



Gearbox for Single-Screw Extruder

單螺桿押出機齒輪箱





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 SINGLE SHAFT 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 of single shaft [required]
Step3	SELECT GEAR UNIT TYPE AND SIZE $T_n > T_{Req}$ Example : $T_{Req} = 9.55 \text{ kNm}$ Gear unit type NEX 200-3S with Nominal Torque $T_{Req} = 11.52 \text{ kNm}$ $T_n \geq T_{Req}$ NEX 200-3S Gear Unit is okay	T_n = Nominal torsion T_{Req} = Torsion of single shaft [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 NEX 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
Step5	CALCULATE THRUST LOAD $F_a = \pi \times \frac{d_s^2 \times P_s}{4 \times 10000} \text{ kN}$ Example : $d_s = 100 \text{ mm}$: $P_s = 200 \text{ Bar}$ $F_a = \pi \times \frac{100^2 \times 200}{4 \times 10000} = 157 \text{ kN}$	d_s = Screw Diameter P_s = Pressure on screw F_a = Thrust Load 1 bar = 14.5 Psi
Step6	CALCULATE NOMINAL THRUST BEARING LIFE TIME $L_{h10} = \frac{10^6}{60 \times n_2} \times \left(\frac{C_{dyn}}{F_a} \right)^{\left(\frac{10}{3} \right)} [\text{hr}]$ Example : $n_2 = 120 \text{ rpm}$: $C_{dyn} = 1400 \text{ kN}$: $F_a = 157 \text{ kN}$ $L_{h10} = \frac{10^6}{60 \times 120} \times \left(\frac{1400}{157} \right)^{\left(\frac{10}{3} \right)} 204218 [\text{hr}]$ NOMINAL THRUST BEARING LIFE TIME $\geq 204218 [\text{hr}]$	L_{h10} = LIFE TIME n_2 = Driven machine speed C_{dyn} = Dyn.Capacity Thrust Bearing F_a = Thrust Load

單螺桿押出機齒輪箱選定方法

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 = 輸入端轉速 n_2 = 輸出端轉速
步驟二	計算單軸的輸出扭力 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 = 輸出端轉速 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 NEX-200-3S , 得知 $T_n = 11.52 \text{ kNm}$, $T_n \geq T_{Req}$ 故 NEX-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 NEX-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
步驟五	計算止推軸承推力負荷 $F_a = \pi \times \frac{d_s^2 \times P_s}{4 \times 10000} \text{ kN}$ 範例 : $d_s = 100 \text{ mm}$: $P_s = 200 \text{ Bar}$ $F_a = \pi \times \frac{100^2 \times 200}{4 \times 10000} = 157 \text{ kN}$	d_s = 螺桿直徑 P_s = 螺桿承受壓力[Bar] F_a = 止推軸承推力負荷 1 bar = 14.5 Psi
步驟六	計算止推軸承的使用壽命時間 $L_{h10} = \frac{10^6}{60 \times n_2} \times \left(\frac{C_{dyn}}{F_a} \right)^{\left(\frac{10}{3} \right)} [\text{hr}]$ 範例 : $n_2 = 120 \text{ rpm}$: $C_{dyn} = 1400 \text{ kN}$: $F_a = 157 \text{ kN}$ $L_{h10} = \frac{10^6}{60 \times 120} \times \left(\frac{1400}{157} \right)^{\left(\frac{10}{3} \right)} 204218 [\text{hr}]$ 止推軸承使用壽命時間 $\geq 204218 [\text{hr}]$	L_{h10} = 壽命 n_2 = 螺桿轉速 C_{dyn} = 止推軸承動態定荷重 F_a = 止推軸承推力負荷



112-3S→400-3S

(三軸) 直驅 / 單螺桿押出機齒輪箱

Single Screw Features 單螺桿特點

SINGLE SCREW EXTRUDER - TWO STAGE

Specification

- Screw dia: Ø ~ 250 mm
- Rated torque: 0 ~ 100,000 Nm

Low noise

- dB ≤ 70

Compact Structure

- Smooth gear-reduction mechanism: Featuring gears that mesh precisely, quiet spiral-gear drive for minimal backlash and high torque output.

(三軸) 直驅 / 單螺桿押出機齒輪箱

規格

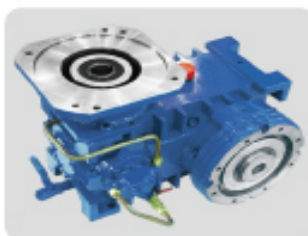
- 螺桿直徑: Ø ~ 250 mm
- 額定輸出扭矩: 0 ~ 100,000 Nm

低噪音

- dB ≤ 70

結構緊湊

- 齒輪箱之減速機構: 採用精確咬合齒輪設計, 具有高度啮合率、運轉平順、低噪音、低背隙、高輸出扭矩等特性。



(Two stage reduction) Gearbox for Single-Screw Extruder

Torque Data Sheet 扭力數據表

(三軸) 直驅 / 單螺桿押出機齒輪箱
(Two stage reduction) Gearbox For Single-Screw Extruder (Table)

型號 Type	減速比 Nominal Ratio [In]						
	8	10	12	16	20	25	30
	(T _n) 齒輪箱額定輸出扭力 Nominal Torsion of driven machine [kN.M]						
NEX-112-3S	2.08	2.08	2.08	1.6	1.6	1.6	1.12
NEX-125-3S	2.64	2.64	2.64	2	2	2	1.44
NEX-140-3S	4.4	4.4	4.4	3.36	3.36	3.36	2.24
NEX-160-3S	6.24	6.24	6.24	4.8	4.8	4.8	3.68
NEX-180-3S	9.76	9.76	9.76	7.44	7.44	7.44	5.2
NEX-200-3S	15.2	15.2	15.2	11.5	11.52	11.52	8
EX-225-3S	23.2	23.2	23.2	17.6	17.6	17.6	12.32
EX-250-3S	30.4	30.4	30.4	23.2	23.2	23.2	16
EX-280-3S	37.6	37.6	37.6	28	28	28	20
EX-320-3S	60.8	60.8	60.8	45.6	45.6	45.6	32
EX-360-3S	85.6	85.6	85.6	64.8	64.8	64.8	45.6
EX-400-3S	126.4	126.4	126.4	96	96	96	67.2

(三軸) 直驅 / 單螺桿押出機齒輪箱
(Two stage reduction) Gearbox For Single-Screw Extruder (Table)

型號 Type	[PG] 熱容量 Thermal Capacity [KW]	止推軸承 型號 Model of Trust Bearing	[Cdyn] 止推軸承 動額定荷重 [kN]	建議採用螺桿直徑 Advise Screw Diameter [mm]	重量 Weight [KG]	潤滑容量 Oil Volume [LITER]
NEX-112-3S	7.5	29413	410	Ø 25- Ø 35	85	3.5
NEX-125-3S	11	29415	525	Ø 35- Ø 45	118	5
NEX-140-3S	19	29417	640	Ø 45- Ø 55	165	7
NEX-160-3S	22	29420	870	Ø 55- Ø 75	210	10
NEX-180-3S	30	29424	1210	Ø 65- Ø 80	325	14
NEX-200-3S	37	29426	1400	Ø 80- Ø 90	490	20
EX-225-3S	56	29430	1663	Ø 90- Ø 100	616	27
EX-250-3S	75	29432	1820	Ø 100- Ø 120	820	36
EX-280-3S	94	29436	1950	Ø 110- Ø 130	1205	49
EX-320-3S	112	29440	2350	Ø 120- Ø 150	1608	64
EX-360-3S	150	29444	2410	Ø 150- Ø 200	2145	80
EX-400-3S	225	29452	2940	Ø 200- Ø 250	2720	108

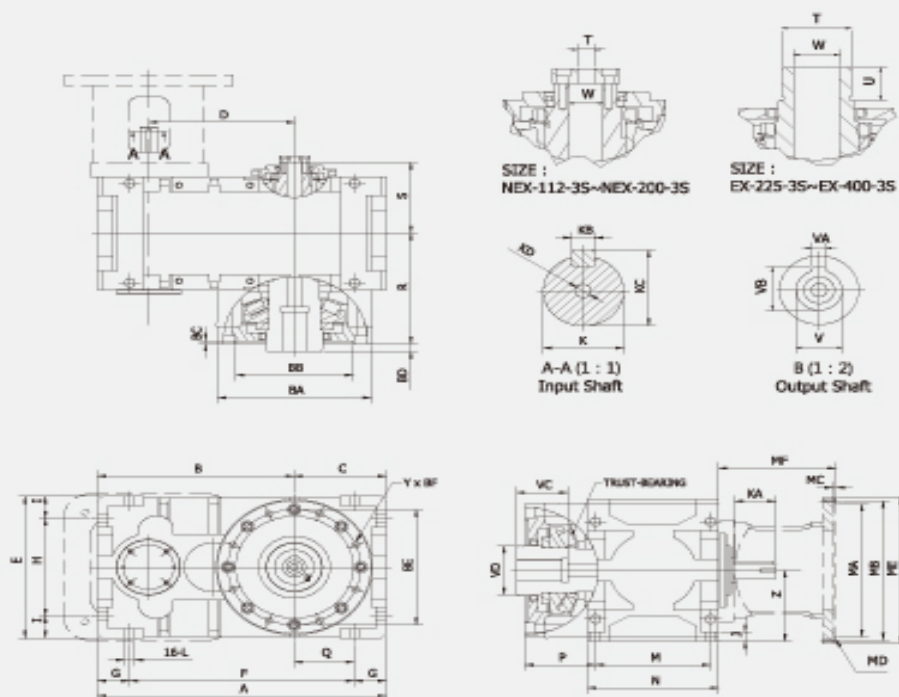


112-3S→400-3S

(三軸) 直驅 / 單螺桿押出機齒輪箱

(Two stage reduction) Gearbox for
Single-Screw Extruder

Overall Dimensions 機台三視圖



Specifications 規格表

Unit : mm

Type	Size	A	B	C	D	E	F	G	H	I	J
NEX-112-3S		407	282	125	202	224	307	50	144	40	18
NEX-125-3S		445	305	140	225	250	345	50	180	45	18
NEX-140-3S		502	342	160	252	280	380	56	184	48	18
NEX-160-3S		585	385	180	285	320	439	83	220	50	21
NEX-180-3S		632	432	200	320	360	492	70	240	60	25
NEX-200-3S		710	485	225	380	400	550	80	280	70	30
EX-225-3S		795	545	250	405	450	615	90	290	80	30
EX-250-3S		890	610	280	450	500	690	100	320	90	30
EX-280-3S		1000	685	315	505	560	776	112	360	100	48
EX-320-3S		1125	770	355	570	640	875	125	416	112	54
EX-360-3S		1265	865	400	640	720	985	140	470	125	55
EX-400-3S		1420	970	450	720	800	1100	160	520	140	60

Type	Size	L (Ø)	M	N	P	Q	R	S	T	U	V (Ø)	Z
NEX-112-3S		Ø 14	172	186	84	76	180	125	M14	0	Ø 18	112
NEX-125-3S		Ø 18	180	204	115	90	205	135	M18	0	Ø 22	125
NEX-140-3S		Ø 18	200	225	115	104	212.5	145	M18	0	Ø 25	140
NEX-160-3S		Ø 20	225	256	137.5	117	250	160	M18	0	Ø 30	160
NEX-180-3S		Ø 22	250	286	150	130	275	190	M20	0	Ø 35	180
NEX-200-3S		Ø 24	280	320	180	145	320	245	M25	50	Ø 45	200
EX-225-3S		Ø 25	315	360	197.5	160	355	270	M25	50	Ø 55	225
EX-250-3S		Ø 30	355	407	227.5	180	405	300	M25	50	Ø 55	250
EX-280-3S		Ø 33	400	460	245	203	445	320	M30	50	Ø 60	280
EX-320-3S		Ø 36	450	520	265	230	490	350	M30	50	Ø 60	320
EX-360-3S		Ø 38	500	580	310	280	550	390	M120	50	Ø 60	360
EX-400-3S		Ø 42	560	650	360	290	640	425	M120	50	Ø 60	400

Type	Size	料管 (客製化) Barrels (customize)						螺桿 (客製化) Screw (customize)					入力端 Input shaft					馬達法蘭 Motor Flange						
		BA (ø)	BB (ø)	BC	BD	BE (ø)	Y	BF	V (ø)	VA	VB	VC	VD (ø)	K (ø)	KA (ø)	KB	KC	KD	MA	MB (ø)	MC	MD	MF	Flange
NEX-112-3S		200	150	6	0	170	8	M12	22	6	25.3	60	70	24	60	8	27	M8	230	265	5	4-M12	186	10HP-4P
NEX-125-3S		230	180	6	8	205	8	M12	28	10	31.3	80	80	28	65	8	31	M8	230	265	5	4-M12	186	7.5HP-6P
NEX-140-3S		260	200	6	8	230	8	M12	35	12	38.3	80	90	32	80	10	35	M8	250	300	6	4-M16	230	15/20HP-4P
NEX-160-3S		300	230	6	17	260	8	M16	45	14	48.8	100	110	35	90	10	38	M10	250	300	6	4-M16	230	10/15HP-6P
NEX-180-3S		350	260	6	17	300	8	M20	50	14	53.8	110	130	40	95	12	43	M10	300	350	6	4-M16	250	30/40HP-4P
NEX-200-3S		380	290	6	18	330	8	M20	60	180	64.3	120	140	45	110	14	48.5	M10	300	350	6	4-M16	250	20/30HP-6P
EX-225-3S		400	310	6	18	350	12	M20	70	20	74.9	140	160	50	120	14	53.5	M12	350	400	6	8-M16	285	50/60HP-4P
EX-250-3S		450	365	8	20	400	12	M24	80	22	85.3	140	170	55	130	16	59	M12	350	400	6	8-M16	285	40/50HP-6P
EX-280-3S		500	400	8	20	450	12	M24	90	25	95.4	140	180	60	150	18	64	M16	450	500	6	8-M16	305	75/100HP-4P
EX-320-3S		600	450	8	20	500	12	M24	100	28	106	140	190	70	170	20	75	M16	450	500	6	8-M16	305	60/75HP-6P
EX-360-3S		680	520	10	24	600	12	M30	110	28	116	180	200	80	190	22	85	M20	-	-	-	-	-	-
EX-400-3S		750	600	10	24	680	12	M33	130	32	137	180	220	90	210	25	95	M20	-	-	-	-	-	-



125-4S→400-4S

(四軸) 直驅 / 單螺桿挤出機齒輪箱

Single Screw Features 單螺桿特點

SINGLE SCREW EXTRUDER - THREE STAGE

Advance 4 Shaft Design

- 4 shafts design requires less motor output, power consumption is lower than those of pulley

Compact Structure

- Allows more work space on your machine table
- Barrel end motor could be on the same direction
- Motor shaft can connect to our gearbox directly

Cost Down

- No Coupling end adapter needed
- No drive pulley and belt needed
- Electricity saving, also save your electrical bill

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 imitating maintaining processes, just change lubricating oil regularly

(四軸) 直驅 / 單螺桿挤出機齒輪箱

齒輪配置為四軸設計

- 四軸設計降低了馬達輸出電流
- 比皮帶輪式省電

結構緊湊

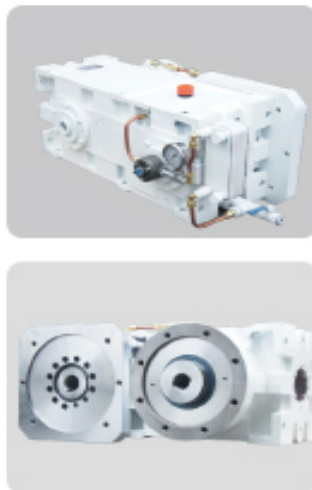
- 節省空間
- 馬達可與料管同側配置
- 馬達心軸能直接連接在我們齒輪箱的中空軸上, 無須額外轉接

降低成本

- 不需聯軸器與馬達座
- 不需皮帶輪與皮帶
- 節省電費

保養簡單, 安裝輕鬆

- 馬達心軸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 Single-Screw Extruder

Torque Data Sheet 扭力數據表

(四軸) 直驅 / 單螺桿挤出機齒輪箱
(Three stage reduction) Gearbox For Single-Screw Extruder (Table)

型號 Type	減速比 Nominal Ratio [In]						
	10	16	20	25	30	40	50
	[Tn] 齒輪箱額定輸出扭力 Nominal Torsion of driven machine [kN.M]						
NEX-125-4S	4.27	4.07	3.88	3.70	3.52	3.36	3.20
NEX-140-4S	6.40	6.08	5.92	5.76	5.60	4.96	4.64
NEX-160-4S	8.64	8.48	8.16	8.00	7.68	7.52	7.04
NEX-180-4S	13.28	12.96	12.64	12.48	12.32	11.84	10.72
NEX-200-4S	20.80	19.68	19.20	18.72	18.40	17.28	16.00
EX-225-4S	30.72	29.60	28.32	27.20	25.92	23.52	22.40
EX-250-4S	40.10	38.40	35.68	34.72	33.60	29.60	26.88
EX-280-4S	56.00	52.00	50.40	48.32	47.20	43.20	40.20
EX-320-4S	92.00	85.60	82.40	79.20	76.05	72.12	65.60
EX-360-4S	110.40	103.20	100.00	96.00	94.40	85.60	81.60
EX-400-4S	160.80	146.40	144.00	140.00	136.10	122.40	111.20

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型號 Type	[PG] 熱容量 Thermal Capacity [KW]	止推軸承 型號 Model of Trust Bearing	[Cdyn] 止推軸承 動額定荷重 [kN]	建議採用螺桿直徑 Advise Screw Diameter [mm]	重量 Weight [KG]	潤滑容量 Oil Volume [LITER]
NEX-125-4S	19	29416	580	Ø 35-Ø 45	122	5.4
NEX-140-4S	22	29418	710	Ø 45-Ø 55	161	7
NEX-160-4S	30	29422	1060	Ø 55-Ø 75	253	9.5
NEX-180-4S	37	29424	1210	Ø 65-Ø 80	334	15
NEX-200-4S	56	29428	1410	Ø 80-Ø 90	485	30
EX-225-4S	75	29430	1663	Ø 90-Ø 100	655	26
EX-250-4S	94	29432	1820	Ø 100-Ø 120	910	48
EX-280-4S	1125	29436	1950	Ø 110-Ø 130	1350	60
EX-320-4S	150	29440	2350	Ø 120-Ø 150	1900	90
EX-360-4S	225	29444	2410	Ø 150-Ø 200	2800	135
EX-400-4S	300	29452	2940	Ø 200-Ø 250	3900	150



125-4S→400-4S

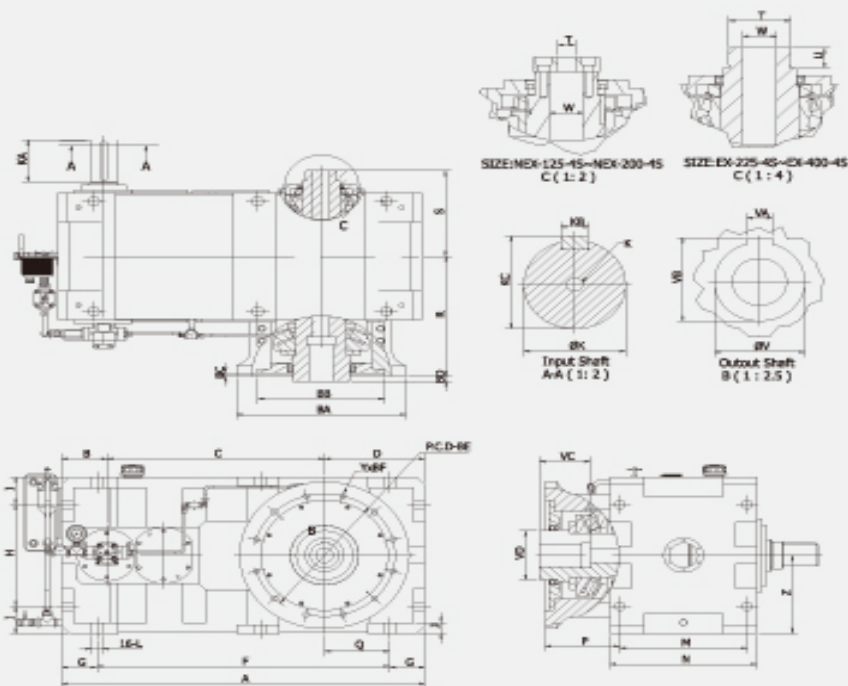
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Specifications 規格表

Overall Dimensions 機台三視圖

Unit : mm



Type	Size	A	B	C	D	E	F	G	H	I	J
NEX-125-4S		525	80	305	140	250	408	50	180	45	17
NEX-140-4S		582	90	342	160	280	459	56.5	184	48	18
NEX-160-4S		665	100	385	180	320	539	63	220	50	21
NEX-180-4S		744	112	432	200	360	604	70	240	60	26
NEX-200-4S		835	125	485	225	400	675	80	260	70	31
EX-225-4S		935	140	545	250	450	755	90	290	80	36
EX-250-4S		1050	160	610	280	500	850	100	320	90	42
EX-280-4S		1180	180	685	315	560	958	112	360	100	48
EX-320-4S		1285	160	770	355	640	1035	125	416	112	45
EX-360-4S		1490	225	855	400	710	1210	140	460	125	55
EX-400-4S		1870	250	970	450	800	1350	160	520	140	60

Type	Size	L (Ø)	M	N	P	Q	R	S	T	U	W(Ø)	Z
NEX-125-4S		Ø 18	180	204	115	90	205	135	M18	50	Ø 22	125
NEX-140-4S		Ø 18	200	226	130	103.5	230	145	M18	56	Ø 25	140
NEX-160-4S		Ø 20	225	256	137.5	117	250	160	M18	63	Ø 30	160
NEX-180-4S		Ø 22	250	286	150	130	275	190	M20	70	Ø 35	180
NEX-200-4S		Ø 24	280	320	160	145	320	245	M85	80	Ø 45	200
EX-225-4S		Ø 27	315	360	197.5	160	355	270	M85	90	Ø 55	225
EX-250-4S		Ø 30	355	407	227.5	180	405	300	M85	100	Ø 55	250
EX-280-4S		Ø 33	400	460	245	203	445	320	M90	112	Ø 60	280
EX-320-4S		Ø 36	450	520	265	230	490	350	M90	125	Ø 60	315
EX-360-4S		Ø 39	500	580	310	260	560	390	M120	140	Ø 80	355
EX-400-4S		Ø 42	560	650	360	290	640	425	M120	160	Ø 80	400

Type	Size	料管 (客製化) Barrels (customize)						螺桿 (客製化) Screw (customize)					入力端 Input shaft				
	BA (Ø)	BB (Ø)	BC	BD	BE (Ø)	Y	BF	V (Ø)	VA	VB	VC	VD (Ø)	K (Ø)	KA (Ø)	KB	KC	X
NEX-125-4S	230	180	5	8	205	8	M12	32	10	31.3	80	80	22	56	8	31	M8
NEX-140-4S	260	200	5	8	230	8	M12	38	10	38.3	80	90	24	63	10	35	M8
NEX-160-4S	300	230	6	17	260	8	M16	42	12	48.8	100	110	28	70	10	38	M10
NEX-180-4S	350	260	6	17	300	8	M20	48	14	53.8	110	130	32	80	12	43	M10
NEX-200-4S	380	290	6	18	330	8	M20	60	18	64.3	120	140	40	90	14	48.5	M10
EX-225-4S	400	310	6	18	350	12	M20	70	20	74.9	140	160	45	100	14	53.5	M12
EX-250-4S	450	365	8	20	400	12	M24	80	22	85.3	140	170	50	112	16	59	M12
EX-280-4S	500	400	8	20	450	12	M24	90	25	95.4	140	180	55	125	18	64	M16
EX-320-4S	600	450	8	20	500	12	M24	100	28	106	140	190	60	140	20	75	M16
EX-360-4S	680	520	10	24	600	12	M30	110	28	116	160	200	70	160	22	85	M20
EX-400-4S	750	600	10	24	680	12	M33	125	32	137	180	220	80	180	25	95	M20



Power Transmission Solution



Design by Polaris 2016-06, 1,000 pcs. +886-6-24617070



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