 5, 7	9, 12, 15, 16, 20, 21, 25, 28, 35, 49	27, 36, 45, 48, 60, 75, 80, 100
MF120S	3, 4, 5, 7	9, 12, 15, 16, 20, 21, 25, 28, 35, 49	27, 36, 45, 48, 60, 75, 80, 100
MF150S	3, 4, 5, 7, 10	9, 12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 49, 50, 70	27, 36, 45, 48, 60, 75, 80, 90, 100
MF180S	3, 4, 5, 7, 10	9, 12, 15, 20, 21, 25, 28, 30, 35, 40, 49, 50, 70, 100	27, 36, 45, 48, 60, 75, 80, 90

MF-S 系列轉動慣量表								
	段數	比數	MF070S	MF090S	MF120S	MF150S	MF180S	
轉動慣量表 kg x cm <sup>2</sup>	L1	3	0.12	1.05	2.38	10.76	26.48	
		4	0.09	0.94	1.99	8.89	21.51	
		5	0.08	0.91	1.91	8.55	20.6	
		6	—	—	—	—	—	
		7	708	0.89	1.86	8.42	20.26	
		8	—	—	—	—	—	
		9	—	—	—	—	—	
		10	—	—	—	8.38	20.15	
		L2	15	0.08	0.89	1.87	8.51	20.5
			20	0.08	0.89	1.87	8.51	20.5
	25		0.08	0.89	1.87	8.51	20.5	
	30		—	—	—	8.51	20.5	
	35		0.08	0.88	1.84	8.4	20.2	
	40		—	—	—	8.37	20.13	
	45		—	—	—	—	—	
	50		—	—	—	8.37	20.13	
	60		—	—	—	—	—	
	70		—	—	—	8.37	20.13	
	80	—	—	—	—	—		
	90	—	—	—	—	—		
100	—	—	—	8.37	20.13			

MF-S Series Reducer Moment of Inertia Table								
	Stage	Ratio	MF070S	MF090S	MF120S	MF150S	MF180S	
Moment of inertia Table kg x cm <sup>2</sup>	L1	3	0.12	1.05	2.38	10.76	26.48	
		4	0.09	0.94	1.99	8.89	21.51	
		5	0.08	0.91	1.91	8.55	20.6	
		6	—	—	—	—	—	
		7	708	0.89	1.86	8.42	20.26	
		8	—	—	—	—	—	
		9	—	—	—	—	—	
		10	—	—	—	8.38	20.15	
		L2	15	0.08	0.89	1.87	8.51	20.5
			20	0.08	0.89	1.87	8.51	20.5
	25		0.08	0.89	1.87	8.51	20.5	
	30		-	—	—	8.51	20.5	
	35		0.08	0.88	1.84	8.4	20.2	
	40		—	—	—	8.37	20.13	
	45		—	—	—	—	—	
	50		—	—	—	8.37	20.13	
	60		—	—	—	—	—	
	70		—	—	—	8.37	20.13	
	80	—	—	—	—	—		
	90	—	—	—	—	—		
100	—	—	—	8.37	20.13			



# 技術規格表

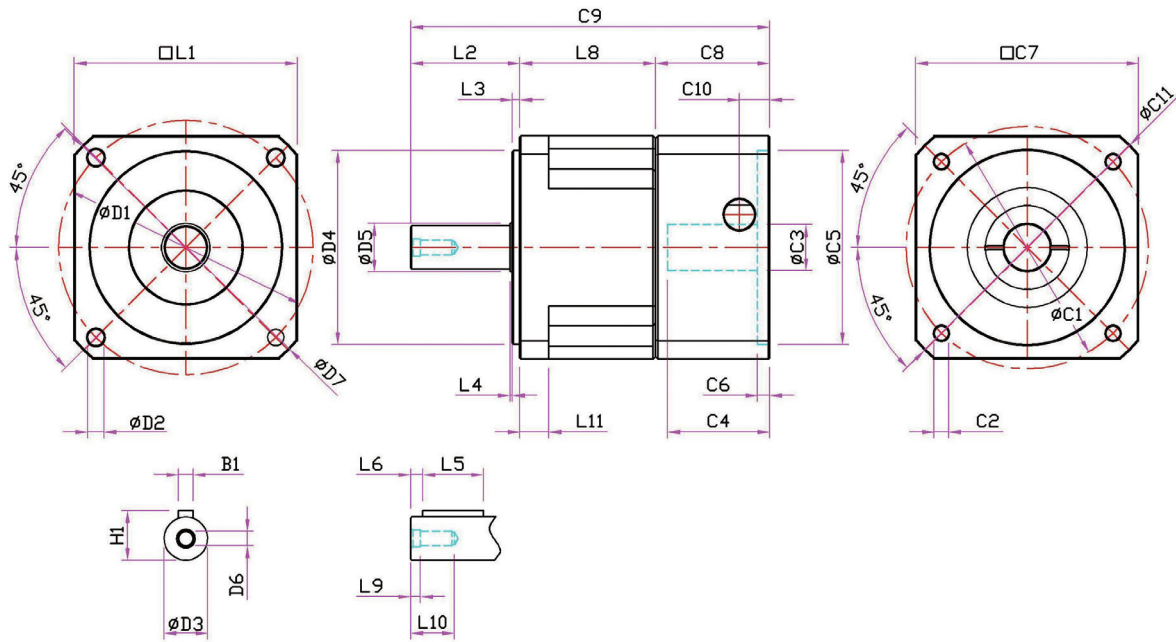
## TECHNICAL SPECIFICATIONS TABLE

MF-S 系列技術規格 Technical Specifications								
規格 Specification	單位 Unit	段數 Stage	比數 Ratio	MF070S	MF090S	MF120S	MF150S	MF180S
額定輸出扭矩 $T_{2N}$ Normal Output Torque	Nm	L1	3	25	80	190	450	1,050
			4	34	90	230	520	1,120
			5	30	86	220	500	1,100
			7	25	82	200	480	1,080
			10	—	—	—	450	1,050
		L2	9	25	80	200	480	1,080
			15	25	80	200	480	1,080
			20	34	90	230	520	1,120
			25	30	86	220	500	1,100
			35	30	86	220	500	1,100
			40	—	—	—	450	1,120
		L3	49	25	80	200	480	1,080
			70	—	—	—	450	1,080
			100	—	—	—	—	1,050
			27	34	90	230	520	1,120
			36	25	80	200	480	1,080
			45	25	80	200	480	1,080
			48	25	80	200	480	1,080
60	25	80	200	480	1,080			
75	25	80	200	480	1,080			
80	34	90	230	520	1,120			
100	34	90	230	500	—			
急停扭矩 Emergency Stop Torque	Nm	L1, L2, L3	3-100	2.5倍額定輸出扭矩 2.5 Times of Nominal Output.				
額定輸入轉速 $n_{IN}$ Normal Input Speed	rpm	L1, L2, L3	3-100	3,000	3,000	2,000	2,000	2,000
最大輸入轉速 $n_{IB}$ Max. Input Speed	rpm	L1, L2, L3	3-100	4,500	4,500	3,000	3,000	3,000
標準背隙 Standard Backlash	arcmin	L1	3-10	≤10-15	≤10-15	≤10-15	≤8-12	≤6-10
		L2	9-100	≤13-18	≤13-18	≤13-18	≤10-14	≤10-14
扭轉剛性 Torsional Rigidity	Nm/arcmin	L1, L2, L3	3-100	4	13	35	64	135
容許徑向力 $F_{aB}$ Max. Radial Load	N	L1, L2, L3	3-100	1,790	1,920	3,770	6,290	9,910
容許軸向力 $F_{rB}$ Max. Axial Load	N	L1, L2, L3	3-100	930	1,010	2,075	3,210	5,800
平均使用壽命 Average Life Time	hr	L1, L2, L3	3-100	20,000				
全負載時效率 $\eta$ Efficiency of Full Load	%	L1	3-10	≥ 96%				
		L2	9-100	≥ 93%				
		L3	27-100	≥ 90%				
淨重 Net Weight	kg	L1	3-10	1.5	3.3	6.0	15.2	37.0
		L2	9-100	1.9	4.2	7.2	16.2	46.4
		L3	27-100	2.2	6.8	8.2	18.5	
使用溫度 Operating Temp	°C	L1, L2, L3	3-100	- 10°C ~ + 90°C				
潤滑 Lubrication		L1, L2, L3	3-100	全合成潤滑油脂 Lithium Complex Synthetic Lubrication				
安裝方向 Mounting Position		L1, L2, L3	3-100	任意方向 All Directions				
噪音值 Running Noise	dBA	L1, L2, L3	3-100	≤70	≤70	≤70	≤74	≤74

- 上述單段減速機(未指定比數)相關規格，主要為使用各型號5比減速機所測得之數據。
- 減速比：i = 輸入轉速/輸出轉速。
- 背隙值：為在2%額定輸出扭矩下測試所得之數據。
- 最大徑向力及最大軸向力：施力於出力軸中心位置，週期負載時間50%，轉速100rpm，條件下所測得之數據。
- 運轉負載週期<60%狀況下，平均使用壽命如列表數據值；負載週期≥60%之連續運轉狀況下，平均使用壽命可能會降低至正常值的50%以下。
- 噪音值：距離1公尺，空載運轉，額定輸入轉速，條件下所測得之數據。

- Above relative specifications of each model most are measured on 5 : 1 gear ratio
- Ratios : i = Nin / Nout
- Backlash : Measured on 2% of nominal output torque
- Max. Radial and Axial Load : Applied to the output shaft center, and 50% of duty time and at 100 rpm
- Duty Cycle < 60%, Average Lifetime = List Value; Duty Cycle ≥ 60%, Average Lifetime < 50% List value
- Noise Level : Numeric measured on idle running in 1m distance, and at nominal input speed

# 尺寸圖 DRAWING & DEMENSION



(單位：mm)  
(Unit：mm)

尺寸Size	MF070S	MF090S	MF 120S	MF 150S	MF 180S	
D1	75	105	130	165	215	
D2	5.5	6.8	8.7	10.5	13	
D3	14	18	24	38(40)	50	
D4	60	80	110	130	160	
D5	15	20	35	40	60	
D6	M5×0.8P	M6×1P	M8×1.25P	M12×1.75P	M12×1.75P	
D7	90	120	150	190	240	
L1	70	92	115	142	182	
L2	32.5	45	56	75.5	95	
L3	3	3	3.5	4.5	10	
L4	1	1	1	3	2	
L5	20	25	40	45	70	
L6	2	5	5	5	6	
L8	一段 (stage 1)	49.6	56	62.1	103.1	127
	二段 (stage 2)	72	84	90.1	138.6	209
	三段 (stage 3)	93.8	112	118.1	174	291
L9	3	4	4	8	10	
L10	14	18	20	32	34	
L11	10	12	13.6	18.4	26	
C1	70	100	100	165	200	
C2	M5×0.8P(MAX)	M6×1P(MAX)	M8×1.25P(MAX)	M10×1.5P(MAX)	M12×1.75P(MAX)	
C3	6.35~14	14~19	16~24	22~42	35~42	
C4	32.5	42.1	47.4	69.5	82.5	
C5	50	80	80	130	114.3	
C6	4	5	5	15	11	
C7	70	92	115	142	182	
C8	47.5	47.1	52	86.9	110	
C9	一段 (stage 1)	129.6	148.1	170.1	265.5	332
	二段 (stage 2)	152	176.1	198.1	300.5	414
	三段 (stage 3)	173.8	204.1	226.1	336.4	496
C10	12	12.5	14.5	27	30	
C11	90	120	150	190	240	
B1	5	6	8	10(12)	14	
H1	16	20.5	27	41	53.5	

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note: C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

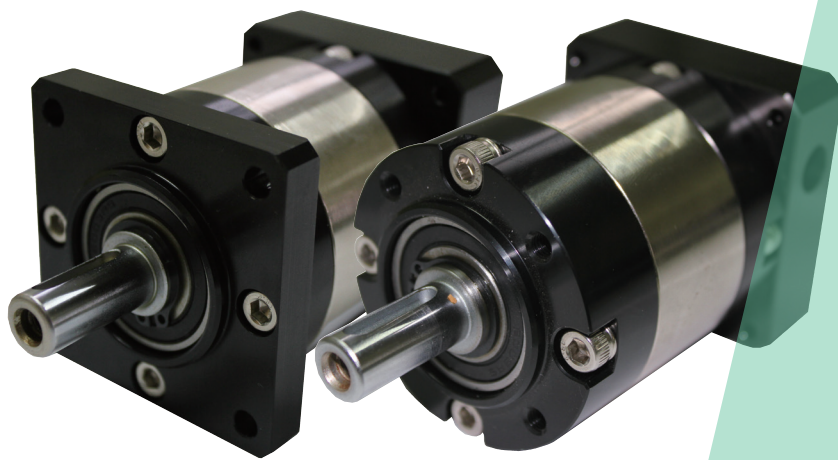
---

---

---

---

---



# P系列

## 泛用經濟型減速機

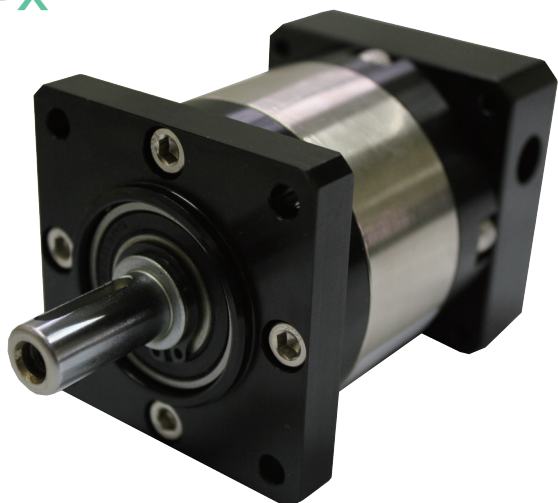
### Cost Effective, Universal Use Planetary Gearbox

- 一段背隙：12-17 弧分
- 減數比：3-100
- 一段負載時效率達 94%
- 1 Stage-Minimal backlash: 12-17 arc-min
- Ratio: 3-100
- 1 Stage-High efficiency: 94%

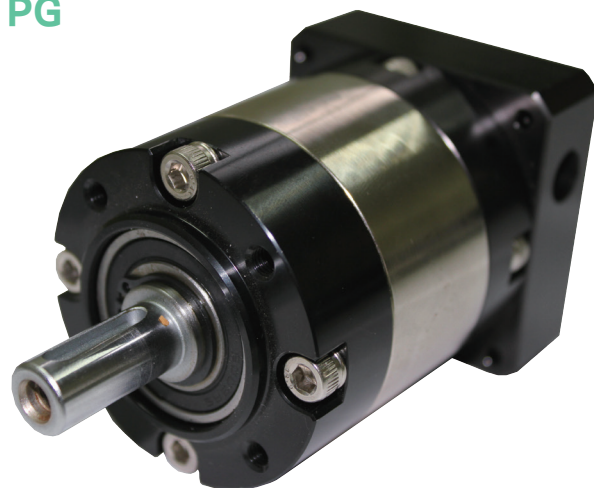
# 機型代碼

## P SERIES ORDERING CODE

PF/PX



PG



PG/PF/PX 60 - L1 - 10 - Motor

型號 Model
PG/PF/PX60
PG/PF/PX90
PG/PF/PX120

段數 Stage
L1: (Ratio 3-10)
L2: (Ratio 9-100)
L3: (Ratio 120-1000)

馬達 Motor
馬達廠牌、型號 Motor Brand & Model

減速比 Ratio
請參閱目錄第 34 頁，減速比組成表。 Please refer to page 34 " Ratio Composition Table".

# 輸出軸之容許徑向力

## PERMITTED RADIAL & AXIAL LOADS ON OUTPUT SHAFT OF THE GEARBOX

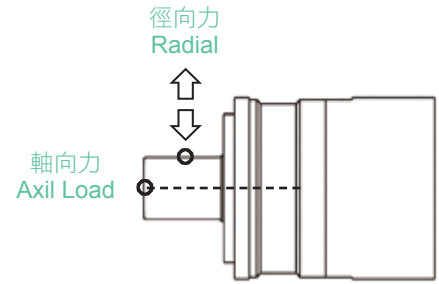
容許徑向力：垂直於軸心的力量

容許軸向力：平行於軸心的力量

容許徑和容許軸向力與減速機的出力軸轉速及施力點的距離相關。

轉速越快，容許徑向力會降低。

負載的距離越遠，容許的徑向力也隨之降低。



\* Permitted Radial Load :The force exerts perpendicular to output shaft

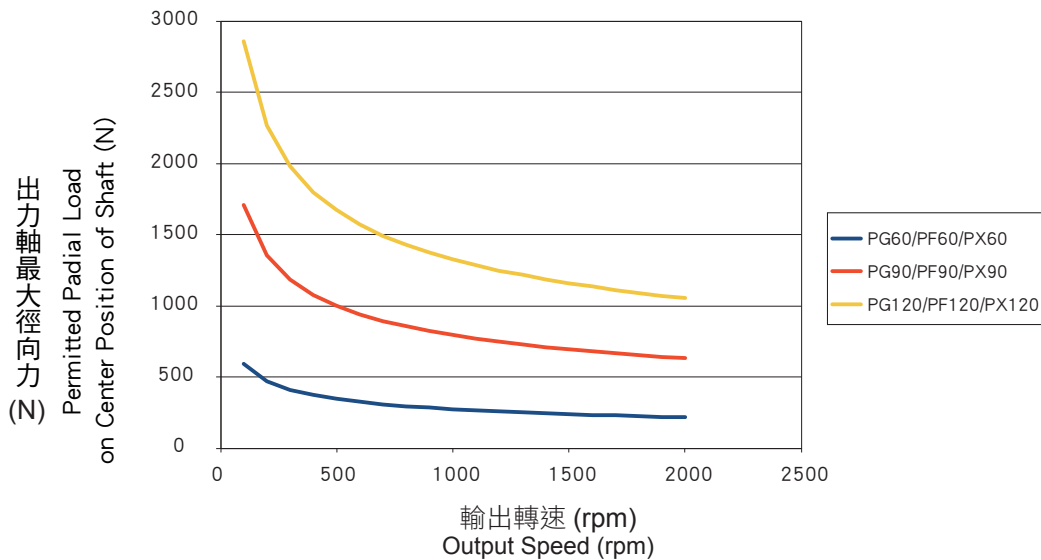
\* Permitted Axial Load :The force exerts parallel to output shaft

The radial & axial loads are related to the speed and application point on output shaft.

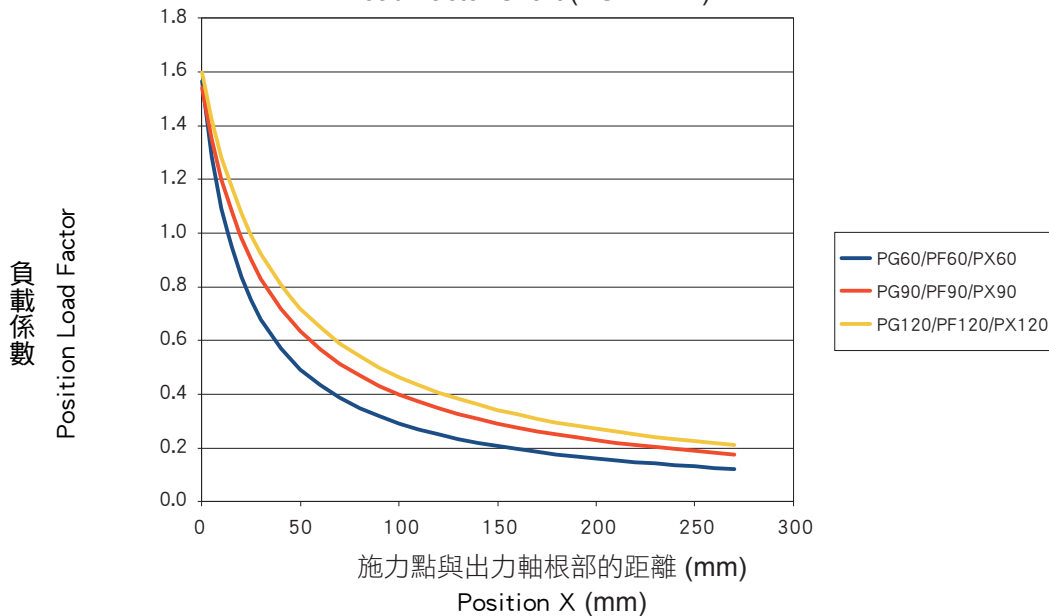
The radial & axial loads are decreased when the output shaft runs faster.

The radial & axial loads are decreased when the application points away from root segment of shaft.

徑向負荷表  
Radial Load Chart (PG/PF/PX)



負載係數表  
Load Factor Chart (PG/PF/PX)



# 馬達功率、減速比選用

## SELECTION REFERENCE TABLE & RATIO SELECTION TABLE

P系列 減速機選用參考表(依據伺服馬達輸出功率選擇) P Series Selection Reference (Based on The Motor Output Torque)																					
馬達功率 Motor Output Power	減速機型號 Model	比數 Ratio																			
		1/3	1/4	1/5	1/7	1/9	1/10	1/12	1/15	1/16	1/20	1/21	1/25	1/28	1/30	1/35	1/40	1/49	1/50	1/70	1/100
100W	PG/PF/PX60	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
200W	PG/PF/PX60	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
400W	PG/PF/PX60	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	PG/PF/PX90	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
500W	PG/PF/PX90	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	PG/PF/PX120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
750W	PG/PF/PX90	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	PG/PF/PX120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.0KW	PG/PF/PX120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1.5KW	PG/PF/PX120	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

備註：

1. 可以依馬達輸出功率選用該比數有 '●' 記號之減速機型號。
2. 當應用於扭矩或慣性矩較大之場合，必須選用較大一級減速機。
3. 上表未列出之比數，如有需要請洽詢業務工程師。

Note :

1. By the motor output power, select the suitable gearbox models with '●' mark in above table.
2. When applied to a bigger torque or torsional rigidity mechanism, we suggest using a larger size gearbox.
3. Please contact us at vgm@vgmgear.com for ratios not being listed in above table.

P系列 比數組成 P Series Ratio Composition Table			
減速機型號 Model	減速機各段可選擇基本減速比數 Ratio Table of each Stage		
	一段式比數 Stage (L1)	二段式比數 Stage (L2)	三段式比數 Stage (L3)
PG60 PF60 PX60	3, 4, 5, 7, 10	9, 12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 49, 50, 70, 100	
PG90 PF90 PX90	3, 4, 5, 7, 10	9, 12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 49, 50, 70, 100	27, 36, 45, 48, 60, 75, 80, 90
PG120 PF120 PX120	3, 4, 5, 7, 10	9, 12, 15, 16, 20, 21, 25, 28, 30, 35, 40, 49, 50, 70, 100	27, 36, 45, 48, 60, 75, 80, 90



P 系列轉動慣量表						
	段數	比數	PG/PX/PF 60	PG/PX/PF 90	PG/PX/PF 120	
轉動慣量表 kg x cm <sup>2</sup>	L1	3	0.05	1.01	2.31	
		4	0.05	0.9	1.91	
		5	0.05	0.88	1.86	
		6	—	—	—	
		7	0.05	0.86	1.8	
		8	—	—	—	
		9	—	—	—	
		10	0.05	0.86	1.78	
		L2	15	0.05	0.86	1.78
			20	0.05	0.86	1.78
	25		0.05	0.86	1.78	
	30		0.05	0.86	1.78	
	35		0.05	0.86	1.78	
	40		0.05	0.86	1.78	
	45		—	—	—	
	50		0.05	0.86	1.78	
	60		—	—	—	
	70		0.05	0.86	1.78	
	80	—	—	—		
	90	—	—	—		
100	0.05	0.86	1.78			

P Series Reducer Moment of Inertia Table						
	Stage	Ratio	PG/PX/PF 60	PG/PX/PF 90	PG/PX/PF 120	
Moment of inertia Table kg x cm <sup>2</sup>	L1	3	0.05	1.01	2.31	
		4	0.05	0.9	1.91	
		5	0.05	0.88	1.86	
		6	—	—	—	
		7	0.05	0.86	1.8	
		8	—	—	—	
		9	—	—	—	
		10	0.05	0.86	1.78	
		L2	15	0.05	0.86	1.78
			20	0.05	0.86	1.78
	25		0.05	0.86	1.78	
	30		0.05	0.86	1.78	
	35		0.05	0.86	1.78	
	40		0.05	0.86	1.78	
	45		—	—	—	
	50		0.05	0.86	1.78	
	60		—	—	—	
	70		0.05	0.86	1.78	
	80	—	—	—		
	90	—	—	—		
100	0.05	0.86	1.78			

# 技術規格表

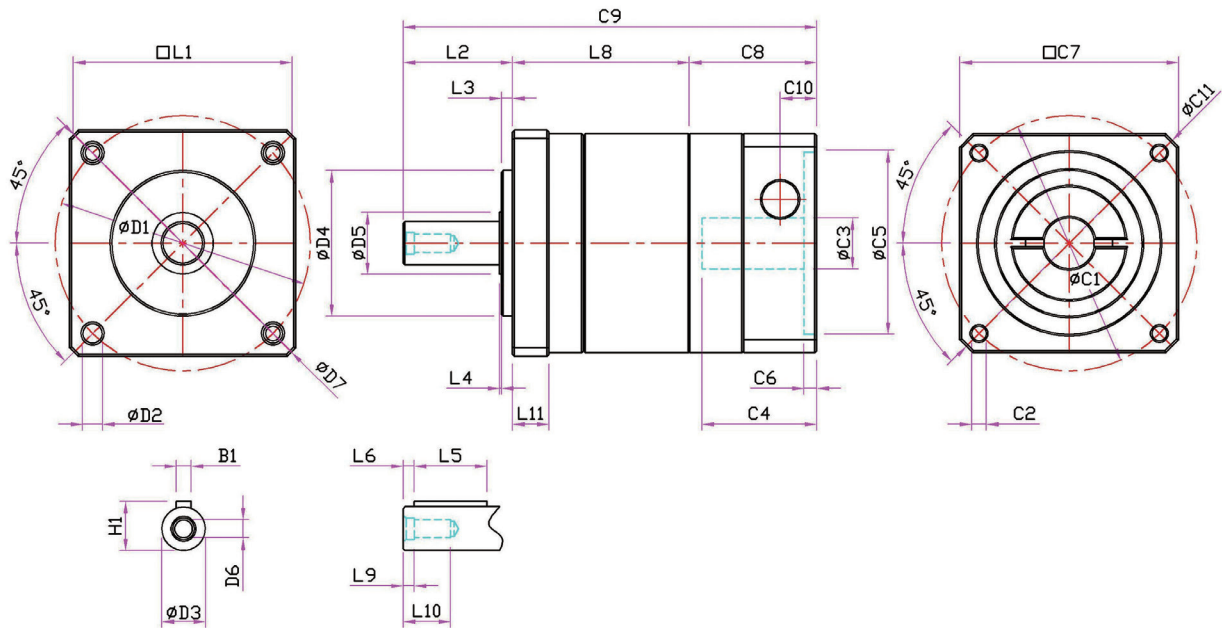
## TECHNICAL SPECIFICATIONS TABLE

P系列 技術規格 Technical Specifications						
規格 Specification	單位 Unit	段數 Stage	比數 Ratio	PG60/PF60/PX60	PG90/PF90/PX90	PG120/PF120/PX120
額定輸出扭矩 $T_{2N}$ Normal Output Torque	Nm	L1	3	15	79	190
			4	21	88	230
			5	20	85	215
			7	18	82	205
			10	15	79	190
		L2	9	15	79	190
			15	15	79	190
			20	21	88	230
			25	20	85	215
			35	20	85	215
			40	21	88	230
			49	18	82	205
		L3	70	18	82	205
			100	15	79	190
			27	—	88	230
			36	—	79	190
			45	—	79	190
			48	—	79	190
60	—	79	190			
75	—	79	190			
80	—	88	230			
急停扭矩 Emergency Stop Torque	Nm	L1, L2, L3	3-100	2.5倍額定輸出扭矩 2.5 Times of Nominal Output Torque		
額定輸入轉速 $n_{IN}$ Normal Input Speed	rpm	L1, L2, L3	3-100	3,000	3,000	2,000
最大輸入轉速 $n_{IB}$ Max. Input Speed	rpm	L1, L2, L3	3-100	4,500	4,500	3,000
標準背隙 Standard Backlash	arcmin	L1	3-10	≤15-20	≤12-17	≤12-17
		L2	9-100	≤17-22	≤15-20	≤15-20
扭轉剛性 Torsional Rigidity	Nm/arcmin	L1, L2, L3	3-100	2	7.2	14
容許徑向力 $F_{ar}$ Max. Radial Load	N	L1, L2, L3	3-100	590	1,700	2,850
容許軸向力 $F_{rB}$ Max. Axial Load	N	L1, L2, L3	3-100	325	840	1,470
平均使用壽命 Average Life Time	hr	L1, L2, L3	3-100	20,000		
全負載時效率 $\eta$ Efficiency of Full Load	%	L1	3-10	≥ 94%		
		L2	9-100	≥ 91%		
		L3	27-100	≥ 86%		
淨重 Net Weight	kg	L1	3-10	1.1	3.6	8.6
		L2	9-100	1.4	5.4	10.9
		L3	27-100	—	7.3	13.2
使用溫度 Operating Temp	°C	L1, L2, L3	3-100	- 10°C ~ + 90°C		
潤滑 Lubrication		L1, L2, L3	3-100	全合成潤滑油脂 Lithium Complex Synthetic Lubrication		
安裝方向 Mounting Position		L1, L2, L3	3-100	任意方向 All Directions		
噪音值 Running Noise	dBA	L1, L2, L3	3-100	≤70	≤70	≤70

1. 上述單段減速機(未指定比數)相關規格，主要為使用各型號5比減速機所測得之數據。
2. 減速比：i = 輸入轉速/輸出轉速。
3. 背隙值：為在2%額定輸出扭矩下測試所得之數據。
4. 最大徑向力及最大軸向力：施力於出力軸中心位置，週期負載時間50%，轉速100rpm，條件下所測得之數據。
5. 運轉負載週期<60%狀況下，平均使用壽命如列表數據值；負載週期≥60%之連續運轉狀況下，平均使用壽命可能會降低至正常值的50%以下。
6. 噪音值：距離1公尺，空載運轉，額定輸入轉速，條件下所測得之數據。

1. Above relative specifications of each model most are measured on 5 : 1 gear ratio
2. Ratios : I = Nin / Nout
3. Backlash : Measured on 2% of nominal output torque
4. Max. Radial and Axial Load : Applied to the output shaft center, and 50% of duty time and at 100 rpm
5. Duty Cycle < 60%, Average Lifetime = List Value; Duty Cycle ≥ 60%, Average Lifetime < 50% List value
6. Noise Level : Numeric measured on idle running in 1m distance, and at nominal input speed

# 尺寸圖 DRAWING & DEMENSION



(單位：mm)  
(Unit：mm)

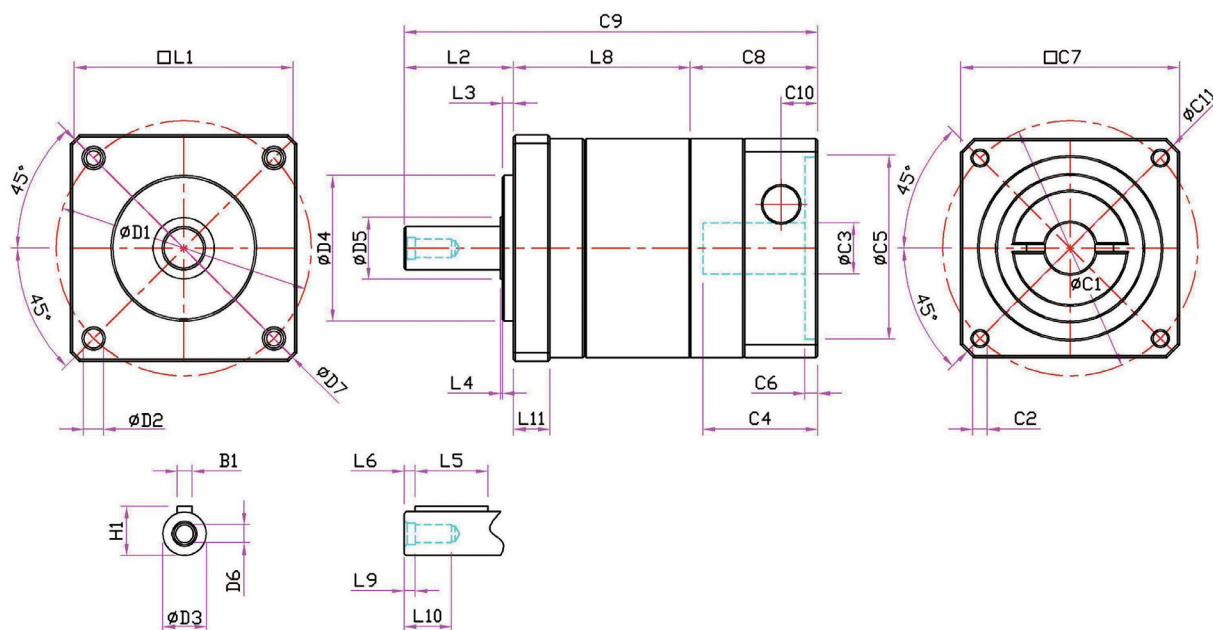
尺寸 Size	PF60	PF90	PF120
D1	70	105	145
D2	5.5	6.8	8.7
D3	12(14)	18(20)	32(24)
D4	40	80	80
D5	17	25	35
D6	M5×0.8P	M6×1P	M8×1.25P
D7	84.5	120	160
L1	62	95	120
L2	30(34)	57	70(60)
L3	3	15	10
L4	1	2	1
L5	20	25	40
L6	3	5	5
L8	一段 (stage 1)	48.5	80
	二段 (stage 2)	67	114
	三段 (stage 3)	—	148
L9	3	4	4
L10	14	18	20
L11	10	10	15
C1	70	100	145
C2	M5×0.8P(MAX)	M6×1P(MAX)	M8×1.25P(MAX)
C3	6-14	14-19	19-24
C4	31.5	43.5	61.5
C5	50	80	110
C6	3.5	8	7
C7	60	95	120
C8	35	56	72
C9	一段 (stage 1)	113.5(117.5)	222(212)
	二段 (stage 2)	132(136)	256(246)
	三段 (stage 3)	—	290(280)
C10	10	18	30.5
C11	80	120	160
B1	4(5)	6	10(8)
H1	13.5(16)	20.5(22.5)	35(27)

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note : C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.

# 尺寸圖

## DRAWING & DEMENSION



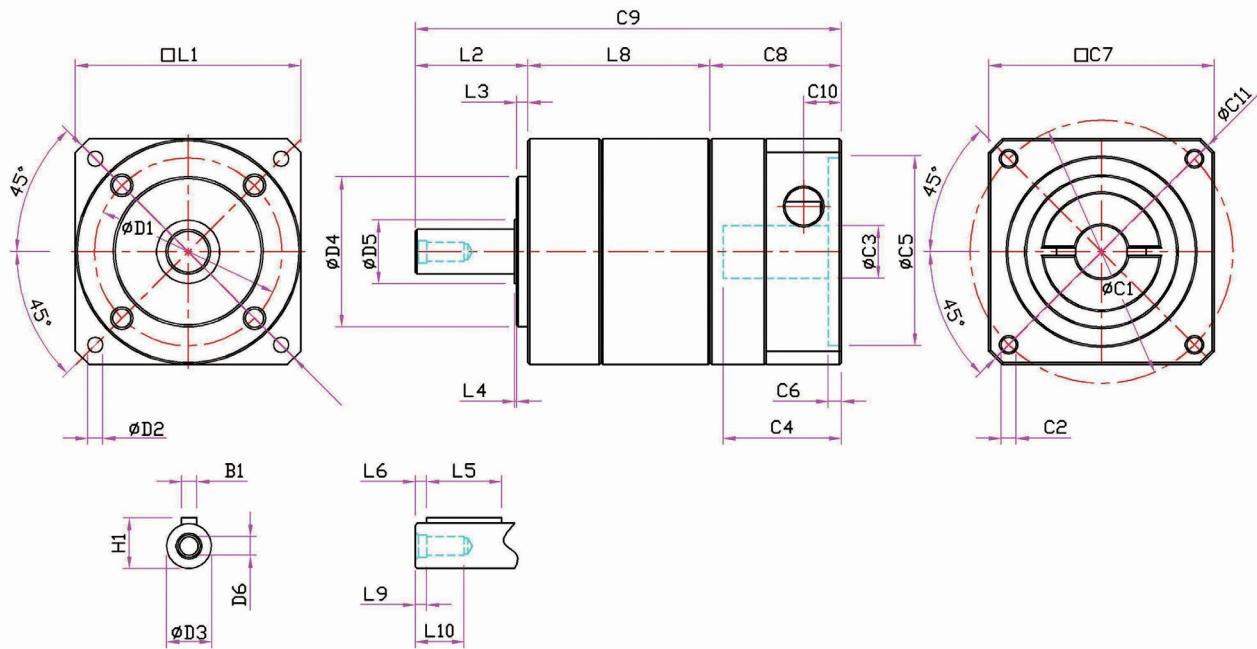
(單位：mm)  
(Unit：mm)

尺寸 Size	PX60	PX90	PX120
D1	70	100	145
D2	5.5	6.8	8.7
D3	16(14)	22(20)	32(24)
D4	50	80	110
D5	17	25	35
D6	M5×0.8P	M6×1P	M8×1.25P
D7	84.5	120	160
L1	62	95	120
L2	34	47	70(60)
L3	3	5	10
L4	1	2	1
L5	20	25	40
L6	3	5	5
L8	一段 (stage 1)	48.5	80
	二段 (stage 2)	67	114
	三段 (stage 3)	—	148
L9	3	4	4
L10	14	18	20
L11	10	10	15
C1	70	100	145
C2	M5×0.8P(MAX)	M6×1P(MAX)	M8×1.25P(MAX)
C3	6-14	14-19	19-24
C4	31.5	43.5	61.5
C5	50	80	110
C6	3.5	8	7
C7	60	95	120
C8	35	56	72
C9	一段 (stage 1)	117.5	222(212)
	二段 (stage 2)	136	256(246)
	三段 (stage 3)	—	290(280)
C10	10	18	30.5
C11	80	120	160
B1	5	6	10(8)
H1	18(16)	24.5(22.5)	35(27)

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note：C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.

# 尺寸圖 DRAWING & DEMENSION



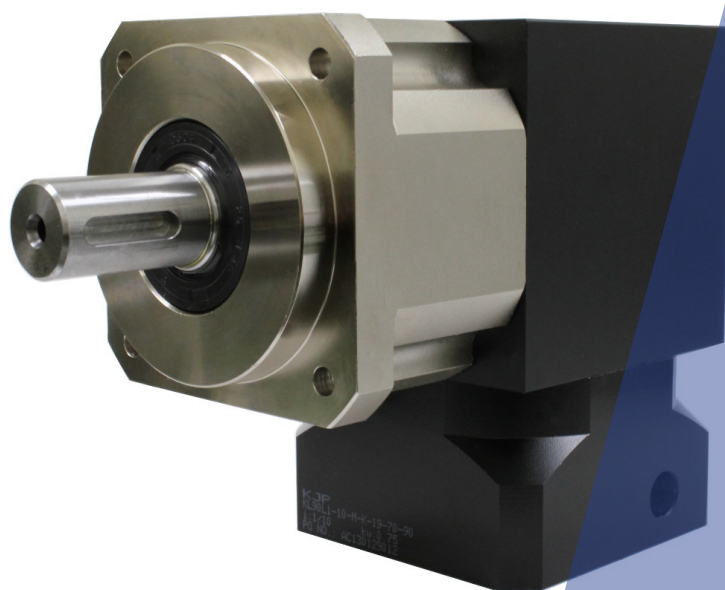
(單位：mm)  
(Unit：mm)

尺寸 Size	PG60	PG90	PG120
D1	50	70	100
D2	M5	M6	M10
D3	12(14)	18(20)	32(24)
D4	40	60	80
D5	17	25	35
D6	M5×0.8P	M6×1P	M8×1.25P
L1	60	95	120
L2	30(34)	47	70(60)
L3	3	5	10
L4	1	2	1
L5	20	25	40
L6	3	5	5
L8	一段 (stage 1)	48.5	66.5
	二段 (stage 2)	67	94
	三段 (stage 3)	—	121.5
L9	3	4	4
L10	14	18	20
C1	70	100	145
C2	M5×0.8P(MAX)	M6×1P(MAX)	M8×1.25P(MAX)
C3	6-14	14-19	19-24
C4	31.5	43.5	61.5
C5	50	80	110
C6	3.5	8	7
C7	60	95	120
C8	35	56	72
C9	一段 (stage 1)	113.5(117.5)	169.5
	二段 (stage 2)	132(136)	197
	三段 (stage 3)	—	224.5
C10	10	18	30.5
C11	80	120	160
B1	4(5)	6	10(8)
H1	13.5(16)	20.5(22.5)	35(27)

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note：C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.





# MFL 系列

節省空間 - 90 度轉角型減速機

Space-Saving Design Right-Angle Planetary Gearbox

- 一段背隙： $\leq 4$  弧分
- 減數比：3-200
- 一段負載時效率達 94%
- 1 Stage-Minimal backlash: :  $\leq 4$  arc-min
- Ratio: 3-200
- High efficiency: 94%

# 產品結構特點

## COMPONENT CHARACTERISTICS

### 本體

採用鉻鉬合金鋼及一體成型設計，精密度高及輸出扭矩大，表面採用噴砂陽極處理，具有高抗蝕效果。

### Ring Gear

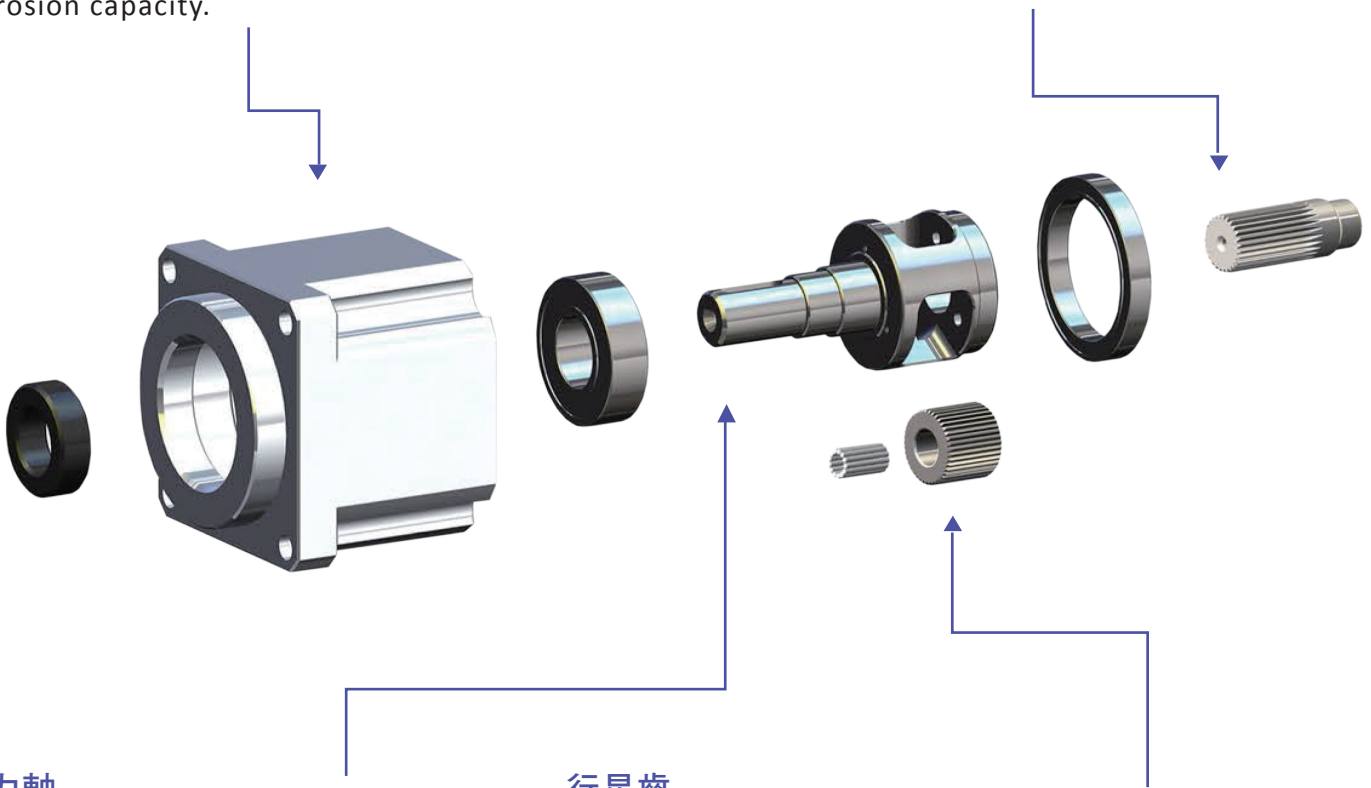
With Cr-Mo alloy steel and one-piece construction for internal gear to deliver high precision and large output torque. Sandblasting and Anodizing painting on gearbox surface to improve the anti-corrosion capacity.

### 太陽齒

選用鎳鉻鉬合金鋼，齒面經滲碳熱處理，耐磨性高及耐高衝擊。齒型精修處理，能提升齒輪精度及降低噪音。

### Sun Gear

Nickel chromium molybdenum alloy steel gear is manufactured with carburizing heat treatment for high abrasion resistance and impact toughness and by honing process to increase gear precision and low noise operation.



### 出力軸

使用鉻鉬合金鋼，採一體成型設計確保大扭力輸出之結構剛性，表面用無電解鎳處理，具備高防鏽蝕的功能。

### Output Shaft

Cr-Mo alloy steel shaft with one-piece design and structural rigidity to ensure large torque output. Surface coated with electroless nickel plating for high resistance to corrosion.

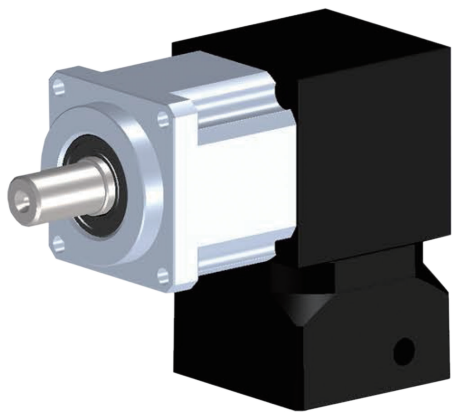
### 行星齒

選用鎳鉻鉬合金鋼，齒面經滲碳熱處理，耐磨性高及耐高衝擊，齒型精修處理，能提升齒輪精度及降低噪音，內孔使用滿針滾針軸，具高耐磨與高強度。

### Planetary Gear

Nickel chromium molybdenum alloy steel gear is manufactured with carburizing heat treatment for high abrasion resistance and impact toughness and by honing process to increase gear precision and low noise operation. Internal gear bore uses needle roller to obtain higher abrasion resistance and strength.



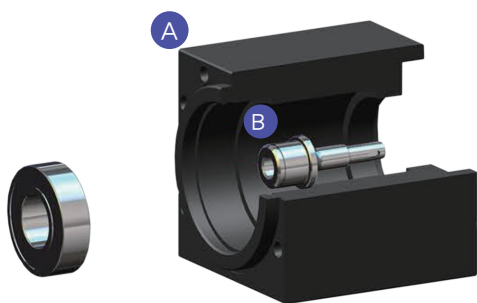


### A 轉向本體

特殊加工能確保轉軸的同心度與入力軸的垂直度。本體使用鋁合金材質，大幅降低整體結構重量，表面陽極處理提高防鏽等級。

### Steering Gearbox

Our specific treatment assures concentricity and alignment of the rotating shaft. Gearbox made with Aluminum alloy, decreased the weight. Anodizing painting on surface to improve the anti-corrosion capacity.



### 1 雙軸承設計

增加輸入的穩定性

### Double Bearings

Double bearings design to enhance the input stability.

### B 轉軸

採用鉻鉬合金鋼

### Rotating Shaft

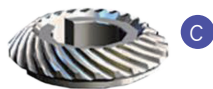
With nickel chromium molybdenum alloy steel.

### 2 入力軸

採用模組化設計，能搭配各廠牌，伺服馬達出力軸，表面染黑處理。

### Input Shaft

Modularized design can be used for various dimensions of servo motors. Shaft surface is coated with black oxide finishing



### C 螺旋傘齒輪

使用鎳鉻鉬合金鋼，表面滲碳處理，具耐磨與高衝擊特性

### Helical Bevel Gear

With Cr-Mo alloy steel and carburizing heat treatment for high abrasion resistance and impact toughness.

### 3 連接法蘭

採用模組化設計，適合各式伺服馬達組裝，表面採用噴砂陽極技術處理，提高防氧化效果。

### Connecting Flange

Modularized design can be used for various dimensions of servo motors. Sandblasting and Anodizing painting on surface to improve the anti-corrosion capacity.

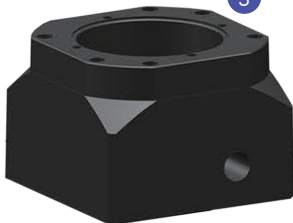


### D 滾珠軸承

轉軸簡支樑的支點使用滾珠軸承較滾針軸承有更大的支撐與壽命

### Ball Bearing

Use the ball bearing instead of needle bearing on the simple beam for the better loading capacity and the longer life.



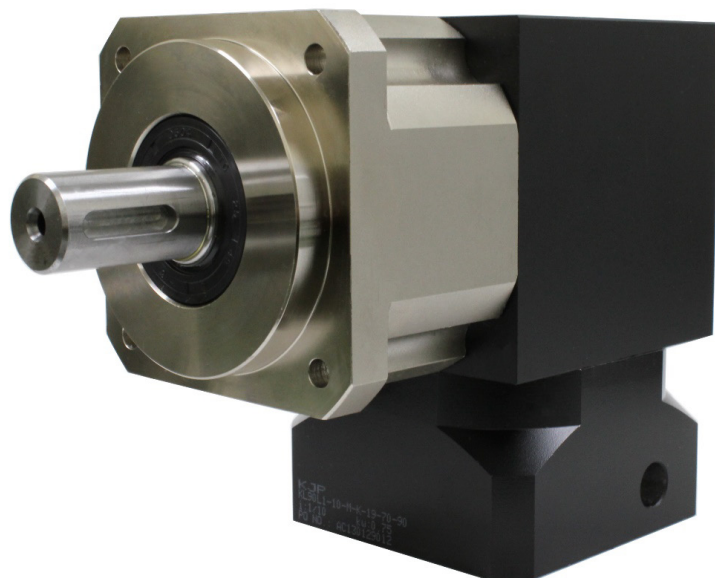
### A — D

### A-D 專利的後端整體結構

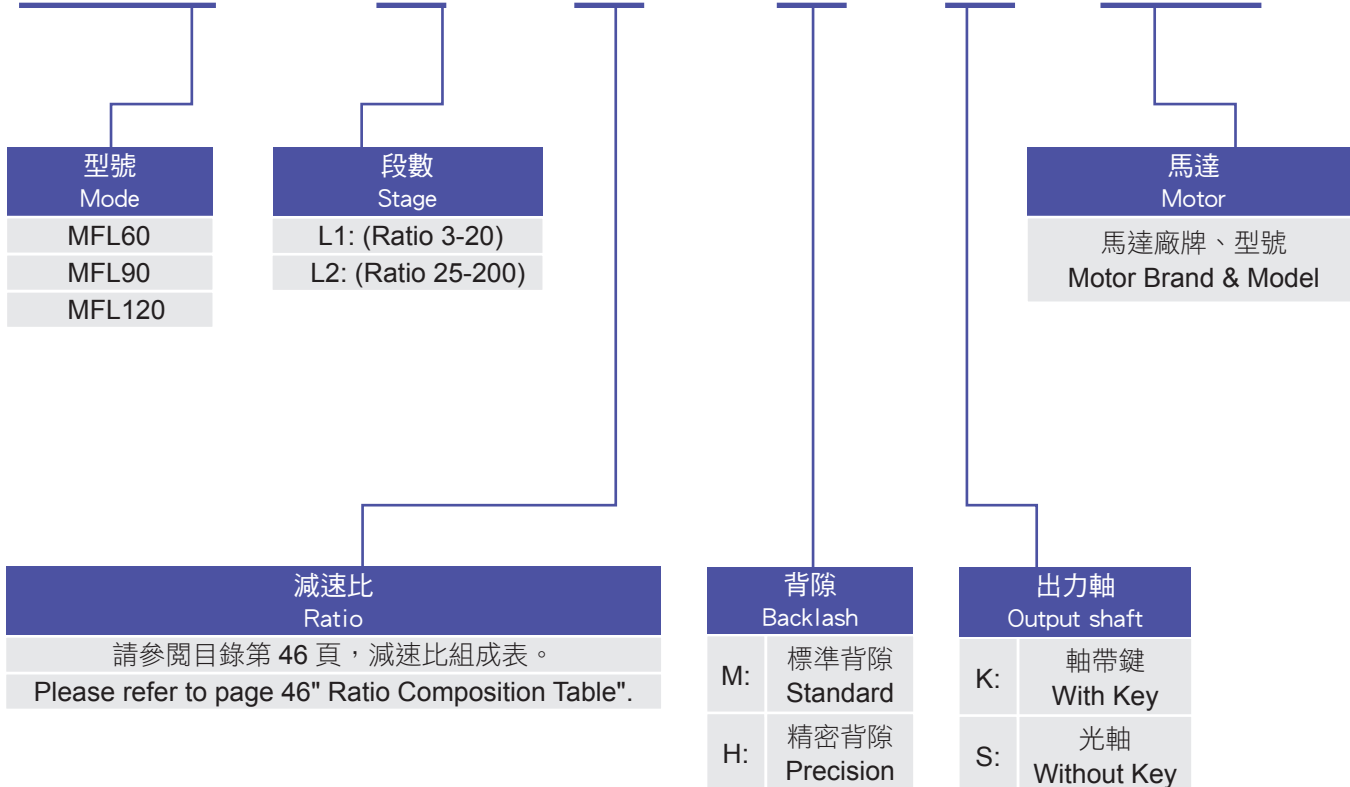
傘型齒背隙調整結構可同時調整軸承及傘型齒的組裝背隙。

### Patented Structure Design

The structure of helical bevel gear can adjust bearing and bevel gear's backlash at the same time



### MFL60 - L1 - 10 - M - K - Motor



# 輸出軸之容許徑向力

## PERMITTED RADIAL & AXIAL LOADS ON OUTPUT SHAFT OF THE GEARBOX

容許徑向力：垂直於軸心的力量

容許軸向力：平行於軸心的力量

容許徑和容許軸向力與減速機的出力軸轉速及施力點的距離相關。

轉速越快，容許徑向力會降低。

負載的距離越遠，容許的徑向力也隨之降低。

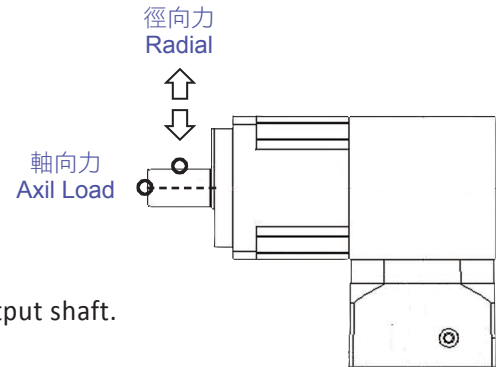
\* Permitted Radial Load :The force exerts perpendicular to output shaft

\* Permitted Axial Load :The force exerts parallel to output shaft

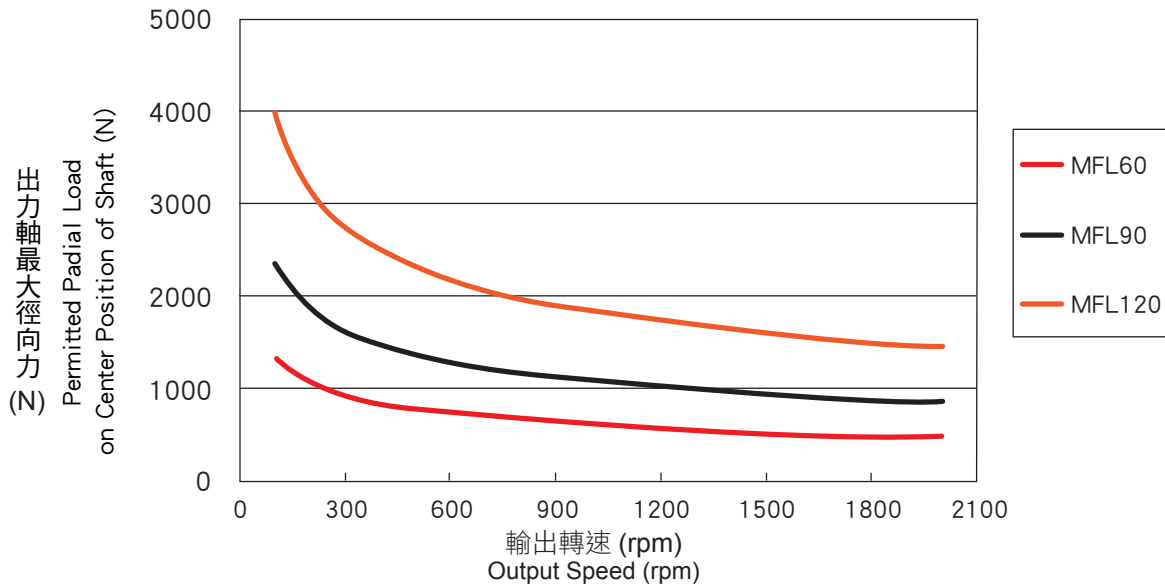
The radial & axial loads are related to the speed and application point on output shaft.

The radial & axial loads are decreased when the output shaft runs faster.

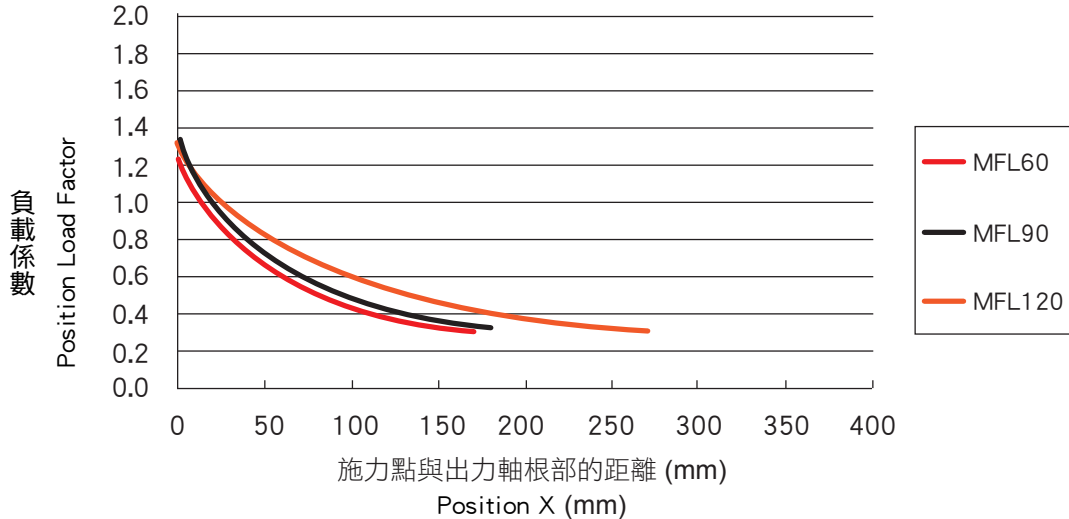
The radial & axial loads are decreased when the application points away from root segment of shaft.



徑向負荷表  
Radial Load Chart (MFL)



負載係數表  
Load Factor Chart (MFL)



# 減速比選用 . 轉動慣量表

## RATIO SELECTION TABLE & MOMENT OF INERTIA TABLE

MFL 系列減速比選擇 MFL Series Ratio Composition Table		
減速機型號 Model	減速比 Ratio	
	一段式減速比 Stage (L1)	二段式減速比 Stage (L2)
MFL60	3, 4, 5, 6, 7, 8, 9, 10, 14, 20	25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 180, 200
MFL90	3, 4, 5, 6, 7, 8, 9, 10, 14, 20	25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 180, 200
MFL120	3, 4, 5, 6, 7, 8, 9, 10, 14, 20	25, 30, 35, 40, 45, 50, 60, 70, 80, 90, 100, 120, 140, 180, 200

MFL 系列減速機轉動慣量表 MFL Series Moment of Inertial Table		
機型 Model	入力減速比 Gear Ratio	轉動慣量 Moment of inertial J1 kg*cm <sup>2</sup>
MFL60	1 : 1	0.11
	1 : 2	0.10
MFL90	1 : 1	1.31
	1 : 2	1.15
MFL120	1 : 1	2.91
	1 : 2	2.48

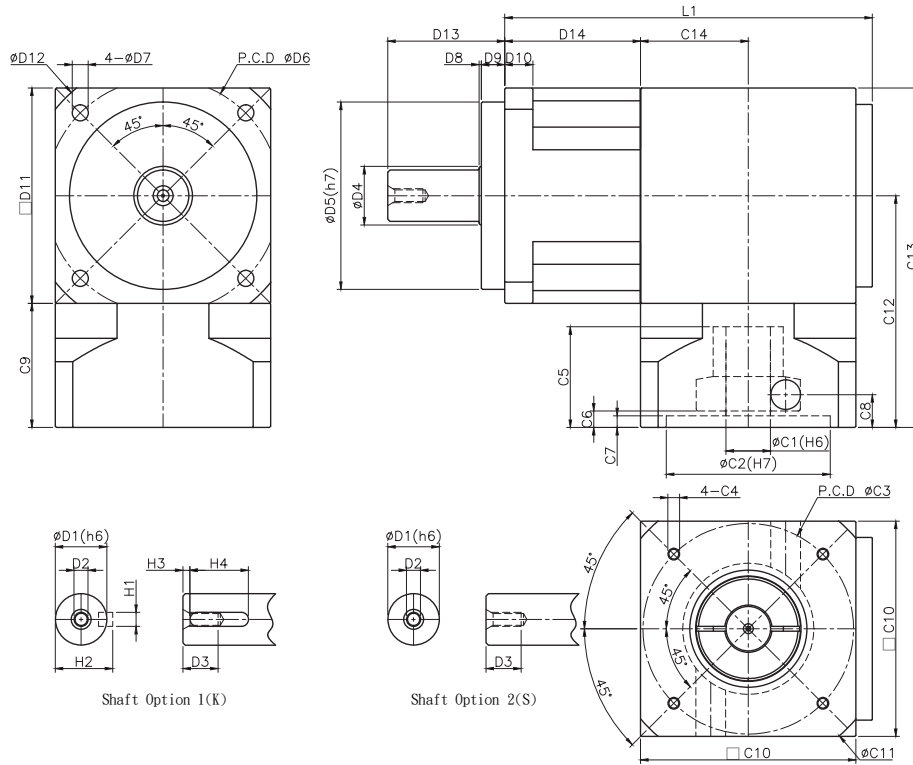
MFL系列技術規格表 Technical Specifications						
規格 Specification	單位 Unit	段數 Stage	減速比 Ratio	MFL60	MFL90	MFL120
額定輸出扭矩 $T_{2N}$ Normal Output Torque	Nm	L1	3	34	116	228
			4	35	120	236
			5	34	117	229
			6	33	113	222
			7	33	110	214
			8	35	100	236
			9	31	107	203
			10	29	94	184
			14	33	110	214
			20	29	94	184
		L2	25	34	117	229
			30	34	113	228
			35	34	117	229
			40	35	120	236
			45	31	107	203
			50	34	117	229
			60	33	113	222
			70	33	110	214
			80	35	100	236
			90	31	107	203
100	29	94	184			
120	33	113	222			
140	29	94	184			
180	31	107	203			
200	29	94	184			
急停扭矩 Emergency Stop Torque	Nm	L1, L2	3-200	3 倍額定輸出扭矩 3 Times of Nominal Output Torque		
額定輸入轉速 $n_{IN}$ Normal Input Speed	rpm	L1, L2	3-200	3,000	3,000	2,500
最大輸入轉速 $n_{IB}$ Max. Input Speed	rpm	L1, L2	3-200	6,000	6,000	5,000
精密背隙 H Precision Backlash	arcmin	L1	3-20	$\leq 4$	$\leq 4$	$\leq 4$
		L2	25-200	$\leq 7$	$\leq 7$	$\leq 7$
標準背隙 M Standard Backlash	arcmin	L1	3-20	$\leq 6$	$\leq 6$	$\leq 6$
		L2	25-200	$\leq 9$	$\leq 9$	$\leq 9$
扭轉剛性 Torsional Rigidity	Nm/arcmin	L1, L2	3-200	4	11	35
容許徑向力 $F_{rB}$ Max. Radial Load	N	L1, L2	3-200	1,328	2,340	4,000
容許軸向力 $F_{aB}$ Max. Axial Load	N	L1, L2	3-200	664	1,170	2,000
保固期 Warranty period	Y	L1, L2	3-200	1 年 / 1year		
全負載時效率 Efficiency of Full Load $\eta$	%	L1	3-20	$\geq 94\%$		
		L2	25-200	$\geq 91\%$		
淨重 Net Weight	kg	L1	3-20	2.26	6.85	13.5
		L2	25-200	2.56	8.05	15.88
使用溫度 Operating Temp	°C	L1, L2	3-200	-10°C ~ +90°C		
潤滑 Lubrication		L1, L2	3-200	鋰基複合全合成潤滑油脂 Lithium Complex Synthetic Lubrication		
安裝方式 Mounting Position		L1, L2	3-200	任意方向 All Directions		
防護等級 Degree of Protection		L1, L2	3-200	IP65		
噪音值 Running Noise	dBA	L1, L2	3-200	$\leq 68$	$\leq 70$	$\leq 70$

- 上述單段減速機(未指定比數)相關規格，主要為使用各型號5比減速機所測得之數據。
- 減速比：i = 輸入轉速/輸出轉速。
- 背隙值：為在2%額定輸出扭矩下測試所得之數據。
- 最大徑向力及最大軸向力：施力於出力軸中心位置，週期負載時間50%，轉速100rpm，條件下所測得之數據。
- 運轉負載週期<60%狀況下，平均使用壽命如列表數據值；負載週期 $\geq 60\%$ 之連續運轉狀況下，平均使用壽命可能會降低至正常值的50%以下。
- 噪音值：距離1公尺，空載運轉，額定輸入轉速，條件下所測得之數據。

- Above relative specifications of each model most are measured on 5 : 1 gear ratio
- Ratios : I = Nin / Nout
- Backlash : Measured on 2% of nominal output torque
- Max. Radial and Axial Load : Applied to the output shaft center, and 50% of duty time and at 100 rpm
- Duty Cycle < 60%, Average Lifetime = List Value; Duty Cycle  $\geq 60\%$ , Average Lifetime < 50% List value
- Noise Level : Numeric measured on idle running in 1m distance, and at nominal input speed

# 尺寸圖

## DRAWING & DEMENSION

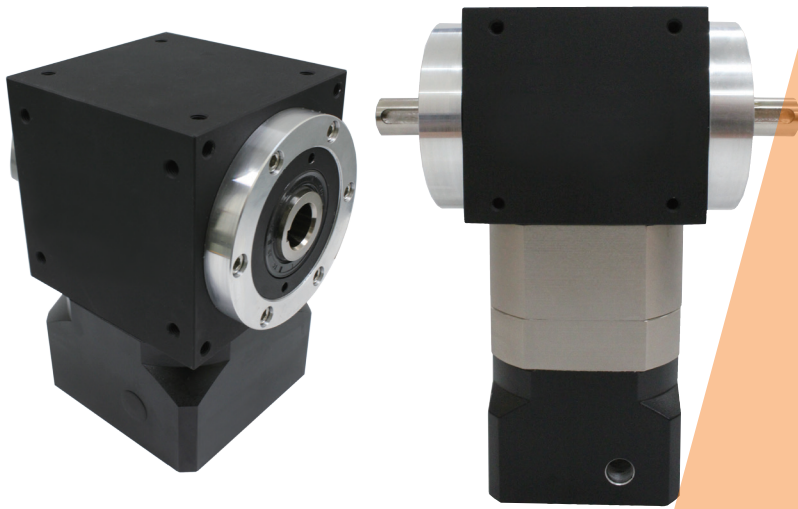


(單位：mm)  
(Unit：mm)

尺寸 Size	MFL60	MFL90	MFL120
D1	16	22	32
D2	M5x0.8P	M6x1.0P	M8x1.25P
D3	12	15	20
D4	18	25	35
D5	50	80	110
D6	70	100	130
D7	5.5	6.8	8.7
D8	1.5	1	1
D9	7.5	10	12
D10	10	12	15
D11	60	92	120
D12	80	118	158
D13	35.5	50	65
D14	49	58	69
H1	5	6	10
H2	18	24.5	35
H3	3	5	3
H4	20	25	40
L1	一段 (stage 1)	114	157
	二段 (stage 2)	130	184.5
C1	6-14	14-19	16-24
C2	50	70	110
C3	70	90	145
C4	M5x0.8P(MAX)	M6x1.0P(MAX)	M8x1.25P(MAX)
C5	40	44	65
C6	6	7	20
C7	4	5	7
C8	12	14	28.5
C9	45	53	78
C10	60.4	92	120
C11	80	120	161
C12	75	99	138
C13	105	145	198
C14	31	46	60

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note: C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.



# MFT系列

多樣性的連接方式

中空軸 / 雙出力軸 / 單邊出力軸

Multiple Connection Options

Hollow Shaft / Double Shaft / Single Shaft

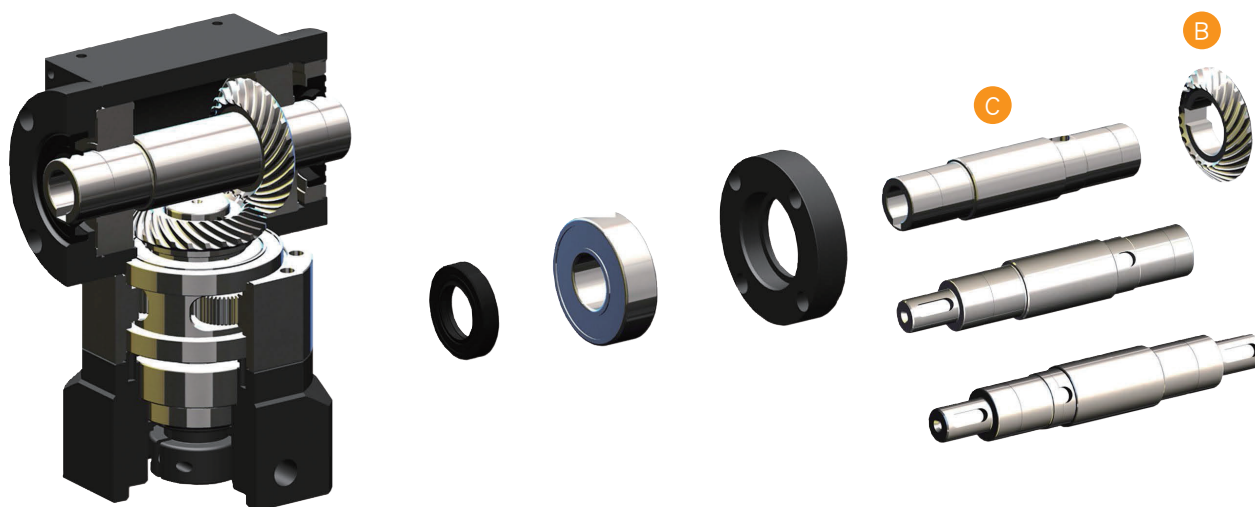
- 零段背隙： $\leq 6$  弧分
- 減數比：1-100
- 零段負載時效率達 98%
- 0 Stage-Minimal backlash:  $\leq 6$  arc-min
- Ratio: 1-100
- 0 Stage-High efficiency: 98%

### A—C 後端整體結構

傘型齒背隙調整結構可同時調整軸承及傘型齒的組裝背隙

### Patented Structure Design

The structure of helical bevel gear can adjust bearing and bevel gear's backlash at the same time.



### A 轉向本體

特殊加工能確保轉軸的同心度與入力軸的垂直度。本體使用鋁合金材質，大幅降低整體結構重量，表面陽極處理提高防鏽等級。

### Output Gearbox

Specific processing for the gearbox to ensure the alignment of rotating shaft and perpendicularity of input shaft.  
Using Aluminum alloy for the gearbox to slash the weight and sandblasting on surface to improve the antioxidant capacity.

### B 螺旋傘齒輪

採用鉻鉬合金鋼，表面滲炭熱處理，具耐磨與高衝擊特性。

### Helical Bevel Gear

With Cr-Mo alloy steel and carburizing heat treatment for high abrasion resistance and impact toughness.

### C 出力軸

使用鉻鉬合金鋼，採一體成型設計確保大扭力輸出之結構剛性，表面用無電解鍍處理，具備高防鏽蝕的功能。

### Output Shaft

Cr-Mo alloy steel shaft with one-piece design and structural rigidity to ensure large torque output. Surface coated with electroless nickel plating for high resistance to corrosion.





### 1 太陽齒

選用鎳鉻鉬合金鋼齒面經滲碳熱處理，耐磨性高及耐高衝擊。齒型精修處理，能提升齒輪精度及降低噪音。

### 2 減速軸

採用一體成型設計確保大扭力輸出之結構剛性

### 3 行星齒

選用鎳鉻鉬合金鋼，齒面經滲碳熱處理，耐磨性高及耐高衝擊，齒型精修處理，能提升齒輪精度及降低噪音，內孔使用滿針滾針軸，具高耐磨與高強度。

### 4 本體

採用鉻鉬合金鋼及一體成型設計，精密度高及輸出扭矩大，表面採用噴砂陽極處理具有高抗蝕效果

### 5 入力軸

採用模組化設計，能搭配各廠牌，伺服馬達出力軸，表面染黑處理。

### 6 連接法蘭

採用模組化設計，適合各式伺服馬達組裝，表面採用噴砂陽極技術處理，提高防氧化效果。

### Sun Gear

Nickel chromium molybdenum alloy steel gear is manufactured with carburizing heat treatment for high abrasion resistance and impact toughness and by honing process to increase gear precision and low noise operation

### Reduced Shaft

One-piece construction to ensure large torque output and structural rigidity.

### Planetary Gear

Nickel chromium molybdenum alloy steel gear is manufactured with carburizing heat treatment for high abrasion resistance and impact toughness and by honing process to increase gear precision and low noise operation. Internal gear bore uses needle roller to obtain higher abrasion resistance and strength.

### Ring Gear

Made of chrome-molybdenum alloy steel and one-piece design, precision high and high output torque, the surface is treated with sandblasted anode High corrosion resistance

### Input Shaft

Modularized design can be used for various dimensions of servo motors. Shaft surface is coated with black oxide finishing.

### Connecting Flange

Modularized design can be used for various dimensions of servo motors. Sandblasting and Anodizing painting on surface to improve the anti-corrosion capacity.

# 機型代碼

## MFT SERIES ORDERING CODE



### MFT60 - S0 - L1 - 10 - K - Motor

型號 Model
MFT60
MFT90
MFT120

出力軸樣式 Output Shaft Type:
S0: 中空軸 Hollow Shaft
S1: 單邊出力軸 Single Shaft
S2: 雙邊出力軸 Double Shaft

段數 Stage
L0: (Ratio 1)
L1: (Ratio 3-10)
L2: (Ratio 15-100)

減速比 Ratio
請參閱目錄第 54 頁，減速比組成表。 Please refer to page 54 "Ratio Composition Table".

馬達 Motor
馬達廠牌、型號 Motor Brand & Model

出力軸 Output shaft	
K:	軸帶鍵 With Key
S:	光軸 Without Key

# 輸出軸之容許徑向力

## PERMITTED RADIAL & AXIAL LOADS ON OUTPUT SHAFT OF THE GEARBOX

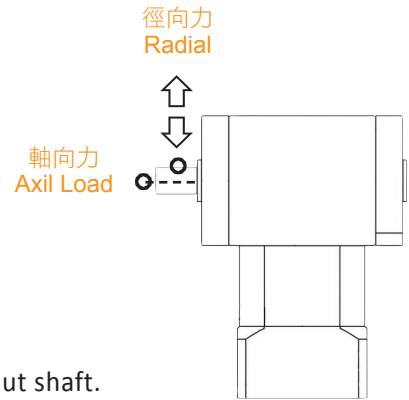
容許徑向力：垂直於軸心的力量

容許軸向力：平行於軸心的力量

容許徑和容許軸向力與減速機的出力軸轉速及施力點的距離相關。

轉速越快，容許徑向力會降低。

負載的距離越遠，容許的徑向力也隨之降低。



\* Permitted Radial Load :The force exerts perpendicular to output shaft

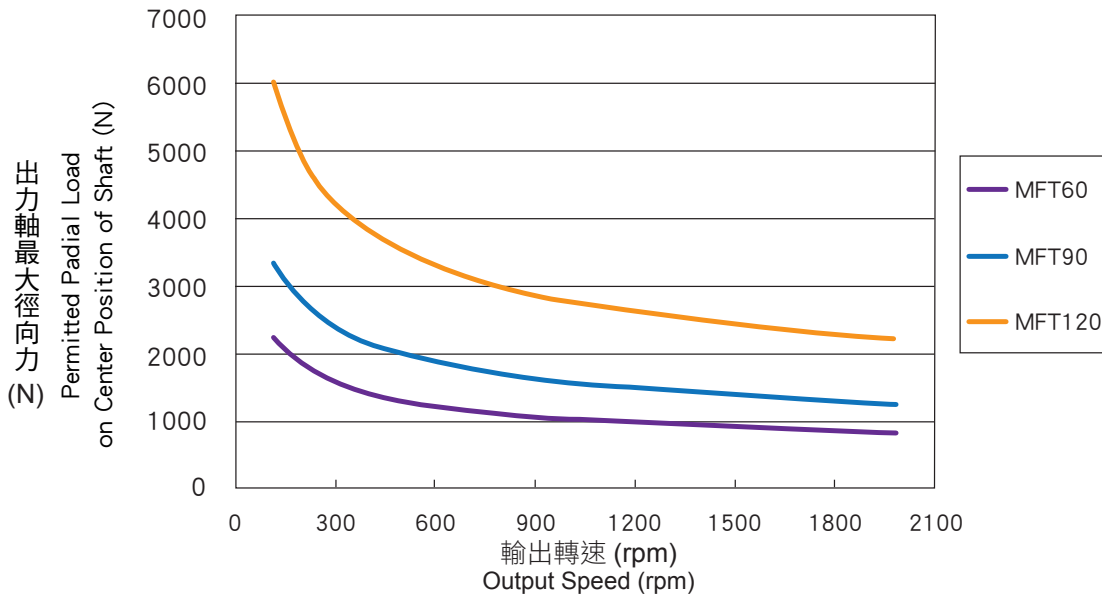
\* Permitted Axial Load :The force exerts parallel to output shaft

The radial & axial loads are related to the speed and application point on output shaft.

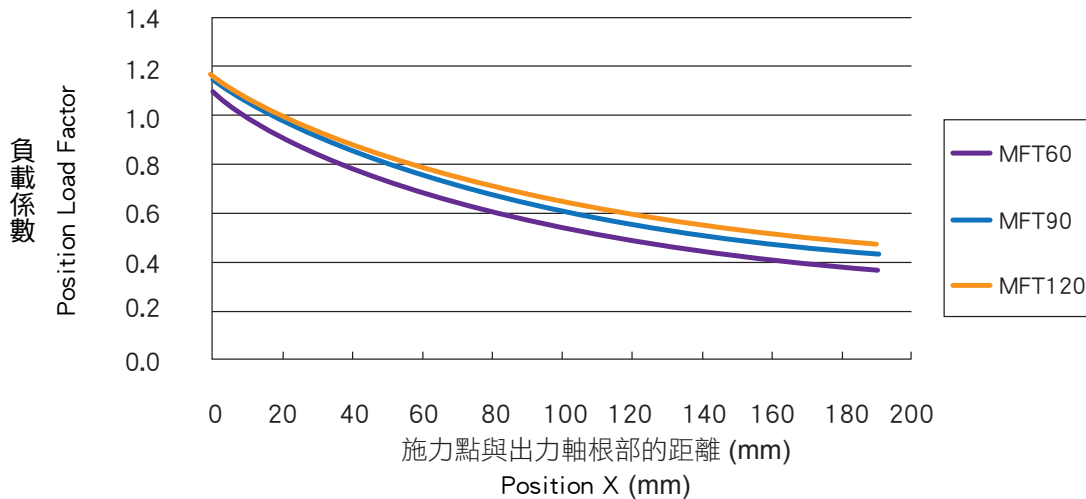
The radial & axial loads are decreased when the output shaft runs faster.

The radial & axial loads are decreased when the application points away from root segment of shaft.

徑向負荷表  
Radial Load Chart (MFT)



負載係數表  
Load Factor Chart (MFT)



# 減速比選用 . 轉動慣量表

## RATIO SELECTION TABLE & MOMENT OF INERTIA TABLE

MFT系列比數組成 MFT Series Ratio Composition Table			
減速機型號 Model	減速機各段可選擇基本減速比數 Ratio Table of Each Stage		
	零段式減速比 Stage (L0)	一段式減速比 Stage (L1)	二段式減速比 Stage (L2)
MFT60	1	3, 4, 5, 7, 10	15, 20, 25, 30, 35, 40, 50, 70, 100
MFT90	1	3, 4, 5, 7, 10	15, 20, 25, 30, 35, 40, 50, 70, 100
MFT120	1	3, 4, 5, 7, 10	15, 20, 25, 30, 35, 40, 50, 70, 100

MFT系列減速機轉動慣量總表 MFT Series Moment of inertial Table						
轉動慣量 Moment of inertial J1 (kg*cm <sup>2</sup> )	段數 Stage	減速比 Ratio	MFT60	MFT90	MFT120	
		L0	1	0.274	2.14	6.05
L1		3	0.14		1.25	3.28
		4	0.11		1.14	2.89
		5	0.10		1.11	2.81
		6	—		—	—
		7	0.10		1.10	2.76
		8	—		—	—
		9	—		—	—
		10	0.10		1.10	2.74
		L2	15		0.10	1.11
20				1.11		2.81
25				1.11		2.81
30				1.10		2.74
35				1.10		2.76
40				1.10		2.74
50				1.10		2.74
70				1.10		2.74
100				1.10		2.74

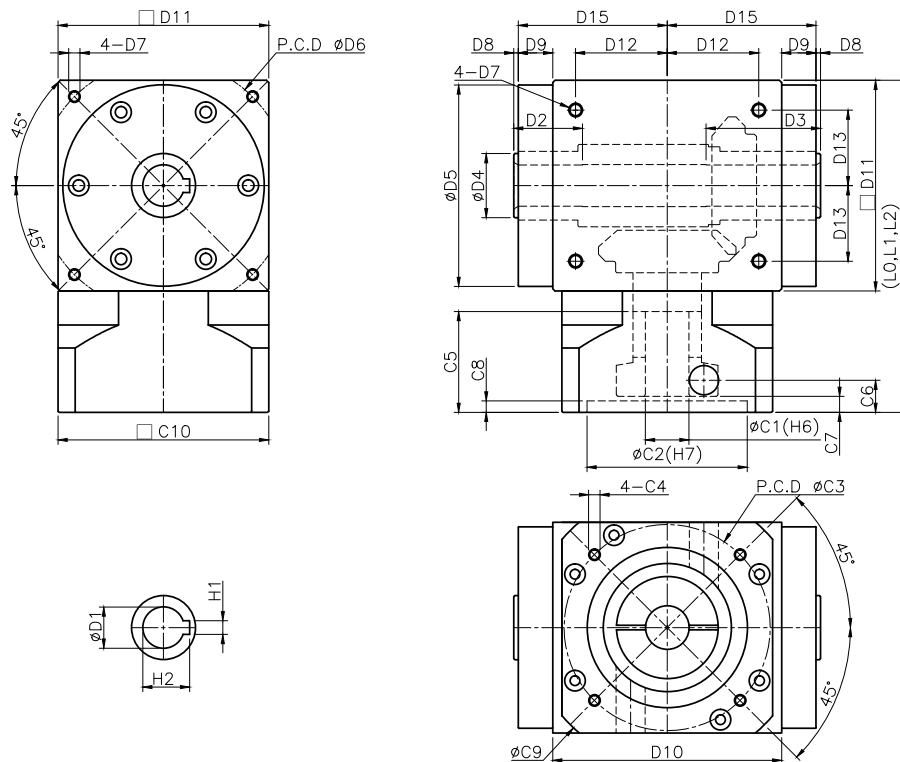
MFT系列技術規格表 Technical Specifications						
規格 Specification	單位 Unit	段數 Stage	比數 Ratio	MFT60	MFT90	MFT120
額定輸出扭矩 $T_{2N}$ Normal Output Torque	Nm	L0	1	15	58	114
	Nm	L1	3~10			
	Nm	L2	15~100			
急停扭矩 Emergency Stop Torque	Nm	L0, L1, L2	1~100	1.5 倍額定輸出扭矩 1.5 Times of Nominal Output Torque		
額定輸入轉速 $n_{1N}$ Normal Input Speed	rpm	L0, L1, L2	1~100	3,000	3,000	3,000
最大輸入轉速 $n_{1B}$ Max. Input Speed	rpm	L0, L1, L2	1~100	6,000	6,000	6,000
標準背隙 Standard Backlash	arcmin	L0	1	≤ 6	≤ 6	≤ 6
		L1	3~10	≤ 8	≤ 8	≤ 8
		L2	15~100	≤ 10	≤ 10	≤ 10
容許徑向力 $F_{rB}$ Max. Radial Load	N	L0	1	810	1,220	2,080
	N	L1, L2	3~100	1,108	1,688	2,900
容許軸向力 $F_{aB}$ Max. Axial Load	N	L0	1	381	610	1,040
	N	L1, L2	3~100	584	844	1,450
保固期 Warranty period	Y	L0, L1, L2	1~100	1 年 / 1 year		
全負載時效率 $\eta$ Efficiency of Full Load	%	L0	1	≥ 98%		
		L1	3~10	≥ 95%		
		L2	15~100	≥ 92%		
淨重 Net Weight	kg	L0	中空軸 S0 S0 (Hollow)	1.85	4.29	9.05
			單邊軸 S1 S1 (Single-side shaft)	1.98	4.65	9.66
			雙邊軸 S2 S2 (Both-side shaft)	2	4.71	9.77
		L1	中空軸 S0 S0 (Hollow)	2.05	6.47	13.8
			單邊軸 S1 S1 (Single-side shaft)	2.18	6.83	14.41
			雙邊軸 S2 S2 (Both-side shaft)	2.2	6.89	14.52
		L2	中空軸 S0 S0 (Hollow)	2.35	7.6	16.4
			單邊軸 S1 S1 (Single-side shaft)	2.48	7.95	17.01
			雙邊軸 S2 S2 (Both-side shaft)	2.5	8.01	17.12
使用溫度 Operating Temp	°C	L0, L1, L2	1~100	-10°C ~+90°C		
潤滑 Lubrication		L0, L1, L2	1~100	鋰基複合全合成潤滑油脂 Lithium Complex Synthetic Lubrication		
安裝方向 Mounting Position		L0, L1, L2	1~100	任意方向 All Directions		
防護等級 Degree of Protection		L0, L1, L2	1~100	IP65		
噪音值 Running Noise (轉速 = 1500 rpm)	dBA	L0	1	≤ 73	≤ 76	≤ 79
	dBA	L1, L2	3~100	≤ 65	≤ 65	≤ 65

1. 上述單段減速機(未指定比數)相關規格，主要為使用各型號5比減速機所測得之數據。
2. 減速比：i = 輸入轉速/輸出轉速。
3. 背隙值：為在2%額定輸出扭矩下測試所得之數據。
4. 最大徑向力及最大軸向力：施力於出力軸中心位置，週期負載時間50%，轉速100rpm，條件下所測得之數據。
5. 運轉負載週期<60%狀況下，平均使用壽命如列表數據值；負載週期≥60%之連續運轉狀況下，平均使用壽命可能會降低至正常值的50%以下。
6. 噪音值：距離1公尺，空載運轉，額定輸入轉速，條件下所測得之數據。

1. Above relative specifications of each model most are measured on 5 : 1 gear ratio
2. Ratios : i = Nin / Nout
3. Backlash : Measured on 2% of nominal output torque
4. Max. Radial and Axial Load : Applied to the output shaft center, and 50% of duty time and at 100 rpm
5. Duty Cycle < 60%, Average Lifetime = List Value; Duty Cycle ≥ 60%, Average Lifetime < 50% List value
6. Noise Level : Numeric measured on idle running in 1m distance, and at nominal input speed

# 尺寸圖

## DRAWING & DEMENSION



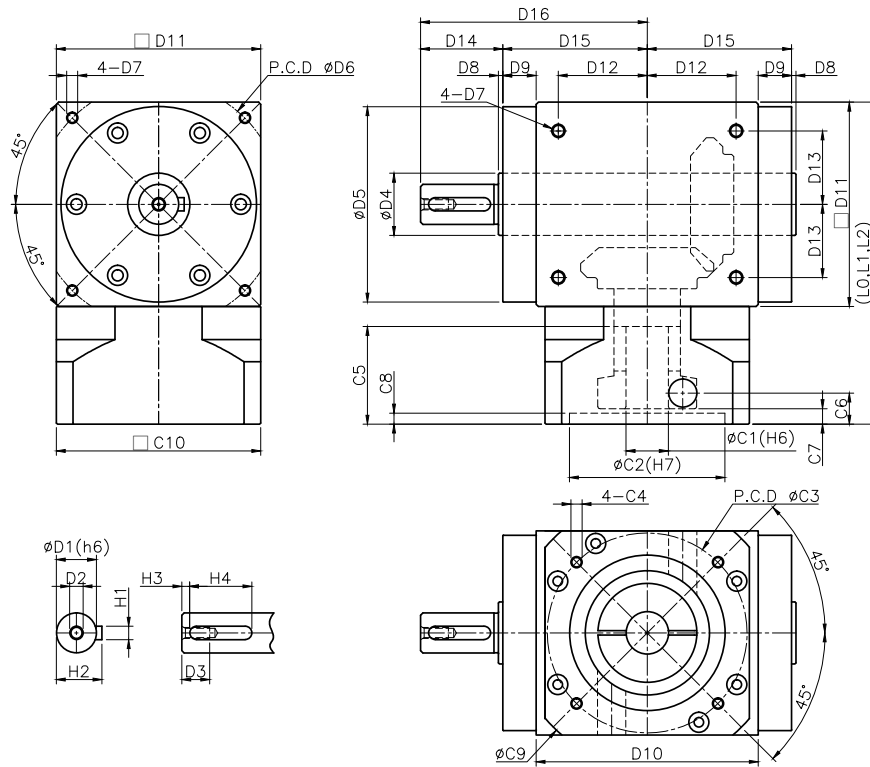
(單位：mm)  
(Unit：mm)

尺寸 Size	MFT60-S0	MFT90-S0	MFT 120-S0
ØD1	13	18	22
D2	30	30	35
D3	30	50	55
ØD4	20	28	35
ØD5	62	88	108
ØD6	76	110	145
D7	M4x0.7P	M6x1.0P	M8x1.25P
D8	2	2	2
D9	13	15	15
D10	70	100	126
D11	62	92	120
D12	25	40	50
D13	25	33	42
D15	48	65	78
H1	5	6	6
H2	15.3	20.8	24.8
L0 零段 (stage 0)	101.5	141	198
L1 一段 (stage 1)	130	185.5	254
L2 二段 (stage 2)	146	213	287.2
ØC1	6-14	14-19	16-24
ØC2	50	70	110
ØC3	70	90	145
C4	M5x0.8P(MAX)	M6x1.0P(MAX)	M8x1.25P(MAX)
C5	33	39	65
C6	13	15	28.5
C7	7	7	20
C8	4	5	7
ØC9	80	120	161
C10	60	92	120

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note: C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product..

# 尺寸圖 DRAWING & DEMENSION



(單位：mm)  
(Unit：mm)

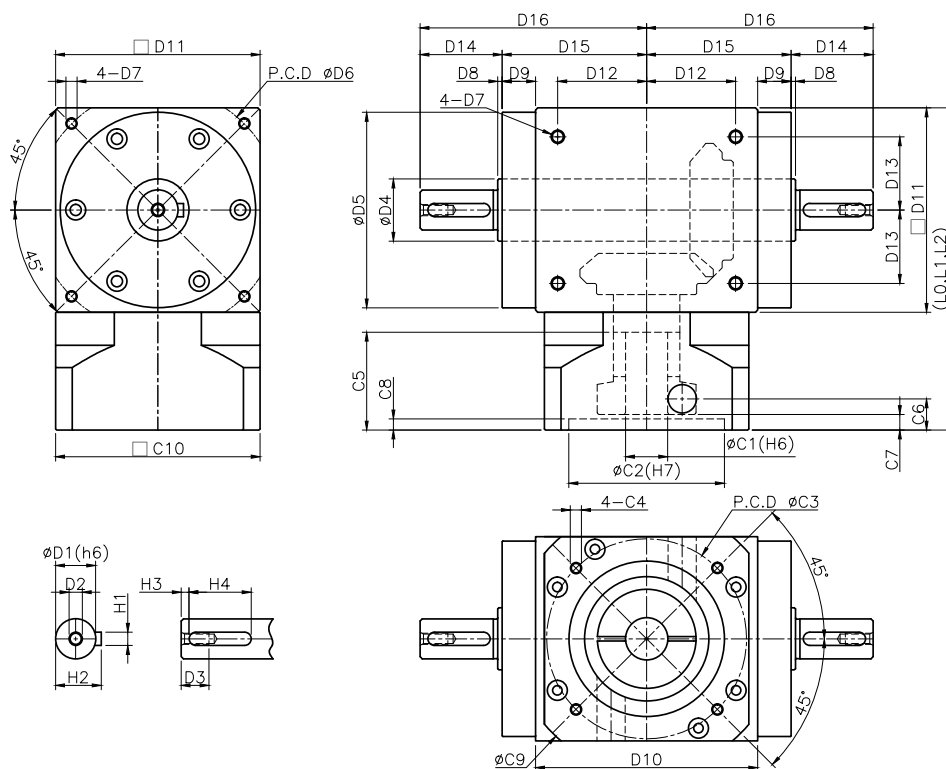
尺寸 Size	MFT60 -S1	MFT90-S1	MFT120-S1
ØD1	13	18	22
D2	M4x0.7P	M5x0.8P	M8x1.25P
D3	12	14.5	22
ØD4	20	28	35
ØD5	62	88	108
ØD6	76	110	145
D7	M4x0.7P	M6x1.0P	M8x1.25P
D8	2	2	2
D9	13	15	15
D10	70	100	126
D11	62	92	120
D12	25	40	50
D13	25	33	42
D14	22	37	42
D15	48	65	78
D16	70	102	120
H1	5	6	6
H2	15	20.5	24.5
H3	2	3.5	5
H4	16	25	25
L0 零段 (stage 0)	101.5	141	198
L1 一段 (stage 1)	130	185.5	254
L2 二段 (stage 2)	146	213	287.2
ØC1	6-14	14-19	16-24
ØC2	50	70	110
ØC3	70	90	145
C4	M5x0.8P(MAX)	M6x1.0P(MAX)	M8x1.25P(MAX)
C5	33	39	65
C6	13	15	28.5
C7	7	7	20
C8	4	5	7
ØC9	80	120	161
C10	60	92	120

\* 註：C1-C6 為標準品最大尺寸，為公制標準馬達連接板尺寸，尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note：C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.

# 尺寸圖

## DRAWING & DEMENSION



(單位 : mm)  
(Unit : mm)

尺寸 Size	MFT60-S2	MFT90-S2	MFT120-S2
ØD1	13	18	22
D2	M4x0.7P	M5x0.8P	M8x1.25P
D3	12	14.5	22
ØD4	20	28	35
ØD5	62	88	108
ØD6	76	110	145
D7	M4x0.7P	M6x1.0P	M8x1.25P
D8	2	2	2
D9	13	15	15
D10	70	100	126
D11	62	92	120
D12	25	40	50
D13	25	33	42
D14	22	37	42
D15	48	65	78
D16	70	102	120
H1	5	6	6
H2	15	20.5	24.5
H3	2	3.5	5
H4	16	25	25
L0 零段 (stage 0)	101.5	141	198
L1 一段 (stage 1)	130	185.5	254
L2 二段 (stage 2)	146	213	287.2
ØC1	6-14	14-19	16-24
ØC2	50	70	110
ØC3	70	90	145
C4	M5x0.8P(MAX)	M6x1.0P(MAX)	M8x1.25P(MAX)
C5	33	39	65
C6	13	15	28.5
C7	7	7	20
C8	4	5	7
ØC9	80	120	161
C10	60	92	120

\* 註 : C1-C6 為標準品最大尺寸, 為公制標準馬達連接板尺寸, 尺寸依搭配的馬達而改變。如超出尺寸屬特殊規格請與我司聯絡。

\* Note : C1-C6 are metric standard specific dimensions of motor. Please contact us at vgm@vgmgear.com for other specification or customize product.

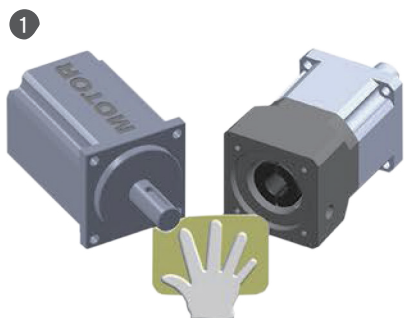


# 其他補充參考資料

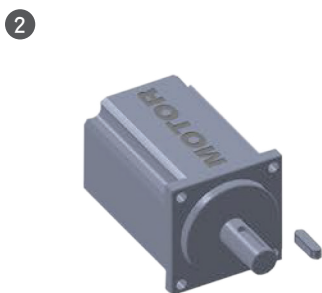
## ADDITION INSTRUCTION

---

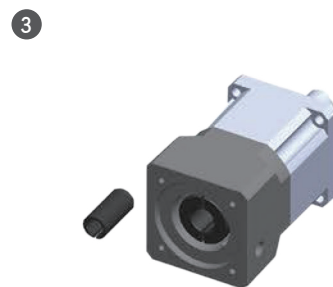
安裝方式 .....	P.60
減速機快選法 .....	P.62
Mounting Instruction.....	P.60
Gear Reducer Quick Selection Method.....	P.62



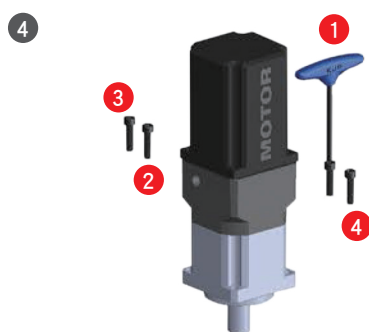
1. 檢查馬達與減速機規格是否正確，與介面是否相符。
2. 清潔馬達與減速機連接介面的表面，清除油污與雜質。



取下馬達上原先之鍵。



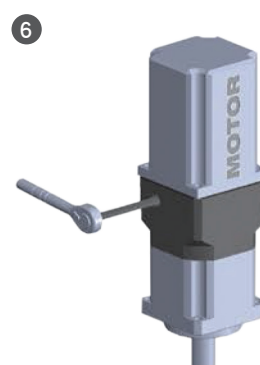
確認馬達軸心尺寸，若有必要，裝上襯套。



1. 將馬達與減速機垂直放置。
2. 使用六角板手，依鎖緊扭力建議表二的 5% 扭力，依 1-4 的順序，用板手將鎖緊螺絲與墊圈，輕輕鎖上。



將馬達與減速機直立擺設，以螺絲扭力表 (表一) 建議之扭力值，依序 1-4，用扭力板手將螺絲鎖緊。



將馬達與減速機直立擺設，參照 (表二) 建議之扭力值，以扭力板手將入力軸鎖緊。

表一

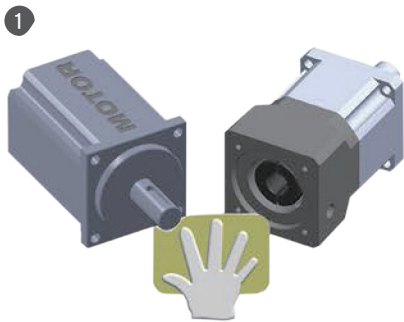
馬達鎖緊螺絲扭力建議表

螺絲尺寸	六角頭尺寸 [mm]	強度8.8螺絲之鎖緊扭力		強度10.9螺絲之鎖緊扭力		強度12.9螺絲之鎖緊扭力	
		[Nm]	[In-lbs]	[Nm]	[In-lbs]	[Nm]	[In-lbs]
M3x0.5P	2.5	1.3	12	1.8	16	2.1	19
M4x0.7P	3	3	27	4.1	37	4.9	44
M5x0.8P	4	6.1	55	8.2	73	9.8	87
M6x1P	5	11	98	14	124	17	151
M8x1.25P	6	25	222	34	302	41	364
M10x1.5P	8	49	434	67	594	80	709
M12x1.75P	10	85	753	116	1028	139	1232
M14x2P	12	137	1214	186	1648	223	1976
M16x2P	14	210	1860	286	2534	343	3038

表二

馬達鎖緊殼螺絲扭力建議表

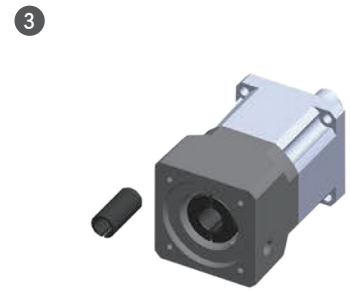
減速機型號		馬達軸徑 [mm]	螺絲尺寸 [mm]	六角頭尺寸 [mm]	鎖緊扭力	
					[Nm]	[In-lbs]
40 Type	1 Stage/ 2 Stage	≦12	M3x0.5Px12L	2.5	2.1	19
60 Type	1 Stage/ 2 Stage	≦16	M5x0.8Px16L	4	9.8	87
90 Type	1 Stage/ 2 Stage	≦24	M6x1.0Px20L	5	17	151
120 Type	1 Stage/ 2 Stage	≦32	M8x1.25Px25L	6	41	364
150 Type	1 Stage/ 2 Stage	≦38	M10x1.5Px30L	8	80	709
180 Type	1 Stage/ 2 Stage	≦50	M12x1.75Px35L	10	139	1232
220 Type	1 Stage/ 2 Stage	≦75	M12x1.75Px40L	10	139	1232



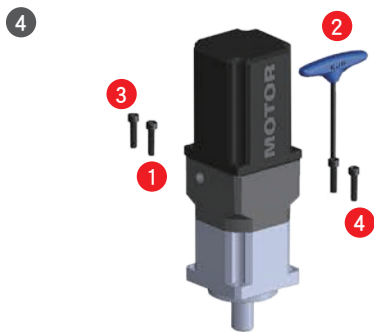
Reconfirm the specifications of servomotor and gearbox.  
Clean the mounting surface.



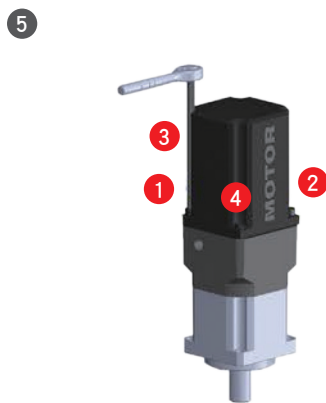
Remove the motor key.



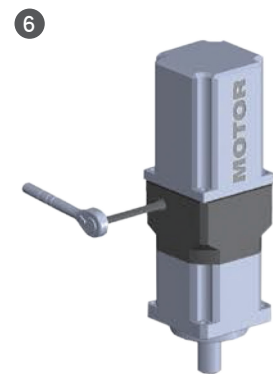
Check motor shaft size. Insert bushing if needed.



Set at vertical position. Tighten the mounting bolt (including washer) in 1-4 order with wrench to 5 % of suggested torque (See in table 1).



Tighten the mounting bolts in 1-4 order with wrench to suggested torque (See in table 1).



Tighten the set screw with torque wrench to suggested torque (See in table 2). And insert the plug.

Table 1 Tightening Torque Recommended for Motor Mounting bolt

bolt Size	Width Across Flats [mm]	Strength 8.8 Tightening Torque		Strength 10.9 Tightening Torque		Strength 12.9 Tightening Torque	
		[Nm]	[In-lbs]	[Nm]	[In-lbs]	[Nm]	[In-lbs]
M3x0.5P	2.5	1.3	12	1.8	16	2.1	19
M4x0.7P	3	3	27	4.1	37	4.9	44
M5x0.8P	4	6.1	55	8.2	73	9.8	87
M6x1P	5	11	98	14	124	17	151
M8x1.25P	6	25	222	34	302	41	364
M10x1.5P	8	49	434	67	594	80	709
M12x1.75P	10	85	753	116	1028	139	1232
M14x2P	12	137	1214	186	1648	223	1976
M16x2P	14	210	1860	286	2534	343	3038

Table 2 Tightening Torque Recommended for Set Collar Bolt

Reducer Model		Motor Shaft [mm]	Bolt Size [mm]	Width Across Flats [mm]	Tightening Torque	
					[Nm]	[In-lbs]
40 Type	1 Stage/ 2 Stage	≦ 12	M3x0.5Px12L	2.5	2.1	19
60 Type	1 Stage/ 2 Stage	≦ 16	M5x0.8Px16L	4	9.8	87
90 Type	1 Stage/ 2 Stage	≦ 24	M6x1.0Px20L	5	17	151
120 Type	1 Stage/ 2 Stage	≦ 32	M8x1.25Px25L	6	41	364
150 Type	1 Stage/ 2 Stage	≦ 38	M10x1.5Px30L	8	80	709
180 Type	1 Stage/ 2 Stage	≦ 50	M12x1.75Px35L	10	139	1232
220 Type	1 Stage/ 2 Stage	≦ 75	M12x1.75Px40L	10	139	1232

## 減速機快選法

### 週期性運轉 (S5)

(每小時運轉週期數  $\leq 1000$ )

負載運轉週期  $< 60\%$  且  $< 20$ 分鐘

#### 1. 扭矩確認：

$$T_{\text{馬達最大輸出扭矩}} \times i_{\text{減速比}} < T_{\text{減速機急停扭矩}}$$

#### 2. 重要尺寸確認：

- 1.馬達軸直徑 (C3)
- 2.馬達入力引導凸緣直徑 (C5)
- 3.馬達軸長度 (C4)
- 4.馬達入力引導凸緣深度 (C6)
- 5.入力法藍螺絲孔節圓直徑 (C1)
- 6.入力法藍螺絲孔規格 (C2)

### 連續性運轉 (S1)

負載運轉週期  $\geq 60\%$  或  $\geq 20$ 分鐘

#### 1. 扭矩確認：

$$T_{\text{馬達額定輸出扭矩}} \times i_{\text{減速比}} < T_{\text{減速機額定輸出扭矩}}$$

#### 2. 轉速確認：

$$N_{\text{馬達額定輸出轉速}} \leq N_{\text{減速機額定輸入轉速}}$$

#### 3. 重要尺寸確認：

1. 馬達軸直徑 (C3)
2. 馬達入力引導凸緣直徑 (C5)
3. 馬達軸長度 (C4)
4. 馬達入力引導凸緣深度 (C6)
5. 入力法藍螺絲孔節圓直徑 (C1)
6. 入力法藍螺絲孔規格 (C2)

如需精確的減速機選用計算，請洽詢銷售工程師。

## Quick Selection Method

### Periodic Duty(S5)

Per Hour Continuous Operation Period  $\leq$  (1000)

Load Operation Period  $<$  60% and  $<$  20 Minutes

1. Torque Confirmation :

$$T_{\text{Motor Max. Output Torque}} \times i_{\text{Ratio}} < T_{\text{Gearbox Emergency Stop Torque}}$$

2. Technical Specification Confirmation :

- 1.Motor Shaft Diameter
- 2.Motor Pilot Diameter
- 3.Length of Motor Shaft
- 4.Motor Pilot Depth
- 5.P.C.D (Pitch Circle Diameter)
- 6.Bolt Hole Diameter

### Continuous Duty (S1)

Load Operation Period  $\geq$  60% or  $\geq$  20 Minutes

1. Torque Confirmation :

$$T_{\text{Motor Nominal Output Torque}} \times i_{\text{Ratio}} < T_{\text{Gearbox Nominal Input Torque}}$$

2. Revolutions Per Minute (RPM) Confirmation :

$$N_{\text{Motor Nominal Output Speed}} \leq N_{\text{Gearbox Nominal Input Speed}}$$

3. Technical Specification Confirmation :

- 1.Motor Shaft Diameter
- 2.Motor Pilot Diameter
- 3.Length of Motor Shaft
- 4.Motor Pilot Depth
- 5.P.C.D (Pitch Circle Diameter)
- 6.Bolt Hole Diameter

Please contact us for further assistance.

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

# VIGOR GEAR MACHINERY CO, Ltd

## 聚盛工業股份有限公司

24872 新北市五股區中興路一段1巷12弄25號

Address: No.25, Alley. 12, Lane. 1, Sec. 1, Zhongxing Rd., Wugu  
Dist., New Taipei City 24872, Taiwan (R.O.C.)

TEL: +886-8982-0709

FAX: +886-8988-2565

Email: vgm@vgmgear.com

Website: [http://: www.vgmgear.com/](http://www.vgmgear.com/)

## 中國區代理商：

### 東莞市帝仁精密機電有限公司

電話：0769-81125379

傳真：0769-81125379

網址：www.dgdiren.com

郵箱：dgdiren@163.com

地址：廣東省東莞市大朗大井頭社區金麗路一巷13號

# VGM<sup>®</sup>

2018年版