



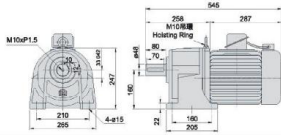
新型減速機系列

NEW STYLE GEAR REDUCER SERIES

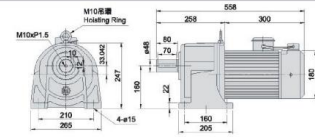
停車設備用減速機規格表 SPECIFICATION OF NEW STYLE REDUCER

型號 Model	馬達外殼 Motor Outer Shell	減速比 Ratio	馬力/極數 HP/POLE	頻率/Frequency 電壓/Voltage	剎車 Brake	重量/kg Weight	其它功能 Other Feature
H48B	鑄鐵 Cast Iron	40	3HP/4P	50/60HZ	DC Brake	63	附機械定位裝置 Mechanical Positioning Devices Are Attached
H48C	鋁合金 Aluminum	50		可選擇: Selection		56	
H48G	鋁合金 Aluminum	70		1.220/440V		57	
H310E	鑄鐵 Cast Iron	80		2.220/380V		63	

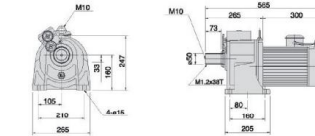
MODEL: LM-H48B



MODEL: LM-H48C



MODEL: LM-H48G



MODEL: HB48



齒輪減速機

GEAR REDUCER

臥式齒輪減速機 HORIZONTAL



B11
STANDARD
標準型H



B15
DOUBLE SHAFT
雙軸型HD



B19
MOTOR PLUG IN
馬達插入式HB



B24
MULTI-STAGE
連結式LSH



B25
MULTI-STAGE
DOUBLE SHAFT
連結雙軸式LSHD



B29
NEW STYLE
新樣式

立式齒輪減速機 VERTICAL



B13
STANDARD
標準型V



B17
DOUBLE SHAFT
雙軸型VD



B21
MOTOR PLUG-IN
馬達插入式VB



B26
MULTI-STAGE
連結式LSV



B27
MULTI-STAGE
DOUBLE SHAFT
連結雙軸式LSVD

減速機附無段變速

REDUCER WITH VARIATOR



C2
RCGH



C3
RCGV



C4
RCHW



C6
GRV-H



C7
GRV-V



C8
WRV-H



C9
WRV-V

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訂貨須知

- ◆ 機種、型號、馬力 ◆ 荷重狀況及聯結方式
- ◆ 減速比或每分鐘回轉數 ◆ 數量及被安裝的機械名稱
- ◆ 回轉方向及出力軸配置 ◆ 入力方式和入力轉速

Your order shall kindly specify:

- ◆ Type, model and horsepower
- ◆ Reduction gear ratio or rpm
- ◆ Rotating direction and position of output shaft
- ◆ Load and connecting method
- ◆ Quantity and the kind of machine applied
- ◆ Input method and rpm



機種、型式表示

DESCRIPTION OF TYPE & MODEL

LM - H - 205 - 1 - 20 - A - OH	公司代號 COMPANY NAME	機型 TYPE	型號 MODEL	馬力 HORSE POWER	速比 RATIO	馬達 MOTOR	使用方向 OPERATION DIRECTION
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- 請參閱型號選比一覽表
- 1/4HP-7.5HP
- 二段式 TWO-STAGE 10~140
- 三段式 THREE-STAGE 140~1200
- 連軸式 MULTI-STAGE 1/200~1/6000
- A 三相 3 PHASE
- B 剎車 BRAKE
- C 特殊 SPECIAL
- S 單相 SINGLE PHASE

利明牌齒輪減速機馬力型號選比一覽表 Selection Table Of HP & Model

馬力 HP-4P(BP)	型號 MODEL	減速比 RATIO	馬力 HP-4P(BP)	型號 MODEL	減速比 RATIO
1/4	201	5 10 15 20 25 30	7 1/2	212	5 10
	203	35 40		213	15 20 25 30
	304	50 60 70 80 90 100 110 120 ※ 150		314	35 40 50 ※ 60
	306	130 140 150 160 170 180 190 200		315	60 70 80 90 100 110 120
1/2	202	5 10	(5)	317	130 140 150 160 170 180 190 200
	203	10 15 20 25 30	(10)	212	5 10
1	205	35 40 45 50	(15)	214	15 20 25 30
	※304	35 40 50 60	(7 1/2)	315	35 40 50 ※ 60
	306	60 70 80 90 100 110 120	316	60 70 80 90 100 110 120	
	(1/4)	308	130 140 150 160 170 180 190 200	318	130 140 150 160 170 180 190 200
2	205	5 10 15 20 25 30	(10)	213	5 10
	207	35 40	(15)	215	15 20 25 30
	308	40 50 60 70 80 90 100 110 120	(7 1/2)	316	35 40 50 ※ 60
	(1/2)	310	130 140 150 160 170 180 190 200	317	60 70 80 90 100 110 120
3	206	5 10	(20)	318	130 140 150 160 170 180 190 200
	207	15 20 25 30	(10)	215	5 10
	209	35 40	(15)	216	15 20 25 30
	※308	35 40	(7 1/2)	317	40 50 ※ 60
5	310	40 50 60 70 80 90 100 110 120	(20)	217	15 20 25 30
	(1)	312	130 140 150 160 170 180 190 200	318	60
	208	5 10	(30)	319	70 80 90 100 110 120
	209	15 20 25 30	(40)	217	5 10 15 20 25 30
10	211	35 40	(20)	318	40 50 60
	※310	40 50 60	(25.30)	218	5 10
	312	50 60 70 80 90 100 110 120	(40)	219	15 20 25 30
	(2)	314	130 140 150 160 170 180 190 200	(50)	218
15	210	5 10	(75)	219	10 15 20 30
	211	15 20 25 30	(60)	220	5 10
	314	60 70 80 90 100 110 120	(3)	315	130 140 150 160 170 180 190 200
	(3)	315	130 140 150 160 170 180 190 200		

- 表輕負荷使用 ※Are used for light loading
- 亦可訂製其他不定速比 Other ratios are available upon request
- 減速比5, 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 150, 200屬於標準品, 其餘皆屬於特殊品。 Standard gear ratios are 5, 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 150, 200 Others are special specifications.

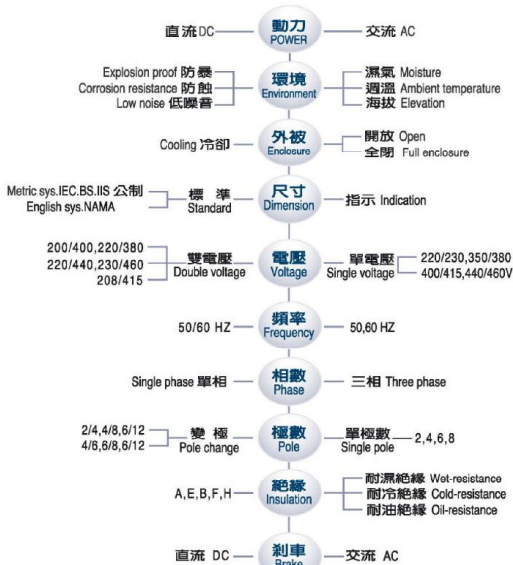


一般注意事項

General Notices

- ◆ 電源：單相、三相、電壓速率、變壓器容量等。
- ◆ 負載機械：所需馬力數，負載轉矩特性。
- ◆ 特殊使用條件：
 1. 急速逆轉或停止。
 2. 起動停止頻繁。
 3. 需特別大之起動轉矩。
 4. 與往復運動機械連結時。

- ◆ Electricity: single phase, 3 phase, voltage frequency, capacity of transformer, etc.
- ◆ Loading machine: required horse power, load torque characteristics.
- ◆ Special Conditions of Use:
 1. Rush reverse or stop.
 2. Frequent start-up or stop.
 3. Specially large start-up torque required.
 4. Where linking with backward traveling machinery.



◆ 利明牌齒輪減速機之標準品使用低壓、三相感應馬達、IEC尺寸、全封閉外扇鼠籠型轉子。

◆ LIMING standard gear reducers use low voltage, 3 phase induction motor, IEC dimension, full-enclosed outer fan cage rotor.

◆ 馬達尺寸請參閱「IEC標準馬達尺寸參考表」(第W1頁)

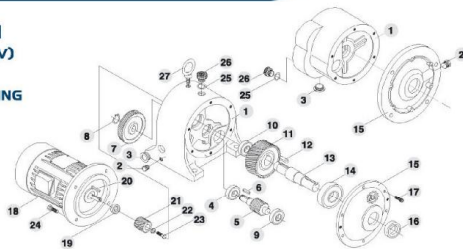


分解系統圖
SYSTEM DRAWING

二段式分解系統圖

MODEL.LMH(LMV)

2-STAGE SYSTEM DRAWING

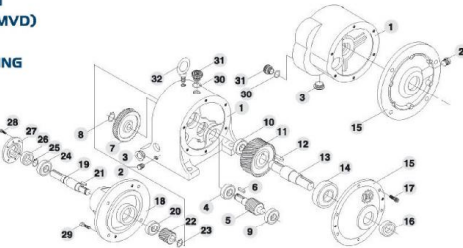


NO.	零件名稱 NAME OF PARTS	NO.	零件名稱 NAME OF PARTS	NO.	零件名稱 NAME OF PARTS
1	外殼 Outer shell	12	鎖 Key	21	D型鎖 Gear
2	排油栓 Drain plug	13	出力軸 Output shaft	22	螺帽(或D型鎖) Washer or Snap ring
3	油標 Oil gauge	14	軸承 Bearing	23	六角螺絲 Hexagon head bolt
4	軸承 Bearing	15	前蓋 Front cover	24	六角螺絲 Hexagon head bolt
5	C齒輪軸 Gear shaft	16	油封 Oil Seal	25	O型環 O ring
6	鎖 Key	17	立式、外六角螺絲 螺絲 Hex. screw	26	油封蓋 Oil Plug
7	B齒輪 Gear	18	立式、外六角螺絲 螺絲 Hex. screw	27	吊環 Hoisting ring
8	扣環 Snap ring	19	高速 Motor		
9	軸承 Bearing	20	鎖 Key		
10	軸承 Bearing				

二段式分解系統圖

MODEL.LMHD(LMVD)

2-STAGE SYSTEM DRAWING



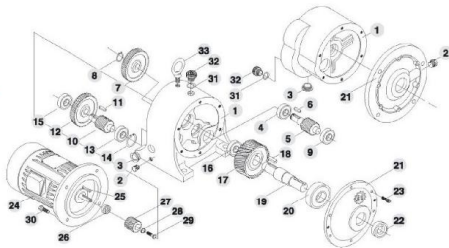
NO.	零件名稱 NAME OF PARTS	NO.	零件名稱 NAME OF PARTS	NO.	零件名稱 NAME OF PARTS
1	本體 Outer shell	12	鎖 Key	23	孔環 Snap ring
2	排油栓 Drain plug	13	出力軸 Output shaft	24	軸承 Bearing
3	油標 Oil gauge	14	軸承 Bearing	25	扣環 Snap ring
4	軸承 Bearing	15	前蓋 Front cover	26	油封 Oil Seal
5	C齒輪軸 Gear shaft	16	油封 Oil Seal	27	小蓋 Small Cover (71/2HP以上使用)
6	鎖 Key	17	立式、外六角螺絲 螺絲 Hex. screw	28	六角螺絲 Hexagon head bolt
7	B齒輪 Gear	18	六角螺絲 Big Cover	29	六角螺絲 Hexagon head bolt
8	扣環 Snap ring	19	入力軸 Input shaft	30	O型環 O ring
9	軸承 Bearing	20	軸承 Bearing	31	吊環 Oil Plug
10	軸承 Bearing	21	鎖 Key	32	吊環 Hoisting ring
11	D齒輪 Gear	22	A齒輪 Gear		

SYSTEM DRAWING
分解系統圖

三段式分解系統圖

MODEL.LMH(LMV)

3-STAGE SYSTEM DRAWING

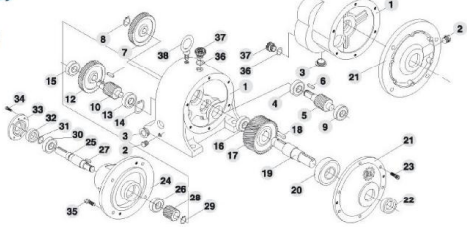


NO.	零件名稱 NAME OF PARTS	NO.	零件名稱 NAME OF PARTS	NO.	零件名稱 NAME OF PARTS
1	外殼 Outer shell	13	軸承 Bearing	25	鎖 Key
2	排油栓 Drain plug	14	R扣環 R Snap ring	26	油封 Oil Seal
3	油標 Oil gauge	15	軸承 Bearing	27	A齒輪 Gear
4	軸承 Bearing	16	軸承 Bearing	28	螺帽(或D型鎖) Washer or Snap ring
5	C齒輪軸 Gear shaft	17	D齒輪 Gear	29	六角螺絲 Hexagon head bolt
6	鎖 Key	18	鎖 Key	30	O型環 O ring
7	B齒輪 Gear	19	出力軸 Output shaft	31	O型環 O ring
8	扣環 Snap ring	20	軸承 Bearing	32	吊環 Oil Plug
9	軸承 Bearing	21	前蓋 Front cover	33	吊環 Hoisting ring
10	A(B)齒輪軸 Gear shaft	22	油封 Oil Seal		
11	鎖 Key	23	立式、外六角螺絲 螺絲 Hex. screw		
12	B齒輪 Gear	24	高速 Motor		

三段式分解系統圖

MODEL.LMHD(LMVD)

3-STAGE SYSTEM DRAWING

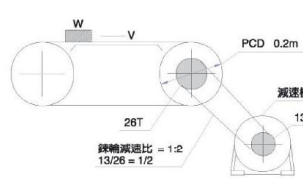


NO.	零件名稱 NAME OF PARTS	NO.	零件名稱 NAME OF PARTS	NO.	零件名稱 NAME OF PARTS
1	外殼 Outer shell	14	R扣環 R Snap ring	27	鎖 Key
2	排油栓 Drain plug	15	軸承 Bearing	28	A齒輪 Gear
3	油標 Oil gauge	16	軸承 Bearing	29	扣環 Snap ring
4	軸承 Bearing	17	D齒輪 Gear	30	六角螺絲 Hexagon head bolt
5	C齒輪軸 Gear shaft	18	鎖 Key	31	扣環 Snap ring
6	鎖 Key	19	出力軸 Output shaft	32	油封 Oil Seal
7	B齒輪 Gear	20	軸承 Bearing	33	小蓋 Small Cover (71/2HP以上使用)
8	扣環 Snap ring	21	前蓋 Front cover	34	六角螺絲 Hexagon head bolt
9	軸承 Bearing	22	油封 Oil Seal	35	六角螺絲 Hexagon head bolt
10	A(B)齒輪軸 Gear shaft	23	立式、外六角螺絲 螺絲 Hex. screw	36	O型環 O ring
11	鎖 Key	24	入力軸 Input shaft	37	吊環 Oil Plug
12	B齒輪 Gear	25	六角螺絲 Big Cover	38	吊環 Hoisting ring
13	軸承 Bearing	26	軸承 Bearing		



減速機之選定範例
EXAMPLE OF SELECTION

例一：Example 1



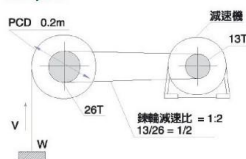
- ◆ 搬運物重量: W=600kg
- ◆ 搬送速度: V=9.5m/min
- ◆ 與導軌之摩擦係數: $\mu = 0.15$
- ◆ 鏈傳動效率: $\eta = 0.95$
- ◆ 減速機傳動效率: $\eta = 0.9$
- ◆ 運轉時間: 8小時/日
- ◆ 起動次數: 1回/分、中衝擊
- ◆ 使用電源: 三相220V, 60Hz
- ◆ Total weight of cargo: W=600kg
- ◆ Carrying speed: V=9.5m/min
- ◆ Friction coefficient to guiding rail: $\mu = 0.15$
- ◆ Chain pulley transmission coefficient: $\eta = 0.95$
- ◆ Gear reducer transmission coefficient: $\eta = 0.9$
- ◆ Operation time: 8 hours/day
- ◆ Start frequency: 1 time/min, medium shock
- ◆ Power: 3 phase 220V, 60Hz

減速比 Ratio	選定之注意事項 Notices Calculation Example	計算範例 Calculation Example
26T / 13T	<p>藉由必要之入力轉數及出力轉數求選定減速比</p> <p>1.先求出搬送速度之轉數(N1)</p> $N1 = \frac{V}{\pi \times \text{鏈距} \times \eta}$ <p>2.再求出運轉機之轉數(N2)</p> $N2 = N1 \times (\text{鏈傳動效率} \times \text{減速機效率})$ <p>3.以30,60Hz之轉數計算減速比(r)</p> $r = \frac{\text{出力轉數} \times \text{減速機效率}}{\text{入力轉數} \times \text{鏈傳動效率}}$ <p>Reduction Ratio Notices Calculation Example The reduction ratio is based on input/output shaft revolutions.</p> <p>1. Find the revolution of conveyor pulley (N1) first N1=carrying speed / (pulley D x η)</p> <p>2. Find the output shaft revolution of gear reducer (N2) N2= N1 x (chain pulley speed/gear number of reducer)</p> <p>3. Calculate reduction ratio (r) based on 30,60Hz motor r= output shaft revolution/input shaft revolution motor rpm/r</p>	<p>Load Condition Notices Calculation Example</p> <p>1. $N1 = V / (D \times \eta) = 9.5 / (0.2 \times 3.14) = 15 \text{ min (RPM)}$</p> <p>2. $N2 = N1 \times (\eta_1 \times \eta_2) = 15 \times 0.95 = 30 \text{ / min (RPM)}$</p> <p>3. $r = N2 / N = 30 / 1800 = 1/60$ (馬達轉速, motor RPM, input rpm)</p>
1:2 13/26 = 1/2	<p>決定減速比後，由使用機械之條件換算其扭力</p> <p>1.先算出搬送速度之扭力(T1)</p> $T1 = \frac{W \times V}{\eta_1 \times \eta_2}$ <p>2.再算出搬送機之扭力(T2)</p> $T2 = \frac{T1 \times \text{鏈傳動效率}}{\eta_2}$ <p>Torque Notices Calculation Example After reduction ratio is decided, calculate the torque by the pulley reducers ratio condition of the machine used.</p> <p>1. Find the torque of conveyor pulley (T1) $T1 = (W \times \text{pulley radius}) / \eta_1$</p> <p>2. Find the torque needed from the output shaft of reducer (T2) $T2 = (T1 \times \text{reduction ratio of chain pulley}) / \eta_2$</p>	<p>Load Condition Notices Calculation Example</p> <p>1. $T1 = W \times V / \eta_1$</p> <p>$= 0.15 \times 600 \times (0.2 \times 3.14) / 0.95 = 9.5 \text{ kg-m}$</p> <p>2. $T2 = (T1 \times \eta_1) / \eta_2$</p> <p>$= (9.5 \times 1/2) / 0.9 = 5.28 \text{ kg-m}$</p>
負荷條件 Load conditions	<p>選定之注意事項 Notices Calculation Example</p> <p>搬運機之使用時間 搬送機之使用時間</p> <p>Driver machine Load Classification</p> <p>均一負荷 Uniform 0.80 0.90 1.00 1.25</p> <p>中等衝擊 Medium Shock 0.90 1.00 1.25 1.50</p> <p>嚴重衝擊 Heavy Shock 1.00 1.25 1.50 1.75</p> <p>補正扭力 = 減速機出力軸扭力 × 係數</p> <p>Corrective torque = reducer shaft torque x coefficient</p>	<p>Load Condition Notices Calculation Example</p> <p>$T3 = T2 \times K$</p> <p>$= 5.28 \times 1.25 = 6.6 \text{ kgf-m}$</p>
馬力 Horse Power	<p>選定之注意事項 Notices Calculation Example</p> <p>1. 算出搬送機之馬力(Hp)</p> $Hp = \frac{\text{補正扭力} \times \text{出力軸轉數}}{716.2}$ <p>1. Find horse power (Hp) Hp=(corrective torque x revolution of input shaft) / 716.2</p>	<p>Load Condition Notices Calculation Example</p> <p>$Hp = (T3 \times N2) / 716.2 = (6 \times 30) / 716.2 = 0.3$</p> <p>1/2Hp 再選擇用 (For 1/2 Hp motor)</p>
型號選定 Model Selected	<p>根據本目錄之型號速比對照表1/2Hp、減速比1/60、型號306選用。</p> <p>According to the model-reduction ratio reference table,model 306, 1/2 Hp, reduction ratio 1/60 are selected.</p>	



減速機之選定範例

例二：Example 2



- 搬運物重量: $W=600\text{kg}$
- 搬送速度: $V=9.5\text{m/min}$
- 鍊輪傳動效率: $\eta_1=0.95$
- 減速機傳動效率: $\eta_2=0.9$
- 運轉時間: 8小時/日
- 起動次數: 1個/分, 中衝擊
- 使用電源: 三相220V, 60Hz
- Total weight of cargo: $W=600\text{kg}$
- Carrying speed: $V=9.5\text{m/min}$
- Chain pulley transmission coefficient: $\eta_1=0.95$
- Gear reducer transmission coefficient: $\eta_2=0.9$
- Operation time: 8hour/day
- Start frequency: 1 time/min, medium shock
- Power: 3 phase 220V, 60Hz

減速比 Ratio	選定之注意事項 Notices Calculation Example	計算範例 Calculation Example
	藉由必要之輸入軸轉數及出力軸轉數求定減速比 1.先求出輸入軸轉數(N1) $N1 = \text{搬送速度} / (\text{鏈輪直徑} \times \pi)$ 2.再求出輸出軸轉數(N2) $N2 = N1 \times \text{鍊輪齒數比}$ 3.以26齒之主動鍊輪求定減速比 $r = \text{出力軸轉數} / \text{入力軸轉數} = (\text{高速轉速})$ Reduction Ratio Notices Calculation Example The reduction ratio is based on input/output shaft revolutions. 1. Find the revolution of conveyor pulley (N1) first N1=carrying speed/(pulley D x π) 2. Find the output shaft revolution of gear reducer (N2) N2=N1 x chain pulley speed/gear number of reducer. 3. Calculate reduction ratio r based on 26,60Hz motor r=output shaft revolution/input shaft revolution motor rpm/N1	1. $N1 = V / (D \times \pi) = 9.5 / (0.2 \times 3.14) = 15 \text{ r/min}$ 2. $N2 = N1 / r = 15 / (2/1) = 30 \text{ r/min}$ 3. $r = \text{出力軸轉數} / \text{入力軸轉數} = 30 / 15 = 2$ (高速轉速)
扭力 Torque	選定之注意事項 Notices Calculation Example	計算範例 Calculation Example
	決定減速比後, 由使用機械之條件求其扭力 1.先求出搬送物之重力(T1) $T1 = (W \times \text{重力} \times \text{旋轉半徑}) / \eta_1$ 2.再計算出減速機出力軸所需扭力(T2) $T2 = T1 \times \text{鍊輪齒數比} / \eta_2$ Torque Notices Calculation Example After reduction ratio is decided, calculate the torque by the condition of the machine used. 1. Find the torque of conveyor pulley (T1) $T1 = (W \times \text{load} \times \text{pulley radius}) / \eta_1$ 2. Find the torque needed from the output shaft of reducer(T2) $T2 = T1 \times \text{reduction ratio of chain pulley} / \eta_2$	1. $T1 = W(D/2) \times (1/\eta_1) = 600 \times (0.2/2) / 0.9 = 60 \text{ kg-m}$ 2. $T2 = T1 \times 1/2 \times 1/\eta_2 = 60 \times 1/2 \times 1/0.9 = 33.3 \text{ kg-m}$
負荷條件 Load conditions	選定之注意事項 Notices Calculation Example	計算範例 Calculation Example
	1.根據運轉條件算出修正扭力(T3) $T3 = T2 \times \text{運轉條件}(K)$ 1. Find corrective torque (T3) according to operation condition $T3 = T2 \times \text{operation condition (coefficient K)}$	$T3 = T2 \times K = 33.3 \times 1 = 33.3 \text{ kg-m}$
馬力 Horse Power	選定之注意事項 Notices Calculation Example	計算範例 Calculation Example
	1.最後換算成馬力(Hp) $Hp = (T \times N) / 716.2$ 1. Find horse power (Hp) $Hp = (T \times N) / 716.2$	$Hp = (T3 \times N) / 716.2 = (33.3 \times 30) / 716.2 = 1.39 \dots (2HP)$

根據本目錄之型號選定對照表2HP、減速比1/60、型號310適用。
According to the model-reduction ratio reference table, model 310, 2 HP, reduction ratio 1/60 are selected.

常用之公式集 Frequently Used Formula

欲知的條件 Intended Conditions	已知之條件 Known Conditions	公式 Formula
扭力(Torque) T	動力(馬力)與轉數(N)(r.p.m.)	$T = F \times R$ (kg-m)
扭力(Torque) T	動力(kw)與轉數(N)(r.p.m.) / 扭力(N)與轉數(N)(r.p.m.)	$T = (716 \times Hp) / N$ (kg-m)
馬力(Horse Power) Hp	扭力(N)與轉數(N)(r.p.m.) / 馬力(kw)與轉數(N)(r.p.m.)	$T = (974 \times Kw) / N$ (kg-m)
馬力(Horse Power) Hp	馬力(kw)與轉數(N)(r.p.m.) / 馬力(kw)與轉數(N)(r.p.m.)	$Hp = (T \times N) / 716.2$ (馬力)
馬力(Horse Power) Hp	馬力(kw)與轉數(N)(r.p.m.) / 馬力(kw)與轉數(N)(r.p.m.)	$Kw = (T \times N) / 974$ (千瓦)
馬力(Horse Power) Hp	馬力(kw)與轉數(N)(r.p.m.) / 馬力(kw)與轉數(N)(r.p.m.)	$Hp = (F \times V) / 75$ (馬力)
馬力(Horse Power) Hp	馬力(kw)與轉數(N)(r.p.m.) / 馬力(kw)與轉數(N)(r.p.m.)	$Kw = (F \times V) / 102$ (千瓦)
速度(Velocity) V	馬力(kw)與轉數(N)(r.p.m.) / 馬力(kw)與轉數(N)(r.p.m.)	$V = (F \times D \times N) / 60$ (m/sec)
減速比(Reduction Ratio) i	馬力(kw)與轉數(N)(r.p.m.) / 馬力(kw)與轉數(N)(r.p.m.)	$i = N1 / N2$

齒輪減速機的使用及安裝 OPERATION AND INSTALLATION OF GEAR REDUCER

減速機安裝 Usage and Installation

- 使用前檢查
- 檢查機體、型號、馬力、軸方向、減速比回轉方向及入力軸出力軸回轉數是否適合。
 - 注意檢查注油情況, 先確定是否有油, 並保持油量在油面計一半以上。

- 場所
- 須設置於平坦堅固之底部。
 - 安裝之環境須乾燥且通風良好, 周圍溫度0°C~40°C異常高溫或低溫時請註明。
 - 使用前請拔掉油蓋上的插銷。

- 連結方式
- 當聯接器用以聯接入力或出力軸時, 須確實固定並務使兩軸平行, 底座須以適當螺栓, 確保固鎖緊密。
 - 所有配備均應輕裝於軸上, 勿使用鐵鏈, 並避免裝配過緊而引起軸承損壞。
 - 滑輪、鏈輪或齒輪在裝配時應盡量靠近軸承以減少彎曲應力, 使用適當大小(在出力軸徑的6倍以內)與出力軸連接之鏈輪, 皮帶輪等請配合H7公差使用, 可避免發出異常與軸面受損。
 - VB、HB型入力孔可加添適當黃油, 避免孔徑過度磨損上發生異常。
 - 軸面可塗上防銹塗料避免生鏽。

- 馬達
- 電源電壓變動大於10%時, 馬達會有燒燬之虞, 並使出出力軸扭力降低或異常。
 - 馬達超負荷使用有燒燬之虞。
 - 馬達結線錯誤會導致馬達燒燬。
 - 高氣壓之環境會使馬達馬達的煞車器產生磨損, 失去煞車功能。
 - 搭配變頻器使用時, 如常使用於低頻, 請使用變頻專用馬達。

CHECK BEFORE OPERATING

- Check if the model, model No., horse power, shaft direction, reduction ratio, revolution direction and input/output shaft revolutions are in accordance with the standard.
- Check carefully the oil level to make sure that the oil volume is sufficient and maintains above the middle of oil gauge.

PLACE

- A flat and solid base is one of the requirements for installation.
- The environment for installation shall be dry and well ventilated, with ambient temperature at 0°C to 40°C. Abnormal high or low temperature shall be declared.
- Please pull the pin out of the oil lid before use.

CONNECTING METHOD

- If coupler is used to connect input or output shaft, make sure they are firmly fixed and parallel. The base seat shall be anchored with prober bolts.
- All of the components shall be properly assembled to the shaft. Avoid hammering and over-light assembly which could damage the bearing.
- The pulley, chain pulley and gear shall be assembled as close to the bearing as possible to minimize the curving stress. The chain pulley and belt pulley used to connect the output shaft shall be properly chosen (within 6 times as large as the diameter of output shaft) and used in accordance with H7 tolerance so as to keep out of abnormal noise and harm to the shaft surface.
- Proper amount of grease can be applied to VB and HB input hole to ensure the hole against over-wearing and making abnormal noise.
- The application of anti-rust paint can keep the shaft from rusting.

MOTOR

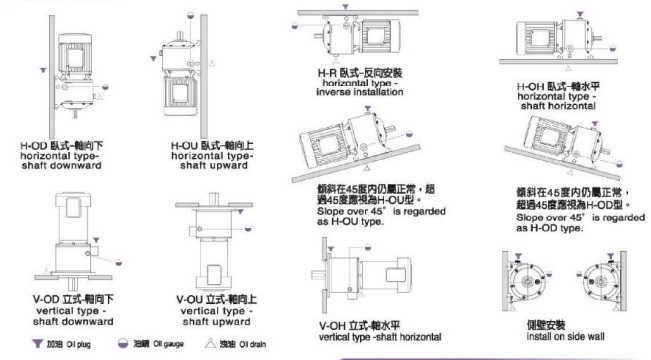
- The voltage variation over 10% could cause motor to burn out and reduce the torque of output shaft.
- Motor is subject to damage due to overload.
- Improper connection could cause motor to burn out.
- High-moisture environment could cause the brake of motor rusted and disabled.
- An appropriate motor shall be applied with the frequency converter while the low frequency is required in usual condition.

OPERATION AND INSTALLATION OF GEAR REDUCER 齒輪減速機的使用及安裝

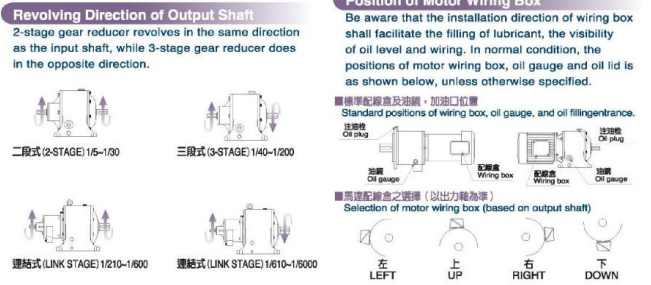
減速機使用方向 Application of Gear Reducer

正常的使用方向可使減速機保持較高的壽命, 非不得已的情況下盡量不要採用H-OU或V-OU的方式, 因入力軸的油封在高速度轉下, 較出力軸的油封容易損壞, 而導致潤滑油由油封滲漏, 如須採用請註明, 以特別處理。

The life time of gear reducer can be prolong with proper operation. Unless otherwise specified, H-OU or V-OU type of operation shall be avoided as much as possible, because the oil seal of input shaft could damage more easily than output shaft and thus result in leakage of lubricant.



馬達配線位置
安裝方向注意潤滑油加油便利, 油量計可見且配線容易, 正常情況下, 附馬達之減速機其配線位置及油錶, 油蓋位置如下圖, 如有不同時, 請註明。



齒輪減速機的使用及安裝 OPERATION AND INSTALLATION OF GEAR REDUCER

潤滑油之選定

適當潤滑油的黏度, 須使齒輪磨擦容易, 遇高負荷及衝擊負荷時, 減速機才能充分發揮其機能。下表即「利明牌」減速機潤滑油的選定:

SELECTION OF LUBRICANT OIL

Proper viscosity of lubricant is contributive to ease the friction of gears, so the speed reducer can fully apply its function in the case of high load or impact load. The table below shows the selection of lubricants for LI-MING speed reducers:

荷重 (LOAD)	周圍溫度 Ambient Temperature	中國石油 KUO-KUANG BRAND	SHELL OIL	MOBIL OIL	ISO VG
普通荷重 COMMON LOAD	-5°C ~ 20°C	國光牌極壓機油 HD-150	OMALA OIL 150	MOBIL GEAR 629	ISO VG EP 150
	20°C ~ 40°C	國光牌極壓機油 HD-320	OMALA OIL 320	MOBIL GEAR 632	ISO VG EP 320
	40°C ~ 80°C	國光牌極壓機油 HD-460	OMALA OIL 460	MOBIL GEAR 634	ISO VG EP 460
超荷重 HEAVY LOAD	-3°C ~ 20°C	國光牌極壓機油 HD-320	OMALA OIL 320	MOBIL GEAR 632	ISO VG EP 320
	20°C ~ 40°C	國光牌極壓機油 HD-460	OMALA OIL 460	MOBIL GEAR 634	ISO VG EP 460
	40°C ~ 80°C	國光牌極壓機油 HD-680	OMALA OIL 680	MOBIL GEAR 636	ISO VG EP 680

注意事項:

- 本公司出廠減速機, 使用國光牌極壓機油 HD-460。
- 最初使用100小時後, 洗淨內部、換上新油以後每2500小時換油。
- 在高溫、高濕、低溫、重荷重、強制潤滑等特殊情況下使用場合, 請與本公司洽商。
- 潤滑油不足可能導致噪音和齒輪快速磨損。
- 潤滑油過多可能導致漏油。
- 請加入適當潤滑油至油量計一半以上(請參考下一頁油量表)。

NOTICE:

- LI-MING gear reducers use Kuo-Kuang Brand engine oil HD-460.
- After initial 100 hours of usage, replace with new lubricant; then, do it every 2500 hours.
- If to use in the special conditions, such as high speed, high temperature, low speed, heavy load, and forced lubrication, please contact our company.
- Insufficiency of lubricant could cause noise and fast abrasion of gears.
- Excessive fill proper lubricant could lead to oil leakage.
- Please fill proper lubricant above half position of the oil gauge. (see "OIL CAPACITIES" next page)

油量表：

立式減速機依使用方向的不同而使用不同的油量，而油鏡及油孔位置亦不同，訂貨時請註明使用方向。臥式減速機之油量請參考尺寸表。

OIL CAPACITIES:

The capacity of lubricant oil and the positions of oil gauge and drain hole for the vertical speed reducers are based on use direction. Please indicate the intended use direction when ordering. Please refer to the table below for the lubricant oil



油量表(Oil capacities) 單位：公升(LITERS)

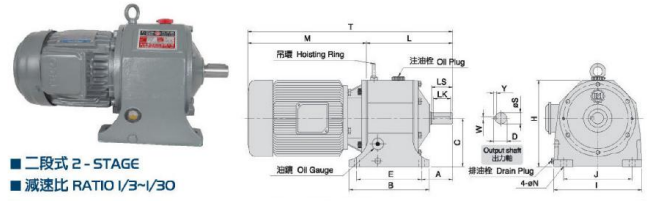
TYPE	LM-V	LM-VD	LM-VB
方向	OH	OV	OH
MODEL	OH	OV	OH
201	0.3	0.5	0.3
202	0.3	0.5	0.3
203	0.5	1.0	0.5
205	1.0	2.0	1.0
206	1.0	2.0	1.0
207	1.5	3.0	1.5
208	1.5	3.0	1.5
209	2.0	4.0	2.0
210	2.0	4.0	2.0
211	3.0	6.0	3.0
212	3.0	6.0	3.0
213	5.0	12	5.0
214	5.0	12	5.0
215	8.0	20	8.0
216	8.0	20	8.0
217	10	24	10
218	12	30	12
304	0.5	1.0	0.5
306	1.0	2.0	1.0
308	1.5	3.0	1.5
310	2.0	4.0	2.0
312	3.0	6.0	3.0
314	5.0	12	5.0
315	8.0	20	8.0
316	8.0	20	8.0
317	10	24	10
318	12	30	12

油量表(Oil capacities) 單位：公升(LITERS)

TYPE	LM-LSV	OV	LM-LSVD	OV
方向	OH	OV	OH	OV
MODEL	LSV1	LSV2	LSV1	LSV2
406	0.8	0.3	2.0	0.5
408	1.5	0.5	3.0	1.0
410	2.0	1.0	4.0	2.0
412	3.0	1.0	6.0	3.0
414	5.0	2.0	12	4.0
416	6.0	2.0	20	4.0
417	10	3.0	24	8.0
418	12	3.0	30	8.0
508	1.5	0.5	3.0	1.0
510	2.0	1.0	4.0	2.0
512	3.0	1.0	6.0	3.0
514	5.0	1.0	12	3.0
516	6.0	2.0	20	4.0
517	10	3.0	24	8.0
518	12	3.0	30	8.0
610	2.0	1.0	4.0	1.0
612	3.0	1.0	6.0	2.0
614	5.0	1.0	12	3.0
616	8.0	2.0	20	4.0
617	10	3.0	24	8.0
618	12	3.0	30	8.0

齒輪減速機系列 GEAR REDUCER SERIES

臥式減速機 HORIZONTAL TYPE REDUCER MODEL: H



二段式 2-STAGE 減速比 RATIO 1/3-1/30

尺寸表 Dimension 單位：mm

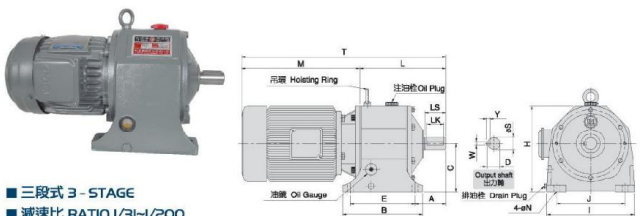
型號 MODEL	馬力 HP (4P)	減速比 RATIO	M	L	T	H	C	A	腳座 FOOT STOCK	出力軸 OUTPUT SHAFT	重量 Weight (KG)
									E B I N D	LS S W x Y x LK	Oil (L)
H-201	1/4	3-30	225	165	390	170	90	53	125 140 155 180 10	21 38 19	5x5x30 9 0.5
H-202	1/2	3-10	248	172	420	170	90	60	125 140 155 180 10	27 45 24	7x7x35 9 0.5
H-203	1/4	31-80	225	180	408	190	110	62	135 145 167 190	13 27	45 24 7x7x35 12 0.7
H-205	1/2	31-80	248	231	478	227	127	77	170 180 210 230	15 31	50 28 7x7x40 22 1
H-206	2	3-10	322	226	548	227	127	80	170 180 210 230	15 35	55 32 10x8x45 22 1
H-207	1	11-30	322	254	578	253	145	80	205 195 245 255	15 35	55 32 10x8x45 28 1.4
H-208	3	3-10	315	262	577	265	145	87	205 195 245 255	15 41	60 38 10x8x50 29 1.4
H-209	3	31-80	322	290	612	289	164	86	215 215 265 295	19 41	60 38 10x8x50 42 2
H-210	5	3-10	371	263	654	266	164	92	215 215 265 295	19 45	65 42 12x8x55 42 2
H-211	5	11-30	371	325	696	332	192	109	250 270 310 340	19 51	75 48 12x8x55 63 3
H-212	7 1/2	3-10	374	325	699	332	192	109	250 270 310 340	19 51	75 48 12x8x55 63 3
H-213	15	3-10	498	385	759	385	210	128	310 310 380 410	22 60	80 58 15x10x70 100 6.5
H-214	10	11-30	412	390	802	385	210	131	310 310 380 410	22 66	85 62 15x10x75 100 6.5
H-215	20	3-10	542	468	1010	445	245	151	360 360 440 455	25 76.5	100 72 20x12x90 166 10
H-216	25	11-30	542	469	1011	445	245	151	360 360 440 455	25 80.5	100 76 20x12x90 168 10
H-217	30	4-30	682	508	1070	506	280	172	380 420 460 530	25 84.5	110 80 20x12x100 217 15
H-218	40	4-10	600	1108	1208	445	245	151	360 360 440 455	25 80.5	100 76 20x12x90 168 10
H-219	50	5-10	660	608	1268	575	310	196	480 480 570 600	28 106.5	130 100 24x16x120 336 24
H-220	60	11-30	660	676	1336	680	380	214	540 500 635 680	28 124	150 115 32x22x140 537 32
H-220	75	5-10	678	1352	1502	600	430	272	600 680 700 840	38 139	180 130 35x22x170 750 45

*重量不含馬達 Motor weight exclusive *表使用圖形外殼 *減速比5,10,15,20,25,30,35,40,50,60,70,80,90,100,120,150,200屬於標準品，其餘皆屬於特殊品。

齒輪減速機系列 GEAR REDUCER SERIES

齒輪減速機系列

臥式減速機 HORIZONTAL TYPE REDUCER MODEL: H



三段式 3-STAGE 減速比 RATIO 1/3-1/200

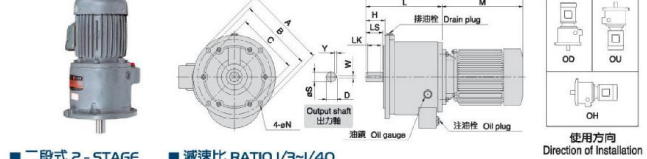
尺寸表 Dimension 單位：mm

型號 MODEL	馬力 HP (4P)	減速比 RATIO	M	L	T	H	C	A	腳座 FOOT STOCK	出力軸 OUTPUT SHAFT	重量 Weight (KG)
									E B I N D	LS S W x Y x LK	Oil (L)
H-304	1/4	51-120	225	197	422	190	110	68	135 145 167 190 13	31 50	28 7x7x40 13 0.7
H-306	1/4	121-200	225	236	461	210	110	68	135 145 167 190 13	31 50	28 7x7x40 13 0.7
H-308	1/2	51-120	248	244	492	227	127	80	170 180 210 230	15 35	55 32 10x8x45 23 1
H-310	1/2	121-200	248	268	516	248	145	85	205 195 245 255	15 41	60 38 10x8x50 30 1.4
H-312	1	40-120	242	259	501	253	145	85	205 195 245 255	15 41	60 38 10x8x50 30 1.4
H-310	2	31-80	322	290	612	289	164	92	215 215 265 295	19 45	65 42 12x8x55 46 2
H-312	2	121-200	242	306	548	332	192	109	250 270 310 340	19 51	75 48 12x8x55 70 3
H-314	3	41-120	315	337	652	332	192	109	250 270 310 340	19 51	75 48 12x8x55 70 3
H-316	5	31-80	371	337	706	371	210	131	310 310 380 410	22 66	85 62 15x10x75 115 6.5
H-318	7 1/2	35-120	374	484	858	445	245	151	360 360 440 455	25 76.5	100 72 20x12x90 181 10
H-310	15	31-80	498	485	897	445	245	151	360 360 440 455	25 80.5	100 76 20x12x90 183 10
H-317	20	40-120	542	523	1065	505	280	172	380 420 460 530	25 84.5	110 80 20x12x100 245 15
H-318	25	121-200	542	523	1065	505	280	172	380 420 460 530	25 84.5	110 80 20x12x100 245 15
H-318	30	60-120	542	628	1170	575	310	196	480 480 570 600	28 106.5	130 100 24x16x120 460 24
H-319	30	70-90	542	628	1190	575	310	196	480 480 570 600	28 106.5	130 100 24x16x120 460 24
H-319	30	121-200	542	699	1241	670	380	214	540 500 635 680	28 124	150 115 32x22x140 590 32
H-319	40	40-80	600	699	1299	670	380	214	540 500 635 680	28 124	150 115 32x22x140 590 32

*重量不含馬達 Motor weight exclusive *表使用圖形外殼 *減速比5,10,15,20,25,30,35,40,50,60,70,80,90,100,120,150,200屬於標準品，其餘皆屬於特殊品。

齒輪減速機系列 GEAR REDUCER SERIES

立式減速機 VERTICAL TYPE REDUCER MODEL: V

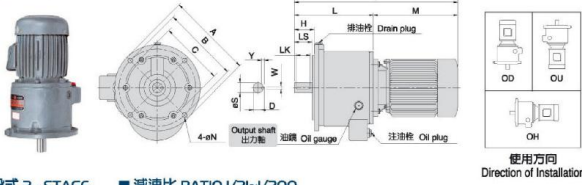


二段式 2-STAGE 減速比 RATIO 1/3-1/40

尺寸表 Dimension 單位：mm

型號 MODEL	馬力 HP (4P)	減速比 RATIO	M	L	T	H	法蘭面 FLANGE	出力軸 OUTPUT SHAFT	重量 Weight (KG)
							A B C N D	LS S W x Y x LK	Oil (KG)
V-201	1/4	3-30	225	145	370	43	178 155 130 10 21	38 19	5x5x30 8
V-202	1/2	3-10	248	153	401	50	178 155 130 10 27	45 24	7x7x35 8
V-203	1/4	31-80	255	201	426	50	200 175 150 12 27	45 24	7x7x35 12
V-205	1/2	31-80	248	217	465	55	240 215 180 14 31	50 28	7x7x40 20
V-206	2	3-10	322	214	536	60	240 215 180 14 35	55 32	10x8x45 20
V-207	1	11-30	322	233	565	60	280 245 210 14 35	55 32	10x8x45 26
V-208	2	11-30	322	238	565	65	280 245 210 14 41	60 38	10x8x50 26
V-209	3	3-10	315	261	576	65	330 300 250 18 41	60 38	10x8x50 39
V-210	5	3-10	371	266	637	70	330 300 250 18 45	65 42	12x8x55 39
V-211	5	11-30	371	305	676	80	380 335 290 18 51	75 48	12x8x55 59
V-212	7 1/2	3-10	374	305	679	80	380 335 290 18 51	75 48	12x8x55 59
V-213	15	4-10	498	358	856	85	450 400 350 22 60	80 58	15x10x75 93
V-214	10	11-30	412	363	775	90	450 400 350 22 66	85 62	15x10x75 93
V-215	15	11-30	498	437	935	105	500 450 400 24 76.5	100 72	20x12x90 138
V-216	20	11-30	542	437	970	105	500 450 400 24 80.5	100 76	20x12x90 140
V-217	25	11-30	542	437	970	105	500 450 400 24 80.5	100 76	20x12x90 140
V-217	30	4-30	682	479	1041	115	580 540 480 24 84.5		

■ 立式減速機 VERTICAL TYPE REDUCER
■ MODEL : V



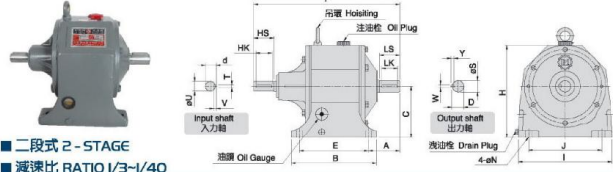
■ 三段式 3-STAGE ■ 減速比 RATIO 1/3~1/200

尺寸表 Dimension																
單位: mm																
型號 MODEL	馬力 HP (4P)	減速比 RATIO	M	L	T	法蘭面 FLANGE				出力軸 OUTPUT SHAFT			重量 Weight (KG)	油量 Oil (L)		
						A	B	C	N	D	LS	S	WxYxLxK			
V-304	1/4	51~120	225	187	412	55	200	175	150	12	31	60	28	7x7x40	14	
V-306	1/4	121~200	225	222	447	60	240	215	180	14	35	55	32	10x8x45	24	
	1/2	51~120	248	234	482											
V-308	1/2	121~200	248	246	494											
	1	40~120	242	238	480	65	280	245	210	14	41	60	38	10x8x50	27	
V-310	2	31~40	322	238	560											
	1	121~200	242	242	521											
V-312	2	51~120	322	279	601	70	330	300	250	18	45	65	42	12x8x55	40	
	3	31~50	315	269	594											
V-314	3	121~200	315	279	601											
	5	51~120	371	315	693											
V-316	5	121~200	371	379	749	90	450	400	350	22	66	85	62	15x10x75	106	
	7 1/2	31~50	374	366	740											
V-318	7 1/2	125~200	374	823	823											
	10	60~120	374	452	826	105	500	450	400	24	76.5	100	72	20x12x90	162	
V-320	10	121~200	412	484	884											
	15	31~50	498	452	950	105	500	450	400	24	80.5	100	76	20x12x90	163	
V-322	15	125~200	374	853	853											
	20	40~50	542	479	977	115	590	540	480	24	84.5	110	80	20x12x100	230	
V-324	25	40~50	562	1041	1041											
	30	40~50	562	1041	1041											
V-326	30	121~200	412	1009	1009											
	40	121~200	498	1095	1095											
V-328	40	60~120	542	597	1139	135	660	610	560	24x6	106.5	130	100	24x16x120	386	
	50	60~120	562	1159	1159											
V-330	50	40~50	562	1159	1159											
	60	121~200	542	1216	1216											
V-332	60	70~90	562	1236	1236											
	80	70~90	562	1236	1236	155	700	650	600	24x6	124	150	115	32x20x140	615	
V-334	80	40~60	600	1274	1274											

*重量不含馬達 Motor weight exclusive *V-319以下臥用請看外觀圖或內洽
*減速比15,10,15,20,25,30,35,40,50,60,70,80,90,100,120,150,200屬於標準品,其餘皆屬於特殊品。



■ 臥式雙軸減速機 HORIZONTAL DOUBLE SHAFT TYPE REDUCER
■ MODEL : HD



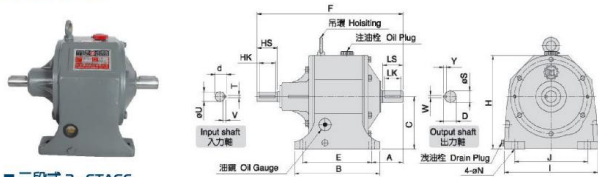
■ 二段式 2-STAGE
■ 減速比 RATIO 1/3~1/40

尺寸表 Dimension																					
單位: mm																					
型號 MODEL	馬力 HP (4P)	減速比 RATIO	F	A	C	H	入力軸 INPUT SHAFT			腳座 FOOT STOCK				出力軸 OUTPUT SHAFT			重量 Weight (KG)	油量 Oil (L)			
							d	HS	TxVxHK	U	E	J	B	N	D	LS	S	WxYxLxK			
*HD-201	1/4	3~30	252	53	90	170	18	35	5x5x25	16	125	140	155	180	10	21	38	19	5x5x30	12	0.5
*HD-202	1/2	3~30	284	60	90	170	21	40	5x5x30	19	125	140	155	180	10	27	45	24	7x7x35	12	0.5
HD-203	1/4	31~50	287				18	35		16											
	1/2	11~30	272	62	110	190	21	40	5x5x30	19	135	145	167	190	13	27	45	24	7x7x35	15	0.7
HD-205	1/2	31~50	360	77	127	227	27	50	7x7x40	24	170	180	210	230	15	31	50	28	7x7x40	25	1
HD-206	2	3~10	365	80	127	227	27	50	7x7x40	24	170	180	210	230	15	35	55	32	10x8x45	28	1
HD-207	1	31~40	392	80	145	253	27	50	7x7x40	24	205	195	245	255	15	35	55	32	10x8x45	34	1.4
HD-208	3	11~30	397	87	145	253	27	50	7x7x40	24	205	195	245	255	15	41	60	38	10x8x50	35	1.4
HD-209	2	31~40	419	88	164	289	31	55	7x7x45	28	215	215	265	295	19	41	60	38	10x8x50	50	2
HD-210	3	11~30	419	88	164	289	31	55	7x7x45	28	215	215	265	295	19	41	60	38	10x8x50	50	2
	5	3~10	423	92	164	289	31	55	7x7x45	28	215	215	265	295	19	45	65	42	12x8x55	50	2
HD-211	3	31~40	465	109	192	332	31	55	7x7x45	28	250	270	310	340	19	51	75	48	12x8x55	72	3
HD-212	5	11~30	479	109	192	332	35	60	10x8x50	32	250	270	310	340	19	51	75	48	12x8x55	72	3
	7 1/2	3~10	484	109	192	332	35	60	10x8x50	32	250	270	310	340	19	51	75	48	12x8x55	72	3
HD-213	7 1/2	11~30	564	126	210	385	41	65	10x8x55	38	310	310	380	410	22	60	80	56	15x10x70	120	6.5
HD-214	15	4~10	569	131	210	385	41	65	10x8x55	38	310	310	380	410	22	66	85	62	15x10x75	120	6.5
HD-215	20	4~10	692	151	245	445	51	80	12x8x70	48	360	360	440	455	25	75.5	100	72	20x12x90	201	10
HD-216	20	11~30	693	151	245	445	51	80	12x8x70	48	360	360	440	455	25	80.5	100	76	20x12x90	203	10
	25	4~10	734	172	280	505	51	80	12x8x70	48	380	420	460	530	25	84.5	110	80	20x12x100	255	15
HD-217	30	4~10	734	172	280	505	51	80	12x8x70	48	380	420	460	530	25	84.5	110	80	20x12x100	255	15
HD-218	40	4~10	881	196	310	575	59	90	15x10x80	55	480	480	570	600	28	106.5	130	100	24x16x120	386	24
	50	5~10	881	196	310	575	59	90	15x10x80	55	480	480	570	600	28	106.5	130	100	24x16x120	386	24
HD-219	60	10~30	970	214	380	680	69	100	15x10x90	65	540	500	635	680	28	124	150	115	32x20x140	617	32
HD-220	75	5~10	1093	272	430	800	79.5	110	20x12x100	75	600	680	700	840	38	139	180	130	35x22x170	852	45

*此使用圖形外殼 *減速比15,10,15,20,25,30,35,40,50,60,70,80,90,100,120,150,200屬於標準品,其餘皆屬於特殊品。



■ 臥式雙軸減速機 HORIZONTAL DOUBLE SHAFT TYPE REDUCER
■ MODEL : HD

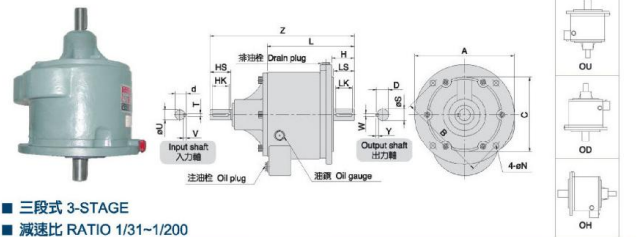


■ 三段式 3-STAGE
■ 減速比 RATIO 1/3~1/200

尺寸表 Dimension																					
單位: mm																					
型號 MODEL	馬力 HP (4P)	減速比 RATIO	F	A	C	H	入力軸 INPUT SHAFT			腳座 FOOT STOCK				出力軸 OUTPUT SHAFT			重量 Weight (KG)	油量 Oil (L)			
							d	HS	TxVxHK	U	E	J	B	N	D	LS	S	WxYxLxK			
HD-304	1/4	51~120	284	66	110	190	18	35	5x5x25	16	135	145	167	190	13	31	50	28	7x7x40	16	0.7
HD-306	1/4	121~200	329	80	127	227	18	35	5x5x30	19	170	180	210	230	15	35	55	32	10x8x45	26	1
	1/2	51~120	338				21	40	5x5x30	19											
HD-308	1/2	121~200	361	85	145	253	27	50	5x5x30	19											
	1	40~120	397	85	145	253	27	50	7x7x40	24	205	195	245	255	15	41	60	38	10x8x50	36	1.4
HD-310	2	31~40	397				27	50	7x7x40	24											
	1	121~200	444	92	164	289	27	50	7x7x40	24	215	215	265	295	19	45	65	42	12x8x55	52	2
HD-312	2	51~120	477	109</																	

■ 立式雙軸減速機 VERTICAL DOUBLE SHAFT TYPE REDUCER

■ MODEL : VD



■ 三段式 3-STAGE
■ 減速比 RATIO 1/31~1/200

尺寸表 Dimension

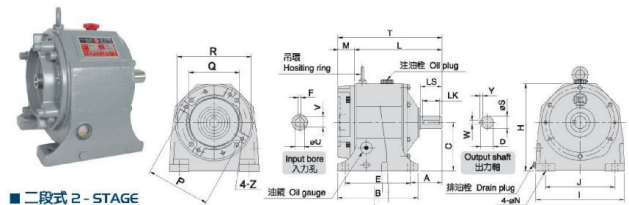
型號 MODEL	馬力 HP (4P)	減速比 RATIO	腳座		法蘭面 FLANGE					出力軸 OUTPUT SHAFT					重量 Weight (KG)				
			L	Z	d	HS	TX	Y	HK	U	A	B	C	N		D	LS	S	H
VD-304	1/4	51-120	187	274	18	35	5x5x25	16	200	175	150	12	31	50	28	55	7x7x40	17	
	1/4	121-200	222	309	18	35	5x5x25	16	242	215	180	14	35	55	32	60	10x8x45	30	
	1/2	121-200	234	326	21	40	5x5x30	19											
VD-306	1/2	121-200	246	333	21	40	5x5x30	19											
	1	40-120	238	375	27	50	7x7x40	24	280	245	210	14	41	60	38	65	10x8x50	33.5	
	2	31-40	238	375	27	50	7x7x40	24											
VD-310	1	121-200																	
	2	51-120	279	416	27	50	7x7x40	24	330	300	250	18	45	65	42	70	12x8x55	51	
	3	31-50																	
VD-312	3	41-120	315	455	31	55	7x7x45	28	380	335	290	18	51	75	48	80	12x8x55	75	
	5	31-50																	
	5	51-120	378	523	35	60	10x8x50	32	450	400	350	22	66	85	62	90	15x10x75	115	
VD-314	7/12	31-60																	
	5	121-200			35	60	10x8x45	32											
	7/12	35-120	452	636	41	65	10x8x55	38	550	450	400	24	76.5	100	72	105	20x12x90	182	
VD-316	10	125-200	452	636	41	65	10x8x55	38	550	450	400	24	80.5	100	76	105	20x12x90	183	
	7/12	125-200			41	65	10x8x55	38											
	15	40-120	479	703	51	80	12x8x70	48	590	540	480	24	84.5	110	80	115	20x12x100	265	
VD-317	20	40-50			51	80	12x8x70	48											
	25	40-50			51	80	12x8x70	48											
	15	121-200			51	80	12x8x70	48											
VD-318	20	51-120	597	823	51	80	12x8x70	48	660	610	560	24x6	106.5	130	100	135	24x16x120	424	
	30	31-50			51	80	12x8x70	48											
	25	70-90	674	962	51	80	12x8x70	48	700	650	600	24x6	124	150	115	155	32x20x140	665	
VD-319	30	70-90			51	80	12x8x70	48											
	40	40-60			59	90	15x10x80	55											

* VD-319 立式馬達用者外觀圖或內洽。 * 減速比 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 150, 200 屬於標準品，其餘皆屬於特殊品。



■ 馬達插入式臥式減速機 HORIZONTAL TYPE REDUCER MOTOR PLUG-IN

■ MODEL : HB



■ 二段式 2-STAGE
■ 減速比 RATIO 1/3-1/40

尺寸表 Dimension

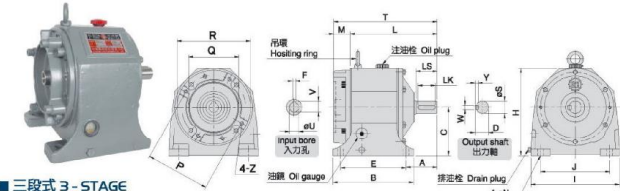
型號 MODEL	馬力 HP (4P)	減速比 RATIO	腳座		法蘭面 FLANGE					馬達殼 IEC MOTOR FLANGE					入力孔 INPUT BORE					出力軸 OUTPUT SHAFT					重量 Weight (KG)
			T	H	L	C	A	E	J	B	I	N	M	P	Q	R	Z	U	F	V	D	LS	S	H	
* HB-201	1/4	3-30	192	170	165	90	63	125	140	155	180	10	27	130	110	160	M8	11	4	12.7	21	38	19	5x5x30	12
	1/2	3-10	199	170	172	90	60	125	140	155	180	10	27	130	110	160	M8	14	5	16.3	27	45	24	7x7x35	12
HB-203	1/2	3-10	207	190	180	110	62	135	145	167	190	13	27	130	110	160	M8	14	5	16.3	27	45	24	7x7x35	15
	1/2	31-50	251	222	222	127	77	170	180	210	230	15	26	130	110	160	M8	14	5	16.3	31	50	28	7x7x40	27
HB-205	1	3-30	255	227	227	127	77	170	180	210	230	15	26	130	110	200	M10	18	6	21.8	31	50	28	7x7x40	27
	2	3-10	270	227	226	127	80	170	180	210	230	15	44	165	130	200	M10	24	8	27.3	35	55	32	10x8x45	27
HB-207	1	31-40	298	253	254	145	80	205	195	245	255	15	44	165	130	200	M10	19	6	21.8	35	55	32	10x8x45	33
	2	11-30	298	253	254	145	80	205	195	245	255	15	44	165	130	200	M10	24	8	27.3	41	60	38	10x8x50	38
HB-208	3	3-10	315	265	262	145	87	205	195	245	255	15	57	185	160	250	M12	28	8	31.3	41	60	38	10x8x50	51
	2	31-40	323	289	279	164	88	215	215	265	295	19	57	185	160	250	M10	24	8	27.3	41	60	38	10x8x50	38
HB-209	3	11-30	322	289	279	164	88	215	215	265	295	19	57	185	160	250	M12	28	8	31.3	41	60	38	10x8x50	51
	5	3-10	327	289	283	164	92	215	215	265	295	19	57	185	160	250	M12	28	8	31.3	45	65	42	12x8x55	51
HB-210	5	3-10	369	332	325	192	109	250	270	310	340	19	57	185	160	250	M12	28	8	31.3	51	75	48	12x8x55	72
	5	11-30																							
HB-212	7/12	11-30	390	332	325	192	109	250	270	310	340	19	57	185	160	250	M12	28	8	31.3	51	75	48	12x8x55	77
	10	3-10																							
HB-213	15	4-10	470	385	385	210	126	310	310	380	410	22	65	265	230	300	M12	38	10	41.3	60	80	56	15x10x70	114
	15	4-10	470	385	380	210	131	310	310	380	410	22	65	265	230	300	M12	38	10	41.3	66	85	62	15x10x75	122
HB-215	15	11-30	553	445	445	245	151	360	360	440	455	25	85	300	250	350	M16	42	12	45.3	76.5	100	72	20x12x90	180
	20	4-10																							
HB-216	20	11-30	554	445	449	245	151	360	360	440	455	25	85	300	250	350	M16	42	12	45.3	80.5	100	76	20x12x90	182
	25	5-10																							
HB-217	30	4-30	595	505	508	280	172	380	420	460	530	25	87	350	300	400	M16	48	14	51.8	84.5	110	80	20x12x100	255
	40	4-10																							
HB-218	40	11-30	695	575	608	310	196	480	480	570	600	28	87	350	300	400	M16	55	16	59.3	106.5	130	100	24x16x120	374
	50	5-10																							
HB-219	50	60	772	680	685	380	214	540	500	635	660	28	400	350	450	M16	60	18	84.3	124	150	115	32x20x140	597	
	60	10-30																							

* 表使用圖形外觀。 * 減速比 10, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 120, 150, 200 屬於標準品，其餘皆屬於特殊品。



■ 馬達插入式臥式減速機 HORIZONTAL TYPE REDUCER MOTOR PLUG-IN

■ MODEL : HB



■ 三段式 3-STAGE
■ 減速比 RATIO 1/31~1/200

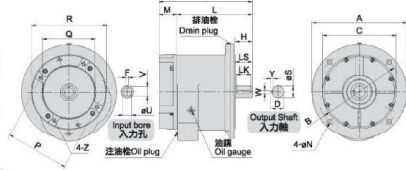
尺寸表 Dimension

型號 MODEL	馬力 HP
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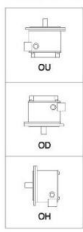
馬達插入式減速機

VERTICAL TYPE REDUCER MOTOR PLUG-IN

MODEL: VB



使用方向
Direction of Installation



三段式 3-STAGE

減速比 RATIO 1/31-1/200

尺寸表 Dimension

單位: mm

型號 MODEL	馬力 HP (4P)	減速比 RATIO	法蘭蓋 FLANGE			馬達殼 IEC MOTOR FLANGE										出力軸 OUTPUT SHAFT			重量 Weight (KG)				
			T	L	H	A	B	C	M	N	P	Q	R	Z	U	V	D	LS		S	WxYxLk		
VB-304	1/4	51-120	214	187	55	200	175	150	12	27	130	110	160	M8	11	4	12.7	31	50	28	7x7x40	17	
VB-306	1/2	121-200	250	222	60	240	215	180	14	28	130	110	160	M8	11	4	12.7	35	55	32	10x8x45	27	
VB-308	1	121-200	271	246	65	280	245	210	14	28	130	110	200	M8	14	5	16.3						
VB-310	2	31-40	271	246	65	280	245	210	14	33	165	130	200	M10	19	6	21.8	41	60	38	10x8x50	32	
VB-312	3	121-200	313	282	70	330	300	250	18	44	165	130	200	M10	24	8	27.3	45	65	42	12x8x55	53	
VB-314	5	121-200	495	462	80	380	335	290	18	53	215	180	250	M12	28	8	31.3	51	75	48	12x8x55	75	
VB-315	7.1/2	35-120	517	452	105	500	450	400	24	65	265	230	300	M12	38	10	41.3	76.5	100	72	20x12x90	171	
VB-316	10	35-120	517	452	105	500	450	400	24	65	265	230	300	M12	38	10	41.3	80.5	100	76	20x12x90	184	
VB-317	15	31-40	537	452	105	500	450	400	24	65	265	230	300	M12	38	10	41.3	80.5	100	76	20x12x90	185	
VB-318	20	40-120	564	479	115	590	540	480	24	85	300	250	350	M16	42	12	45.3	84.5	110	80	24x16x120	282	
VB-319	30	40-120	564	479	115	590	540	480	24	85	300	250	350	M16	42	12	45.3	84.5	110	80	24x16x120	282	
VB-319	40	40-120	682	587	135	680	610	560	24	85	300	250	350	M16	42	12	45.3	106.5	130	100	24x16x120	408	
VB-319	50	40-120	682	587	135	680	610	560	24	85	300	250	350	M16	42	12	45.3	106.5	130	100	24x16x120	424	
VB-319	75	40-120	759	674	155	700	650	600	24	87	350	300	400	M16	48	14	51.8	124	150	115	32x20x140	637	
VB-319	100	40-120	759	674	155	700	650	600	24	87	350	300	400	M16	48	14	51.8	124	150	115	32x20x140	653	

※VB-319立臥取用請看外觀圖或內洽 ※減速比5,10,15,20,25,30,35,40,50,60,70,80,90,100,120,150,200屬於標準品,其餘皆屬於特殊品。



多速比多段齒輪減速機系列
VERTICAL REDUCER SERIES

特點:

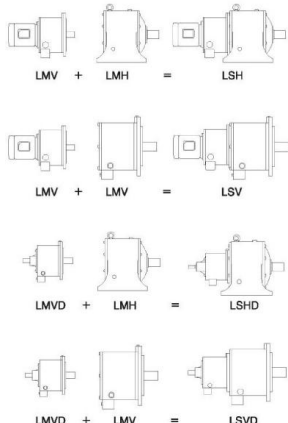
高減速比,從1/210~1/6000

Specifications:

High gear ratio from 1/210 to 1/6000.

多速比減速機-連結規格一覽表
Multi-stage reducer-Link Specification Table

型號 MODEL NO.	系列 TYPE	LSH, LSHD	LSV, LSVd
408	201V+206H	201V+206V	
408	203V+208H	203V+208V	
508	203V+308H	203V+308V	
410	205V+210H	205V+210V	
510	306V+210H	306V+210V	
610	306V+310H	306V+310V	
412	205V+212H	205V+212V	
512	205V+312H	205V+312V	
612	306V+312H	306V+312V	
414	209V+214H	209V+214V	
514	207V+314H	207V+314V	
614	308V+314H	308V+314V	
416	209V+216H	209V+216V	
516	209V+316H	209V+316V	
616	310V+316H	310V+316V	
417	211V+217H	211V+217V	
517	312V+217H	312V+217V	
617	310V+317H	310V+317V	
418	212V+218H	212V+218V	
518	212V+318H	212V+318V	
618	312V+318H	312V+318V	
419	213V+219H	213V+219V	
519	314V+219H		
619	215V+220H		
520	315V+220H		



多速比減速機型號速比一覽表 (速比超過1/6000以上請另購)
Model/Speed Ratio Table for Multi-stage Reducer (speed ratio above 1/6000 excluded)

馬力 HorsePower	型號 MODEL	減速比 RATIO					
		1/210-1/600		1/610-1/1200		1/1210-1/6000	
4P	1/4	408 (40kg-m)	408 (40kg-m)	508 (40kg-m)	512 (50kg-m)	610 (50kg-m)	614 (40kg-m)
	1/2	410 (70kg-m)	412 (90kg-m)	510 (70kg-m)	514 (140kg-m)	612 (90kg-m)	617 (90kg-m)
6P	1	414 (140kg-m)	417 (200kg-m)	512 (200kg-m)	516 (200kg-m)	614 (140kg-m)	618 (200kg-m)
	2	412 (90kg-m)	416 (200kg-m)	514 (140kg-m)	517 (300kg-m)	616 (200kg-m)	619 (1200kg-m)
3	1	414 (140kg-m)	417 (200kg-m)	512 (200kg-m)	516 (200kg-m)	614 (140kg-m)	618 (200kg-m)
	2	412 (90kg-m)	416 (200kg-m)	514 (140kg-m)	517 (300kg-m)	616 (200kg-m)	619 (1200kg-m)
7.5	5	417 (200kg-m)	418 (270kg-m)	517 (200kg-m)	519 (1800kg-m)	618 (200kg-m)	619 (1200kg-m)
	10	418 (270kg-m)	420 (1800kg-m)	519 (1800kg-m)	520 (1800kg-m)		
15	10	419 (1200kg-m)	420 (1800kg-m)	519 (1200kg-m)	520 (1800kg-m)		
	20	420 (1800kg-m)					

● (kg-m)出力轉矩容許值 Remissible torque for output shaft
● 速比超過1/6000以上請另購



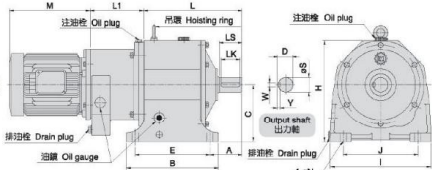
VERTICAL REDUCER SERIES

多速比多段齒輪減速機系列

臥式多速比減速機

HORIZONTAL MULTI-STAGE REDUCER

MODEL: LSH



減速比 RATIO 1/200~1/6000

尺寸表 Dimension

單位: mm

型號 MODEL	L	L1	M	A	C	H	腳座 FOOT STOCK										出力軸 OUTPUT SHAFT			重量 Weight (KG)
							E	J	B	I	N	D	LS	S	WxYxLk					
LSH-406	226	103	215	81	127	227	170	180	210	230	15	35	55	32	10x8x45	30				
LSH-408	259	151	236	87	145	253	205	195	240	255	15	41	60	38	10x8x50	41				
LSH-500	259	103	215	87	145	253	205	195	240	255	15	41	60	38	10x8x50	42				
LSH-410	284	155	232	92	164	289	215	215	265	295	19	45	65	42	12x8x55	62				
LSH-510	294	166	236	92	164	289	215	215	265	295	19	45	65	42	12x8x55	66				
LSH-610	308	132	215	92	164	289	215	215	265	295	19	45	65	42	12x8x55	70				
LSH-412	325	155	232	109	192	332	250	270	310	340	19	51	75	48	12x8x65	83				
LSH-512	337	155	232	109	192	332	250	270	310	340	19	51	75	48	12x8x65	87				
LSH-612	337	166	236	109	192	332	250	270	310	340	19	51	75	48	12x8x65	94				
LSH-414	390	196	303	130	210	385	310	310	380	410	22	66	85	62	15x10x75	139				
LSH-514	390	173	322	130	210	385	310	310	380	410	22	66	85	62	15x10x75	145				
LSH-614	417	173	322	131	210	385	310	310	380	410	22	66	85	62	15x10x75	149				
LSH-416	468	196	362	151	245	445	360	360	440	455	25	80.5	100	76	20x12x90	207				
LSH-516	468	196	362	151	245	445	360	360	440	455	25	80.5	100	76	20x12x90	222				
LSH-616	468	219	322	151	245	445	360	360	440	455	25	80.5	100	76	20x12x90	228				
LSH-417	511	225	362	172	280	505	380	420	460	530	25	84.5	110	80	20x12x100	276				
LSH-517	511	235	362	172	280	505	380	420	460	530	25	84.5	110	80	20x12x100	283				
LSH-617	526	209	303	178	280	505	380	420	460	530	25	84.5	110	80	20x12x100	290				
LSH-418	607	225	404	196	310	575	480	480	570	600	28	84.5	130	100	24x16x120	319				
LSH-518	628	225	366	196	310	575	480	480	570	600	28	106.5	130	100	24x16x120	395				
LSH-618	628	235	362	196	310	575	480	480	570	600	28	106.5	130	100	24x16x120	526				
LSH-419	685	273	464	214	380	670	540	500	635	680	28	124	150	115	32x20x140	630				
LSH-519	685	282	404	214	380	670	540	500	635	680	28	124	150	115	32x20x140	643				
LSH-420	801	329	538	272	430	800	600	680	700	850	38	139	180	130	35x22x170					
LSH-520	801	347	494	272	430	800	600	680	700	850	38	139	180	130	35x22x170					

※重量不含馬達 Motor weight

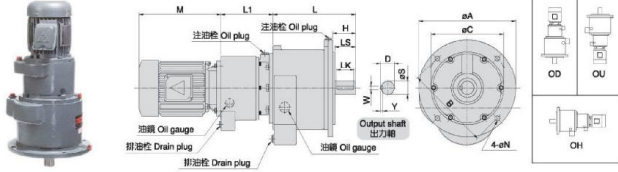
VERTICAL REDUCER SERIES
多速比多段齒輪減速機系列

■ 立式多速比減速機

VERTICAL MULTI-STAGE REDUCER

■ MODEL : LSV

使用方向
Direction of Installation



■ 減速比 RATIO 1/200~1/6000

尺寸表 Dimension														
單位: mm														
型號 MODEL	馬力 HP (4P)	L	L1	M	法蘭面 FLANGE				輸出軸 OUTPUT SHAFT				重量 Weight (KG)	
					A	B	C	N	D	LS	S	WxYxLK		H
LSV-006	1/4	216	103	225	240	215	180	14	35	55	32	10x8x45	60	28
LSV-008	1/2	239	151	248	280	245	210	14	41	60	38	10x8x50	66	35
LSV-008	1/4	239	103	225	280	245	210	14	41	60	38	10x8x50	66	35
LSV-110	1	266	155	242	330	300	250	18	45	65	42	12x8x55	70	59
LSV-510	1/2	266	166	248	330	300	250	18	45	65	42	12x8x55	70	63
LSV-610	1/4	289	132	225	330	300	250	18	45	65	42	12x8x55	70	64
LSV-412	2	305	155	322	380	335	290	18	51	75	48	12x8x65	80	79
LSV-512	1	315	155	242	380	335	290	18	51	75	48	12x8x65	80	86
LSV-612	1/2	315	166	248	380	335	290	18	51	75	48	12x8x65	80	90
LSV-414	3	363	196	315	450	400	350	22	66	85	62	15x10x75	90	132
LSV-514	2	363	156	322	450	400	350	22	66	85	62	15x10x75	90	132
LSV-614	1	372	166	242	450	400	350	22	66	85	62	15x10x75	90	133
LSV-416	5	434	196	371	500	450	400	24	80.5	100	76	20x12x90	105	179
LSV-516	3	452	196	315	500	450	400	24	80.5	100	76	20x12x90	105	202
LSV-616	2	452	219	322	500	450	400	24	80.5	100	76	20x12x90	105	203
LSV-417	7 1/2	479	225	374	590	540	480	24	84.5	110	80	20x12x100	115	275
LSV-517	5	479	235	371	590	540	480	24	84.5	110	80	20x12x100	115	282
LSV-617	3	484	209	315	590	540	480	24	84.5	110	80	20x12x100	115	270
LSV-418	10	565	225	412	660	610	560	24x6	106.5	130	100	24x16x120	135	388
LSV-518	7 1/2	599	225	374	660	610	560	24x6	106.5	130	100	24x16x120	135	445
LSV-618	5	599	235	371	660	610	560	24x6	106.5	130	100	24x16x120	135	452

*重量不含馬達 Motor weight exclusive



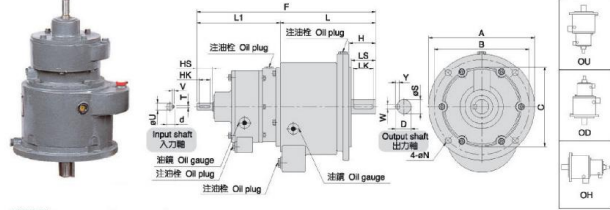
多速比多段齒輪減速機系列
VERTICAL REDUCER SERIES

■ 立式多速比減速機

VERTICAL MULTI-STAGE & DOUBLE SHAFT REDUCER

■ MODEL : LSVd

使用方向
Direction of Installation



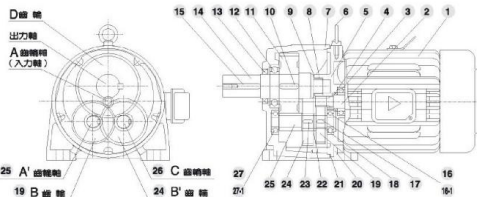
■ 減速比 RATIO 1/200~1/6000

尺寸表 Dimension																	
單位: mm																	
型號 MODEL	L	L1	F	法蘭面 FLANGE				入力軸 INPUT SHAFT				輸出軸 OUTPUT SHAFT				重量 Weight (KG)	
				A	B	C	N	d	HS	TxYxHK	U	D	LS	S	WxYxLK		H
LSVD-006	216	190	406	240	215	180	14	18	35	5x5x25	16	35	55	32	10x8x45	60	32
LSVD-008	239	243	482	280	245	210	14	21	40	5x5x30	19	41	60	38	10x8x50	66	41
LSVD-508	239	190	429	280	245	210	14	18	35	5x5x25	16	41	60	38	10x8x50	66	39
LSVD-410	266	292	558	330	300	250	18	27	50	7x7x40	24	45	65	42	12x8x55	70	65
LSVD-510	266	298	534	330	300	250	18	21	40	5x5x30	19	45	65	42	12x8x55	70	69
LSVD-610	289	215	504	330	300	250	18	16	35	5x5x25	16	45	65	42	12x8x55	70	75
LSVD-412	305	292	597	380	335	290	18	27	50	7x7x40	24	51	75	48	12x8x65	80	85
LSVD-512	315	292	607	380	335	290	18	27	50	7x7x40	24	51	75	48	12x8x65	80	89
LSVD-612	315	268	583	380	335	290	18	21	40	5x5x30	19	51	75	48	12x8x65	80	96
LSVD-414	363	336	699	450	400	350	22	31	55	7x7x45	28	66	85	62	15x10x75	90	110
LSVD-614	378	293	666	450	400	350	22	27	50	7x7x40	24	66	85	62	15x10x75	90	132
LSVD-614	378	298	640	450	400	350	22	27	50	9x5x30	19	66	85	62	15x10x75	90	136
LSVD-416	434	336	770	500	450	400	24	31	55	7x7x45	28	80.5	100	76	20x12x90	105	187
LSVD-516	452	336	788	500	450	400	24	31	55	7x7x45	28	80.5	100	76	20x12x90	105	210
LSVD-616	452	353	805	500	450	400	24	27	50	7x7x40	24	80.5	100	76	20x12x90	105	214
LSVD-417	479	379	859	540	480	424	24	35	55	10x8x45	32	84.5	110	80	20x12x100	115	284
LSVD-517	479	370	849	540	480	424	24	31	55	7x7x45	28	84.5	110	80	20x12x100	115	282
LSVD-617	484	353	825	540	480	424	24	31	55	7x7x45	28	84.5	110	80	20x12x100	115	281
LSVD-418	565	396	951	660	610	560	24x6	35	60	10x8x50	32	106.5	130	100	24x16x120	135	397
LSVD-518	599	396	966	660	610	560	24x6	31	55	7x7x45	28	106.5	130	100	24x16x120	135	454
LSVD-618	599	370	969	660	610	560	24x6	31	55	7x7x45	28	106.5	130	100	24x16x120	135	461



NEW STYLE GEAR REDUCER SERIES
新型減速機系列

- 運轉靜音
在齒滑滾動接觸的負載傳動機構造部份，全部使用高精度研磨處理加工齒型，所以運轉平滑而靜音。
- 扭力大，效率高
高速的A齒輪採用Skiving加工，B齒輪經研磨。
- 體積小，省空間
體積更小，但性能更好，是產品另一項優異的特色之一，其目的在於節省不必要的空間，以因應時代的需求。
- 耐久性强，壽命長
能同時齒合數齒大連續曲線齒型，能耐強大的衝擊在主要的減速機構造，採用耐磨耗性和耐疲勞性之鋼材，所以耐久性强壽命長，適用於停車場設備等。
- Silent Operation
The rolling contact part of the load driven mechanism are made of high-precision milled gear which ensures a smooth and silent operation.
- High Torque and High Efficiency
High speed gear A is treated by skiving and gear B by milling.
- Compactness and Space Saving
Another excellent feature of this product is compactness as well as superior performance for meeting the modern demand for space.
- Strong Durability and Long Lifetime
The product can fit multiple continuous curving gears at the same time and endure heavy shock. The main parts of gear reducer are made of steel materials which resistant high to abrasion and fatigue so that strong durability and long lifetime are obtained. The product is suitable for parking lot facility.



編號 No.	零件名稱 Parts Name	編號 No.	零件名稱 Parts Name	編號 No.	零件名稱 Parts Name
1	馬達 Motor	11	D齒輪 D Gear	20	六角承源螺絲帽 Hex.Screw
2	A齒輪軸 A Gear Shaft	12	滾珠軸承 Ball Bearing	21	注油 Oil Seal
3	滾珠軸承 Ball Bearing	13	油封 Oil Seal	22	扣環 Snap Ring
4	油封 Oil Seal	14	出力軸 Output Shaft	23	雙齒鑰 Key
5	後蓋 Rear Cover	16	單齒鑰 Key	24	B' 齒輪 B' Gear
6	吊環 Hoisting Ring	16	滾珠軸承 Ball Bearing	25	A' 齒輪軸 A' Gear Shaft
7	齒輪箱 Gear Shell	16-1	滾珠軸承 Ball Bearing	26	C 齒輪軸 C Gear Shaft
8	滾針軸承 Needle Bearing	17	雙齒鑰 Key	27	滾珠軸承 Ball Bearing
9	鎖墊圈 Washer	18	扣環 Snap Ring	27-1	滾珠軸承 Ball Bearing
10	雙齒鑰 Key	19	B齒輪 B Gear		

