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

C 2

RCGH

C 3

RCGV

C 4

RCHW

C 6

GRV-H

C 7

GRV-V

C 8

WRV-H

C 9

WRV-V

目次 INDEX

訂貨須知

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

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 - I - 20 - A - OH

LM	H	205	I	20	A	OH
公司代號 COMPANY NAME	機型 TYPE	型號 MODEL	馬力 HOUSE POWER	速比 RATIO	馬達 MOTOR	使用方向 OPERATION DIRECTION
		請參閱型號速比一覽表	1/4HP~75HP	二段式 TWO-STAGE 1/3~1/40 三段式 THREE-STAGE 1/40~1/200 連結式 MULTI-STAGE 1/200~1/6000	A 三相 3 PHASE B 煞車 BRAKE C 特殊 SPECIAL S 單相 SINGLE PHASE	

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

馬力 HP-4P(6P)	型號 MODEL	減速比 RATIO
1/4	201	5 10 15 20 25 30
	203	35 40
	304	50 60 70 80 90 100 110 120 ※150
(1/8)	306	130 140 150 160 170 180 190 200
1/2	202	5 10
	203	10 15 20 25 30
	205	35 40 45 50
	※304	35 40 50 60
	306	60 70 80 90 100 110 120
(1/4)	308	130 140 150 160 170 180 190 200
1	205	5 10 15 20 25 30
	207	35 40
	308	40 50 60 70 80 90 100 110 120
(1/2)	310	130 140 150 160 170 180 190 200
2	206	5 10
	207	15 20 25 30
	209	35 40
	※308	35 40
	310	40 50 60 70 80 90 100 110 120
(1)	312	130 140 150 160 170 180 190 200
3	208	5 10
	209	15 20 25 30
	211	35 40
	※310	40 50 60
	312	50 60 70 80 90 100 110 120
(2)	314	130 140 150 160 170 180 190 200
5	210	5 10
	211	15 20 25 30
	312	40 50※60
	314	60 70 80 90 100 110 120
(3)	315	130 140 150 160 170 180 190 200

馬力 HP-4P(6P)	型號 MODEL	減速比 RATIO
7 1/2	212	5 10
	213	15 20 25 30
	314	35 40 50 ※60
	315	60 70 80 90 100 110 120
(5)	317	130 140 150 160 170 180 190 200
10	212	5 10
	214	15 20 25 30
	315	35 40 50 ※60
	316	60 70 80 90 100 110 120
(7 1/2)	318	130 140 150 160 170 180 190 200
15	213	5 10
	215	15 20 25 30
	316	35 40 50 ※60
	317	60 70 80 90 100 110 120
(10)	318	130 140 150 160 170 180 190 200
20	215	5 10
	216	15 20 25 30
	317	40 50 60
	318	60 70 80 90 100 110 120
(15)	319	130 140 150 160 170 180 190 200
25	216	5 10
	217	15 20 25 30
	317	40 50 ※60
	318	60
(20)	319	70 80 90 100 110 120
30	217	5 10 15 20 25 30
	318	40 50 60
	319	70 80 90 100 110 120
40	217	5 10
	218	10 15 20 25 30
(25.30)	319	40 50 60 80 90
50	218	5 10
(40)	219	15 20 25 30
60	218	5 10
(50)	219	10 15 20 30
75	219	5 10
(60)	220	15 20 30

1. 表輕負荷使用 ※Are used for light loading　2. 亦可訂製其他不定速比 Other ratios are available upon reques

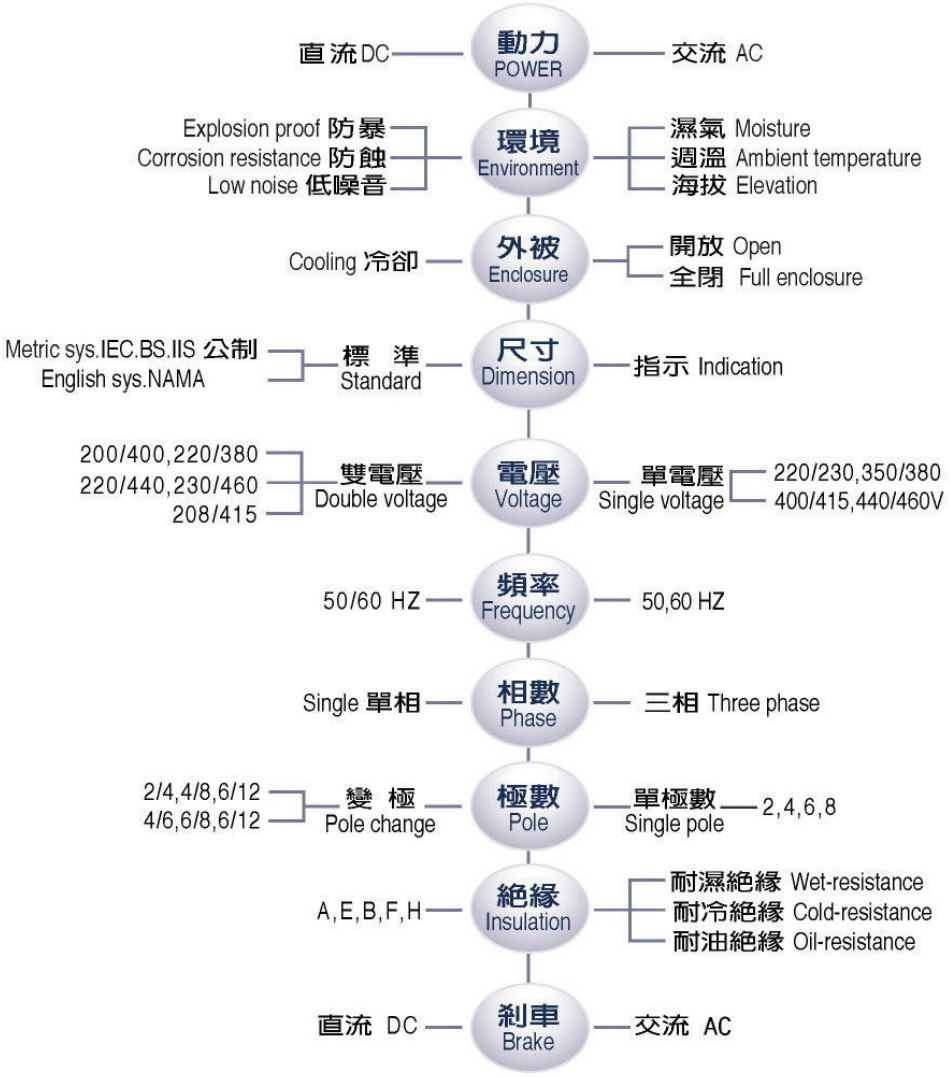
3. 減速比5,10,15,20,25,30,35,40,50,60,70,80,90,100,120,150,200屬於標準品，其餘皆屬於特殊品。

一般注意事項

- 電源：單相、三相、電壓週率、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。

General Notices

- 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.



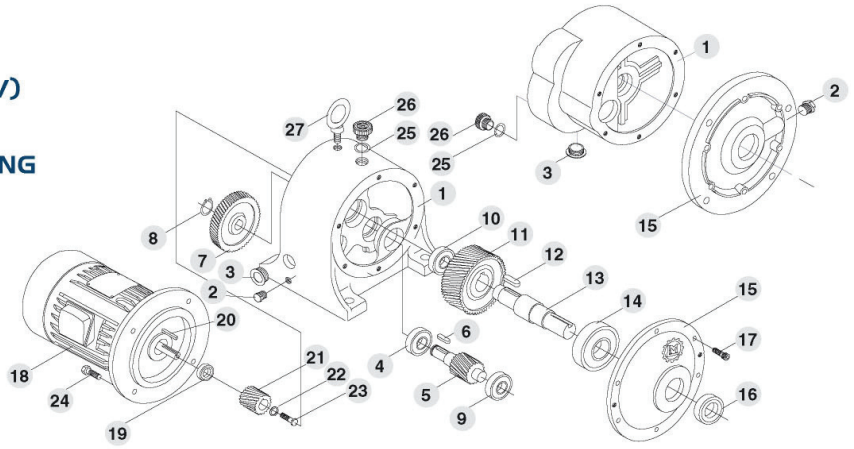
- 利明牌齒輪減速機之標準品使用低壓、三相感應馬達、IEC尺寸、全封閉外扇鼠籠型轉子、E級絕緣

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

- 馬達尺寸請參考「IEC標準馬達尺寸參考表」（第W1頁）

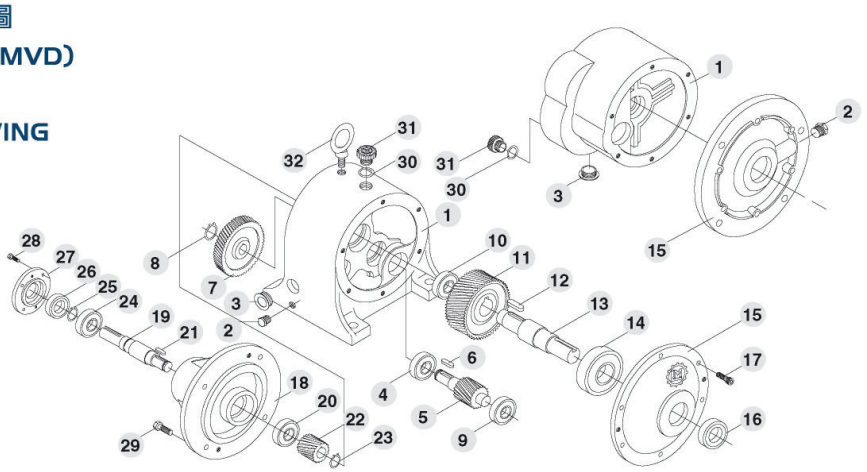
分解系統圖
SYSTEM DRAWING

■ 二段式分解系統圖
■ MODEL:LMH(LMV)
2-STAGE
SYSTEM DRAWING



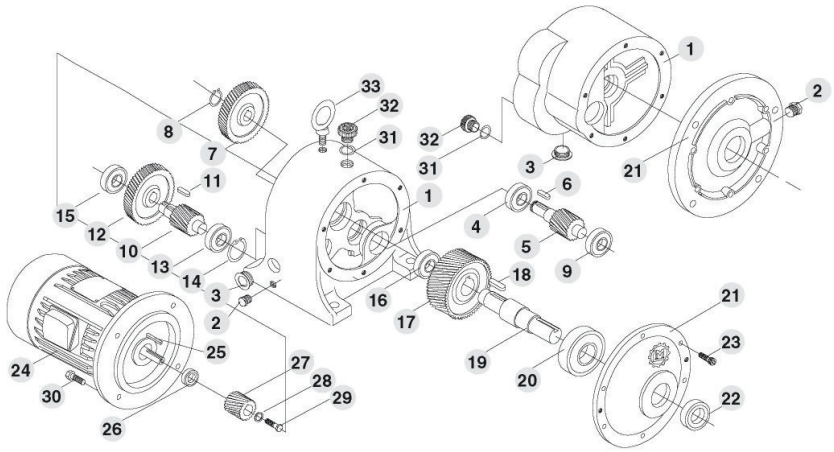
NO.	零 件 名 稱 NAME OF PARTS	NO.	零 件 名 稱 NAME OF PARTS	NO.	零 件 名 稱 NAME OF PARTS
1	本體 Outer shell	11	D齒輪 Gear	21	A齒輪 Gear
2	排油栓 Drain plug	12	鍵 Key	22	華司(or扣環) Washer or Snap ring
3	油鏡 Oil gauge	13	出力軸 Output Shaft	23	六角螺絲 Hexagon head bolt
4	軸承 Bearing	14	軸承 Bearing	24	六角螺絲 Hexagon head bolt
5	C齒輪軸 Gear shaft	15	前蓋 Front Cover	25	O型環 O ring
6	鍵 Key	16	油封 Oil Seal	26	加油蓋 Oil Plug
7	B齒輪 Gear	17	立式：內六角螺絲 臥式：外六角螺絲 Hex. screw	27	吊環 Hoisting ring
8	扣環 Snap ring	18	馬達 Motor		
9	軸承 Bearing	19	油封 Oil Seal		
10	軸承 Bearing	20	鍵 Key		

■ 二段式分解系統圖
■ MODEL:LMHD(LMVD)
2-STAGE
SYSTEM DRAWING



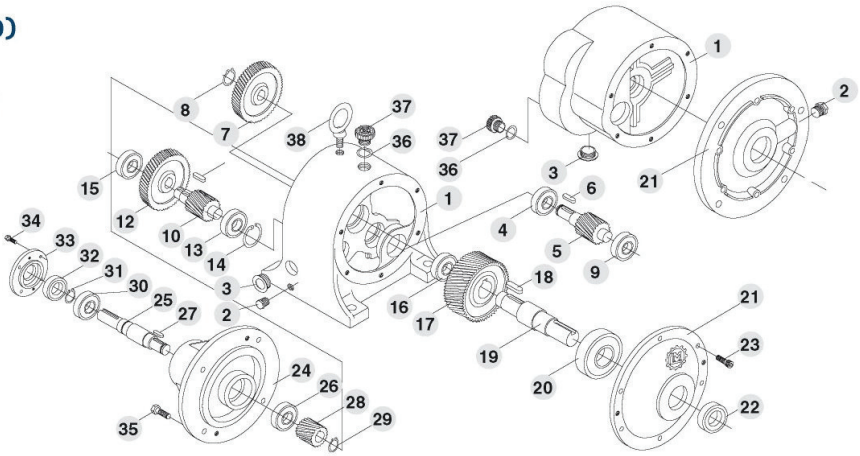
NO.	零 件 名 稱 NAME OF PARTS	NO.	零 件 名 稱 NAME OF PARTS	NO.	零 件 名 稱 NAME OF PARTS
1	本體 Outer shell	12	鍵 Key	23	扣環 Snap ring
2	排油栓 Drain plug	13	出力軸 Output Shaft	24	軸承 Bearing
3	油鏡 Oil gauge	14	軸承 Bearing	25	扣環 Snap ring
4	軸承 Bearing	15	前蓋 Front Cover	26	油封 Oil Seal
5	C齒輪軸 Gear Shaft	16	油封 Oil Seal	27	小蓋 Small Cover (71/2HP以上使用)
6	鍵 Key	17	立式：內六角螺絲 臥式：外六角螺絲 Hex. screw	28	六角螺絲 Hexagon head bolt
7	B齒輪 Gear	18	入力軸大蓋 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	加油蓋 Oil Plug
10	軸承 Bearing	21	鍵 Key	32	吊環 Hoisting ring
11	D齒輪 Gear	22	A齒輪 Gear		

■ 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	本體 Outer shell	13	軸承 Bearing	25	鍵 Key
2	排油栓 Drain plug	14	R扣環 R Snap ring	26	油封 Oil Seal
3	油鏡 Oil gauge	15	軸承 Bearing	27	A齒輪 Gear
4	軸承 Bearing	16	軸承 Bearing	28	華司(or扣環) 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	鍵 Key	18	鍵 Key	30	六角螺絲 Hexagon head bolt
7	B'(F)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	加油蓋 Oil Plug
9	軸承 Bearing	21	前蓋 Front Cover	33	吊環 Hoisting ring
10	A'(E)齒輪軸 Gear Shaft	22	油封 Oil Seal		
11	鍵 Key	23	立式：內六角螺絲 臥式：外六角螺絲 Hex. screw		
12	B齒輪 Gear	24	馬達 Motor		

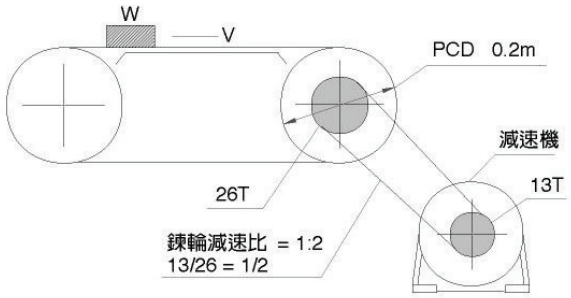
■ 三段式分解系統圖
■ MODEL:LMHD(LMVD)
3-STAGE SYSTEM DRAWING



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	本體 Outer shell	14	R扣環 R Snap ring	27	鍵 Key
2	排油栓 Drain plug	15	軸承 Bearing	28	A齒輪 Gear
3	油鏡 Oil gauge	16	軸承 Bearing	29	扣環 Snap ring
4	軸承 Bearing	17	D齒輪 Gear	30	軸承 Bearing
5	C齒輪軸 Gear Shaft	18	鍵 Key	31	扣環 Snap ring
6	鍵 Key	19	出力軸 Output Shaft	32	油封 Oil Seal
7	B'(F)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'(E)齒輪軸 Gear Shaft	23	立式：內六角螺絲 臥式：外六角螺絲 Hex. screw	36	O型環 O ring
11	鍵 Key	24	入力軸大蓋 Big Cover	37	加油蓋 Oil Plug
12	B齒輪 Gear	25	入力軸 Input Shaft	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 I



- ◆搬運物總重量：W=600kg
- ◆搬送速度：V=9.5m/min
- ◆與導軌之摩擦係數： μ =0.15
- ◆鍊輪傳動效率： η_1=0.95
- ◆減速機傳動效率： η_2=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: μ =0.15
- ◆Chain pulley transmission coefficient: η 1=0.95
- ◆Gear reducer transmission coefficient: η 2=0.9
- ◆Operation time: 8 hour/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

藉由必要的入力軸回轉數及出力軸回轉數來選定減速比
1.先求出輸送帶滾輪回轉數(N1)
N1＝搬送速度／（滾輪直徑×π）
2.再求出減速機出力軸回轉數(N2)
N2＝N1×（鍊輪齒數／減速機齒數）
3.以3ø,60Hz之馬達計算減速比(τ)
τ＝出力軸回轉數／入力軸回轉數（馬達轉速N）

Reduction Ratio Notices Calculation Example The reduction ratio is based on input/output shaft revolutions.
1.Find the revolution of conveyer 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(τ) based on 3ø,60Hz motor τ=output shaft revolution/input shaft revolution motor rpm N)

計算範例 Load Condition Notices Calculation Example

1. N1 = V / (D x π) = 9.5 / (0.2 x 3.14) = 15 r/min (RPM)

2. N2 = N1 x (26 / 13) = 15 x 2/1 = 30 r / min (RPM)

3. τ = N2 / N = 30 / 1800 = 1 / 60
（馬達轉速，motor RPM , input vpm ）

扭力 Torque

選定之注意事項 Notices Calculation Example

決定減速比後，由使用機械之條件換算其扭力
1.先算出輸送帶滾輪之扭力(T1) T1＝(μ×荷重×滾輪半徑)／η1
2.再換算成減速機出力軸所須扭力(T2) T2＝(T1×鍊輪減速比)／η2

Torque Notices Calculation Example
After reduction ratio is decided, calculate the torque by the pulley reducers radius condition of the machine used.
1. Find the torque of conveyer pulley (T1) T1= (μ x load x pulley radius) / η 1
2. Find the torque needed from the output shaft of reducer (T2) T2= (T1 x reduction ratio of chain pulley) η 2

計算範例 Load Condition Notices Calculation Example

1.T1 = μ x W (D / 2) / η 1
= 0.15 x 600 x (0.2 / 2) / 0.95 = 9.5 kgf-m

2.T2 = (T1 x 1/2) / η 2
=(9.5 x 1/2) / 0.9 = 5.28 kgf-m

負荷條件 Load conditions

選定之注意事項 Notices Calculation Example

原動機 Prime Mover	傳動機負荷等級 Driven machine Load Classification	每日使用時間 Duration of Service per day 0.50 hr	2 hrs	8-10 hr	10-24 hr
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	1.50
	重衝擊 Heavy Shock	1.00	1.25	1.50	1.75

補正扭力＝減速機出力軸扭力×系數
Corrective torque = reducer shaft torque x coefficient

計算範例 Load Condition Notices Calculation Example

$T_3 = T_2 \times K$
$= 5.28 \times 1.25 = 6.6$ kgf-m

馬力 Horse Power

選定之注意事項 Notices Calculation Example

1.最後換算成馬力(Hp) Hp＝(補正扭力×出力軸轉數)／716.2
1. Find horse power (Hp) Hp=(corrective torque x revolution of utput shaft) / 716.2

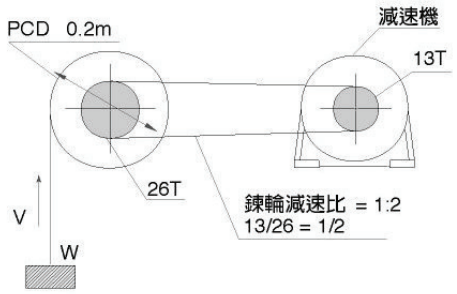
計算範例 Load Condition Notices Calculation Example

Hp = (T3 x N2) / 716.2 = (6.6 x 35) / 716.2 = 0.3
1/2Hp 馬達適用(For 1/2 Hp motor)

型號選定 Model Selected

根據本目錄之型號速比對照表1/2Hp、減速比1/60，型號306適用。
According to the model-reduction ratio reference table,model 306, 1/2 Hp, reduction ratio 1/60 are selected.

例二：Example 2



- 搬運物總重量：W=600kg
- 搬送速度：V=9.5m/min
- 鍊輪傳動效率：η_1=0.95
- 減速機傳動效率：η_2=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
- Chain pulley transmission coefficient: η 1=0.95
- Gear reducer transmission coefficient: η 2=0.9
- Operation time: 8 hour/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 Load Condition Notices Calculation Example
	藉由必要的入力軸回轉數及出力軸回轉數來選定減速比 1.先求出輸送帶滾輪回轉數(N1) N1＝搬送速度／（滾輪直徑×π） 2.再求出減速機出力軸回轉數(N2) N2＝N1×鍊輪齒數減速比 3.以3ø,60Hz之馬達計算減速比(τ) τ ＝出力軸回轉數／入力軸回轉數（馬達轉速N） Reduction Ratio Notices Calculation Example The reduction ratio is based on input/output shaft revolutions. 1.Find the revolution of conveyer 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(τ)based on 3ø,60Hz motor τ =output shaft revolution/input shaft revolution motor rpm N)	1. N1 = V / (D x π) =9.5 / (0.2 x 3.14) = 15 r/min 2. N2 = N1 / i = 15 / (2/1) = 30 r / min 3. τ = 出力軸回轉數／入力軸回轉數 = 30 / 1800 = 1 / 60 （馬達轉速）
扭力 Torque	**選定之注意事項 Notices Calculation Example**	**計算範例 Load Condition Notices Calculation Example**
	決定減速比後，由使用機械之條件換算其扭力 1.先算出輸送帶滾輪之扭力(T_1) T_1=(μ×荷重×滾輪半徑)／η1 2.再換算成減速機出力軸所須扭力(T_2) T_2=(T_1×鍊輪減速比)／η2 Torque Notices Calculation Example After reduction ratio is decided, calculate the torque by the condition of the machine used. 1. Find the torque of conveyer pulley (T_1) T_1= (μ x load x pulley radius) / η 1 2. Find the torque needed from the output shaft of reduce(T_2) T_2= (T_1x reduction ratio of chain pulley) η 2	1. T_1 = W (D/2) x (1/η1) = 600 x (0.2/2) = 60 kg-m 2. T_2 = T_1 x 1/2 x 1/η2 = 60 x 1/2 x 1/0.9 = 33.3 kg-m
負荷條件 Load conditions	**選定之注意事項 Notices Calculation Example**	**計算範例 Load Condition Notices Calculation Example**
	1.根據運轉條件算出補正扭力(T3) T3＝T2×運轉條件（系數K） 1. Find corrective torque (T3) according to operation condition T3=T2 x operation condition (coefficient K)	T_3 = T2 x K = 33.3 x 1 = 33.3 kgf-m
馬力 Horse Power	**選定之注意事項 Notices Calculation Example**	**計算範例 Load Condition Notices Calculation Example**
	1.最後換算成馬力(Hp) Hp=(T x N) / 716.2 1.Find horse power (Hp) Hp=(T x N) / 716.2	Hp = (T x N) / 716.2 = (33.3 x 30) / 716.2 = 1.39 .....(2HP)
型號選定 Model Selected	根據本目錄之型號速比對照表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.	

常用的公式集 Frequently Used Formula

欲知的條件 Intended Conditions		已知的條件 Known Conditions	公式 Formula	
扭力(Torque)	T	動力(F)與半徑(R) / 馬力(Hp)與回轉數(N)(r.p.m.)	T = F x R	(kgf-m)
扭力(Torque)	T	動力(Kw)與回轉數(N)(r.p.m.) / 扭力(T)與回轉數(N)(r.p.m.)	T = (716 x Hp) / N	(kgf-m)
扭力(Torque)	T	扭力(T)與回轉數(N)(r.p.m.) / 重力(F)與速度(V)(m/sec)	T = (974 x Kw) / N	(kgf-m)
馬力(Horse Power)	Hp	重力(F)與速度(V)(m/sec) / 齒輪、皮帶輪等的直徑(D)與回轉速(N)(r.p.m)	Hp = (T x N) / 716.2	（馬力）
動力(Power)	Kw	入力回轉數(N1)與出力回轉數(N2)	Kw = (T x N) / 974	（千瓦）
馬力(Horse)	Hp	Power(F) & Radius (R) Horse power(Hp) & Revolution(N)(r.p.m.)	Hp = (F x V) / 75	（馬力）
動力(Power)	Kw	Power (Kw) & Revolution(N)(r.p.m.) / Torque (T) & Revolution(N)(r.p.m.)	Kw = (F x V) / 102	（千瓦）
速度(Velocity)	V	Torque (T) & Revolution(N)(r.p.m.) / Gravity (F) & Velocity (V) (m/sec)	V = (π x D x N) / 60	(m/sec)
減速比(Reduction Ratio)	i	Gravity (F) & Velocity (V) (m/sec) Diameter (D)of gear and belt pulley & revolution (N) (r.p.m.) Input shaft revolution (N1) & Output / shaft revolution (N2)	i = N1 / N2	

■ 減速機安裝
Usage and Installation

使用前檢查

- ◆檢查機種、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符合。
- ◆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

- ◆須裝置於平且堅固的底部。
- ◆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。
- ◆使用前請拔掉加油蓋上的插梢。

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，勿使用鐵鎚，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）與出力軸連接之鍊輪，皮帶輪等請配合H7公差使用，可避免發出異聲與軸面受損。
- ◆VB、HB型入力孔可加添適當黃油，避免孔徑過度磨損及發出異聲。
- ◆軸面可塗上防鏽塗料避免生鏽。

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。
- ◆濕氣過重的環境會使煞車馬達的煞車器產生鏽蝕，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 dedicated.
- ◆ 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 paralleled. The base seat shall be anchored with proper bolts.
- ◆ All of the components shall be properly assembled to the shaft. Avoid hammering and over-tight 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.

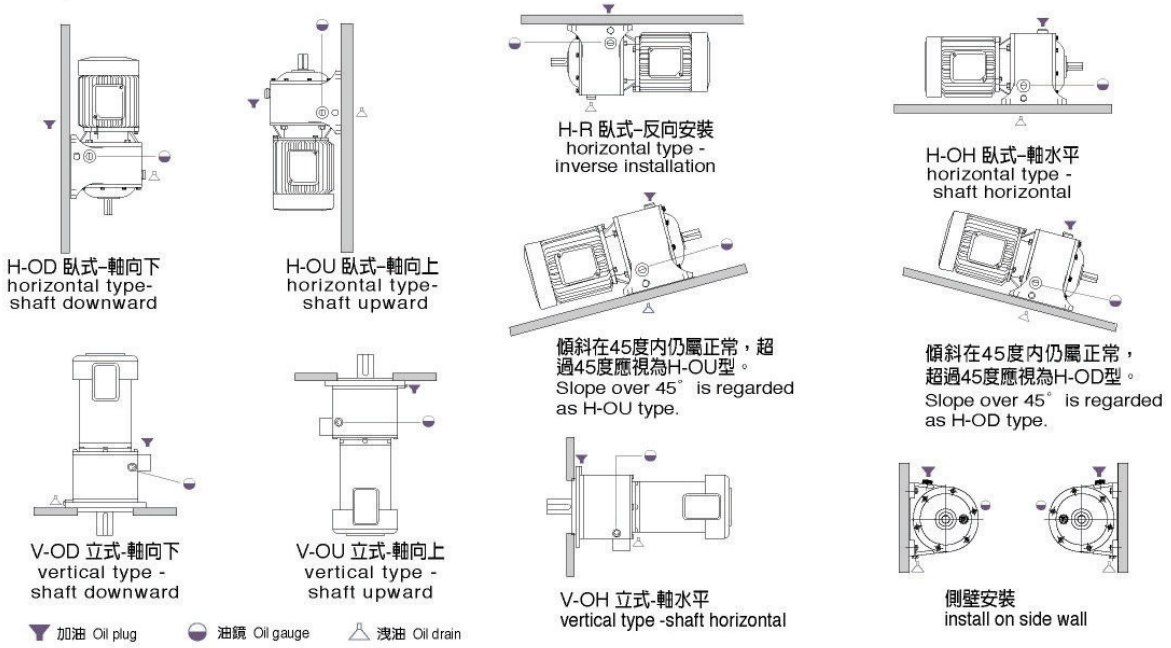
MOTOR

- ◆ 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.

■ 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，因入力軸端的油封在高速運轉下，較出力軸端的油封容易損壞，而導致潤滑油由油封滲出，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 types of operation shall be avoid 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.

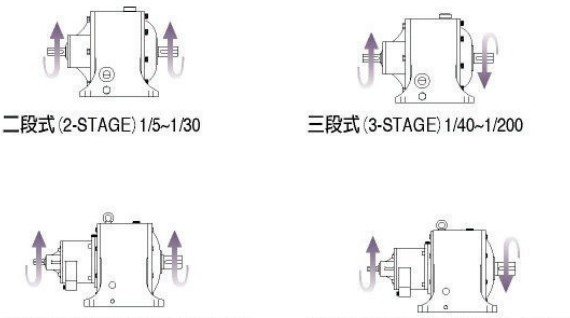


出力軸迴轉方向

二段式齒輪減速機的迴轉方向與入力的方向相同，三段式齒輪減速機的迴轉方向與入力的方向相反。

Revolving Direction of Output Shaft

2-stage gear reducer revolves in the same direction as the input shaft, while 3-stage gear reducer does in the opposite direction.



馬達配線盒位置

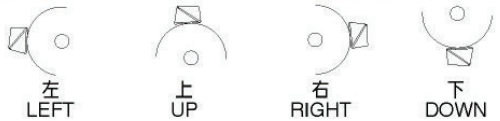
安裝方向注意潤滑油加油便利，油量計可看見且配線容易，正常情況下，附馬達之減速機其配線盒位置和油鏡，油蓋位置如下圖，如有不同時，請註明。

Position of Motor Wiring Box

Be aware that the installation direction of wiring box shall facilitate the filling of lubricant, the visibility of oil level and wiring. In normal condition, the positions of motor wiring box, oil gauge and oil lid is as shown below, unless otherwise specified.

■標準配線盒及油鏡，加油口位置
Standard positions of wiring box, oil gauge, and oil fillingentrance.

■馬達配線盒之選擇（以出力軸為準）
Selection of motor wiring box (based on output shaft)



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：

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

NOTICE:

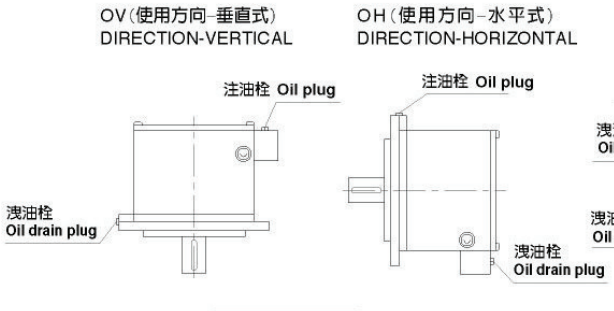
1. LI-MING gear reducers use Kuo-Kuang Brand engine oil HD-460.
2. After initial 100 hours of usage, replace with new lubricant; then, do it every 2500 hours.
3. If use in the special conditions, such as high speed, high temperature, low speed, heavy load, and forced lubrication, please contact our company.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

油量表：

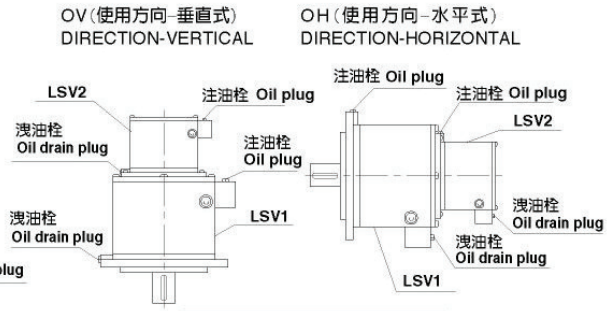
立式減速機依使用方向的不同而使用不同的油量，而油鏡及洩油孔位置亦不同，訂貨時請註明使用方向。臥式減速機之油量請參考尺寸表。

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



立式(Vertical)



立式連結式(Multi-Stage)

油量表(Oil capacities) 單位：公升(UNIT: *l*)

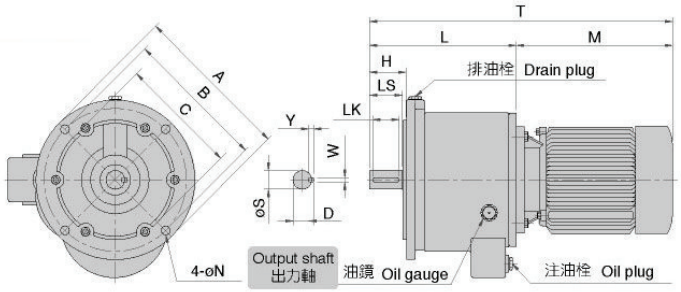
TYPE	LM-V		LM-VD		LM-VB	
方向 / MODEL	OH	OV	OH	OV	OH	OV
201	0.3	0.5	0.3	0.5	0.3	0.5
202	0.3	0.5	0.3	0.5	0.3	0.5
203	0.5	1.0	0.5	1.0	0.5	1.0
205	1.0	2.0	1.0	2.0	1.0	2.0
206	1.0	2.0	1.0	2.0	1.0	2.0
207	1.5	3.0	1.5	3.0	1.5	3.0
208	1.5	3.0	1.5	3.0	1.5	3.0
209	2.0	4.0	2.0	4.0	2.0	4.0
210	2.0	4.0	2.0	4.0	2.0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

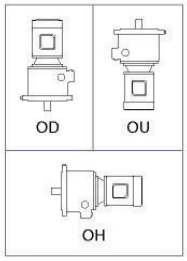
油量表(Oil capacities) 單位：公升(UNIT: *l*)

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

■ 立式減速機 VERTICAL TYPE REDUCER

■ MODEL：V





使用方向
Direction of Installation

■ 二段式 2 - STAGE　　■ 減速比 RATIO 1/3~1/40

尺寸表 Dimension

單位：m/m

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	WxYxLK	
V-304	1/4	51~120	225	187	412	55	200	175	150	12	31	50	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	65	280	245	210	14	41	60	38	10x8x50	27
	1	40~120	242	238	480										
	2	31~40	322		560										
V-310	1	121~200	242	279	521	70	330	300	250	18	45	65	42	12x8x55	40
	2	51~120	322		601										
	3	31~50	315	269	584										
V-312	2	121~200	322	325	647	80	380	335	290	18	51	75	48	12x8x65	66
	3	41~120	315	315	630										
	5	31~50	371		686										
V-314	3	121~200	315	378	693	90	450	400	350	22	66	85	62	15x10x75	106
	5	51~120	371		749										
	7 1/2	31~50	374	366	740										
V-315	5	121~200	371	452	823	105	500	450	400	24	76.5	100	72	20x12x90	162
	7 1/2	60~120	374		826										
	10	31~50	412		864										
V-316	10	60~120	412	452	864	105	500	450	400	24	80.5	100	76	20x12x90	163
	15	31~50	498		950										
V-317	7 1/2	125~200	374	479	853	115	590	540	480	24	84.5	110	80	20x12x100	230
	15	40~120	498		977										
	20	40~50	542		1021										
	25	40~50	562		1041										
V-318	10	121~200	412	597	1009	135	660	610	560	24x6	106.5	130	100	24x16x120	386
	15	121~200	498		1095										
	20	60~120	542		1139										
	25	60	562		1159										
	30	40~50	562		1159										
V-319	20	121~200	542	674	1216	155	700	650	600	24x6	124	150	115	32x20x140	615
	25	70~90	562		1236										
	30	70~90	562		1236										
	40	40~60	600		1274										

※重量不含馬達 Motor weight exclusive　　※V-319立臥兩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。