BUCK™
CHUCK COMPANY

ROTARY HYDRAULIC CYLINDERS

高速中空油壓迴轉缸

SUPER HIGH SPEED HOLLOW ROTARY HYDRAULIC CYLINDERS

操作說明書
INSTRUCTION MANUAL

重要

機械操作人員在使用油壓缸前，請詳閱操作說明書，以確保操作安全。

Important

To ensure correct and safe operation read all operating instructions carefully before attempting to use the cylinder.

請詳閱手冊內容並善加保存
Please Read And Keep This Manual.

千鳥精密夾盤

警告標語
Safety Information

⊙ 重要說明，請妥善保管
Please read and keep this manual for future reference.

當您在使用本項產品之前，請先詳細閱讀本文說明及注意事項，
以確保您的安全和正確的使用，尤其特別標示之說明。

To ensure safe and correct use of this product, please read and pay attention to all of the instructions and keep this manual in a location where it can easily be retrieved as needed.

警告標誌說明
Safety alert symbols and signal words

未依照此標示的說明，將產生立即的危險和重大的傷害或死亡。

Indicates an imminently hazardous situation of which, if not avoided, will result in death or serious injury.

未依照此標示的說明，將引起潛在的危險和重大的傷害或死亡。

Indicates a potentially hazardous situation of which, if not avoided, will result in death or moderate injury.

未依照此標示的說明，將引起潛在的危險和中度的傷害或死亡。

Indicates a potentially hazardous situation of which, if not avoided, may result in minor or moderate injury.

留意標誌說明
Important symbols and signal words

依照此標示的說明，充分了解本產品性能，可避免因誤解而產生錯誤的操作。

Instructions for chuck performance and avoiding errors or mistakes.

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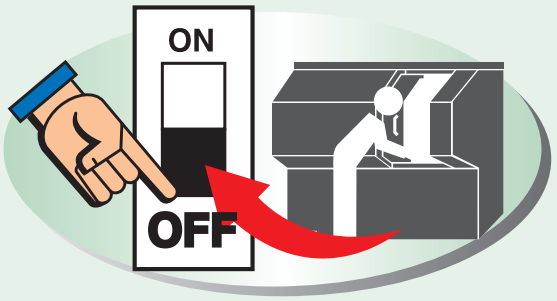
DANGER 危險

在安裝、檢查或維護保養油壓缸時，應關掉所有電源，確保操作者安全。
The power should be off to ensure the safety of the operator during installation, maintenance, or inspection of the cylinder.

電源未關閉
易發生人員身體傷害
及衣服被捲入的危險。

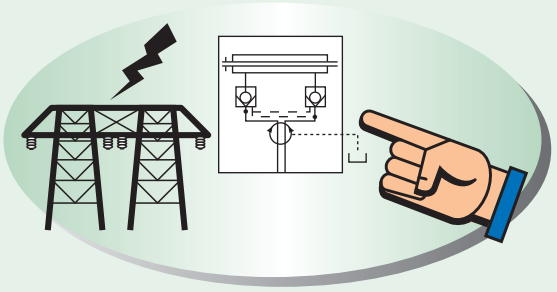
Danger of being caught inside a machine.



中空油壓缸的內藏式止逆閥，在停電情況下仍可保持夾持狀態，並請搭配使用停電仍可保持夾持迴路之電磁閥。
The built-in lock/relief valve will maintain the grip force when the power to the cylinder is interrupted, but the solenoid valve also needs to be installed.

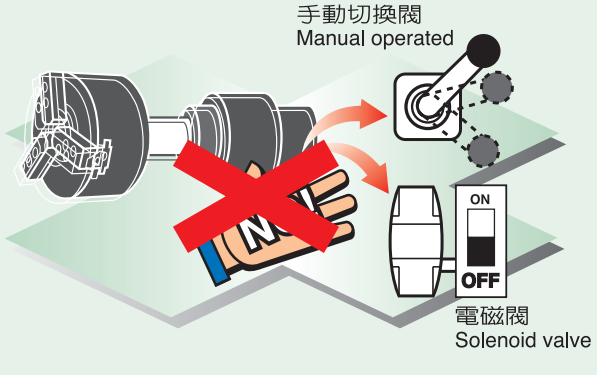
使用無止逆閥裝置的油缸，
在斷電時易造成
工件瞬間飛散的危險。

Using the cylinder without the lock/relief valve will increase the dange of the workpiece flying out of the chuck when power is interrupted.



當主軸旋轉時，不可關掉泵浦的電源，更不可操作切換閥。
Do not turn off the power to the pump or operate the switch valve when the spindle is rotating.

易造成
夾持力喪失，
工作物有飛散之危險。
Gripping force will be lost and the workpiece will fly out of the chuck.



使用注意事項
Operating Precaution Items

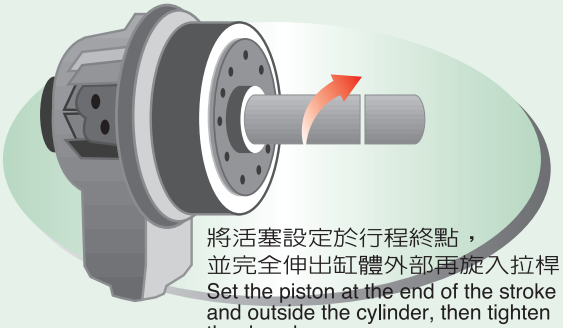
WARNING 警告

拉桿請依標準扭矩鎖緊。
Tighten the draw bar with the specified torque.

拉桿鬆脫
將導致工作物飛散之危險。

The loose draw bar will induce the danger of the workpiece scattering.

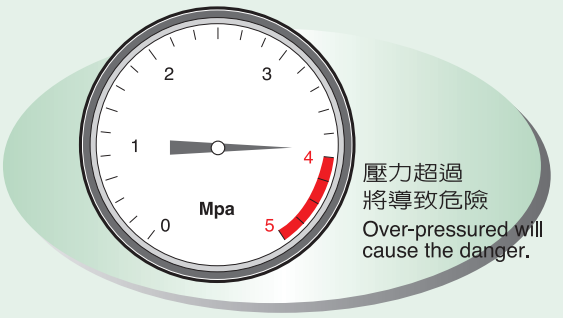
Cylinder Type	Clamping Torque
0928	90N·m(9.18kgf·m)
1036	100N·m(10.2kgf·m)
1246	150N·m(15.3kgf·m)
1552	280N·m(28.6kgf·m)
1875	340N·m(34.7kgf·m)
2091	380N·m(38.7kgf·m)
2511	500N·m(50.9kgf·m)
2816	800N·m(81.6kgf·m)



請依照夾頭規格設定油壓壓力。（油壓缸最大油壓壓力為3.9Mpa(40kgf/cm²)）
Set the hydraulic pressure to the chuck specification. (the maximum hydraulic pressure of the cylinder is 3.9Mpa(40kgf/cm²))

油壓壓力過大，
將導致夾頭破損，
工作物有飛散之危險。

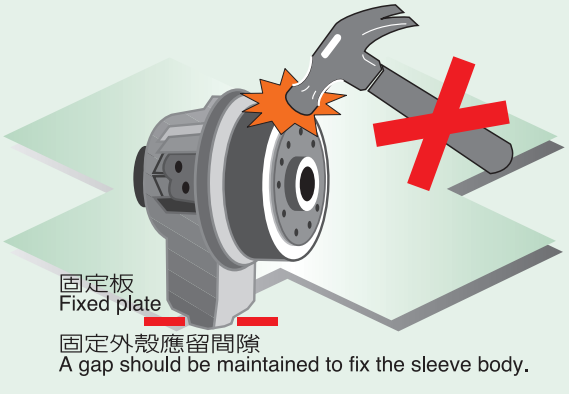
Too much hydraulic pressure will cause damage to the chuck, increasing the danger of the workpiece flying out of the chuck.



油壓缸請勿隨意敲擊或施加週邊任何外力。（外殼固定時，勿鎖死）
Do not strike or apply external force on the cylinder

敲擊油缸
將導致零件破損，
使油缸卡死造成人員傷害。

Striking the cylinder will cause damge to the cylinder which could cause it to seize, causing injury to the operator.



使用注意事項
Operating Precaution Items

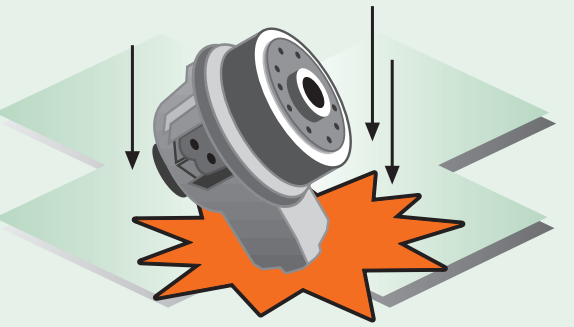
WARNING 警告

油壓缸摔落或受到碰撞的損壞，勿再使用。

Do not use the cylinder if it has been damaged by dropping or striking.

油壓缸破損
將造成工作物飛散之危險。

Damage to the cylinder could cause it to lose grip force, increasing the risk of the workpiece flying out of the chuck.



使用油壓缸需加防護罩。

A cover should be installed to use the cylinder.

迴轉中的油壓缸
易發生身體及衣物，
被捲入的危險。

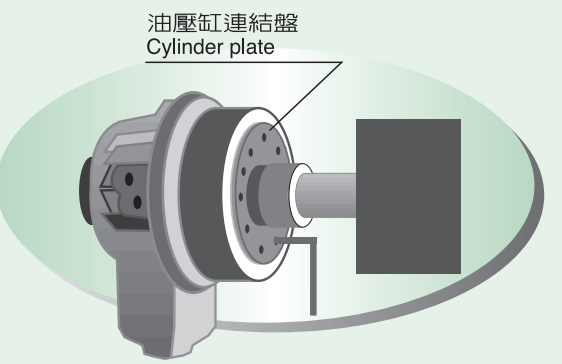
Installing a cover will reduce the chance of clothing or body parts being caught in the cylinder as it rotates.

連結螺絲請依照標準扭矩鎖緊。（參照第十九頁）

Tighten the mounting screws with the specified torque. (ref. to page 19)

鎖緊力太大或不足
將造成油壓缸損壞，
工作物有飛散之危險。

Too much or insufficient torque will cause damage to the cylinder, increasing the danger of the workpiece flying out of the chuck.



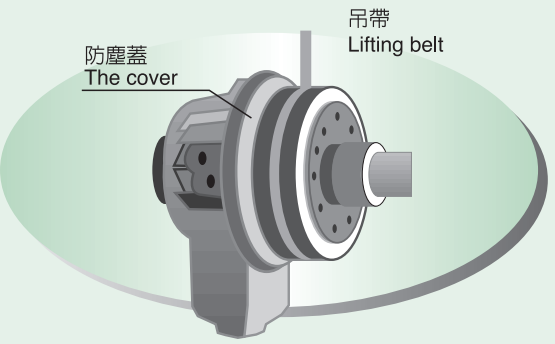
使用注意事項
Operating Precaution Items

CAUTION 注 意

欲拆裝油壓缸時，請使用吊帶。

Always use a lifting belt when moving the cylinder.

未使用吊帶，
掉落將造成危險。
Not using a lifting belt will increase the danger of dropping the cylinder and causing damage. Damage to the cylinder increases the danger of the workpiece flying out of the chuck.

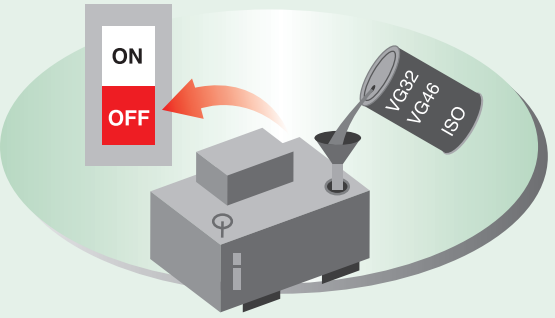


供應油壓油時，須先關掉電源。

Turn off the power before supplying the hydraulic oil.

油壓油供應不足時，
將造成油壓缸作動速度變慢、推力不足，
工作物有飛散之危險。

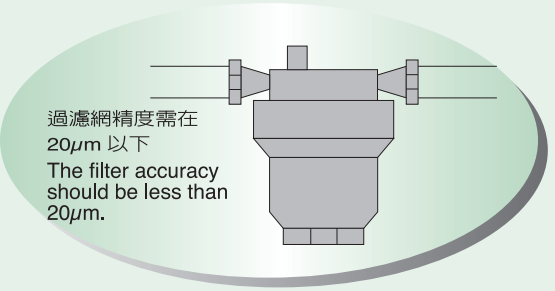
Insufficient or contaminated hydraulic oil will reduce the operating speed and input force of the cylinder, increasing the danger of the workpiece flying out of the chuck.



油壓系統需裝置過濾器。

A filter should be installed on the hydraulic system.

如果雜質進入，
將使油壓缸阻塞，喪失工能，
導致工作物飛散之危險。
If the oil is not filtered properly, there is a danger that contamination will cause the cylinder to seize, increasign the danger of the workpiece flying out of the chuck.



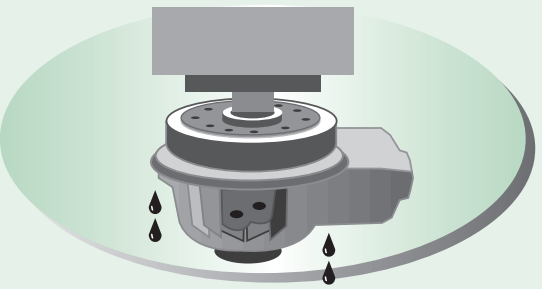
使用注意事項
Operating Precaution Items

CAUTION 注 意

油壓缸勿倒立安裝。
Do not install the cylinder upsidedown.

倒立安裝會造成漏油現象，
導致人員滑倒之危險。

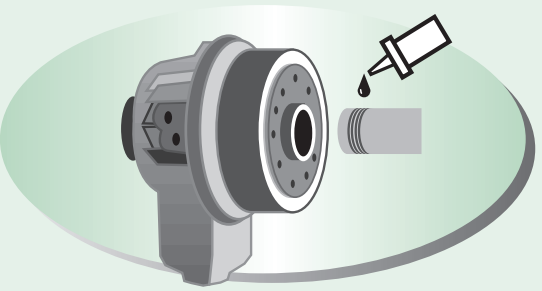
Installing the cylinder upside down will cause oil leakage which will create a slipping hazard.



拉桿螺牙部位需塗上防鬆劑，並依照標準扭矩鎖緊。
Apply the loctite on the thread of the draw bar and tighten with the specified torque.

如拉桿鬆開
造成夾頭行程不足，
將導致工作物夾持不良造成危險。

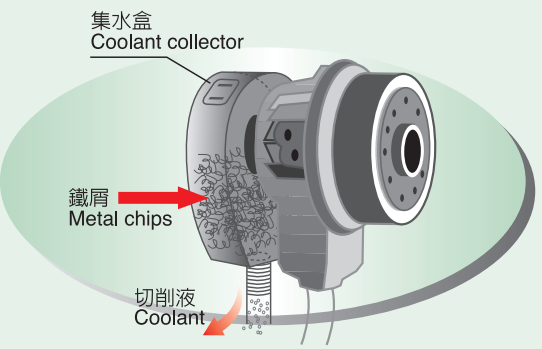
If the draw bar is not properly tightened, the chuck will not stroke properly causing a reduction in grip force and increasing the risk of the workpiece flying out of the chuck.



油壓缸後面加裝集水盒時，應定期檢查清除鐵屑，保持切削液的暢通。
When a coolant collector is installed at the rear of the cylinder, the metal chips should be cleaned periodically to keep the cooolant from becoming clogged.

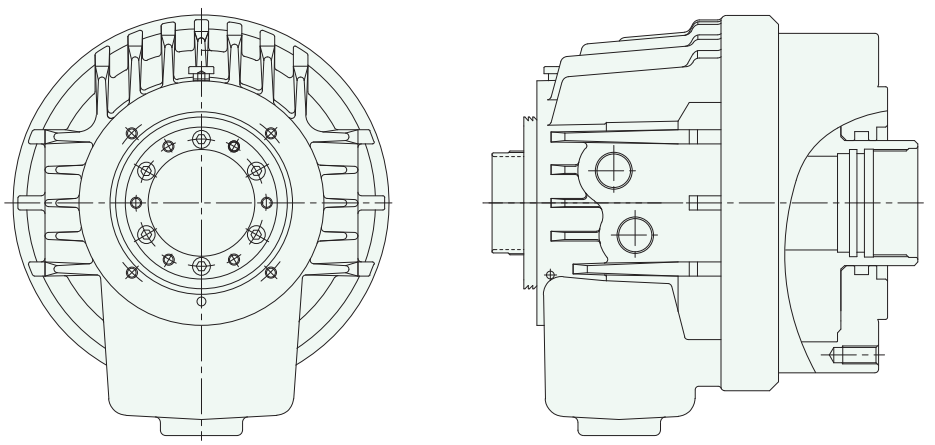
阻塞的切削液
將溢入油壓缸，造成油壓箱內
油水混合損壞機械。

Clogged coolant collector will cause coolant to spill into the cylinder and will cause damage.



規格說明
Specifications

高速中空油壓迴轉缸
SUPER HIGH SPEED HOLLOW ROTARY HYDRAULIC CYLINDERS



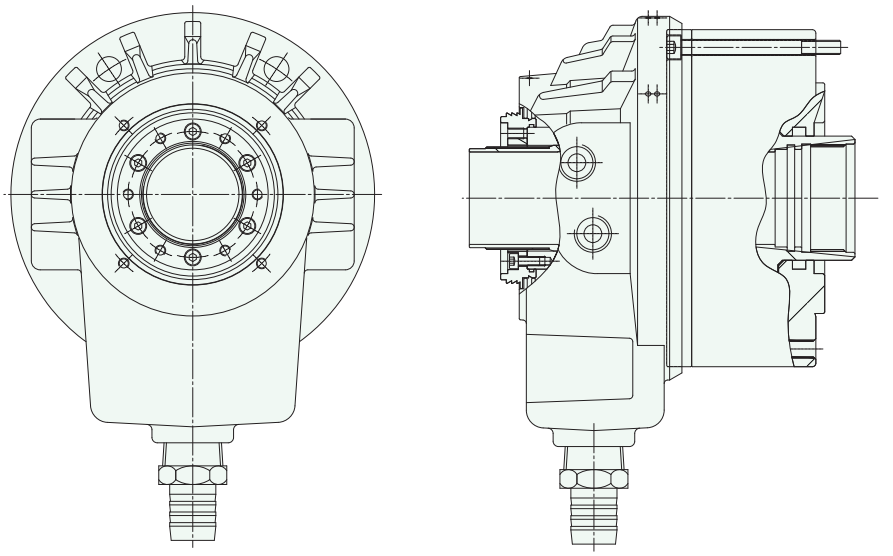
規格表 (Specifications) :

機 型 Type		高速中空油壓迴轉缸 Super high hollow rotary hydraulic cylinders									
型式 Model		0928	1036	1246	1552	1875	1878	2091	2093	2511	2816
活塞行程 Piston stroke (mm)		10	15	15	22	25	25	30	30	30	30
活塞面積 Piston area (cm^2)	推力側 Push side	54	70	100	160	198	198	252	252	348	346
	拉力側 Pull side	47.5	68	89	150	183	178	235	226	336	332
最大推（拉）力 Max. Operating force KN (kgf)	推力 Push side	19.6 (2000)	24.5 (2500)	36.2 (3700)	57.8 (5900)	70.5 (7200)	70.5 (7200)	90.1 (9200)	90.1 (9200)	121.5 (12400)	119.6 (12200)
	拉力 Pull side	17.2 (1750)	23.5 (2400)	31.3 (3200)	53.9 (5500)	65.6 (6700)	63.7 (6500)	84.3 (8600)	81.5 (8313)	117.6 (12000)	115.7 (11800)
最高使用壓力 Max. Pressure	Mpa (kgf/cm^2)	3.9 (40)	3.9 (40)	3.9 (40)	3.9 (40)	3.9 (40)	3.9 (40)	3.9 (40)	3.9 (40)	3.9 (40)	3.9 (40)
流量 Oil leakage rate (l / min)		3.0	3.0	3.0	3.9	4.2	4.2	4.5	4.5	7.0	8.4
最高迴轉數 Max. Speed r.p.m.(min^{-1})		8000	8000	7000	6200	4700	4700	3800	3800	2800	2000
淨重 Weight (kg)		6.5	9.0	11.9	17.3	26.4	25.5	37	32.9	63	96.3
通孔直徑 Thru-hole (diameter)mm		28	36	46	52	75	78	91	93	117.5	166.5
搭配夾頭型號 Matching chuck		204	205	206	208	210		212		215 218	221 224

1KN = 101.97kgf 1Mpa = 10.197kgf/cm^2

規格說明
Specifications

薄型高速中空油壓迴轉缸
HIGH SPEED COMPACT HOLLOW ROTARY HYDRAULIC CYLINDERS



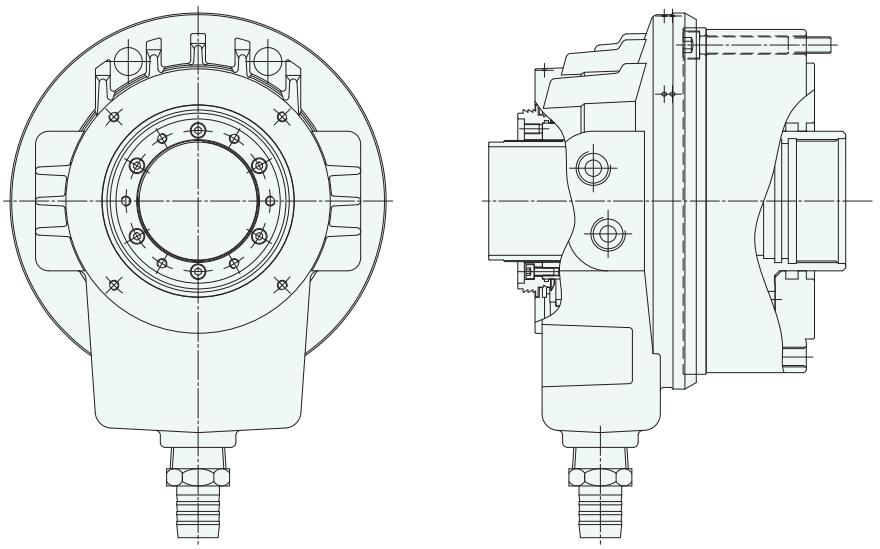
規格表 (Specifications) :

機 型 Type		薄型高速中空油壓迴轉缸 High speed compact hollow rotary hydraulic cylinders		
型式 Model		**F1246S**	**F1552S**	**F1875S**
活塞行程 Piston stroke (mm)		15	22	25
活塞面積 Piston area (cm^2)	推力側 Push side	100	160	198
	拉力側 Pull side	89	150	183
最大推（拉）力 Max. Operating force KN (kgf)	推力 Push side	36.2 (3700)	57.8 (5900)	70.5 (7200)
	拉力 Pull side	31.3 (3200)	53.9 (5500)	65.6 (6700)
最高使用壓力 Mpa Max. Pressure (kgf/cm^2)		3.9 (40)	3.9 (40)	3.9 (40)
流量 Oil leakage rate (*l* / min)		3.0	3.9	4.2
最高迴轉數 Max. Speed r.p.m.(min^{-1})		7000	6200	4700
通孔直徑 Thru-hole (diameter)mm		46	52	75
搭配夾頭型號 Matching chuck		206	208	210

1KN = 101.97kgf 1Mpa = 10.197kgf/cm^2

規格說明
Specifications

大孔徑超薄中空油壓迴轉缸
LARGE THROUGH HOLE SUPER THIN HOLLOW ROTARY HYDRAULIC CYLINDERS



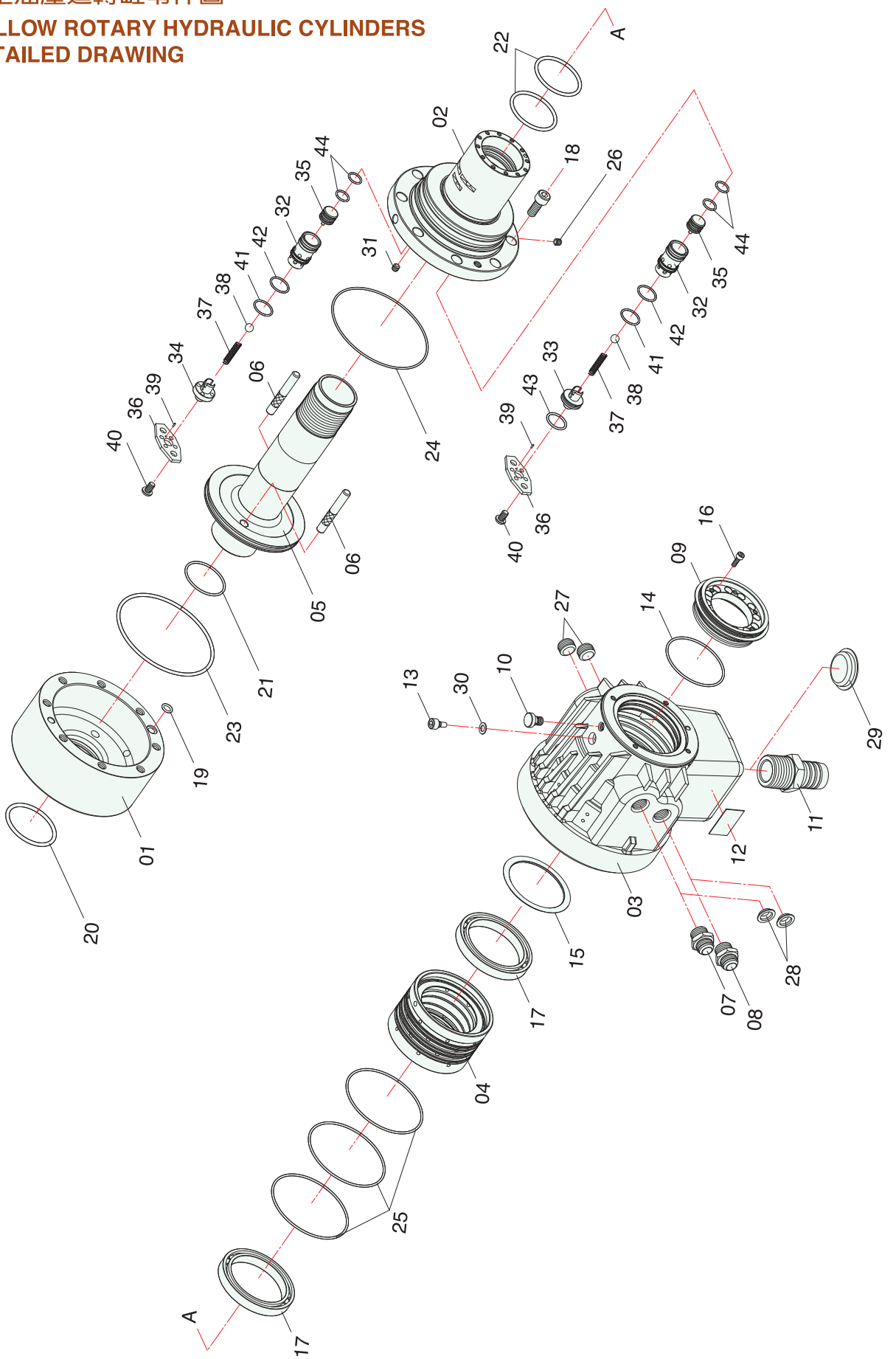
規格表 (Specifications) :

機 型 Type		大孔徑超薄中空油壓迴轉缸 Large through hole super thin hollow rotary hydraulic cylinders		
型式 Model		**P1452S**	**P1666S**	**P1881S**
活塞行程 Piston stroke (mm)		20	22	25
活塞面積 Piston area (cm^2)	推力側 Push side	137	170	191
	拉力側 Pull side	126	157	175
最大推（拉）力 Max. Operating force KN (kgf)	推力 Push side	47.6 (4860)	59.3 (6048)	66.7 (6804)
	拉力 Pull side	43.7 (4464)	54.7 (5580)	61.4 (6264)
最高使用壓力 Max. Pressure Mpa (kgf/cm^2)		3.9 (40)	3.9 (40)	3.9 (40)
流量 Oil leakage rate (l / min)		3.9	4.0	4.3
最高迴轉數 Max. Speed r.p.m.(min^{-1})		6500	5600	4800
淨重 Weight (kg)		12.3	17.4	21.9
通孔直徑 Thru-hole (diameter)mm		52	66	81
搭配夾頭型號 Matching chuck		OPB-206	OPB-208	OPB-210

1KN = 101.97kgf 1Mpa = 10.197kgf/cm^2

規格說明
Specifications

中空油壓迴轉缸零件圖
HOLLOW ROTARY HYDRAULIC CYLINDERS DETAILED DRAWING



規格說明
Specifications

中空油壓迴轉缸零件表
Super high speed hollow rotary hydraulic cylinders parts list

零件表 (Parts list)

No.	零件名稱	Name	Q'ty 0928	1036	1246	1552	1875 1878	2091 2093	2511 2816
1	缸體	Cylinder	1	1	1	1	1	1	1
2	迴轉閥	Rotary valve	1	1	1	1	1	1	1
3	外殼	Sleeve body	1	1	1	1	1	1	1
4	套筒	Sleeve	1	1	1	1	1	1	1
5	活塞	Piston	1	1	1	1	1	1	1
6	導銷	Guide pin	2	2	2	2	2	2	2
7	油管接頭	Hose fitting	1	1	1	1	1	1	1
8	油管接頭	Hose fitting	1	1	1	1	1	1	1
9	後固定環	Stopper	1	1	1	1	1	1	1
10	導氣螺絲	Air breather	1	1	1	1	1	1	1
11	洩油接頭	Hose fitting	1	1	1	1	1	1	1
12	名牌	Name Plate	2	2	2	2	2	2	2
13	套筒固定螺絲	Plug	1	1	1	1	1	1	1
14	O型環	O-Ring	1	1	1	1	1	1	1
15	緩衝片	Flintier	1	1	1	1	1	1	1
16	固定環螺絲	Hexagon socket head cap screw	8	12	12	6	6	12	6
17	軸承	Bearing	2	2	2	2	2	2	2
18	缸體固定螺絲	Hexagon socket head cap screw	12	8	12	16	12	16	16
19	O型環	O-Ring	1	1	1	1	1	1	1
20	O型環	O-Ring	1	1	1	1	1	1	1
21	O型環	O-Ring	1	1	1	1	1	1	1
22	O型環	O-Ring	2	2	2	2	2	2	2
23	O型環	O-Ring	1	1	1	1	1	1	1
24	O型環	O-Ring	1	1	1	1	1	1	1
25	O型環	O-Ring	3	3	3	3	3	3	3
26	油栓螺絲	Plug	1	1	1	1	1	1	1
27	油栓螺絲	Plug	2	2	2	2	2	2	2
28	塑膠蓋	Nylon Cap	2	2	2	2	2	2	2
29	塑膠蓋	Nylon Cap	1	1	1	1	1	1	1
30	塑膠墊片	Seal Washer	1	1	1	1	1	1	1
31	油栓螺絲	Plug	4	4	4	4	4	4	4
32	引導止迴閥閥體	Housing	2	2	2	2	2	2	2
33	頂銷 A	Retainer(A)	1	1	1	1	1	1	1
34	頂銷 B	Retainer(B)	1	1	1	1	1	1	1
35	柱塞	Pilot spool	2	2	2	2	2	2	2
36	止推片	Plate	2	2	2	2	2	2	2
37	彈簧	Spring	2	2	2	2	2	2	2
38	鋼珠	Steel ball	2	2	2	2	2	2	2
39	固定銷	Spring pin	2	2	2	2	2	2	2
40	止推片固定螺絲	Hexagon socket head cap screw	4	4	4	4	4	4	4
41	O 型環	O-Ring	2	2	2	2	2	2	2
42	O 型環	O-Ring	2	2	2	2	2	2	2
43	O 型環	O-Ring	1	1	1	1	1	1	1
44	O 型環	O-Ring	4	4	4	4	4	4	4

消耗零件 (Consumable parts)

Name / **O-Ring**

No.	0928	1036	1246
14	S50	S60	S70
19	P7	P8	P8
20	P45	P48	P65
21	S34	S38	G50
22	G35	G45	JASO 2053
23	G85	G100	G120
24	S85	AS568-45	G120
25	S70	S80	S95
41	S18	S18	S22
42	S18	S18	JASO 1021
43	JASC 1018	JASO 1018	JASO 1022
44	S12	S12	JASO 1013

Name / **O-Ring**

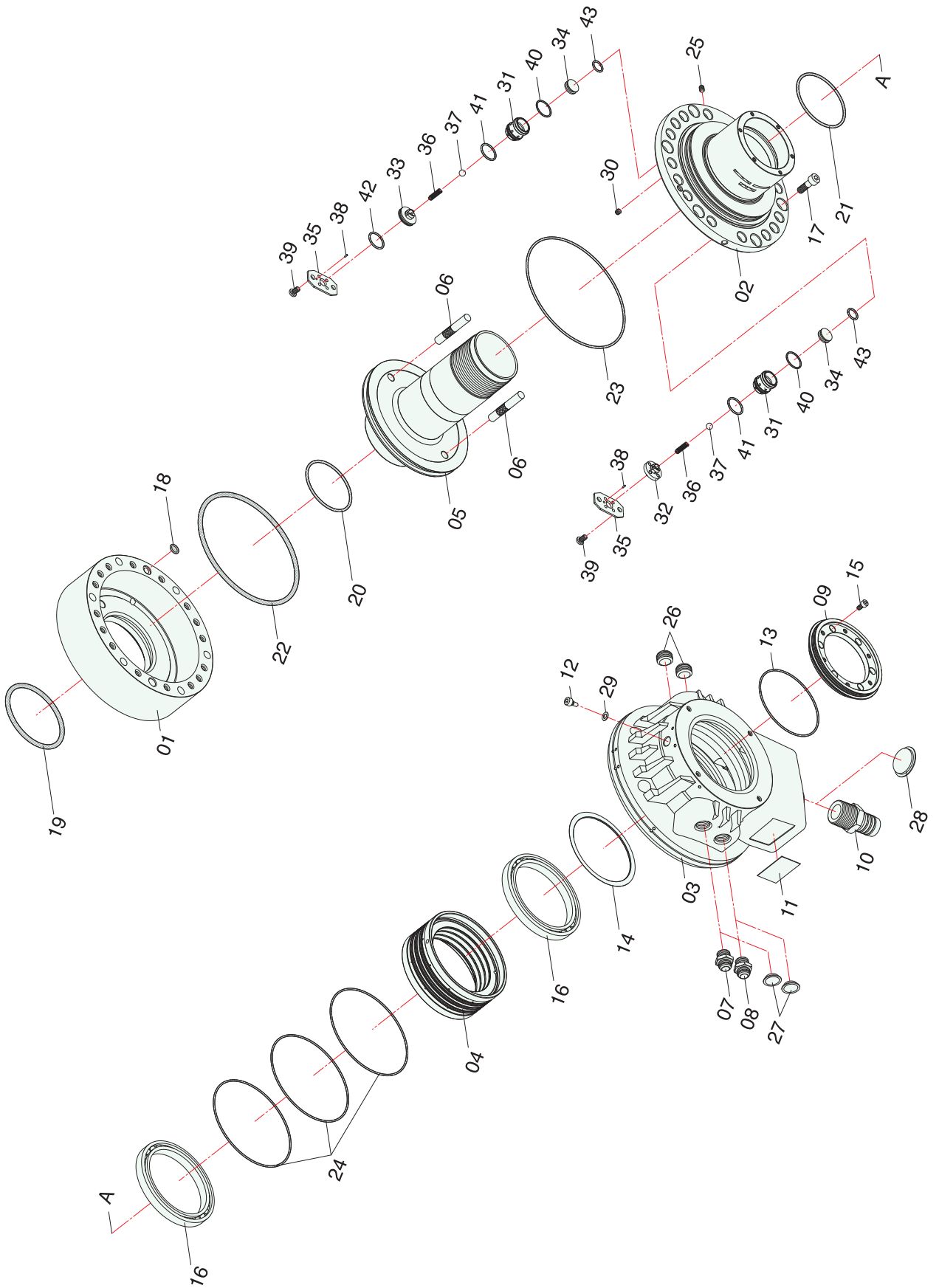
No.	1552	1875, 1878
14	S80	S105
19	P10	P10
20	P70	P95(P1875) AS568-344(P1878)
21	G55	G80(P1875) AS568-152(P1878)
22	G60	G85
23	P145	G170
24	AN6230-34	AN6230-39
25	S105	G135
41	S22	S22
42	JASO 1021	JASO 1021
43	JASO 1022	JASO 1022
44	JASO 1013	JASO 1013

Name / **O-Ring**

No.	2091, 2093		2816
14	S120	AN6230-37	G220
19	P10	P10	P11
20	P110(P2091) P115(P2093)	P140	P190
21	G95(P2091) G100(P2093)	G125	AS568-261
22	G100	G135	G185
23	G195	P235	P265
24	AN6230-43	AN6230-50	G270
25	G150	G200	G275
41	S22	JASO 1023	JASO 1023
42	JASO 1021	JASO 1023	JASO 1023
43	JASO 1022	S26	S26
44	JASO 1013	JASO 1015	JASO 1015

規格說明
Specifications

薄型 (大孔徑超薄型) 中空油壓迴轉缸零件圖
HIGH SPEED COMPACT (LARGE THROUGH HOLE SUPER THIN) HOLLOW ROTARY HYDRAULIC CYLINDERS DETAILED DRAWING



規格說明
Specifications

薄型 (大孔徑超薄型) 中空油壓迴轉缸零件表
High speed compact (large through hole super thin) hollow rotary hydraulic cylinders parts list

零件表 (Parts list)

No.	零件名稱	Name	Q'ty
1	缸體	Cylinder	1
2	迴轉閥	Rotary valve	1
3	外殼	Sleeve body	1
4	套筒	Sleeve	1
5	活塞	Piston	1
6	導銷	Guide pin	2
7	油管接頭	Hose fitting	1
8	油管接頭	Hose fitting	1
9	後固定環	Stopper	1
10	洩油接頭	Hose fitting	1
11	名牌	Name Plate	2
12	套筒固定螺絲	Plug	1
13	O型環	O-Ring	1
14	緩衝片	Flintier	1
15	固定環螺絲	Hexagon socket head cap screw	12or6
16	軸承	Bearing	2
17	缸體固定螺絲	Hexagon socket head cap screw	8or12or16
18	O型環	O-Ring	1
19	O型環	O-Ring	1
20	O型環	O-Ring	1
21	O型環	O-Ring	2
22	O型環	O-Ring	1
23	O 型環	O-Ring	1
24	O 型環	O-Ring	3
25	油拴螺絲	Plug	1
26	油拴螺絲	Plug	2
27	塑膠蓋	Nylon Cap	2
28	塑膠蓋	Nylon Cap	1
29	塑膠墊片	Seal Washer	1
30	油拴螺絲	Plug	4
31	引導止迴閥閥體	Housing	2
32	頂銷 A	Retainer(A)	1
33	頂銷 B	Retainer(B)	1
34	柱塞	Pilot spool	2
35	止推片	Plate	2
36	彈簧	Spring	2
37	鋼珠	Steel ball	2
38	固定銷	Spring pin	2
39	止推片固定螺絲	Hexagon socket head cap screw	4
40	O 型環	O-Ring	2
41	O 型環	O-Ring	2
42	O 型環	O-Ring	1
43	O 型環	O-Ring	4

消耗零件 (Consumable parts)

No.	Name	F1246S	F1552S	F1875S	P1452S	P1666S	P1881S
13	O-Ring	S70	S80	S105	S80	S95	S110
18	O-Ring	P8	P10	P10	P8	P10	P10
19	O-Ring	P65	P70	P95	P70	P85	P100
20	O-Ring	G50	G55	G80	G55	G70	G85
21	O-Ring	JASO 2053	G60	G85	G60	G75	G90
22	O-Ring	G120	P145	G170	G140	G155	G170
23	O-Ring	G120	AN6230-34	AN6230-39	AS568-161	AS568-164	AN6230-39
24	O-Ring	S95	S105	G135	S105	S125	AS568-162
40	O-Ring	S22	S22	S22	S22	S22	S22
41	O-Ring	JASO 1021	JASO 1021	JASO 1021	JASO 1021	JASO 1021	JASO 1021
42	O-Ring	JASO 1022	JASO 1022	JASO 1022	JASO 1022	JASO 1022	JASO 1022
43	O-Ring	JASO 1013	JASO 1013	JASO 1013	JASO 1013	JASO 1013	JASO 1013

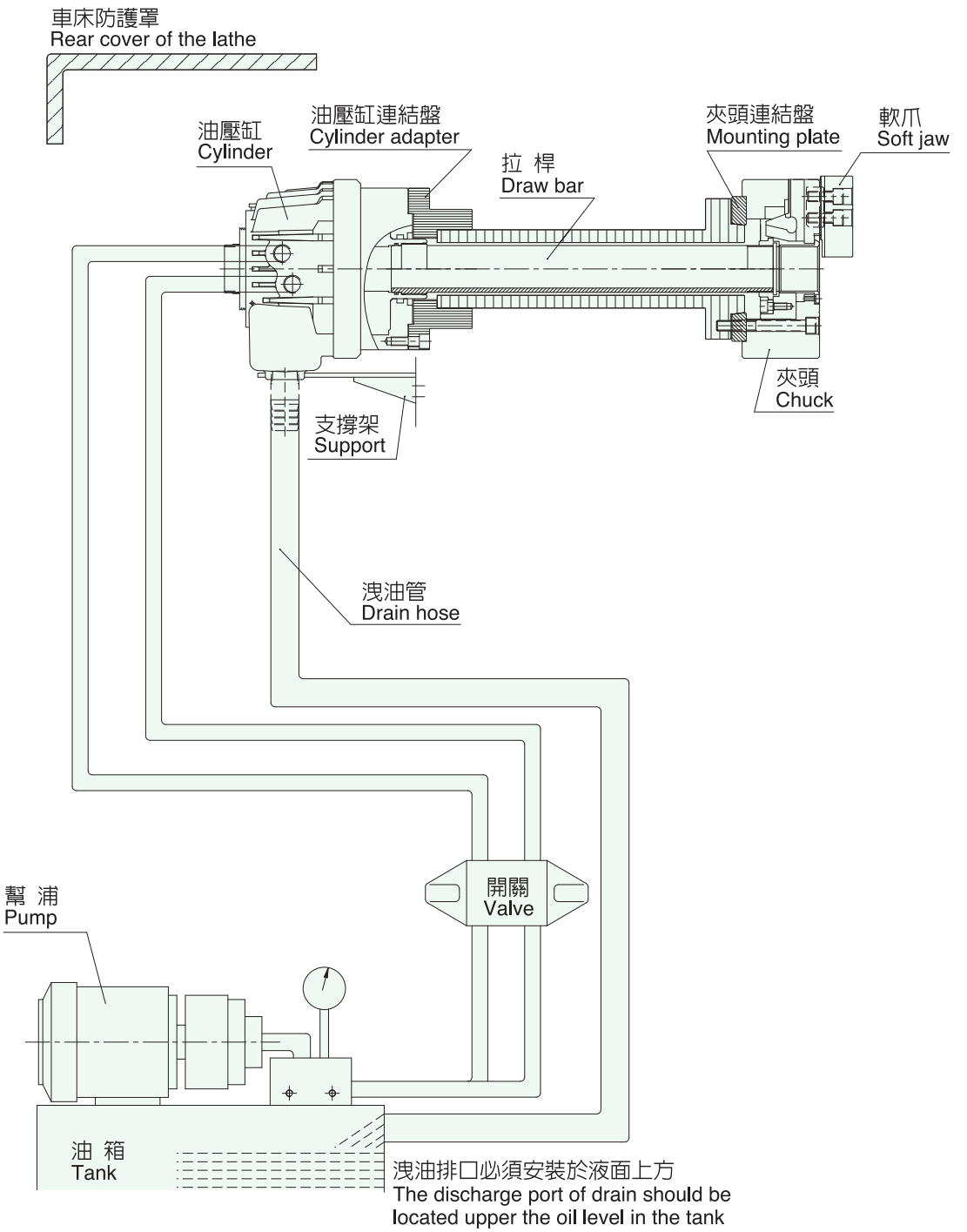
安裝
Installation

4-1 中空油壓迴轉缸安裝概要
The installation outline of the hollow rotary hydraulic cylinder

首先將中空油壓夾頭安裝於主軸的前端，高速中空油壓迴轉缸裝於後方，而二者以拉桿來連接。
Install the hollow hydraulic chuck to the front end of the lathe spindle first, then install the P-type high speed rotary hydraulic cylinder to the rear end, and draw bar connects both units.

CAUTION
注 意

- 當油壓缸裝設於車床後方，車床的防護罩必須預留通風口，如此油壓缸產生的熱量可以由此散去。
- When the cylinder is installed to the rear end of the lathe, a ventilation exit should be provided on the cover for cooling.



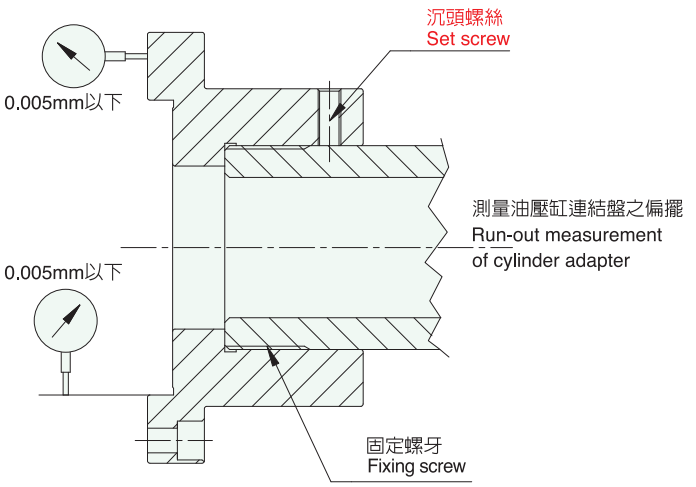
安裝
Installation

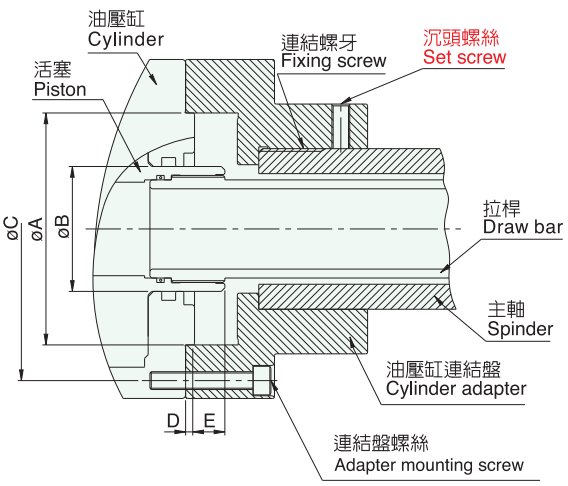
4-2 中空油壓迴轉缸連結盤的製作及安裝
The manufacture and installation of the hollow rotary hydraulic cylinder adapter

CAUTION
注 意

- 校正油壓缸連結盤端面的偏擺及油壓缸連結盤外徑的偏擺在 0.005mm 以內，過多的偏擺會造成震動，而導致油壓缸的使用壽命減短。
- Adjust the run-out of the cylinder adapter end face and the outer diameter of cylinder adapter within 0.005mm, too much run-out will induce vibration, and cause the service life of the cylinder reduced.

- 把油壓缸裝在距離車床主軸托架愈近的地方越好，而油壓缸連結盤的安裝方式及量測偏擺的方式都在下表中表示出來。
- 一定要裝上沉頭螺絲才能防止連結盤的鬆動。
- Install the cylinder as close as possible to the spindle support of the lathe, the methods of the cylinder adapter installation and run-out measuring shown in the following diagram.
- The set screws should be installed to prevent adapter loosening.



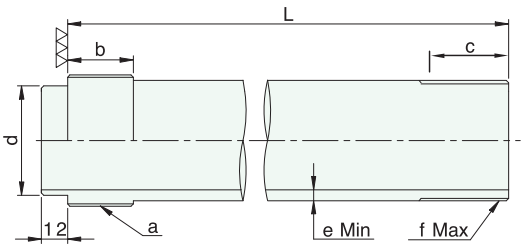


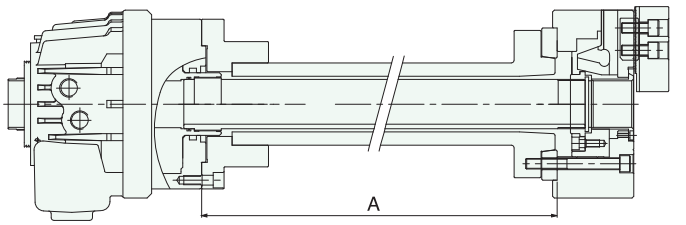
項目 Item / 型式 Model	0928	1036	1246	1552	1875	1878	2091	2093	2511
A(F7)	80	100	100	130	160	160	180	180	230
B	45	48	65	70	95	98.5	110	115	140
C	100	115	130	170	190	190	215	215	275
連結盤螺絲 Adapter mounting screw	6-M8	6-M10	12-M10	12-M10	12-M10	12-M10	12-M12	12-M12	12-M16
D	5	5	5	5	5	5	5	5	6
E(MAX.)	9	10	10	17	20	20	25	25	24

項目 Item / 型式 Model	P2816		F1246S	F1552S	F1875S	P1452S	P1666S	P1881S
A(F7)	260		100	130	160	140	168	168
B	190		65	70	95	70	85	100
C	298	305	130	170	190	165	190	205
連結盤螺絲 Adapter mounting screw	12-M12	12-M16	12-M10	12-M10	12-M10	12-M10	12-M12	12-M12
D	6		5	5	5	5	5	5
E(MAX.)	24		10	17	20	17	19	21

4-3 拉桿的製作
The manufacture of the draw bar

拉桿的長度請依下列計算 The length of the draw bar should be determined by following calculation.





型式 Model	油壓缸規格 Hydraulic cylinder	a	b	c	d(f7)	e Min	f Max	L
204	0928	M38x1.5P	25	25	34 $^{-0.025}_{-0.050}$	3	M32x1.5P	A+28
205	1036	M42x1.5P	25	25	38 $^{-0.025}_{-0.050}$	3.5	M40x1.5P	A+28
206	1246 / F1246S	M55x2P	30	25	50 $^{-0.025}_{-0.050}$	5	M55x2P	A+41
208	1552 / F1552S	M60x2P	30	25	55 $^{-0.030}_{-0.060}$	4	M60x2P	A+39
210	1875 / F1875S	M85x2P	35	30	80 $^{-0.030}_{-0.060}$	5	M85x2P	A+38.5
212	2091	M100x2P	35	35	95 $^{-0.036}_{-0.071}$	4.5	M100x2P	A+36
215	2511	M130x2P	45	50	125 $^{-0.043}_{-0.084}$	6.5	M130x2P	A+59.5
218	2511	M130x2P	45	50	125 $^{-0.043}_{-0.084}$	6.5	M130x2P	A+59.5
221	2816	M180x3P	45	50	171.5 $^{-0.043}_{-0.084}$	7.5	M195x2P	A+62.5
224	2816	M180x3P	45	50	171.5 $^{-0.043}_{-0.084}$	7.5	M220x3P	A+65.5
206L	1246 / F1246S	M55x2P	30	25	50 $^{-0.025}_{-0.050}$	5	M55x2P	A+41
208L	1552 / F1552S	M60x2P	30	25	55 $^{-0.030}_{-0.060}$	4	M60x2P	A+39
210L	1875 / F1875S	M85x2P	35	30	80 $^{-0.030}_{-0.060}$	5	M85x2P	A+38.5
210BH	1878	M87x2P	35	30	83 $^{-0.036}_{-0.071}$	4.5	M87x2P	A+38.5
212BH	2093	M103x2P	35	35	100 $^{-0.036}_{-0.071}$	5	M103x2P	A+34.5
OPB-206	P1452S	M60x2P	30	25	55 $^{-0.025}_{-0.050}$	4	M60x2P	A+34
OPB-208	P1666S	M75x2P	35	30	70 $^{-0.030}_{-0.060}$	4.5	M75x2P	A+42
OPB-210	P1881S	M90x2P	35	30	85 $^{-0.030}_{-0.060}$	4.5	M90x2P	A+37.5
OPB-212	2511	M130x2P	45	35	125 $^{-0.043}_{-0.084}$	4.5	M115x2P	A+46.5
OPB-218	2816	M180x3P	45	50	171.5 $^{-0.043}_{-0.084}$	4	M175x3P	A+59.5

WARNING 警告

- 拉桿厚度增加方能有足夠之強度。若拉桿之強度不足會使其斷裂而喪失夾持力，同時工件飛出，產生危險。
- A thicker draw tube is preferred as it adds to the strength of the grip force. Insufficient strength will cause a loss of grip force, which will cause the workpiece to fly out of the chuck.

IMPORTANT 留 意 事 項

螺牙鬆動是造成振動的主要原因

- 拉桿厚度 e 為最小極限值，加工螺牙 f 部份時最好選用大直徑，使 e 值儘可能最大。
- 以抗拉強度 380Mpa(38kg/mm²) 以上之材料來製作拉桿。
- 螺紋 a,d,f 同心度需在 0.05mm T. I. R 以內。

The key factor of vibration is the loose screws.

- The thickness of the draw bar "e" is the minimum limit value, used big diameter value to manufacture the thread in order to get "e" value as high as possible.
- Using the material of tensile strength of 380Mpa(38kg/mm²) or higher to manufacture the draw bar.
- The concentricity of thread "a" , "b" and "f" should be within 0.05mm T.I.R.

4-4 支撐架的製作及安裝
The manufacture and installation of the support

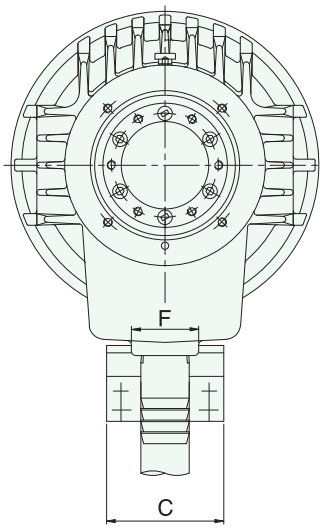
- 安裝油壓缸時必須使洩油口在最底部，否則由於油壓缸的結構，將使得液壓油在罩殼的兩端溢出來。
- The drainage port should be on the bottom when the cylinder installed, otherwise, the hydraulic oil will overflow from the both side of the sleeve body due to the cylinder structure.

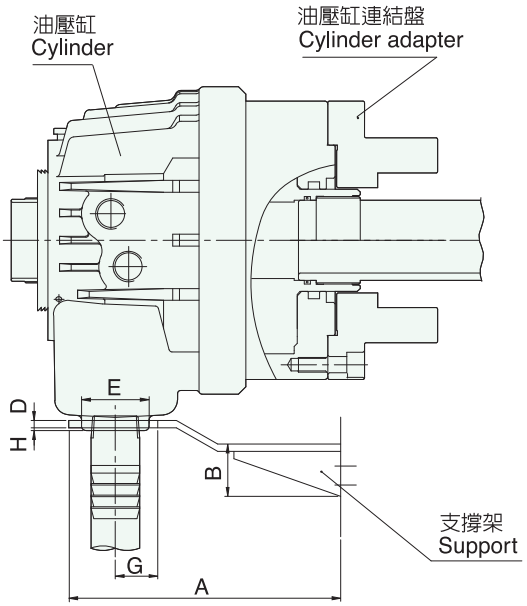
IMPORTANT
留 意 事 項

- 為了防止油壓缸的罩殼主體發生旋轉現象，可以在罩殼洩油口的突起部位安裝一個支撐架。
- In order to prevent the cylinder sleeve body rotating, a support can be installed at the protruding area of the drainage port.

- 在支撐架安裝於車床上時，必須將罩殼洩油口突出部位與支撐架之間保持一定的間隙，使罩殼本體不受其它的外力。
- 當安裝油壓缸時，除了安裝固定罩殼本體的支撐架（防止旋轉的托架）之外，並且需注意油壓缸外徑的偏擺及罩殼主體後端的上、下偏擺，必須比在下圖所示的標準值要來的小。

- A clearance should be kept in between the sleeve body and the support when installing the support to the lathe, in order to prevent the sleeve body taking the load.
- When installing the cylinder, except to install the support to the sleeve body (a support to prevent rotating), the upper and lower run-out of the cylinder outer diameter and the sleeve body rear end should be smaller than the specified values in the following diagram.



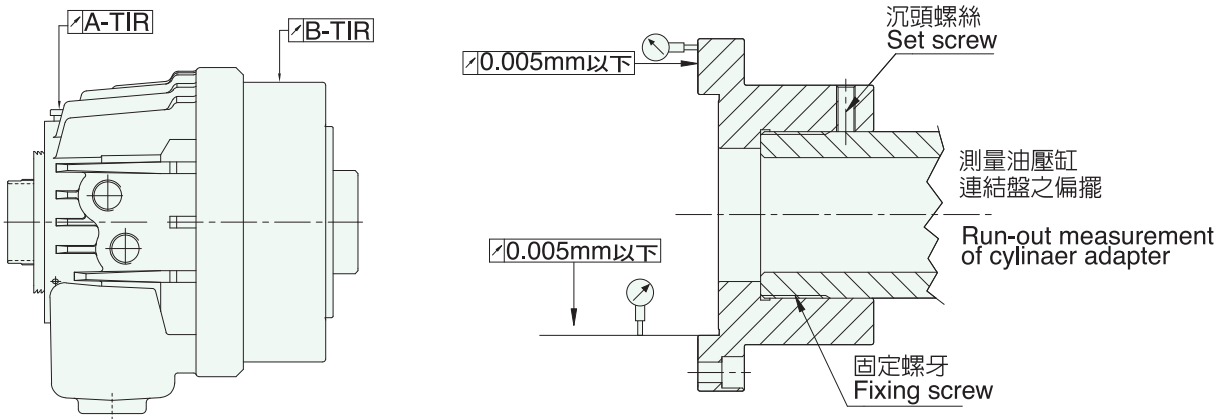


型式 Modle / 尺寸 Size	A	B	C	D	E	F	G	H
0928	依車床的長度來決定 To be determined depending on the lathe.		75	4.5	ø46	50	30	1
1036			75	4.5	ø46	50	30	1
1246, F1246S			75	4.5	ø46	50	30	1
1552, F1552S			75	6	ø46	50	30	1
1875, F1875S, P1878			80	6	ø46	50	30	1
2091, P2093			80	6	ø46	50	30	1
2511			80	6	ø46	65	40	1
2816			100	10	ø60	50	30	1
P1452S			75	4.5	ø46	50	30	1
P1666S			75	6	ø46	50	30	1
P1881S			80	6	ø46	50	30	1

安裝
Installation

測量油壓缸及連結盤的偏擺
Measure the run-out of the cylinder and the adapter.

為了能夠得到上列所需的數值，油壓缸連結盤前端的偏擺必須為最小(0.005 mm以下)。
In order to get the required values shown above, the run-out of the cylinder adapter front end should be less than 0.005mm.



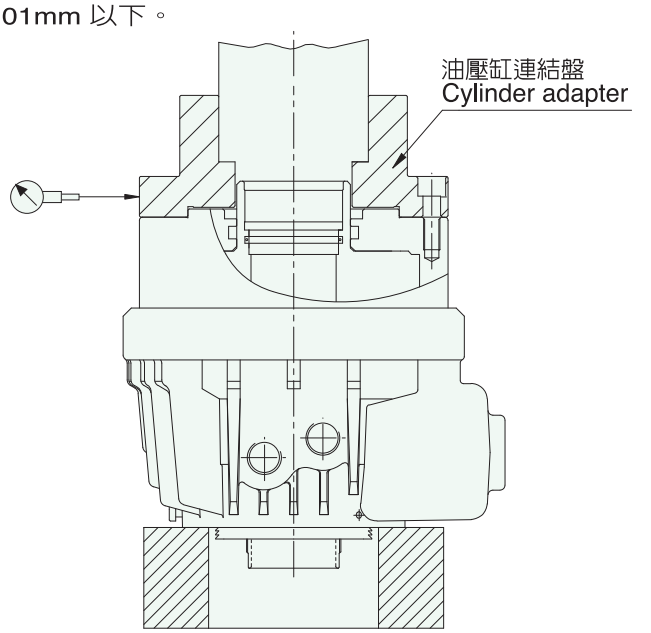
型式 Model	0928	1036	1246	1552	1875 1878	2091 2093	
A	0.015	0.015	0.015	0.015	0.020	0.025	0.030
B	0.010	0.010	0.010	0.010	0.010	0.010	0.010

型式 Model	2816	F1246S	F1552S	F1875S	P1452S	P1666S	P1881S
A	0.035	0.015	0.015	0.020	0.015	0.015	0.020
B	0.010	0.010	0.010	0.010	0.010	0.010	0.010

安裝油壓缸連結盤
Installation of cylinder adapter

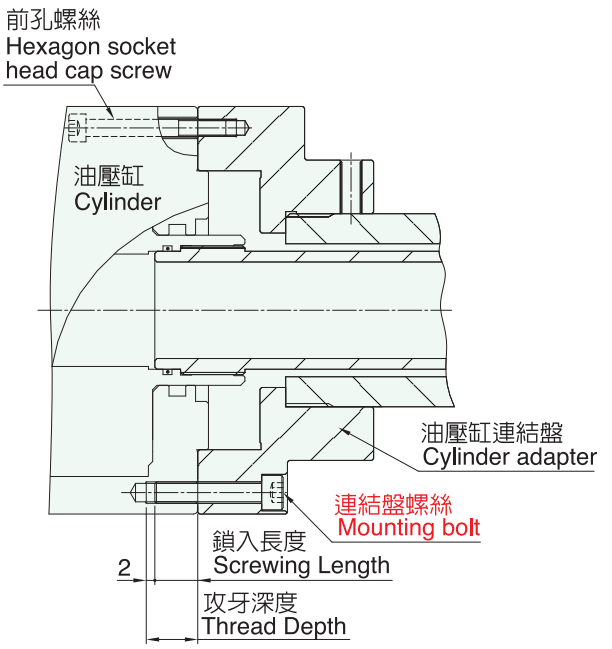
- 當安裝油壓缸連結盤於車床後端之前，應垂直放置連結盤如圖示。
- 須先校正油壓缸外徑及連結盤外徑之偏擺量於 0.01mm 以下。

- When installing the cylinder adapter in front of the lathe rear end, the adapter should be placed vertically as shown in the figure.
- The run-out of the cylinder outer diameter and the adapter outer diameter should be corrected under 0.01mm.



4-5 連結盤螺絲的鎖緊扭矩
Tightening torque of the adapter mounting bolts

- 將安裝油壓缸於油壓缸連結盤時，鎖緊固定螺絲如下圖所示，儘量越深越好。
- When installing the cylinder to the adapter, tighten the mounting screws as deep as possible as shown in the following figure.



型式 Model	0928	1036	1246	1552	1875 1878	2091 2093	2511
連結盤螺絲 Adapter mounting bolt	M8	M10	M10	M10	M10	M12	M16
攻牙深度 Thread depth	15	17	20	20	20	23	23
前孔螺絲 Hexagon socket head cap screw	--	--	--	--	--	--	--

型式 Model	P2816		P1452S	P1666S	P1881S	F1246S	F1552S	F1875S
連結盤螺絲 Adapter mounting bolt	M12	M16	M10	M12	M12	M10	M10	M10
攻牙深度 Thread depth	23	28	20	22	25	20	20	20
前孔螺絲 Hexagon socket head cap screw	--		M8	M10	M10	M8	M8	M10

螺絲規格 Bolt size	鎖緊扭矩 Tightening torque
M8	31N·m(3.1kgf·m)
M10	60N·m(6.1kgf·m)
M12	87N·m(8.9kgf·m)
M16	205N·m(20.9kgf·m)

因為油壓缸是鋁合金的材質，其鎖緊扭矩約為本公司油壓夾頭(同規格螺絲)的80%
Because the material of the cylinder is the aluminum alloy, its tightening torque should be 80% of hydraulic chucks (for the same specified screws).

油壓系統的安裝
Installation Of The Hydraulic System

5-1 油壓回路設計說明
Design description of the hydraulic pressure circuit

油壓回路的設計是基於操作簡便和安全的原則，並且提供失效的安全回路，以防止停電時所產生的危險。

- 油壓缸之油壓回路含有自鎖機構當工作進行加工時，發生停電或壓力源故障所產生的壓力異常降低時，自鎖的機構產生效用，將夾持力維持固定狀態讓工作物不致飛出而產生危險。

The design of the hydraulic circuit is based on the principle of simplified operation and safety. It provides a fail-safe circuit to prevent a loss of grip force when the power is interrupted.

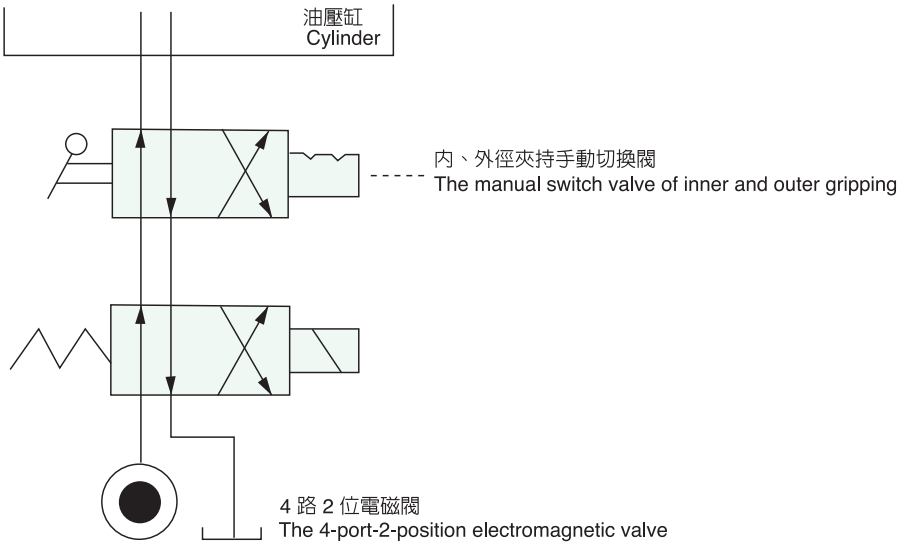
- The hydraulic circuit has a self-lockign mechanism. When pressure is reduced due to interruption of power, the self-locking mechanism will activate to maintain the grip force and keep the workpiece from flying out of the chuck.

DANGER
危 險

- 如果使用 4 路 2 位電磁閥作油壓缸之切換作用，那麼油壓回路就必須設計成當脫磁狀態時，工作物仍處於被夾持狀態。
- If the 4-port-2-position electromagnetic valve is used for switching, the hydraulic circuit should be designed as demagnetized when the workpiece is under gripping condition.

CAUTION
注 意

- 為了防止由內徑夾持切換至外徑夾持所產生的錯誤操作，必須提供一個內外徑夾持的切換閥。
- To prevent the operating error of changing the inner gripping to outer gripping, a switch valve of inner and outer gripping should be provided.



油壓系統的安裝
Installation Of The Hydraulic System

5-2 油壓油 Hydraulic oil

為了能順暢的操作油壓缸，我方推薦使用黏性在 30~50 cSt (溫度 40˚c)的油壓油(相當於ISO VG32和VG46)

In order to operate the cylinder smoothly, it is recommended to use the hydraulic oil whose viscosity is 30~50 cSt at 40˚c. (equivalent to ISO VG32 and VG46)

IMPORTANT
留 意 事 項

- 油壓油必須有抗磨損及不起泡的特質，為了保持油壓缸良好的運作，在油壓供應系統中必須安裝20μm的濾油網。
- The hydraulic oil should have the characteristic of abrasion resistance and non-foaming, a filter of 20 μm should be installed in the hydraulic pressure supply system in order to keep cylinder operating smoothly.

油壓油的品質將影響油壓缸的溫升，洩油量，作動速度，因此請參考幫浦的使用說明來調整油壓油。

The quality of the hydraulic oil will affect the temperature rise, drainage volume and operating speed of the cylinder, therefore, please refer to the instruction manual of the pump to adjust the hydraulic pressure.

5-3 安裝控制閥、油壓系統及管路
Installation of control valve, hydraulic system and piping

- 在便於手動操作的地方，安裝一個手動的切換控制閥來控制夾頭的開啓／關閉。
- 儘量將油壓系統安裝於靠近油壓缸的地方注意洩油管要保持平直，而且油壓錶能夠清楚的被看見。
- 儘量使用內徑大的油管。
- Install a manual switching valve at the place where easy to handle to control the clamp/unclamp of the chuck.
- Install the hydraulic system to the cylinder as near as possible and keep the drainage pipe straight, and the pressure gauge can be observed clearly.
- Use the pipe with the inner diameter as large as possible.

CAUTION
注 意

- 將油管內部的雜物灰塵儘量清出後再安裝，如果油管內部有雜物將導致油壓缸的過熱，十分的危險。

  Before installing the pipe, be sure to clean all dust out. If there is dust in the pipe, it could cause the cylinder to overheat.

IMPORTANT
留 意 事 項

油壓缸的配管必須使用撓性油管，可以防止油管的彎曲阻礙了油壓缸的作動。

配管時的注意事項：

- 使用內徑ø32的洩油管。
- 為了檢查油壓油是否停滯使用透明乙烯基的洩油管或透明材質的洩油管。
- 必須有一定的斜度以利油壓油的流動及排除空氣。
- 油箱的洩油口必須於油面以上。
- 使用於油壓油的幫浦必須至少有20 l/min的流出量，然而油壓壓力的控制必需由幫浦的控制器或減壓閥分開來控制。

The piping of the cylinder should be flexible, it can prevent the bended pipe interfering with the movement of the cylinder. Cautions for piping:

- Use the drainage pipe of 32 inner diameter.
- In order to check the stagnation of the hydraulic oil, a transparent vinyl or transparent material pipe should be used.
- An inclination should be incorporated to make the oil flow and expel the air.
- The drainage port of the tank should be above the oil level.
- Use the pump of 20 l/min flow rate at least, but hydraulic pressure should be controlled by the pump controller or the pressure reducing valve separately.

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5-4 運轉測試 Test run

(1) 確認所輸入的電壓與所指定的相同。
(2) 試運轉時，先將油壓壓力調整到最小的位置，而後迅速切換開關一次，檢查油壓幫浦的旋轉方向是否正確，如果是以相反方向來旋轉應更換三相電源中的二條線後，啓動開關以全速來運轉。
(3) 首先將油壓的壓力設定於低壓，此低油壓力要足夠使夾頭產生作動 (0.35~0.5Mpa)，設定完畢後，依下列步驟檢查。
- 檢查夾頭的作動是否順暢。
- 檢查作動方向是否正確 (夾爪的開合)。
- 檢查作動行程是否足夠 (夾爪的行程)。
- 檢查各部位的管路有無漏油的現象。

依照上敘的事項檢查正確後，慢慢的增加壓力直到所需要的油壓力時，再檢查一次，同時檢看洩油管是否順暢的流下。

(4) 將車床主軸的轉速設定於最小值，檢查油壓缸的偏擺狀況及管路有無異常，若一切正常則再慢慢的增加速度。一旦有震動的情況發生，必須再次檢查油壓缸連結盤的偏擺狀況。
(5) 如果油壓油的油溫不高時 (低於30˚c)，以最大速度的 1/3 來運轉溫機。

(1) Confirm the input voltage is same as specified voltage.
(2) During test run, adjust the hydraulic pressure to the minimum position first, then switch the valve once rapidly to check if the rotating direction is correct, if want to reverse the direction, the two wires in the three-phase power should be switched, then turn on the power and operate at the maximum speed.
(3) First, set the hydraulic pressure to low pressure which should be enough to activate the chuck (0.35~0.5Mpa), then follow the checking procedure below to check.
- Check if the chuck work smoothly.
- Check if the direction of the movement is correct (chuck clamping direction).
- Check if the operating stroke is enough (stroke of the chuck).
- Check if there is any oil leakage on the pipes.

After checking, increase the hydraulic pressure to the required pressure slowly, then check it again and check if the oil flows from the drainage pipe smoothly.

(4) Set the speed of the lathe spindle to the minimum value, then check if the run-out of the cyliner and the piping are normal, if everything is normal then increase the speed slowly. once there is vibration occurred, the run-out of the cylinder adapter should be checked again.
(5) If the temperature of the hydraulic oil is not high (below 30 degree C), operate with 1/3 of the maxmum speed to warm up.

CAUTION
注 意

當機器長期的運轉而沒有更換液壓油時，將造成油壓缸內部壓力升高使得油壓缸過熱，這種情況通常發生於 1.油壓缸的溫度有極大的差異時。 2.由於車床主軸旋轉時所產生的熱。 3.當油壓缸周圍有熱源時，所以必須經常測試油壓缸的功能。

Operating for a long period without replacing the hydraulic oil will cause the internal pressure of the cylinder to increase and will over-heat the cylinder. This will occur under the following conditions: 1. there is a great temperature difference in the cylinder, 2. the heat induced by the lathe spindle rotation, 3. when there is a heat source near the cylinder, the cylinder function should be checked regularly.

- 當油壓缸運轉逐漸變得不正常，請採取下列步驟：
  1.如果主軸仍在運轉中，立即停止運轉。
  2.增加油壓壓力大約 0.5Mpa，重覆油壓缸切換的動作測試油壓缸的運動是否順暢。
- When the operation of the cylinder becomes abnormal gradually, please use the following procedure:
  1. Stop the operation immediately if the spindle is operating.
  2. Increase the hydraulic pressure approx. 0.5Mpa, switch the movement of the cylinder repeatly to test if the movement of the cylinder is smooth.

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3. 如果油壓缸的運轉仍然不正常，逐步的增加油壓的壓力每次約 0.5Mpa，再重覆上述(2)的過程來測試油壓缸的運動。然而增加的預設壓力不可超過夾頭最大油壓力的30%。
   當油壓缸的運轉回覆到正常時，將預設壓力回復到原來的程度。
4. 如果油壓缸的運轉雖然經過上(3)的方法操作許多次而且預設壓力已達到最大值，仍然無法恢復正常，那將夾頭預設壓力回復到正常程度，將電源關掉等到油壓缸的表面溫度回降與室溫相當時，重覆(2)和(3)的方法來測試油壓缸的運動。
   油壓缸的溫度可以用風槍或類似的裝置將空氣吹到油壓缸上來降低。
5. 當溫度降低後油壓缸的運動仍然無法恢復正常，將夾頭的拉桿螺帽鬆開，取下夾頭確認油壓缸的運動。

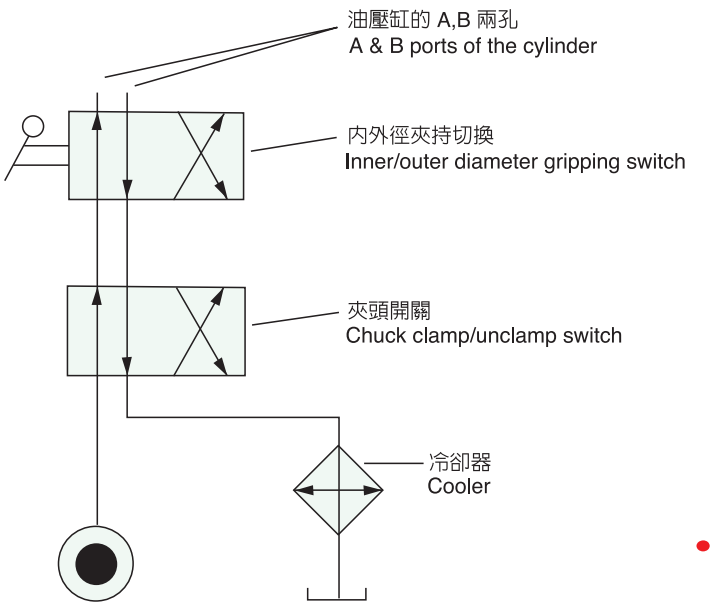
3. If the cylinder operation is still abnormal, gradually increase the hydraulic pressure 0.5Mpa each time, then repeat the procedure of the item (2) to test the cylinder operation. but the increment of the pre-set pressure should not exceed 30% of the maximum chuck hydraulic pressure.
   When cylinder operation is back to normal, the pre-set pressure should be recovered to original level.
4. If the cylinder operation still can not back to normal after repeating the process of item (3) several times and the pre-set pressure reach the maximum value already, then recover the pre-set pressure to normal level, shut down the power to lower the surface temperature of the cylinder to room temperature, then repeat the process of the item (2) and (3) to test the cylinder operation.
   The cylinder temperature can be lowered by air gun or similar equipments.
5. If the cylinder operation is still abnormal after reducing the temperature, loosen the draw nut of the chuck and remove the chuck to confirm the cylinder operation.

5-5 油壓油的溫度上升 Temperature rise of the hydraulic oil

連續高速的使用將導致油溫的升高而造成油封材質及油壓油的快速惡化，
使用冷卻裝置，保持溫度低於 60˚C

Continuous high speed operation will cause the temperature rise and induce the sealing material and hydraulic oil deteriorated rapidly. use a cooler to keep the temperature below 60˚C.

例 Example



- 此時，應該減少背壓
  In this case, reduce the back pressure.

6 維護及檢查 Maintenance and inspection

- 當漏油的情況出現時，分解油壓缸清洗和更換O型環，此時在處理油壓缸時必須很小心，因為它一部份是由鋁合金製造。

油壓系統

- 清潔吸油口過濾網，約 2~3 個月一次。
- 檢查油壓油約半年一次，如果已經變質，請更換。

- After a leak has occurred, disassemble the cylinder, clean it, and replace the o-ring.

Hydraulic system

- Clean the oil suction filter every 2~3 months.
- Check the hydraulic oil every half year, and replace it when it is deteriorated.

WARNING
警 告

當操作機械使用最大油壓力及最高轉速時，每年必須分解檢查內部零件，並更換油封。
當突壓力過大時，會造成油壓缸的作動不良及損壞，所以必須調整節流閥來降低突壓力。

If the machine is operting under maximum speed and hydraulic pressure on a regular basis, disassemmble and check the parts and replace the oil seal at least once per year.

If the surge pressure is too high, the cylinder will fail. Therefore, adjust the throttle valve to reudce the surge pressure.

WARNING
警 告

每星期檢查止逆閥之斷電裝置是否正常，檢查方法：先讓夾頭夾持一圓棒後關掉電源，查看工件是否會脫落，不會鬆脫表示功能正常，如鬆動表示功能失效，須立刻送廠檢修。

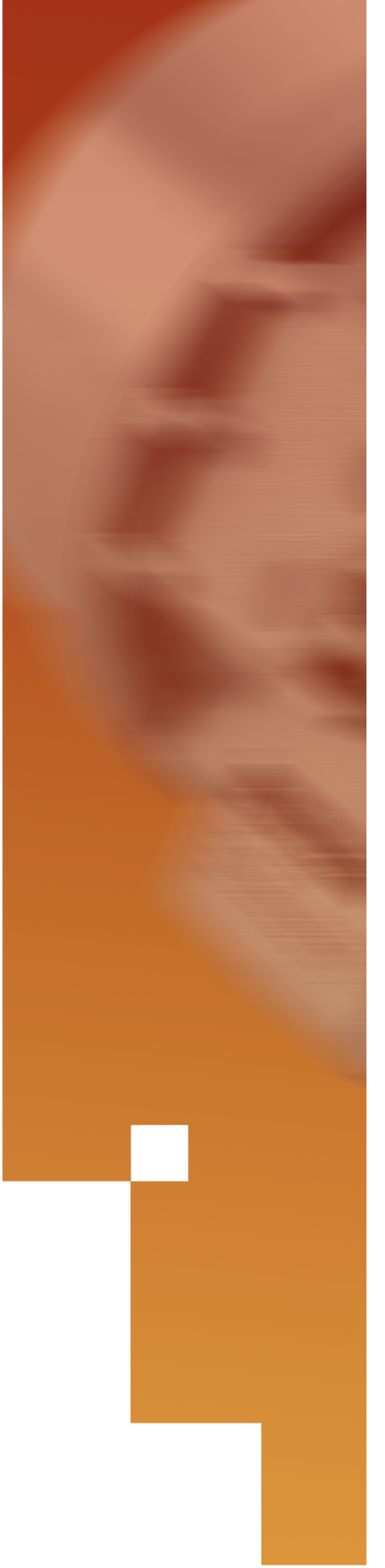
Be sure to occasionally check the operation of the check valve. Grip a workpiece, then turn off the power to the machine and check to see if the workpiece is still gripped at the correct grip force. If the workpiece is not gripped properly, contact Buck chuck for repair service.

7 故障排除

如油壓缸故障，請停下來檢查，依下列狀況來處理

不正常情況	原因	對策
活塞不作動	油壓系統停止運作	檢視油壓系統是否屬於正常運作中
活塞不作動	管路連接錯誤	確認所有管路皆連接正確
活塞不作動	油壓幫浦方向錯誤	依運轉中測試步驟重新修正
油壓缸推力不足	壓力不在正常值	裝置一個壓力計於油壓缸入油口處，以確認其壓力是否達到正常值
油壓缸推力不足	回油管之壓力太高或洩油量多於正常值	O型環損壞所導致，須更換O型環
油壓缸推力不足	吸油口過濾網阻塞	清洗濾網及油箱內雜質及更換液壓油
溫度上升	油之黏度不符	確認液壓油之黏度是否正確並更正
溫度上升	油箱之油量不足	補充油箱內的油
溫度上升	高溫使油箱溫度升高	使用冷卻器或電扇控制油溫
溫度上升	液壓油變質	清洗油箱更換液壓油
溫度上升	油壓壓力過高	調整壓力至正常值
幫浦之噪音	空氣或雜質進入	避免空氣及異物進入
幫浦之噪音	油箱內油量不足	補充液壓油
幫浦之噪音	堆積過多的雜質或液壓油品質已經惡化	清洗油路系統及油箱更換液壓油
幫浦之噪音	油壓幫浦磨損	立即修理或更換
不明之漏油現象	洩油管不能順暢洩油	檢查洩油通路是否太小或彎曲阻礙洩油
不明之漏油現象	油封硬化或破損	更換油封或O型環組
不明之漏油現象	油壓缸導氣螺絲或油缸中有雜質阻塞	清除油壓缸通氣栓或油缸中之雜質異物

備註：
簡單之故障請自行處理，如無法自行處理或特殊狀況時，可通知各地經銷商或與本公司連繫。
我們將於接到問題後立即為客戶服務。



BUCK™
CHUCK COMPANY

2155 Traversefield Dr
Traverse City, MI 49686
800-228-BUCK
www.buckchuck.com
info@buckchuck.com