TK/TS/TH/TR type

中空迴轉油壓缸

ROTARY HYDRAULIC CYLINDER WITH THRU-HOLE

使 用 說 明 書

INSTRUCTION MANUAL

Original instructions

重要　Important Notes：

- 請仔細閱讀本說明書，充分瞭解之後再使用本製品。
  本說明書請妥善保管，製品使用者變更時，請將此說明書交給新的使用者。
- Before you use the product.Please read this insturction carefully.
  Keep the instruction carefully. Ifthe user of the product altered,
  please hand the instruction to the new user.

◎序 言

為了確保你的安全，在使用你的中空迴轉油壓缸之前，請務必詳閱本說明書內所記載之警告事項，並特別注意文中此 ⚠ 圖形符號下之說明。

◎ INTRODUCTION

To ensure safe operation of your Hydraulic Rotary Cylinder with Thru-Hole , please read this instruction manual and payparticular attention to instructions marked with ⚠ including IMPORTANT instructions concerning cylinder performance.

DANGER 危 險

→ 若未依照此符號底下的說明來操作機械將引起立即的危險，導致重大傷害或死亡。
Indicates an imminently hazardous situation which, if not avoided, could result in death or serious injury.

WARNING 警 告

→ 若未依照此符號底下的說明來操作機械將引起潛在的危險，導致重大傷害或死亡。
Indicates an potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION 注 意

→ 若未依照此符號底下的說明來操作機械將引起潛在的危險，導致中輕度的傷害。
Indicates an potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT 留 意 事 項

→ 依照此符號底下的說明事先了解製品的性能，可避免不正確的操作夾頭。
Indicates for chuck performance and avoiding errors of mistake.

目　錄

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官網 Web Site　微信公眾號 WeChat　@AUTOGRIP MACHINERY　@佳賀精機 AUTOGRIP　YOUKU AUTOGRIP佳賀固力普

2D圖檔(PDF、DWG格式)、3D圖檔(STEP格式)可以從官網下載。

You can download the outline drawing and 3D step at AUTOGRIP WEB Site.

注 意 事 項 FOR SAFE OPERATION

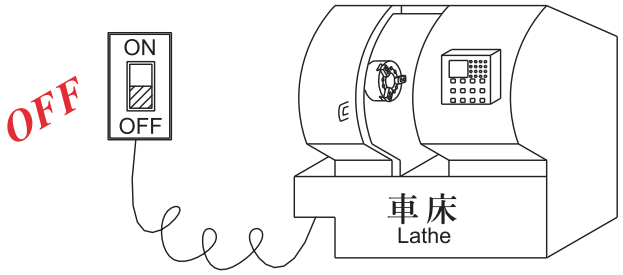
請詳閱本說明書，並依循指示說明。若未依照指示，錯誤的使用而致引起的損傷或意外事，本公司概不負責。

Please read this manual and following instructions carefully. We cannot assume responsibility for damage or accidents caused by misuse, through noncompliance with the safety instructions.

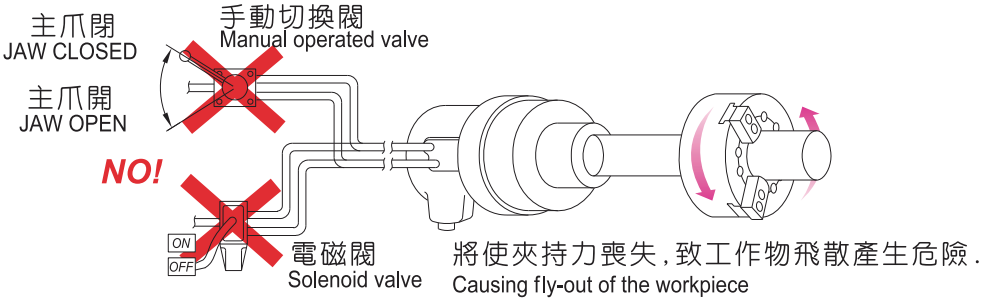
DANGER 危 險

在安裝檢查或潤滑油壓缸時，務必關掉所有電源，確保操作者之安全。
SWITCH OFF power before setting, inspecting, lubricating or changing the chuck to ensure operator safety.

易發生身體或衣物捲入等意外事故。
To avoid accident of operator body or clothes drawn into machine.

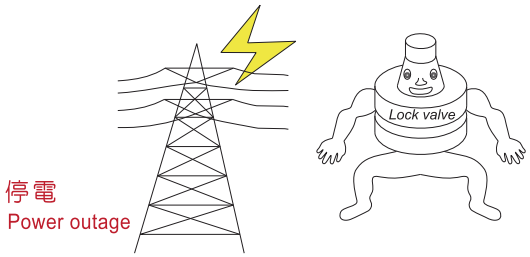


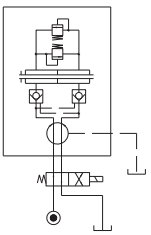
當主軸迴轉時，切勿操作切換閥。
Never operate the selector valve and the solenoid valve and the air supply during the spindle rotation.



某些型式的油壓缸內建有 " 逆止閥 " 機構，當電源意外中斷時，能防止油壓缸內部壓力驟降，保持穩固的夾持。
In case of power failure, some cylinders are fitted with check valves and pressure relief valve . When power is restored, the solenoid valce resumes its normal function.

停電時喪失夾持力，致使工作物飛散產生危險。
Power outage may cause fly-out of the workpiece.



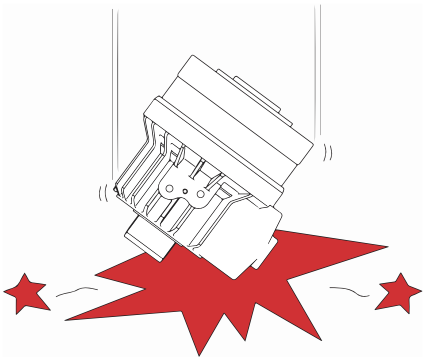


設定工件在正確的夾持位置。
Set the workpiece to the correct gripping position.

WARNING
警　告

勿使油壓缸受到衝擊或碰撞。
Never shock the cylinder.

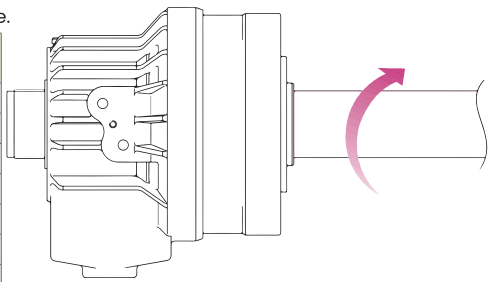
油壓缸破損，將導致工件飛出之危險。
Danger by fly-out of clamping workpiece in case of damaging of cylinder.



依標準鎖緊力矩確實鎖緊螺絲。
Secure tightening bolts with specified torque.

將活塞設定於行程終點，完全伸出油壓缸外，再旋入拉桿。
Set the piston at stroke end on pushing side, then screw the draw pipe.

油壓缸型式 Cylinder type	鎖緊力矩 Tightening torque
TH-428	80 N・m (8.1 kgf・m)
TH-A536/TK-A533/TK-A528/TR-539/TS-539	100 N・m (10.2 kgf・m)
TK-A646/TK-B646/TK-C646/TK-C643/TR-646	150 N・m (15.3 kgf・m)
TK-A853/TK-B853/TK-B846/TS-866/TR-853	280 N・m (28.6 kgf・m)
TK-A1075/TK-A1068/TK-A1078/TS-1081/TR-1075	340 N・m (34.7 kgf・m)
TK-A1291 / TK-A1287 / TR-1291	380 N・m (38.7 kgf・m)
TK-A1511 / TK-A1512 / TK-A1512-35 / TS-1210	430 N・m (43.6 kgf・m)

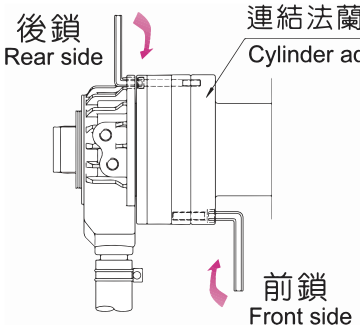


依標準力矩確實鎖緊螺絲。
Tightening the clamp bolts with correct torque.

後鎖側的場合 (僅限 TK 型式)
Rear side (Only TK type)

螺絲規格 Bolt size	鎖緊力矩 Tightening torque
M8	38.2 N・m (3.9 kgf・m)
M10	72.6 N・m (7.4 kgf・m)
M12	106.8 N・m (10.9 kgf・m)

油壓缸鬆脫，將導致工件飛出之危險。
Danger by fly-out of clamping workpiece in case of looseing of cylinder.



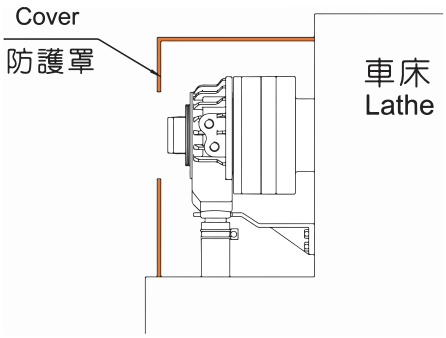
前鎖側的場合 Front side

螺絲規格 Bolt size	鎖緊力矩 Tightening torque
M8	31.5 N・m (3.2 kgf・m)
M10	60.0 N・m (6.1 kgf・m)
M12	87.0 N・m (8.9 kgf・m)
M16	205.0 N・m (20.9 kgf・m)
M20	325.6 N・m (33.2 kgf・m)

WARNING
警　告

油壓缸外圍須以防護罩蓋住。
Be sure to cover the periphery of cylinder.

如無防護罩，易發生肢體或衣物捲入等意外事故。
Danger by catching of opereator in a machine.

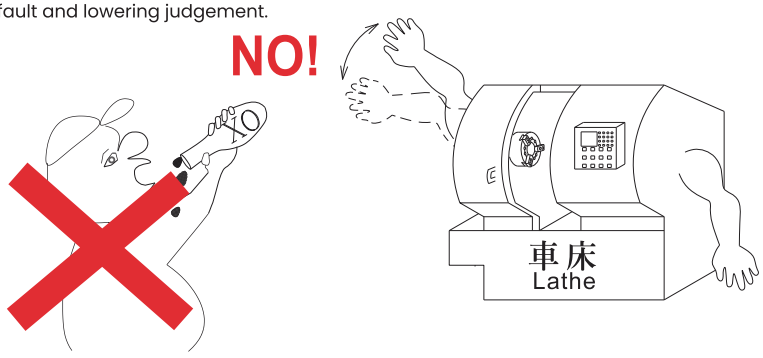


油壓缸可容許之最大壓力請參考各油壓缸之最高使用壓力，但設定使用壓力時，需考量夾頭的適用性。
The maximum hydraulic pressure of cylinder please refer to the Max. Pressure of each hydraulic cylinder,but set hydraulic pressure need according to chuck speicification.

如油壓力超過容許最大值，將使油壓缸受損，甚至使夾頭變形或破裂之危險。
If hydraulic pressure is exceeded, the cylinder or the chuck may be deformed or broken.

操作機器前，請勿喝酒或服用麻醉性藥物。
Never attempt to operate machine after drinking alcohol taking drugs.

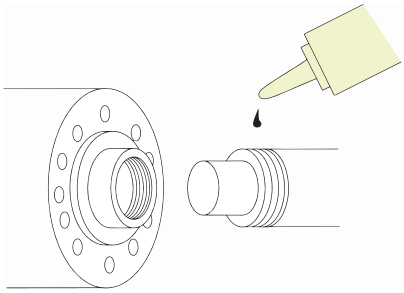
判斷力差時，容易操作錯誤十分危險。
Danger by opereational fault and lowering judgement.



CAUTION
注 意

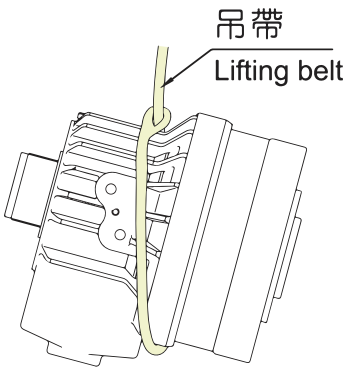
拉桿螺紋處塗上防鬆接著劑，再依標準力矩鎖緊。
Coat the threaded part of the draw pipe with adhesive and screw it with the specified torque.

如拉桿鬆脫的話，會使爪行程變短。
If draw bar becomes loosed, the jaw stroke of the chuck will becomes short.



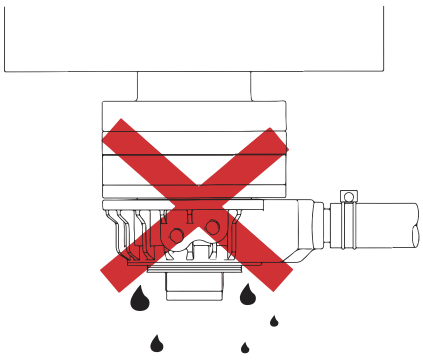
拆裝油壓缸時，請使用吊帶。
When mounting or unmounting the cylinder, use a lifting belt.

掉落時十分危險。
Danger by dropping.



油壓缸不可直立裝置。
Never set the cylinder vertically.

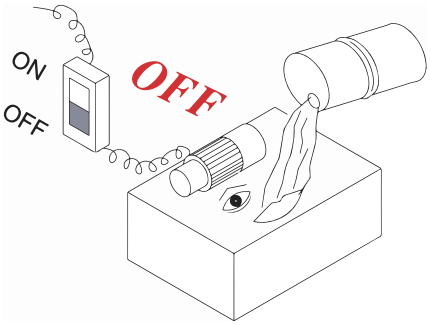
會發生漏油。
Oil leakage.



CAUTION
注 意

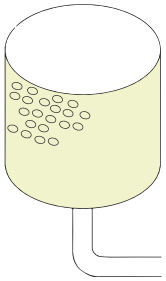
供給足夠的油壓油，且先關掉電源。
Turn off power source and supply specified oil.

油壓油不足將使得油壓缸作動速度變慢，推力不足，導致夾持力減弱，工作物飛散而十分危險。
Danger by discharge of workpiece incompletely gripped because of slow operation speed or insufficient thrust.



油壓系統需裝置過濾器.
Incorporate a filter in hydraulic system.

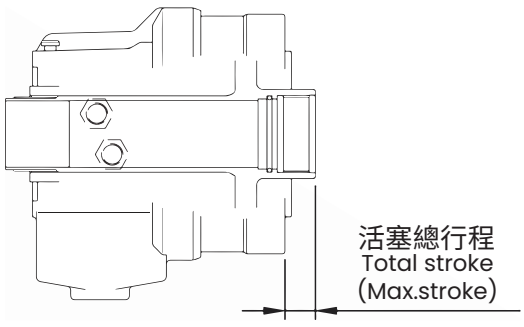
如雜質造入，將使油壓缸阻塞而失去功能，工作物容易飛散而產生危險。
Danger by discharge of workpiece because cylinder may seize if foreign matter is entered into cylinder.



過濾密度需在20μm以下。
Filter accuracy 20 um or less.

請勿自行改造油壓缸活塞總行程.
Don't attempt to modify the total stroke of piston by yourself.

不當改造活塞總行程，將損害油壓缸而無法發揮正常功能。如有需要改變活塞行程，請與我們聯繫。
Danger by function damage of cylinder.
If you have need to do it, please contact us.



2. 規格 2. SPECIFICATIONS

超短型中空迴轉油壓缸 (TK-type)
Short type Thru-Hole Hydraulic Rotary Cylinder with Safety Device

型號	活塞面積 Eff. piston area		行程	最高迴轉數	最高使用壓力	I	重量	總洩漏量
Model	押側 (Extend)	拉側 (Retract)	Piston stroke	Max. speed	Max. pressure	Moment of inertia	Weight	Total oil leakage
	cm^2	cm^2	mm	min^{-1}(r.p.m.)	MPa(kgf/cm^2)	kg・m^2	kg	lit. / min.
TK-A528	73.0	69.7	12	8000	4.5 (45)	0.012	6.2	3.0
TK-A533	73.0	69.7	12	8000	4.5 (45)	0.012	6.0	3.0
TK-C643	99.1	88.0	15	7000	4.5 (45)	0.018	7.5	3.0
TK-A646	105.0	93.9	15	7000	4.5 (45)	0.018	7.3	3.0
TK-B646	105.0	93.9	15	7000	4.5 (45)	0.018	8.6	3.0
TK-C646	99.1	88.0	15	7000	4.5 (45)	0.018	7.5	3.0
TK-B846	135.3	125.0	20	6300	4.5 (45)	0.032	12.4	3.9
TK-A853	135.3	125.0	20	6300	4.5 (45)	0.032	11.8	3.9
TK-B853	135.3	125.0	20	6300	4.5(45)	0.032	11.7	3.9
TK-A1068	170.1	155.3	25	5500	4.5 (45)	0.065	19.2	4.2
TK-A1075	170.1	155.3	25	5500	4.5(45)	0.065	18.8	4.2
TK-A1078	170.1	155.3	25	5500	4.5 (45)	0.065	17.4	4.2
TK-A1287	234.0	217.5	30	3800	4.0 (40)	0.092	24.8	4.5
TK-A1291	234.0	217.5	30	3800	4.0 (40)	0.092	24.8	4.5
TK-A1511	336.4	315.2	30	3000	3.5(35)	0.38	57.9	7.0
TK-A1512	336.4	315.2	30	3000	3.5(35)	0.38	53.8	7.0
TK-A1512-35	336.4	315.2	35	3000	3.5(35)	0.38	53.8	7.0
TK-2114	373.2	336.1	35	2500	3.0 (30)	0.54	58.2	8.0
TK-2416	418.4	375.4	35	2000	3.0 (30)	1.12	78.0	9.0
TK-2416L	418.4	375.4	51	2000	3.0 (30)	1.31	79.2	9.0
TK-2820	526.2	472.6	51	1600	3.0 (30)	2.4	134.0	10.0

大孔徑超短型中空迴轉油壓缸 (TS-type)
Short Type Rotary Hydraulic Cylinder with Big-bore Thru-Hole and Safety Device

型號	活塞面積 Eff. piston area		行程	最高迴轉數	最高使用壓力	I	重量	總洩漏量
Model	押側 (Extend)	拉側 (Retract)	Piston stroke	Max. speed	Max. pressure	Moment of inertia	Weight	Total oil leakage
	cm^2	cm^2	mm	min^{-1}(r.p.m.)	MPa(kgf/cm^2)	kg・m^2	kg	lit. / min.
TS-539	72.4	67.1	15	8000	4.5(45)	0.012	6.9	3.0
TS-866	168.0	155.5	25	5600	4.5(45)	0.056	16.3	4.0
TS-1081	189.2	174.3	25	4800	4.5(45)	0.085	21.2	4.3
TS-1210	231.7	222.0	30	3500	3.5(35)	0.193	35.6	6.0

中空迴轉油壓缸 (TH-type)
Thru-Hole Rotary Hydraulic Cylinder with Safety Device

型號	活塞面積 Eff. piston area		行程	最高迴轉數	最高使用壓力	I	重量	總洩漏量
Model	押側 (Extend)	拉側 (Retract)	Piston stroke	Max. speed	Max. pressure	Moment of inertia	Weight	Total oil leakage
	cm^2	cm^2	mm	min^{-1}(r.p.m.)	MPa(kgf/cm^2)	kg・m^2	kg	lit. / min.
TH-428	53.2	50.5	10	8000	4.0(40)	0.008	5.8	3.0
TH-A536	69.8	67.5	15	8000	4.0(40)	0.05	8.3	3.0

中空迴轉油壓缸 (TR-type)
Short type Thru-Hole Rotary Hydraulic Cylinder with Safety Device

型號	活塞面積 Eff. piston area		行程	最高迴轉數	最高使用壓力	I	重量	總洩漏量
Model	押側 (Extend)	拉側 (Retract)	Piston stroke	Max. speed	Max. pressure	Moment of inertia	Weight	Total oil leakage
	cm^2	cm^2	mm	min^{-1}(r.p.m.)	MPa(kgf/cm^2)	kg・m^2	kg	lit. / min.
TR-539	72.4	67.1	15	8000	4.0(40)	0.010	6.8	3.0
TR-646	105.0	93.9	15	7000	4.0(40)	0.015	9.5	3.0
TR-853	135.3	125	20	6300	4.0(40)	0.032	11.5	3.9
TR-1075	170	155	25	4500	4.0(40)	0.065	18	4.2
TR-1291	234	217.5	30	3500	4.0(40)	0.092	29.5	4.5

註 1) 總洩漏量的測定是油壓壓力 30kgf/cm² 及油溫 50° C 的情況。

註 2) 活塞推力的計算方式。

$$\text{活塞推力(KN)} = \text{活塞最大推力(KN)} \times \frac{\text{使用油壓力(MPa) -0.25 (MPa)}}{\text{最高油壓力(MPa) -0.25 (MPa)}}$$

Note 1) Total oil leakage is measured when hydraulic pressure is 30 kgf/cm² and oil temperature is 50° C.

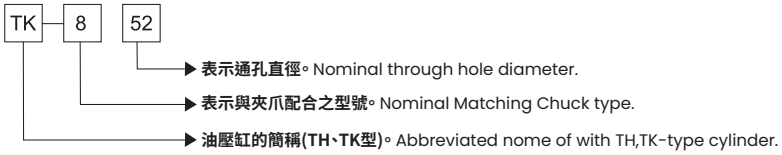
Note 2) Caculate the piston thrust.

$$\text{Piston thrust(KN)} = \text{Max. piston thrust(KN)} \times \frac{\text{Hydraulic pressure(MPa)-0.25(MPa)}}{\text{Max. hydraulic pressure(MPa)-0.25(MPa)}}$$

註 3) 以下為 AUTOGRIP 油壓缸型式的表示方法。請依照型式的稱呼方式，對照規格表來了解產品的機能。

Note 3) The following explains AUTOGRIP Brand Standard Cylinder.
Please understand specifications and tunctions by referring to the following Procedures for the nominal designation of model.

例 Example



註 4) 洩壓閥 (僅限 TK 型)

防止油壓缸內因溫昇過大導至壓力增大而損毀油壓缸。

Note 4) The reief valve (only for TK type)

This prevents any damage when the operating oil inside the cylinder increases in pressure and volume due to excessive temperature rise.

3. 安裝

3.1 油壓缸安裝概要

中空動力夾頭裝於車床主軸前方，後方裝置中空迴轉油壓缸，再以拉桿連接。

IMPORTANT
留 意 事 項

- 在油壓缸後方的防護罩需有一類似罩殼大小之通風孔，並將油壓缸配管置於防護罩之外，以便散熱。

3. MOUNTING

3.1 Mounting of rotating hydraulic cylinder

Mount the power chuck to the front of the lathe spindle, and Thru-Hole Hydraulic Rotary Cylinder to the rear.

- The window with the size similar to sleeve body or air passage should be provided on the rear cover of the lathe behind the cylinder, so that the heat generated from the cylinder may go out from it.

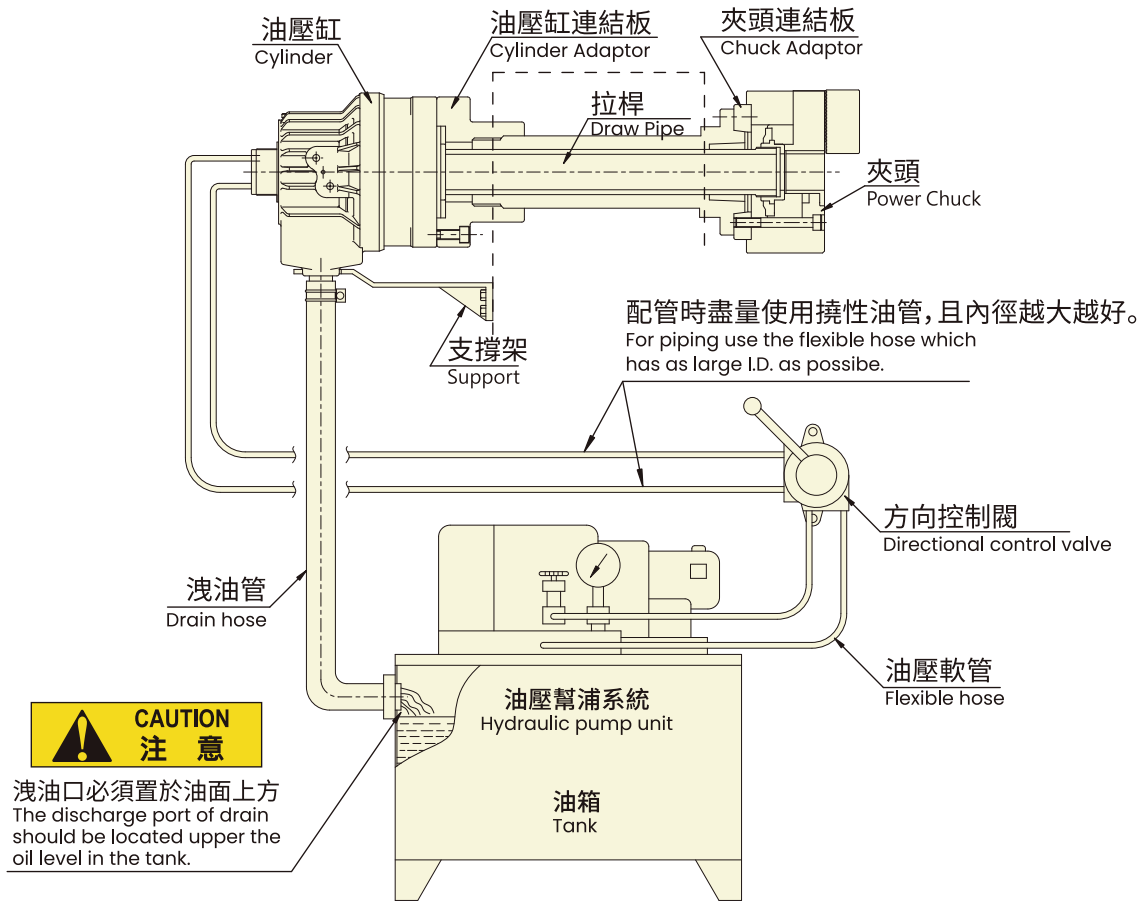


Fig.1

3.2 油壓缸連結板的製作及安裝

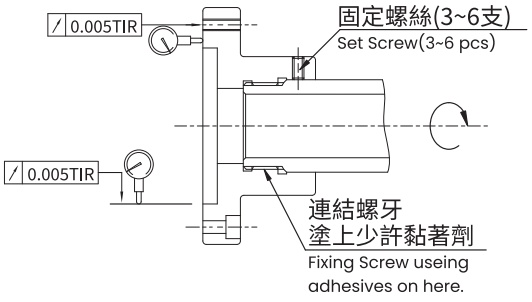
油壓缸連接板之正面及插口內徑之偏轉超過 0.005mm 將使油壓缸因震動而縮短使用壽命。

- 確使油壓缸裝置儘量靠近車床主軸支撐處。(Fig.3)
- 確實裝上固定螺絲以防止連結板鬆脫。

3.2 Preparation and mounting of cylinder adapter

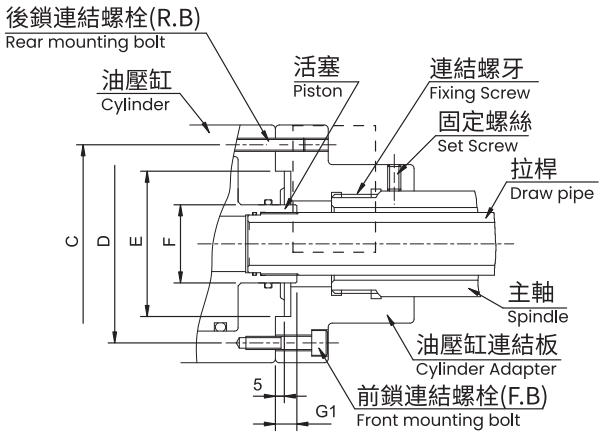
Keep the run-out on cylinder adapter front face and the run-out on its inside diameter both within 0.005mm, Excessive vibration can cause vibration and markedly shortened cylinder service life.

- Be sure cylinder near the spindle support of the lathe (Fig 3)
- Prevent lossening of the adapter remember to provide the set screw.



油壓缸連結板的偏擺量測
Run-out Measurement of Cylinder Adaptor

Fig.2



油壓缸連結板的安裝
Mounting of Cylinder Adaptor

Fig.3

型號 Model / 寸法 Dim	TH-428	TH-A536	TK-A528 TK-A533	TK-A646	TK-B646	TK-C643 TK-C646	TK-B846 TK-B853	TK-A853	TK-A1068 TK-A1075 TK-A1078	TK-A1287 TK-A1291	TK-A1511 TK-A1512	TK-A1512-35	TK-2114
C	-	-	125	147	147	140	165	165	190	225	275	275	295
D	100	115	125	147	147	140	170	170	190	215	275	275	295
E(h7)	80	100	110	130	100	120	130	140	160	180	230	230	240
F	40	48	45	65	65	65	70	70	95	110	140	140	165
G1(Max.)	10	15	12	15	15	15	20	20	25	30	30	35	35
F.Bolt 前鎖連結螺栓	6~M8	6~M10	6~M8 6~M10	12~M10	12~M10	12~M10	12~M10	12~M10	12~M10	12~M12	12~M16	12~M16	12~M16
R.Bolt	-	-	6~M8	6~M8	6~M8	6~M8	6~M8	6~M8	6~M10	6~M10	6~M12	6~M12	6~M12

型號 Model / 寸法 Dim	TK-2416 TK-2416L	TK-2820	TS-539	TS-866	TS-1081	TS-1210	TR-539	TR-646	TR-853	TR-1075	TR-1291
C	-	-	125	190	205	240	125	147	165	190	225
D	300	360	125	190	205	240	125	147	170	190	215
E(h7)	260	320	110	168	168	200	110	130	130	160	180
F	190	235	52	85	100	125	52	65	70	95	110
G1(Max.)	35	51	15	25	25	30	15	15	20	25	30
F.Bolt 前鎖連結螺栓	12~M16	12~M20	6~M10	12~M10	12~M10	12~M12	6~M10	12~M10	12~M10	12~M10	12~M12
R.Bolt	-	-	6~M8	6~M10	6~M10	6~M12	6~M8	6~M8	6~M8	6~M10	6~M10

3.3 拉桿的製作及安裝

- 參考圖 4 及圖 5 以決定拉桿長度。
- 使活塞完全伸出外部時再旋入拉桿。

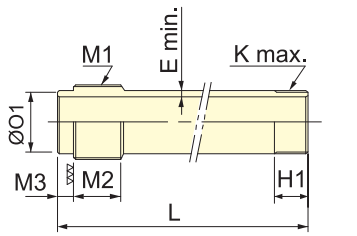
CAUTION
注 意

活塞和拉桿的螺牙的部位完全清潔後，塗上接合膠並依標準力矩鎖緊。

3.3 Preparation and mounting of draw pipe.

- Refer Fig.4 and Fig.5 determine the length of draw pipe.
- With the piston rod thoroughly extraced outside, serew the draw pipe into piston rod.

Decrease the threaded sections of the cylinder and the draw pipe completely before applying adhesives thinly and screw them.



中空拉桿詳圖 Detail of Draw Tube

L=A+G2max.+H-G1max.+M2+M3

Fig.4

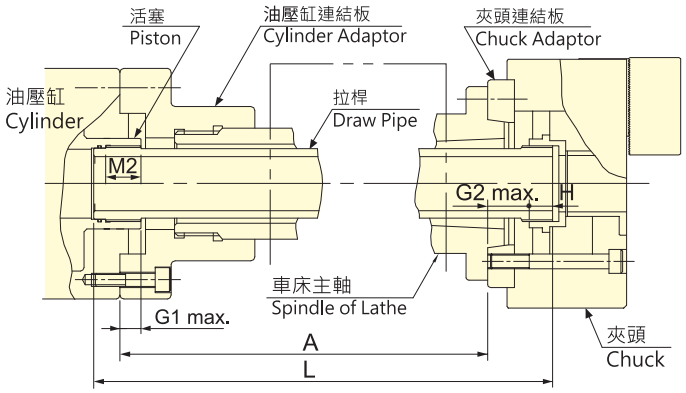


Fig.5

寸法 Dim / 型號 Mode	M1	O1 H8	H	G1 max.	G2 max.	M2	M3	E min	L	夾頭規格
TH-428	M33x1.5	30	14.5	10	31.5	25	9	5	A+61+9	3H-204A4
TH-A536	M42x1.5	38	14.5	15	31.5	25	9	5	A+56+9	3H-204A4
TK-A528/TK-A533	M38x1.5	35	14.5/17	12	31.5/16	25	10	5	A+61+9 A+46+10	3H-204A4 3H-205A4
TK-C643	M50x2	45	14	15	28	25	10	5	A+52+10	3H-206A5
TK-A646 /TK-B646 TK-C646 / TR-646	M55x2	50								
TK-B846	M55x2	50	16.5	20	33.5	30	12	5	A+60+12	3H-208A6
TK-A853/TK-B853 TR-853	M60x2	55								
TS-866	M75x2	72	16.5	25	33.5	35	12	5	A+60+12	3H-208A6
TK-A1068	M75x2	70	21	25	28.5	35	12	5	A+59.5+12	3H-210A8
TK-A1075/TR-1075	M85x2	80								
TK-A1078	M87x2	82	21	25	28.5	35	12	5	A+59.5+12	3H-210A8
TK-A1287	M95x2	90	23	30	32	35	12	5	A+60+12	3H-212A11
TK-A1291	M100x2	95								
TK-A1511	M120x2	115	23	30	32	45	12	5	A+70+12	3H-212A11
			33	30	44/51/38	45	12	5	A+92+12 A+99+12 A+86+12	3H-215A8 3H-215A11 3H-215A15

寸法 Dim / 型號 Mode	M1	O1 H8	H	G1 max.	G2 max.	M2	M3	E min	L	夾頭規格
TK-A1512	M130x2	125	23	30	32	45	12	5	A+70+12	3H-212A11
			33	30	44/51/38	45	12	5	A+92+12 A+99+12 A+86+12	3H-215A8 3H-215A11 3H-215A15
TK-A1512-35	M130x2	125	23	35	32	45	12	5	A+65+12	3H-212A11
			33	35	44/51/38	45	12	5	A+87+12 A+94+12 A+81+12	3H-215A8 3H-215A11 3H-215A15
TK-2114	M155x2	145	33	35	44/51/38/38	45	17	5	A+92+12 A+99+12 A+86+12 A+86+12	3H-215A8 3H-215A11 3H-215A15 3H-218A15
TK-2416/TK-2416L	M180x3	170	33/34	35/51	44/51/38/38/42	45	17	5	A+92+12 A+99+12 A+86+12 A+86+12 A+70+17	3H-215A8 3H-215A11 3H-215A15 3H-218A15 3H-221A15
TK-2820	M220x3	210	35	51	42	45	17	5	A+71+17	3H-224A20
TR-539 TS-539	M45x1.5	42	17	15	16	25	9	5	A+43+9	3H-205A4
TS-1081	M90x2	85	21	25	28.5	35	12	5	A+59.5+12	3H-210A8
TS-1210	M115x2	110	23	30	43	35	12	5	A+71+12	3H-212A8
TR-1291	M100x2	95	23	30	32	35	12	5	A+60+12	3H-212A11

- 依上表求得 A 值(油壓缸連接板至夾頭連接板)之距離,可得知拉桿長度 L。
- 範列:
  在 3H-206A5 、TK-C646 配合, A 值為 800mm,拉桿總長 L=A+52+10=800+52+10=862mm
- 拉桿與活塞桿之縲紋須相同。

- Use the table to find A (between cylinder adapter and back plate) and determine the dimension L..
- Example Type 3H-206A5 and TK-C646 the distance A is 800mm, so that the overall length of the draw pipe will be 862mm.L=A+52+10=800+52+10=862mm
- Accurate threading must be provided on the draw pipe in conformity with the threads on the piston rod.

WARNING
警 告

拉桿厚度不足而強度不夠引起斷裂,造成夾持力喪失產生危險而導致工件飛出。

Danger by insufficient thickness of draw pipe to secure strength It will cause the gripping force lost. As a result the workpiece discharges.

IMPORTANT
留 意 事 項

拉桿振動乃由螺牙鬆動所致。

Vibration of the draw pipe is caused by insecure threads.

3.4 安裝油壓缸

由於中空迴轉油壓缸的結構特性,洩油口務必朝下安裝,否則油壓缸罩殼的兩端會溢油出來。

3.4 Mounting of cylinder

Because of the cylinder structure. oil will overflow from both ends of the sleeve body if don't mount the cylinder with drain port on the bottom.

IMPORTANT
留 意 事 項

TK-type 型式 (24" 、28" 除外) 和 TS-type(5"~10"),通氣孔請勿堵塞,否則安裝集水盒時,容易造成油水混合。(Fig.6)

TK-type (Except 24" and 28") and TS-type (5"~10"),Do not block the vent hole,otherwise the oil and water will be easily mixed when the coolant collector is installed.(Fig.6)

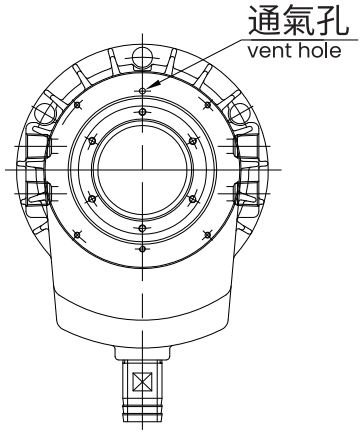


Fig.6

為防止油壓缸罩殼之旋轉發生，以洩油口底部突起處安裝一支撐架。

- 支撐架安裝於車床，應使罩殼之突出部位與其有一定之間隙方不致於承受其他外力。(Fig.7)
- 安裝油壓缸時須注意其偏擺應小於 Fig.8 所示之標準值。

In order to preevent the rotation of the cylinder sleeve body, provide a support utilizing the projections on the drain port base.

- After the support is mounted to the lathe, retain the clearance between the projected part of the sleeve body and the support so that the sleeve body will not be subjected to loading. (Fig.7)
- Be sure mounting the cylinder, the run out of the periphery must be less than the standard valves as shown in table of Fig.8.

定位架的安裝
Mounting of Support

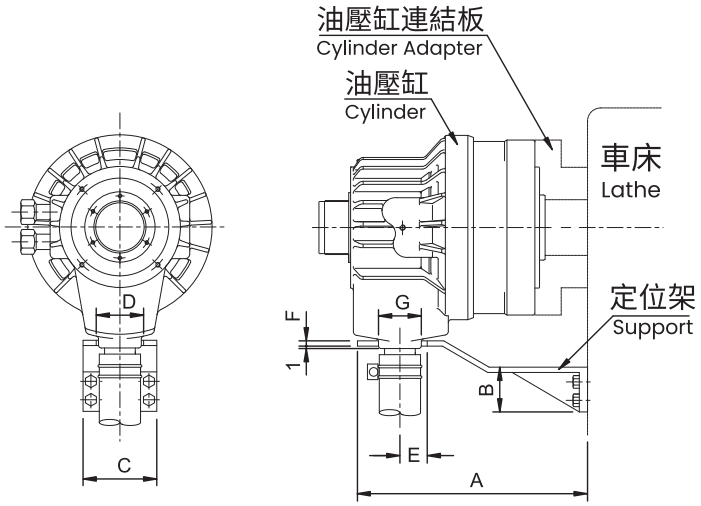
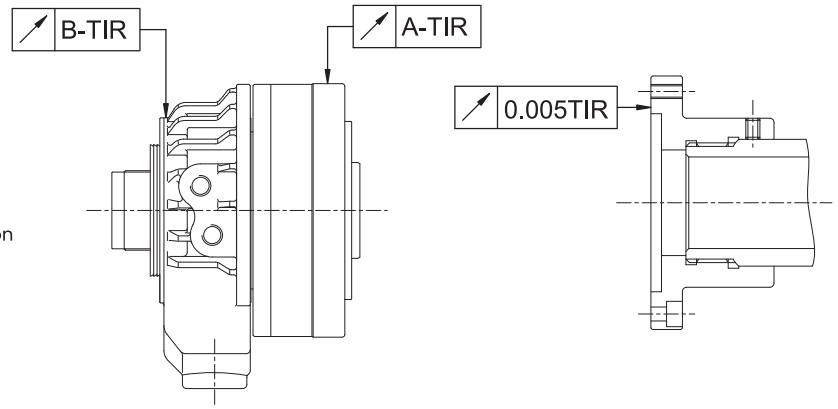


Fig.7

型號 Model / 寸法 Dim	TH-428	TH-A536	TK-A528 TK-A533 TS-539 TR-539	TK-C643 TK-A646 TK-B646 TK-C646 TR-464	TK-B846 TK-A853 TK-B853 TS-866 TR-853	TK-A1068 TK-A1075 TK-A1078 TS-1081 TR-1075	TS-1210 TK-A1287 TK-A1291 TR-1291	TK-A1511 TK-A1512 TK-A1512-35	TK-2114	TK-2416 TK-2416L	TK-2820
A	依車床的實際狀況來決定 To be determined depending on the lathe.										
B											
C	75					80					
D	43	50						52			
E	26	30						32			
F	5				6						
G	40	47						50			

油壓缸安裝時的偏擺
Run-out of Cylinder After Installation



油壓缸裝配圖
Mounting of Cylinder

油壓缸連結板
Cylinder Adapter

Fig.8

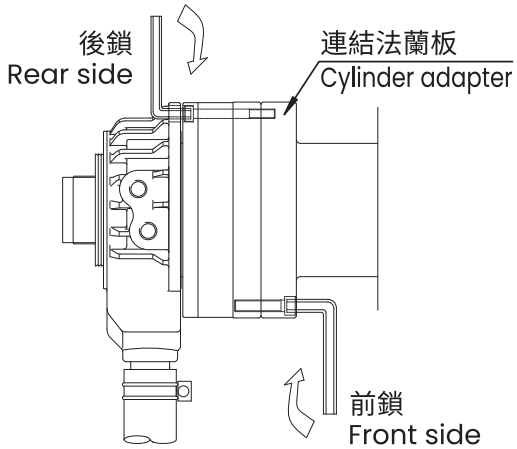
型號 Model / 寸法 Dim	TH-428	TH-A536	TK-A528 TK-A533 TS-539 TR-539	TK-C643 TK-A646 TK-B646 TK-C646 TR-464	TK-B846 TK-A853 TK-B853 TS-866	TK-A1068 TK-A1075 TK-A1078 TS-1081 TR-1075	TS-1210 TK-A1287 TK-A1291 TR-1291	TK-A1511 TK-A1512 TK-A1512-35	TK-2114	TK-2416 TK-2416L	TK-2820
A	0.010	0.010	0.010	0.015	0.015	0.020	0.020	0.025	0.030		
B	0.015	0.015	0.015	0.020	0.020	0.025	0.025	0.035	0.045		

為合乎上列數值，油壓缸連結板前端之偏擺應小於 0.005 TIR 。

In order to obtain the required value shown above, run-out on cylinder adapter front face should be 0.005TIR or less.

3.5 安裝油壓缸的正確方式及鎖緊力矩

油壓缸安裝於連接板其固定螺絲應越深越好，如下圖所示。



3.5 Use correct method and tightening torque to mounting cylinder.

When mounting a cylinder on the cylinder adapter screw as deep as illustrated below.

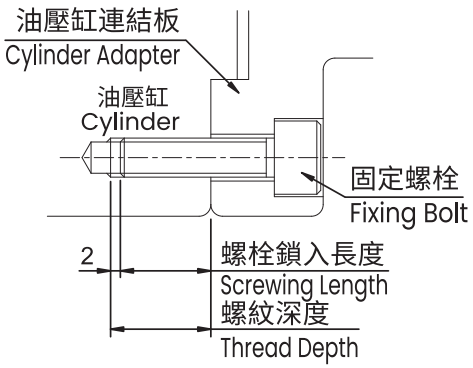


Fig.9

型號 Model / 寸法 Dim	TH-428	TH-A536 TK-A528 TK-A533 TS-539 TR-539	TK-C643 TK-A646 TK-B646 TK-C646 TR-646	TK-B846 TK-A853 TK-B853 TS-866 TR-853	TK-A1068 TK-A1075 TK-A1078 TS-1081 TR-1075	TS-1210 TK-A1287 TK-A1291 TR-1291	TK-A1511 TK-A1512 TK-A1512-35	TK-2114	TK-2416 TK-2416L	TK-2820
螺栓規格 Bolt dia.	M8	M10				M12	M16	M16	M16	M20
螺紋深度 Thread depth	15	20				24	36	32	32	40

螺紋鎖入長度須距離油壓缸螺紋深度約 2mm 。

Screwing length of the bolt should be the screw tapped length minus 2mm.

WARNING 警 告

- 依下表力矩而鎖緊螺絲。

螺絲規格 Bolt size	鎖緊力矩 Tightening torque
M8	38.2 N・m (3.9 kgf・m)
M10	72.6 N・m (7.4 kgf・m)
M12	106.8 N・m (10.9 kgf・m)

後鎖側的場合 (僅限 TK 型式)
Rear side (Only TK type)

- 由於油壓缸為鋁與合金材料, 故其鎖緊力矩約為夾頭同規格螺絲鎖緊力矩之 80% 。

- Tighten the mounting bolts comforming to each torque specified as follows.

螺絲規格 Bolt size	鎖緊力矩 Tightening torque
M8	31.5 N・m (3.2 kgf・m)
M10	60.0 N・m (6.1 kgf・m)
M12	87.0 N・m (8.9 kgf・m)
M16	205.0 N・m (20.9 kgf・m)
M20	325.6 N・m (33.2 kgf・m)

前鎖側的場合
Front side

- Each torque values above is shown with a tightening torque at 80% of hydraulic pressure chuck bolts because the cylinder is made of aluminum.

3.6 適用動力夾頭規格

為配合 AUTOGRIP 油壓缸請使用本公司之夾頭, 其規格如下:

3.6 Matching power chucks specifications

To match the AUTOGRIP hydraulic cylinder, please use our company power chucks as following specification:

型號	楔心行程	容許最大入力	最大夾持力	最大使用壓力	最高迴轉數	通孔直徑	適用油壓缸
Model	Plunger stroke	Max. D.B. pull	Max. Clamping force	Max. pressure	Max. speed	Open center	Matching cyl.
	mm	kN (kgf)	kN (kgf)	MPa (kgf/cm²)	min⁻¹ (r.p.m.)	m.m.	
3H-204	13	13.7(1400)	36.0(3670)	2.0(20)	8000	32	TK-A528/TK-C646
3H-205	13	17.2(1750)	48(4890)	2.5(25)	7000	39	TK-A533/TS-539/TR-539
3H-206	14	23.3(2375)	66.8(6810)	2.5(25)	6000	53	TK-A646/TK-A853/TR-646/TR-853
3H-208	18	31.9(3250)	107(10900)	2.6(26)	5000	66	TK-A853/TK-A1068/TS-866/TK-A1068/TR-853
3H-210	21	49.1(5010)	152(15500)	3.2(32)	4500	86	TK-A1075/TK-A1287/TR-1075
3H-212	25	58.8(6000)	157(16010)	1.9(19)	3700	106	TK-A1075/TK-A1511/TR-1075 /TS-1210
3H-215	25	71(7240)	180(18350)	2.1(21)	2500	145	TK-A1291/TK-2114 /TR-1291
3H-18B	23	71(7240)	180(18350)	1.9(19)	2000	165	TK-A1512/TK-A1512-35/TK-2416
3H-221	28	90(9175)	234(23860)	2.4(24)	1800	180	TK-A1512/TK-A1512-35/TK-2416
3H-224	28	100(10200)	240(24500)	2.1(21)	1500	210	TK-A1512/TK-A1512-35/TK-2820
3L-205	12	15.6(1590)	17.2(1750)	2.3(23)	4200	32	TK-A533

- 使用其它廠牌之動力夾頭, 使用者必須參考上述規格。
- 油壓缸之噪音低於 70dBA 。

- If other chucks are to be used, users must refer to the corresponding specifications of AUTOGRIP's power chucks.
- The noise levels of all cylinders are less than 70dBA.

4. 油壓迴路之設計

油壓迴路的設計是基於操作簡便和安全的原則，提供安全迴路，以防止停電時所產生的危險。(Fig.10)

- AUTOGRIP 油壓缸之油壓迴路含有自鎖機構工作進行時，發生停電或壓力源故障所產生的壓力異常降低時，安全閥產生效用，將夾持力維持固定狀態讓工件不致飛出而產生危險。

DANGER 危 險

- 如採 4 口 2 位電磁閥設計油壓缸之切換作用，迴路則須設計成在脫磁狀態時，工件仍能被夾持。(Fig.10)

CAUTION 注 意

- 防止由內徑夾持切換至外徑夾持之錯誤操作，須提供一個 4 口 2 位電磁閥來保持固定其位置。(Fig.10)

IMPORTANT 留 意 事 項

- 洩油管之內徑須符合油壓缸排油管之外徑，當管徑變小時，則油路阻抗增大，油缸作動速度變慢。

4. Design the Oil circuit

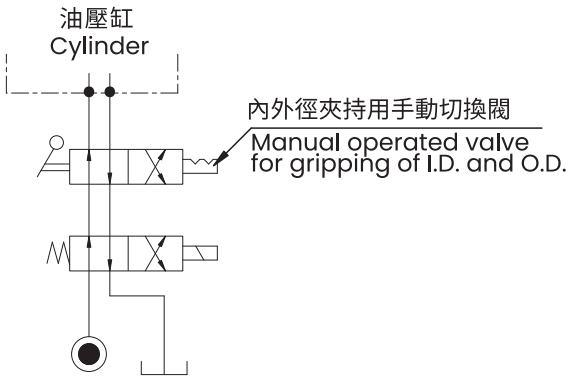
Design the hydraulic operation circuit so that it is easily operated and mis-operation does not occur. Provide the fail-safe circuiting so that the accident does not occur even if the power source is interrupted. (Fig.10)

- The unit is incorporating the locking mechanism which works to retain the specified griping force even when the abnormal drop of the supplied pressure is carsed by power failure or breakdown of pressure source during the work machining.

- In order to make the change-over of cylinder by use of the 4-port 2-position solenoid valve, the hydraulic circuit should be so designed as to grip the work when solenoid controlled is demagnetized. (Fig.10)

- Provide the inner dia./outer dia. gripping change valve in order to prevent mis-operation when changing from the inner dia. gripping to outer dia. When the solenoid valve is used for this chang valve. use the 4-port 2-position valve with position stop. The designation circuit is to be maintained.(Fig.10)

- Select the bore dia. of operation eguipment which corresponds to the piping bore dia. of cylinder. The piping resistance increases as the diameter becomes small and speed is slow.



四口二位切換閥
4-ports 2-positions controlled valve
Fig.10

5. 安裝控制閥油壓系統及管路

- 將手動控制閥安置於方便操作處。
- 油壓系統儘量安裝於靠近油壓缸附近，使其洩油管能夠盡量保持平直垂下，而壓力表指針需很容易的被清楚看見。
- 盡量使用內徑大之油管。

CAUTION
注 意

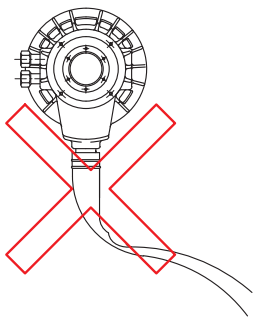
- 安裝前油管內部之雜物灰塵應完全清出，否則將導至油壓缸迴轉閥部位因過熱咬死而產生危險。
- TR-type 型式的迴轉油壓缸，在迴轉部位裝有油封，如果配置洩油管不當，有如下列圖示之情況時，則會產生較大的背壓，這將是導致油壓缸漏油的最主要原因，故在配管時應特別注意，避免發生這些情況。
- TR-type 洩油孔允許最大背壓為 0.15Kgf/cm^2，洩油管最大高度為相對於油壓缸中心上方 2.5 m 。

5. Attachment of control valve, hydraulic unit and piping.

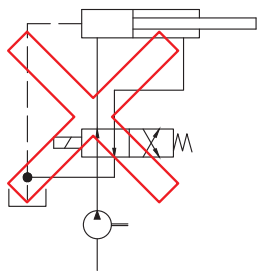
- Attach the manual operated valve in the place convenient to handle on the machine.
- Install the hydraulic unit in the place close to the hydraulic cylinder, where the drain hose can be kept straightened and where the pressure gage dial can be clearly observed.
- Use the pipe which has as large I.D. as possible.

- Remove any dirt throughly from inside of the pipe, and then install it, dirt in the cylinder can be a cause of cylinder overheating.
- TR-type Rotary Hydraulic Cylinder is with oil seals in rotary section. If the drain hose is not well installed, it will cause bigger back pressure. (As shown in the following drawing.) Back pressure is the main reason for causing oil leaking in Cylinders. Please notice and avoid back pressure when installing pipes.
- TR-type Rotary Hydraulic Cylinder the allowable back pressure on the drain port is 0.15kgf/cm^2 max. and therefore, the maximum allowable height of the drain hose relative to the cylinder center is approximately 2.5 m.

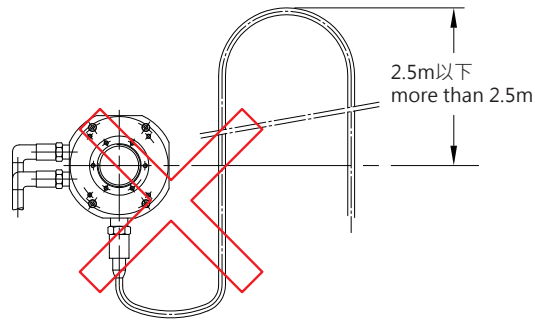
● 洩油管不可扭曲。
● Drain hose can not be tortured or blocked. Please keep the drainage smooth.



● 回油管和洩油管不可連接在一起。
● Do not connect return port with drain port together.



● TR-type型式的迴轉油壓缸，洩油管懸掛不可高於油壓缸中心線2.5m以下。
● TR-type Rotary Hydraulic Cylinders: Drain hose is hung lower more than 2.5m (measured from the center line of Rotary cylinder.)



IMPORTANT
留 意 事 項

油壓缸配管必須使用撓性油管，可防止因彎曲及張力而影響油壓缸之作動。

- 使用內徑 Ø32 的洩油管。
- 為了檢查排油是否順暢，請使用透明乙烯基的油管或相同材質油管。
- 洩油配管須有一定的斜度以利排油的流動及排除空氣。
- 油箱的洩油口必須於油面以上。(Fig.1)
- 使用於油壓油的幫浦必須至少有 20L/min 的流出量，然而油壓壓力的控制必需由幫浦的控制裝置或減壓閥分開來控制。

Be sure to use the flexible hose for piping to the cylinder so that the bending force and tensile force are not applied to the cylinder.

- Use a drain hose of 32mm I.D.
- In order to check the stagnation of hydraulic oil, use transparent vinyl hose or equivalent.
- Provide a slope to make oil flow and eliminate air inclusion.
- The drain discharge port should be located upper the oil level in the tank.(Fig.1)
- For hydraulic oil supply, the variable capacity type pump which has the discharge capacity or 20 L/min or more is used. Oil pressure is set with pump's own control device or a reduction valve which is provided separately from the system.

6. 油壓油

- 為了確保油壓缸之適用性，建議使用黏性 30~50cSt (溫度 40° C) 之油壓油 (相當於 ISO VG32 和 VG46)

IMPORTANT
留 意 事 項

- 油壓油應具有抗磨損及不起泡等性質，且供給油路中應有 20 μ m 之濾網。
- 油壓缸之溫度，洩油量及作動速度受油之品質所影響，應依幫浦之使用說明來調整油壓油。

6.Hydraulic oil

- For satisfactory operation of the cylinder it is recommended to use the hydraulic oil whose viscosity is 30~50cSt at a temperature of 40° C. (equipvalent to ISO VG32 and VG46)

- The hydraulic oil should have anti-abrasive and anti-foaming characteristic. In order to retain good performance of the cylinder, be sure to include the filter of 20 μ m in the pressure supply system.
- Since hydraulic oil is influenced to the cylinder healing, drain volume and operation speed, regulate the oil according to the instruction manual of the pump unit.

7. 操作測試

(1) 確認電壓為指定值。

(2) 測試時壓力調整把手開到最小並迅速切換開關以檢查幫浦旋轉方向是否正確，如運轉方向相反，關掉電源並換接電源線中之兩條電線後，重復檢測無誤後，始可全速運轉。

(3) 油壓力設定以能使夾頭作動之最低壓(0.35~0.5MPa) 接著依下列程序檢查。

- 檢查夾頭作動是否順暢。
- 夾爪開合的動作方向是否正確。
- 夾爪的行程是否足夠。
- 有無漏油。

依上述事項檢查正確後，緩慢的增加壓力直至所需的壓力值，再檢查一次，同時查看洩油管的排油是否順暢。

(4) 主軸轉速設定於最低，若運轉正常，增加轉速並檢查油壓缸之偏擺狀況及支撐處及管路有無異常。若產生震動則檢查油壓缸連接板之偏擺狀況。

(5) 如油溫不高 (介於 20 至 30° C) 以最高轉速之 1/3 來熱機。

7.Test Run

(1) Confirm the voltage is as specified.

(2) During the test run. set te pressure adjustment handle at the minimum level and check the direction of pump rotation by inching (putting the switch on and off briefly in alternation). If the pump is rotated in reverse direction, turn power source off. Reverse two of three powerwises. After checking the direction of rotation, to operate at maximum speed.

(3) After lowering the chucking pressure to the minimum pressure, set the pressure to the low pressure which can chuck (0.35~0.5MPa) and check the following steps.

- Check the chuck operation is smooth.
- Check the chucking direction is corect (chuck clamp and unclamp directions)
- Chuck the operation stroke is adequate (chuck jaw stroke)
- Check the oil leakage is not found on each piping.

When the above procedures are correct, slowly raise the operation pressure to the rated pressure, rechecking the above steps. At this time, check that the drain smoothly flows.

(4) Rotate the lathe spindle at a minimum revolution and slowly raise the revolution unless there is the run-out of cylinder and fault of supporter or piping. If the rotary vibration is extreme, it is recheck the run-out of adapter.

(5) In case of the oil temperature is low (below 20~30°C), make the run-in operation at the rotational speed of approx. 1/3 of max. speed.

CAUTION
注 意

當機器長時間持續運轉，而沒有做油壓缸切換操作動作或主軸皮帶輪發熱，或油壓缸周圍存在著特別熱源，其內部的鎖緊機構將使油壓缸因溫度突然上昇導至內部壓力上昇，而無法正常操作，這些問題在試車時特別容易發生，所以必須經常使活塞做反覆運動。

When the ambient temperature of cylinder rises suddenly, i.e., When the machine is continuously operated for long hours without changing operation or with heat generation of main shaft pulley occurring or special heat source exists around the cylinder, the sealed pressure into the cylinder rises because of a built-in locking mechanism, thereby causing cylinder malfunction. Especially, during running-in, this trouble is apt to occur. Therefore, frequently make reciprocating motions of the piston.

當油壓缸的運轉逐漸變得不正常，請採取下列步驟：

(1) 停止運轉。

(2) 旋轉油壓系統中控制夾頭壓力設定之減壓把手，增加約 0.5MPa 之壓力，其次重覆切換開關以測試油壓缸之運動。

(3) 如運轉仍不正常，增加夾頭之預設壓力每次約 0.5MPa，再重覆步驟 (2)，但增加的預設壓力不可超過最大壓力之 30%。當一切回復正常時，將預設壓力調回正常值。

(4) 如步驟 (3) 已重覆多次並使預設壓力達到最大值亦無法正常，則將壓力回復正常值，關掉電源，待油壓缸之溫度降回室溫時再重覆步驟 (2)、(3)。可用風槍或類似裝置降低油壓缸之溫度。

(5) 降溫後仍無法正常運轉，鬆開夾頭端的連接螺帽，拆下連結部份以檢視油壓缸之作動是否正常。

When the cylinder becomes inoperative, operate the machine with the following steps for normal operation as well as test run:

(1) Stop the spindle.

(2) Turn the pressure adjustment handle of reducing valve provided on the hydraulic unit for the purpose of chuck pressure setting (cylinder pressure setting), and raise the pre-set chuck pressure by approx. 0.5MPa. Then make the repeated change-over of the cylinder operation change-over switch to confirm cylinder motion.

(3) If the cylinder remains inoperative, gradually increase the pre-set chuck pressure (by approx. 0.5MPa each) and repeat the same procedures as described in above (2) for confirmation of cylinder motion. At this time, upper limit of pressure is added by 30% of maxmum chuck pressure. when the cylinder operation is recovered, bring back the pre-set chuck pressure to the normal level.

(4) When the normal cylinder operation can not be recovered despite that the pre-set chuck pressure is brought up to maximum value and that the operations described in above (3) are made several times, bring the pre-set chuck pressure down to the normal level and turn off the power. Then let it cool down until the cylinder surface temperature becomes nearly the same as room temperature, and repeat the procedures stated in (2) and (3) above to check the cylinder motion. The cylinder can be cooled faster by blowing air on the cylinder with an air gun or equivalent.

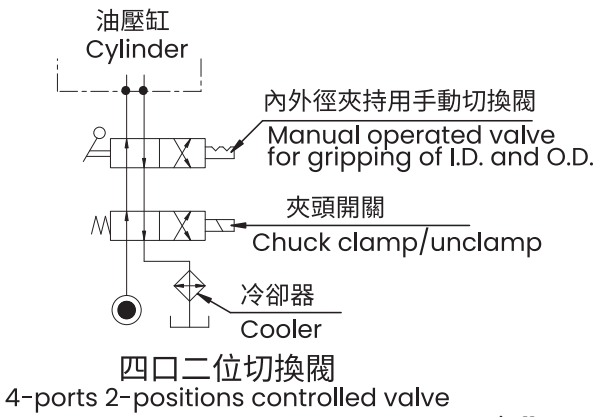
(5) When the cylinder operation never recovers even after it is cooled, loosen the draw-nut of the chuck side and take off the connection for confirmation of cylinder motion.

8. 油壓油的溫度上昇

・ 持續高速操作會讓密封件材質及油質惡化，使用冷卻裝置使溫度低於 60° C 。

8.Temperature rise of hydraulic oil

・ Continuous high speed operation causes a considerable increase of oil temperature, rapidly deteriorating the sealing materials and the hydraulic oil. Keep the oil temperature below 60° C, by use of a cooler.



四口二位切換閥
4-ports 2-positions controlled valve

Fig.11

☆ 此時應減少背壓

☆ In this case minImige the back pressure.

9. 維護及檢查

・ 當因漏油而須拆解油壓缸清洗和更換 O 型環時應很小心，因其一部份乃是由輕合金製造。

油壓系統

・ 吸油口過濾網每隔 2~3 月清洗一次。

・ 油壓油每半年檢查一次，如已變質即行更換。

9.Maintenance and inspection

・ When the oil leakage observed, disassemble the cylinder for cleaning and replacement of O-ring. At the time, handle the cylinder with care as it partly uses the ligth alloy.

Hydraulic Unit

・ Clean the suction strainer in every 2~3 months.

・ Check the hydraulic oil in every half year and replace it if it is deteriorated.

9.1 清潔

・ 集水盒堆積過多之切屑，導致切削液及雜質溢流回罩殼油槽，造成油壓缸損壞，亦可能造成油壓泵有不正常之磨損，須保持切削液暢通，參考 Fig.12 。

9.1 Clean

・ Excessive swarf clogging in the coolant collector may cause the coolant and impurities to overflow to the oil tank,thus resulting in damage to the rotary cylinder. Moreover, it may also cause abnormal wear and tear to the oil hydraulic pump; therefore, it is necessary to keep the the coolant flowing smoothly. (Refer to Fig.12)

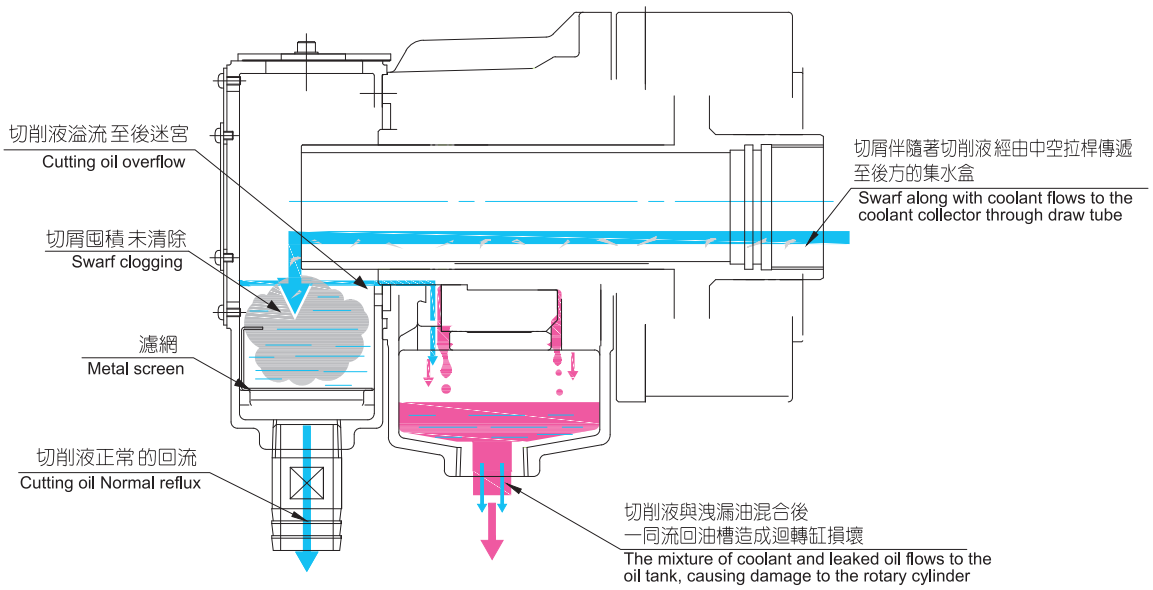


Fig.12

WARNING 警 告

- 以最大油壓力及最高轉速操作時每 25 萬次分解內部零件，更換油封檢查各零件。
- 油壓缸之作動不良、損壞乃因突壓過大，以節流閥來降低其壓力。
- 每星期檢查斷電時之安全裝置，以夾持一工件後關掉電源查看夾持情形，假若能完全夾緊，表示安全裝置能有效運作，相反則否，如此請立刻與你的經銷商連絡，給予修理服務。

- When operating the machine with maximum hydraulic pressure and maximum speed, disassemble it at every 250 thousands of use and replace the seal and inspect each component.
- When surge pressure is greatly applied, thereby causing cylinder faiure and damage. Therefore, adjust the throttle valve to reduce the surge pressure.
- The safety device for power failure should be checked once a week. The checking procedure is to grip a workpiece first, then turn off hte power. Inspect the gripping condition of the workpiece. If the workpiece is clamped tightly, it indicates the safety device works effectively. Otherwise, the safety function fails. Please call your local dirstributor for repair service.

10. 故障排除

活塞不作動

- 由撓性油管中確認油壓系統處於運轉中。
- 確認所有管路皆連接正確。
- 依循操作測試步驟來修正活塞之不作動。

油壓缸推力不足

- 裝置一個壓力計於油壓缸之給油入口處以確認其壓力是否達到正常值。
- 如在油路回歸測之壓力太高或洩油量多於正常值，可能為 O 型環損壞所致。

溫度上昇

- 確認油壓油之黏度是否合乎標準。
- 如油箱之油量不足須再補充。
- 如油箱的周遭溫度太高而造成油箱散熱不良時，請使用冷卻裝置或風扇來控制油溫。

泵之噪音

- 避免空氣進入。
- 如油箱之油量不足須再補充。
- 油箱堆積過多之雜質或油壓油之品質已惡化，可能是油壓泵有不正常之磨損，須立即修理或更換。

不明之漏油現象

- 使洩油管傾斜一個適當角度，以利排除空氣。
- 確認洩油口是否在油箱之油面上。(Fig.1) 。
- 確認油壓缸通氣栓或油箱有無遭雜質阻塞。

10.Troubleshooting

Inoperative Piston

- Confirm from the motion of the flexible hose that the hydraulic pressure is working.
- Confirm that the piping is correctly arranged.
- Follow the procedures described under Test Run to correct the inoperative piston.

Insufficient Cylinder Propulsive Force

- Apply the pressure gage near the entrance of the cylinder and confirm that the pressure in the cylinder pipe entrance confirms to the specified value.
- If the pressure of piping at return side is high or drain flow is more than a normal condition, it is considerd that the inside 0-ring is worn.

Temperature Rise

- Confirm the viscosity of the hydraulic oil is correct.
- Replenish the hydraulic oil if in the tank it has decreased.
- High room temperature will cause the temperature of the tank to rise. Use a cooler or fans to control the temperature.

Pump Noise

- Avoid suctioning of air.
- Replenish the hydraulic oil if it has decreased.
- When considerable dirt is deposited inside of the hydraulic tank or when the hydraulic oil has deteriorated, it is probable that the pump has been abnormally worn out, needing repair or replace.

Leakage Out of the Labyrinth

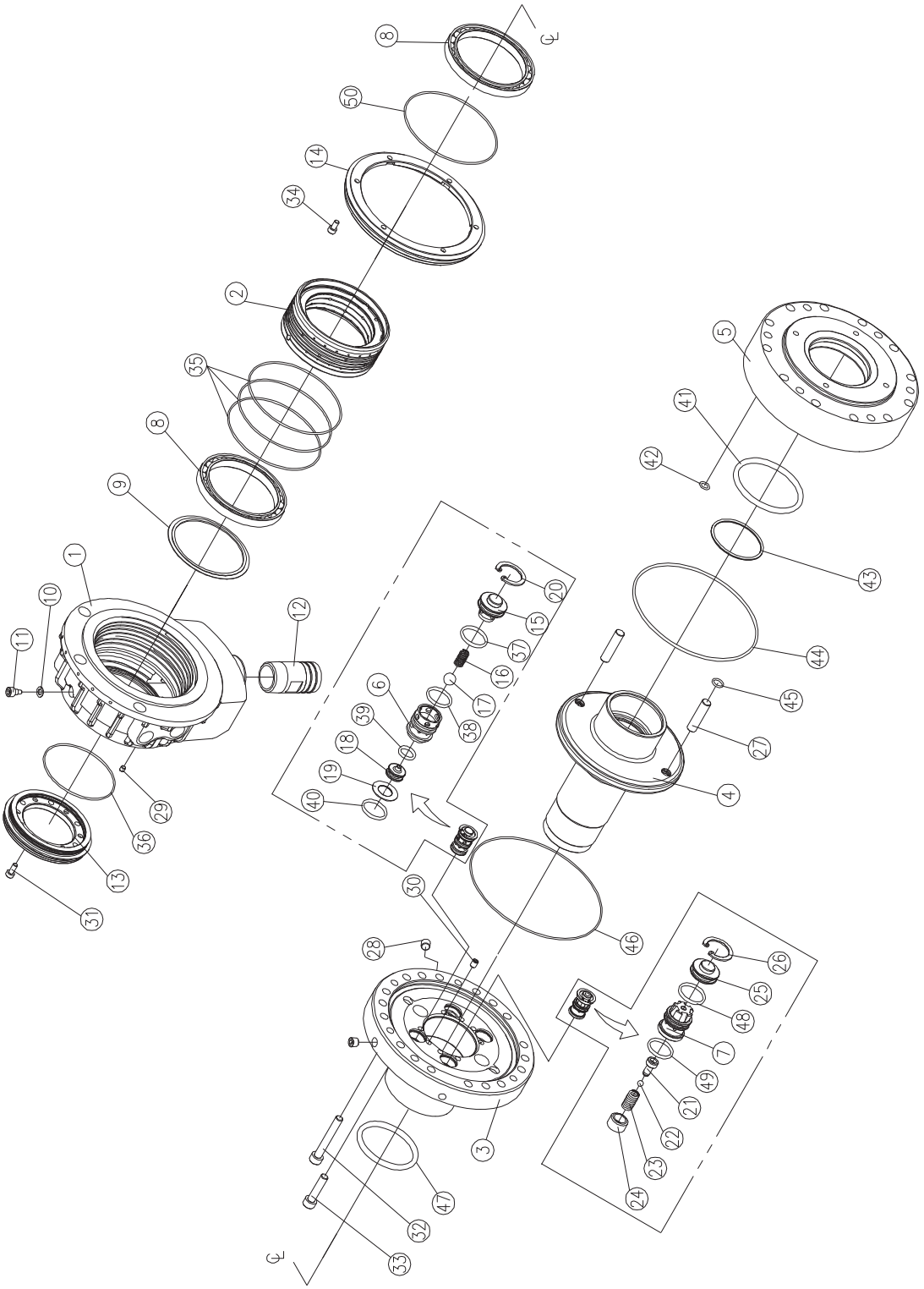
- Set the drain hose with a flowing grade in order to eliminate air pockets.
- Return drain to the oil face of the hydraulic unit.(Fig.1)
- Confirm that the air vent of cylinder or hydraulic uit is not clogged with dirt, etc.

11. 迴轉油壓缸零件分解圖

11.1 TK 型零件分解圖

11.Parts list of cylinder

11.1 TK type parts list



TK 型 - 零件表 Parts List

No.	零件名稱	Name of parts	Q'ty 數量
1	罩殼	Housing	1
2	閥體	Valve Sleeve	1
3	迴轉閥軸	Rotary Valve Saft	1
4	活塞	Piston	1
5	油壓缸體	Cylinder Body	1
6	自鎖閥	Check Valve	2
7	洩壓閥	Relief Valve	2
8	滾珠軸承	Ball Bearing	2
9	柵環	Flinger	1
10	鐵氟龍墊圈	Seal Washer	1
11	罩殼固定螺絲	Hex. Socket set screw	1
12	排油接頭	Nipple	1
13	外柵環	Outside Flinger	1
14	前柵環	Inside Flinger	1
15	自鎖閥珠保持座 (A)	Retainer(A)	1
	自鎖閥珠保持座 (B)	Retainer(B)	1
16	彈簧	Spring	2
17	鋼珠	Steel Ball	2

No.	零件名稱	Name of parts	Q'ty 數量
18	導引活塞	Pilot piston	2
19	墊片	Gasket	2
20	C 型扣環	Snap Ring	2
21	洩壓閥珠保持座	Retainer	2
22	鋼珠	Steel Ball	2
23	彈簧	Spring	2
24	調整螺絲	Adjust the screws	2
25	洩壓閥蓋 (A)	Plate(A)	1
	洩壓閥蓋 (B)	Plate(B)	1
26	C 型扣環	Snap Ring	2
27	導銷	Guide Pin	2
28	PT 1/8 管塞	Pipe thread 1/8	2
29	六角孔固定螺絲	Hex. Socket set screw	1
30	六角孔固定螺絲	Hex. Socket set screw	8
31	六角孔圓頭螺栓	Hex. socket cap bolt	6
32	六角孔圓頭螺栓	Hex. socket cap bolt	6
33	六角孔圓頭螺栓	Hex. socket cap bolt	12
34	六角孔圓頭螺栓	Hex. socket cap bolt	6

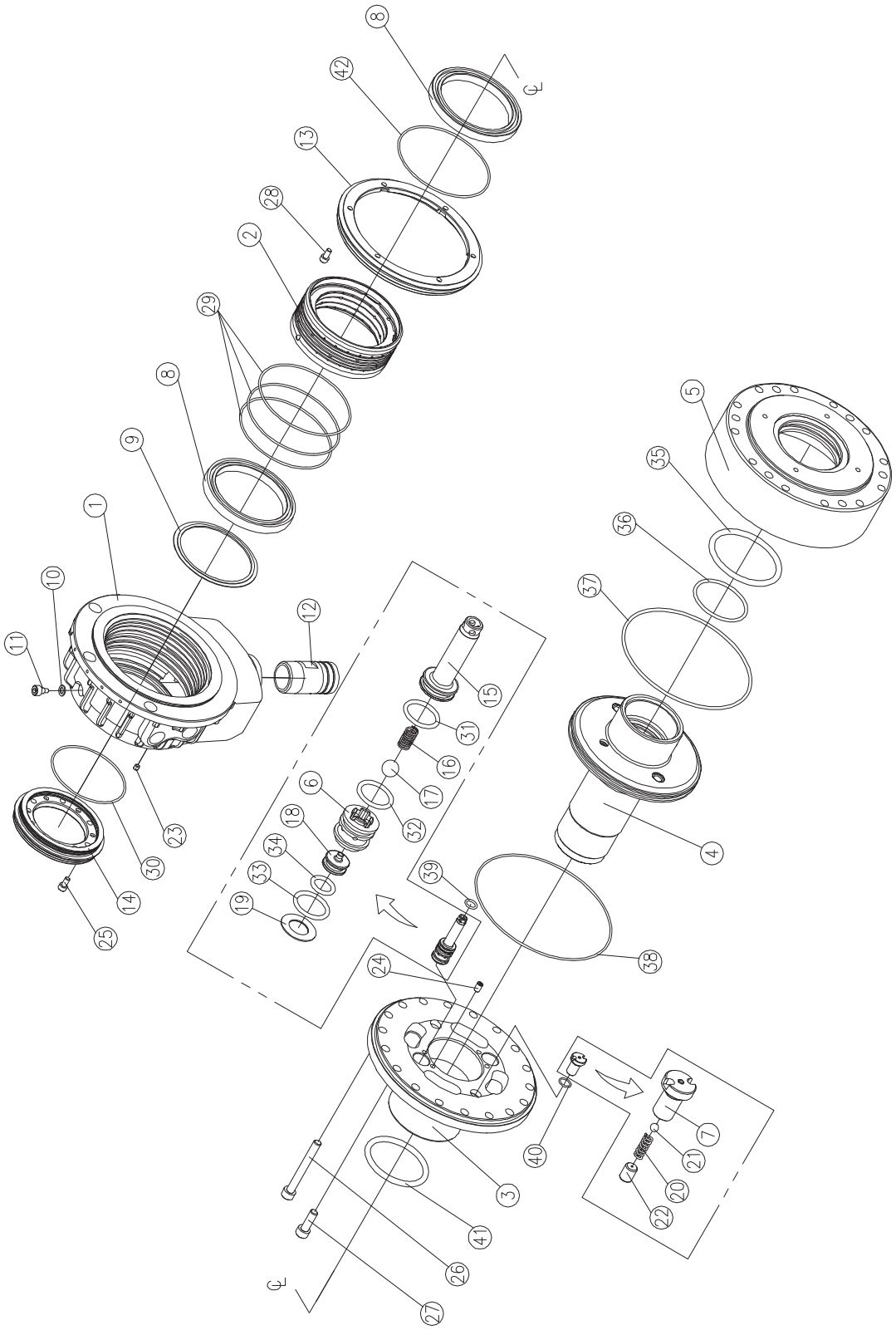
消耗零件表 Consumable Parts

No.	零件名稱	Name of parts	TK-2114	TK-2416	TK-2416L	TK-2820	Q'ty 數量
35	O 型環	O-Ring	AS568-174	3260		3330	3
36	O 型環	O-Ring	3170	3200		3250	1
37	O 型環	O-Ring	JASO1016				1
38	O 型環	O-Ring	JASO1015				2
39	O 型環	O-Ring	P9				2
40	O 型環	O-Ring	JASO1015				2
41	O 型環	O-Ring	P165	P190		P235	1
42	O 型環	O-Ring	P9				2
43	O 型環	O-Ring	P145	G170		G210	1
44	O 型環	O-Ring	P250	P275		P325	1
45	O 型環	O-Ring	P10				2
46	O 型環	O-Ring	AS568-275	AS568-277		AS568-279	1
47	O 型環	O-Ring	P150	G175		G220	1
48	O 型環	O-Ring	JASO1016				1
49	O 型環	O-Ring	JASO1015				2
50	O 型環	O-Ring	AS568-271	AS568-277		AS568-279	1

註：
1) No.15 自鎖閥珠保持座 (B) 不用安裝 No.37 的 O 型環及 No.25 洩壓閥蓋 (B) 不用安裝 No.48 的 O 型環 .
1) No.15 Retainer(B) don't have to install No.37 O-Ring and No.25 Plate(B) don't have to install No.48 O-Ring.

11.2 TK-A 型零件分解圖

11.2 TK-A type parts list



TK-A 型 - 零件表 Parts List

No.	零件名稱	Name of parts	Q'ty 數量
1	罩殼	Housing	1
2	閥體	Valve Sleeve	1
3	迴轉閥軸	Rotary Valve Saft	1
4	活塞	Piston	1
5	油壓缸體	Cylinder Body	1
6	自鎖閥	Check Valve	2
7	洩壓閥 (A.B)	Relief Valve	2
8	滾珠軸承	Ball Bearing	2
9	柵環	Flinger	1
10	鐵氟龍墊圈	Seal Washer	1
11	罩殼固定螺絲	Hex. Socket set screw	1
12	排油接頭	Nipple	1
13	前柵環	Inside Flinger	1
14	外柵環	Outside Flinger	1

No.	零件名稱	Name of parts	Q'ty 數量
15	自鎖閥珠保持座 (A)	Retainer(A)	1
	自鎖閥珠保持座 (B)	Retainer(B)	1
16	彈簧	Spring	2
17	鋼珠	Steel Ball	2
18	導引活塞	Pilot piston	2
19	墊片	Gasket	2
20	彈簧	Spring	2
21	鋼珠	Steel Ball	2
22	調整螺絲	Adjust the screws	2
23	六角孔固定螺絲	Hex. Socket set screw	1
24	六角孔固定螺絲	Hex. Socket set screw	4
25	六角孔圓頭螺栓	Hex. socket cap bolt	6
26	六角孔圓頭螺栓	Hex. socket cap bolt	6
27	六角孔圓頭螺栓	Hex. socket cap bolt	12
28	六角孔圓頭螺栓	Hex. socket cap bolt	6

消耗零件表 Consumable Parts

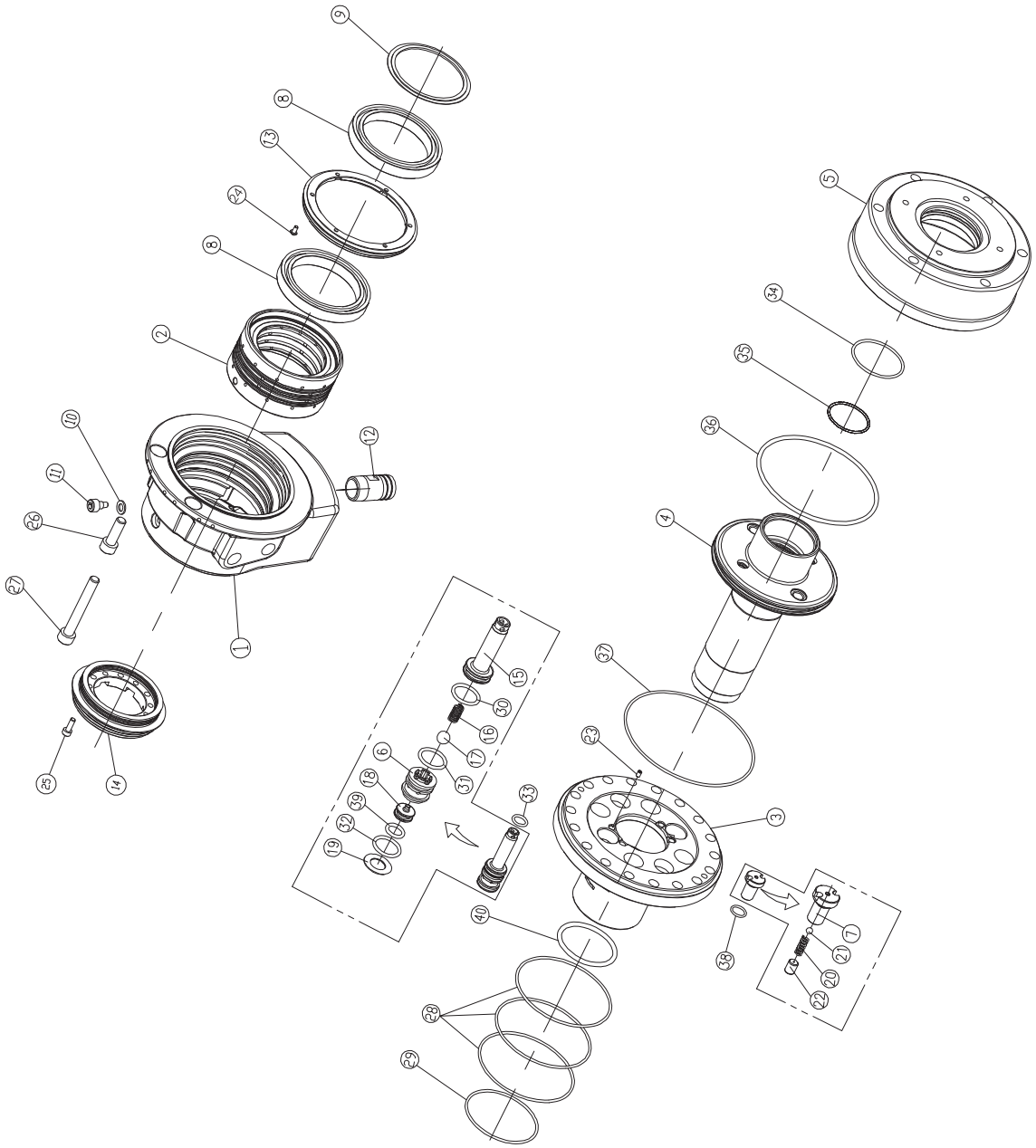
No.	零件名稱	Name of parts	TK-A528	TK-A533	TK-C643	TK-A646	TK-B646	TK-C646	Q'ty 數量
29	O 型環	O-Ring	S75		S90				3
30	O 型環	O-Ring	S55		S70				1
31	O 型環	O-Ring	JASO1015						1
32	O 型環	O-Ring	JASO1015						2
33	O 型環	O-Ring	JASO1015						2
34	O 型環	O-Ring	P9						2
35	O 型環	O-Ring	P45		P65				1
36	O 型環	O-Ring	S35		S45	S50			1
37	O 型環	O-Ring	G100		G120				1
38	O 型環	O-Ring	S110		S125	S132		S125	1
39	O 型環	O-Ring	P10						2
40	O 型環	O-Ring	S11.2						2
41	O 型環	O-Ring	P40		P53				1
42	O 型環	O-Ring	-						1

No.	零件名稱	Name of parts	TK-B846	TK-A853 TK-B853	TK-A1068	TK-A1075	TK-A1078	TK-A1287	TK-A1291	TK-A1511 TK-A1512 TK-A1512-35	Q'ty 數量
29	O 型環	O-Ring	S100		G130			AS568-163	AS568-163	AS568-170	3
30	O 型環	O-Ring	S80		S105			S120	S120	S150	1
31	O 型環	O-Ring	JASO1015							JASO1021	1
32	O 型環	O-Ring	JASO1015							JASO1021	2
33	O 型環	O-Ring	JASO1015							JASO1021	2
34	O 型環	O-Ring	P9							P14	2
35	O 型環	O-Ring	P70		P95			P110	P110	P140	1
36	O 型環	O-Ring	G50	G55	G70	G80	AS568-152	G90	G95	G115/G125	1
37	O 型環	O-Ring	G140		G160			G190	G190	G235	1
38	O 型環	O-Ring	S150		S170			AS568-171	AS568-171	AS568-273	1
39	O 型環	O-Ring	P10							P12	2
40	O 型環	O-Ring	S11.2								2
41	O 型環	O-Ring	P60		P85			P100	P100	P130	1
42	O 型環	O-Ring	-							AS568-270	1

註：
1) No.15 自鎖閥珠保持座 (B) 不用安裝 No.31 的 O 型環 .
1) No.15 Retainer(B) don't have to install No.31 O-Ring.
2) TK-A1511 和 TK-A1512 需安裝 No.13 前柵環 ,No.28 六角孔圓頭螺絲及 No.42 O 型環 .
2) TK-A1511 and TK-A1512 have to install No.13 Inside Flinger,No.28 Hex. socket cap bolt and No.42 O-Ring.

11.3 TS 型零件分解圖

11.3 TS type parts list



TS 型 - 零件表 Parts List

No.	零件名稱	Name of parts	Q'ty 數量
1	罩殼	Housing	1
2	閥體	Valve Sleeve	1
3	迴轉閥軸	Rotary Valve Saft	1
4	活塞	Piston	1
5	油壓缸體	Cylinder Body	1
6	自鎖閥	Check Valve	2
7	洩壓閥 (A.B)	Relief Valve	2
8	滾珠軸承	Ball Bearing	2
9	柵環	Flinger	1
10	鐵氟龍墊圈	Seal Washer	1
11	罩殼固定螺絲	Hex. Socket set screw	1
12	排油接頭	Nipple	1
13	前柵環	Inside Flinger	1
14	外柵環	Outside Flinger	1

No.	零件名稱	Name of parts	Q'ty 數量
15	自鎖閥珠保持座 (A)	Retainer(A)	1
	自鎖閥珠保持座 (B)	Retainer(B)	1
16	彈簧	Spring	2
17	鋼珠	Steel Ball	2
18	導引活塞	Pilot piston	2
19	墊片	Gasket	2
20	彈簧	Spring	2
21	鋼珠	Steel Ball	2
22	調整螺絲	Adjust the screws	2
23	六角孔固定螺絲	Hex. Socket set screw	4
24	六角孔半圓頭螺栓	Hex. socket button screw	4 or 6
25	六角孔圓頭螺栓	Hex. socket cap bolt	6
26	六角孔圓頭螺栓	Hex. socket cap bolt	12
27	六角孔圓頭螺栓	Hex. socket cap bolt	6

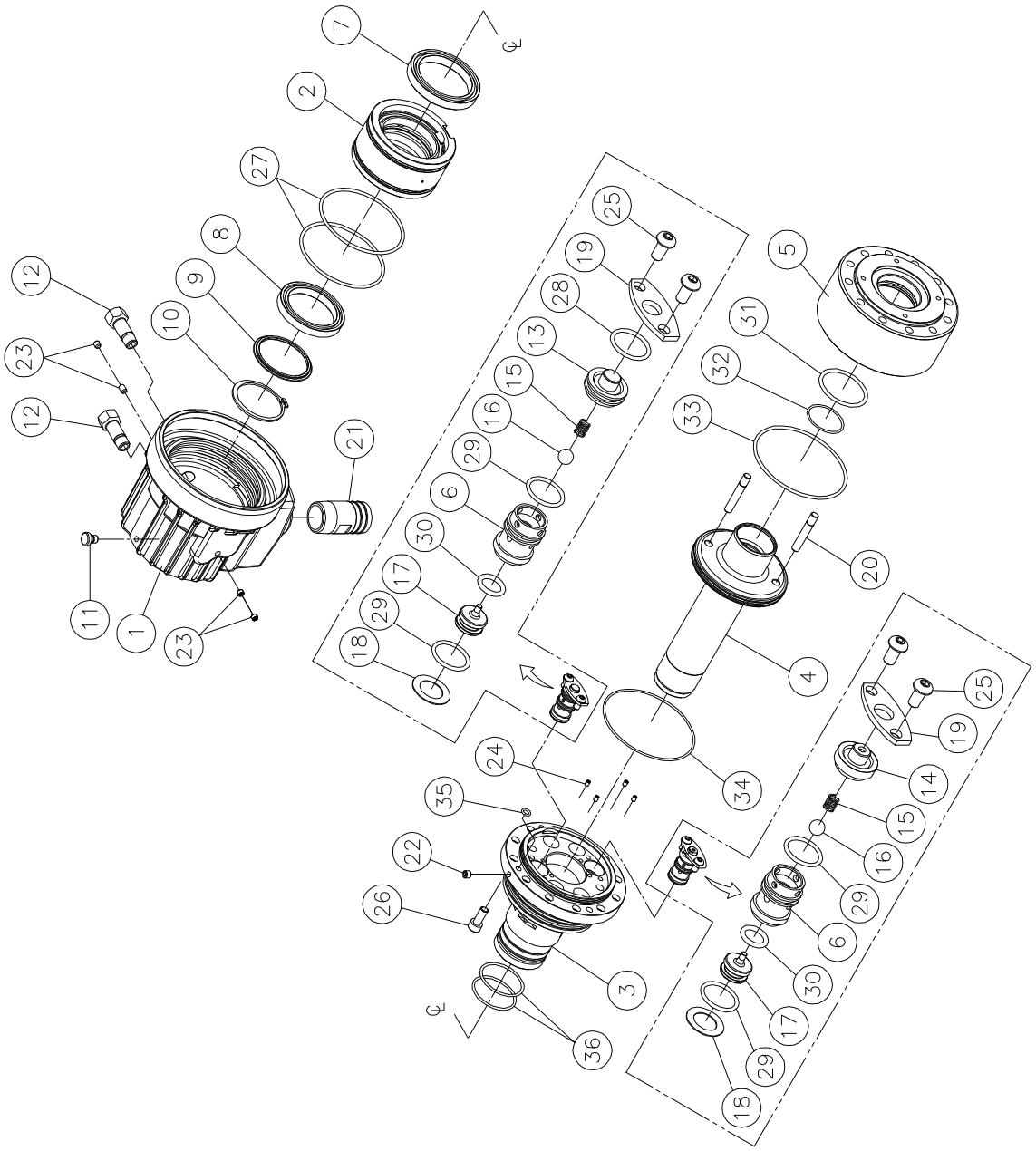
消耗零件表 Consumable Parts

No.	零件名稱	Name of parts	TS-539	TS-866	TS-1081	TS-1210	Q'ty 數量
28	O 型環	O-Ring	S80	S125	AS568-162	AS566-167	3
29	O 型環	O-Ring	S60	S95	S110	S140	1
30	O 型環	O-Ring	JASO1015			JASO1017	1
31	O 型環	O-Ring	JASO1015			JASO1017	2
32	O 型環	O-Ring	JASO1015			JASO1017	2
33	O 型環	O-Ring	P10			P10	2
34	O 型環	O-Ring	CO7279A	P85	P100	P125	1
35	O 型環	O-Ring	S42	G72	G85	G110	1
36	O 型環	O-Ring	G100	G155	G170	G200	1
37	O 型環	O-Ring	S110	AS568-166	AS568-168	AS568-173	1
38	O 型環	O-Ring	S11.2			S11.2	2
39	O 型環	O-Ring	P9			P10A	2
40	O 型環	O-Ring	P45	P75	P90	P120	1

註：No.15 自鎖閥珠保持座 (B) 不用安裝 No.30 的 O 型環 .　　Note:No.15 Retainer(B) don't have to install No.30 O-Ring.

11.4 TH 型零件分解圖

11.4 TH type parts list



TH 型 - 零件表 Parts List

No.	零件名稱	Name of parts	Q'ty 數量
1	罩殼	Housing	1
2	閥體	Valve Sleeve	1
3	迴轉閥軸	Rotary Valve Saft	1
4	活塞	Piston	1
5	油壓缸體	Cylinder Body	1
6	自鎖閥體	Housing	2
7	滾珠軸承	Ball Bearing	1
8	滾珠軸承	Ball Bearing	1
9	柵環	Flinger	1
10	C 型扣環	Snap Ring	1
11	通氣栓	Air Vent	1
12	油管接頭	Nipple	2
13	自鎖閥珠保持座 (A)	Retainer(A)	1
14	自鎖閥珠保持座 (B)	Retainer(B)	1

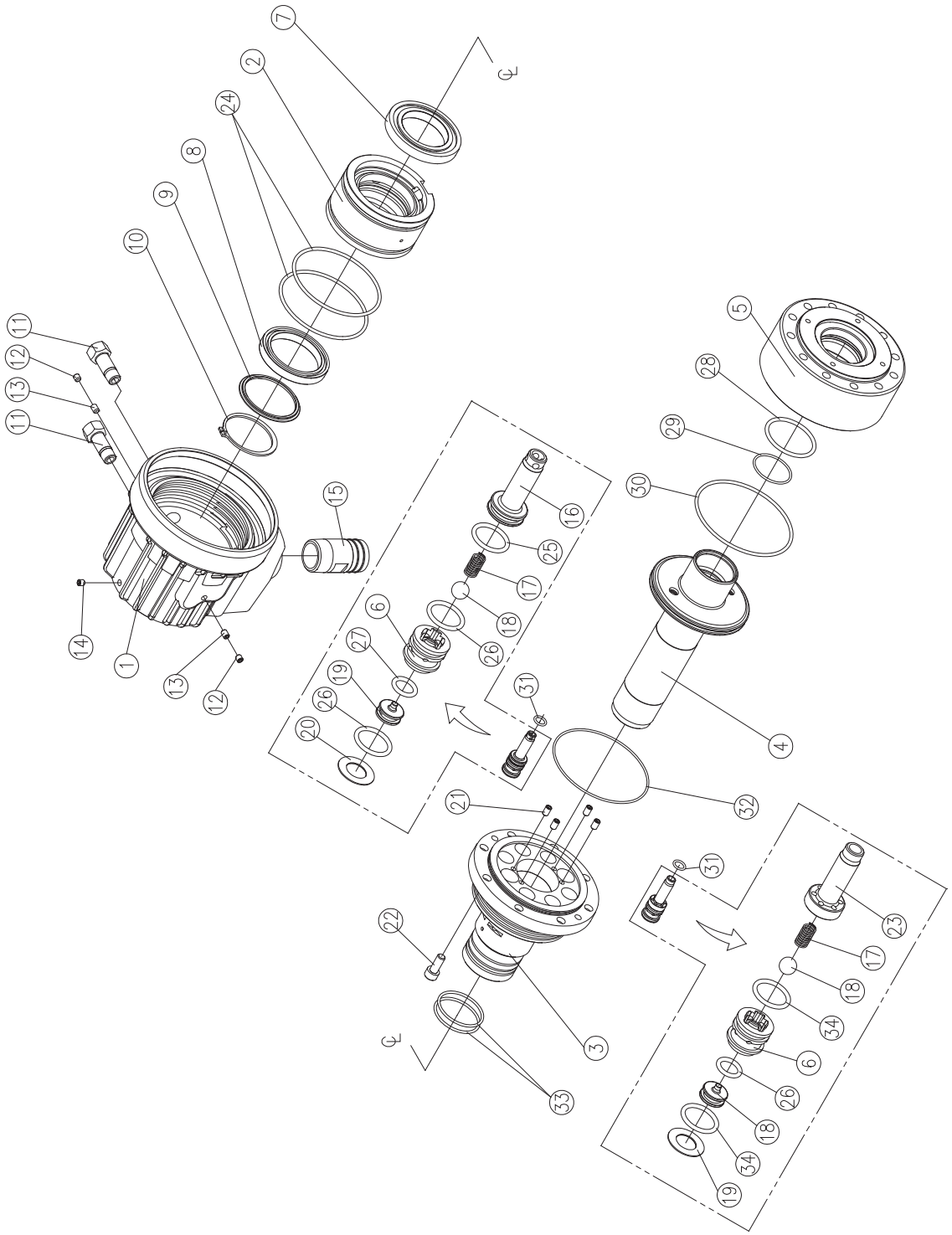
No.	零件名稱	Name of parts	Q'ty 數量
15	彈簧	Spring	2
16	鋼珠	Steel Ball	2
17	導引活塞	Pilot piston	2
18	墊片	Gasket	2
19	固定塊	Plate	2
20	止迴銷	Guide pin	2
21	排油接頭	Nipple	1
22	斜管牙管塞	Plug Screw	1
23	六角孔固定螺絲	Hex. Socket set screw	4
24	六角孔固定螺絲	Hex. Socket set screw	4
25	六角孔半圓頭螺栓	Hex. socket button screw	4
26	六角孔圓頭螺栓	Hex. socket cap bolt	12

消耗零件表 Consumable Parts

No.	零件名稱	Name of parts	TH-428	Q'ty 數量
27	O 型環	O-Ring	G75	2
28	O 型環	O-Ring	JASO1019	1
29	O 型環	O-Ring	JASO1018	4
30	O 型環	O-Ring	P11	2
31	O 型環	O-Ring	P40	1
32	O 型環	O-Ring	S30	1
33	O 型環	O-Ring	G85	1
34	O 型環	O-Ring	S85	1
35	O 型環	O-Ring	P7	1
36	O 型環	O-Ring	JASO2035	2

11.5 TH-A 型零件分解圖

11.5 TH-A type parts list



TH-A 型 - 零件表 Parts List

No.	零件名稱	Name of parts	Q'ty 數量
1	罩殼	Housing	1
2	閥體	Valve Sleeve	1
3	迴轉閥軸	Rotary Valve Saft	1
4	活塞	Piston	1
5	油壓缸體	Cylinder Body	1
6	自鎖閥體	Housing	2
7	滾珠軸承	Ball Bearing	1
8	滾珠軸承	Ball Bearing	1
9	柵環	Flinger	1
10	C 型扣環	Snap Ring	1
11	油管接頭	Nipple	2
12	六角孔固定螺絲	Hex. Socket set screw	2

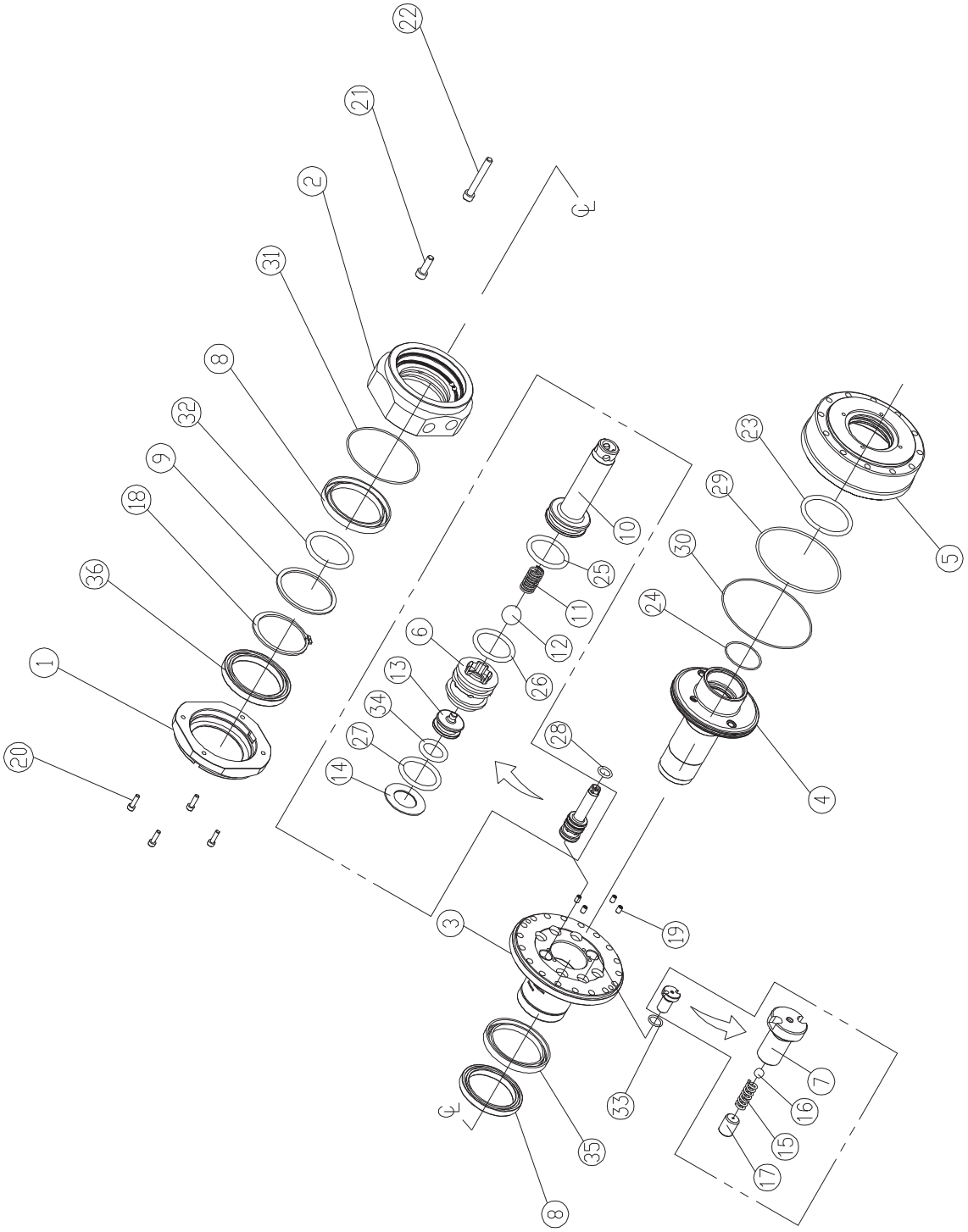
No.	零件名稱	Name of parts	Q'ty 數量
13	六角孔固定螺絲	Hex. Socket set screw	2
14	通氣栓	Air Vent	1
15	排油接頭	Nipple	1
16	自鎖閥珠保持座 (A)	Retainer(A)	1
17	彈簧	Spring	2
18	鋼珠	Steel Ball	2
19	導引活塞	Pilot piston	2
20	墊片	Gasket	2
21	六角孔固定螺絲	Hex. Socket set screw	4
22	六角孔圓頭螺栓	Hex. socket cap bolt	8
23	自鎖閥珠保持座 (B)	Retainer(B)	1

消耗零件表 Consumable Parts

No.	零件名稱	Name of parts	TH-A536	Q'ty 數量
24	O 型環	O-Ring	G90	2
25	O 型環	O-Ring	JASO1015	1
26	O 型環	O-Ring	JASO1015	2
27	O 型環	O-Ring	P9	2
28	O 型環	O-Ring	P48	1
29	O 型環	O-Ring	S38	1
30	O 型環	O-Ring	G100	1
31	O 型環	O-Ring	P10	2
32	O 型環	O-Ring	S100	1
33	O 型環	O-Ring	JASO2045	2
34	O 型環	O-Ring	JASO1015	2

11.6 TR 型零件分解圖

11.6 TR type parts list



TR 型 - 零件表 Parts List

No.	零件名稱	Name of parts	Q'ty 數量
1	閥蓋	Housing	1
2	閥體	Valve Sleeve	1
3	迴轉閥軸	Rotary Valve Saft	1
4	活塞	Piston	1
5	油壓缸體	Cylinder Body	1
6	自鎖閥	Check Valve	2
7	洩壓閥 (A.B)	Relief Valve	2
8	滾珠軸承	Ball Bearing	2
9	隔環	Check Valve	1
10	自鎖閥珠保持座 (A)	Retainer(A)	1
	自鎖閥珠保持座 (B)	Retainer(B)	1
11	彈簧	Spring	2

No.	零件名稱	Name of parts	Q'ty 數量
12	鋼珠	Steel Ball	2
13	導引活塞	Pilot piston	2
14	墊片	Gasket	2
15	彈簧	Spring	2
16	鋼珠	Steel Ball	2
17	調整螺絲	Adjust the screws	2
18	C 型軸用扣環	Snap Ring	1
19	六角孔固定螺絲	Hex. Socket set screw	4
20	六角孔圓頭螺栓	Hex. socket cap bolt	4
21	六角孔圓頭螺栓	Hex. socket cap bolt	12
22	六角孔圓頭螺栓	Hex. socket cap bolt	6

消耗零件表 Consumable Parts

No.	零件名稱	Name of parts	TR-539	TR-646	TR-853	TR-1075	TR-1291	Q'ty 數量
23	O 型環	O-Ring	CO7279A	P65	P70	P95	P110	1
24	O 型環	O-Ring	S42	S50	G55	G80	G95	1
25	O 型環	O-Ring	JASO1015		JASO1017		JASO1017	1
26	O 型環	O-Ring	JASO1015		JASO1017		JASO1017	2
27	O 型環	O-Ring	JASO1015		JASO1017		JASO1017	2
28	O 型環	O-Ring	P10				P10	2
29	O 型環	O-Ring	G100	G120	G140	G160	G190	1
30	O 型環	O-Ring	S110	S130	S150	S170	AS568-171	1
31	O 型環	O-Ring	S85	S95	S105	S140	S160	1
32	O 型環	O-Ring	P45	P53	P60	P85	P100	1
33	O 型環	O-Ring	S11.2				S11.2	2
34	O 型環	O-Ring	P9		P10A		P10A	2
35	油封	Oil Seal	FOS10460R	FOS20580R	FOS20660R	FOS20670R	FOS10490B	1
36	油封	Oil Seal	FOS20260R	FOS10440R	FOS20430R	FOS20680R	FOS10480B	1

註:No.10 自鎖閥珠保持座 (B) 不用安裝 No.25 的 O 型環 .　　Note:No.10 Retainer(B) don't have to install No.25 O-Ring.

12. 冷卻液集水盒

冷卻液集水盒可以與油壓缸分開購買，需要時，可依下表所列規格來配合。二個近接開關與集水盒安裝在一起，以此檢測活塞行程之作動。

12. Coolant collector

A coolant collector is available separately from cylinder, when it is needed, please specify from the models tabulated below.

Two proximity switches are attached to the coolant collector, by which operation of the cylinder can be checked.

型式 Model	適用油壓缸 Matching Cylinder
CT-04/CT-04S	TH-428
CT-05/CT-05S	TH-A536,TK-A528, TK-A533
CT-06/CT-06S	TK-C643, TK-A646, TK-B646, TK-C646, TR-646
CT-08/CT-08S	TK-B846, TK-A853, TK-B853, TR-853
CT-K10/CT-K10S	TK-A1068, TK-A1075, TK-A1078, TR-1075
CT-12/CT-12S	TK-A1287, TK-A1291 , TR-1291
CT-15/CT-15S	TK-A1511, TK-A1512 , TK-A1512-35
CT-21/CT-21S	TK-2114
CT-24/CT-24S	TK-2416, TK-2416L
CT-28/CT-28S	TK-2820
CT-S05B/CT-S05BS	TS-539, TR-539
CT-S08B/CT-S08BS	TS-866
CT-S10B/CT-S10BS	TS-1081
CT-S12B/CT-S12BS	TS-1210

13. 檢出裝置安裝說明

(1) 概要

集水盒連結於油壓缸後端可以很順暢的收集中空活塞桿內的切削液使其流回切削水槽。

集水盒上有二個近接開關，以此檢視活塞動作，確認工件處於夾持或不夾持狀態。

(2) 規格

近接開關使用 IFS287(IFM) ，如需它種廠牌，請聯絡我們。

13. Coolant collector (With stroke control)

(1) Outline

The coolant collector is mounted to Thru-Hole Hydraulic Rotary Cylinder to collect smoothly the cutting oil which flows inside the draw pipe. The coolant collector has two pieces proximity switches for checking electrically the piston operation of a cylinder and for the detection of chucking/unchucking of a workpiece

(2) Specification

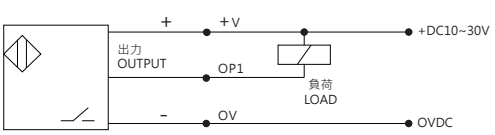
The proximity switch is of a standard IFS287(IFM) and if requiring other types, please contact us.

行程確認裝置。 The proximity switch is optional.

型式	電壓	負荷容量	輸出規格
Model	Power supply	Switching cap.	Output tpye
IFS287(IFM)	DC 10/30V	100mA	NPN

端子連接 Terminal Connections

型式 Model	+V	OP1	OV
IFS287(IFM)	棕 BROWN	黑 BLACK	藍 BLUE



(3) 安裝

檢出環旋入活塞桿，再將集水盒裝進罩殼後端後鎖緊螺絲。

集水盒下端鎖入排油接頭和油管，將油管適度傾斜以使排油順利流下不受阻塞，建議採用 (Fig. 13) 內徑且透明的乙烯基油管，以便於檢視油之流動。

(3) Mounting

Mount the detectable plate to the cylinder piston rod, Mount the coolant collector to the cylinder rear end.

To smoothly collect the cutting oil flowing into the coolant collector, we recommend to make the piping adequately inclined so the cutting oil not to stagnate inside the hose. It is recommended to use transparent vinyl hose for checking flow condition. (inside dia, Fig.13)

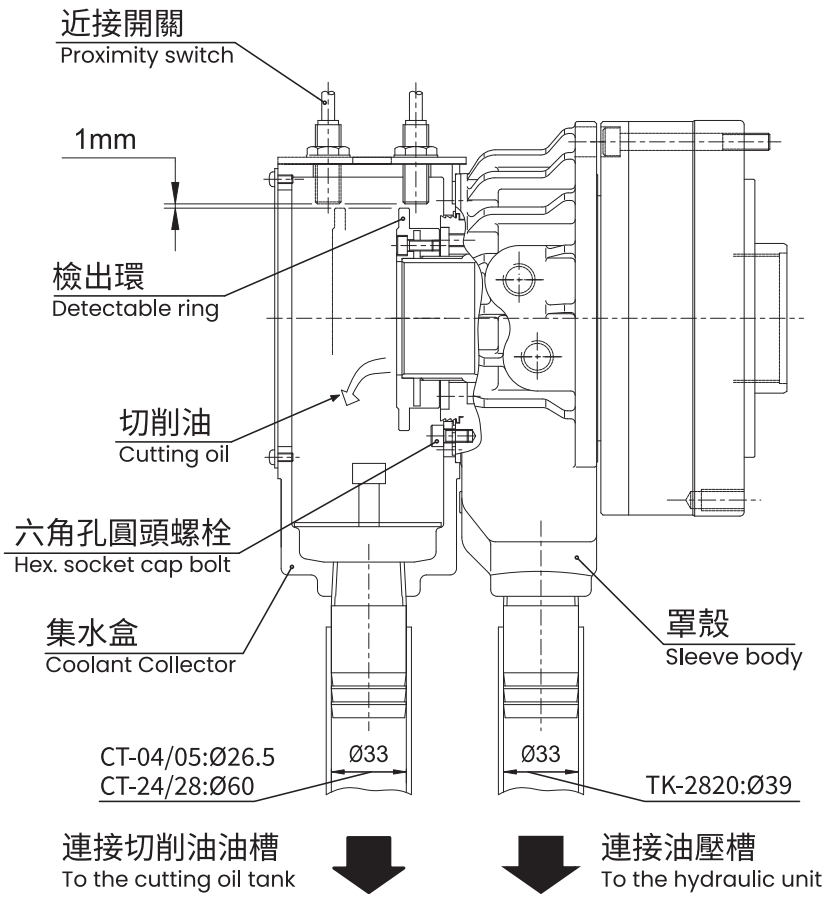


Fig.13

(4) 調整近接開關之位置

安裝近接開關於集水盒外圍之調整板上，其感應端和檢出環外徑保持 1mm 距離，並由調整板之滑動以調整其軸向位置。

(4) Adjusting the position of a proximity switch

Mount the proximity swirtch to the outside of the coolant collector body through the adjusting plate and must be set with the screws of the proximity switch so that the distance between the proximity switch and the outer diameter and of the detectable plate is approx. 1 mm. The adjustment to the axial directions done by sliding the adjusting plate.

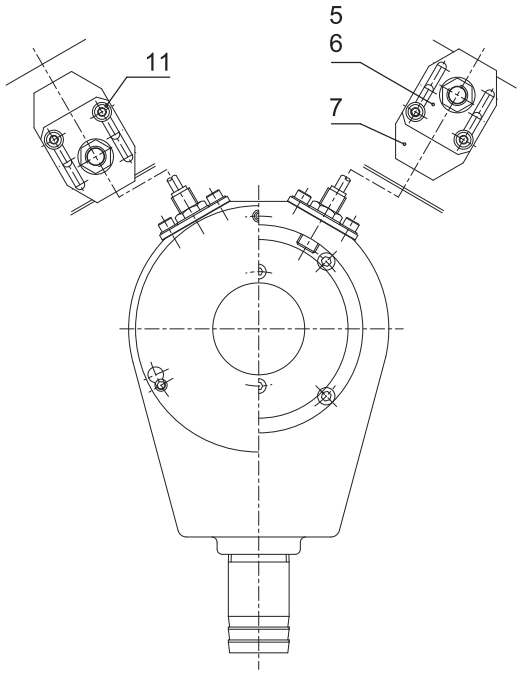
CAUTION
注 意

(5) 集水盒之使用

切削油會因滿出集水盒而流入罩殼並和油壓用油混在一起而影響油壓油之油質，因此經常清理濾網使切削油不積存於集水盒。所以更須避免鐵屑阻塞濾油網。

(6) 冷卻液收集槽(檢出裝置)

零件分解圖

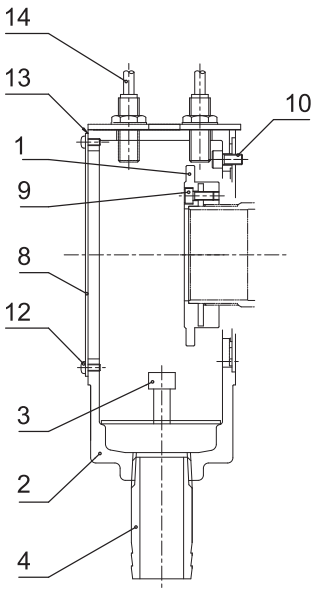


(5) Using the coolant collector

If coolant oil flows over from the coolant collector, it flows over to the sleeve body side. Terefore, clean the metal screen frequently so that hte coolant oil does not collect.
Thus, avoid swarf clogging the metal screen.

(6) Coolant collector (With stroke control)

parts list



零件表 Parts List

No.	零件名稱	Name of parts	Q'ty 數量
1	檢出環	Detectable ring	1
2	集水盒	Collector body	1
3	過濾網	Metal screen	1
4	排油接頭	Hose nipple	1
5	檢出調整座版	Adjusting plate	2
6	密封墊 (1)	Seal packing	2
7	檢出槽蓋板	Plate	2
8	後蓋板	Cover	1

No.	零件名稱	Name of parts	Q'ty 數量
9	六角孔圓頭螺栓	Hex. Socket cap bolt	2
10	六角孔圓頭螺栓	Hex. Socket cap bolt	4
11	六角孔圓頭螺栓	Hex. Socket cap bolt	4
12	六角孔半圓頭螺絲	Hex. Socket button screw	3
13	密封墊 (2)	Seal packing	1
14	近接開關	Proximity switch	2

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