

產品目錄 CONTENTS

AT

軸輸入轉向器
Shaft Input Steering Gearbox



01-08

AT-F

法蘭輸入90度減速器
Flange Input 90 Degree Reducer



09-24

PAW-A(B)

標準型90度減速機
Standard Type 90 Degree Reducer



25-32

PT

標準型轉向器
Standard Type Steering Gearbox



33-37

AAW-AS(BS)

精密型90度減速機
Precision Type 90 Degree Reducer



39-47

AAW-BS

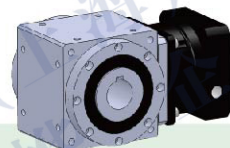
90度螺桿減速機
90 Degree Screw Reducer



48

AATM

精密型轉向器
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49-53

AAT

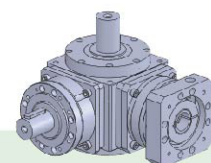
精密型轉向器
Precision Type Steering Gearbox



54-56

AATM-2AX

90度兩軸轉向器
90 Degree Two Shaft Steering Gearbox



59-60

減速機的訂購 Purchase of Reducer



AT065

L

1

S1

減速機型號：Reducer Mode
AT065, AT075, AT090, AT110, AT140,
AT170, AT210, AT240, AT280

減速比：Reduction Ratio
單節：1, 1.5, 2, 3, 4, 5

減速機型式：Reducer Type
L / L1 / H / C / R1 / LM / RM / 4M

軸型式選擇：Selection of Shaft Type
S1: 平滑直軸 Smooth Straight Shaft
S2: 附鍵直軸 Attached Key Straight Shaft

選用範例 Selection Example：AT065-L-1-S1



AT210

FL1

200

S1

MOTOR

減速機型號：Reducer Model
AT065, AT075, AT090, AT110, AT140,
AT170, AT210, AT240, AT280

減速比：Reduction Ratio
單節：1, 1.5, 2, 3, 4, 5
雙節：7, 10, 15, 20, 25, 35, 50
三節：75, 100, 125, 150, 200,
250, 350, 500

馬達型號：Motor Model
馬達製造商及型號
Motor Manufacture & Model

減速機型式：Reducer Types
FL / FLM1 / FLM2 / FL1 / FL1M1 / FL1M2 /
FR1 / FR1M1 / FR1M2 / FH / FHM1 / FHM2 /
FC / FCM1 / FCM2

軸型式選擇：Shaft Type Selection
S1: 平滑直軸 Smooth Straight Shaft
S2: 附鍵直軸 Attached Key Straight Shaft

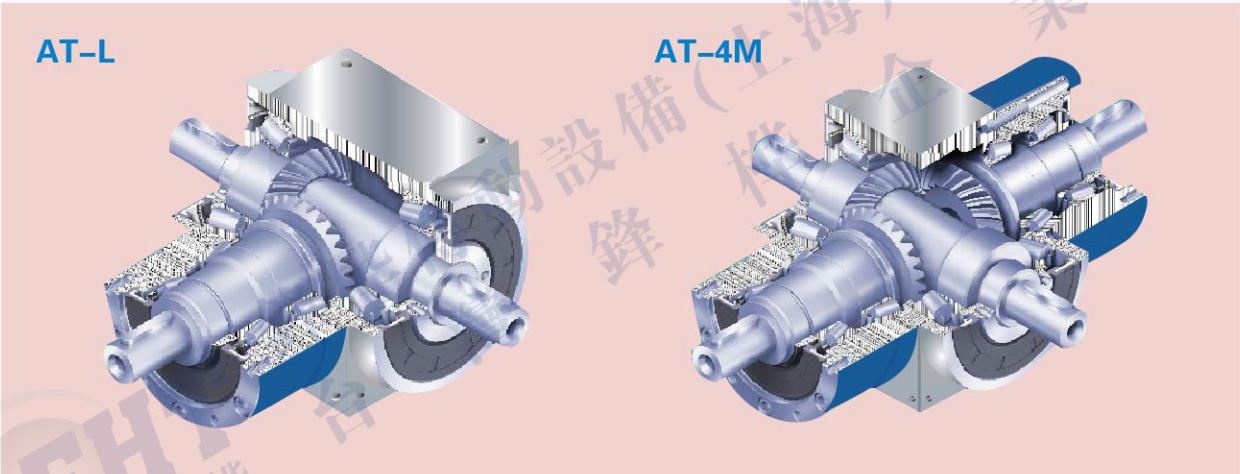
選用範例 Selection Example：AT210-FL1-200-S1 / SIEMENS 1FK6 032-6AK71

AT 雙軸出軸系列

產品特點

Double Output Shaft Series

Product Features



- 1

一體化不銹鋼本體確保最大剛性與耐蝕性，多重精密加工表面易于組裝。
Integrated stainless steel body ensures maximum rigidity and corrosion resistance. Multiple precision machined surface for easy assembly.
- 2

採用頂級蝸綫傘齒輪的設計軟體，經最佳化設計接觸齒面負載均一容許高扭矩輸出，齒輪采高強度滲碳合金鋼，研磨精密度符合 DIN 5 級標準以內。
The adoption of the top spiral worm gear design software and the optimized design of contact tooth surface make the even load and allow high torque output. Gears are made of high strength carburizing alloy steel and the grinding precision is up to the standard of DIN 5 level.
- 3

多重不銹鋼輸出入力軸的設計可以適用於各種工業上應用的需求。
Multiple stainless steel output and input shaft design can be applied to various of industrial applications needs.
- 4

高精度研磨的蝸綫傘齒輪組結合最佳化設計的行星式齒輪組可以達到500:1 的減速比。
The combination of high-precision grinded worm bevel gear set and the optimized the design of planetary gear set can make the reduction speed up to 500:1.
- 5

高扭矩低背隙的精簡結構設計適用於精密伺服的應用。
High torque and low backlash design of the compact structure is suitable for the application of precision servo.
- 6

專利的油封設計，免保養無需更換潤滑油，運轉壽命長。
Patented oil seal design, maintenance-free without replacing the lubrication oil, long operating life.

重量 Weight

減速機型 Model No.		節數 Stage	比數 ¹ Ratio	AT065	AT075	AT090	AT110	AT140	AT170	AT210	AT240	AT280
L 系列	L Series	kg	1	1~5	2.6	4.2	6.8	11.6	19.8	34.8	66.2	155.7
L1 系列	L1 Series		1	1~5	2.6	4.1	6.7	11.5	19.5	34.2	65.1	153.4
H 系列	H Series		1	1~5	2.5	3.9	6.4	11.0	18.1	31.6	60.0	143.4
C 系列	C Series		1	1~5	2.8	4.2	6.9	11.4	19.6	33.7	63.3	149.1
R1 系列	R1 Series		1	1~5	2.6	4.1	6.7	11.5	19.5	34.2	65.1	153.4
LM 系列	LM Series		1	1	3.5	5.6	9.0	15.2	24.1	42.4	81.4	122.0
RM 系列	RM Series		1	1	3.5	5.6	9.0	15.2	24.1	42.4	81.4	122.0
4M 系列	4M Series		1	1	3.5	5.6	9.1	15.4	24.8	42.6	82.5	123.5

AT 雙軸出軸系列

產品規格

Double Output Shaft Series

Product Specification

減速機性能資料 Files of Reducer Performance

規 格 Specification	節 數 Stage	比數 ¹ Ratio ¹	AT065 L	AT075 L	AT090 L	AT110 L	AT140 L	AT170 L	AT210 L	AT240 L	AT280 L
			AT065 L1	AT075 L1	AT090 L1	AT110 L1	AT140 L1	AT170 L1	AT210 L1	AT240 L1	AT280 L1
額定輸出力矩 T _{2N} Rated Output Torque	1	1	25	45	78	150	360	585	1,300	2,150	3,200
		1.5	25	45	78	150	360	585	1,300	2,150	3,200
		2	24	42	68	150	330	544	1,220	2,010	3,050
		3	18	33	54	120	270	450	1,020	1,650	2,850
		4	13	28	48	100	224	376	860	1,410	2,300
最大加速力矩 T _{2a} Max.	1	1~5	1.5倍額定輸出力矩 1.5 Times of Rated Output Torque								
		1~5	7,500	6,500	5,500	4,500	3,500	3,000	2,200	2,000	1,700
		1~5	≤6	≤6	≤6	≤6	≤6	≤6	≤6	≤6	≤6
		1~5	700	950	1,450	2,100	2,700	3,800	7,800	9,600	10,500
		1~5	900	1,100	1,700	2,700	4,800	6,600	11,500	16,000	18,000
容許徑向力 F _{1rB} ² Radial 輸入軸d1 Input d1	1	1~5	350	425	725	1,050	1,350	1,900	3,900	4,800	5,250
		1~5	450	550	850	1,350	2,400	3,300	5,750	8,500	9,000
		1~5	20,000*								
		1~5	≥98%								
		1~5	-10℃ ~ 90℃								
容許徑向力 F _{2rB} ³ Radial 輸出軸d2 Output d2	1	1~5	合成潤滑油 Fully Synthetic Grease								
		1~5	≤68	≤70	≤74	≤76	≤77	≤78	≤80	≤82	≤83
		1~5	20,000*								
		1~5	≥98%								
		1~5	-10℃ ~ 90℃								
容許軸向力 F _{1aB} ² Axial 輸入軸d1 Input d1	1	1~5	合成潤滑油 Fully Synthetic Grease								
		1~5	≤68	≤70	≤74	≤76	≤77	≤78	≤80	≤82	≤83
		1~5	20,000*								
		1~5	≥98%								
		1~5	-10℃ ~ 90℃								
容許軸向力 F _{2aB} ³ Axial 輸出軸d2 Output d2	1	1~5	合成潤滑油 Fully Synthetic Grease								
		1~5	≤68	≤70	≤74	≤76	≤77	≤78	≤80	≤82	≤83
		1~5	20,000*								
		1~5	≥98%								
		1~5	-10℃ ~ 90℃								
使用壽命 Service Life	1	1~5	20,000*								
		1~5	≥98%								
		1~5	-10℃ ~ 90℃								
		1~5	合成潤滑油 Fully Synthetic Grease								
		1~5	≤68	≤70	≤74	≤76	≤77	≤78	≤80	≤82	≤83
效率 η Efficiency	1	1~5	20,000*								
		1~5	≥98%								
		1~5	-10℃ ~ 90℃								
		1~5	合成潤滑油 Fully Synthetic Grease								
		1~5	≤68	≤70	≤74	≤76	≤77	≤78	≤80	≤82	≤83
使用溫度 Operating Temp	1	1~5	20,000*								
		1~5	≥98%								
		1~5	-10℃ ~ 90℃								
		1~5	合成潤滑油 Fully Synthetic Grease								
		1~5	≤68	≤70	≤74	≤76	≤77	≤78	≤80	≤82	≤83
潤滑 Lubrication	1	1~5	20,000*								
		1~5	≥98%								
		1~5	-10℃ ~ 90℃								
		1~5	合成潤滑油 Fully Synthetic Grease								
		1~5	≤68	≤70	≤74	≤76	≤77	≤78	≤80	≤82	≤83
噪音值 (n _F =1500rpm, 無負載) dB(A)	1	1~5	20,000*								
		1~5	≥98%								
		1~5	-10℃ ~ 90℃								
		1~5	合成潤滑油 Fully Synthetic Grease								
		1~5	≤68	≤70	≤74	≤76	≤77	≤78	≤80	≤82	≤83

1. 減速比 (i=N_{in}/N_{out})

2. 作用於輸入軸中心位置 @ n_{is}

3. 作用於輸出軸中心位置 @ n_{os}

* 連續運轉降低使用壽命二分之一。

AT-LM / RM / 4M 只提供 1 : 1 比數

* 背隙值為在 2% 額定力矩 T_{2N} 的扭力下所測得

減速機轉動慣量 Rotary Inertia of Reducer

規 格 Specification	節 數 Stage	比數 ¹ Ratio ¹	AT065 L	AT075 L	AT090 L	AT110 L	AT140 L	AT170 L	AT210 L	AT240 L	AT280 L
			AT065 L1	AT075 L1	AT090 L1	AT110 L1	AT140 L1	AT170 L1	AT210 L1	AT240 L1	AT280 L1
轉動慣量 J _r Rotary Inertia	1	1	0.51	1.30	3.16	7.70	23.57	58.99	195.40	369.34	799.12
		1.5	0.64	1.16	2.82	6.74	19.37	49.28	155.45	283.58	595.78
		2	0.44	1.11	2.70	6.31	17.75	45.35	140.24	249.74	511.76
		3	0.43	1.09	2.66	6.17	17.18	44.01	134.95	237.71	483.06
		4	0.43	1.09	2.65	6.13	17.06	43.70	133.58	234.72	476.26
	1	5	0.43	1.09	2.65	6.12	17.02	43.60	133.14	233.67	473.58

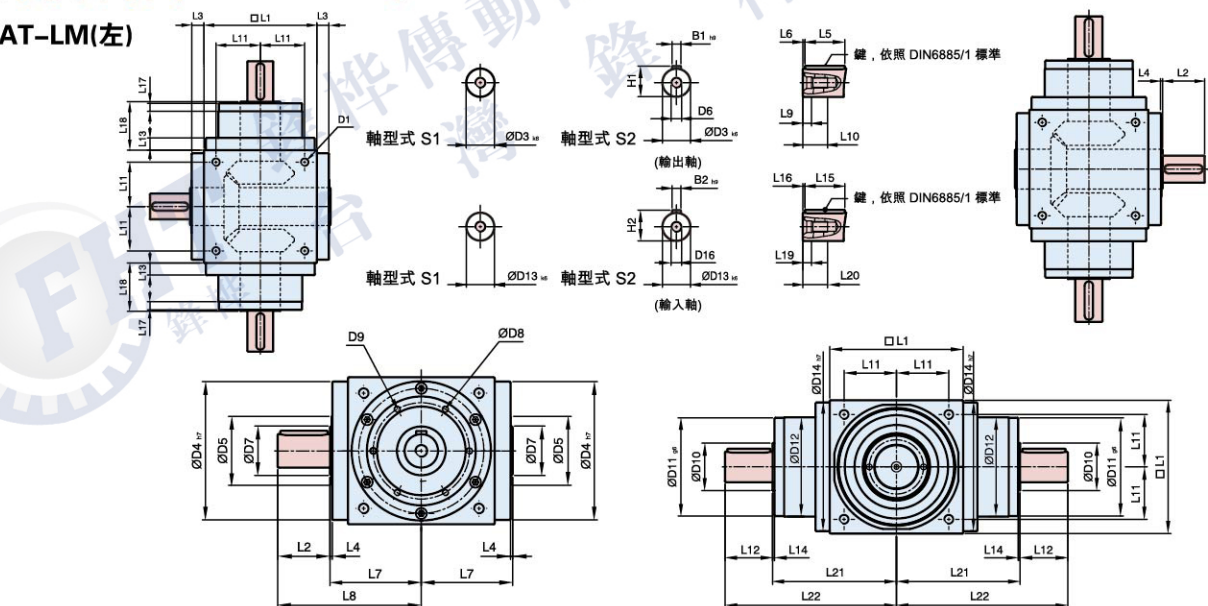
AT-LM (左) /AT-RM(右)系列
雙出軸方向相反型式

Double Output Shaft Opposite Direction Type
尺寸(單節1-stage, 減速比ratio i=1)



外形尺寸圖 Dimensions:

AT-LM(左)



Unit:mm

AT-RM(右)

規格表 Specifications:

尺寸 Sizes	AT065LM/RM	AT075LM/RM	AT090LM/RM	AT110LM/RM	AT140LM/RM	AT170LM/RM	AT210LM/RM	AT240LM/RM	AT280LM/RM
D1	M4	M6	M6	M8	M10	M12	M16	M16	M16
D3 k6	13	16	18	22	32	40	50	55	60
D4 h7	63	73	88	108	135	165	205	235	275
D5	31	35	43	53	68	83	104	124	144
D6	M4	M5	M5	M8	M12	M16	M16	M16	M20
D7	21	22	28	33	47	55	75	85	110
D8	53	62	76	95	92	114	142	160	176
D9	4xM4xL7	4xM5xL8	4xM5xL8	6xM6xL10	6xM6xL10	6xM8xL12.5	6xM8xL12.5	6xM8xL12.5	6xM10xL15
D10	15.4	20.4	25.8	35.8	49.8	59.3	79.3	92.3	102.3
D11 g6	62.9	72.9	87	107	103	127	158	178	198
D12	62	72	86	106	104	128	160	180	200
D13 k6	13	16	18	22	32	40	50	55	60
D14 h7	63	73	88	108	135	165	205	235	275
D16	M4	M5	M5	M8	M12	M16	M16	M16	M20
L1	65	75	90	110	140	170	210	240	280
L2	19.5	30	35	40	50	60	75	85	110
L3	13	14.5	15	15	15	15	20	25	25
L4	2	2	2	2	2	2	2	2	2
L5	16	25	28	32	45	50	70	80	100
L6	2	2.5	3.5	4	2.5	5	2.5	2.5	5
L7	47.5	54	62	72	87	102	127	147	167
L8	67	84	97	112	137	162	202	232	277
L9	4.5	4.8	4.8	7.2	10	12	12	12	15
L10	10	12.5	12.5	19	28	36	36	36	42
L11	27	30	36	44	55	67	85	95	110
L12	19.5	30	35	40	50	60	75	85	110
L13	13	15	15	15	15	15	20	25	25
L14	2	2	2	2	2	2	2	2	2
L15	16	25	28	32	45	50	70	80	100
L16	2	2.5	3.5	4	2.5	5	2.5	2.5	5
L17	6	8	8	8	10	10	10	10	10
L18	43	52.5	55	60	60	70	90	105	120
L19	4.5	4.8	4.8	7.2	10	12	12	12	15
L20	10	12.5	12.5	19	28	36	36	36	42
L21	75.5	90	100	115	130	155	195	225	260
L22	95	120	135	155	180	215	270	310	370
B1 h9	5	5	6	6	10	12	14	16	18
B2 h9	5	5	6	6	10	12	14	16	18
H1	15	18	20.5	24.5	35	43	53.5	59	64
H2	15	18	20.5	24.5	35	43	53.5	59	64

Unit:mm

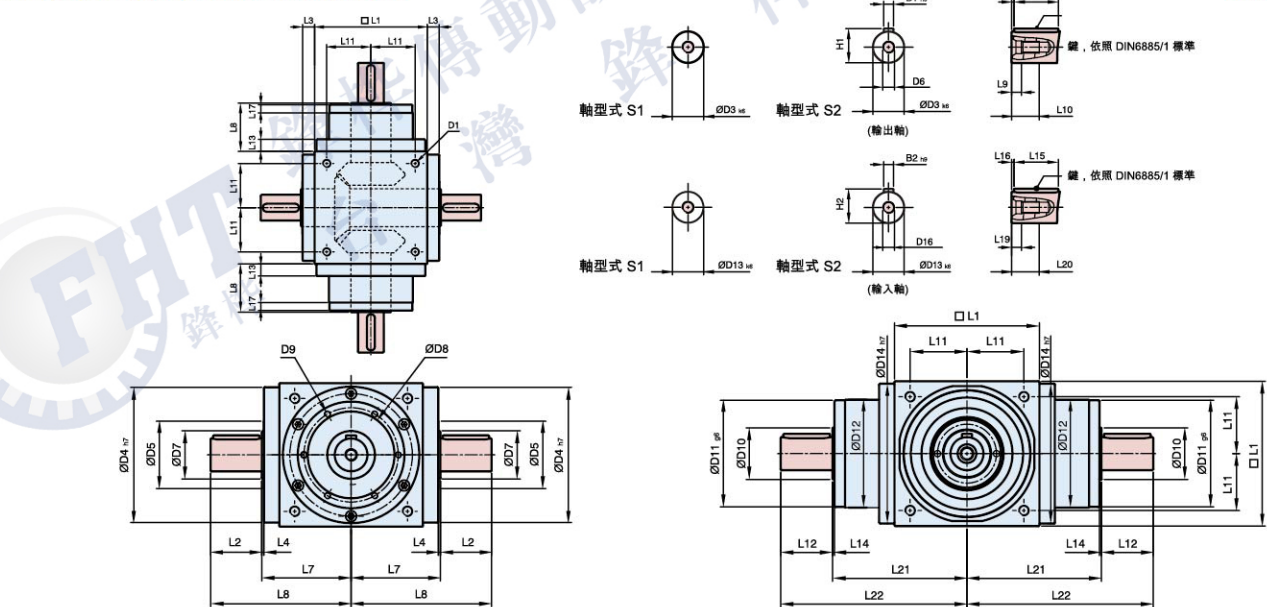
AT-4M系列

Series

尺寸(單節1-stage, 減速比ratio i=1)



外形尺寸圖 Dimensions:



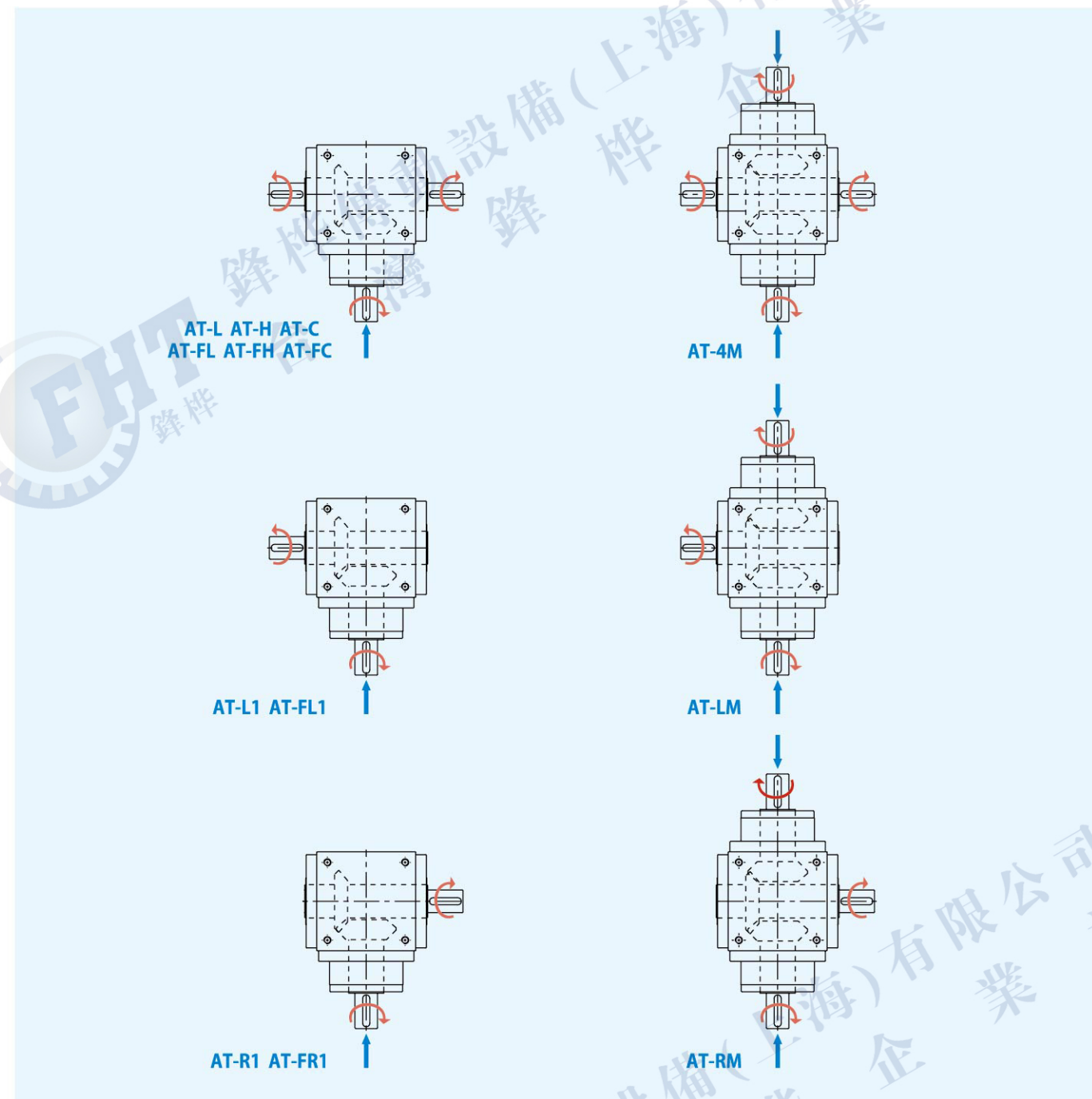
Unit:mm

規格表 Specifications:

尺寸 Sizes	AT065 4M	AT075 4M	AT090 4M	AT110 4M	AT140 4M	AT170 4M	AT210 4M	AT240 4M	AT280 4M
D1	M4	M6	M6	M8	M10	M12	M16	M16	M16
D3 k6	13	16	18	22	32	40	50	55	60
D4 h7	63	73	88	108	135	165	205	235	275
D5	31	35	43	53	68	83	104	124	144
D6	M4	M5	M5	M8	M12	M16	M16	M16	M20
D7	21	22	28	33	47	55	75	85	110
D8	53	62	76	95	92	114	142	160	176
D9	4xM4xL7	4xM5xL8	4xM5xL8	6xM6xL10	6xM6xL10	6xM8xL12.5	6xM8xL12.5	6xM8xL12.5	6xM10xL15
D10	15.4	20.4	25.8	35.8	49.8	59.3	79.3	92.3	102.3
D11 g6	62.9	72.9	87	107	103	127	158	178	198
D12	62	72	86	106	104	128	160	180	200
D13 k6	13	16	18	22	32	40	50	55	60
D14 h7	63	73	88	108	135	165	205	235	275
D16	M4	M5	M5	M8	M12	M16	M16	M16	M20
L1	65	75	90	110	140	170	210	240	280
L2	19.5	30	35	40	50	60	75	85	110
L3	13	14.5	15	15	15	15	20	25	25
L4	2	2	2	2	2	2	2	2	2
L5	16	25	28	32	45	50	70	80	100
L6	2	2.5	3.5	4	2.5	5	2.5	2.5	5
L7	47.5	54	62	72	87	102	127	147	167
L8	67	84	97	112	137	162	202	232	277
L9	4.5	4.8	4.8	7.2	10	12	12	12	15
L10	10	12.5	12.5	19	28	36	36	36	42
L11	27	30	36	44	55	67	85	95	110
L12	19.5	30	35	40	50	60	75	85	110
L13	13	15	15	15	15	15	20	25	25
L14	2	2	2	2	2	2	2	2	2
L15	16	25	28	32	45	50	70	80	100
L16	2	2.5	3.5	4	2.5	5	2.5	2.5	5
L17	6	8	8	8	10	10	10	10	10
L18	43	52.5	55	60	60	70	90	105	120
L19	4.5	4.8	4.8	7.2	10	12	12	12	15
L20	10	12.5	12.5	19	28	36	36	36	42
L21	75.5	90	100	115	130	155	195	225	260
L22	95	120	135	155	180	215	270	310	370
B1 h9	5	5	6	6	10	12	14	16	18
B2 h9	5	5	6	6	10	12	14	16	18
H1	15	18	20.5	24.5	35	43	53.5	59	64
H2	15	18	20.5	24.5	35	43	53.5	59	64

Unit:mm

轉向圖 Diagram of Rotate Direction

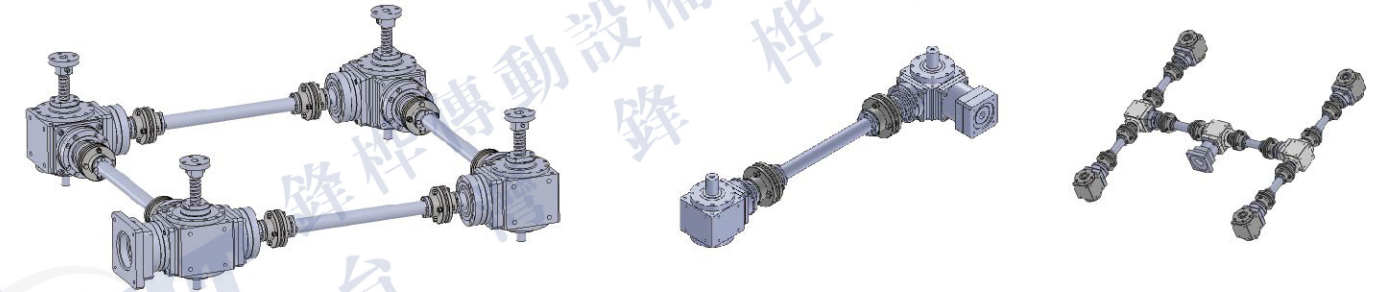


縮緊盤附件選配 Selection of Shrink Disc Accessories

C / FC 系列	(單位 : mm)				
	D1	D2	D3	H1	H2
SSD-d16xdw14	41	16	26	15	18.5
SSD-d22xdw18	50	22	36	19.5	23
SSD-d25xdw22	50	25	38	19.5	23
SSD-d44xdw32	80	44	61	25.5	29.5
SSD-d50xdw40	90	50	70	27.5	31.5
SSD-d62xdw50	110	62	86	30.5	34.5
SSD-d68xdw55	115	68	86	30.5	34.5
SSD-d75xdw60	138	75	100	32.5	38

適用於多軸連動場合：

TFT-LCD 升降機構、各種升降、水平連動機構... 等機構



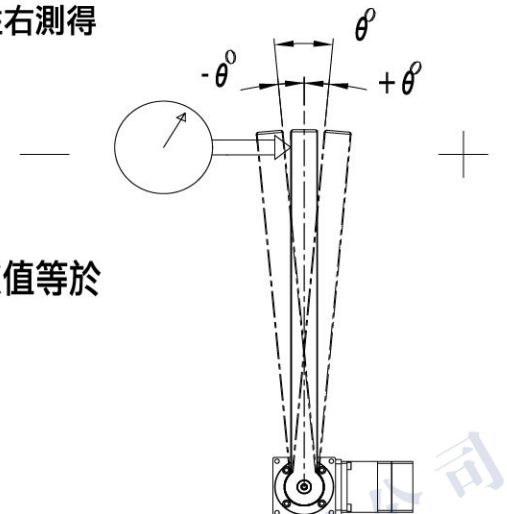
減速機-背隙測定值：

入力軸固定,出力軸施以微小力距(額定值的5%),測量棒往左再往右測得的 θ° ($+\theta^\circ$ 與 $-\theta^\circ$) 即為背隙。

背隙值的計算：

例:當 360° 裡最大 θ° 為 0.05° (3弧分),半徑500MM,背隙值等於 $(500 \times 2 \times \pi) \div (360 \times 60) \times 3 = 0.436\text{MM}$

θ° 為 0.05° (3弧分) = 0.436MM (背隙值或齒隙)



減速機-出力軸偏擺與同心度

- 1.輸出軸的偏擺與同心度的高低對其壽命有絕對的影響,出力軸偏擺過大易產生偏擺運動,對齒輪產生磨損壽命縮短。
- 2.全系列使用NSK錐形滾柱軸承,軸偏擺要求0.01MM以內(測量時施以定格扭矩的5%)。

