Planetary Variator

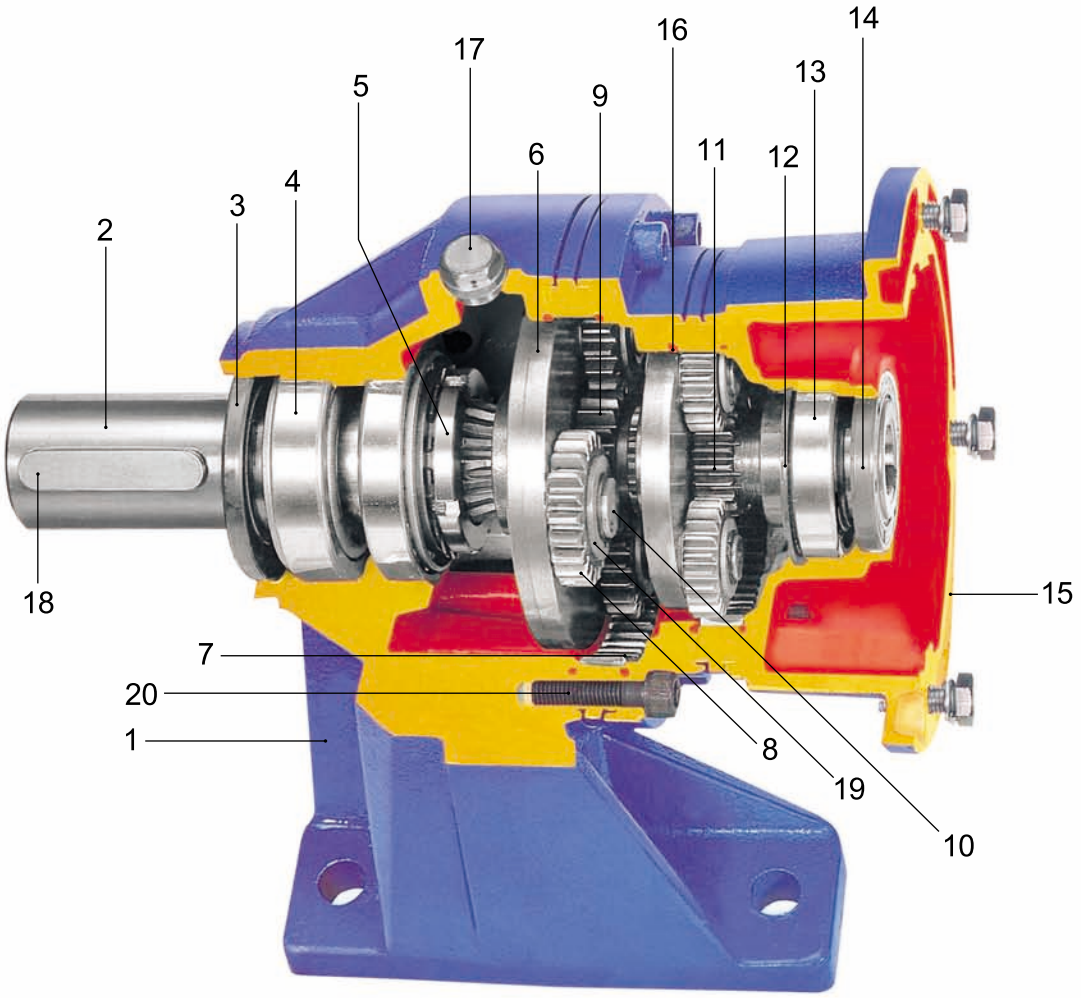
東力遊星式減速機

結 構
Structure

- 高 效 率 *High Efficiency*
- 低 背 隙 *Low Clearance*
- 高 扭 力 *High Torque Force*
- 耐 衝 擊 *Impact Resistant*
- 體 積 小 *Small Size*
- 重 量 輕 *Light Weight*

本產品依據AGMA標準製造，適用於每日24小時連續運轉。

The products are manufactured per **AGMA** standards and are able to be operated 24 hours a day continuously.



零件 Parts List

1.	本體	Housing	
2.	出力軸	Output Shaft	
3.	出力軸油封	Oil Seal-Output Shaft	
4.	出力軸承	Bearing-Output Shaft	
5.	太陽螺帽	Sun Nut	
6.	遊星架	Planetary Carrier	
7.	內齒環	Internal Gear Ring	
8.	遊星齒輪	Planetary Gear	
9.	階段齒輪	Using Connected Section's Gear	
10.	滾針軸	Needle Roller Pin	
11.	太陽齒輪	Sun Gear Input Shaft	
12.	C 型扣環	Snap Ring	
13.	入力軸承	Bearing-Input Shaft	
14.	入力軸油封	Oil Seal-Input Shaft	
15.	入力法蘭	Input Flange	
16.	O 型環	O-Ring	
17.	透氣塞	Breather Plug	
18.	鍵	Key-Output Shaft	
19.	墊圈	Washer	
20.	六角承窩螺絲	Hex Socket Cap Screw	

行星減速機傳動原理

行星減速機之傳動結構為目前齒輪減速機效率最高之組合，其基本傳動結構為：

(A) 太陽齒輪。 (B) 行星齒輪（組合於行星架）。

(C) 內齒輪環。 (D) 階段齒輪。

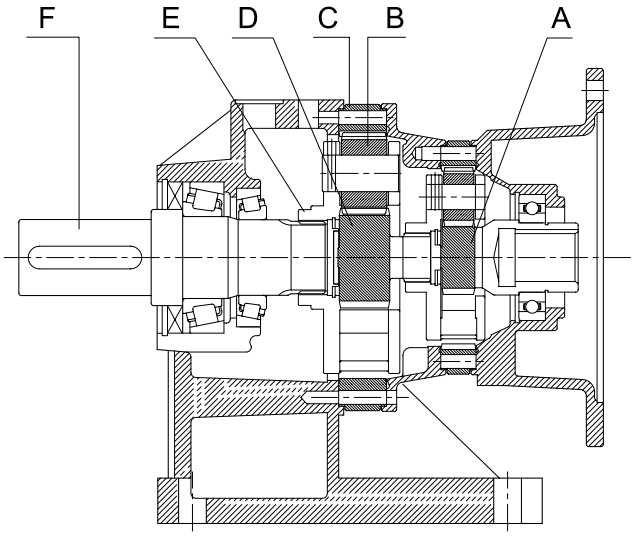
驅動源以直結或連接方式啟動太陽齒輪，太陽齒輪將組合於行星架上之行星齒輪帶動運轉。整組行星齒輪系統沿著外齒輪環自轉繞行轉動，行星架連結出力軸輸出達到減速目的。更高減速比則藉由多組階段齒輪與行星齒輪倍增累計而成。

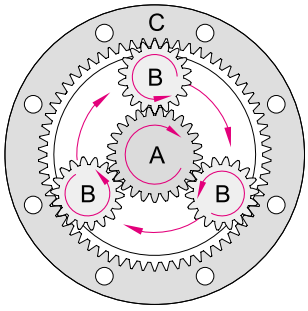
Transmission Principle of Planetary Speed Reducer

The transmission structure of the planetary speed reducer has the highest geared speed reducer efficiency among all the combinations. Its basic transmission structure includes:

(A) Sun Gear, (B) Planetary Gear (assembled with the planetary carrier), (C) Internal GearRing, (D) Staging Gear

The driving power through direct connection or link initiates the sun gear. The sun gear then drives the planetary gears assembled with the external gear ring to operate. The whole set of planetary gear system revolves on its own axis and along the external gear ring, where the output shaft connected to the planetary carrier achieves the goal of speed reduction. A higher reduction ratio can be achieved by doubling the multiple staged gears and planetary gears.





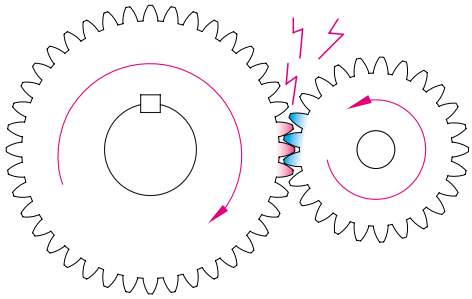
A	太陽齒輪	Sun Gear
B	行星齒輪	Planetary Gear
C	內齒輪環	Internal GearRing
D	連接齒輪	Using Connected Section's Gear
E	行星架	Planetary Carrier
F	出力軸	Output Shaft

行星齒輪減速機之特性

■ 高扭力、耐衝擊：行星齒輪之結構異同於傳統平行齒輪之運動方式。傳統齒輪僅依靠兩個齒輪間極少數點接觸面擠壓驅動，所有負荷集中於相接觸之少數齒輪面(圖一)，容易產生齒輪之磨擦與斷裂。而行星減速機具有六個更大面積齒輪接觸面360度均佈負荷(圖二)，多個齒輪面共同均勻承受瞬間衝擊負荷，使其更能承受較高扭力之衝擊，本體及各軸承零件亦不因高負荷而損壞破裂。

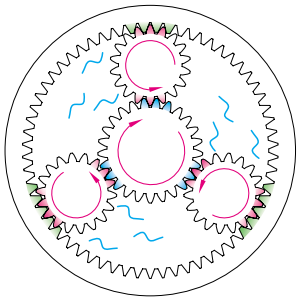
Characteristics of Planetary Speed Reducer

High torque, impact resistance: The method of motion of a planetary gear structure is different from traditional parallel gears. Traditional gears rely on a small number of contact points between two gears to squeeze as the driving force, where all the loadings are concentrated on a few contacting surfaces (Figure 1), making it easy to wear and crack the gears. But the planetary speed reducer has six gear contacting surfaces with a larger area that can distribute the loading evenly over 360 degrees (Figure 2). Multiple gear surfaces share the instantaneous impact loading evenly which make them more resistant to the impact from higher torques. The housing and bearing parts will not be damaged and crack due to high loading, either.



(圖一)：齒輪咬合

(Figure 1)：Gear Engagement Gear Conjunction



(圖二)：行星齒輪咬合

(Figure 2)：Planetary Gear Engagement Planetary Gear Conjunction

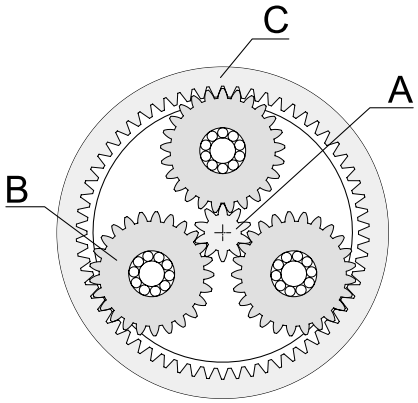
比數與組合 Gear ratio and combination

行星齒輪減速原理與比速計算

行星減速機比數之簡易計算方法；當階段齒輪或太陽齒輪 (A) 轉動一定轉速，行星齒輪 (B) 繞行內齒輪環 (C) 一圈回到原點，其轉速即為該單段減速比。由於同型號之內齒輪環皆為共用，故減速比之高低係由太陽齒輪齒數決定，太陽齒輪數越少減速比越高(圖一)，反之太陽齒輪數越多，則減速比越小(圖二)。其實際計算方式為內齒環齒數除以太陽齒輪齒數；所得數字加固定係數1，該值即為減速比。各單段比數相乘即為該機總比數。

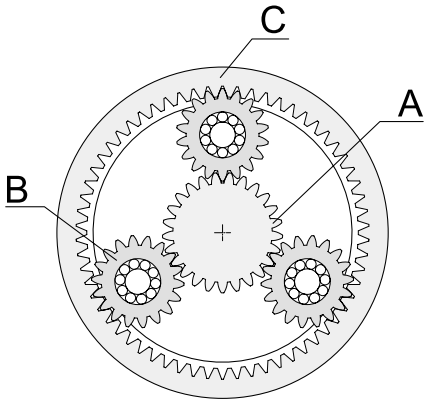
Principle of planetary gear speed reduction and calculation of gear ratio

Simple calculation method for the gear ratio of a planetary speed reducer: when step gear or sun gear (A) rotates at a certain speed, planet gear (B) travels along the internal gear ring (C) in a full round and return to the origin, where the rotation speed is the reduction ratio of that single interval. Because the internal gear ring is common to the same model number, the value of the speed reduction ratio is determined by the tooth number of the sun gear. The lower the tooth number of the sun gear, the higher the speed reduction ratio (Figure 1). On the contrary, the higher the tooth number of the sun gear, the lower the speed reduction ratio (Figure 2). The actual calculation method is to divide the tooth number of the internal gear ring by the tooth number of the sun gear. The number derived added to the fixed coefficient 1 is then the speed reduction ratio. Multiply the ratios of each single step to obtain the total reduction ratio of that machine.



(圖一) 高減速比
單段減速比（i）之計算方式　i＝C÷A+1

(Figure 1) High reduction ratio
Calculation of a single reduction ratio (i)
i＝C÷A+1



(圖二) 低減速比
多段減速比（i）之計算方式　i＝(C÷A+1)×(C÷A+1)×…

(Figure 2) Low reduction ratio
Calculation of a multiple step reduction ratio (i)
i＝(C÷A+1)×(C÷A+1)×...

行星減速機之拆解與傳動元件之搭配

行星減速機之行星架採用浮動式內置於減速機中，拆解零件及更換比數時只需局部取出部份零件更換，無需大部拆解造成零件受損。安裝法蘭採用國際標準規格直接式連結，客戶可自行選用不同廠牌或特殊防護等級需求之馬達安裝。本公司亦提供各種特殊連結法蘭，如伺服、直流、油壓、氣動、渦輪、變速機等。

Dismantling of the planetary speed reducer and collocation of transmission components

The planetary rack of the planetary speed reducer is floating and embedded inside the speed reducer. When disassembling parts and changing ratios, only partial removal of some of the parts is required for the replacement. There is no need to disassemble the major portion, which could cause damage to the parts.ine.Install the flange in a direct connection, which is applied to international standard specifications. Customers can select different brands by themselves or install the motor of specific requirements for protective grades. Our company also provides specific sizes including servo, DC, hydraulic, pneumatic, turbine, speed variator, etc.

蝸輪減速機組合
Combined With Worm Gear

伺服馬達組合
Combined With Servo Motor

變速機組合
Combined With Variator

氣動馬達組合
Combined With Air Motor

Technical 計算-單位轉換-係數表

公式及範例 Technical formula

$$HP = \frac{T \times N}{716.2}$$

HP = 馬力 Horse power（HP）
T = 扭矩 Torque（kg-m）
N = 迴轉數 rpm

範例：
入力轉動馬力1HP
減速比1/20
設定傳動效率100%
求其輸出扭矩To？

$HP = \frac{T \times N}{716.2}$　　$T = \frac{716.2}{1800} = 0.3979kg\text{-}m$

For example：
Input Motor HP = 1HP
Ratio = 1/20
Efficiency = 100%
The Torque To = ?

To = 0.3979 x 20 x 100% = 7.958kg-m

範例：
已知出力軸迴轉數90 rpm，
入力軸迴轉數1800 rpm，求其減速比？
求其減速比？

$R = \frac{1800}{90} = 20$　　減速比 = 20

For example：
Ooutput Shaft rpm = 90rpm
Input Shaft rpm = 1800rpm
The Ratio = ?

Ratio = 20

單位換算

Meter(m) = inches(in) x 0.0254
Meter(m) = feet(ft) x 0.3048
Kilograms(kg) = tons(t) x 1016.047
Kilograms(kg) = pounds(lb) x 0.45359
Newton(N) = pound-force(lbf) x 4.448222
Newton metro(Nm) = pound foot(lb ft) x 1.355818
Newton metro(Nm) = Kilograms meter(Kgm) x 9.81
DaNm = Nm/10

懸垂荷重係數表 O.H.L Factor Table

鏈輪	Sprocket	1.00
齒輪	Gear	1.25
三角皮帶	V-Belt	1.50
平皮帶	Flat-Belt	2.50

荷重係數表 Load Factor Table

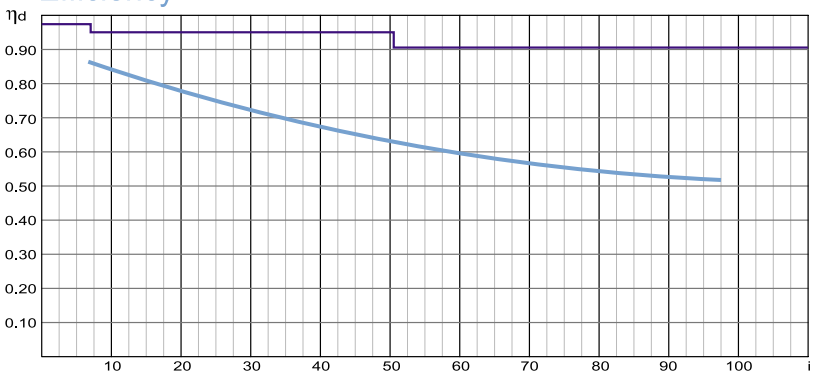
原動機 Prime Machine	傳動機荷重等級 Driven Machine Load Classification	每日使用時間 Duration Of Service Per Day			
		Occasional 0.5hr.	Intermittent 2hr.	8-10hrs	10-24hrs
電動機 Electric Motor	均一負荷 Uniform	0.80	0.90	1.00	1.25
	中衝擊 Medium Shock	0.90	1.00	1.25	1.5
	重衝擊 Heavy Shock	1.00	1.25	1.50	1.75

效率與潤滑油脂 Efficiency and Oil

遊星齒輪減速機的效率表

段數 Stage	減速比 Reduction Ratio	效率值 Efficiency
L1	3.48 ~ 7.2	97%
L2	12.1 ~ 51.8	95%
L3	63 ~ 373	92%
L4	403 ~ 2687	90%

Efficiency



ηd：表示傳輸效率　Transmission efficiency
i　：表示減速比數　Reduction ratio
—：表示遊星式齒輪減速機效率值　Efficiency of planetary gear
—：表示傳統式齒輪減速機效率值　Efficiency of helical gear

潤滑油選定

適當潤滑油的黏度，可使齒輪滑動摩擦圓滑，於高負荷及衝擊負荷時，減速機才能充分發揮應有之效率。

Gear lubrication

Suitable gear lubrication oil will increase gear surface contact running and extension gears, bearings & other parts life. Please reference following table of lubrication gear oil for your reducers.

下表即減速機潤滑的選定 Gear lubrication

荷重 LOAD	周圍溫度 AMBIENT	SHELL OIL	MOBIL OIL	中國石油
普通荷重 Normal Load	-30℃～5℃	Omala oil 68	Mobil Comp 629	國光牌極壓機油 HD-68
	5℃～40℃	Omala oil R220	Mobil Comp 632 600W Cylinder oil	國光牌極壓機油 HD-220
	40℃～65℃	Omala oil R320	Mobil Comp 634 600W Cylinder oil	國光牌極壓機油 HD-320
重級荷重 Heavy Load	-30℃～5℃	Omala oil 150	Mobil Comp 632	國光牌極壓機油 HD-150
	5℃～40℃	Omala oil R320	Mobil Comp 634	國光牌極壓機油 HD-320
	40℃～65℃	Omala oil R68	Mobil Comp 636	國光牌極壓機油 HD-680

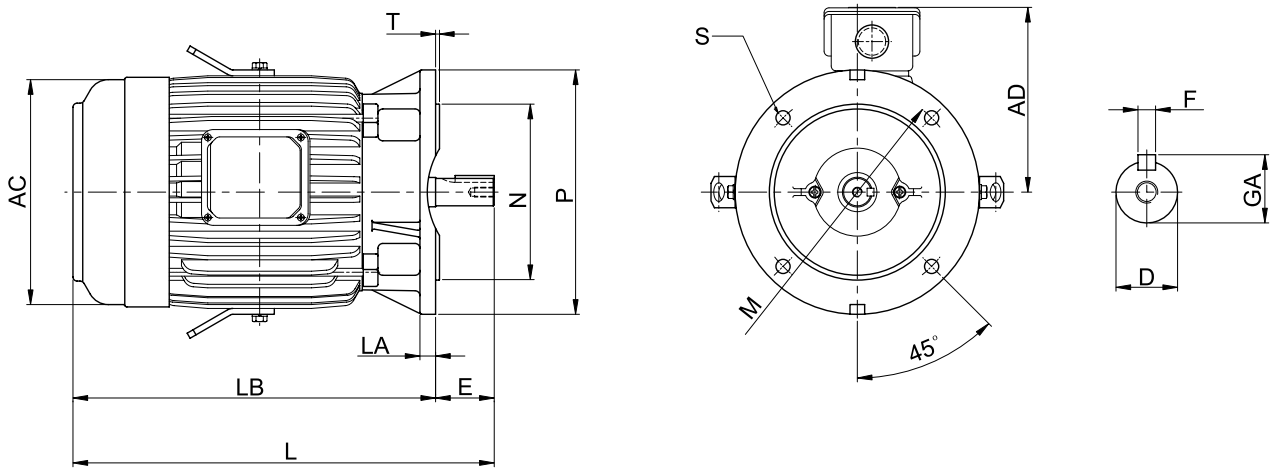
注意事項

※ 適當的潤滑油黏度，可使齒輪磨擦容易，則高負荷及衝擊負荷時，減速機才能充分發揮其機能。
※ 本產品出廠之減速機皆使用國光牌極壓機油HD-320。
※ 最初使用300小時後，需換上新油，其後每2500小時更換潤滑油。
※ 使用環境在高溫、高速、低速、重負荷、強制潤滑等特殊情況時，請向本公司提示。
※ 潤滑油不足可能導致齒輪快速磨損和效率降低。
※ 潤滑油過多可能導致漏油及溢出現象，請加入適當潤滑油至油面計一半以上。

Remark

※ Appropriate viscosity of the lubricant will make the gears engage much easier. Such would then help the speed reducers to fully exploit its performance for heavy loading and impact loading.
※ All speed reducers equipped with products by Sanya all apply CPC E.P. Lubricant HD-320
※ After the first use of 300 hours, new oil should be replaced, lubricant should be replaced for every 2,500 hours following the first oil change.
※ Please remind our company of the special conditions of the operating environment including high temperature, high speed, low speed, heavy loading, forced lubrication etc.
※ Insufficient lubrication could result in quick wear-out of gears and low efficiency.
※ Excessive lubrication can result in oil leaking. Please fill with an appropriate amount of lubricant more than half of the oil level gage.

Motor Dimension 馬達尺寸圖



馬達尺寸圖 (參考尺寸) Motor Dimension

單位:(mm)

輸出馬力 (HP)			框號	AC	AD	L	LA	LB	E	M	N	P	D	S	T	F	GA
2P	4P	6P															
0.25	0.25	—	63	144	123	248.0	12	225.0	23	130	110	160	11	10.0	3.5	4	12.5
0.5	0.5	—	71	162	133	277.5	12	247.5	30	130	110	160	14	10.0	3.5	5	16.0
1	1	0.5	80	177	144	282.0	12	242.0	40	165	130	200	19	12.0	3.5	6	21.5
2, 3	2	1	90L	200	157	371.5	12	321.5	50	165	130	200	24	12.0	3.5	8	27.0
—	3	2	100L	219	180	374.5	16	314.5	60	215	180	250	28	14.5	4.0	8	31.0
5	5	3	112M	235	189	431.0	16	371.0	60	215	180	250	28	14.5	4.0	8	31.0
7.5, 10	7.5	5	132S	273	224	454.0	20	374.0	80	265	230	300	38	14.5	4.0	10	41.0
—	10	7.5	132M			492.0		412.0									
15, 20	15	10	160M	334	263	608	20	498	110	300	250	350	42	18.5	5.0	12	45.0
25	20	15	160L			652		542									
30	—	—	180MA	382	305	672	20	562	110	350	300	400	48	18.5	5.0	14	51.5
—	25, 30	20	180MC			672		562									
40	—	—	180LA	382	305	710	20	600	110	350	300	400	55	18.5	5.0	16	59.0
—	40	25, 30	180LC			710		600									
50, 60	—	—	200LA	420	342	770	20	660	110	400	350	450	55	18.5	5.0	16	59.0
—	50, 60	40,50	200LC			800			140				60			18	64.0
75	—	—	225SA	458	386	786.0	22	676.0	110	500	450	550	55	18.5	5.0	16	59.0
—	75	60	225SC			816.0			140				65			18	69.0
100	—	—	250SA	510	479	890.5	22	780.5	110	500	450	550	55	18.5	5.0	16	59.0
	100	75	250SC			920.5			140				75			20	79.5
125	—	—	250MA	510	479	947.5	22	837.5	110	500	450	550	55	18.5	5.0	16	59.0
—	125	100	250MC			977.5			140				75			20	79.5

訂貨記號說明 Products Selection

範例 / EX

HF – 200 – 5.78 – 1/4 – H1

形式 Type	機型 Size	減速比 Ratio	馬力 Motor	安裝 Installation
HF	200	3.57	1/4HP	H1
	280	4.94	1/2HP	H2
	300	5.78	1HP	.
	301	7.09	2HP	.
	303	9.37	3HP	V1
	.	.	.	.
	.	.	.	.
	.	.	.	.
				.
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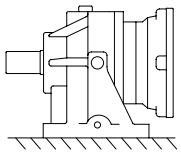
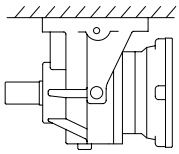
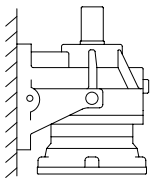
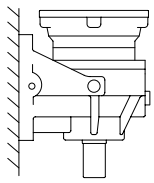
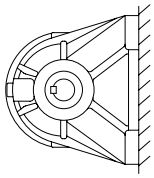
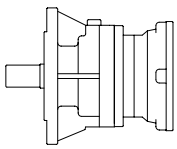
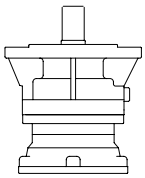
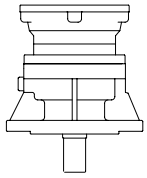
安裝方式 / Installation

H1	H2	H3	H4
			
H5 L(R)	**V1**	**V2**	**V3**
			

機型選用步驟 Model Selection Procedures

1. 依貴公司設備自行計算出所需馬力數與需求減速比。
2. 在 P12 頁機型選用表內對照該馬力所配合之機型為何 (200~313)？
3. a. 至 P13、14 頁找到該型號中之最接近比數，並查詢上方段數 (L1~4)。
   b. 依選擇比數檢查該型號之最大受力值 ABC 是否符合設計值。
   c. 當設計扭力超過該型號時，請選用更大機型。
4. 按照所需機型至 P15~18 選用安裝尺寸圖 (HF、VF、HS、VS)。

1. Calculate the required power and reduction ratio according to the equipment of your company.
2. Refer to the Model Selection Table on Page 12 to select the model (200-313) that matches with the power.
3. a. Find the closest ratio of that model number on Pages 13 and 14 and check the number of steps (L1-4).
   (For a special ratio, please contact our company.)
   b. Per the selected ratio, check whether the maximum allowed force ABC of that model number meets the design value.
   c. If the design torque exceeds that of the selected model number, please select a lager model.
4. Refer to Pages 15-18 for installation dimensional drawings (HF, VF, HS, VS) of the selected model.

Type Selection Table 機型選用

入力轉速　1750/1420 (60Hz/50Hz)

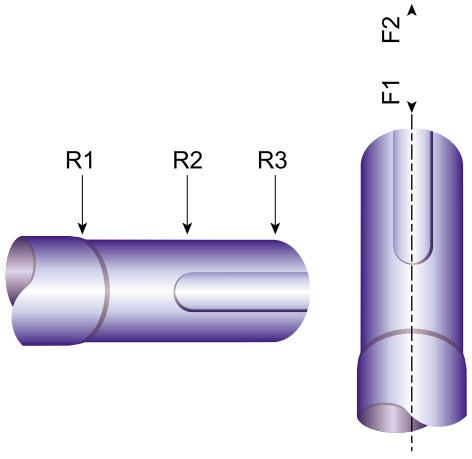
輸入馬力 INPUT HP	減速比範圍 RANGE OF RATIO	型號 SIZE
1/4HP	1/3.57~1/2936.8	200-L1, L2, L3
1/2HP	1/3.57~1/73.7	200-L1, L2
	1/87.1~1/221	280-L2, L3
	1/239~1/494	280-L3, L4
	1/503~1/1041	301-L4
1HP	1/3.48~1/116	280-L1,L2, L3
	1/131~1/221	300-L3
	1/239~1/616	301-L3, L4
	1/618~1/756	303-L4
	1/801~1/869	305-L4
	1/906~1/2422	307-L4
2HP	1/3.48~1/41.5	280-L1, L2
	1/51.8~1/177	300-L2, L3
	1/192~1/221	301-L3
	1/230~1/456	305-L3, L4
	1/492~1/1591	307-L4
3HP	1/3.48~1/7.2	280-L1
	1/12.1~1/85	300-L2, L3
	1/87.2~1/221	301-L3
	1/230~1/276	305-L3
	1/278~1/1022	307-L3, L4

輸入馬力 INPUT HP	減速比範圍 RANGE OF RATIO	型號 SIZE
5HP	1/3.48~1/7.2	300-L1
	1/12.1~1/85	301-L2,L3
	1/90~1/134	303-L3
	1/136~1/184	305-L3
	1/188~1/546	307-L3, L4
	1/603~1/1022	309-L4
7.5HP	1/3.48~1/7.2	300-L1
	1/12.1~1/51.8	301-L2
	1/53~1/96.7	303-L3
	1/104~1/141	305-L3
	1/146~1/455	307-L3, L4
	1/492~1/546	309-L4
	1/586~1/2186	313-L4
10HP	1/3.48~1/7.2	301-L1
	1/12.5~1/54	303-L2
	1/63~1/107	305-L3
	1/113~1/234	307-L3
	1/270~1/455	309-L3, L4
	1/501~1/2186	313-L4
15HP	1/3.48~1/7.2	301-L1
	1/12.5~1/30.7	303-L2
	1/35.8~1/54	305-L2
	1/60~1/192	307-L3
	1/199~1/234	309-L3
	1/252~1/990	313-L3, L4

輸入馬力 INPUT HP	減速比範圍 RANGE OF RATIO	型號 SIZE
20HP	1/3.6~1/7.5	303-L1
	1/12.5~1/43	305-L2
	1/46~1/125	307-L2, L3
	1/139~1/192	309-L3
	1/193~1/649	313-L3, L4
25HP	1/3.6~1/7.5	305-L1
	1/12.3~1/46	307-L2
	1/51~1/303	313-L3
30HP	1/3.6~1/7.5	305-L1
	1/12.3~1/46	307-L2
	1/51~1/303	313-L3
40HP	1/3.43~1/6.23	307-L1
	1/12.3~1/46	309-L2
	1/51~1/176	313-L3
50HP	1/3.43~1/6.23	307-L1
	1/12.3~1/46	309-L2
	1/51~1/176	313-L3
75HP	1/3.43~1/6.23	309-L1
	1/14.2~1/40.5	313-L2
100HP	1/3.43~1/6.23	309-L1
	1/14.2~1/40.5	313-L2
150HP	1/4.14~1/6.5	313-L1

徑向負荷與推力最大容許值(kg)　Max. Load Of Radial And Axis(Kg)

型號 SIZE	R1	R2	R3	F1	F2
200	1000	600	420	950	600
280	1360	800	560	1100	800
300	1900	1100	750	2000	1500
300H	1900	1100	750	2000	1500
301	1900	1100	750	2000	1500
301H	1900	1100	750	2000	1500
303	6000	3800	2800	5500	4400
305	6000	3800	2800	5500	4400
307	9500	4500	3500	9000	5000
309	17000	11000	8000	10000	6000
313	32000	21000	16000	20000	15000



入力轉數為 1750 rpm (INPUT WITH 1750 RPM)

型號 Size	L1 一段減速比 1 STAGE		最大輸入馬力 (A)	L2 二段減速比 2 STAGE		最大輸入馬力 (A)	二段減速比 2 STAGE		最大輸入馬力 (A)	L3 三段減速比 3 STAGE		最大輸入馬力 (A)	三段減速比 3 STAGE		最大輸入馬力 (A)	三段減速比 3 STAGE		最大輸入馬力 (A)	L4 四段減速比 4 STAGE		最大輸入馬力 (A)	四段減速比 4 STAGE		最大輸入馬力 (A)	四段減速比 4 STAGE		最大輸入馬力 (A)	最大承受扭力 MAX. OUTPUT TORQUE (kg-m)	
200	3.57	C	0.5	12.75	C	0.5	50.3	C	0.5	45.5	C	0.5	165	A	0.25	313	B	0.25	311	B	0.25	855	A	0.25	1809	C	0.25	A	28
	4.94	A	0.5	17.6	A	0.5	54.16	C	0.5	63	C	0.5	173	A	0.25	356.4	C	0.25	364	B	0.25	954	B	0.25	1897	C	0.25		
	5.78	B	0.5	20.6	B	0.5	66.4	C	0.5	73.7	C	0.5	179.5	C	0.25	383.9	C	0.25	426	B	0.25	1000	A	0.25	2060	C	0.25		
	7.09	C	0.5	24.4	A	0.5	87.8	C	0.5	87.1	A	0.25	193.1	B	0.25	433.7	B	0.25	504	A	0.25	1116	B	0.25	2143	B	0.25	B	20
	9.37	C	0.5	25.3	C	0.5				90.4	C	0.25	202.4	A	0.25	471	C	0.25	522	C	0.25	1227	A	0.25	2219	C	0.25		
				28.5	A	0.5				101.9	A	0.25	228.7	A	0.25	507.5	C	0.25	596	A	0.25	1322	A	0.25	2326	C	0.25		
				33.4	C	0.5				120.5	A	0.25	236.9	B	0.25	622.5	C	0.25	641	C	0.25	1435	C	0.25	2527	C	0.25		
				35	A	0.5				125	B	0.25	248.3	B	0.25	822.6	C	0.25	697	B	0.25	1546	C	0.25	2937	C	0.25		
				41	B	0.5				141	A	0.25	267.5	A	0.25				723	B	0.25	1679	C	0.25	4754	B	0.25	C	17
				46.3	B	0.5				146.3	B	0.25	290.5	C	0.25				815	B	0.25	1760	C	0.25	7708	C	0.25		
280	3.48	C	3	12.1	C	2	51.8	C	1	52	A	2	116	A	1	299	B	0.25	403	B	0.25	628	C	0.25	1108	B	0.25	A	60
	4.26	A	3	14.8	A	2				63	A	2	131	A	0.5	373	C	0.25	446	A	0.25	669	B	0.25	1274	A	0.25		
	5.77	B	3	18.1	A	2				69	B	1	141	A	0.5				454	A	0.25	754	A	0.25	1299	C	0.25		
	7.2	C	3	20	B	2				77	A	1	144	A	0.5				494	B	0.25	818	A	0.25	1383	B	0.25	B	45
				24.6	A	2				85	A	1	177	A	0.5				503	B	0.25	834	B	0.25	1590	A	0.25		
				30.7	A	2				87.2	C	1	192	B	0.5				557	A	0.25	940	A	0.25	1726	B	0.25		
				33.3	B	2				104	A	1	221	A	0.5				604	A	0.25	1021	A	0.25	2154	B	0.25	C	35
				41.5	B	2				106	A	1	239	B	0.25				616	B	0.25	1041	B	0.25	2687	C	0.25		
300 300H	3.48	C	7.5	12.1	C	5	51.8	C	3	52	A	3	116	A	2	299	B	0.5	403	B	0.5	628	C	0.25	1108	B	0.25	A	120
	4.26	A	7.5	14.8	A	5				63	A	3	131	A	2	373	C	0.25	446	A	0.5	669	B	0.25	1274	A	0.25		
	5.77	B	7.5	18.1	A	5				69	B	3	141	A	2				454	A	0.5	754	A	0.25	1299	C	0.25		
	7.2	C	7.5	20	B	5				77	A	3	144	A	2				494	B	0.25	818	A	0.25	1383	B	0.25	B	90
				24.6	A	5				85	A	3	177	A	2				503	B	0.25	834	B	0.25	1590	A	0.25		
				30.7	A	5				87.2	C	2	192	B	1				557	A	0.25	940	A	0.25	1726	B	0.25		
				33.3	B	5				104	A	2	221	A	1				604	A	0.25	1021	A	0.25	2154	B	0.25	C	70
				41.5	B	5				106	A	2	239	B	0.5				616	B	0.25	1041	B	0.25	2687	C	0.25		
301 301H	3.48	C	15	12.1	C	7.5	51.8	C	7.5	52	A	5	116	A	3	299	B	1	403	B	1	628	C	0.5	1108	B	0.25	A	240
	4.26	A	15	14.8	A	7.5				63	A	5	131	A	3	373	C	1	446	A	1	669	B	0.5	1274	A	0.25		
	5.77	B	15	18.1	A	7.5				69	B	5	141	A	3				454	A	1	754	A	0.5	1299	C	0.25		
	7.2	C	15	20	B	7.5				77	A	5	144	A	3				494	B	1	818	A	0.5	1383	B	0.25	B	185
				24.6	A	7.5				85	A	5	177	A	3				503	B	1	834	B	0.5	1590	A	0.25		
				30.7	A	7.5				87.2	C	3	192	B	2				557	A	1	940	A	0.5	1726	B	0.25		
				33.3	B	7.5				104	A	3	221	A	2				604	A	1	1021	A	0.5	2154	B	0.25	C	155
				41.5	B	7.5				106	A	3	239	B	1				616	B	1	1041	B	0.5	2687	C	0.25		
303	3.6	C	20	12.5	C	15	43	B	10	53	A	7.5	112	C	5	190	C	2	412	B	1	962	B	0.5	1989	B	0.25	A	320
	4.25	A	20	15.3	A	15	44.6	C	10	63	A	7.5	124	C	5	221	B	2	456	B	1	1024	B	0.5	2244	D	0.25		
	5.33	B	20	18.1	A	15	54	D	10	72	A	7.5	131	B	5	230	C	2	524	D	1	1084	D	0.25	2799	D	0.25	B	280
	6.2	C	20	20.8	A	15				77	A	7.5	134	B	5	258	C	1	558	B	1	1177	B	0.25					
	7.5	D	20	22.7	B	15				79	B	7.5	136	C	3	276	B	1	618	B	1	1278	B	0.25					
				24.5	A	15				85	A	7.5	141	A	3	311	C	1	654	D	1	1327	D	0.25				C	245
				26.4	D	15				90	B	7.5	150	C	3	321	C	1	696	B	1	1440	D	0.25					
				30.7	B	15				96.7	B	7.5	163	B	3	388	D	1	756	B	1	1594	B	0.25					
				35.8	C	10				104	A	5	177	B	3				801	D	0.5	1656	D	0.25				D	210
				38.4	B	10				107	B	5	184	C	3				869	D	0.5	1798	D	0.25					

入力轉數為 1750 rpm (INPUT WITH 1750 RPM)

型號 Size	L1 一段減速比 1 STAGE		最大輸入馬力 (A)	L2 二段減速比 2 STAGE		最大輸入馬力 (A)	二段減速比 2 STAGE		最大輸入馬力 (A)	L3 三段減速比 3 STAGE		最大輸入馬力 (A)	三段減速比 3 STAGE		最大輸入馬力 (A)	三段減速比 3 STAGE		最大輸入馬力 (A)	L4 四段減速比 4 STAGE		最大輸入馬力 (A)	四段減速比 4 STAGE		最大輸入馬力 (A)	四段減速比 4 STAGE		最大輸入馬力 (A)	最大承受扭力 MAX. OUTPUT TORQUE (kg-m)	
305	3.6	C	30	12.5	C	20	43	B	20	53	A	10	112	C	7.5	190	C	3	412	B	2	962	B	0.5	1989	B	0.5	A	630
	4.25	A	30	15.3	A	20	44.6	C	15	63	A	10	124	C	7.5	221	B	3	456	B	2	1024	B	0.5	2244	D	0.5		
	5.33	B	30	18.1	A	20	54	D	15	72	A	10	131	B	7.5	230	C	3	524	D	1	1084	D	0.5	2799	D	0.5	B	550
	6.2	C	30	20.8	A	20				77	A	10	134	B	7.5	258	C	3	558	B	1	1177	B	0.5					
	7.5	D	30	22.7	B	20				79	B	10	136	C	5	276	B	3	618	B	1	1278	B	0.5					
				24.5	A	20				85	A	10	141	A	7.5	311	C	2	654	D	1	1327	D	0.5					
				26.4	D	20				90	B	10	150	C	5	321	C	2	696	B	1	1440	D	0.5				C	470
				30.7	B	20				96.7	B	10	163	B	5	388	D	2	756	B	1	1594	B	0.5					
				35.8	C	20				104	A	10	177	B	5				801	D	1	1656	D	0.5				D	410
				38.4	B	20				107	B	10	184	C	5				869	D	1	1798	D	0.5					
307	3.43	C	50	12.3	C	30	46	C	30	43	A	20	125	B	20	202	B	10	396	A	7.5	848	C	3	1721	C	1	A	1525
	4.09	A	50	14.7	A	30				50	A	20	139	C	15	221	A	10	455	A	7.5	906	A	3	1941	C	1		
	5.25	B	50	17.4	A	30				60	A	20	146	C	15	227	B	10	492	C	5	941	A	3	2002	C	1		
	6.23	C	50	18.9	B	30				63	A	20	152	B	15	234	B	10	546	A	5	1022	A	3	2422	C	1		
				21.8	B	30				77	B	20	157	A	15	270	C	7.5	603	C	3	1106	C	2				B	1245
				25.4	C	30				80	B	20	163	C	15	278	C	7.5	669	A	3	1130	A	2					
				27.9	B	30				89	A	20	177	B	15	284	C	7.5	693	C	3	1149	C	2					
				30.7	C	30				93	A	20	188	B	15	336	C	7.5	755	A	3	1275	A	2					
				32.5	C	30				100	A	20	192	B	15				769	A	3	1433	C	2				C	1075
				38	C	30				113	C	20	199	C	10				816	C	3	1591	A	2					
309	3.43	C	100	12.3	C	50	46	C	50	43	A	20	125	B	20	202	B	15	396	A	10	848	C	5	1721	C	2	A	2250
	4.09	A	100	14.7	A	50				50	A	20	139	C	20	221	A	15	455	A	10	906	A	5	1941	C	2		
	5.25	B	100	17.4	A	50				60	A	20	146	C	20	227	B	15	492	C	7.5	941	A	5	2002	C	2		
	6.23	C	100	18.9	B	50				63	A	20	152	B	20	234	B	15	546	A	7.5	1022	A	5	2422	C	2		
				21.8	B	50				77	B	20	157	A	20	270	C	10	603	C	5	1106	C	3				B	1800
				25.4	C	50				80	B	20	163	C	20	278	C	10	669	A	5	1130	A	3					
				27.9	B	50				89	A	20	177	B	20	284	C	10	693	C	5	1149	C	3					
				30.7	C	50				93	A	20	188	B	20	336	C	10	755	A	5	1275	A	3					
				32.5	C	50				100	A	20	192	B	20				769	A	5	1433	C	3				C	1600
				38	C	50				113	C	15	199	C	15				816	C	5	1591	A	3					
313	4.14	A	150	14.2	A	100	28.3	B	100	51	A	50	110	A	50	181	C	30	335	A	20	706	B	15	1035	B	10	A	6500
	5.4	B	150	16.9	A	100	33.6	B	100	61	A	50	120	B	50	193	A	30	381	A	20	793	A	15	1192	B	10		
	6.5	C	150	18.5	B	100	34.1	C	100	71	A	50	135	B	50	208	B	30	501	B	20	847	B	15	1393	A	10	B	5000
				21.7	B	100	40.5	B	100	78	A	50	143	B	50	252	B	30	541	A	20	914	A	15	1817	B	10		
				25.8	B	100				92	A	50	151	B	50	303	C	30	586	A	20	956	B	15	2186	B	10	C	4100
				26.6	C	100				105	A	50	176	B	50				649	A	20	990	A	15					

✻ 依您需要的減速比及轉矩來對照每一段減速比上的ABC最大受力值，及最大輸入馬力。

Please determine your ratio and output torque to match each code of gear stages A, B & C. and find different maximum torque & input capacity.

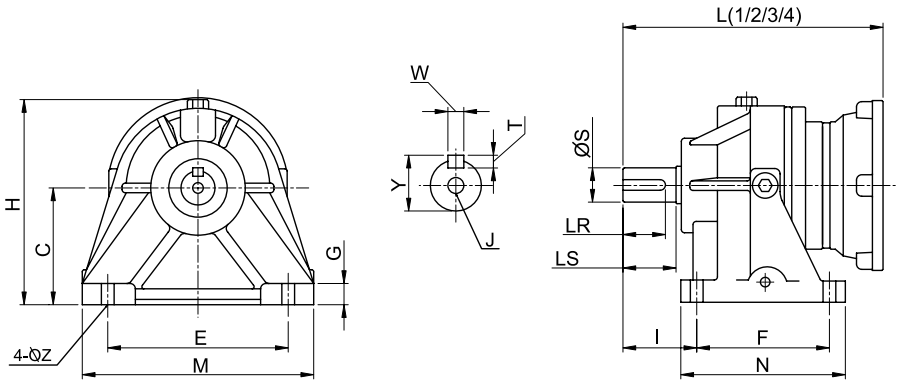
例：

型號 280，一段齒5.77比(B)在對照右側最大受力表，其(B)最大受力為45kg-m，最大可輸入馬力3HP。

Example : Type 280#, Ratio 1/5.77
Gear Stage Code : (B)
Max Torque : 45 Kg-M
Max Input Hp : 3Hp

TYPE: **HF**

臥式直結型 *Horizontal Flange Type*



尺寸規格表 DIM.TABLE (mm)

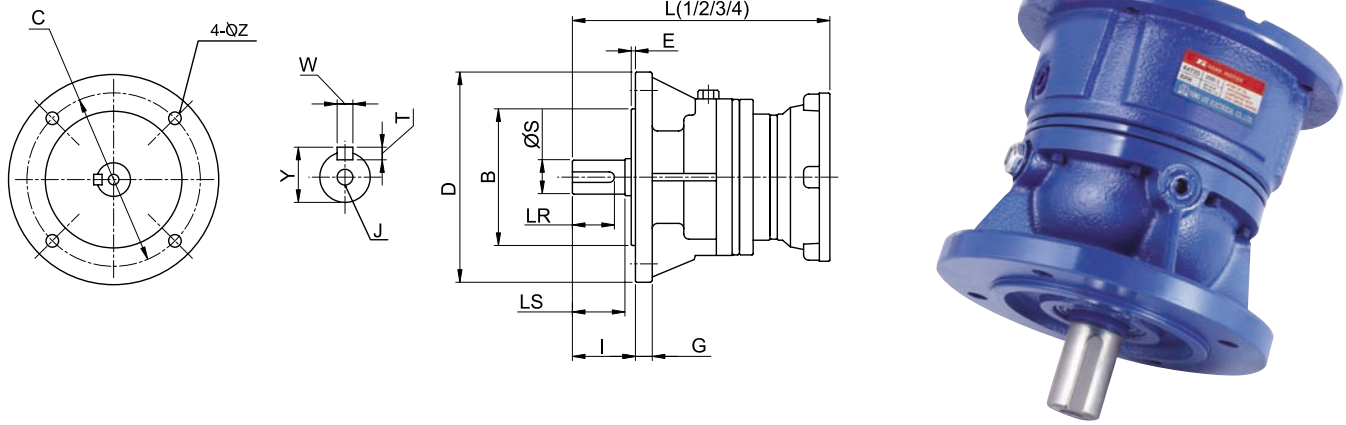
Size	腳座 Foot									出力軸 Output Shaft			鍵 Key				馬達框號 IEC規格 MOTOR FRAME
	C	E	F	G	H	I	M	N	Z	LR	LS	S	J	T	W	Y	
200	90	140	90	13	150	53	165	120	4-12	30	35	24	M8	7	8	27	63A-71B
280	110	170	125	20	185	69.5	210	155	4-12	40	50	32	M10	8	10	35	71B-90L
300	140	200	160	25	233	78	260	200	4-18	50	58	38	M12	8	10	41	71B-112M
300H	190	200	160	25	283	78	260	200	4-18	50	58	38	M12	8	10	41	132L
301	140	200	160	25	233	104	260	200	4-18	70	82	50	M16	9	14	53.5	90L-160L
301H	190	200	160	25	283	104	260	200	4-18	70	82	50	M16	9	14	53.5	132L-160M
303	210	300	250	35	332	128	370	305	4-22	80	95	55	M16	10	16	59	90L-160L
305	210	300	250	35	332	138	370	305	4-22	90	105	60	M20	11	18	64	90L-180L
307	250	365	356	45	425	175	445	436	4-28	110	130	80	PCD-55 3-M12	14	22	85	100LA-200L
309	250	365	356	45	425	215	445	436	4-28	150	170	90	PCD-55 3-M12	14	25	95	100LA-225S
313	280	457	470	35	503	291	560	626.5	4-28	180	200	120	PCD-70 3-M16	18	32	127	200LA-280S

L長度表 LENGTH TABLE (mm)

一段式 Stage 1												
型號 Size 馬力 HP		200	280	300	300(H)	301	301(H)	303	305	307	309	313
1/4, 1/2	L1	176	236	*	*	*	*	*	*	*	*	*
1, 2		*	236	278	278	316	316	*	*	*	*	*
3, 5		*	246	280	280	318	318	412.5	422.5	*	*	*
7.5, 10		*	*	295	295	333	333	427.5	437.5	*	*	*
15, 20		*	*	*	*	369	369	463.5	473.5	*	*	*
25, 30		*	*	*	*	*	*	463.5	473.5	*	*	*

二段式 Stages 2												
型號 Size 馬力 HP		200	280	300	300(H)	301	301(H)	303	305	307	309	313
1/4, 1/2	L2	206	270	308	308	*	*	*	*	*	*	*
1, 2		*	270	308	308	358	358	437	447	*	*	*
3, 5		*	280	318	318	360	360	439	449	639.5	679.5	*
7.5, 10		*	*	*	*	375	375	454	464	654.5	694.5	*
15, 20		*	*	*	*	423	423	490	500	690.5	730.5	*
25, 30		*	*	*	*	*	*	*	*	690.5	730.5	*

Vertical Flange Type 立式直結型



尺寸規格表 DIM.TABLE (mm)

Size	出力法蘭 Output Flange							出力軸 Output Shaft			鍵 Key				馬達框號 IEC規格 MOTOR FRAME
	B	C	D	E	G	I	Z	LR	LS	S	J	T	W	Y	
200	110	130	160	4	12	44	4-10	30	35	24	M8	7	8	27	63A-71B
280	130	165	200	4	16	60	4-12	40	50	32	M10	8	10	35	71B-90L
300	180	215	250	4	20	68	4-16	50	58	38	M12	8	10	41	71B-112M
300H	230	265	300	4	20	68	4-16	50	58	38	M12	8	10	41	132L
301	180	215	250	4	20	94	4-16	70	82	50	M16	9	14	53.5	90L-160M
301H	230	265	300	4	20	94	4-16	70	82	50	M16	9	14	53.5	132L-160M
303	250	300	350	4	20	104	4-19	80	95	55	M16	10	16	59	90L-160L
305	250	300	350	4	20	114	4-19	90	105	60	M20	11	18	64	90L-180L
307	350	400	450	5	27	140	4-22	110	130	80	PCD-55 3-M12	14	22	85	100LA-200L
309	350	400	450	5	27	180	4-22	150	170	90	PCD-55 3-M12	14	25	95	100LA-225S
313	450	500	550	5	32	214.5	8-28	180	200	120	PCD-70 3-M16	18	32	127	200LA-280S

L長度表 LENGTH TABLE (mm)

三段式 Stages 3

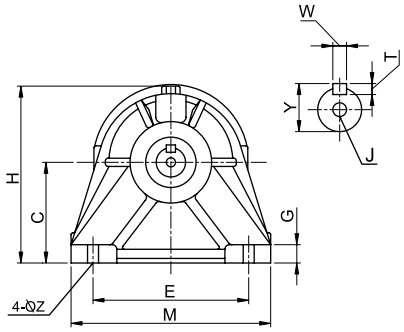
型號 Size 馬力 HP		200	280	300	300(H)	301	301(H)	303	305	307	309	313
1/4, 1/2	L3	236	304	342	342	388	388	*	*	*	*	*
1, 2		*	304	342	342	388	388	479	489	664	704	*
3, 5		*	314	352	352	398	398	481	491	666	706	*
7.5, 10		*	*	*	*	*	*	496	506	681	721	1051.5
15, 20		*	*	*	*	*	*	544	554	717	757	1087.5
25, 30		*	*	*	*	*	*	*	*	*	*	1087.5

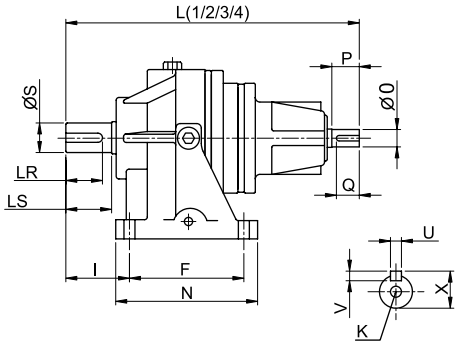
四段式 Stages 4

型號 Size 馬力 HP		200	280	300	300(H)	301	301(H)	303	305	307	309	313
1/4, 1/2	L4	266	338	376	376	422	422	509	519	*	*	*
1, 2		*	338	376	376	422	422	509	519	706	746	1061
3, 5		*	348	386	386	432	432	519	529	708	748	1063
7.5, 10		*	*	*	*	*	*	*	*	723	763	1078
15, 20		*	*	*	*	*	*	*	*	771	811	1114
25, 30		*	*	*	*	*	*	*	*	*	*	*

TYPE: **HS**

臥式雙軸型 *Horizontal Two Shaft Type*





尺寸規格表 DIM.TABLE (mm)

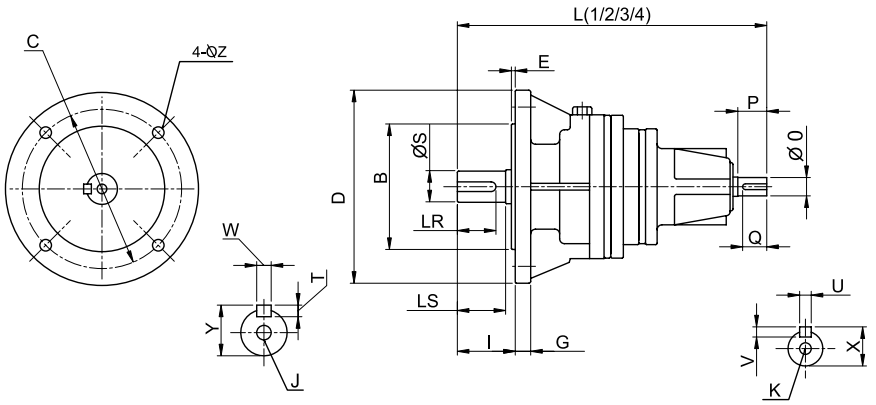
Size	腳座 Foot									出力軸 Output Shaft			鍵 Key			
	C	E	F	G	H	I	M	N	Z	LR	LS	S	J	T	W	Y
200	90	140	90	13	150	53	165	120	4-12	30	35	24	M 8	7	8	27
280	110	170	125	20	185	69.5	210	155	4-12	40	50	32	M 10	8	10	35
300	140	200	160	25	233	78	260	200	4-18	50	58	38	M 12	8	10	41
300H	190	200	160	25	283	78	260	200	4-18	50	58	38	M 12	8	10	41
301	140	200	160	25	233	104	260	200	4-18	70	82	50	M 16	9	14	53.5
301H	190	200	160	25	283	104	260	200	4-18	70	82	50	M 16	9	14	53.5
303	210	300	250	35	332	128	370	305	4-22	80	95	55	M 16	10	16	59
305	210	300	250	35	332	138	370	305	4-22	90	105	60	M 20	11	18	64
307	250	365	356	45	425	175	445	436	4-28	110	130	80	PCD-55 3-M12	14	22	85
309	250	365	356	45	425	215	445	436	4-28	150	170	90	PCD-55 3-M12	14	25	95
313	280	457	470	35	503	291	560	626.5	4-28	180	200	120	PCD-70 3-M16	18	32	127

L長度表 LENGTH TABLE (mm)

一段式 Stage 1								
Size	L1	入力軸 Input Shaft			鍵 Key			
		O	P	Q	K	U	V	X
200	252	19	30	20	M 6	6	6	21.5
280	297	24	40	35	M 8	8	7	27
300H	362	38	58	45	M 10	10	8	41
301H	400	38	58	45	M 10	10	8	41
303	502.5	50	82	70	M 12	14	9	53.5
305	512.5	50	82	70	M 12	14	9	53.5
307	705	60	105	90	M 14	18	11	64
309	745	60	105	90	M 14	18	11	64
313		80	130	110	PCD-55 3-M12	22	14	85

二段式 Stages 2								
Size	L2	入力軸 Input Shaft			鍵 Key			
		O	P	Q	K	U	V	X
200	282	19	30	20	M 6	6	6	22
280	331	24	40	35	M 8	8	7	27
300H	369	24	40	35	M 8	8	7	27
301H	442	38	58	45	M 10	10	8	41
303	521	38	58	45	M 10	10	8	41
305	531	38	58	45	M 10	10	8	41
307	729.5	50	82	70	M 12	14	9	54
309	769.5	50	82	70	M 12	14	9	54
313	1102	60	105	90	M 14	18	11	64

Vertical Two Shaft Type 立式雙軸型



尺寸規格表 DIM.TABLE (mm)

Size	出力法蘭 Output Flange							出力軸 Output Shaft			鍵 Key			
	B	C	D	E	G	I	Z	LR	LS	S	J	T	W	Y
200	110	130	160	4	12	44	4-10	30	35	24	M8	7	8	27
280	130	165	200	4	16	60	4-12	40	50	32	M10	8	10	35
300	180	215	250	4	20	68	4-16	50	58	38	M12	8	10	41
300H	230	265	300	4	20	68	4-16	50	58	38	M12	8	10	41
301	180	215	250	4	20	94	4-16	70	82	50	M16	9	14	53.5
301H	230	265	300	4	20	94	4-16	70	82	50	M16	9	14	53.5
303	250	300	350	4	20	104	4-19	80	95	55	M16	10	16	59
305	250	300	350	4	20	114	4-19	90	105	60	M20	11	18	64
307	350	400	450	5	27	140	4-22	110	130	80	PCD-55 3-M12	14	22	85
309	350	400	450	5	27	180	4-22	150	170	90	PCD-55 3-M12	14	25	95
313	450	500	550	5	32	214.5	8-28	180	200	120	PCD-70 3-M16	18	32	127

L長度表 LENGTH TABLE (mm)

三段式 Stages 3								
Size	L3	入力軸 Input Shaft			鍵 Key			
		O	P	Q	K	U	V	X
200	312	19	30	20	M6	6	6	21.5
280	365	24	40	35	M8	8	7	27
300H	403	24	40	35	M8	8	7	27
301H	449	24	40	35	M8	8	7	27
303	563	38	58	45	M10	10	8	41
305	573	38	58	45	M10	10	8	41
307	748	38	58	45	M10	10	8	41
309	788	38	58	45	M10	10	8	41
313	1126.5	50	82	70	M12	14	9	53.5

四段式 Stages 4								
Size	L4	入力軸 Input Shaft			鍵 Key			
		O	P	Q	K	U	V	X
200	342	19	30	20	M6	6	6	21.5
280	399	24	40	35	M8	8	7	27
300H	437	24	40	35	M8	8	7	27
301H	483	24	40	35	M8	8	7	27
303	570	24	40	35	M8	8	7	27
305	580	24	40	35	M8	8	7	27
307	790	38	58	45	M10	10	8	41
309	830	38	58	45	M10	10	8	41
313	1145	38	58	45	M10	10	8	41

東力小型 齒輪、渦輪減速變速馬達

先進尖端的品質，精確控制機器自動化的命脈

DNV ISO-9001 國際品質保證 CE (EMC)認證通過

臥式、立式齒輪減速馬達
Horizontal/Vertical type gear motor

CE/EMC approved
馬力(Horsepower):
0.1kw-3.7kw
減速比(Ratio):
1/3-1/1800

無段變速齒輪馬達
Speed control gear motor

齒輪減速馬達
Gear motor

馬力(Horsepower):
6w-150w
減速比(Ratio):
1/3-1/1800

直線型馬達
Linear gear motor

推力(Thrust): 1kg-140kg
基本速度(Strock Speed): 1-50 mm/sec
長度(Length): 100~600mm

電磁制動馬達
Electromagnetic brake motor

馬力(Horsepower): 6-150w
減速比(Ratio): 1/3-1/1800

中空渦輪減速機
Hollow-worm gear motor

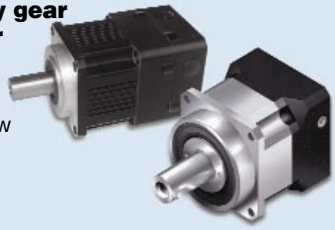
馬力(Horsepower): 40w-2200w
減速比(Ratio): 1/5-1/180

軸上型減速機 (直交軸型)
Shaft-Mounted Reducer

Model: TL-4060, 4070, 5080
減速比(Ratio): 1/30~1/300
馬力(Horsepower): 100w-1500w

TRS低間隙伺服馬達專用減速機 (歐系規格)
Low backlash planetary gear reducer for servo motor

機種(Mode)l :
042, 060, 090, 115, 142, 180
馬力(Horsepower): 50w-5000w
減速比(Ratio): 3-100



TRK低間隙伺服馬達專用減速機 (日系規格)
Low backlash planetary gear reducer for servo motor

機種(Type): TRK-B.C.D.E.F
馬力(Horsepower): 50w-5000w
減速比(Ratio): 3-25

無段變速機
Variable Speed control motor

馬力(Horsepower):
0.2kw-3.7kw
變速範圍(Speed range):
200rpm-1200rpm

遊星式減速機
Planetary Reducer

馬力(Horsepower): 1/2HP-150HP
減速比齊全

東 力

東 力 電 機 股 份 有 限 公 司
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