



CHOSEN | THE BEST MATERIAL
SUPPLY SOURCES !



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CHOSEN Applied Material Co., Ltd

隨著科技產品日新月異，製程不斷更動、創新，各產業皆需要強而有力的供應商來增加自身的競爭優勢。子申應用材料憑藉多年來於晶圓半導體，LED，Touch Panel，光電，太陽能等高科技產業領域之製程專業及製造背景；提供客戶研發單位以及廠務端：各式特殊精密軸承，各式金屬、陶瓷、工程塑膠乃至特殊材料精密加工零組件等製程耗材以及治具。

整合上下游以One-stop一站購足式的專業顧問化的產品服務，達到應用整合之效益，不但省去您寶貴時間，亦能達到極高的成本cost-down需求，提昇您的產業競爭力，無論是常規或特規產品，乃至逆向工程，子申應用材料絕對是您不可或缺的好幫手！

子申應材更於2011年開始投入研發及擴產計畫，開始生產機器人關鍵零組件“諧波式減速機”，與客戶攜手合作測試驗證及導入量產，並持續擴廠計畫，以因應客戶端日益擴大的需求。

Following the advance of technology and innovation, the high tech manufacturing process changes and progress constantly, various industries need the good supplier to support to increase their own competitive advantages.

C.A.M with many years of professional and manufacturing processes in semiconductor, LED, Touch Panel, photovoltaic, and other high-tech industries; Offers a variety of special precision bearings, all kinds of metals, ceramics, engineering plastics and the special materials, precision machining components and parts, as well as the molding manufacture.

One-stop-shopping professional consultant service to achieve the benefits of integration, not only save your time, but also achieve high cost-down demands. C.A.M is definitely your best partner.

In 2011, C.A.M put into research and development plans to begin robot production of key components "Harmonic Reducer", and cooperate with customers to test verification then mass production, and continue to expanding plant, to meet rapidly growing customer demand.



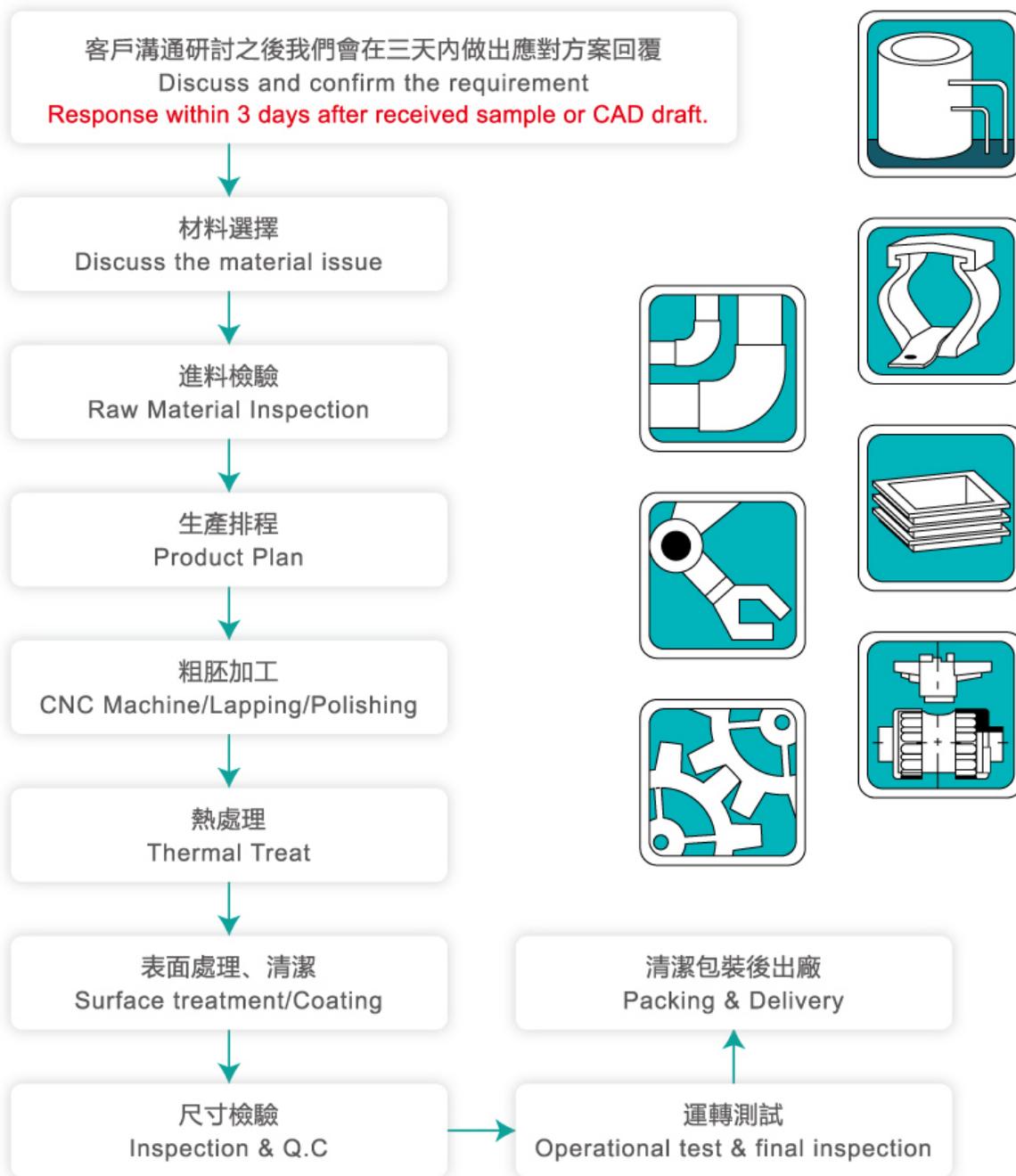
**WORLDWIDE
SUPPLY CHAIN**

製造與品檢 Manufacturing Capacity

「專業」「品質」「服務」「創新」

為子申應用材料的核心精神，也是我們與其他廠商的優勢差異。

The core value: Professional Quality Service Innovation



製造與品檢 Manufacturing Capacity



■ 粗胚件車銑加工
Primary processing of lathing & milling

■ 精密滾齒機
Precision hobbing

■ 精密滾齒機
Precision hobbing



■ 產品設計與改善
Product design and improvement

■ 3D尺寸量測
3D measuring

■ 2D尺寸量測
2D measuring

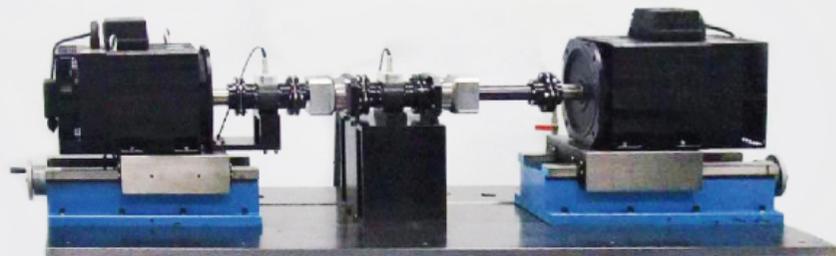


■ 滾齒加工
Hobbing

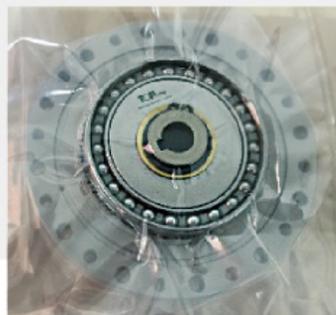
■ 插齒加工
Shaper machining



■ 寸量測
Dimension measuring



■ 運轉精度測試 Operational test & final inspection



■ 清潔包裝出廠 Packing & delivery



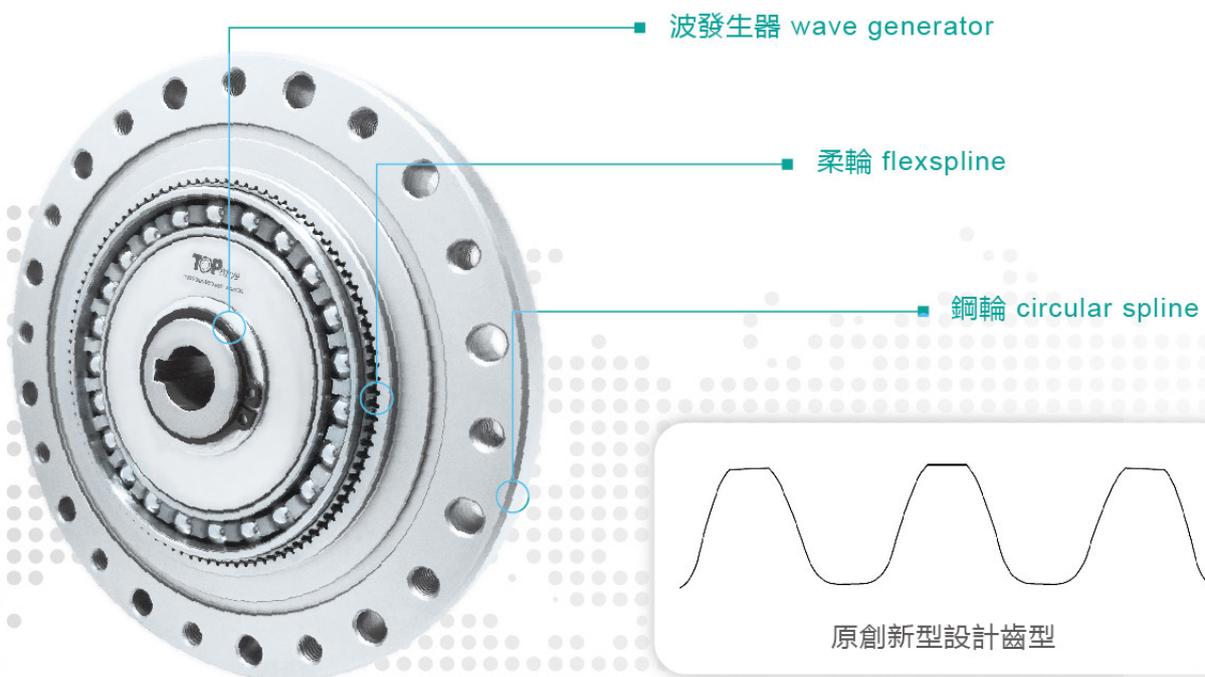
『 Strainwave gearing 』

傳動科技的偉大先驅

The great invention of motion control

諧波齒輪傳動原理是由美國的天才發明家 C.W.Musser 所創造發明，在發表時被稱為這顛覆了傳統的物理常識且應用於金屬撓曲的發明，成為劃時代的動力並影響工業界至今。

我們以該理論基礎構思，開發出更符合市場廣泛應用需求的新型齒，配合敝廠豐富的設計加工經驗及組裝高精密度；以“TOPDRIVE”品牌出發，期盼未來在工業界開創出嶄新的格局，與客戶共榮共存，讓MIT品牌在世界發光。





型號選用 Ordering Information

TSG - 17 - 100 - CS - CM

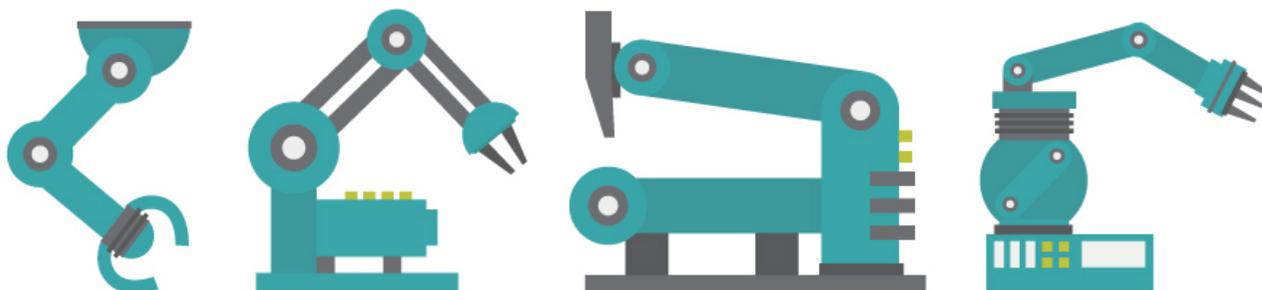
機型 Type	尺寸 Size	減速比 Ratio	組合型式 Gear Head Model	特殊規格 Special Specification
TSG	11.25.50	30.120	CS=Component Set 整機組合型	CM=
TSD	14.32.58	50.160	SU=Simple Unit 簡易式齒輪箱型	Customized Specification
THG	17.40.60	80	CSH=Hollow Shaft 中空型	客戶特製
THD	20.45.65	100	CSJ=Shaft Input 軸輸入型	

注意 以上選型請參照敝司產品實測扭矩及轉速值參考，歡迎洽詢討論。

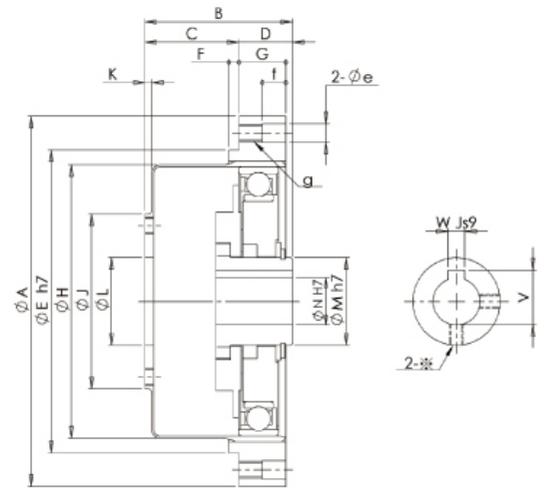
產業應用 Application

應用領域：

- 多軸關節機器手臂 SCARA、Multi-Axis Industrial Robots
- 各式精密加工機 Machinery Tooling Equipment、
- 精密量測儀器、望遠鏡 High Precision Measurement Systems、Telescopes
- 晶圓半導體製造設備 Semiconductor Manufacturing Device
- 人型智能機器人 Humanoid Robots、Android
- 太陽能收集設備 Solar Collector
- 電動機踏車 Electric Scooter/Bike



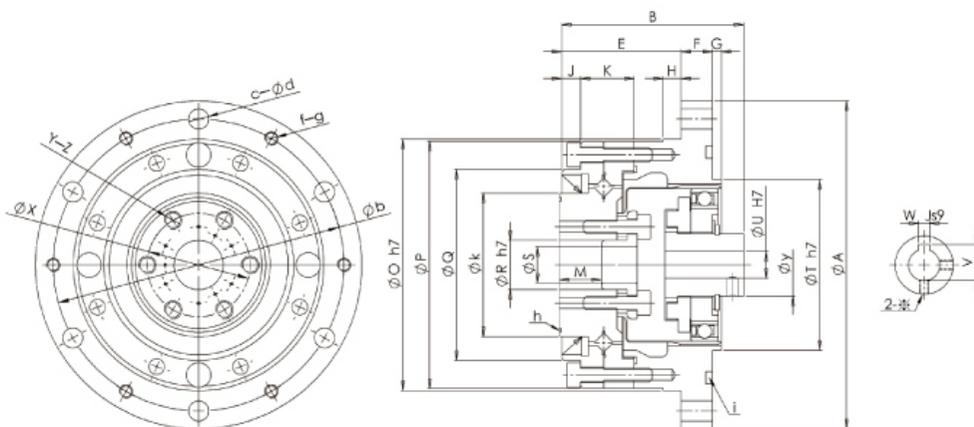
TSG-SU type 簡易式齒輪箱型



TSG-SU 尺寸規格表

型號 記號	14	17	20	25	32	40	45	50	58
ϕA	50	60	70	85	110	135	155	170	195
B	28.5	32.5	33.5	37	44	53	58.5	64	75.5
C	17.5	20	21.5	24	28	34	38	41	48
D	11	12.5	12	13	16	19	20.5	23	27.5
ϕE	38	48	54	67	90	110	124	135	156
F	2	2	3	3	3	4	4	4	5
G	6	9	7.5	10	14	17	19	22	25
ϕH	34.4	43.6	49.8	62.3	81.2	101.6	114.3	127	147.4
ϕJ	23	27	32	40	52	64	72	80	92.8
K	2	2	2.8	2	2	3	3.2	4	5
ϕL	11	10	14	20	26	32	36	40	46
ϕM	14	18	21	26	26	32	32	32	40
ϕN	6	8	9	11	14	14	19	19	22
W	-	-	3	4	5	5	6	6	6
V	-	-	10.4	12.8	16.3	16.3	21.8	21.8	24.8
ϕb	44	54	62	75	100	120	140	150	175
c	6	12	12	12	12	12	12	12	12
ϕd	3.5	3.4	3.5	4.5	5.5	6.6	9	9	11
ϕe	-	-	3.5	4.5	5.5	6.6	9	9	11
f	-	-	3.5	4	7	8	7	9	10
g	M3	M3	M3	M4	M5	M6	M8	M8	M10
ϕh	17	19	24	30	40	50	54	60	70
j	6	6	8	8	8	8	8	80	8
ϕk	4.5	5.5	5.5	6.6	9	11	13.5	15.5	15.5
ϕx	18.5	21.5	27	34	45	56	61	68	79
y	M3	M3	M3	M4	M5	M6	M8	M8	M10
※	M3	M3	-	-	-	-	-	-	-
Weight (kg)	0.1	0.17	0.3	0.43	0.91	1.9	2.4	3.4	4.8

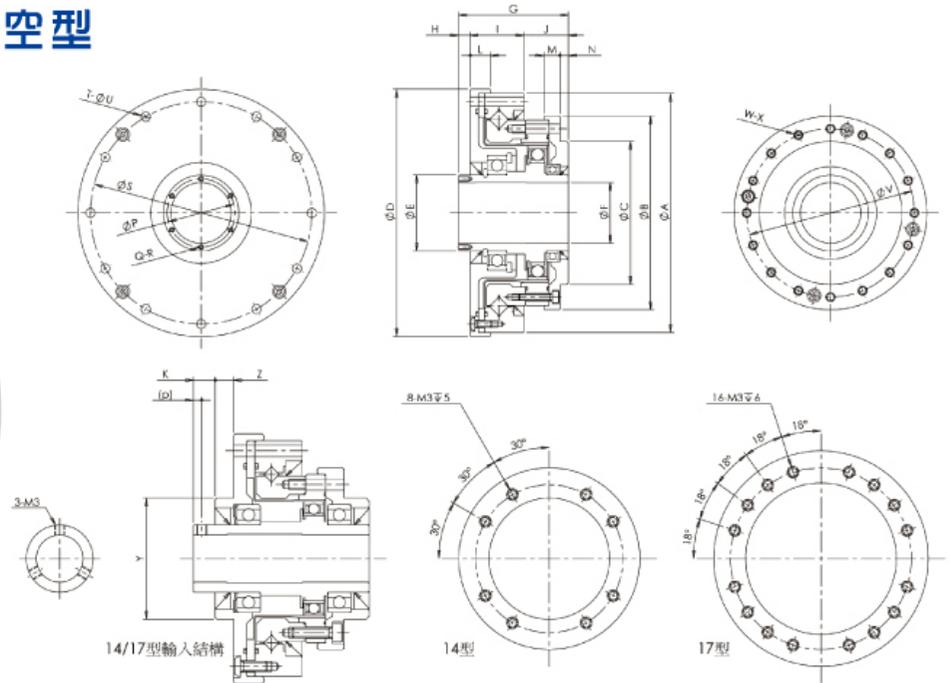
TSG-CS type 整機組合型



TSG-CS 尺寸規格表

型號 記號	14	17	20	25	32	40	45	50	58
ØA	73	79	93	107	138	160	180	190	226
B	41	45	45.5	52	62	72.5	79.5	90	104
E	27	29	28	36	45	50.5	58	69	77
F	7	8	10	10	12	16	16	16	20
G	2	2	3	3	3	4	4	4	5
H	4	4	5	5	5	5	6	6	6
J	4.5	4.5	4	4.5	5.5	7.5	7	8	8.5
K	12	12	12.5	14	17	16.5	20	23	26.5
L	0.5	0.5	0.5	0.5	1	1.5	1	1	1.5
M	9.4	9.5	9	12	15	5	6	8	10
ØO	56	63	72	86	113	127	148	158	186
ØP	55	62	70	85	112	126	147	157	185
ØQ	42.5	49.5	58	73	96	109	127	137	161
ØR	11	10	14	20	26	32	32	40	46
ØS	8	7	10	15	20	24	25	32	38
ØT	38	48	56	67	90	110	124	135	156
ØU	6	8	12	14	14	14	19	19	22
V	-	-	13.8	16.3	16.3	16.3	21.8	21.8	24.8
W	-	-	4	5	5	5	6	6	6
ØX	23	27	32	42	55	68	82	84	100
Y	6	6	8	8	8	8	8	8	8
Z	M4×8	M5×10	M6×9	M8×12	M10×15	M10×15	M12×18	M14×21	M16×24
Øb	65	71	82	9	125	144	164	174	206
c	6	6	6	8	12	8	12	12	12
Ød	4.5	4.5	5.5	5.5	6.5	9	9	9	11
f	6	6	6	8	12	8	12	12	12
g	M4	M4	M5	M5	M6	M8	M8	M8	M10
h	29×0.5	34×1	40×1	52×1	71×1.5	AS568-042	S100	S105	S125
l	S50	S56	S67	S80	S105	S125	S145	S155	S180
Øk	32	38	45	58	78	90	107	112	135
Øy	14	18	21	26	26	32	32	32	40
※	M3	M3	-	-	-	-	-	-	-
Weight (kg)	0.54	0.7	1	1.7	3.5	5.1	7	9	14.5

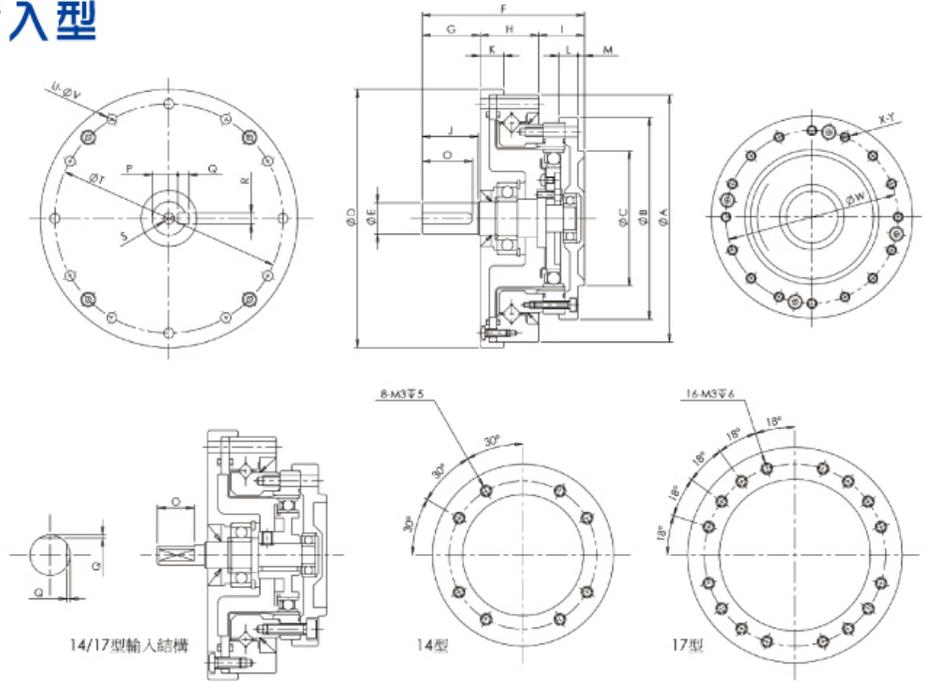
THG-CSH type 中空型



THG-CSH 尺寸規格表

型號 記號	14	17	20	25	32	40	45	50	58
$\varnothing A$	70	80	90	110	142	170	190	214	240
$\varnothing B$	54	64	75	90	115	140	160	175	201
$\varnothing C$	36	45	50	60	85	100	120	130	150
$\varnothing D$	74	84	95	115	147	175	195	220	246
$\varnothing E$	20	25	30	38	45	59	64	74	84
$\varnothing F$	14	19	21	29	36	46	52	60	70
G	52.5	56.5	51.5	55.5	65.5	79	85	93	106
H	12	12	5	6	7	8	8	9	10
I	20.5	23	25	26	32	38	42	45	52
J	20	21.5	21.5	23.5	26.5	33	35	39	44
K	6.5	6.5	-	-	-	-	-	-	-
L	9	10	10.5	10.5	12	14	15	16	17
M	8	8.5	9	8.5	9.5	13	12	12	15
N	7.5	8.5	7	6	5	7	7	7	7
$\varnothing P(p)$	-2.5	-2.5	25.5	33.5	40.5	52	58	67	77
Q	3	3	6	6	6	6	6	6	8
R	M3	M3	M3×6	M3×6	M3×6	M4×8	M4×8	M4×8	M4×8
$\varnothing S$	64	74	84	102	132	158	180	200	226
T	8	12	12	12	12	12	18	12	16
$\varnothing U$	3.5	3.5	3.5	4.5	5.5	6.6	6.6	9	9
$\varnothing V$	44	54	62	77	100	122	140	154	178
W	8	16	16	16	16	16	12	16	12
X	M3×5 $\varnothing 3.5 \times 11.5$	M3×6 $\varnothing 3.5 \times 12$	M3×6 $\varnothing 3.5 \times 13.5$	M4×7 $\varnothing 4.5 \times 15.5$	M5×8 $\varnothing 5.5 \times 20.5$	M6×10 $\varnothing 6.6 \times 25$	M8×10 $\varnothing 9 \times 28$	M8×11 $\varnothing 9 \times 30$	M10×15 $\varnothing 11 \times 35$
$\varnothing Y$	36	45	-	-	-	-	-	-	-
Z	5.5	5.5	-	-	-	-	-	-	-
Weight (kg)	0.72	1.05	1.4	2.3	4.5	7.8	10	14.3	20.2

THG-CSJ type 軸輸入型



THG-CSJ 尺寸規格表

型號 記號	14	17	20	25	32	40	45	50	58
ØA	70	80	90	110	142	170	190	214	240
ØB	54	64	75	90	115	140	160	175	201
ØC	36	45	50	60	85	100	120	130	150
ØD	74	84	95	115	147	175	195	220	246
ØE	6	8	10	14	14	16	19	22	22
F	50.5	56	63.5	72.5	84.5	100	108	121	133
G	15	17	21	26	26	31	31	37	37
H	20.5	23	25	26	32	38	42	45	52
I	15	16	17.5	20.5	26.5	31	35	39	44
J	14	16	20	25	25	30	30	35	35
K	9	10	10.5	10.5	12	14	15	16	17
L	8	8.5	9	8.5	9.5	13	12	12	15
M	2.5	3	3	3	5	5	7	7	7
O	11	12	16.5	22.5	22.5	27.5	28	33	33
P	-	-	8.2	11	11	13	15.5	18.5	18.5
Q	0.5	0.5	3	5	5	5	6	6	6
R	-	-	3	5	5	5	6	6	6
S	-	-	M3×6	M5×10	M5×10	M5×10	M6×12	M6×12	M6×12
ØT	64	74	84	102	132	158	180	200	226
U	8	12	12	12	12	12	18	12	16
ØV	3.5	3.5	3.5	4.5	5.5	6.6	6.6	9	9
ØW	44	54	62	77	100	122	140	154	178
X	8	16	16	16	16	16	12	16	12
Y	M3×5 Ø3.5×11.5	M3×6 Ø3.5×12	M3×6 Ø3.5×13.5	M4×7 Ø4.5×15.5	M5×8 Ø5.5×20.5	M6×10 Ø6.6×25	M8×10 Ø9×28	M8×11 Ø9×30	M10×15 Ø11×35
Weight (kg)	0.68	0.95	1.4	2.12	4.5	7.4	9.9	14	19.5

額定參數表 Rating Table

機型 Type	減速比 Ratio	輸入2000r/min時額定轉矩 Rated Torque at 2000r/min		重複峰值轉矩 Repeated Peak Torque		瞬間容許最大轉矩 Allowable Maximum Momentary Torque		容許最高輸入轉速 r/min		容許平均輸入轉速 r/min		轉動慣量 (1/4GD ²) ×10-4kgm ²	齒隙 Hysteresis (arc-min)
		Nm	in-lb	Nm	in-lb	Nm	in-lb	潤滑油	潤滑脂	潤滑油	潤滑脂		
14	30	4.1	0.4	7	0.7	17.6	1.7	14000	8500	6500	3500	0.030	< 1
	50	5.6	0.6	7.1	0.7	36.2	3.7						
	80	8.1	0.8	11.4	1.1	48.6	4.9						
	100	8.1	0.8	11.4	1.1	55.9	5.8						
17	30	9.1	0.9	12.4	1.2	31.1	3.2	10000	7300	6500	3500	0.071	< 1
	50	16.6	1.6	26.9	2.7	72.5	7.4						
	80	22.8	2.3	27.9	2.8	90	9.2						
	100	24.8	2.5	40.4	4.1	111.8	11.4						
	120	24.8	2.5	40.4	4.1	89	9.1						
20	30	15.5	1.6	20.7	2.1	51.8	5.3	10000	6500	6500	3500	0.174	< 1
	50	25.9	2.6	35.2	3.7	101.4	10.4						
	80	35.2	3.7	48.6	4.9	131.4	13.5						
	100	41.4	4.3	50.7	5.2	152.1	15.5						
	120	41.4	4.3	50.7	5.2	152.1	15.5						
	160	41.4	4.3	50.7	5.2	152.1	15.5						
25	30	27.9	2.9	39.3	4	98.3	10	7500	5600	5600	3500	0.372	< 1
	50	40.4	4.1	56.9	5.8	192.5	19.7						
	80	65.2	6.7	90	9.2	263.9	26.9						
	100	69.3	7	111.8	11.4	293.9	30						
	120	69.3	7	111.8	11.4	314.6	32.1						
	160	69.3	7	111.8	11.4	325	33.1						
32	30	55.9	5.8	77.6	7.9	207	20.7	7500	4800	4600	3500	1.52	< 1
	50	78.7	8.1	111.8	11.4	395.4	40.4						
	80	122.1	12.4	172.8	17.6	587.9	60						
	100	141.8	14.5	223.6	22.8	669.6	68.3						
	120	141.8	14.5	223.6	22.8	710	72.5						
	160	141.8	14.5	223.6	22.8	710	72.5						
40	50	141.8	14.5	202.9	20.7	710	72.5	5600	4000	3600	3000	4.05	< 1
	80	213.2	21.7	293.9	30	1014.3	103.5						
	100	274.3	27.9	385	39.3	1117.8	113.9						
	120	304.3	31.1	466.8	47.6	1221.3	124.2						
	160	304.3	31.1	466.8	47.6	1221.3	124.2						
45	50	182.2	18.6	274.3	27.9	983.3	100.4	5000	3800	3300	3000	7.81	< 1
	80	324	33.1	403.7	41.4	1314.5	134.6						
	100	365.4	37.3	517.5	52.8	1625	165.6						
	120	416.1	42.4	641.7	65.2	1821.6	186.3						
	160	416.1	42.4	652.1	66.2	1976.9	201.8						
50	50	253.6	25.9	362.3	37.3	1480.1	151.1	4500	3500	3000	2500	11.3	< 1
	80	385	39.3	537.2	54.9	1925.1	196.7						
	100	486.5	49.7	689.3	70.4	2132.1	217.4						
	120	547.5	55.9	841.5	85.9	2132.1	217.4						
	160	547.5	55.9	872.5	89	2535.8	258.8						
58	50	365.4	37.3	538.2	54.9	2028.6	207	4000	3000	2700	2200	24.6	< 1
	80	568.2	58	797	81.8	2535.8	258.8						
	100	720.4	73.5	1097.1	111.8	3291.3	337						
	120	771.1	78.7	1231.7	125.2	3446.6	351.9						
	160	771.1	78.7	1252.4	127.3	3550.1	362.3						

型號選定流程 Checking procedure



關於潤滑脂 On lubricant

本公司TOP-1潤滑脂潤滑，極佳耐久耐磨耗特性，潤滑部位使用溫度 - 10°C ~ + 60°C



組合型產品的標準潤滑方法為潤滑脂潤滑，出廠前均已添加潤滑脂，組裝時無需再注入、塗抹潤滑脂。簡易型出廠時未封入潤滑脂，於組裝時須另行添加。

Grease lubricant is standard for lubricating the component type. You do not need to apply grease during assembly as the product is lubricated and shipped.



請避免與其他種類潤滑脂混和使用。

Avoid using TOP-1 with other grease.



組合型產品的標準潤滑方法為潤滑脂潤滑，出廠前均已添加潤滑脂，組裝時無需再注入、塗抹潤滑脂。簡易型出廠時未封入潤滑脂，於組裝時須另行添加。

Grease lubricant is standard for lubricating the component type. You do not need to apply grease during assembly as the product is lubricated and shipped.



通過實施下述項目以提升潤滑壽命。

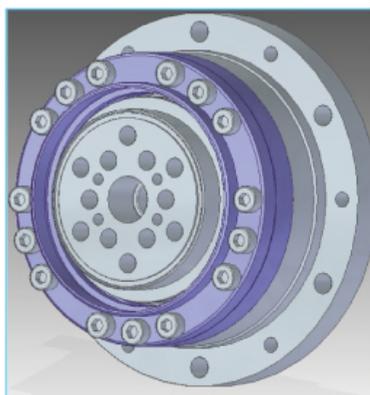
Please carry out the following operations to increase lubricant lifespan.

- ① 在運轉初期時向各接觸部位確實塗抹潤滑脂
Apply grease on contacting parts during initial running stage.
- ② 徹底清除各接觸部位密封階段產生的初期磨耗粉塵雜屑。
Remove the initial abrasion powder from contacting parts during sealing stage.
- ③ 為各接觸部位補充塗抹潤滑脂。
Reapply grease on contacting parts.

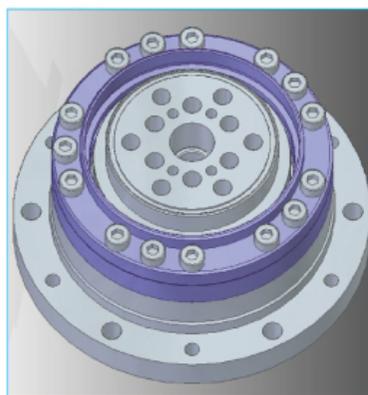
潤滑脂注入量 Grease Usage

型號 Type	14	17	20	25	32	40	45	50	58
水平使用	5.5	10	16	30	60	110	170	220	360
垂直使用	輸出軸向上	7	12	18	35	70	125	240	380
	輸出軸向下	8.5	14	21	40	80	145	275	460

單位(g)



■ 水平使用
Horizontal usage



■ 輸出軸向上
Vertical usage



■ 輸出軸向下
Vertical usage

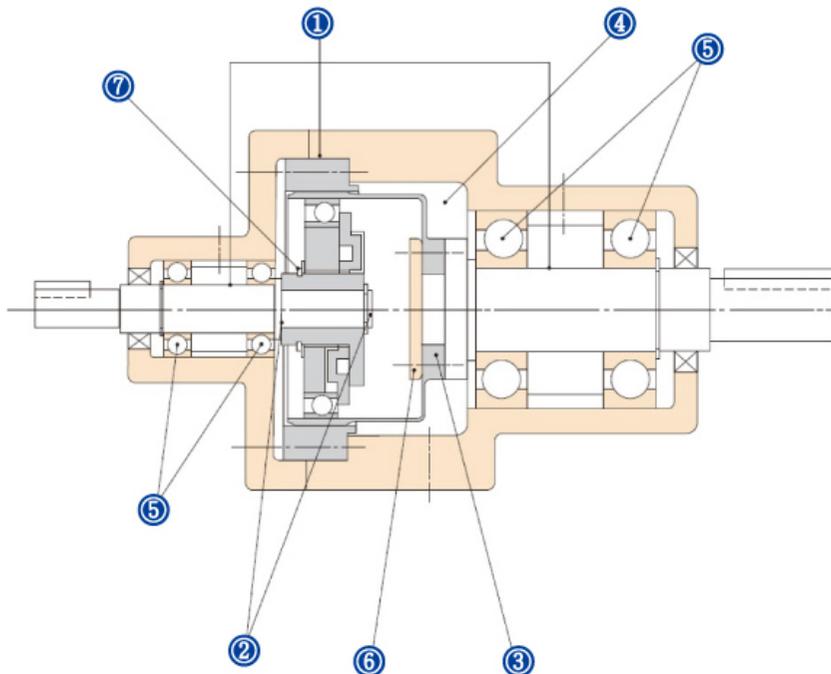


組裝注意事項

Notice

組裝前 Before assembly

- ① 請將輸入軸、鋼輪、輸出軸及殼體設為同心。(建議在 $\pm 0.01 \sim 0.015\text{mm}$ 之間)
The input shaft, circular spline, output shaft and the case shall be concentric.
- ② 波發生器會產生軸向力。輸入軸請設計成能夠支撐此力的結構。
As thrust force is generated to a small degree on the wave generator, movement in the shaft direction should be stopped.
- ③ 由於諧波減速機體積小又能傳遞較大轉矩。請注意對於連接柔輪和輸出軸的螺栓部分採用相對應的扭緊轉矩進行鎖固。
Even though harmonic drive reducer is compact and small, it transmits a large torque. Therefore, join the flexspline and the output shaft with a bolt and compatible tightening torque.
- ④ 由於柔輪會發生彈性形變。因此殼體內壁的尺寸請依照推薦尺寸設計。
The flexspline is subject to elastic distortion, recommended size should be applied to the inner wall of the case.
- ⑤ 輸入軸和輸出軸必須採用匹配的軸承並留有間隔做2點支撐點。且可承受軸上作動的所有徑向負載以及軸向負載的結構。請不要向波發生器和柔輪施加多餘的力。
The input shaft and the output shaft should be supported with two points with appropriate bearing space. It should be structured to bear all radial loads and thrust loads so that no extra force is applied to the wave generator and the flexspline.
- ⑥ 請確保柔輪的安裝用法蘭。直徑不會超出柔輪的輪轂孔直徑。並在與膜片連接的法蘭部上加工倒圓角。
尺寸請按照推薦尺寸設計。
The mounting flange diameter of the flexspline shall not exceed the boss diameter of the flexspline. Milling "R" chamfer on the flange that is in contact with the diaphragm. Please follow recommended size for parts.
- ⑦ 我們使用C型卡環固定波發生器輪轂。請確保卡環的鈎部不會與殼體接觸。
The C-type retaining ring is used to hold the hub of the wave generator. The hook of the retaining ring shall not interfere with the case.



組裝方式錯誤。TOP drive在運轉時可能會發生振動過大、噪音等問題。請務必遵守下述組裝 注意事項組裝。
TOP drive may generate vibration and abnormal sound due to problems during assembly. Please following the below information.

組裝注意事項 Notice

組裝時 While assembly



【波發生器注意事項】 The wave generator

- ① 請在組裝時避免向波發生器軸承部位施加過度的力，確保波發生器能旋轉順暢地實施插入。
Avoid such assembly where excessive force is applied to the wave generator bearing.
You can smoothly insert the wave generator by turning it.
- ② 請特別注意把中心偏移量的影響控制在 $\pm 0.01\text{mm}$ 內。
Pay attention to that the effect of misalignment and turnover is within $\pm 0.01\text{mm}$ for the wave.

【鋼輪注意事項】 The circular spline

- ① 確認安裝面的平面度保持良好，勿歪斜。
Is flatness of the mounting surface good?
- ② 確認螺釘孔位是否有隆起、毛邊或其他雜質異物侵入。
Is any embossment of the screw hole area, burr or trapped foreign matter found?
- ③ 確認是否對殼體組裝部都實施了倒角加工以及避讓加工，以避免與鋼輪產生互相干涉。
Have chamfering and relief working of the corner to prevent interference of the corner of the circular spline in the house built-in area?
- ④ 當鋼輪組裝至殼體後，確認其是否能夠旋轉，是否有些部位存在干涉，緊迫感。
Can the circular spline rotate smoothly built in the house? Does it interfere with or catch on any part?
- ⑤ 插入螺栓時，確認螺孔位置是否正確、是否由於螺孔歪斜加工等原因導致螺栓與鋼輪發生接觸，使螺栓旋轉變沉重難鎖固。
Does any bolt inserted into the mounting bolt hole interfere with the circular spline and rotate irregularly due to the bolt hole being misaligned or oblique?
- ⑥ 請不要一次性按照規定轉矩擰緊螺栓。請先使用約為設計轉矩1/2的力實施暫時緊固，然後再按照設計規範轉矩緊固。然後，請按照對角線順序依次鎖緊所有螺栓。
Do not tighten the bolts with the specified torque all at once. Tighten the bolts temporarily with about half the specified torque, and then tighten them with the specified torque. Tighten them in an even, crisscross pattern.
- ⑦ 請盡可能避免向鋼輪打銷子而造成旋轉精度降低。
Avoid pinning the circular spline if possible as it may reduce the rotational precision.

【柔輪注意事項】 Precautions on the flexspline

- ① 確認安裝面的平面度保持良好，勿歪斜。
Is flatness of the mounting surface good?
- ② 確認螺釘孔位是否有隆起、毛邊或其他雜質異物侵入。
Is any embossment of the screw hole area, burr or trapped foreign matter found?
- ③ 確認是否對殼體組裝部都實施了倒角加工以及避讓加工，以避免與柔輪產生互相干涉。
Have chamfering and relief working of the corner to prevent interference of the corner of the flexspline in the house built-in area?
- ④ 插入螺栓時，確認螺孔位置是否正確、是否由於螺孔歪斜加工等原因導致螺栓與鋼輪發生接觸，使螺栓旋轉變沉重難鎖固。
Does any bolt inserted into the mounting bolt hole interfere with the circular spline and rotate irregularly due to the bolt hole being misaligned or oblique?
- ⑤ 請不要一次性按照規定轉矩擰緊螺栓。請先使用約為設計轉矩1/2的力實施暫時緊固，然後再按照設計規範轉矩緊固。然後，請按照對角線順序依次鎖緊所有螺栓。
Do not tighten the bolts with the specified torque all at once. Tighten the bolts temporarily with about half the specified torque, and then tighten them with the specified torque.
Tighten them in an even, crisscross pattern.
- ⑥ 確認與鋼輪組合時，是否存在極大的單邊嚙合。
若發生單邊嚙合時，可能是由於兩個部件發生中心偏移或歪斜。
Does it engage with the circular spline in an extremely unbalanced way when it is combined?
If it is unbalanced, they could be misaligned or not upright.
- ⑦ 柔輪組裝時，請不要敲擊開口部的齒輪前端或以過度力度實施按壓。
Avoid hitting the tip of the flexspline teeth on the opening and inserting the flexspline with excessive force in assembling it



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組裝注意事項 Notice

組裝時 While assembly



【柔輪螺栓安裝】 Flexspline Bolts

- ① 母螺絲的材質，以能夠承受螺栓鎖緊扭力為前提。
Female screw material, in order to be able to withstand the locking bolt torque as a precondition.
- ② 建議使用螺栓 螺栓名：JIS B 1176內六角螺栓 強度區分：JIS B 1051 12.9以上
Recommends using Studs name: within JIS B 1176 strength hex bolts distinction: JIS B 1051 12.9 above

機型 Type		14	17	20	25	32	40	45	50	58
項目 project										
螺栓數量 amount		6	6	8	8	8	8	8	8	8
螺栓尺寸 size		M4	M5	M5	M6	M8	M10	M12	M14	M14
組裝 P.C.D	mm	17	19	24	30	40	50	54	60	70
鎖緊扭矩 Clamp torque	Nm	5.4	10.8	10.8	18.4	44.4	88.8	154	246	246
	Kgfm	0.55	1.10	1.10	1.87	4.53	9.06	15.7	25.1	25.1
傳達扭矩 Torque transmission capacity	Nm	43	77	130	230	555	1110	1728	2636	3075
	Kgfm	4.4	8	13	23	57	113	176	269	314



【鋼輪螺栓安裝】 Circular spline Screws, Bolts and Optional Dowel Pins

- ① 母螺絲的材質，以能夠承受螺栓鎖緊扭力為前提。
Female screw material, in order to be able to withstand the locking bolt torque as a precondition.
- ② 建議使用螺栓 螺栓名：JIS B 1176內六角螺栓 強度區分：JIS B 1051 12.9以上
Recommends using Studs name: within JIS B 1176 strength hex bolts distinction: JIS B 1051 12.9 above

機型 Type		14	17	20	25	32	40	45	50	58
項目 project										
螺栓數量 amount		6	12	12	12	12	12	12	12	12
螺栓尺寸 size		M3	M3	M3	M4	M5	M6	M8	M8	M10
組裝 P.C.D	mm	44	54	62	75	100	120	140	150	175
鎖緊扭矩 Clamp torque	Nm	2.0	2.0	2.0	4.5	9.0	15.3	37	37	74
	Kgfm	0.2	0.2	0.2	0.46	0.92	1.56	3.8	3.8	7.5
傳達扭矩 Torque transmission capacity	Nm	54	131	147	314	676	1150	2440	2620	4820
	Kgfm	5.5	13	15	32	69	117	249	267	492



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