

TTRD-C 系列 TTRD-C SERIES

中空機身，直結輸出，為機器人第一軸設計
HOLLOW BODY DESIGN, DIRECT OUTPUT
DESIGNED FOR BASE OF ROBOT



Overview

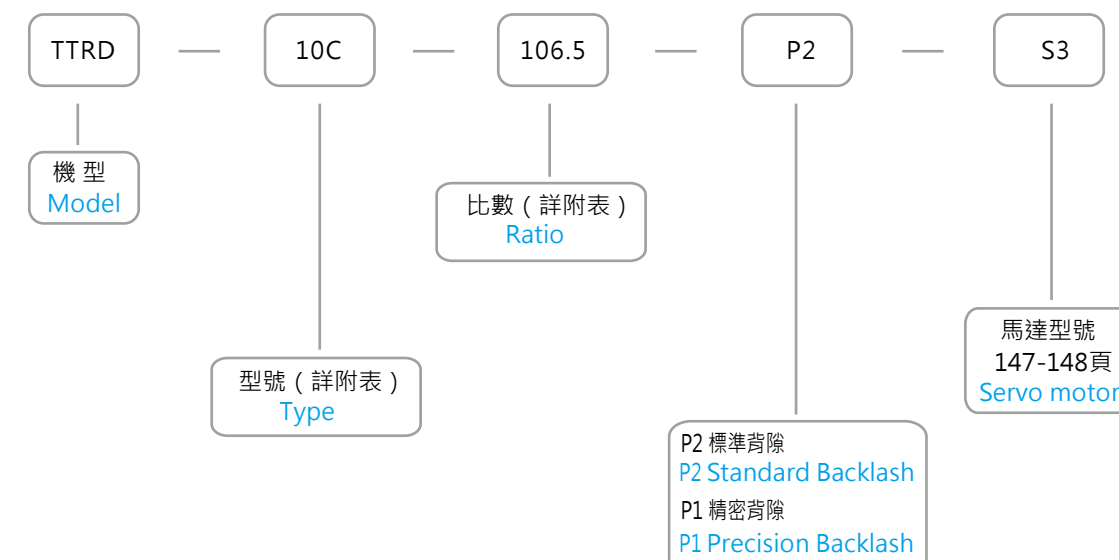
- Type : TTRD-10C ~ TTRD-500C
- Backlash : $\leq 1-5$ Arc.min
- Ratio : 1/64.38 ~ 1/219
- Capacity : 0.2KW ~ 15KW
- Rotation : Shaft Run
- Rated output torque : 98NM ~ 4900NM

- 型 式 : TTRD-10C ~ TTRD-500C
- 背 隙 : $\leq 1-5$ 弧分
- 減速比 : 1/64.38 ~ 1/219
- 容 量 : 0.2KW ~ 15KW
- 轉動方式 : 軸轉動
- 額定輸出扭矩 : 98NM ~ 4900NM

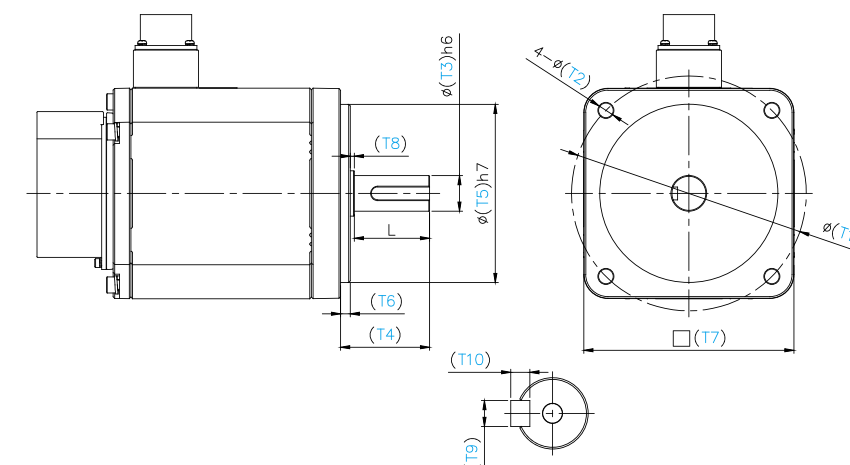
TTRD-C 訂購說明 TTRD-C ORDERING INSTRUCTIONS

● 機型代碼 ORDERING CODE EXAMPLE :

(型號和比數請參考後面附表 For the type and ratio, please refer to technical specifications table.)



● 訂購時請提供電機尺寸 Please provide the motor dimension below when ordering



馬達廠牌 Motor Brand :					
馬達型號 Motor Model :					
T1	T2	T3	T4	T5	T6
螺絲孔中心距 P.C.D	螺絲孔直徑 Bolt Hole Diameter	馬達軸外徑 Motor Shaft Diameter	馬達軸長度 Motor shaft length	馬達凸緣外徑 Motor Pilot Diameter	馬達緣高度 Motor Pilot Height
T7	L	T8	T9	T10	
馬達面尺寸 Motor Outline Dimension	馬達軸有效長 Motor Shaft Length	非安川免填 Diameter required when using YASKAWA made motor	鍵 寬 Key Width	鍵 高 Key Thickness	

TTRD-C 性能表 TTRD-C TECHNICAL SPECIFICATION TABLE

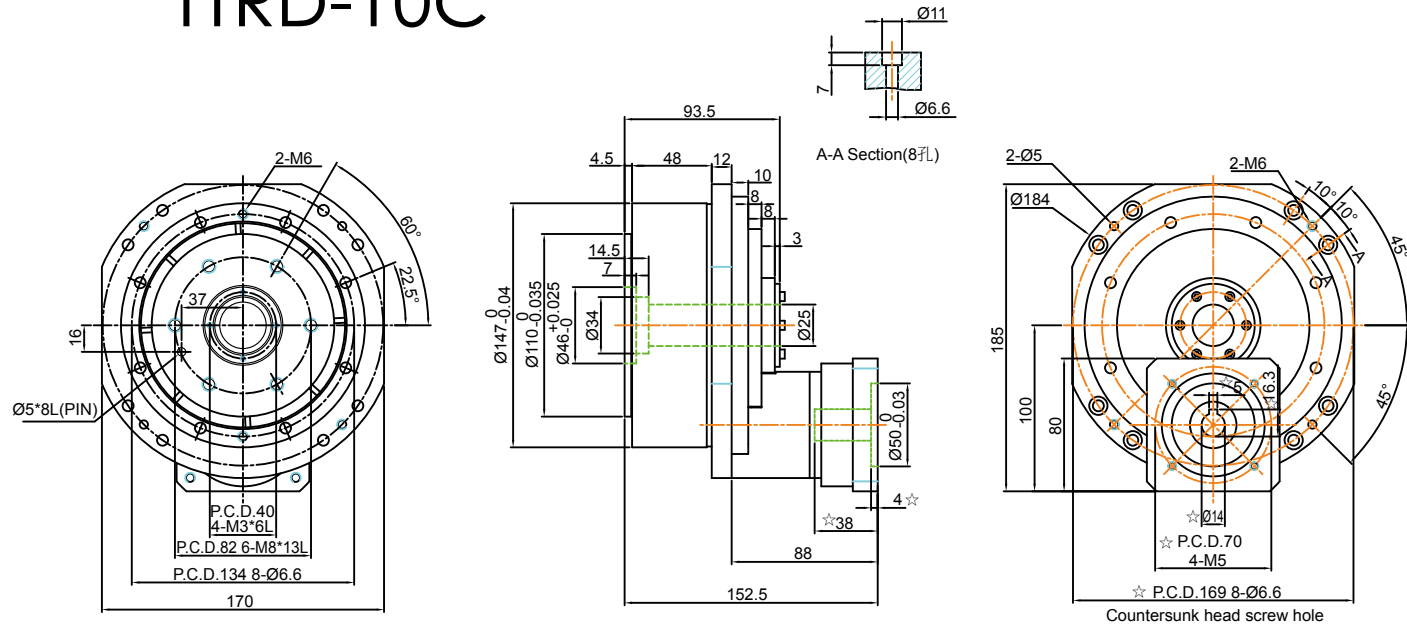
TTRD-C Technical Specification Table						TTRD-C Technical Specification Table					
		TTRD-10C	TTRD-30C	TTRD-50C		TTRD-105C		TTRD-200C	TTRD-320C	TTRD-500C	TTRD-700C
Rotation 轉動方式		Shaft Run 軸轉動	Shaft Run 軸轉動	Shaft Run 軸轉動			Shaft Run 軸轉動	Shaft Run 軸轉動	Shaft Run 軸轉動	Shaft Run 軸轉動	-
Ratio 減速比		106.5	64.38	78.4			97.6777	71.9924	94.5	111	-
		154	84.18	102.4			110.5677	92.2932	109.5	130.8	
		131.5	103.98	126.4			136.3478	105.827	123	147	
		-	121.8	148			187.9079	137.9699	153	183	
		-	161.4	196			211.1099	171.8045	213	219	
Rated Output Torque 額定輸出扭矩	Nm kgf-m	98 (10)	295 (30)	490 (50)			1030 (105)	1960 (200)	3136 (325)	4900 (500)	-
Acceleration & Braking Torque 加速和制動扭矩	Nm kgf-m	245 (25)	737 (75)	1225 (125)			2575 (262)	4900 (500)	7840 (800)	12250 (1250)	-
Instantaneous Max. Allowable Torque 瞬時最大容許轉矩	Nm kgf-m	490 (50)	1475 (150)	2450 (250)			5150 (525)	9800 (1000)	15680 (1600)	24500 (2500)	-
Rated Input Speed 額定輸入轉速	Nr (rpm)	2000	2000	1500			1500	1500	1500	1500	-
Ratrd Output Speed 額定輸出轉速	Nr (rpm)	15	15	15			15	15	15	15	-
Rated Lifetime 額定壽命	Hr	6000	6000	6000			6000	6000	6000	6000	-
Maximum Allowable Output Speed(Intermittent) 容許最高輸出轉速（間歇）		Nmax (rpm)	28	47	38		26	28	21	18	-
			19	36	29		23	22	18	14	
			-	29	24		18	19	16	11	
			-	-	-		13	14	13	9	
Allowable Output Speed (Continuous) 容許輸出轉速（連續）		Min (rpm)	19	31	26		15	21	16	14	-
			13	24	20		14	16	14	10	
			-	19	16		11	14	12	8	
			-	-	-		8	11	10	7	
Tilting Stiffness 傾斜鋼度	Nm(arc.min) kgf-m(arc.min)	421 (43)	1068 (109)	1960 (200)			2813 (287)	9800 (1000)	12740 (1300)	24500 (2500)	-
Torsional Stiffness 扭轉鋼度	Nm(arc.min) kgf-m(arc.min)	47 (4.8)	147 (15)	255 (26)			510 (52)	980 (100)	1960 (200)	3430 (350)	-
Max.Lost Motion 最大無效行程	(arc.min)	<2.0	<2.0	<1.0			<1.0	<1.0	<1.0	<1.0	-
Angular Transmission Error 扭轉傳輸中角度偏移量	ATE (arc.sec)	50	50	50			50	50	50	50	-
Backlash 背隙	Standard Backlash 標準背隙	arcmin	<5.0	<4.0	<3.0		<3.0	<3.0	<3.0	<3.0	-
	Precision Backlash 精密背隙		<3.0	<2.0	<1.0		<1.0	<1.0	<1.0	<1.0	-
Maximum Tilting Moment 最大傾斜力矩	Nm kgf-m	1372 (140)	1960 (200)	3528 (360)			4900 (500)	17640 (1800)	39200 (4000)	78400 (8000)	-
Rated Radial Force 額定徑向力	Nm	686	980	1764			2450	8820	20580	34300	-
Max.Axial Force 最大軸向推力	N	5880	8820	11760			13720	19600	29400	39200	-
Start Efficiency 啓動效率	%	65	70	70			80	80	80	80	-
Weight 重量	KG	10.7	20	34			46	100	176	-	-

PS:需要上述速比之外的減速比時，請洽詢本公司，電機轉速超出額定輸入轉速時，運轉噪音將會提高，請注意
減速機容許負載使用表面溫度需低於70℃。
Please contact us for other ratio selections.Please be noted that the noise will be increased when the
input speed (RPM:revolution per minute)of motor is higher than rated input speed; the operating
temperature and motor service temperature should be under 70℃.



■ TTRD-C 尺寸圖 DRAWING & DIMENSION

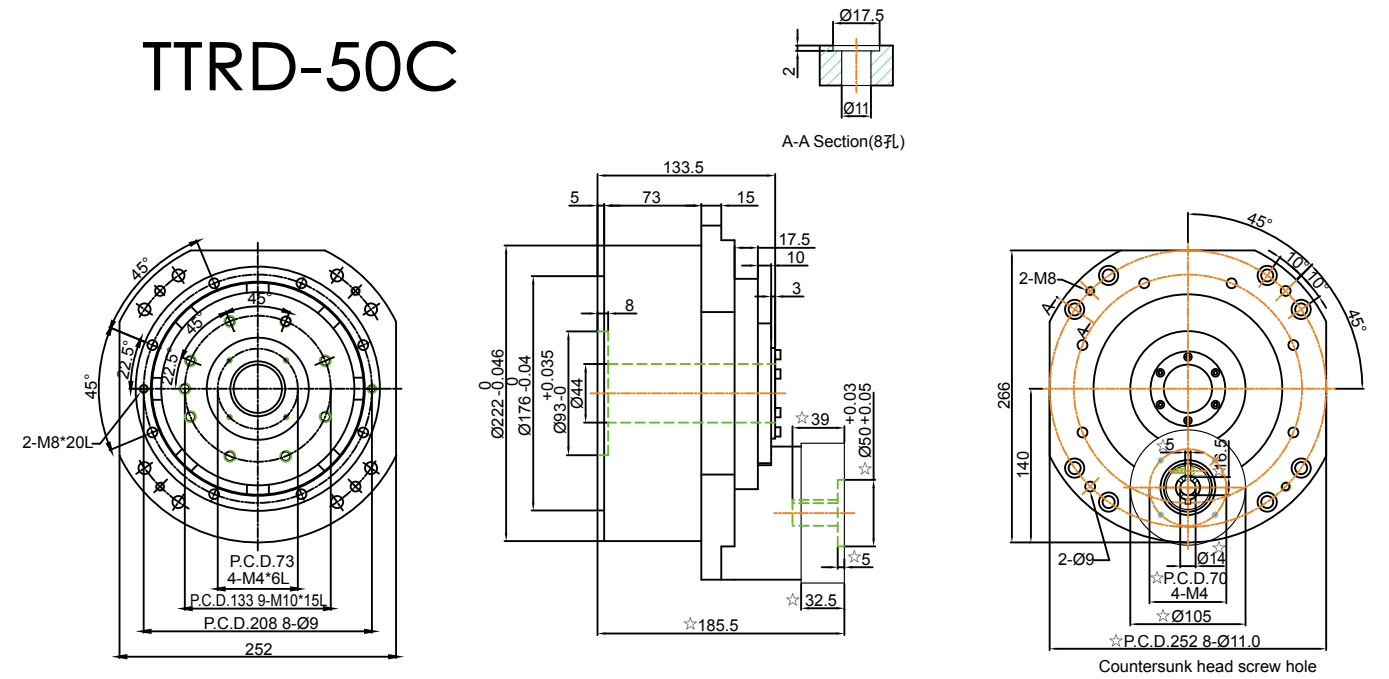
TTRD-10C



1. ☆ 會隨伺服馬達不同有所變更
- 2.此圖為輸出法蘭轉動（軸轉動）

1. The dimensions are changed by motor specification.
2. The drawing is for output flange rotation (shaft run)

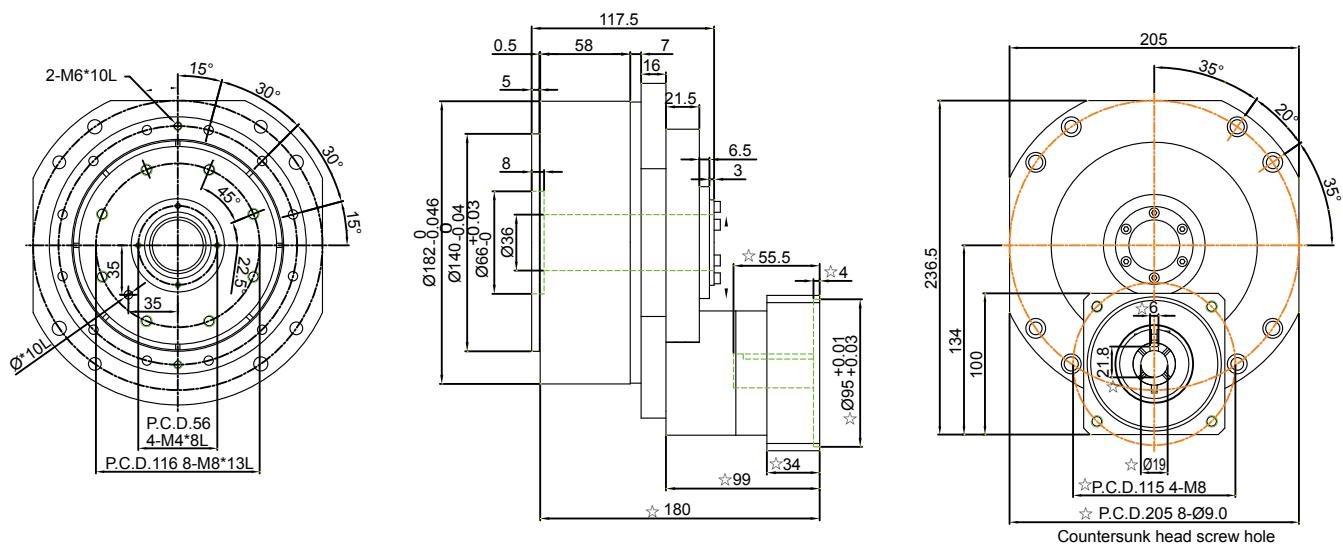
TTRD-50C



1. ☆ 會隨伺服馬達不同有所變更
- 2.此圖為輸出法蘭轉動（軸轉動）

1. The dimensions are changed by motor specification.
2. The drawing is for output flange rotation (shaft run)

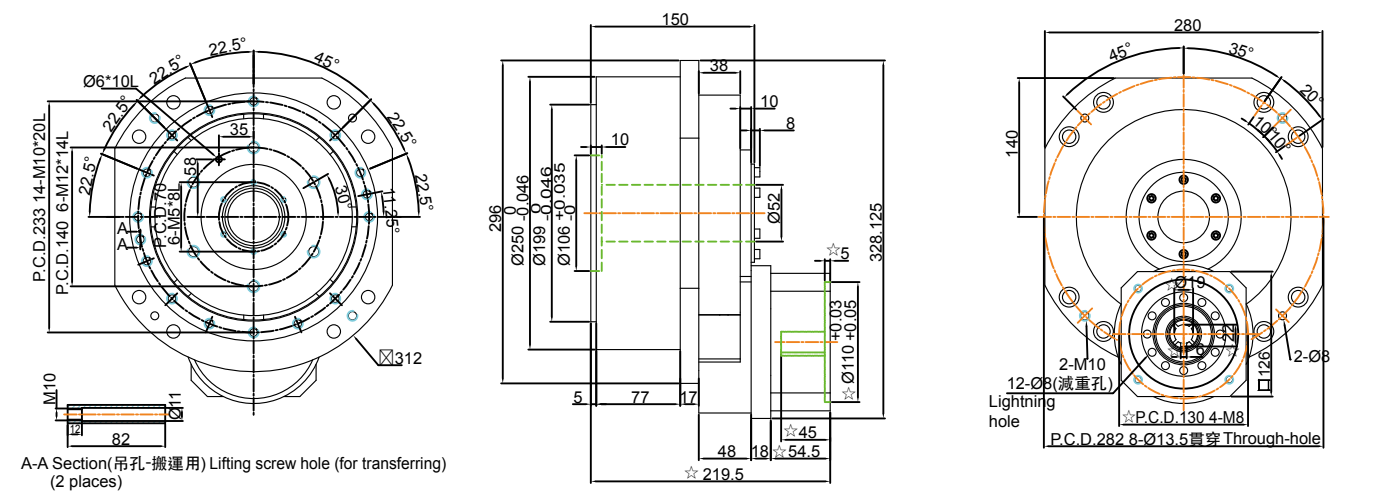
TTRD-30C



1. ☆ 會隨伺服馬達不同有所變更
- 2.此圖為輸出法蘭轉動（軸轉動）

1. The dimensions are changed by motor specification.
2. The drawing is for output flange rotation (shaft run)

TTRD-105C

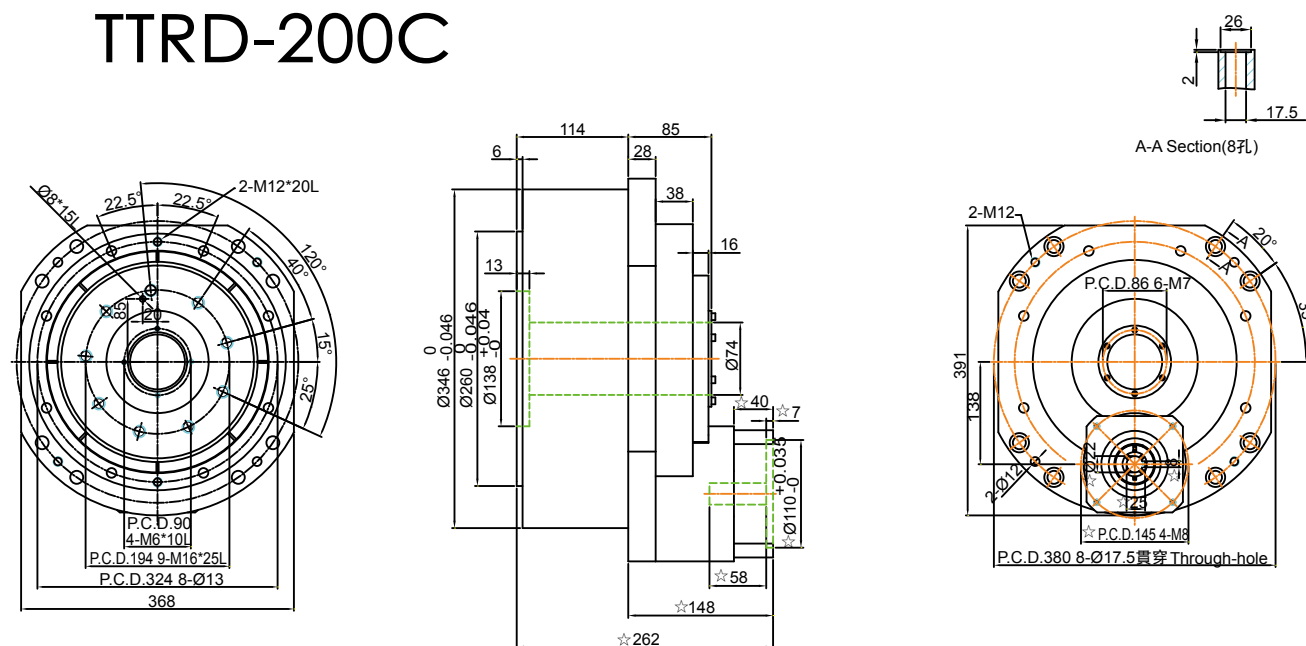


1. ☆ 會隨伺服馬達不同有所變更
- 2.此圖為輸出法蘭轉動（軸轉動）

1. The dimensions are changed by motor specification.
2. The drawing is for output flange rotation (shaft run)

TTRD-C 尺寸圖 DRAWING & DIMENSION

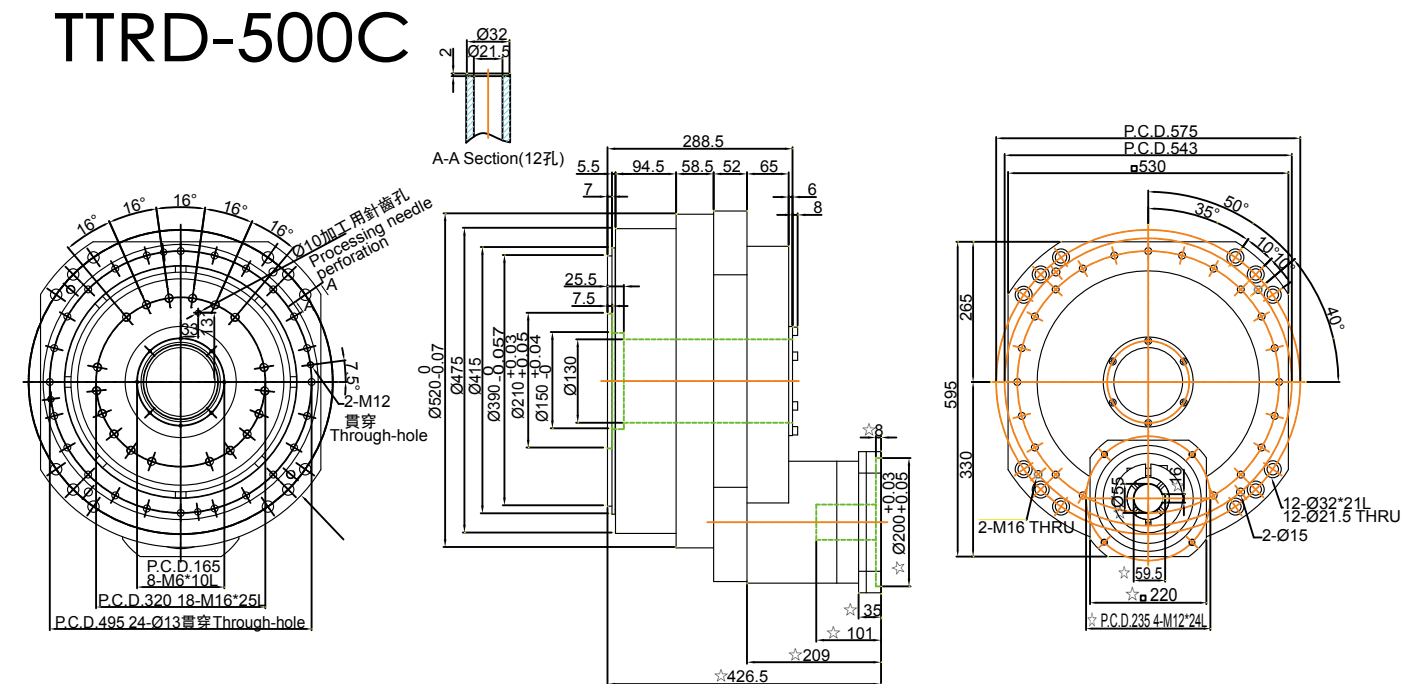
TTRD-200C



1. ☆ 會隨伺服馬達不同有所變更
2. 此圖為輸出法蘭轉動（軸轉動）

1. The dimensions are changed by motor specification.
2. The drawing is for output flange rotation (shaft run)

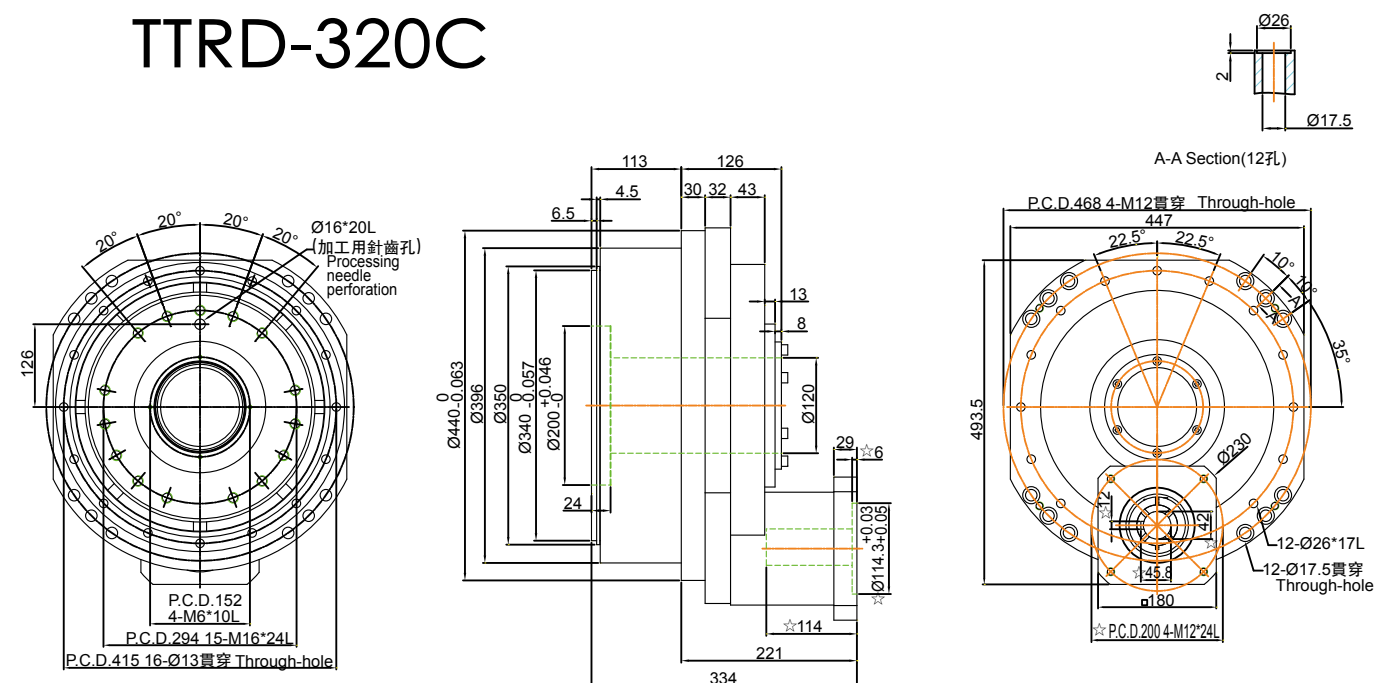
TTRD-500C



1. ☆ 會隨伺服馬達不同有所變更
- 2.此圖為輸出法蘭轉動（軸轉動）

1. The dimensions are changed by motor specification.
2. The drawing is for output flange rotation (shaft run)

TTRD-320C



1. ☆ 會隨伺服馬達不同有所變更
- 2.此圖為輸出法蘭轉動（軸轉動）

1. The dimensions are changed by motor specification.
2. The drawing is for output flange rotation (shaft run)

■ 裝配精度需求 ASSEMBLY PRECISION

伺服電機安裝法蘭請依照以下精度安裝，避免產生震動以及噪音
Design motor mounting flange within tolerances please refer to below table.
Poor assemble accuracy will cause vibration and noise

型 式 Model	同心度公差 Concentricity tolerance	平行度公差 Parallelism tolerance	中心距公差 center-to-center tolerance
TTRA-5E	MAX±0.03	MAX±0.03	
TTRA-7E	MAX±0.03	MAX±0.03	
TTRA(RAC)-25E	MAX±0.03	MAX±0.03	
TTRA(RAC)-45E	MAX±0.03	MAX±0.03	
TTRA(RAC)-135E	MAX±0.03	MAX±0.03	
TTRA(RAC)-165E	MAX±0.05	MAX±0.03	
TTRA(RAC)-325E	MAX±0.05	MAX±0.03	
TTRA-450E	MAX±0.05	MAX±0.03	
TTRAD-7E	MAX±0.03	MAX±0.03	
TTRAD-25E	MAX±0.03	MAX±0.03	
TTRAD-45E	MAX±0.03	MAX±0.03	
TTRAD-135E	MAX±0.03	MAX±0.03	
TTRAD-165E	MAX±0.05	MAX±0.03	
TTRAD-325E	MAX±0.05	MAX±0.03	
TTRAD-450E	MAX±0.05	MAX±0.03	
TTRV-6E	MAX±0.03	MAX±0.03	
TTRV-20E	MAX±0.03	MAX±0.03	
TTRV-40E	MAX±0.03	MAX±0.03	
TTRV-80E	MAX±0.03	MAX±0.03	
TTRV-110E	MAX±0.03	MAX±0.03	
TTRV-160E	MAX±0.05	MAX±0.03	
TTRV-320E	MAX±0.05	MAX±0.03	
TTRV-450E	MAX±0.05	MAX±0.03	
TTRV(RD)-10C	MAX±0.03	MAX±0.03	MAX±0.03
TTRV(RD)-30C	MAX±0.03	MAX±0.03	MAX±0.03
TTRV(RD)-50C	MAX±0.03	MAX±0.03	MAX±0.03
TTRV(RD)-105C	MAX±0.03	MAX±0.03	MAX±0.03
TTRV(RD)-200C	MAX±0.03	MAX±0.03	MAX±0.03
TTRV(RD)-320C	MAX±0.03	MAX±0.03	MAX±0.03
TTRV(RD)-500C	MAX±0.03	MAX±0.05	MAX±0.03

■ 彎矩剛性 TORSIONAL RIGIDITY

型 號 Model	彎矩剛性(Moment rigidity) Nm/arc.min.	尺寸 Size (mm)	
		a	b
TTRA-5E	91	12.25	75.5
TTRA-7E	137	27.5	121
TTRA(RAC)-25E	447	30.75	146.5
TTRA(RAC)-45E	1036	36	168
TTRA(RAC)-135E	1238	58.5	231
TTRA(RAC)-165E	3022	64.75	250
TTRA(RAC)-325E	4957	76.5	293
TTRA-450E	7513	97	342
TTRAD-7E	137	27.5	121
TTRAD-25E	447	13.75	146.5
TTRAD-45E	1036	11.5	168
TTRAD-135E	1238	40.5	231
TTRAD-165E	3022	42.75	250
TTRAD-325E	4957	48.5	293
TTRAD-450E	7513	60	342
TTRV-6E	113	23.5	110
TTRV-20E	364	29.25	132.5
TTRV-40E	922	39.5	168
TTRV-80E	1168	47.75	196.5
TTRV-110E	1459	51	209
TTRV-160E	2933	66.75	250.5
TTRV-320E	4882	73	286.5
TTRV-450E	7434	93.5	347
TTRV(RD)-10C	419	30.75	137.5
TTRV(RD)-30C	1051	40	173
TTRV(RD)-50C	1942	55	213
TTRV(RD)-105C	2803	64	231
TTRV(RD)-200C	9789	92	335
TTRV(RD)-320C	12727	120	424
TTRV(RD)-500C	24488	148.5	510

■ 選用注意事項 PRODUCT SELECTION GUIDE

$$T_m = \sqrt[10]{\frac{t_1 \cdot N_1 \cdot T_1^{10} + t_2 \cdot N_2 \cdot T_2^{10} + \dots + t_n \cdot N_n \cdot T_n^{10}}{t_1 \cdot N_1 + t_2 \cdot N_2 + \dots + t_n \cdot N_n}}$$

已知平均負載轉矩 T_m
(average load torque)
已知平均輸出轉速 N_m
(average output speed)
<請參閱伺服馬達規格>
<refer to motor specifications>

對照額定表
(comparing nominal chart)

輸出轉矩 T_m
(output torque)

輸出轉速 N_m
(output speed)

$$N_m = \frac{t_1 \cdot N_1 + t_2 \cdot N_2 + \dots + t_n \cdot N_n}{t_1 + t_2 + \dots + t_n}$$

$MC \leq$ 允許彎矩
 $MC \leq$ allowable bending torque

$$MC = [W_1 \ell_2 + W_2 \ell_3 (\ell_2 > b)] / 1000$$

確定負載彎矩 MC
ensure tilt load torque MC

$MC >$ 允許彎矩
 $MC >$ allowable bending torque

型號確定
model determined

$\theta \leq$ 允許傾斜
 $\theta \leq$ allowable tilt

$$\theta = (W_1 \ell_1 + W_2 \ell_3) / (M_t \times 10^3)$$

確定彎矩剛性 θ
ensure bending rigidity θ

$\theta >$ 允許傾斜
 $\theta >$ allowable tilt

確定主軸承能力
(ensure main bearing capability)

$T_{out} >$ 允許瞬時最大轉矩
 $T_{out} >$ allowable torque for instantaneity

$T_{out} \leq$ 允許瞬時最大轉矩
 $T_{out} \leq$ allowable torque for instantaneity

電機軸 0° 旋轉時
外部衝擊轉矩 T_{out}
during stall status of motor T_{out}

$$T_{out} = T_{m1} \times R \times \eta$$

T_1 = 啟動時轉矩 Maximum torque for startup
 T_3 = 停止時轉矩 Maximum torque for stop
 N_o = 額定輸出轉速 Rated output speed (r/min)
 N_m = 平均輸出轉速 Average output speed (r/min)
 T_o = 額定轉矩 Rated torque (Nm)
 T_m = 平均負載轉矩 Average load torque (Nm)
 M_t = 彎矩剛性 Moment rigidity (Nm/arc.min)
 W_1, W_2 = 負荷 Weight (N)
 ℓ_1, ℓ_3 = 到負荷點距離 Arm length (mm)
 $\ell_1 = \ell + \frac{b}{2} - a$
 ℓ = 輸出軸面到負荷點距離 (mm)
Length from flange side to loading point (mm))
 $\ell_2 = \ell + b - a$
 T_{m1} = 馬達瞬時最大轉矩 Instantaneous maximum torque of motor
 R = 實際速比 Ratio of reducer
 η = 減速機效率 Efficiency of reducer

$$L_h = K \cdot \frac{N_o}{N_m} \cdot \left(\frac{T_o}{T_m} \right)^{\frac{10}{3}}$$

計算機型壽命 L_h
reducer life calculation L_h

$L_h <$ 數值
 $L_h <$ data

$L_h \geq$ 數值
 $L_h \geq$ data

輸入轉速
input speed

輸入轉速
減速比 $\leq$ 允許最高轉速
 $\frac{\text{input speed}}{\text{reduction ratio}} \leq \text{allowable maximum speed}$

輸入轉速
減速比 $\leq$ 允許最高轉速
 $\frac{\text{input speed}}{\text{reduction ratio}} \leq \text{allowable maximum speed}$

目前所選
型號不適用
請再提高型號
確保正確運作
Inappropriate model,
please enlarged the
model to avoid over-
load operation)

T_1 or $T_3 >$ 啟動停止時允許轉矩
 T_1 or $T_3 >$ allowable torque for startup or stop

啟動時轉矩 T_1
停止時轉矩 T_3
torque for startup T_1
torque for stop T_3

T_1 or $T_3 \leq$ 啟動停止時允許轉矩
 T_1 or $T_3 \leq$ allowable torque for startup or stop

緊急停止時轉矩 T_{em}
torque for emergency stop T_{em}

$T_{em} >$ 允許瞬時最大轉矩
 $T_{em} >$ allowable torque for instantaneity

$T_{em} \leq$ 允許瞬時最大轉矩
 $T_{em} \leq$ allowable torque for instantaneity

實際作用次數 $> C_{em}$
actual operation cycle $> C_{em}$

實際作用次數 $\leq C_{em}$
actual operation cycle $\leq C_{em}$

容許作用次數計算 C_{em}
allowable operation cycle calculation C_{em}

$$C_{em} = \frac{775 \times \left(\frac{5 \times T_o}{T_{em}} \right)^{\frac{10}{3}}}{40 \times \frac{N_m}{60} \times t_{em}}$$

■ 基本壽命 SERVICE LIFE

● 額定壽命

Rated service life

減速機的壽命受曲柄軸中使用的滾動軸承壽命限制。各型號減速機的額定轉矩、額定輸出轉速，壽命時間請參考以下表格設定。

The service life of reducer is based on the life of taper roller bearing mounted with crankshaft. Please refer to the below table for rated torque, rated output speed and service life of each type reducer.

L _h	壽命時間 Service life : Hr	
L ₁₀	K	6,000

將減速機實際安裝到裝置並運轉時，由於各負載條件不同，因此請按以下公式計算，求得經公式計算後的壽命時間。

When reducer operated practically in the mechanism, calculate the average service life via the following formula due to various loading conditions.

$$L_h = K * \frac{N_o}{N_m} * \left(\frac{T_o}{T_m} \right)^{\frac{10}{3}}$$

L_h: 壽命時間 Service life

N_m=平均輸出轉速 Average output speed (r/min)

T_m=平均負載轉矩 Average load torque (Nm)

N_o =額定輸出轉速 Rated output speed (r/min)

T_o =額定轉矩 Rated torque (Nm)

■ 主軸承能力 CAPACITY OF MAIN BEARING

減速機其內部都有安裝壓力角球軸承，以支撐外部負荷。

Angular contact ball bearings (main bearing) are incorporated into the reducer-self so that external loads may be supported.

● 彎矩剛性

Moment rigidity

受到外部負荷並產生負載彎矩時，輸出軸與負載彎矩成正比傾斜。(當 $\ell > b$ 的情況)彎矩剛性表示的是主承軸的剛性，用傾斜單位角度(1 弧分)所需的負彎矩值表示。

When external load be burdened with output shaft, it's deflection angle is proportional to the external moment, (when $\ell > b$) The moment rigidity could be represented rigidity of main bearing, whose unit is load torque (Nm)/deflection angle (arc.min)

θ = 輸出軸的傾斜角度

Deflected angle of output shaft (arc.min)

M_t=彎矩剛性 Torsional Rigidity (Nm / arc.min)

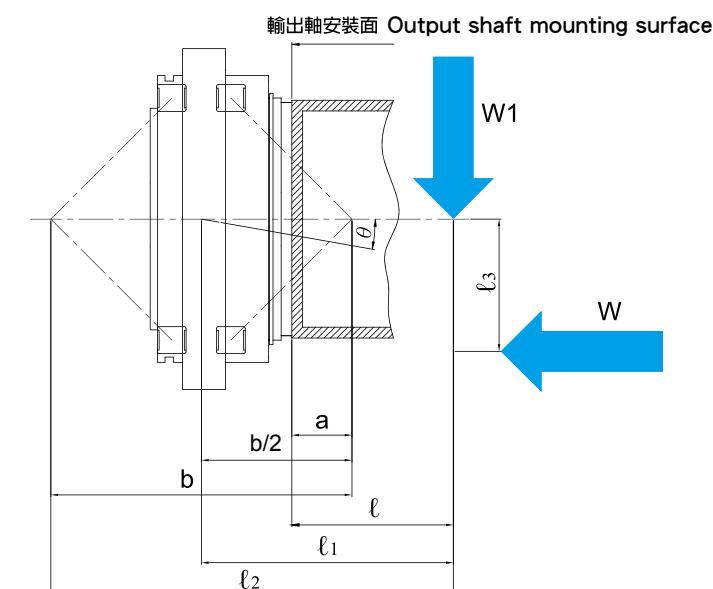
W₁, W₂=負荷 Weight (N)

ℓ_1, ℓ_3 =到負荷點距離 Arm length (mm)

$$\ell_1 = \ell + \frac{b}{2} - a$$

ℓ = 輸出軸面到負荷點距離 (mm)
Length from flange side to loading point (mm)

外部負荷線圖
External loading
diagram



■ 潤滑 LUBRICATION

● 為了充分發揮減速機的性能：

- 1.建議使用德國 LUBRICANT 公司製造的潤滑脂 Li 801 EP。
(註：請勿與其他的潤滑油混合使用)
- 2.減速機的標準潤滑方式為潤滑脂潤滑。
- 3.使用溫度範圍 (周圍溫度) -10°C~40°C。
- 4.減速機內的潤滑脂用量：減速機在出廠時已注入本公司建議的 Lubrication 高負載多用途長效潤滑油脂 Li 801 EP。
(註：顯示減速機內所需的注入量，不含與安裝側之間的空間。因此，有空間時，請將其填充。此外，過度填充可能會使內部氣壓升高、進而損壞油封，因此請確保占全部體積 10%左右的空間。)
- 5.在高速、高溫、低速、重荷重、強制潤滑等特殊情況下使用場合，請與本公司洽商。
- 6.潤滑脂不足，可能導致減速機快速磨損和效率降低；而潤滑脂過多，則可能導致漏油。
- 7.潤滑脂更換時間：潤滑脂在使用一定時間後會發生劣化的情況。減速機在注入適量潤滑脂的運轉情況下，潤滑脂的標準更換時間為3,000小時。
- 8.潤滑脂受到污損或在惡劣的環境中 (周圍溫度在40°C以上) 使用減速機時，應隨時檢查潤滑脂的污損和劣化情況，適時進行更換。

● For making full use of the performance of reducer

1. Recommend to adopt Germany Lubricant brand of lubrication grease Li 801 EP anufactured by German Lubricant. (PS.: Please don't mixed with other lubricant.)
2. Grease lubricant is standard TSUNTEN reducer lubrication.
3. Operating temperature range (ambient temperature) -10°C~40°C
4. Lubricant volume : Filled high-load versatile & durative lubrication grease Li 801 E (PS.: Filled grease volume as the description of enclosed list , not include the inner space of mounting side. Please fill up the room of mounting side. Besides, over-filled grease may to raise inner pressure rapidly to result in the damage of oil seal during operation .Therefore , ensure grease occupied approximately 10% of the whole inner space .)
5. If used to special conditions or environments , such as high speed, high temperature, low speed, heavy load, and forced lubrication, please contact our company.
6. Insufficient lubricant could resulted in noise , abrasion of components and low efficiency . Excessive lubricant may occur oil leakage.
7. Replaced period of lubricant : Suggest to replace lubricant every 3000 operating hours under regulative volume due to poor performance concern.
8. When reducer mostly operated in the contaminated or dirty environments (ambient temperature over 40°C) , please inspect quality of lubricant regularly and replace with new lubricant timely.

安裝水平軸的情況
Horizontal shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RA-5E	80
RA-7E	101
RA-25E	164
RA-45E	369
RA-135E	640
RA-165E	1016
RA-325E	1812
RA-450E	1950

安裝水平軸的情況
Horizontal shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RAD-7E	101
RAD-25E	164
RAD-45E	369
RAD-135E	640
RAD-165E	1016
RAD-325E	1812
RAD-450E	1950

安裝水平軸的情況
Horizontal shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RV-6E	80
RV-20E	96
RV-40E	215
RV-80E	421
RV-110E	475
RV-160E	693
RV-320E	1144
RV-450E	1756

安裝垂直軸的情況
Vertical shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RA-5E	80
RA-7E	106
RA-25E	172
RA-45E	387
RA-135E	672
RA-165E	1067
RA-325E	1902
RA-450E	2048

安裝垂直軸的情況
Vertical shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RAD-7E	106
RAD-25E	172
RAD-45E	387
RAD-135E	672
RAD-165E	1067
RAD-325E	1902
RAD-450E	2048

安裝垂直軸的情況
Vertical shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RV-6E	80
RV-20E	110
RV-40E	246
RV-80E	483
RV-110E	545
RV-160E	763
RV-320E	1312
RV-450E	2014

■ 潤滑 LUBRICATION

安裝水平軸的情況
Horizontal shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RV-10C	150
RV-30C	293
RV-50C	548
RV-105C	832
RV-200C	2014
RV-320C	3890
RV-500C	6527

安裝水平軸的情況
Horizontal shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RAC-25E	164
RAC-45E	369
RAC-135E	640
RAC-165E	1016
RAC-325E	1812

安裝水平軸的情況
Horizontal shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RD-10C	300
RD-30C	475
RD-50C	791
RD-105C	1077
RD-200C	2596
RD-320C	4265
RD-500C	7000

安裝垂直軸的情況
Vertical shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RV-10C	150
RV-30C	336
RV-50C	628
RV-105C	943
RV-200C	2284
RV-320C	4452
RV-500C	7590

安裝垂直軸的情況
Vertical shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RAC-25E	172
RAC-45E	387
RAC-135E	672
RAC-165E	1067
RAC-325E	1902

安裝垂直軸的情況
Vertical shaft installation

型 式 Model	需要注入量約 (cc) Adding volume of lubricant (c.c.)
RD-10C	300
RD-30C	523
RD-50C	870
RD-105C	1185
RD-200C	2856
RD-320C	4692
RD-500C	7700

■ 使用注意事項 & 保固 APPLICATION NOTICE & Warranty

● 使用注意事項 APPLICATION NOTICE :

- 1.當最終用途與軍事有關，且用於武器製造時，本產品可能成為「外匯管理法」中規定的限制出口產品，出口時，需進行充分的審查並辦理必要的出口手續。
- 2.本產品的故障或錯誤動作直接危及人的生命；本產品被用於可能影響人身安全的裝置(原子能設備、宇航設備、交通工具、醫療器械、各種安全裝置等)，有以上這些情況時，均必須進行認真的研究，請與本公司聯繫。
- 3.雖然本產品在製造時進行了嚴格的質量管理，但在有可能因故障影響人身安全及造成嚴重設備損失的機械上使用時，請設置安全裝置。
- 4.在特殊環境(清潔室、食品等)下使用本產品時，請事先與本公司聯繫。
- 5.在使用中，禁止使用反工程等方法對本產品進行分解和內部解析。

1. End-user application related to military affairs and weapon production can make the products to become export restriction goods under the regulation on the Foreign Exchange Management. When exporting, sufficient examination paper and necessary export procedures need to be conducted.
2. Malfunction and misuse can jeopardize human life directly—applying the products to facilities related to nuclear power, space navigation, transportation, medication care, life safety equipment have to be carefully evaluated and contact us.
3. The products are manufactured under high-level quality control ; however, any unpredictable breakdown can endanger human safety and cause serious damage of machine , an security mechanism is necessary to be set up.
4. Operating the products in specific environments (sanitary,food,etc.),please inform us in advance.
5. “Reverse engineering” is strictly forbidden to take apart the products and analyze inside components.

● 保固 Warranty :

- 1.TSUNTIEN公司保證減速機在材料、製造方面沒有缺陷。
- 2.在本公司規定的額定運轉條件內，在正常的裝配狀態以及潤滑狀態下使用，本產品的保固期為交貨後一年，或者實機搭載後運轉2,000小時，以兩者中較早到期的時間為準。
- 3.一旦在上述保固期內發現材料、製造方面的缺陷，而該產品的修理或更換的相關費用由本公司承擔。但是，實機拆卸以及安裝所需的工時、再次交貨所需的運費、税金、倉儲費用等附帶費用不在本公司承擔範圍。
- 4.因本產品不適合而引起搭載實機停機時導致的損失費用，本公司概不負責。
- 5.需要以金額進行賠償時，賠償金額的上限將不超過索賠對象產品的銷售價格。
- 6.在沒有事先通知本公司的情況下，擅自分解該產品、或重新組裝該產品，由此引發性能方面、安全方面的問題等，本公司一概不予負責。

1. TSUNTIEN ensures roller reducers no defects in material and manufacture.
2. TSUNTIEN provide either warranty period one year after delivery or 2000 operation hours , depend on which one is reached earlier , be valid under regulated operation conditions , normal installation and lubrication.
3. Any defects of material and manufacture during warranty period , the fees of repair and replacement wil be in charge of TSUNTIEN.But we are not responsible for work hours of disassembly and installation and for cost of shipping , tax and warehouse.
4. TSUNTIEN is not responsible for the cost of shutdown due to improper model selection.
5. The maximum amount of compensation is under selling price of damage product .
6. Once problems occurred in performance , safety or others , TSUNTIEN is not responsible regarding customers disassemble or assemble by themselves without previous notification .