

# Gearbox for Injection Machine

射出機專用齒輪箱





# Gearbox Selection Process

# 射出機專用齒輪箱選定方法

STEP		REFERENCE
Step1	<p>SELECT NOMINAL RATIO <math>i_n</math>  <math>i_{Req} = n1/n2</math>                      Example : <math>n1 = 1750 \text{ rpm}</math> ; <math>n2 = 120 \text{ rpm}</math>  <math>i_{Req} = 1750/120 = 14.58</math>                      Choose <math>i_n</math> close <math>i_{Req}</math> , see Tables <math>i_n = 16</math></p>	<p><math>i_n</math> = Nominal Ratio  <math>i_{Req}</math> = Ratio [required]  <math>n1</math> = Input speed  <math>n2</math> = Driven machine speed</p>
Step2	<p>CALCULATE OUTPUT TORQUE <math>T_{Req}</math>  <math>T_{Req} = \frac{P \times 9.55 \times SF}{n2} \text{ kNm}</math>                      Example : <math>P = 75 \text{ kw}</math> ; <math>SF = 1.6</math> ; <math>n2 = 120 \text{ rpm}</math>  <math>T_{Req} = 75 \times 9.55 \times 1.6 / 120 = 9.55 \text{ kNm}</math>                      For general conditions, our suggestion of SF is 1.6,                      If you have other different requirement, please contact                      with our Research &amp; Development Dept.</p>	<p><math>P</math> = Power of Working Machine  <math>SF</math> = Service Factor for Driven Machine  <math>n2</math> = Driven machine speed  <math>T_{Req}</math> = Torsion [required]</p>
Step3	<p>SELECT GEAR UNIT TYPE AND SIZE  <math>T_n &gt; T_{Req}</math>                      Example : <math>T_{Req} = 9.55 \text{ kNm}</math>                      Gear unit type IN-200-3S with Nominal Torque <math>T_{Req} = 11.52 \text{ kNm}</math>  <math>T_n \geq T_{Req}</math> IN-200-3S Gear Unit is okay</p>	<p><math>T_n</math> = Nominal torsion  <math>T_{Req}</math> = Torsion [required]</p>
Step4	<p>DETERMINE REQUIRED THERMAL CAPACITY  <math>P &gt; PG</math> , Additional cooling is required.  <math>PG &gt; P</math> , Cooling system is sufficient.                      Example : <math>P = 75 \text{ KW}</math>                      When I adopt IN-200-3S gear case,                      please according to TABLE1 PG                      Knowing <math>PG = 37 \text{ kw}</math> , <math>P &gt; PG</math> ,                      Additional cooling is required</p>	<p><math>P</math> = Power of Working Machine  <math>PG</math> = Thermal Capacity</p>

步驟		參照資料
步驟一	<p>計算選用合適減速比 <math>i_n</math>  <math>i_{Req} = n1/n2</math>                      範例 : <math>n1 = 1750 \text{ rpm}</math> ; <math>n2 = 120 \text{ rpm}</math>  <math>i_{Req} = 1750/120 = 14.58</math>                      選擇 <math>i_n</math> 並近似 <math>i_{Req}</math> , 由TABLE得知 <math>i_n = 16</math></p>	<p><math>i_n</math> = 表定減速比  <math>i_{Req}</math> = 需求減速比  <math>n1</math> = 輸入軸轉速  <math>n2</math> = 輸出軸轉速</p>
步驟二	<p>計算輸出扭力 <math>T_{Req}</math>  <math>T_{Req} = \frac{P \times 9.55 \times SF}{n2} \text{ kNm}</math>                      範例 : <math>P = 75 \text{ kw}</math> ; <math>SF = 1.6</math> ; <math>n2 = 120 \text{ rpm}</math>  <math>T_{Req} = 75 \times 9.55 \times 1.6 / 120 = 9.55 \text{ kNm}</math>                      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>	<p><math>P</math> = 馬達功率  <math>SF</math> = 安全係數  <math>n2</math> = 輸出軸轉速  <math>T_{Req}</math> = 需求輸出扭力</p>
步驟三	<p>選擇齒輪箱型號大小 Type  <math>T_n &gt; T_{Req}</math>                      範例 : <math>T_{Req} = 9.55 \text{ kNm}</math>                      每一種型號的 <math>T_n</math> 必須大於 <math>T_{Req}</math> , 從Table <math>i_n=16</math> ,                      對照其型號 IN-200-3S , 得知 <math>T_n = 11.52 \text{ kNm}</math> .  <math>T_n \geq T_{Req}</math> 故 IN-200-3S 為合適的選擇!</p>	<p><math>T_n</math> = 額定輸出扭力  <math>T_{Req}</math> = 輸出扭力</p>
步驟四	<p>決定是否採用冷卻裝置 ?  <math>P &gt; PG</math> 則需要額外冷卻系統 .  <math>PG &gt; P</math> 則不需要額外冷卻裝置 .                      範例 : <math>P = 75 \text{ KW}</math>                      當我採用 IN-200-3S 齒輪箱時 ,                      請參照Table (熱容量PG)                      得知 <math>PG = 37 \text{ kw}</math> 因為 <math>P &gt; PG</math> 則需要額外冷卻系統 .</p>	<p><math>P</math> = 馬達功率  <math>PG</math> = 熱容量</p>



# Gearbox for Injection Features 射出機特點

# Torque Data Sheet 扭力數據表

## 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到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



## (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

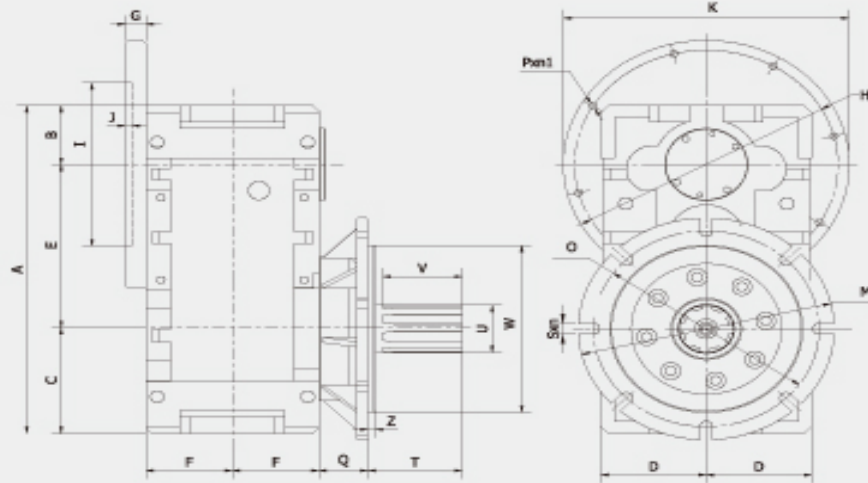
## (三軸) 射出機專用齒輪箱 [Two stage reduction] Gearbox for injection Machine (Table)

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	∅215	∅180	5	∅250	M12 x 4	5HP-4P
132S	24	∅265	∅230	5	∅300	M12 x 4	7.5HP-4P
132M	24	∅265	∅230	5	∅300	M12 x 4	10HP-4P
160M	32	∅300	∅250	6	∅350	M16 x 4	15HP-4P
160L	32	∅300	∅250	6	∅350	M16 x 4	20HP-4P
180MC	32	∅350	∅300	6	∅400	M16 x 4	25HP-4P
180MC	32	∅350	∅300	6	∅400	M16 x 4	30HP-4P
180LC	32	∅350	∅300	6	∅400	M16 x 4	40HP-4P
200LC	32	∅400	∅350	8	∅450	M16 x 8	50HP-4P
200LC	32	∅400	∅350	8	∅450	M16 x 8	60HP-4P
225SC	36	∅500	∅450	8	∅550	M18 x 8	75HP-4P
250SC	36	∅500	∅450	8	∅550	M18 x 8	100HP-4P
250MC	36	∅500	∅450	8	∅550	M18 x 8	125HP-4P
280S	40	∅600	∅550	8	∅660	M20 x 8	150HP-4P
280M	40	∅600	∅550	8	∅660	M20 x 8	175HP-4P
315S	40	∅600	∅550	8	∅660	M20 x 8	200HP-4P
315M	40	∅600	∅550	8	∅660	M20 x 8	250HP-4P

輸出法蘭 Output Flange "OF"

Type	∅M	∅O	S	n	∅W	Q	Z	T	U	V
OF2	∅228	∅204	11	8	∅145	80	8	17	45 x 60 Z=8	50
OF3	∅255	∅225	11	8	∅160	80	10	14	72 x 82 Z=10	85
OF4	∅260	∅232	11	10	∅175	80	10	27	72 x 82 Z=10	85
OF5	∅300	∅266	13	10	∅190	70	10	28	82 x 92 Z=10	97
OF6	∅325	∅290	13	10	∅220	70	10	28	82 x 92 Z=10	97
OF7	∅370	∅330	15	10	∅250	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



## Gearbox for Injection Feature 射出機特點

## Torque Data Sheet 扭力數據表

### 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
- 馬達心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

- 射出機構反應更為靈敏
- 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



### (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 ] 齒輪箱額定期出扭力 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	4.96	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

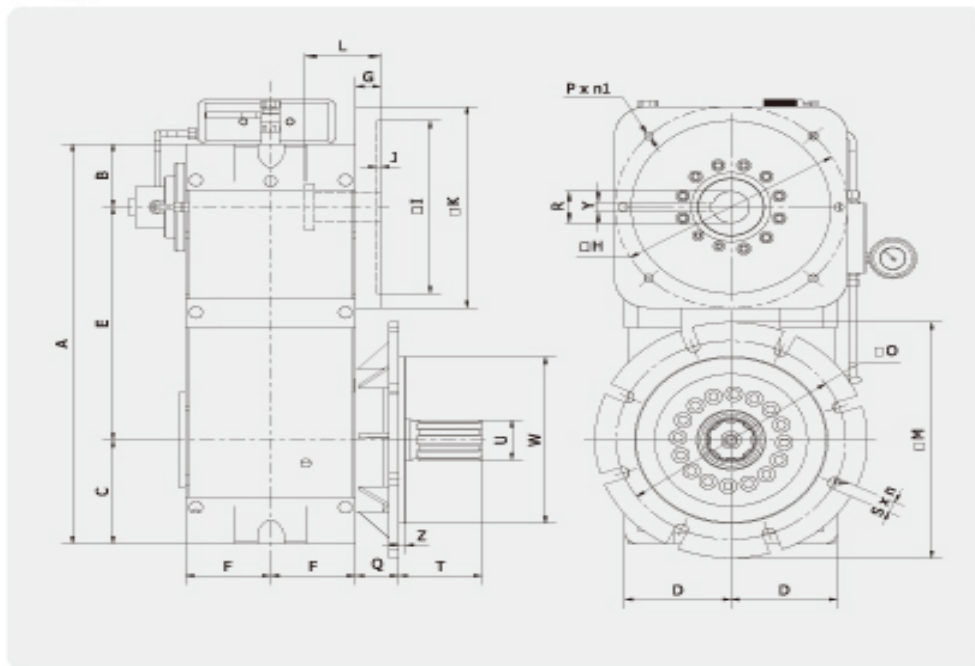
### (四軸) 射出機專用齒輪箱 [Three stage reduction] Gearbox for injection Machine [Table]

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	Q	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	ø266	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	62	150 x 4 x 36
OF13	ø850	ø760	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

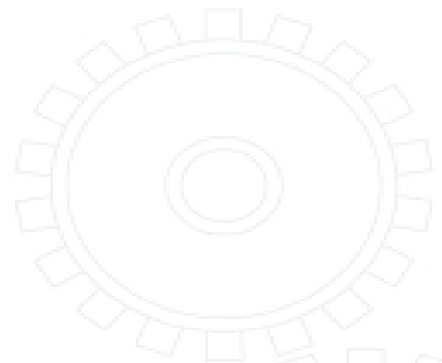
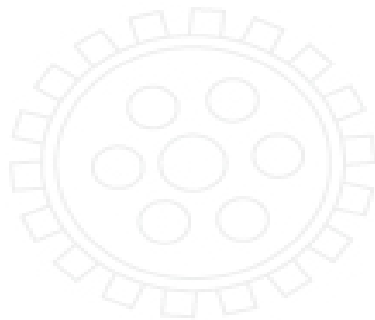
尺寸配合 馬達法蘭 / 輸出法蘭 Possible gearbox mountings Motor flange [ mf ] / output flange [ of ]													
MHP3 / 125	MF2	MF3A	OF3	OF4	OF5	MHP3 / 250	MF6A	MF6B	MF7	OF9	OF10		
MHP3 / 140		MF3A	OF5	OF6		MHP3 / 280		MF6B	MF7	OF10	OF11		
MHP3 / 160		MF3A	MF3B	OF6	OF7	MHP3 / 320		MF6C	MF7	MF8	OF11	OF12	
MHP3 / 180		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, +886-6-24517000



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