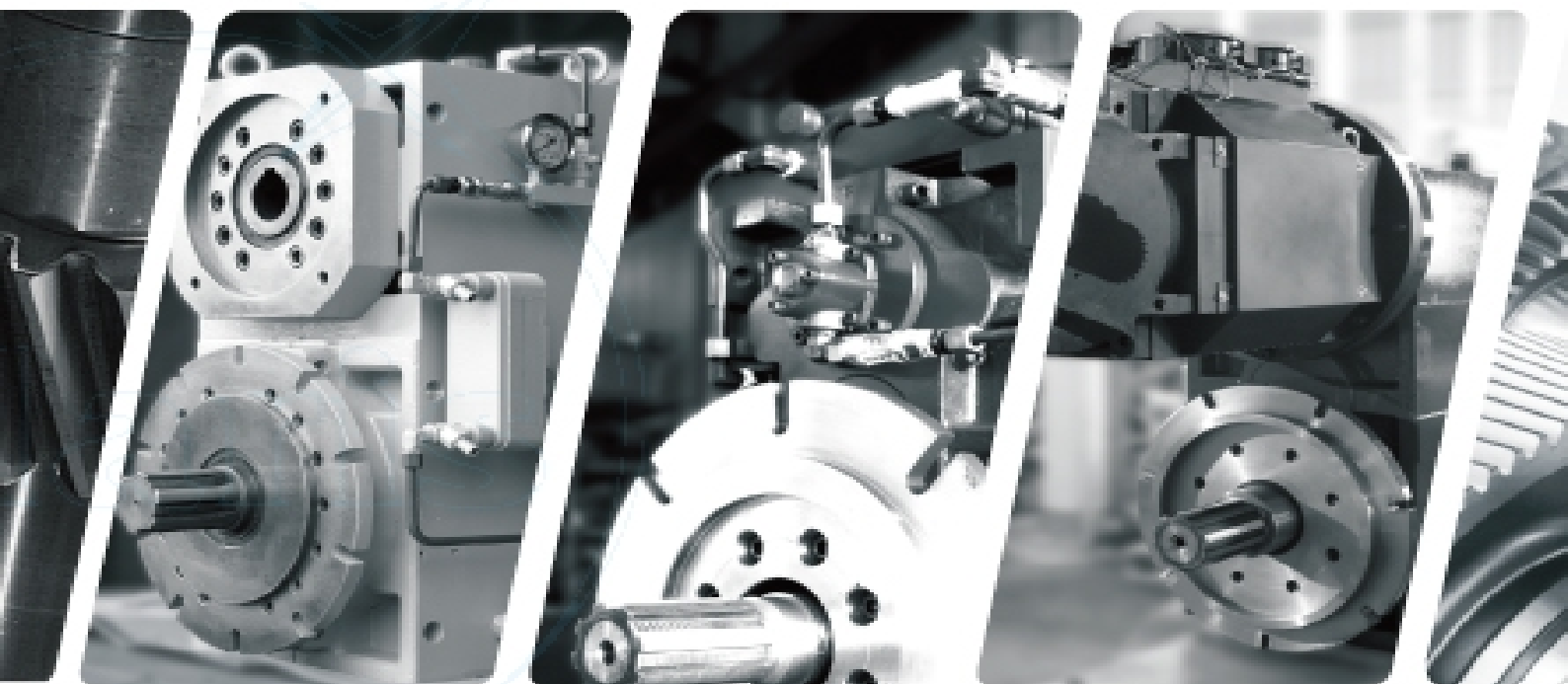




Gearbox for Injection Machine

射出機專用齒輪箱





Gearbox Selection Process

STEP		REFERENCE
Step1	SELECT NOMINAL RATIO i_n $i_{Req} = n_1/n_2$ Example : $n_1 = 1750 \text{ rpm}$: $n_2 = 120 \text{ rpm}$ $i_{Req} = 1750/120 = 14.58$ Choose i_n close i_{Req} , see Tables $i_n = 16$	i_n = Nominal Ratio i_{Req} = Ratio [required] n_1 = Input speed n_2 = Driven machine speed
Step2	CALCULATE OUTPUT TORQUE T_{Req} $T_{Req} = \frac{P \times 9.55 \times SF}{n_2} \text{ kNm}$ Example : $P = 75 \text{ kw}$: $SF = 1.6$: $n_2 = 120 \text{ rpm}$ $T_{Req} = 75 \times 9.55 \times 1.6 / 120 = 9.55 \text{ kNm}$ For general conditions, our suggestion of SF is 1.6, If you have other different requirement, please contact with our Research & Development Dept.	P = Power of Working Machine SF = Service Factor for Driven Machine n_2 = Driven machine speed T_{Req} = Torsion [required]
Step3	SELECT GEAR UNIT TYPE AND SIZE $T_n > T_{Req}$ Example : $T_{Req} = 9.55 \text{ kNm}$ Gear unit type IN-200-3S with Nominal Torque $T_{Req} = 11.52 \text{ kNm}$ $T_n \geq T_{Req}$ IN-200-3S Gear Unit is okay	T_n = Nominal torsion T_{Req} = Torsion [required]
Step4	DETERMINE REQUIRED THERMAL CAPACITY $P > PG$, Additional cooling is required. $PG > P$, Cooling system is sufficient. Example : $P = 75 \text{ KW}$ When I adopt IN-200-3S gear case, please according to TABLE1 PG Knowing $PG = 37 \text{ kw}$, $P > PG$, Additional cooling is required	P = Power of Working Machine PG = Thermal Capacity

射出機專用齒輪箱選定方法

步驟		參照資料
步驟一	計算選用合適減速比 i_n $i_{Req} = n_1/n_2$ 範例 : $n_1 = 1750 \text{ rpm}$: $n_2 = 120 \text{ rpm}$ $i_{Req} = 1750/120 = 14.58$ 選擇 i_n 並近似 i_{Req} , 由TABLE得知 $i_n = 16$	i_n = 表定減速比 i_{Req} = 需求減速比 n_1 = 輸入軸轉速 n_2 = 輸出軸轉速
步驟二	計算輸出扭力 T_{Req} $T_{Req} = \frac{P \times 9.55 \times SF}{n_2} \text{ kNm}$ 範例 : $P = 75 \text{ kw}$: $SF = 1.6$: $n_2 = 120 \text{ rpm}$ $T_{Req} = 75 \times 9.55 \times 1.6 / 120 = 9.55 \text{ kNm}$ 一般使用條件下，建議安全係數為1.6， 如有不同技術要求，請與我司設計單位聯繫。	P = 馬達功率 SF = 安全係數 n_2 = 輸出軸轉速 T_{Req} = 需求輸出扭力
步驟三	選擇齒輪箱型號大小 Type $T_n > T_{Req}$ 範例 : $T_{Req} = 9.55 \text{ kNm}$ 每一種型號的 T_n 必須大於 T_{Req} , 從Table $i_n=16$, 對照其型號 IN-200-3S , 得知 $T_n=11.52 \text{ kNm}$, $T_n \geq T_{Req}$ 故 IN-200-3S 為合適的選擇!	T_n = 額定輸出扭力 T_{Req} = 輸出扭力
步驟四	決定是否採用冷卻裝置? $P > PG$ 則需要額外冷卻系統。 $PG > P$ 則不需要額外冷卻裝置。 範例 : $P=75 \text{ KW}$ 當我採用 IN-200-3S 齒輪箱時， 請參照Table (熱容量PG) 得知 $PG=37 \text{ kw}$ 因為 $P > PG$ 則需要額外冷卻系統。	P = 馬達功率 PG = 熱容量

Gearbox for Injection Features 射出機特點

GEARBOX FOR INJECTION - TWO STAGE

Compact Structure

- Allows more work space on your machine table
- Motor shaft can be connected directly to our gearbox, no additional adapter flange needed

Higher efficiency of productivity

- Inject with faster response, more precision and higher sensitivity feedback
- Cycle time effectively shortened and improving production capacity.

Cost down

- Lower power consumption, saving your electrical bill
- No consumables needed in operation

Easy maintenance. Easy install

- Easy motor mounting. Motor axle can be connected to gearboxes with some bolts
- Easy maintenance. No special tools required to disassemble. No irritating maintaining processes, just change lubricating oil regularly

(三軸) 射出機專用齒輪箱

結構緊湊

- 不受空間的限制
- 馬達心軸能直接連接在我們齒輪箱的中空軸上，無須額外轉座

高產能

- 射出時間反應更為靈敏
- 機台射出速度時更快，產能相對提高

降低成本

- 節省電費
- 沒有消耗品

保養簡單，安裝輕鬆

- 馬達與齒輪箱連接只需鎖緊螺絲
- 保養時不需要太多的工具，只需更換潤滑油，方便保養

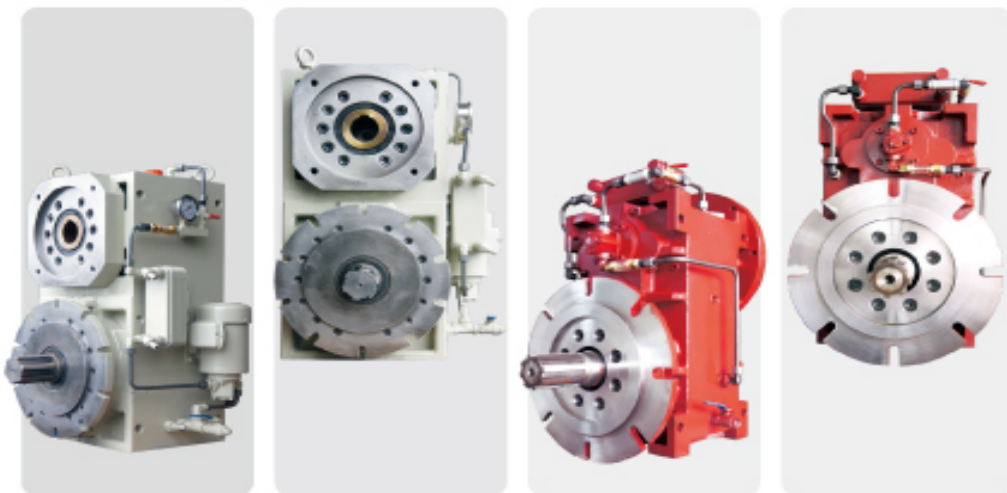
Torque Data Sheet 扭力數據表

(三軸) 射出機專用齒輪箱 [Two stage reduction] Gearbox for injection Machine [Table]

型號 Type	減速比 Nominal Ratio [In]						
	8	10	12	16	20	25	30
	[Tn] 齒輪箱額定輸出扭力 Nominal Torsion of driven machine [kN.M]						
IN-112-3S	2.08	2.08	2.08	1.6	1.6	1.6	1.12
IN-125-3S	2.64	2.64	2.64	2	2	2	1.44
IN-140-3S	4.4	4.4	4.4	3.36	3.36	3.36	2.24
IN-160-3S	6.24	6.24	6.24	4.8	4.8	4.8	3.68
IN-180-3S	9.76	9.76	9.76	7.44	7.44	7.44	5.2
IN-200-3S	15.2	15.2	15.2	11.5	11.5	11.5	8
IN-225-3S	23.2	23.2	23.2	17.6	17.6	17.6	12.3
IN-250-3S	30.4	30.4	30.4	23.2	23.2	23.2	16
IN-280-3S	37.6	37.6	37.6	28	28	28	20
IN-320-3S	60.8	60.8	60.8	45.6	45.6	45.6	32
IN-360-3S	85.6	85.6	85.6	64.8	64.8	64.8	45.6
IN-400-3S	126	126	126	96	96	96	67.2

(三軸) 射出機專用齒輪箱 [Two stage reduction] Gearbox for injection Machine [Table]

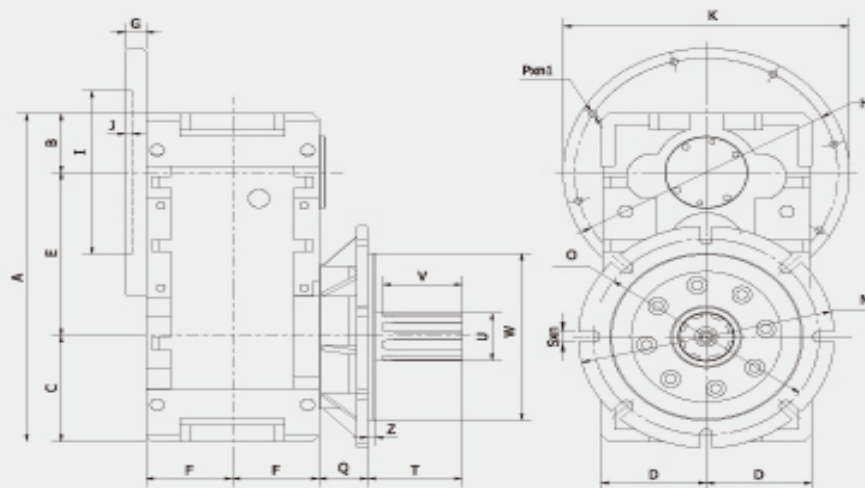
型號 Type	(PG) 熱容量 Thermal Capacity [KW]	重量 Weight [KG]	潤滑容量 Oil Volume [LITER]
IN-112-3S	7.5 KW	80 KG	4.5 LITER
IN-125-3S	11 KW	110 KG	6.5 LITER
IN-140-3S	19 KW	135 KG	9 LITER
IN-160-3S	22 KW	190 KG	12 LITER
IN-180-3S	40 KW	300 KG	18 LITER
IN-200-3S	37 KW	380 KG	25 LITER
IN-225-3S	56 KW	560 KG	37 LITER
IN-250-3S	75 KW	780 KG	47 LITER
IN-280-3S	94 KW	1010 KG	78 LITER
IN-320-3S	112 KW	1450 KG	100 LITER
IN-360-3S	150 KW	2050 KG	162 LITER
IN-400-3S	225 KW	2900 KG	198 LITER





Overall Dimensions 機台三視圖

Specifications 規格表



馬達法蘭 Motor Flange "MF"

Type	G	H	I	J	K	P x n1	馬力
112M	24	Ø215	Ø180	5	Ø250	M12 x 4	5HP-4P
132S	24	Ø265	Ø230	5	Ø300	M12 x 4	7.5HP-4P
132M	24	Ø265	Ø230	5	Ø300	M12 x 4	10HP-4P
160M	32	Ø300	Ø250	6	Ø350	M16 x 4	15HP-4P
160L	32	Ø300	Ø250	6	Ø350	M16 x 4	20HP-4P
180MC	32	Ø350	Ø300	6	Ø400	M16 x 4	25HP-4P
180MC	32	Ø350	Ø300	6	Ø400	M16 x 4	30HP-4P
180LC	32	Ø350	Ø300	6	Ø400	M16 x 4	40HP-4P
200LC	32	Ø400	Ø350	8	Ø450	M16 x 8	50HP-4P
200LC	32	Ø400	Ø350	8	Ø450	M16 x 8	60HP-4P
225SC	36	Ø500	Ø450	8	Ø550	M18 x 8	75HP-4P
250SC	36	Ø500	Ø450	8	Ø550	M18 x 8	100HP-4P
250MC	36	Ø500	Ø450	8	Ø550	M18 x 8	125HP-4P
280S	40	Ø600	Ø550	8	Ø660	M20 x 8	150HP-4P
280M	40	Ø600	Ø550	8	Ø660	M20 x 8	175HP-4P
315S	40	Ø600	Ø550	8	Ø660	M20 x 8	200HP-4P
315M	40	Ø600	Ø550	8	Ø660	M20 x 8	250HP-4P

輸出法蘭 Output Flange "OF"

Type	øM	øO	S	n	øW	Q	Z	T	U	V
OF2	Ø228	Ø204	11	8	Ø145	60	8	17	45 x 60 Z=8	50
OF3	Ø255	Ø225	11	8	Ø160	60	10	14	72 x 82 Z=10	85
OF4	Ø260	Ø232	11	10	Ø175	60	10	27	72 x 82 Z=10	85
OF5	Ø300	Ø266	13	10	Ø190	70	10	28	82 x 92 Z=10	97
OF6	Ø325	Ø290	13	10	Ø220	70	10	28	82 x 92 Z=10	97
OF7	Ø370	Ø330	15	10	Ø250	70	10	38	102 x 112 Z=10	144

箱體尺寸 Dimension of Box Body

Model	Size	A	B	C	D	E	F
IN-112-3S		407	80	125	112	202	98
IN-125-3S		445	80	140	125	225	102
IN-140-3S		502	90	160	140	252	117.5
IN-160-3S		565	100	180	160	285	128
IN-180-3S		632	112	200	180	320	143
IN-200-3S		710	125	225	200	360	160
IN-225-3S		795	140	250	225	405	180
IN-250-3S		890	160	280	250	450	203.5
IN-280-3S		1000	180	315	280	505	230
IN-320-3S		1125	200	355	315	570	260
IN-360-3S		1265	225	400	355	640	290
IN-400-3S		1420	250	450	400	720	325



125-4S → 400-4S (四軸) 射出機專用齒輪箱

Gearbox for Injection Feature 射出機特點

GEARBOX FOR INJECTION - THREE STAGE

4 shaft design

- Advance 4 shaft design
- 4 shafts design reducing power consumption, saving 50% electric bill than traditional hydraulic motor.

Compact Structure

- Allows more work space on your machine table
- Motor shaft can be connected directly to our gearbox, no additional adapter flange needed

Higher efficiency of productivity

- Inject with faster response, more precision and higher sensitivity feedback
- Cycle time effectively shortened and improving production capacity.

Cost down

- Lower power consumption, saving your electrical bill
- No consumables needed in operation

Easy maintenance, Easy install

- Easy motor mounting. Motor axle can be connected to gearboxes with some bolts
- Easy maintenance. No special tools required to disassemble. No irritating maintaining processes, just change lubricating oil regularly

(四軸) 射出機專用齒輪箱

四軸設計

- 齒輪配置為四軸設計
- 四軸比傳統油壓馬達省電50%

結構緊湊

- 不受到空間的侷限
- 馬達軸能直接連接在我們齒輪箱的中空軸上，無須額外轉接

高產能

- 射出瞬間反應更為靈敏
- 機台射出速度時間快，產能相對提高

降低成本

- 節省電費
- 沒有磨耗品

保養簡單，安裝輕鬆

- 馬達與齒輪箱連接只需鎖緊螺絲
- 保養時不需要太多的工具，只需更換潤滑油，方便保養



(Three stage reduction) Gearbox for injection Machine

Torque Data Sheet 扭力數據表

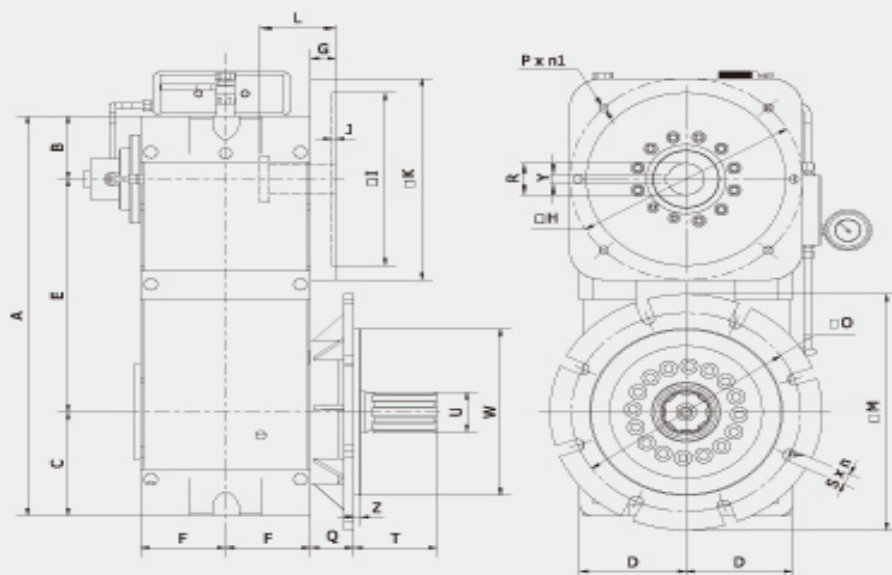
(四軸) 射出機專用齒輪箱 [Three stage reduction] Gearbox for injection Machine [Table]							
型號 Type	減速比 Nominal Ratio [In]						
	10	16	20	25	30	40	50
	[T _n] 齒輪箱額定輸出扭力 Nominal Torsion of driven machine [kN.M]						
IN-125-4S	4.27	4.07	3.88	3.70	3.52	3.36	3.20
IN-140-4S	6.40	6.08	5.92	5.76	5.60	4.98	4.84
IN-160-4S	8.64	8.48	8.16	8.00	7.68	7.52	7.04
IN-180-4S	13.28	12.96	12.64	12.48	12.32	11.84	10.72
IN-200-4S	20.80	19.68	19.20	18.72	18.40	17.28	16.00
IN-225-4S	30.72	29.60	28.32	27.20	25.92	23.52	22.40
IN-250-4S	40.10	38.40	35.68	34.72	33.60	29.60	26.88
IN-280-4S	56.00	52.00	50.40	48.32	47.20	43.20	40.20
IN-320-4S	92.00	85.60	82.40	79.20	76.05	72.12	65.60
IN-360-4S	110.40	103.20	100.00	96.00	94.40	85.60	81.60
IN-400-4S	160.80	146.40	144.00	140.00	136.10	122.40	111.20

(四軸) 射出機專用齒輪箱 [Three stage reduction] Gearbox for injection Machine [Table]			
型號 Type	(PG) 熱容量 Thermal Capacity [KW]	重量 Weight [KG]	潤滑容量 Oil Volume [LITER]
IN-125-4S	19 KW	122 KG	5.4 LITER
IN-140-4S	22 KW	161 KG	7 LITER
IN-160-4S	30 KW	253 KG	9.5 LITER
IN-180-4S	37 KW	334 KG	15 LITER
IN-200-4S	56 KW	485 KG	30 LITER
IN-225-4S	75 KW	655 KG	26 LITER
IN-250-4S	94 KW	910 KG	48 LITER
IN-280-4S	1125 KW	1350 KG	60 LITER
IN-320-4S	150 KW	1900 KG	90 LITER
IN-360-4S	225 KW	2800 KG	135 LITER
IN-400-4S	300 KW	3900 KG	150 LITER



Overall Dimensions 機台三視圖

Specifications 規格表



輸出法蘭 Output Flange "OF"

Type	øM	øO	S	n	øW	G	Z	T	U (DIN 5480)
OF2	ø228	ø204	11	8	ø145	60	8	17	32 x 2 x 14
OF3	ø255	ø225	11	8	ø160	60	10	14	35 x 2 x 16
OF4	ø260	ø232	11	10	ø175	60	10	27	40 x 2 x 18
OF5	ø300	ø268	13	10	ø190	70	10	28	47 x 2 x 22
OF6	ø325	ø290	13	10	ø220	70	10	28	55 x 3 x 17
OF7	ø370	ø330	15	10	ø250	70	10	38	65 x 3 x 20
OF8	ø425	ø380	17	10	ø290	70	10	47	75 x 3 x 24
OF9	ø500	ø440	19	10	ø335	80	12	48	85 x 3 x 27
OF10	ø605	ø540	22	10	ø400	90	12	50	100 x 3 x 32
OF11	ø660	ø600	26	10	ø450	100	15	50	110 x 3 x 35
OF12	ø940	ø856	22	10	ø450	180	20	82	150 x 4 x 36
OF13	ø850	ø780	26	10	ø700	180	8	50	160 x 5 x 30

馬達法蘭 Motor Flange "MF"

Type	G	H	L	I	J	K	Y	R	P x n1
MF2	24	ø215	82	ø180	5	ø250	10	32	M12 x 4
MF3A	24	ø265	112	ø230	5	ø300	12	42	M12 x 4
MF3B	24	ø265	112	ø230	5	ø300	14	48	M12 x 4
MF4	32	ø300	112	ø250	6	ø350	16	55	M16 x 4
MF5	32	ø350	145	ø300	6	ø400	18	60	M16 x 4
MF6A	32	ø400	145	ø350	8	ø450	18	65	M16 x 8
MF6B	32	ø400	145	ø350	8	ø450	20	70	M16 x 8
MF6C	32	ø400	145	ø350	8	ø450	20	75	M16 x 8
MF7	36	ø500	145	ø450	8	ø550	20	75	M18 x 8
MF8	40	ø600	175	ø550	8	ø660	22	80	M20 x 8
MF9	40	ø600	175	ø550	8	ø660	28	100	M20 x 8

箱體尺寸 Dimension of Box Body

Model	Size	A	B	C	D	E	F
IN-125-4S		508	63	140	125	305	107
IN-140-4S		572	71	160	140	342	118
IN-160-4S		645	80	180	160	385	133
IN-180-4S		722	90	200	180	432	148
IN-200-4S		810	100	225	200	485	165
IN-225-4S		907	112	250	225	545	177.5
IN-250-4S		1015	125	280	250	610	200
IN-280-4S		1140	140	315	280	685	200
IN-320-4S		1285	160	355	315	770	225
IN-360-4S		1445	180	400	355	865	250
IN-400-4S		1620	200	450	400	970	280

尺寸配合 馬達法蘭 / 輸出法蘭
Possible gearbox mountings Motor flange [mf] / output flange [of]

MHP3 / 125	MF2 MF3A	OF3 OF4 OF5	MHP3 / 250	MF6A MF6B MF7	OF9 OF10
MHP3 / 140	MF3A	OF5 OF6	MHP3 / 280	MF6B MF7	OF10 OF11
MHP3 / 160	MF3A MF3B	OF6 OF7	MHP3 / 320	MF6C MF7 MF8	OF11 OF12
MHP3 / 180	MF3B MF4	OF7 OF8	MHP3 / 360	MF6C MF7 MF8 MF9	OF12 OF13
MHP3 / 200	MF4 MF5	OF8 OF9	MHP3 / 400	...	...
MHP3 / 225	MF5 MF6A	OF9 OF10	...	...	...



Power Transmission Solution



Design by Polarix 2014-04, 1,000 pcs, +886-6-24517070



BSG GEAR LTD.

百象機械股份有限公司

No. 11, Aly. 31, Ln. 88, Xingnong Road,
Shanhua Dist., Tainan City 741, Taiwan
741 台南市善化區興農路88巷31弄11號
TEL: 886-6-5811101 FAX: 886-6-5811103
E-mail: sales@bsg.com.tw, info@bsg.com.tw
www.bsg.com.tw