H type

中空動力夾頭

THRU-HOLE POWER CHUCK

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. If the user of the product altered,
  please hand the instruction to the new user.

◎ 序 言

為了確保你的安全，在使用你的夾頭之前，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 chuck, please read this instruction manual and paypparticular attention to instructions marked with ⚠ including IMPORTANT instructions concerning chuck 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

CONTENTS

注 意 事 項 FOR SAFE OPERATION

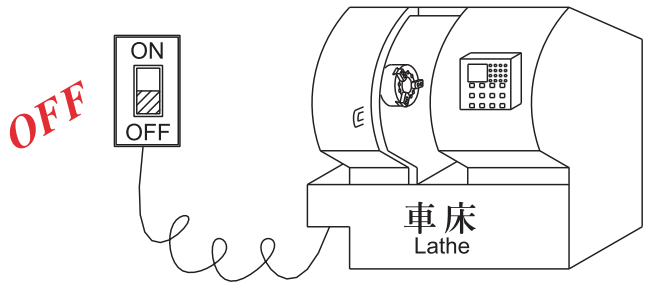
請詳閱本說明書，並依循指示說明。若未依照指示，錯誤的使用而致引起的損傷或意外事，本公司概不負責。

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.

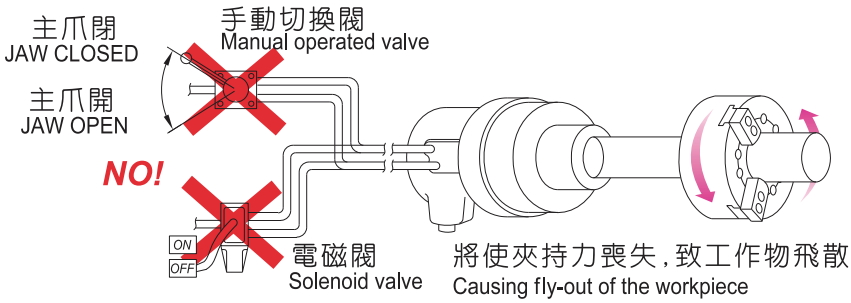
DANGER 危 險

在安裝檢查或潤滑夾頭時，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.

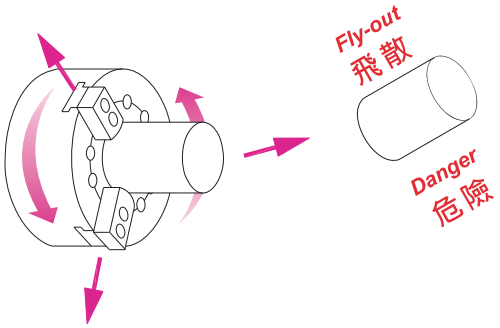


當主軸迴轉時，切勿操作切換閥。
Never operate the selector valve and the solenoid valve during the spindle rotation.



最大旋轉速度必須為夾頭或油壓缸所容許之最高迴轉速中較低者。
The max. speed must be the lower of the max. speed allowed by the power chuck or the hydraulic cylinder.

迴轉數增加時,離心力相對的增加而降低夾持力， 易導致工作物飛散產生危險,故需依切削條件選擇適當的轉數。
Gripping force decreases due to centrifugal force as speed of chuck increases, thereby causing the discharge of workpiece.

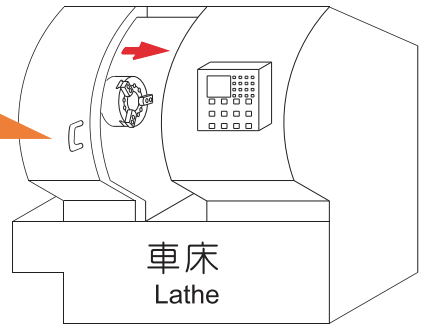


WARNING
警 告

未關好安全門之前，切勿啟動主軸開關。
Don't start the spindle before closing the machine door.

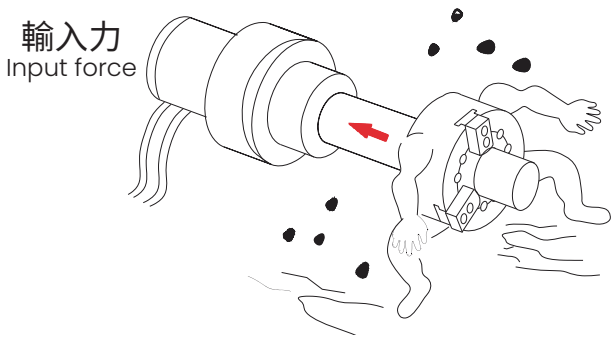
Close 關緊

避免工件或夾爪因未關門而飛出。
Workpiece or jaw may scatte while door open.



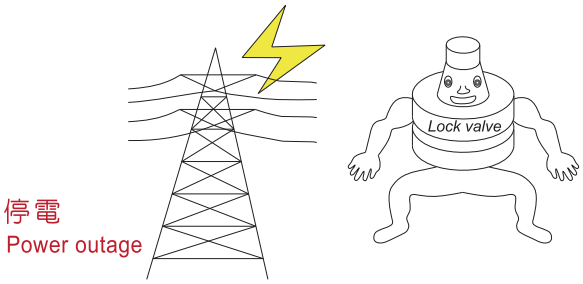
油壓缸出力不可超過夾頭容許之最大入力。
Don't exceed Max. allowable plunger input force.

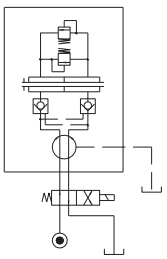
如油壓缸出力超過夾頭容許最大值，
將致使夾頭變形或破裂之危險。
If input force of plunger is exceeded, chuck may be deformed or broken.



某些型式的迴轉缸內建有"逆止閥"機構，當電源意外中斷時，能防止迴轉缸內部壓力遽降，保持穩固的夾持。
In case of power failure, AUTOGRIP's some cylinders are fitted with check valves and pressure relief valves. When power is restored, he solenoid valve 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.



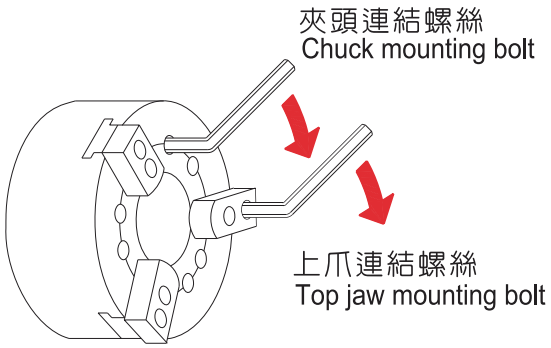


設定工件在正確的夾持位置
Set the workpiece to the correct gripping position.

WARNING
警　告

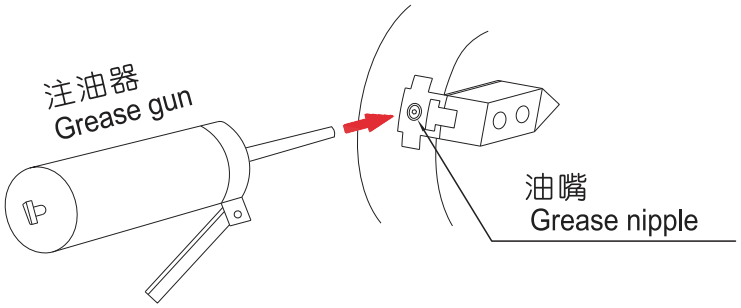
連結螺絲請依照附表所指定之力矩鎖緊。
Secure mounting bolts with specified torque.

螺絲規格 Bolt size	鎖緊力矩 Tightening torque
M6	12.7 N・m (1.3 kgf・m)
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)
M14	170.6 N・m (17.4 kgf・m)
M16	250.0 N・m (25.5 kgf・m)
M20	402.1 N・m (41.0 kgf・m)
M22	539.4 N・m (55.0 kgf・m)
M24	618.0 N・m (55.0 kgf・m)



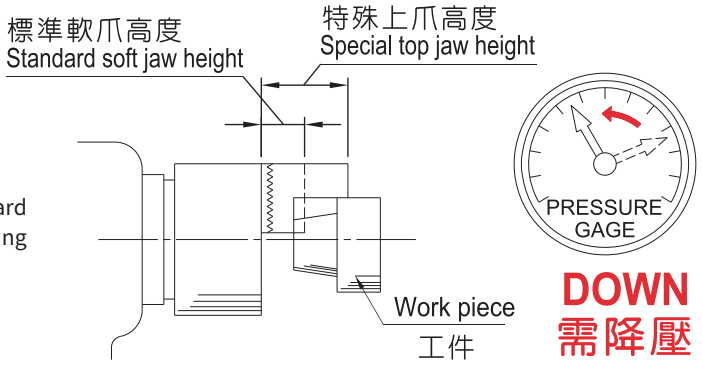
應確實給油。
Don't miss to lubricate chuck.

給油不足時. 會降低夾持力。
Lowering gripping force caused by insufficient lubrication.



使用加高軟爪時，油壓入力需適度降低。
When using higher top jaw, the oil pressure should be reduced.

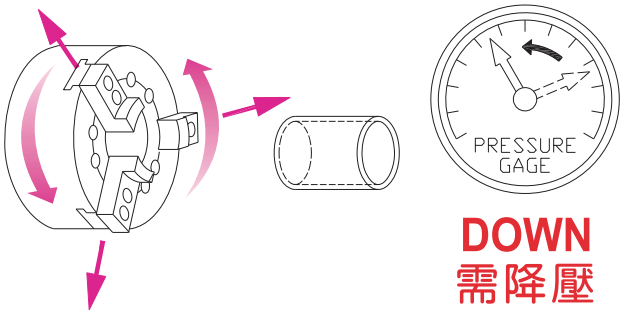
使用加高軟爪時, 需降低油壓力及迴轉數。
Using higher top jaw than standard should reduce input force and rotating speed.



WARNING
警 告

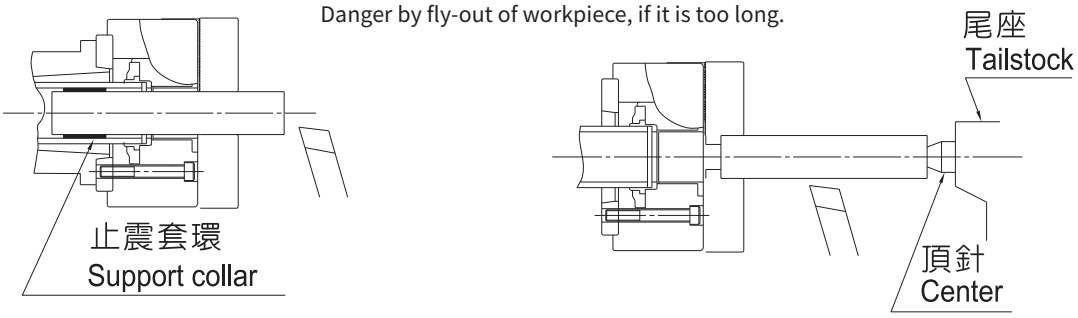
工件加工以內徑夾持時，需將油壓力降低至正常的50%以下。
When chucking components internally, reduce the hydraulic pressure by more than 50%.

如未降低油壓力，可能會因夾持力與離心力的雙重作用而使工件或夾頭受損。
If not reduce the hydraulic pressure, it may cause fly-out of the jaw or the workpiece.



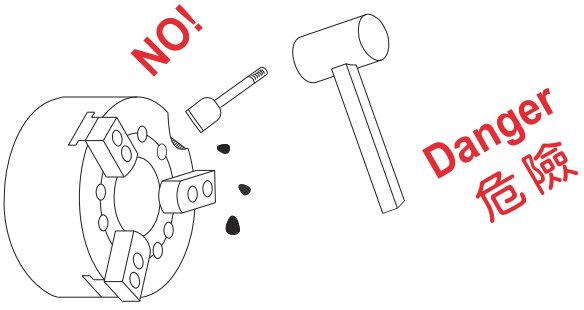
車削長工件物時，必須以尾座頂針或止震套環支撐。
When machining a long workpiece, steady it with a center of tailstock or support collar.

太長而沒有輔助支撐之工件，會有飛散之危險.
Danger by fly-out of workpiece, if it is too long.



不可隨意改造夾頭。
Don't attempt to modify the chuck.

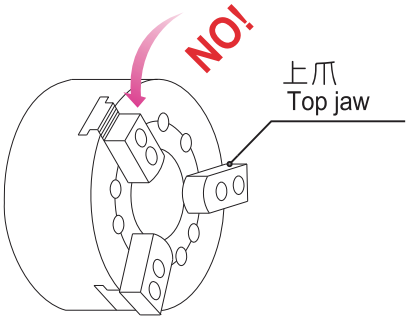
不當改造會損壞夾頭機能而發生危險。
Danger by function damaged of chuck.



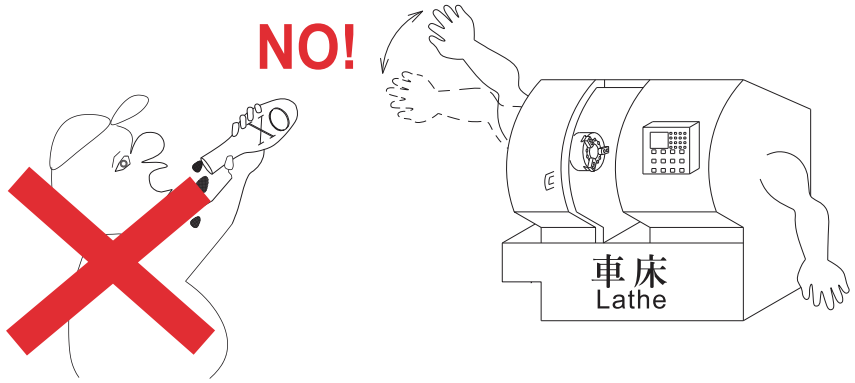
CAUTION
注 意

安裝上爪時，三爪之鎖緊位置必須相同，三爪之重量則盡量一致。
When mounting the top jaw on the chuck, the position should be the same, and mass of each jaw is as much as possible.

動平衡差異過大，易造成機台震動，影響加工精度。
Unbalanced mass will cause larger vibration of the machine, thus result in poor accuracy.



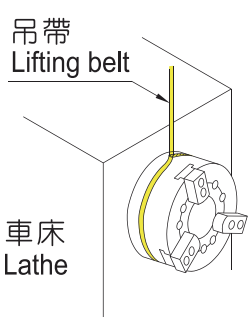
操作機器前，請勿喝酒或服用麻醉性藥物。
Never attempt to operate machine after drinking alcohol taking drugs.

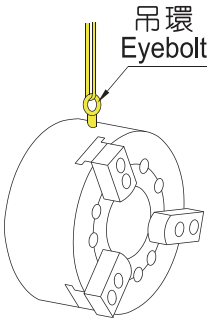


操作機器前，請勿穿戴手套或領帶。
Never attempt to operate machine with gloves and necktie worn.

CAUTION
注 意

拆裝夾頭時，務必使用吊帶或吊環。
Have to using eyebolt or lifting belt, when mounting or dismantle chuck.

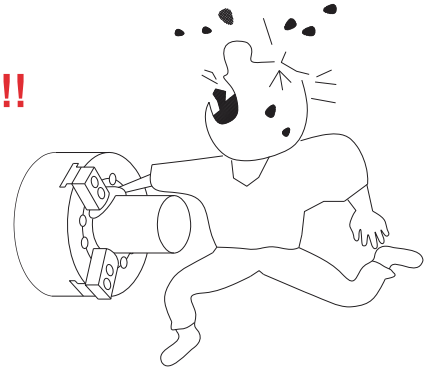




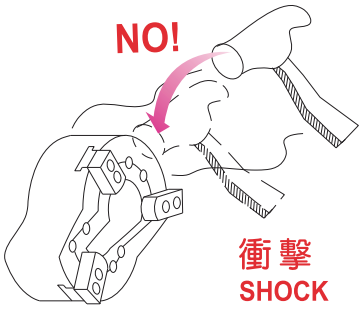
不使用吊帶將肇生危險。
Without lifting belt will cause danger.

夾持工件時，請注意不要被夾到手。
When clamping workpiece, make sure your hand not to be hurt.

DANGER !!
危 險



不可敲擊夾頭、夾爪或夾持之工件物。
Never hammer chuck, jaws or clamped workpiece.

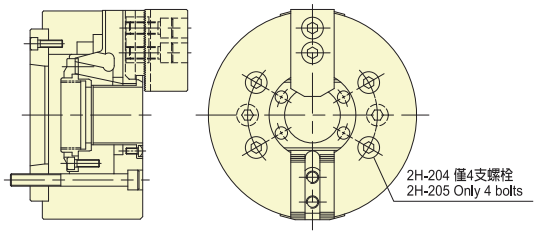


2. 中空動力夾頭

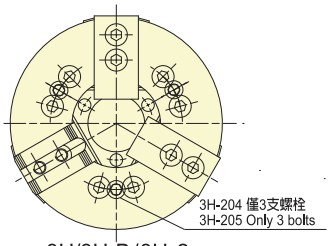
2.1 中空動力夾頭規格

2. Trough-hole power chuck

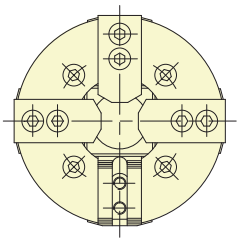
2.1 Specification of through-hole power chuck



2H/2H-2



3H/3H-B/3H-2



4H

註:紅色數據為_H-A型之寸法 (The dimensions and the specifications of _H-A type are in red data.)

型號		楔心行程	爪行程(直徑)	夾持直徑 Chucking Dia.		容許最大入力	最大夾持力	最高迴轉數	I	重量		適用迴轉缸	最大使用壓力
Model		Plunger stroke	Jaw stroke (Dia.)	最大 Max.	最小 Min.	Max. D.B. pull	Max. Clamping force	Max. speed	Moment of inertia	Weight		Matching cyl.	Max. pressure
		mm	mm	mm	mm	kN (kgf)	kN (kgf)	min^{-1} (r.p.m.)	$kg \cdot m^2$	kg			MPa (kgf/cm^2)
3H-204	A4	13	5.5	113	7	13.7(1400)	36.0(3670)	8000	0.012	4.22	5.34	TK-A528	2.0(20)
3H-205	A4	13	5.5	138	10	17.2(1750)	48(4890)	7000	0.02	6.3	7.1	TK-A533	2.5(25)
3H-206	A5	14	6	170	13	23.3(2375)	66.8(6810)	6000	0.06	13.1	14.9	TK-A646	2.5(25)
3H-208	A6	18	7.6	210	17	31.9(3250)	107(10900)	5000	0.15	21.8	23.4	TK-A853	2.6(26)
3H-210	A8	21	8.9	260	37	49.1(5010)	152(15500)	4500	0.32	37.5	43	TK-A1075	3.2(32)
3H-212	A11	25	10.6	315	43	58.8(6000)	157(16010)	3700	0.74	58.6	64.7	TK-A1512	1.9(19)
3H-215	A8	25	10.6	405	49	71(7240)	180(18350)	2500	2.8	127	149	TK-2114	2.1(21)
3H-215	A11	25	10.6	405	49	71(7240)	180(18350)	2500	2.8	127	143.3	TK-2114	2.1(21)
3H-215	A15	25	10.6	405	49	71(7240)	180(18350)	2500	2.8	127	135.6	TK-2114	2.1(21)
3H-18B	A15	23	10.6	456	79	71(7240)	180(18350)	2000	4.8	162.4	173.4	TK-2416	1.9(19)
3H-221	A15	28	12.9	530	105	90(9175)	234(23860)	1800	7.5	223	234	TK-2416	2.4(24)
3H-224	A20	28	12.9	610	135	100(10200)	240(24500)	1500	15.8	270	284	TK-2820	2.1(21)
3H-232	A20	34	18	800	205	100(10200)	240(24500)	1200	47	546	560	TK-2820	2.1(21)

型號		楔心行程	爪行程(直徑)	夾持直徑 Chucking Dia.		容許最大入力	最大夾持力	最高迴轉數	I	重量		適用迴轉缸	最大使用壓力
Model		Plunger stroke	Jaw stroke (Dia.)	最大 Max.	最小 Min.	Max. D.B. pull	Max. Clamping force	Max. speed	Moment of inertia	Weight		Matching cyl.	Max. pressure
		mm	mm	mm	mm	kN (kgf)	kN (kgf)	min^{-1} (r.p.m.)	$kg \cdot m^2$	kg			MPa (kgf/cm^2)
3H-12	A8	25	10.6	304	34	54.9(5600)	143.7(14650)	3300	0.77	56.6	59.3	TK-A1291	2.5(25)
3H-15	A8	25	10.6	381	50	71(7250)	179.8(18350)	2500	2.28	120	134	TK-A1512	2.3(23)
3H-15	A11	25	10.6	381	50	71(7250)	179.8(18350)	2500	2.28	120	127	TK-A1512	2.3(23)
3H-18	A11	25	10.6	450	50	71(7250)	180.3(18400)	2000	4.46	160	174	TK-A1512	2.3(23)

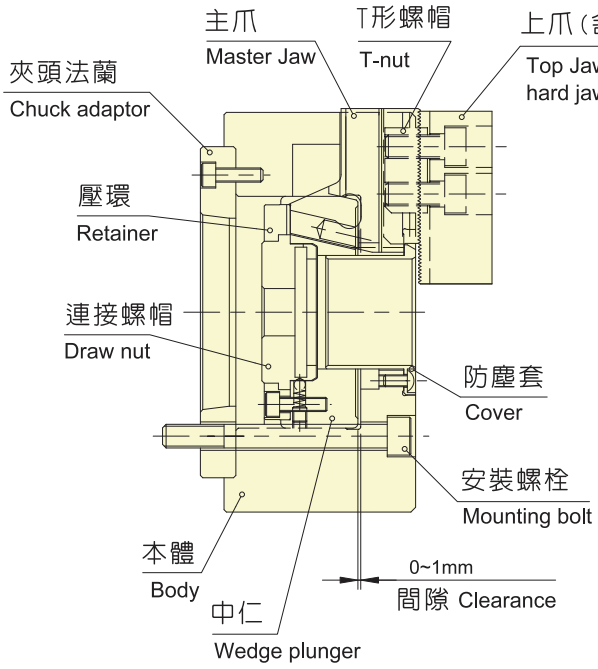
型號		楔心行程	爪行程(直徑)	夾持直徑 Chucking Dia.		容許最大入力	最大夾持力	最高迴轉數	I	重量		適用迴轉缸	最大使用壓力
Model		Plunger stroke	Jaw stroke (Dia.)	最大 Max.	最小 Min.	Max. D.B. pull	Max. Clamping force	Max. speed	Moment of inertia	Weight		Matching cyl.	Max. pressure
		mm	mm	mm	mm	kN (kgf)	kN (kgf)	min^{-1} (r.p.m.)	$kg \cdot m^2$	kg			MPa (kgf/cm^2)
2H-204	A4	13	5.5	113	7	9.2(940)	19.4(1980)	8000	0.012	4.2	4.8	TK-A528	1.3(13)
2H-205	A4	13	5.5	138	10	11.4(1167)	32(3260)	7000	0.02	6.8	7.6	TK-A533	1.6(16)
2H-206	A5	14	6	170	13	15.5(1580)	44.4(4530)	6000	0.06	13.1	14.9	TK-A646	1.6(16)

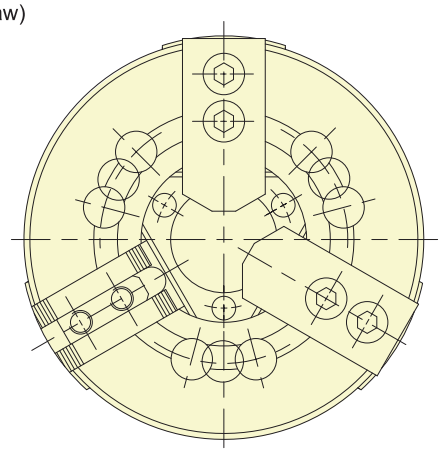
型號		楔心行程	爪行程 (直徑)	夾持直徑 Chucking Dia.		容許最大入力	最大夾持力	最高迴轉數	I	重量		適用迴轉缸	最大使用壓力
Model		Plunger stroke	Jaw stroke (Dia.)	最大 Max.	最小 Min.	Max. D.B. pull	Max. Clamping force	Max. speed	Moment of inertia	Weight		Matching cyl.	Max. pressure
		mm	mm	mm	mm	kN (kgf)	kN (kgf)	min^{-1} (r.p.m.)	$kg \cdot m^2$	kg			MPa (kgf/cm^2)
2H-208	A5	18	7.6	210	17	23.1(2360)	57.3(5840)	5000	0.17	21.3	24.2	TK-A853	1.8(18)
2H-208	A6	18	7.6	210	17	23.1(2360)	57.3(5840)	5000	0.17	21.3	22.4	TK-A853	1.8(18)
2H-210	A8	21	8.9	260	37	32.9(3355)	101.9(10385)	4500	0.31	33.5	36.2	TK-A1075	2.2(22)
2H-12	A8	25	10.6	304	34	36.7(3740)	95.8(9780)	3300	0.70	59.7	62.7	TK-A1291	1.7(17)
2H-15	A8	23	10.6	381	50	46.9(4790)	119.6(12200)	2500	2.42	115	129	TK-A1512	1.5(15)
2H-15	A11	23	10.6	381	50	46.9(4790)	119.6(12200)	2500	2.34	115	122	TK-A1512	1.5(15)

型號		楔心行程	爪行程 (直徑)	夾持直徑 Chucking Dia.		容許最大入力	最大夾持力	最高迴轉數	I	重量		適用迴轉缸	最大使用壓力
Model		Plunger stroke	Jaw stroke (Dia.)	最大 Max.	最小 Min.	Max. D.B. pull	Max. Clamping force	Max. speed	Moment of inertia	Weight		Matching cyl.	Max. pressure
		mm	mm	mm	mm	kN (kgf)	kN (kgf)	min^{-1} (r.p.m.)	$kg \cdot m^2$	kg			MPa (kgf/cm^2)
4H-206	A5	14	6.0	170	13	23.2(2375)	66.7(6810)	5000	0.06	12.5	16.7	TK-C646	2.5(25)
4H-208	A5	18	7.6	210	17	34.3(3500)	85.8(8750)	4200	0.19	23.5	25.4	TK-A853	2.8(28)
4H-208	A6	18	7.6	210	17	34.3(3500)	85.8(8750)	4200	0.19	23.5	24.3	TK-A853	2.8(28)
4H-210	A6	21	8.9	260	37	49.1(5010)	110.7(11300)	3800	0.4	38.7	44	TK-A1075	3.2(32)
4H-210	A8	21	8.9	260	37	49.1(5010)	110.7(11300)	3800	0.4	38.7	42.3	TK-A1075	3.2(32)
4H-12	A8	25	10.6	304	34	54.9(5600)	143.6(14650)	2700	0.77	62	65.7	TK-A1291	2.5(25)
4H-15	A8	25	10.6	381	50	71(7250)	179.8(18350)	2000	2.31	117.6	130	TK-A1512	2.3(23)
4H-15	A11	25	10.6	381	50	71(7250)	179.8(18350)	2000	2.31	117.6	123.5	TK-A1512	2.3(23)
4H-18	A11	25	10.6	450	50	71(7250)	179.8(18350)	1700	4.35	162.6	168.5	TK-A1512	2.3(23)

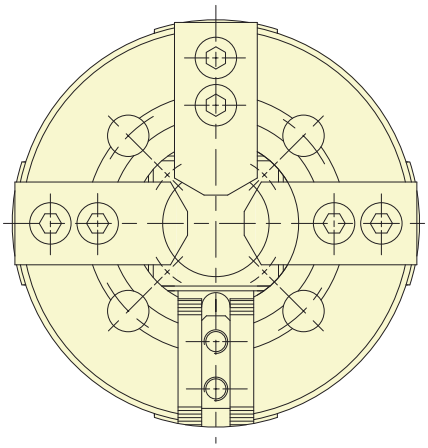
2.2. 中空動力夾頭構造圖

2.2. Drawing of through hole power chuck

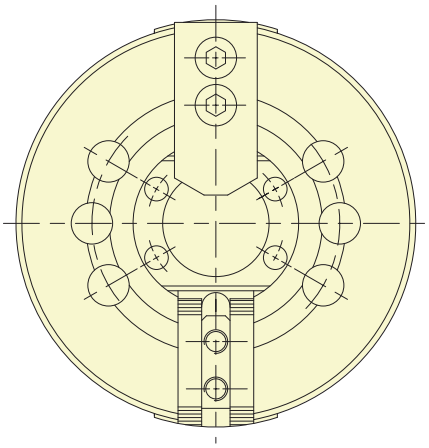




型式 3H/3H-B/3H-2
Model 3H/3H-B/3H-2



型式 4H
Model 4H



型式 2H/2H-2
Model 2H/2H-2

Fig.1

2.3. 中空動力夾頭零件表

2.3. Parts list of through-hole power chuck

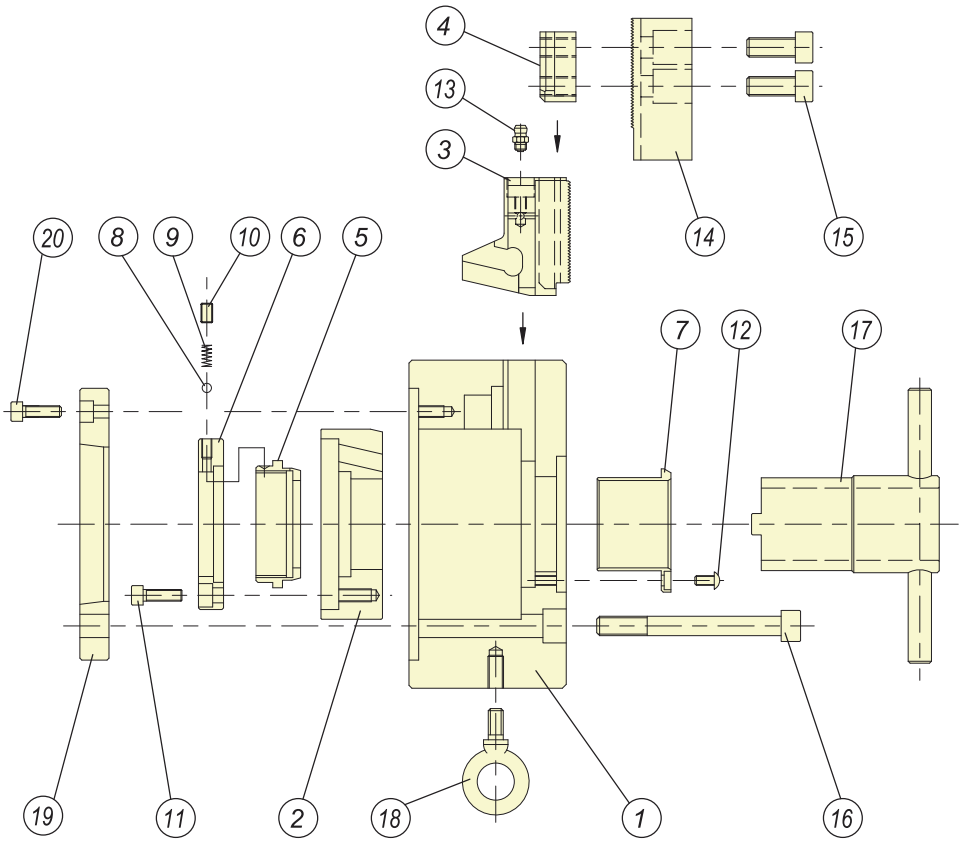


Fig.2

No.	零件名稱	Name of parts	Q'ty
1	本體	Body	1
2	中仁	Wedge plunger	1
3	主爪	Master jaw	2 or 3
4	T 形螺帽	T-nut	2 or 3
5	拉桿連結螺帽	Draw nut	1
6	螺帽壓環	Retainer	1
7	防塵套	Cover	1
8	鋼珠	Steel ball	1
9	彈簧	Spring	1
10	六角孔固定螺絲	Hex. socket set screw	1

No.	零件名稱	Name of parts	Q'ty
11	六角孔圓頭螺栓	Hex. socket cap bolt	4 or 6
12	六角孔半圓頭螺栓	Hex. socket button screw	3 or 4
13	油嘴	Grease nipple	2 or 3
14	軟爪	Soft Jaw	2 or 3
15	軟爪連結螺栓	Jaw mounting bolt	4 or 6
16	夾頭安全螺栓	Chuck mounting bolt	3 or 6
17	連結扳手 (附件)	Joint handle(accessory)	1
18	吊環螺栓 (10" 以上附件)	Eye bolt(accessory 10" or over)	1
19	連結法蘭 (選配)	Adapter plate(option)	1
20	六角孔圓頭螺栓 (選配)	Hex. socket cap bolt(option)	3

2.4 夾持力與迴轉數

最大靜夾持力

- 使用標準的生爪，將夾持力感測器放置於生爪高度一半的位置。(參考Fig.3)
- 安裝上爪時，請使用附屬之螺絲，鎖緊螺絲請依照標準力矩鎖緊。(參考第5頁)
- 表中所列的容許拉力為楔形拉桿的最大容許拉力。(參考2.11中空動力夾頭規格)
- 供給油壓油的幫浦必須至少有20L/min的流出量，而油壓壓力的控制須由幫浦的控制器或減壓閥來分開控制。

最高迴轉數

- 當動態夾持力(迴轉中的夾持力)降至靜態夾持力的1/3倍的實際測量值。

2.4 Relationship between clamping force and rotational speed

Maximum static clamping force

- Using the standard top jaws, and the gripping force sensor should be clamped at half of the height of the top jaws. (Refer to Fig.3)
- Please use the attaching bolts to mount the top jaws. Tighten the mounting bolts according to the specified torque.(Refer to page 5)
- The maximum pull force of wedge plunger is as shown in the table. (Refer to 2.1 Specification of through-hole & non-through-hole power chuck)
- For hydraulic source, the pump with the discharge capacity of 20 liters/min or more should be used. The hydraulic pressure is set by pump's control device or a separately equipped pressure reduction valve.

Maximum rotational speed

- The maximum rotational speed is the actual measured data after lowering the dynamic clamping force(during rotations to 1/3 of the static clamping force.

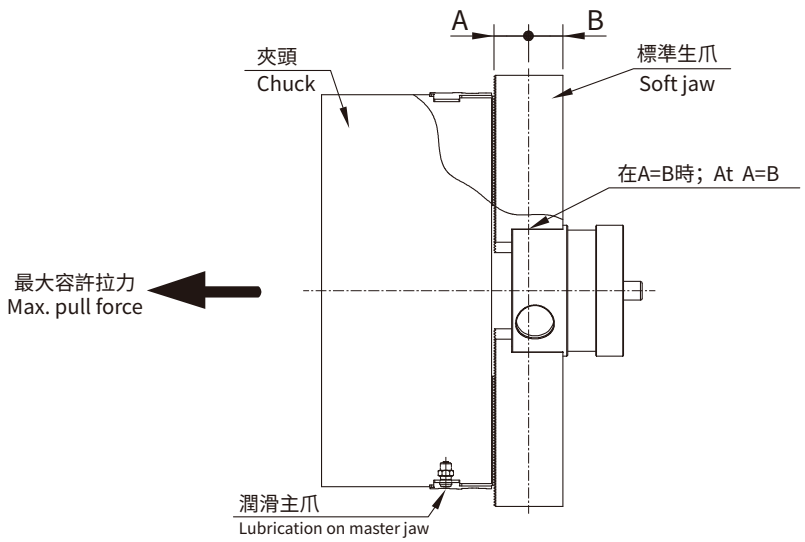


Fig.3

CAUTION 注 意

- 由於幫浦的功能、減壓閥、管路情況及潤滑油脂的使用而有些許的差異，必須加以小心注意，特大型的迴轉油壓缸，使用的場合也必須注意，過大的油壓壓力及夾持力會傷害零件的耐用性及壽命，建議使用節流閥以降低突壓力。

- Gripping force varies according to the performance of pump and reducing valve, piping conditions, grease, etc. Especially, when pressure regulators of the pump or the reducing valve are not performing correctly, excessive surge pressure will be raised, thus increasing the gripping force. As a result, parts will be damaged and chuck durability reduced. Therefore it is recommended to provide a throttle valve to lower the surge pressure.

WARNING
警 告

- 高速迴轉時進行重切削容易造成工件脫落飛出，操作時需特別注意。
- 每三個月定期檢查夾持力是否足夠。
- 最大旋轉速度必須為夾頭或油壓缸所容許之最高迴轉速中較低者。

- Since high speed machining with heavy cutting can cause slippage or discharge the workpiece, extreme care must be taken.
- Periodically(every three months) check that gripping forces is adequate.
- Maximum speed will always be the lower speed on either the cylinder or chuck.

- 迴轉數增加時，離心力相對的增加而降低夾持力，下列圖表的曲線是用標準生爪所測定，但有其他的變數即是上爪的尺寸、外形及安裝的位置，如果夾頭用於高轉速，那就必須使用夾持力感測器量測。

- When the rotational speed becomes higher, the centrifugal force increases accordingly, thus reducing the clamping force.
- The data is shown in the following chart, using the standard soft jaws. The clamping force will be varied by the dimension, shape, and position of the top jaws. Therefore, if the chuck rotates at a high rotational speed, it is required to measure with the gripping force sensor.

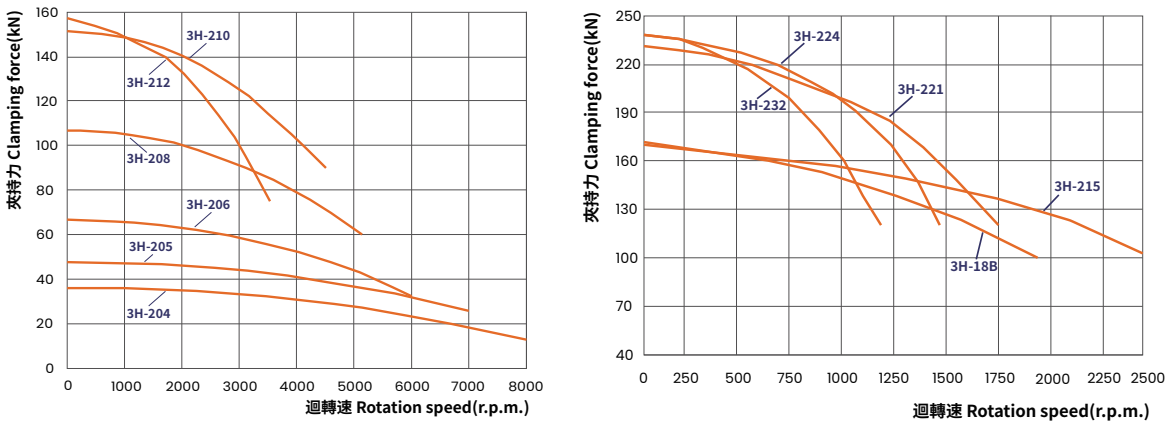


Fig.4

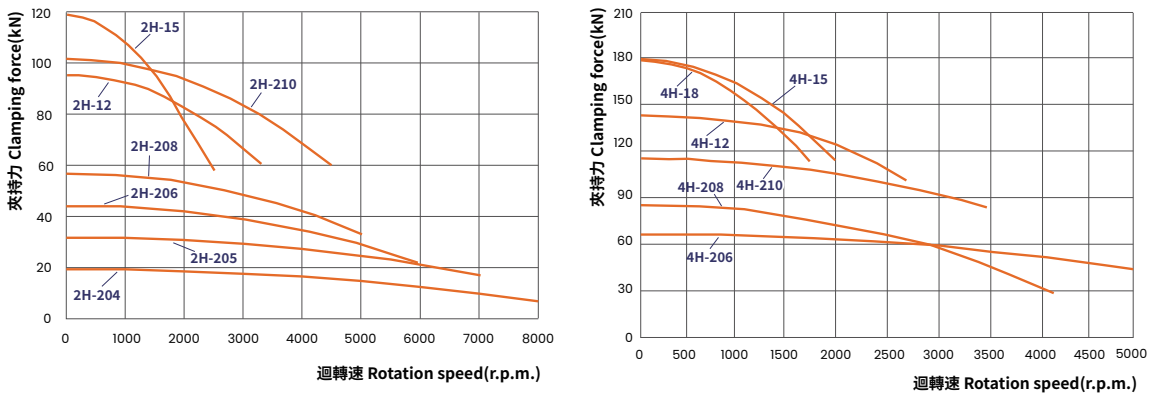


Fig.5

2.5 上爪高度與最大容許拉力

- 使用加高型的上爪時，會對上爪連結螺絲、主爪及其他的零件產生過大的作用力，而使夾頭受損，因此，必須降低油壓缸的入力。規格表內所列的最大容許拉力是依據標準高度的上爪，如果使用加高型的上爪，必須依照下列的曲線圖來設定拉力值。(參考Fig.6)

2.5 Relationship between top jaw height and maximum pull force

- When using the extra-height top jaws, excessive force will be applied to the top jaw mounting bolts, master jaws, and other parts, causing damage to the chuck. As a result, the hydraulic cylinder's input force must be lowered. The max. pull force indicated in the specification table is based on the standard height top jaws. When using the extra-height top jaws, the pull force must be set according to the following charts specified. (Refer to Fig.6)

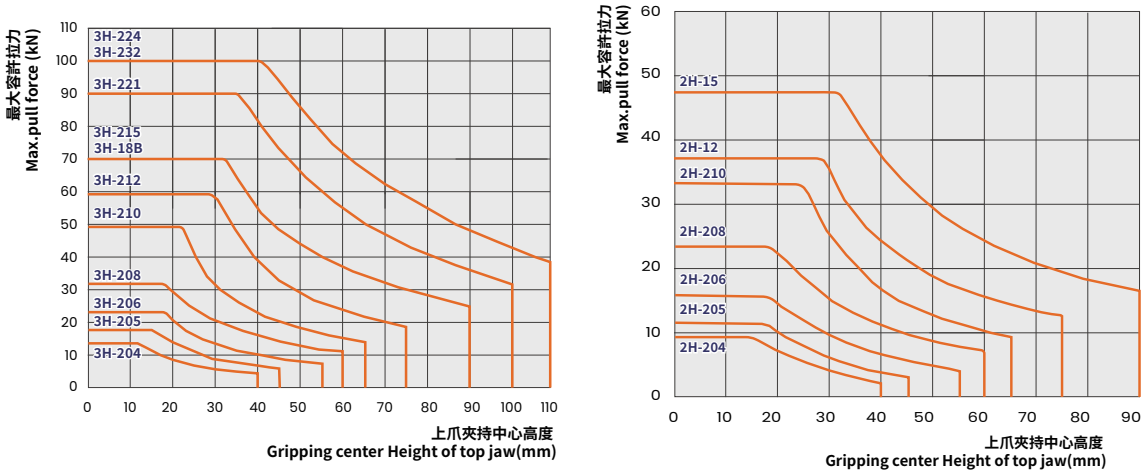


Fig.6

DANGER 危 險

- 如果使用夾頭時，油壓缸的推力超過容許拉力的情況下，將造成夾頭的使用壽命減短，也會導致每個零件因為金屬疲勞的緣故造成損壞。

- Use of the chuck with the cylinder thrust in excess of Max. pull force make the service
- life shorter and it will be linked to damage accident of each part due to fatigue.

WARNING 警 告

- 使用上爪的高度比標準生爪高或上爪以前端夾持工件時，須降低油壓入力，與上爪高度成反比。如果沒有降低油壓入力，可能導致夾頭破裂、工作物飛散等危險。

- When the height of the top jaws is higher than that of the standard soft jaw or the top jaws clamp the workpiece with the front end, the hydraulic pressure must be reduced, which is inversely proportional to the height of the top jaws. If the hydraulic pressure is not reduced, it may cause damage to the chuck or fly-out of workpiece.

- 大型或是重的上爪，在迴轉時產生較大的離心力，致使夾持力遽降，因此，使用此種上爪前，須考慮切削條件再決定。
- 上爪的夾持中心高度H太高時，必須降低油壓力來減少靜態夾持力。如果上爪的質量過大，夾頭轉速必須下降，預防夾持力的損失。
- 使用非標準生爪時，因離心力所產生的夾持力損失其參考公式為:
  $1.12x10^{-6}xn^2$ (WmRm+WtRt)。(單位:kgf)
- Fig.9為特殊上爪對照圖。

- When using the large or heavy top jaws, a larger centrifugal force is generated during rotations, resulting in clamping force greatly lost. Therefore, consider the cutting conditions before using this kind of top jaws.
- If the clamping center height H of the top jaws is too high, it is necessary to reduce the hydraulic pressure so as to decrease the static clamping force. If the mass moment of the top jaws is too high, the rotational speed must be reduced to avoid clamping force loss.
- The loss in clamping force due to the centrifugal force that takes place when non-standard top jaws used can be calculated by the following formula:
  $1.12x10^{-6}xn^2$ (WmRm+WtRt). (Unit: kgf).
- Fig.9 Special top jaws.

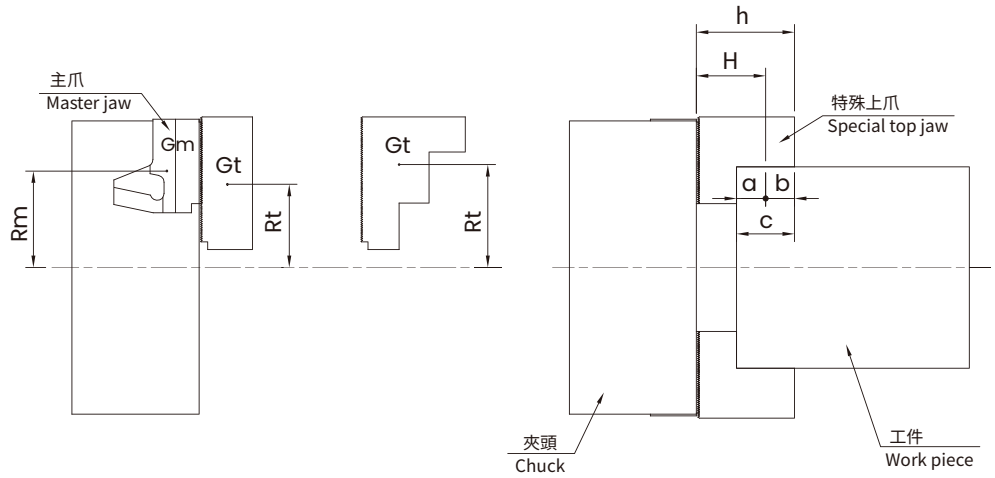


Fig.7

Gm：主爪質量中心
Wm：主爪重量(kg)
Rm：主爪質量中心至夾頭中心距離(mm)
Gt：上爪質量中心
Wt：上爪重量(kg)
Rt：上爪質量中心至夾頭中心距離(mm)
n：迴轉速(r.p.m)
H：上爪夾持中心高度
h：特殊上爪至夾頭面高度
c：夾持長度

Gm:Mass center of master jaw
Wm:Mass of master jaw(kg)
Rm:Turning radius of master jaw's gravity center(mm)
Gt:Mass center of top jaw
Wt:Mass of top jaw(kg)
Rt:Turning radius of top jaw's gravity center(mm)
n:Rotational speed(r.p.m)
H:Clamping force center height
h:Height of special top jaw from chuck face
c:Clamping length

Model 型號	2H-204 3H-204	2H-205 3H-205	2H-206 3H-206 4H-206	2H-208 3H-208 4H-208	2H-210 3H-210 4H-210	3H-212	3H-215	3H-18B	3H-221	3H-224	3H-232	2H-12 3H-12 4H-12	2H-15 3H-15 4H-15	3H-18 4H-18
主爪重量 (單爪) Mass of Master jaw Wm(kg)(single jaw)	0.15	0.2	0.39	0.67	1	1.51	2.88	4.09	4.74	5.45	7	1.75	2.92	3.66

2.6 油壓力與活塞推力

2.6 Relationship between hydraulic pressure and cylinder thrust force

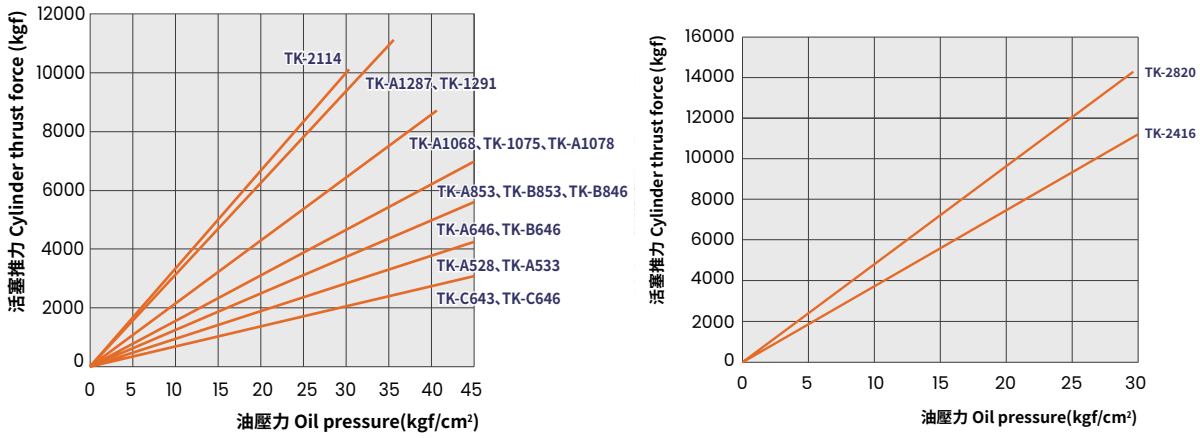


Fig.8

2.7 活塞推力與夾持力

2.7 Relationship between cylinder thrust force and clamping force

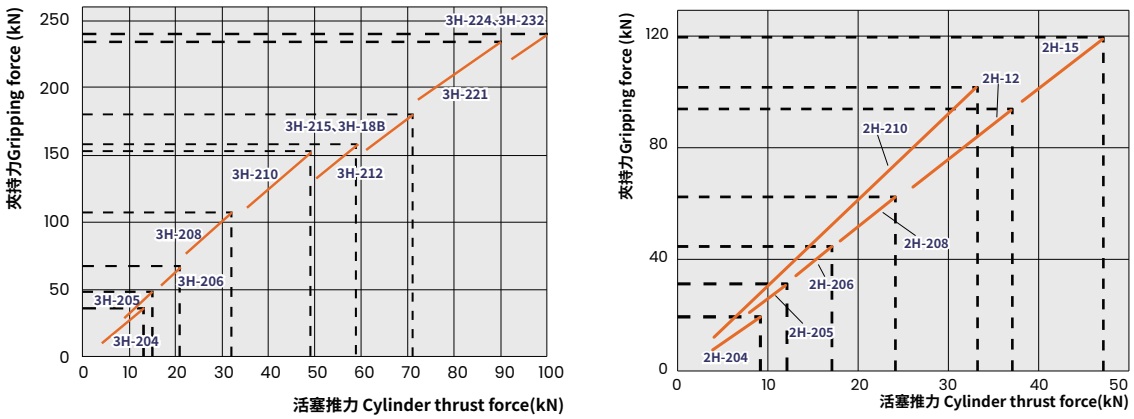
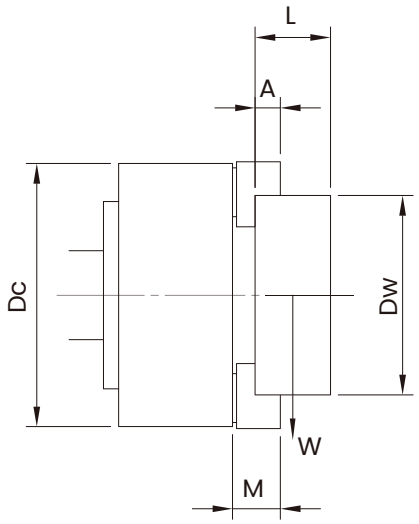


Fig.9

2.8 夾頭夾持工件最大尺寸及重量

2.8 The clamping capacity of power chuck

無頂心
Without center thimble



頂心
With center thimble

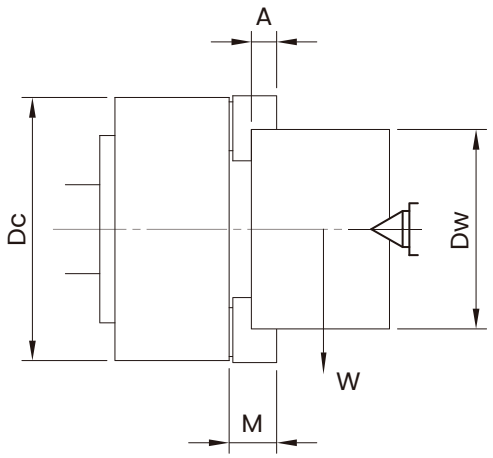


Fig.10

標準夾爪高度：M
夾持深度：A(=M/2)
夾持工件最大徑：Dw=Dc
工件長度：L<=4A
當夾持工件太長或太重時,需有中心架輔助(Fig.10)

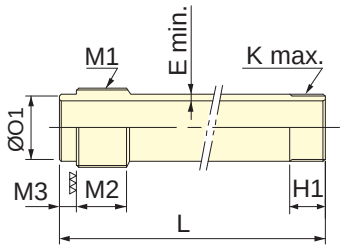
Height of standard jaw : M
Clamping length : A(=M/2)
Max. clamping diameter : Dw=Dc
Max. length : L<=4A
The center support is necessary
when clamping longer or heavy workpiece (Fig.10)

夾頭規格 Chuck type	3H-204	3H-205	3H-206	3H-208	3H-210	3H-212	3H-215	3H-18B	3H-221	3H-224	3H-232
無頂心重量限制 Without center thimble Max. weight (kg)	5	8	15	24	42	65	136	174	234	284	560
頂心重量限制 With center thimble Max. weight (kg)	250	300	600	900	1200	1500	2000	2000	2500	2500	2500

3. 拉桿的製作

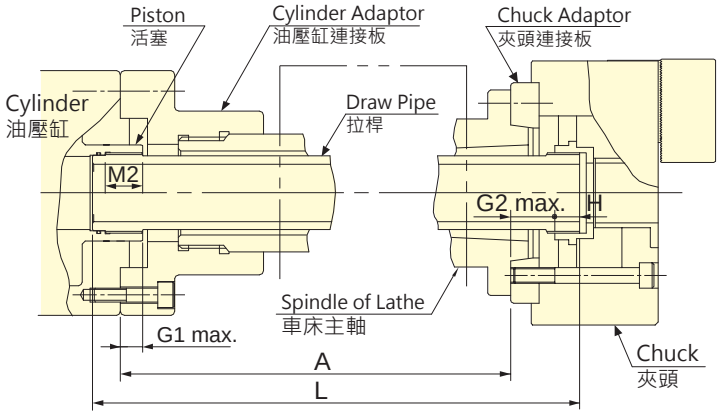
3. Manufacture of draw bar

中空拉桿製作 Manufacture of Draw Pipe



中空拉桿詳圖 Detail of Draw Tube

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



3H-204可搭配TK-C646 註:2H、4H之拉桿長度計算同3H

Fig.11

夾頭規格		迴轉缸規格	G1	H	M3	M2	G2	M1	H1	O1		K	E	L
Chuck type		Cylinder type	max.				max.			(f7)		max.	min.	
3H-12	A8	TK-A1291	30	23	12	35	28	M100x2	35	95	-0.036 -0.071	M100x2	5	A+56+12
3H-15	A11	TK-A1512	30	33	12	45	33	M130x2	45	125	-0.043 -0.083	M130x2	5	A+81+12
3H-18	A11	TK-A1512	30	33	12	45	33	M130x2	45	125	-0.043 -0.083	M130x2	5	A+81+12

夾頭規格		迴轉缸規格	G1	H	M3	M2	G2	M1	H1	O1		K	E	L
Chuck type		Cylinder type	max.				max.			(f7)		max.	min.	
3H-204	A4	TK-A528	12	14.5	10	25	31.5	M38x1.5	20	35	-0.025 -0.05	M38x1.5	5	A+59+10
3H-205	A4	TK-A533	12	17	10	25	16	M38x1.5	25	35	-0.025 -0.05	M45x1.5	5	A+46+10
3H-206	A5	TK-A646	15	14	10	25	28	M55x2	20	50	-0.025 -0.05	M60x2	5	A+52+10
3H-208	A6	TK-A853	20	16.5	12	30	33.5	M60x2	20	55	-0.03 -0.06	M75x2	5	A+60+12
3H-210	A8	TK-A1075	25	21	12	35	28.5	M85x2	25	80	-0.03 -0.06	M95x2	5	A+59.5+12
3H-212	A11	TK-A1512	30	23	12	45	32	M130x2	30	125	-0.043 -0.083	M115x2	5	A+70+12
3H-215	A8	TK-2114	35	33	17	45	44	M155x2	40	145	-0.043 -0.083	M115x2	5	A+87+17
3H-215	A11	TK-2114	35	33	17	45	51	M155x2	40	145	-0.043 -0.083	M155x3	5	A+93+17
3H-215	A15	TK-2114	35	33	17	45	38	M155x2	40	145	-0.043 -0.083	M155x3	5	A+81+17
3H-18B	A15	TK-2416	35	35	17	45	45	M180x3	40	170	-0.043 -0.083	M175x3	5	A+90+17
3H-221	A15	TK-2416	35	34	17	45	42	M180x3	40	170	-0.043 -0.083	M190x3	5	A+86+17
3H-224	A20	TK-2820	51	35	17	45	42	M220x3	40	210	-0.050 -0.096	M225x3	5	A+71+17
3H-232	A20	TK-2820	51	37	17	45	51	M220x3	45	230	-0.050 -0.096	M295x3	5	A+82+17

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。

- Increasing the thickness of the draw pipe and secure the strength. If the strength of the draw pipe is insufficient, the gripping force of the chuck will lose. It will cause the workpiece fly out and it will be dangerous.

IMPORTANT
留 意 事 項

- 螺牙鬆動是造成振動的主要原因。
- 拉桿厚度E為最小極限值強度，加工螺牙K時最好選用大直徑，使E值盡量可能最大。
- 以抗拉強度380MPa(38kg/mm²)以上之材料製作拉桿。
- O1、M1與K同心度需在0.05mmT.I.R以內。

- Insecure threads will cause the draw pipe to vibrate.
- With the thickness of draw pipe minimized, thread part "E" to the maximum permissible thread dia.
- For pipe strength, use the material of tensile strength 380MPa (38kg/mm²)of or more.
- O1,M1 should be concentric with "Thread K" within 0.05mm T.I.R.

4. 安裝

4.1 中空動力夾頭連結螺帽的加工

- 使用六角扳手將螺絲取出6 個，再將連接壓環及連接螺帽一起取出，將鎖在連接壓環周圍的六角無頭螺絲鬆開，將連接螺帽取出。在這個過程中，小心鋼珠(Ø5) 及彈簧不要遺失了。
- 將連接螺帽車牙，必須與拉桿的螺牙一致（連接螺帽之牙徑不可超過Kmax.，請參考3.拉桿的製作章節）。
- 將連接螺帽裝入連接壓環，把鋼珠及彈簧裝回連接壓環內，再用六角柱頭螺絲將連接壓環鎖緊。

4. Mounting

4.1 Mounting of draw nut of through-hole type

- Remove 6 bolts with a hexgon wrench to remove the plunger nut with the draw nut. Next, loosen the hexagon socket headless set screw remove the draw nut. At this time,save the steel ball (Ø5) and coil spring.
- Thread the draw nut corresponding to the draw pipe.(Thread the draw nut so as not exceed K max. , Please refer to the chapter on the 3. Manufacture of draw bar.)
- Integrate the draw nut with the plunger nut and in corporate the steel ball and coil spring into the plunger nut before tightening the plunger nut with the screw.

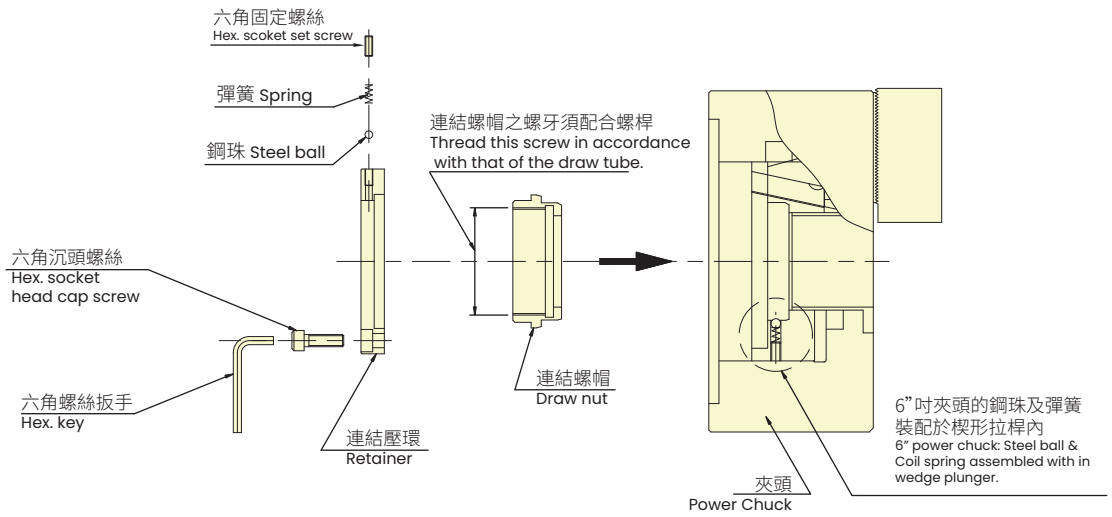


Fig.12

WARNING 警 告

- 鎖緊螺絲時，請依照標準力矩鎖緊，如果鎖緊力矩不足或太大，將造成螺絲斷裂，工作物飛散產生危險。
- 請使用附屬之螺絲。

- Tighten the mounting bolt according to the specified torque. If tightening torque is insufficient or too strong, bolts are broken. Also, the workpiece scatters ,thus resulting in danger.
- Use only attached bolt.

螺絲規格 Bolt size	鎖緊力矩 Tightening torque
M6	12.7 N · m (1.3 kgf · m)
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)
M14	170.6 N · m (17.4 kgf · m)

螺絲規格 Bolt size	鎖緊力矩 Tightening torque
M16	250.0 N · m (25.5 kgf · m)
M20	402.1 N · m (41.0 kgf · m)
M22	539.4 N · m (55.0 kgf · m)
M24	618.0 N · m (63.0 kgf · m)

4.2 中空動力夾頭的安裝步驟

(1) 將拉桿安裝於迴轉油壓缸

- 旋入拉桿至迴轉油壓缸之活塞桿螺牙內時，儘可能將活塞桿縮回到底。(如果活塞桿處在行程中間位置，鎖緊螺牙時，可能會損壞到活塞之止迴銷。)

(2) 將迴轉油壓缸安裝於主軸上 (迴轉油壓缸連接板)

- 檢視迴轉油壓缸有無偏擺及管路是否正常，設定油壓力於低壓狀態(0.4~0.5MPa，4~5 kgf/cm²)，使活塞運動2~3次後停置於前端，然後關掉電源。

CAUTION 注 意

- 在安裝或拆下夾頭時，需使用吊帶或吊環固定。(10"以上夾頭附吊環)。
- 當完成上述動作後，切記取下吊環或吊帶。

4.2 Mounting steps of through-hole type

(1) Connect the draw bar to the cylinder.

- Screw the draw bar into the cylinder piston rod with the rod retracted as far as it will go.(If it is tightened at the intermediate position, the locking pin of the piston may be damaged.)

(2) Mount the cylinder to the spindle(cylinder adapter)

- Check that the run-out of cylinder is minimized before routing the hydraulic piping. Move the piston at low pressure(0.4~0.5MPa,4~5kgf/cm²) two or three times and set the piston at the forward end before witching power off.

- When mounting and removing the chuck, lift it with the crane, using an eyebolt or lifting belt.(For a chuck of 10" or over, the eyebolt is attached.)
- Be sure to remove the eyebolt from the chuck after mounting or removing.

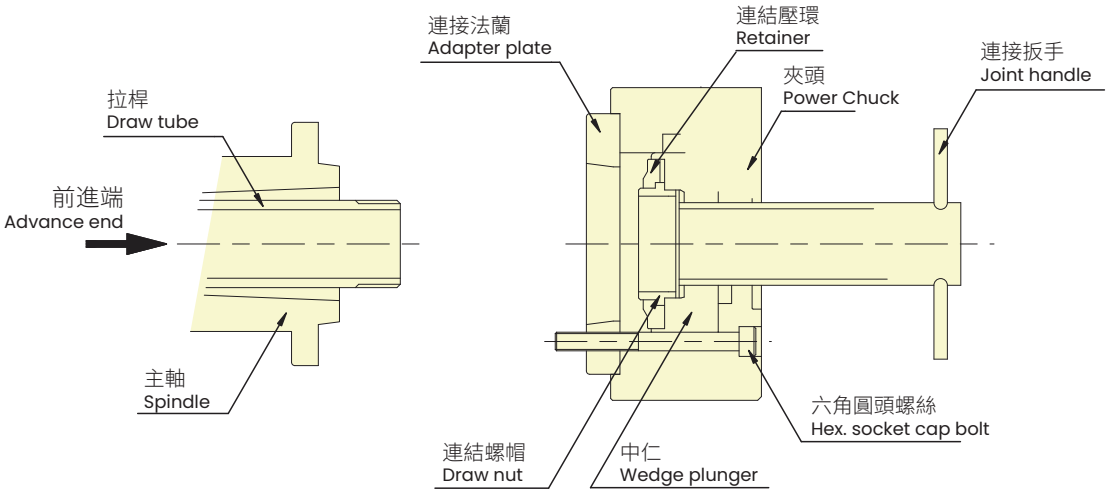


Fig.13

WARNING 警 告

- 如拉桿鎖入連接之螺帽螺牙不足，將損壞螺牙而使夾持力瞬間喪失造成工件飛散之危險。

- If the draw bar is insufficiently screwed into the draw nut, the thread will be damaged, thus elimination the gripping force momentarily. It will result danger due to discharge of workpiece.

4.3 螺栓鎖緊的順序

(1) 安裝夾頭至拉桿上

- 取下夾頭之軟爪及防塵蓋，以1.2.3號螺絲鎖入數牙，將連接扳手置至於夾頭的中心孔上，將連接螺帽鎖入拉桿。
- 連接螺帽鎖入於拉桿時，如不是很平順的鎖入，則應重新檢查螺牙中心是否傾斜…等，如強制鎖入則會造成精度上的誤差及螺牙損壞。

(2) 安裝夾頭於主軸上

- 旋轉連接把手至完全結合於主軸接合面。
  依下列順序鎖上螺絲：1→2→3→4→5→6
  (如果鎖緊力量不平均將產生偏擺)
  (鎖緊螺絲時請依照標準力矩鎖緊)

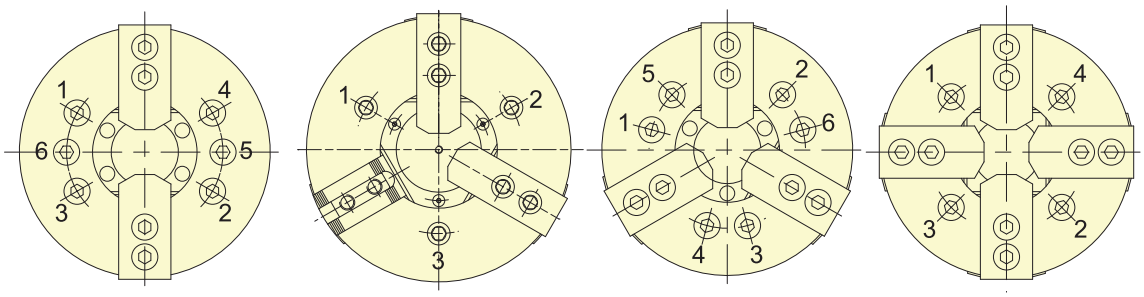
4.3 Bolt tighening steps

(1) Mount the chuck to the draw bar.

- Remove the soft jaw and cover of the chuck. Tighten the installation bolts 1.2.3. for several pitches. Insert the joint handle into the central hole of the chuck. Then turn the draw pipe.
- When the draw nut and the draw bar are connected,in case smooth scrowing is impossible, if will be necossary to confirm inclination of thread center.If connected by force, the thread will be damaged, thus resulting in poor chucking accuracy.

(2) Mount the chuck to the spindle(back plate).

- Turn the joint handle so that the chuck is thoroughly attached to spindle mounting face.
- Tighten the installation bolt
  uniformly：1→2→3→4→5→6
  (Uneven installation will be a cause of run-out.)(As for specified torque of the installation bolt, refer to Tightening torque table.)



2H/2H-2　3H-B/3H-2　3H/3H-B/3H-2　4H

Fig.14

WARNING 警 告

- 連接夾頭之螺絲，請按設定之力矩鎖緊。如鎖緊力矩不足或太強將導致發生意外。
- 以配屬螺絲為使用原則，若特殊情形請採用強度劃分12.9以上（M22以上10.9)並有足夠之長度。
- 使用把手旋轉連接管螺絲來調整楔心在正確位置，如果調整的位置不適當，則夾頭防塵蓋將造成損壞。完成調整動作時，安裝在連接管螺絲後方之止動裝置，必須處於接觸定位點的狀態。

- Tighten chuck mounting bolts at the specified tightening torque. If the tightening torque is insufficient or too strong, it may cause an accident. Periodically chuck that bolts are not loosened.
- Use only attached bolts. In an unavoidable case, use bolt with strenght code 12.9 (M22 or more:10.9) or more and sufficient lenght.
- Turn the draw tube by the handle for adjust the plunger to the correct position. If this adjustment is not suitable, the chuck cover will be damaged. Therefore, as the draw tube holds the click stop equipment, finish the adjustment on the position of the contact.

(3) 調整楔形拉桿的位置

- 將油壓缸的活塞設定在最前端的狀態，使用連接扳手旋轉螺帽，將螺帽與楔形拉桿調整到底後，再逆轉退約4mm(視螺帽Pitch大小約2~3圈)至最近之螺帽定位點，使楔形拉桿與本體保持0~1mm間隙。

(4) 裝回防塵蓋並檢測夾頭偏擺。

- 使得夾頭外圓及端面偏擺在0.02mm內。

(3) Use joint handle to adjust the position of the wedge plunger.

- Set the piston of the hydraulic cylinder at the most front end, use the joint handle to adjust the drawnut and the wedge plunger to the most bottom end, and unscrew it around 4mm to the nearest clip stop of the drawnut, which keeps the clearance between the wedge plunger and the chuck body at 0~1mm. Remount the cover and chuck run-out of the chuck.
- Make peripheral run-out of the chuck to less than 0.02mm.

動平衡

- 當進行追加工或用治具時不可產生不對稱。不對稱會造成震動和噪音，使加工精度降低。
- 當加工不對稱大的工件時由於工件的重量形心引起的離心力加在上爪，要充分檢討後以低轉速加工。
- 安裝使用說明書的允許均衡量是以JIS B 0905-1992 定義的許用均衡 4mm/s為基準。
- 夾頭的不平衡量的大小規定在表格。(JIS B 0905-1992相對應的國際標準是ISO 1940-:1986和ISO 8821-:1989)

Balance

- It's not asymmetry when additionally work or use jigs, otherwise able to cause shaking and noise, then reduce the working accuracy.
- The centrifugal force due to centroid of the workpiece is applies to the top jaw when processing asymmetry workpiece, consideration to process with the low speed.
- Tolerance of instruction manual is use balance 4mm/s as the datum with that defines for JIS B 0905-1992.
- Unbalance value of the chuck is stipulate for the form.(JIS B 0905-1992 correspond to international standard is ISO 1940-:1986 and ISO 8821-:1989)

CAUTION
注 意

- 使用迴轉油壓缸前請參照說明書。

- For the cylinder, refer to the insturction manual.

4.4 連結法蘭的安裝

- 連接板外徑之偏擺須在下表所示D值範圍內，而連接板端面之偏擺須在下表所示E值範圍內。
- 夾頭外徑之偏擺須在下表所示F值範圍內，而夾頭端面之偏擺須在下表所示G值範圍內。
- Fig.15為JIS短錐度主軸圖。

4.4 Mounting of chuck adapter plate

- The outer diameter run-out of the adapter plate should be D-Value or less . The end surface run-out of the adapter plate should be E-Value or less (see table below).
- The outer diameter run-out of the chuck should be F-value or less. The end surface run-out of the chuck should be G-value or less(see table below).
- Fig.15 shows JIS short tapered spindle.

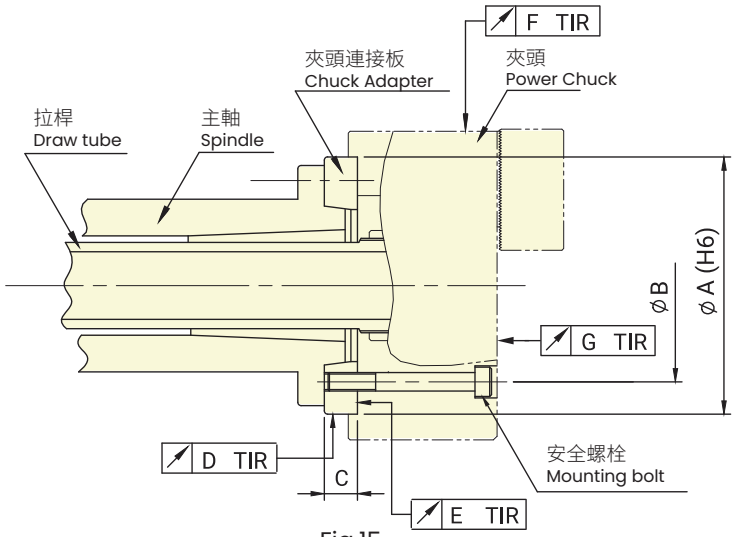


Fig.15

型號 Model / 寸法 Dim	2H-204 3H-204	2H-205 3H-205	2H/3H/4H-206	2H/3H/4H-208	2H/3H-210 3H-210 4H-210	2H/3H-12 4H-12	2H-15/3H-15 4H-15/3H-212 3H-215/3H-18 4H-18	3H-215 3H-18B	3H-224 3H-232
A (H6)	Ø85	Ø110	Ø140	Ø170	Ø220	Ø220	Ø300	Ø380	Ø520
B	70.6	82.6	104.8	133.4	171.5	171.5	235	330.2	463.6
C	15	15	15	17	18	18	22	27	27
D	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.02
E	0.005	0.005	0.005	0.005	0.005	0.005	0.01	0.01	0.02
F	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.05
G	0.02	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.05

A尺寸為DIN之標準規格 A Dimension (mounting recess dia)is according to DIN standard

CAUTION 注 意

- 製作連接板之直徑須依表列A-0.01。

- The diameter of the adapter plate should be A-Value -0.01 (see table above).

WARNING 警 告

- 連結連接扳用之螺絲，應有足夠之強度（直徑、數量、材質）且需有足夠之力矩可鎖緊。（鎖緊螺絲時請依照標準力矩鎖緊）
- 如鎖緊力矩不足或太大，將導致螺絲斷裂而造成夾頭飛散之危險。

- Mount the adapter plate with bolts which have sufficient strength (dia.,pcs.,and material) and tighten it with specified torque. (As for specified torque of the installation bolt, refer to Tightening torque table.)
- If tightening torque is insufficient or too strong, bolts are broken. Also, the chuck discharges thus resulting in danger.

5. 使用上的注意事項

1. 當要換上爪時，必須清理底爪的齒型部分及 T 型塊的接合部分，否則將造成精度上的不準。
2. 依照工件外形及切削情況來設定油壓壓力，如果管狀的工件被高壓夾持將造成變形。
3. 夾持斜面或錐度的鑄品工件時，使用的特殊爪需具有齒狀之夾持面工件物才不會飛散。
4. 夾持偏心工作物時，偏心重量產生的離心力作用在單一爪上，加工時需使用低轉速。
5. 不可使用與主爪排齒不合之上爪，嚙合度不足，將影響夾持力與精度，嚴重者使主爪損壞。
6. 作業開始之前，使用低轉速試做一次，檢查上爪和工作物的位置是否與刀具、刀具座產生干涉。
7. 如果夾持長的工作物時，使用尾座或中心架支撐另一端。(參考第六頁)
8. 長時間停置機器時，夾頭上不可夾持工作物。
9. 當操作不當或機械故障所造成刀具或刀具座撞擊夾頭，立即停機檢查上爪、主爪、T 型塊、連結螺絲及夾持精度等是否正常。
10. 特殊高度上爪使用之油壓壓力需比標準上爪低。

5. Precautions

1. When changing the top jaw, carefully clean the serration of master jaw and fitting part of T-nut.
2. Set the hydraulic pressure according to the shape of workpiece and cutting conditions. If, for example, a pipe shaped workpiece is gripped with high pressure, it may cause distortion.
3. When gripping inclined or tapered parts such as casting, etc., use special jaws with spikes so that the workpiece will not discharge.
4. Machine the unbalanced workpiece at a low speed because the centrifugal force by the eccentricity mass of work is applied onto the jaw.
5. Do not use the top jaw in which serration pitch differs from the master jaw. If the workpiece is gripped with serration insufficient engaged. The serration is broken. At this time, the jaw or workpiece discharges thus resulting in danger.
6. Before machining. Run with low speed to check that the top jaws locator or workpiece do not interfere with the tool or tool holder.
7. When gripping a long workpiece, use the tailstock or steady rest. (Refer to page.6)
8. When stopping the machine for a long period of time, remove the workpiece from the chuck.
9. If the chuck or workpiece is misused by interfering with the tool or tool rest due to malfunction or tape error. Immediately stop the machine and check the top jaw, T-nuts, cap screws for mounting jaw and etc., and gripping accuracy.
10. In case of using higher jaw then standard top jaws must use lower oil pressure.

WARNING
警 告

- 工作物必須夾持於行程的中點位置，或在中點以內，這樣將可達成最好的精度及穩定度，儘量防止用行程的盡端來夾持工作物。(Fig.16)
- 夾持工作物後，確定是否在安全行程內，在主爪做一刻度與本體表面做一爪行程範圍以方便確認。(爪行程參考中空動力夾頭規格)
- 設定爪夾位置時必須注意T型螺帽不可以突出主爪。 (Fig.17右)
- T型螺帽突出底爪，不正確使用方法將造成底爪T型螺帽的損壞及精度上的不準。 (Fig.17左)

- It is the most desirable that the workpiece is gripped atmid stroke of the master jaws. To grip the workpiece correctly, avoid gripping at stroke end. (Fig.16)
- In order to check if the baseline mark of master jaw is within the range of the suitable stroke, the user can draw a baseline mark at mid stroke of the master jaws. (Refer to Specification of through-hole power chuck)
- The T Nut must not be protrude from the master jaw.(Refer to Fig.17 right)
- The use on condition incorrect will cause damage to the master jaw and “ T ” nut as well as inaccuracy.(Refer to Fig.17 left)

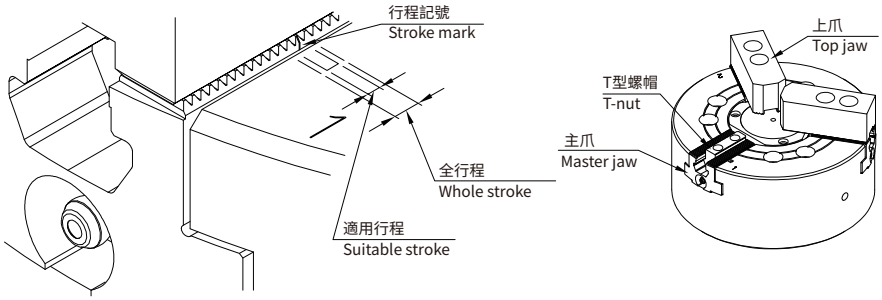


Fig.16

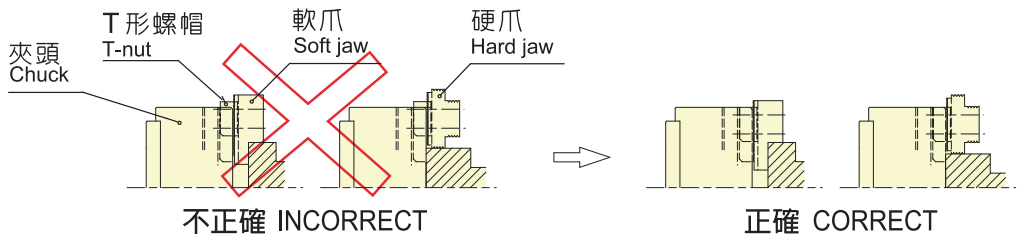


Fig.17

WARNING 警 告

- 如果上爪鎖緊螺絲，其鎖入T型螺帽內的螺紋深度太淺，將致使T型螺帽破損。反之，螺絲突出T型螺帽 底部，則即使螺絲已經鎖緊也無法將上爪完全固定，因此上爪鎖緊螺絲的全長應在距離T型螺帽底部內 0~1mm長。(參考Fig.18)
- 務必使用附屬T型螺帽及固定螺絲（在無法避免的情況下，使用附屬以外的螺帽及螺絲，其強度劃分必須在12.9以上（M22以上10.9），並且特別注意長度是否足夠）。
- 當T型螺帽被鬆開時，不能啟動主軸旋轉，否則上爪及T型螺帽會飛散，產生危險。

- If the screwing depth for T-nut of the top jaw mounting bolt is shallow, T-nut may be damaged. If the bolt protrudes from the T-nut bottom, the top jaw is not fixed even if the mounting bolt is tightened. Consequently, the overall length of the top jaw mounting bolt should be 0~1mm from the T-nut bottom.(See Fig.18)
- Be sure to use the attached T-nut and mounting bolt.(In an unavoidable case, use the bolt and nut of strength 12.9 (M22 or more, 10.9) or more and sufficient length.)
- Never start the spindle with T-nut still loosened. The top jaw may scatter. It is dangerous.

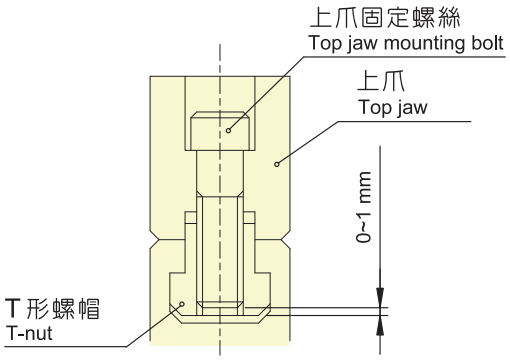
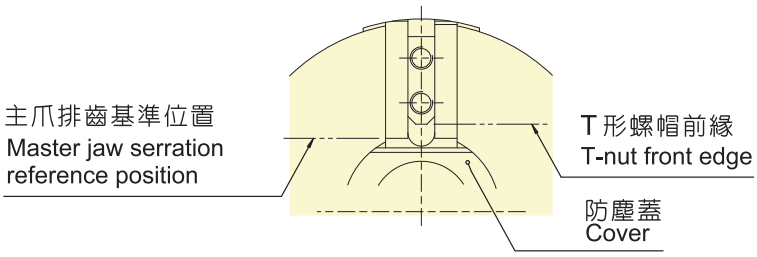


Fig.18

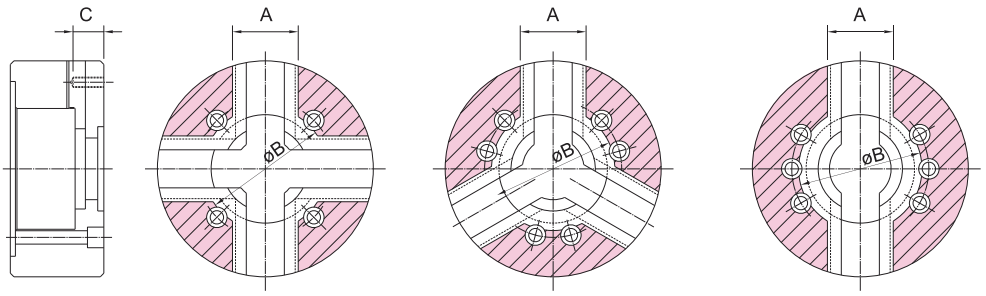
IMPORTANT 留 意 事 項

- 上爪是經由T型塊及連接螺絲安裝於主爪上並可在主爪排齒調整上爪的位置。
- 如果在安裝上爪時，主爪位於開端，T型塊與防塵蓋的距離少於主爪的行程，那麼T型塊將會撞擊防塵蓋，導致防塵蓋損壞。
- 如果T型塊超出主爪排齒基準位置，T型塊將會撞擊到防塵蓋，導致防塵蓋損壞。

- The top jaw is mounted on the master jaw with T-nut and mounting bolt. At this time, the mounting position of the top jaw can be changed by a engaged place of serration.
- If the top jaw is mounted with the master jaw opened, the cover is damaged because T-nut interferes with the cover if the distance between T-nut and the cover is less than the master jaw stroke take extreme care when mounting the top jaw.
- If T-nut front edge protrudes from the reference position of master jaw, T-nut will interfere with cover, so that causing the cover damage.



- 斜線區域為可追加工範圍。
- Shaded area is possible to bore or tap additionally.



四爪 4Jaw　三爪 3Jaw　二爪 2Jaw

- C為鑽孔或攻牙可允許之深度。
- C is permissible depth of drilling or processing.

寸法 Dim / 型號 Model	A	B	C max.
2H-204	46	78	15
2H-205	46	90	15
2H-206/4H-206	61	106	20
2H-208/4H-208	68	126	20
2H-210/ 4H-210	74	170	20
2H-12/3H-12/4H-12	86	180	30
2H-15/3H-15/4H-15	112	215	30
3H-18/4H-18	112	240	30

寸法 Dim / 型號 Model	A	B	C max.
3H-204	46	80	15
3H-205	46	95	15
3H-206	61	110	20
3H-208	68	138	20
3H-210	74	170	20
3H-212	86	195	30
3H-215	112	245	30
3H-18B	115	312	30
3H-221	115	330	30
3H-224	115	360	30
3H-232	115	430	40

6. 軟爪的製造成形

- 調整軟爪位置可將固定主爪之六角孔圓頭螺絲鬆開使與主爪分離。
- 依據工件大小、尺寸、質料、表面精度及切削條件來選擇合適之軟爪。
- 軟爪製程中油壓壓力必須與實際工作時相同或較低。

IMPORTANT
留 意 事 項

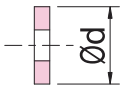
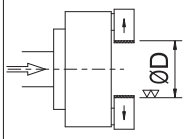
- 盡可能將工件夾持在行程中點。

6. Forming of soft jaws

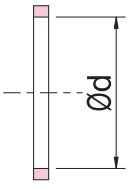
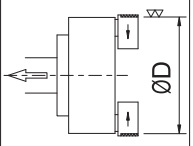
- Since the sofe jaw can be easily separated from the master jaw by loosening haxagon socket head screws, it can be freely adjusted by changing the engaged position on the serration.
- Fit a suitable soft jaw according to the shape, size, material, surface roughness and cutting conditions of the workpiece.
- Adjust the cylinder pressure in forming the soft jaw to the same or less as cutting a workpiece.

- It is desirable to chuck the workpiece in the central part of the stroke.

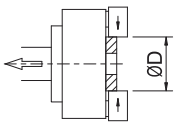
外徑夾持 External gripping

❶ 	準備一個表面粗度▽▽▽內且無變形內壁厚度的適當圓盤。 注意) 先備妥不同尺寸之圓盤。 Prepare the plug for forming. Forming outer dia. Of plug is limited to▽▽▽ finshing. Ensurs the plug is strong with a suitable wall thickness. Note) It is necessary to prepare different size plugs in advance.
❷ 	以切換閥將主爪完全打開。 而後計算直徑D使持d時主爪位於行程中點處。 Open the master jaw fully by operating the valve. Next, set ØD dimension to grip around the middle of the maximum jaw stroke. ØD ≒ Ød + Max Stroke of jaw / 2

內徑夾持 Internal gripping

❶ 	準備一個內徑表面粗度在▽▽▽內且不變形具有適當厚度之圓環。 Prepare a ring wich outer diameter is limited to▽▽▽ finishing and with a suitable wall thickness.
❷ 	以切換閥將主爪關至最小。 而後計算直徑D使夾持d時主爪位於行程中點處。 Close the master jaw as far as it will go by operating the valve. Next, set ØD dimension to grip around the middle of the maximum jaw stroke. ØD ≒ Ød - Max Stroke / 2.

❸

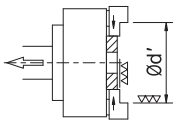


以切換閥使ØD之成形部分夾持圓盤。必須以夾頭端面支撐以防止傾斜。
注意）開合夾頭數次，以確定圓盤夾持正確。

Girp the plug in ØD by operating the valve.

Note) Be sure the plug is correct so that repeat chucking several times.

❹



成形一個工件夾持部份Ød時，需持續夾持圓盤，其尺寸必須相同(H7)於工件之夾持直徑，且表面粗度小於6s。
製程中其壓力必須與實際夾持工件時相同。
注意) 如圓盤產生變形時，須降低壓力或以較厚之圓盤。

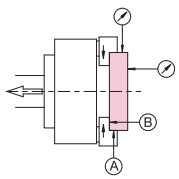
Form the part Ød' for gripping the workpiece with the plug still gripped.

Machine the part Ød' to the same diameter(H7) as the workpiece and surface roughness less than 6s.

Set the gripping pressure for the jaws to be approximately the same as when the workpiece is gripped.

Note) If the plug is distorted, reduce the pressure or alternatively use a stronger plug with additional wall thickness.

❺



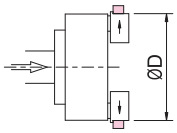
成形後，夾持工件以檢查夾頭行程。
試切工件而後檢視其加工精度…等。
使用內徑(A)及端面(B)來夾持。

After forming jaws, grip the workpiece to check the jaw stroke.

Perform trial cutting to inspect machining accuracy,etc.

Grip the workpiece 2-face fitting of face A and face B. check and face(B).

❸

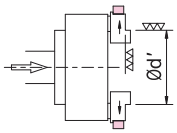


以切換閥使ØD之成形部分夾持圓盤。必須以夾頭端面支撐以防止傾斜。
注意）開合夾頭數次，以確定圓盤夾持正確。

Girp the ring in ØD part by operating the valve.

Note) Be sure the plug is correct so that repeat chucking several times.

❹



成形一個工件夾持部份Ød時，需持續夾持圓盤，其尺寸必須相同(h7)於工件之夾持直徑， 且表面粗度小於6s。
製程中其壓力必須與實際夾持工件時相同。
注意) 如圓盤產生變形時，須降低壓力或以較厚之圓盤。

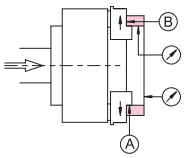
Form the part Ød' for gripping the workpiece with the plug still gripped.

Machine the part Ød' to the same diameter(h7) as the workpiece and surface roughness less than 6s.

Set the gripping pressure for the jaws to be approximately the same as when the workpiece is gripped.

Note) If the plug is distorted, reduce the pressure or alternatively use a stronger plug with additional wall thickness.

❺



成形後，夾持工件以檢查夾頭行程。
試切工件而後檢視其加工精度…等。
使用外徑(A)及端面(B)來夾持。

After forming jaws, grip the workpiece to check the jaw stroke.

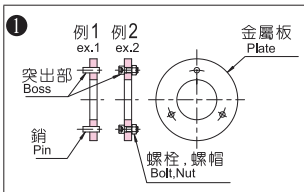
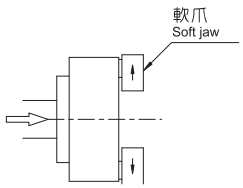
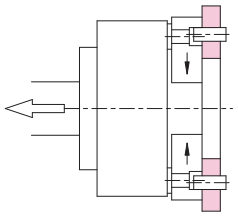
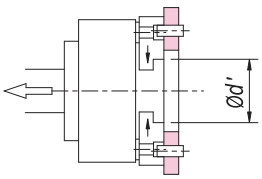
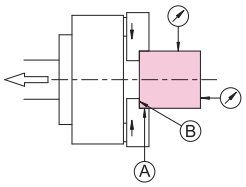
Perform trial cutting to inspect machining accuracy, etc.

Grip the workpiece 2-face fitting of face A and face B. check and face(B).

IMPORTANT
留 意 事 項

高夾持精度時的成形方法（例：外徑夾持情況）
欲達成高夾持精度時， 可如圖1來成形夾具，
軟爪成形必須與實際加工情況相同。

Method for forming soft jaws when higher accuracy is required (e. g. External gripping) with jigs used as shown in the following figure, soft jaws can be formed under the same conditions as the machining of the workpiece. jaws will enable higher accuracy to be achieved.

❶ 	準備好成形的夾具（市售亦可）安裝銷（例1)或螺絲及螺帽（例2）於一個圓環狀三等分的金屬板上。使用一個沒有變形及內壁有一定厚度的圓環。	Prepare jigs for forming.(Available also from maket) Fit pins (EX.1) or nuts and bolts (EX.2) to the ring shaped plate divided equally into three. Use a strong ring with a sutiable wall thickness.
❷ 	以切換閥將主爪開至最大。	Fully open master jaws by operationg the valve.
❸ 	以切換閥把成形夾具的突出部分插入軟爪的螺絲孔內，而後將其夾持，此時將成形夾具的端面部分與軟爪的前端壓合，如此在夾持時方不致於震動。 夾持時，檢查主爪是否位於行程中點附近。 製程中油壓力必須與實際夾持工作物時相同或較小。	Operating the valve, insert projections of jig into the bolt holes of the soft jaw before gripping. At this time, enforce the jig to the jaw, ensuring closed fit. Check that the work is gripped nearby center of correct stroke. Set the hydraulic pressure to form jigs to the same or less pressure when the workpiece is machined.
❹ 	保持成形夾具被夾持的情況，成形 工作物的夾具部分Ød’ ，加工Ød’ 時尺寸必須與工件夾持部分的直徑相同(H7)，而表面精度比6S還小。	Form the part Ød’ for gripping the workpiece with the plug still gripped. Machine the part Ød’ to the same diameter (H7) as the workpiece and surface roughness than 6s.
❺ 	成形後夾持工件以檢視其行程。 試切後測試工件精度。 使用內徑面(A)及端面(B)來夾持。	After forming jaws,grip the workpiece to check the jaw stroke. Perform trial cutting to inspect machining accuracy, etc. Grip the workpiece 2-face fitting of face A and face B.

7. 維護及檢查

7. Maintenance and inspection

WARNING 警 告

- 長時間定期地潤滑可保持夾頭壽命。
  錯誤的潤滑將導致夾持力減弱、精度不良，磨損及卡住，故必須潤滑夾頭。

- To maintain the chuck for a long period of time, it is necessary to lubricate the chuck on a regular basis.
  Inadequate lubrication causes malfunction at low hydraulic pressure, reduces gripping force and affects gripping accuracy, and causes wear and seizure.
  Consequently, securely lubricate the chuck.

潤滑的處所	潤滑油種類	潤 滑 週 期
使用潤滑油槍將潤滑油注入每一個主爪周圍的油嘴。	二硫化鉬潤滑油	每日一次，但如果夾頭在高速旋轉或大量的水性切削液於加 工中使用時，需要更多的潤滑，請依照不同的情況來決定。

Section to be lubricated	Grease useds	Lubrication cycle
Apply grease from the grease nipple at the periphery end of each master jaw with a grease gun.	Moly Kote EP Grease (DOW CORNING CO.,LTD)	Once a day. However, when the chuck is operated at high speed rotation or a large amount of water soluble cutting oil is used, more of lubricated is needed according to service conditions.

- 加工完後務必以風槍或類似的工具清潔夾頭本體及滑道面。
- 避免因生鏽而降低夾持力，需使用防銹之切銷油。

- After machining, clean the chuck body and slideway with air gun, etc.
- Use rust prevention coolant oil so that rust does not reduce gripping force.

CAUTION 注 意

- 每六個月(或每10萬次)取下夾頭做一次徹底之清潔 (切削鑄鐵則每二個月至少一次)。
  檢查零件有無損壞或磨損，如嚴重時立即更換新品。
- 組裝前須充份潤滑。

- Disassemble and clean the chuck at least once per 6 months or every 100,000th used (once every two months for the casting)
  See if parts are worn or cracked
  and replace it if required.
- Lubricated the chuck before reassembling.

8. 故障排除

如夾頭故障，請停下來檢查，依下列情況來處理。

不正常情況	可 能 原 因	對　策
夾頭不能動作	夾頭的零件損壞。	分解夾頭及更換。
	滑動部份被卡住。	分解夾頭及取出被卡住的部份，以油石修整之或更換。
	迴轉油壓缸停止運作。	檢視油壓系統，如減壓閥、洩壓閥…等。
主爪的全行程不足	內部積存了太多的雜屑。	分解後清理。
	拉桿鬆脫。	重新鎖緊拉桿。
工 作 物有滑動的情況	主爪的夾持行程不足。	重新夾持工件使得主爪的位置於行程的中點。
	夾頭的夾持力不足。	檢視所設定的油壓壓力是否到達。
	上爪的形成直徑與工件的直徑不同。	使用正確的成形方法重做一次。
	切削力量太大。	重新計算一次切削力量而確認是否合乎此夾頭的規格。
	主爪滑道的潤滑油不足。	依據潤滑過程重新潤滑各部而後在沒有工件下操作夾頭數次。
	迴轉速度過高。	降低迴轉數到標準內，以減少離心力的影響。
精度不良	夾頭之外徑偏擺過大。	校正外徑或端面的偏擺及鎖緊螺絲。
	主爪與上爪間有外在因素干預，如灰塵…。	取下夾爪並且完全清理。
	上爪固定螺絲沒有鎖緊。	以適當力矩鎖緊。
	夾持力過大，使工件變形。	降低夾持力到適當程度，使得機器可以夾緊工作物但不致變形。
	上爪高度太高，使上爪或固定螺絲變形。	降低上爪至標準高度。（選用一個標準的尺寸）
	在成形上爪的過程不當或不完善。	確定成形圈是否對稱，與平行在夾頭之端面。 檢查成形圈的外形是否因夾持力過大而導致變形。 例外，檢查在成形時油壓壓力及成形面的表面粗度。

備註：

簡單的故障請自行處理，如無法自行處理或特殊狀況時，可通知您的經銷商或寄回本公司處理。

8. Troubleshooting

If the chuck malfunctions, stop the lathe and try the following countermeasures.

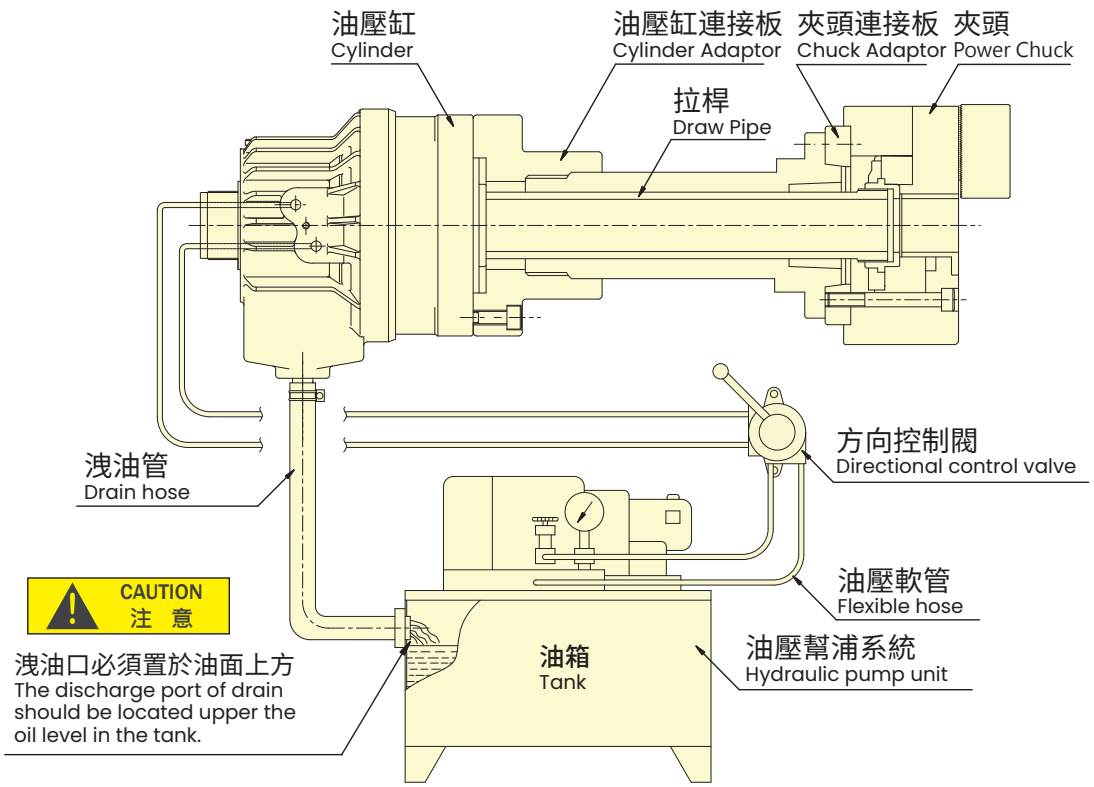
Problem	Possible Reasons	Countermeasures
Chuck will not work	Chuck part is damaged.	Disassemble and replace part.
	Slidway seizes.	Disassemble and repair damaged part with oil stone or make change.
	Chuck is not working.	Examine the hydraulic system, pressure reduction valve, over valve.....etc.
Insufficient master jaw total stroke	Too much swarf in chuck.	Disassemble and clean.
	Draw pipe is loose.	Afresh locking Draw pipe.
Workpiece slippage	Insufficient master jaw clamping stroke.	Make arrangement such that when workpiece is chucked the master jaw will be in the stroke center.
	Chucking force is insufficient.	Check that hydraulic pressure adequately set.
	Formed dia of top jaw does not match workpiece dia.	Reform top jaw according to correct method.
	Cutting force is too high.	Calculate cutting force and confirm whether the force matches chuck specifications.
	Insufficient lubrication on master jaws and each slideway.	Lubricate from the grease nipple and chucking operation of jaws several times without workpiece in the chuck.
	Speed is too hight.	Reduce speedup to necessary gripping force.
Poor accuracy	Perphery of chuckis run out.	Confirm peripheral and end face run-out and tighten bolts.
	Foreign mater is caught in serrations between master and top jaws, dust...ect.	Remove top jaw and clean serrations thoroughly.
	Top jaw mounting bolts are inadequately tightened.	Tighten bolts to correct torque.
	Workpiece is deformed by too much gripping force.	Reduce gripping force to prevent deformation.
	Top jaw is deformed and top jaw bolts are extended because top jaw is too high.	Reduce the height of the top jaw by replacing with standard size jaw.
	Forming of top jaw is inadequate.	Check that forming plug is parallel to chuck end face and plug is not deformed due to gripping force. Also, check hydraulic pressure while forming, and face roughness.

Remark :
Please contact your local distributor or agent.
If no distributor or agent locally, then contact AUTOGRIP Machinery Co., Ltd.
On receipt of the product, we will inform you immediately of repair chedule.
Please call us if you find any problems.

9. 裝配概要圖

9. Assembly drawing

中空型 Through -hole type

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