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detron	
Item	**(1) Introduction**

Thank you for purchasing a "detron" - CNC Rotary Table，To achieve optimum performance, take the time to read this manual carefully. Handling instructions, tips for maintenance and inspection, and much more, are all here at your fingertips. They will help you to maintain the machine's inherent accuracy for a long-term period of time.

This manual should be made available for reference at all times.

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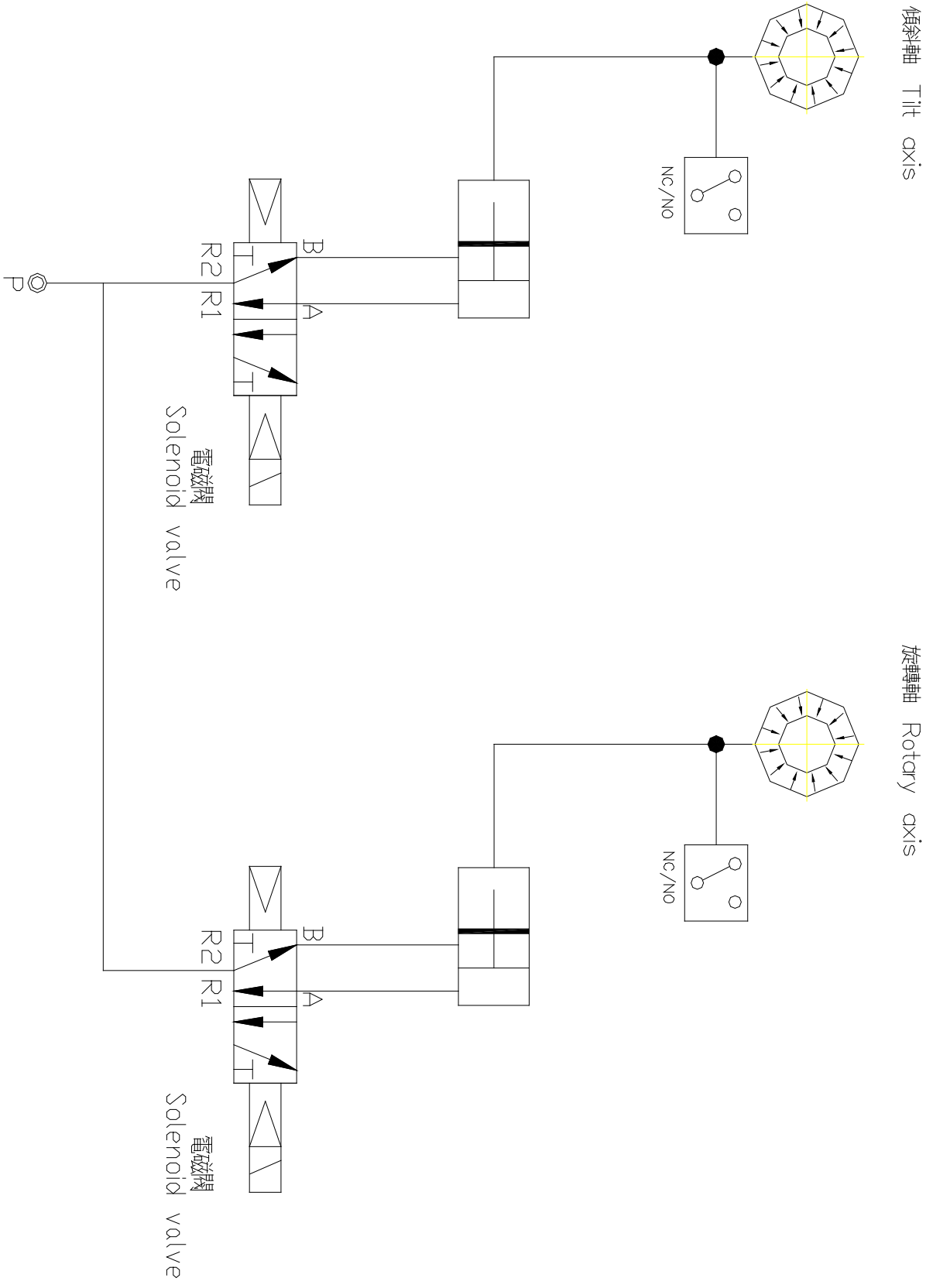
Item	**(4) Hydraulic and Pneumatic Circuit Diagram**



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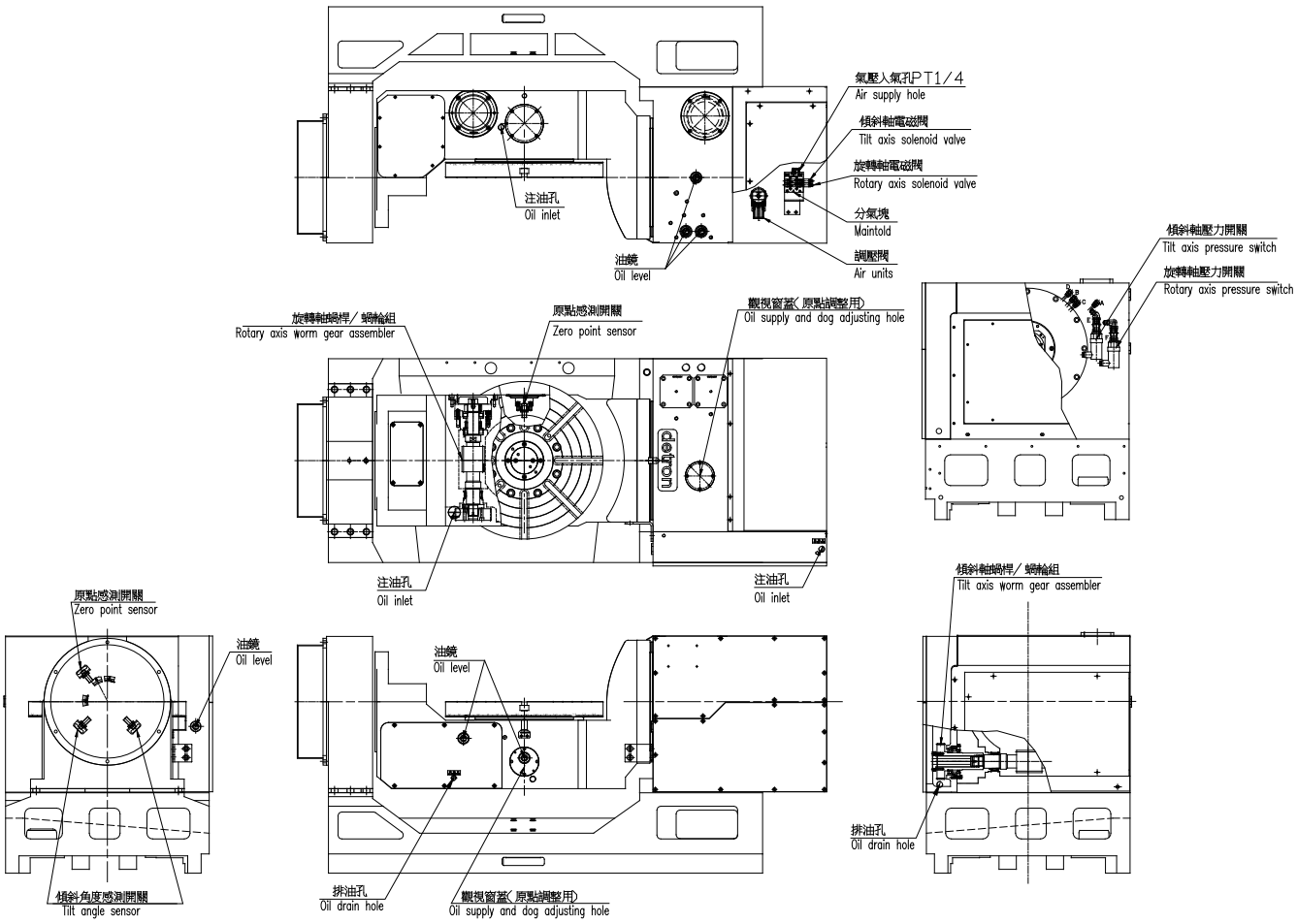
Item	**(5) Mechanism of Major Components**



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Item	**(6) Preparation**

The following preliminary steps, including a test run, are necessary before operating the CNC Rotary Table：

A. Installation and Preparation

(1) Unpacking, and moving the table to the site and setting up onto a mated machine tool.

(2) Lubrication and Cleaning.

(3) Supply of clamping air pressure.。(※: Air source has to go through the F.R.L. unit).

(4) Supply of clamping Hydraulic pressure and elimination of hydraulic oil in the air.

(※: The hydraulic oil must be filtered). 。

(5) Test run and accuracy check.

(6) Table zero return shift setting.

B .Test Run

(1) Check the table top of the mated machine tool and the CNC Rotary Table bottom for burrs and flaws.

(2) Perform a test run without loading applied to the turntable.

(3) Check the turntable for normal operation by repeatedly clamping and unclamping the table.

(4) Increase the speed slowly when checking the rotational speed of the turntable both in the clockwise and counter clockwise directions.

(5) Check the table zero return function.

(6) Check various operations using the commands from the NC unit.

※ **Before operating; please set the angle limitation of tilting axis to avoid the mechanism over stroke and brake.**

※ **To avoid damaging the mechanism; please DO NOT operate the rotary table until the above procedures are completed.**

※ **Strongly recommend to delay 500msec. after clamp/unclamp command; to avoid the mechanism broken or overheat to make the servo motor alarm.**

detron	
Item	**(7) Zero Setting and Adjustment of Dog**

Proximity limit switch has no function causing by：

A. Proximity limit switch is broken。

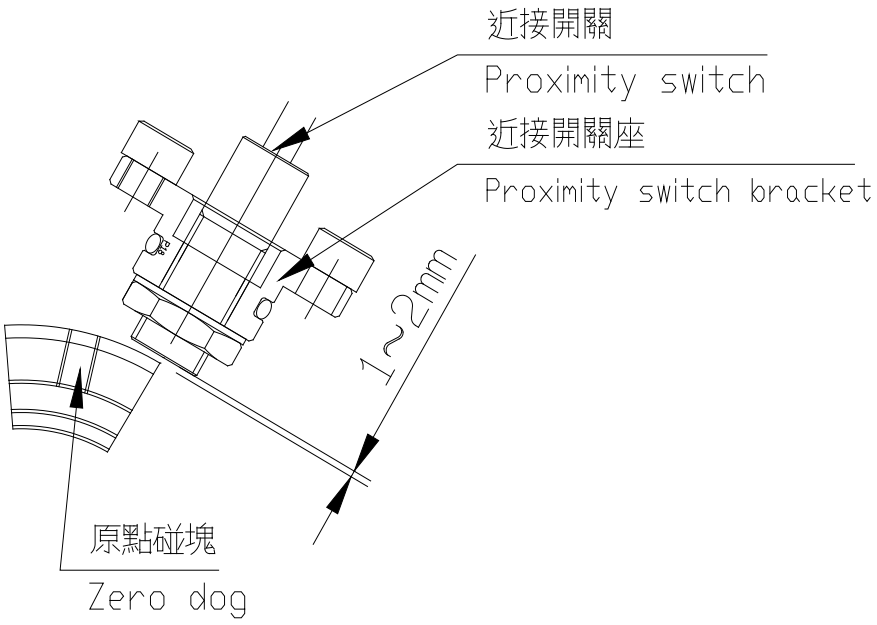
B. The clearance between the proximity switch and the dog is too far; the correct clearance is 1~2mm。

How to adjust the dog：

(1) Remove the top cover(see P9)。

(2) Turn the spindle, and loosen the dog lock bolts (M4) 。

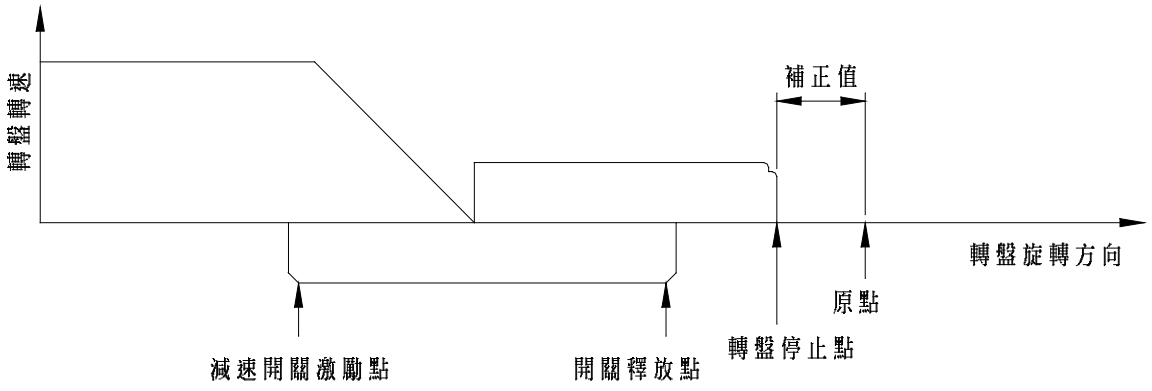
1. (3) The dog adjustment range is about ±5°。After adjustment, tighten the dog lock bolts。



detron	
Item	**(8) Zero Return and Grid Shift Amount Setting**

Upon receiving of a Zero Return command from the NC unit, the turntable begins to rotate in a specified direction in the rapid traverse mode。When the limit switch is tripped by the speed reduction dog, the table starts decelerating. When the turntable has decelerated to a speed such that the position is not uneven, even with instantaneous stop, it stops upon receipt of a reference signal from the detector of the motor。

Repeat the zero return operation of the table several times, measure the difference between the table stop position and the scheduled stop position in degrees, and input the measured value to the zero return grid shift amount of the NC unit as a correction value。



detron	
Item	**(9) Worm Gear Backlash Check**

The CNC Rotary Table is a highly reliable, maintenance-free product. To keep the table in the proper state for a long period of time, however, maintenance and adjustment are needed。

If the backlash is too large, some play occurs between the worm wheel and the worm shaft, causing vibration or chattering due to the cutting resistance during continuous cutting. If the backlash is too small, the worm gear overheats, which will cause seizure. For the long-term operation, please check the backlash periodically.

Backlash check :

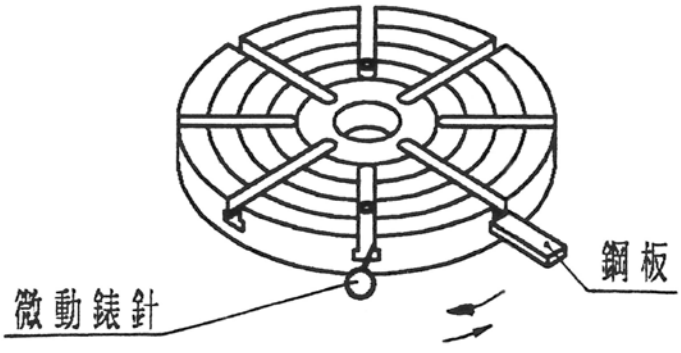
(1) Set the dial gauge on the T-slot surface near the circumference of the turntable。 (drawing shown below)

(2) Inset a steel plate into another T-slot and move it slowly in one direction with a force of 15 to 20 kg. Release the steel plate and read the indication on the dial gauge. Repeat the same procedure in the reverse direction, and read the indication on the dial gauge. The difference between the two measured values is the backlash.

(3) Measure the backlash on the circumference of the turntable at intervals of 90 degrees.

(4) The minimum backlash of the worm gear is 10” to 15” at 20°C.

※The backlash will be varied during temperature changes and properly adjust the backlash are necessary. Even if the backlash exceeds the upper limit of the above range, the turntable can be operated. Adjust the backlash when necessary. If the backlash correction value is input to the NC unit as a parameter, the apparent backlash is 0.



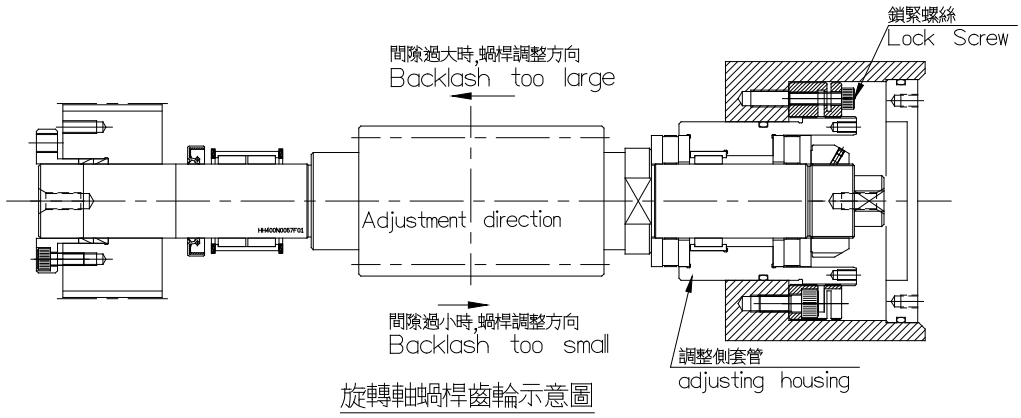
detron	
Item	**(10) Worm Gear Backlash Adjustment**

※Backlash too large:

Loosen the lock screw→Turn the adjusting housing c.w. one to fourth uniformly→ tighten lock screws uniformly→the worm shaft move forward and reduce the backlash →check the data ; Repeat the adjustment and measurement until the proper backlash is obtained。

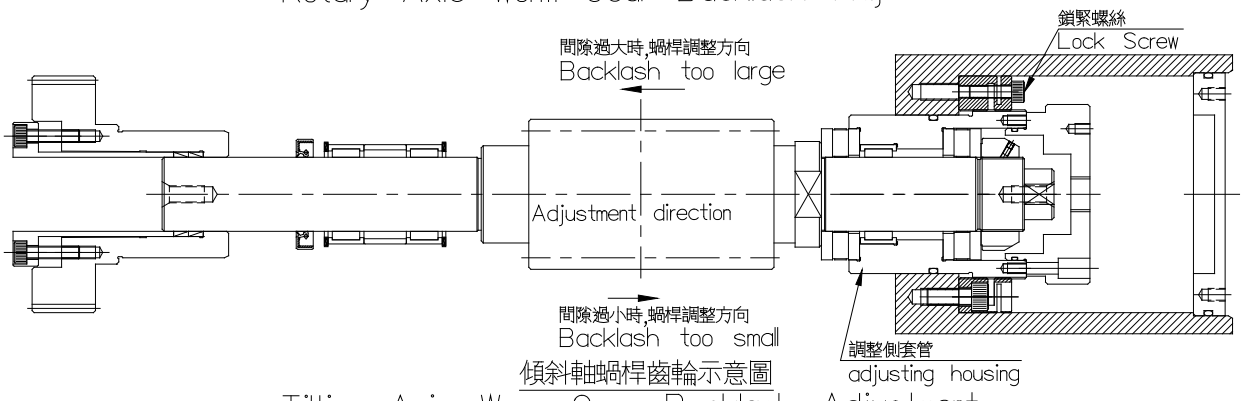
※ Backlash too small:

Loosen the lock screws→Turn the adjusting housing c.c.w. one to fourth uniformly→ tighten lock screws uniformly→the worm shaft move backward and increase the backlash →check the data; Repeat the adjustment and measurement until the proper backlash is obtained。



旋轉軸蝸桿齒輪示意圖

Rotary Axis Worm Gear Backlash Adjustment



傾斜軸蝸桿齒輪示意圖

Tilting Axis Worm Gear Backlash Adjustment

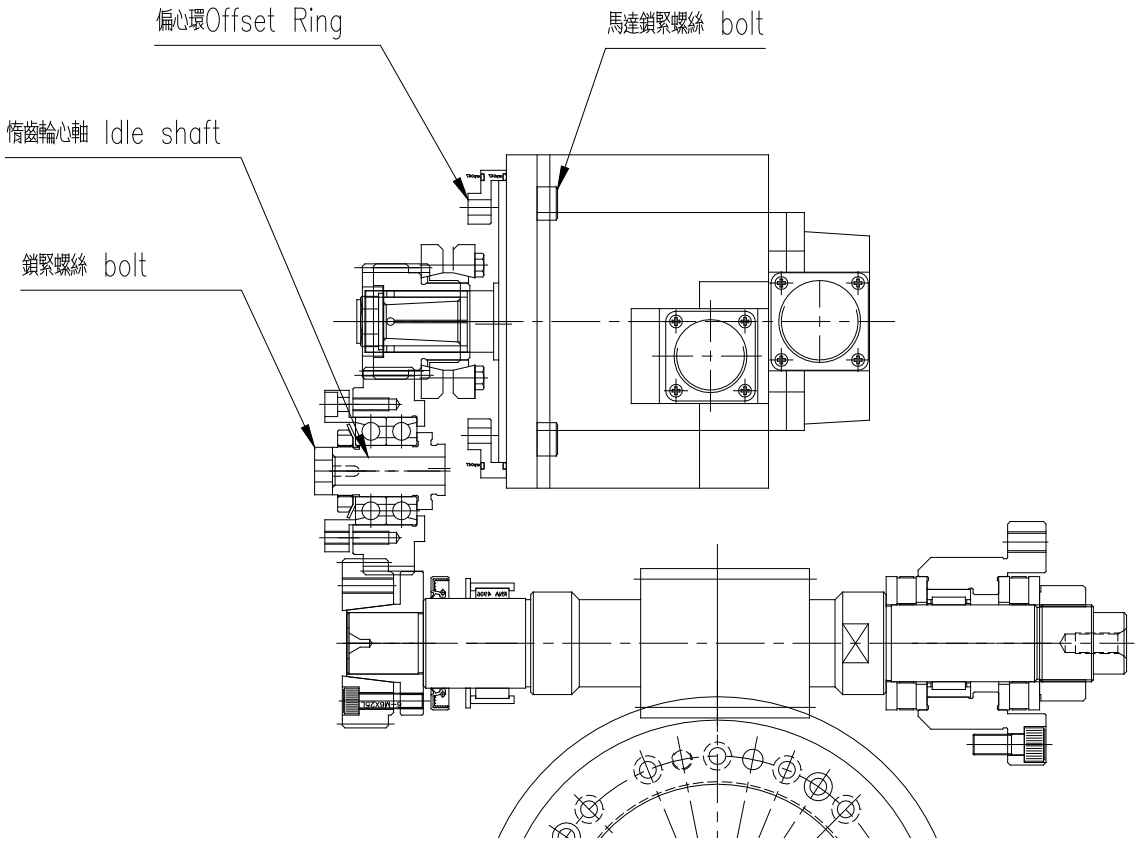
detron	
Item	**(11) Driving Gear Backlash Adjustment**

A: Rotary Axis Gear Backlash Adjustment procedure :

Gear center distance C1 adjusting：loosen ”locking bolt”→turn ”gear spindle” (The distance between axes can be adjusted up to 0.5mm by the gear spindle) until obtain a proper backlash around 0.03~0.04mm→tighten ” locking bolt”。

Gear center distance C2 adjusting：loosen ”motor locking bolt”→turn adjustable shaft sleeve by rod”(The distance between axes can be adjusted up to 0.5mm) until obtain a proper backlash around 0.03~0.04mm→tighten ”motor locking bolt”。

※ Drain the oil of gear box before adjusting the backlash of gear sets:



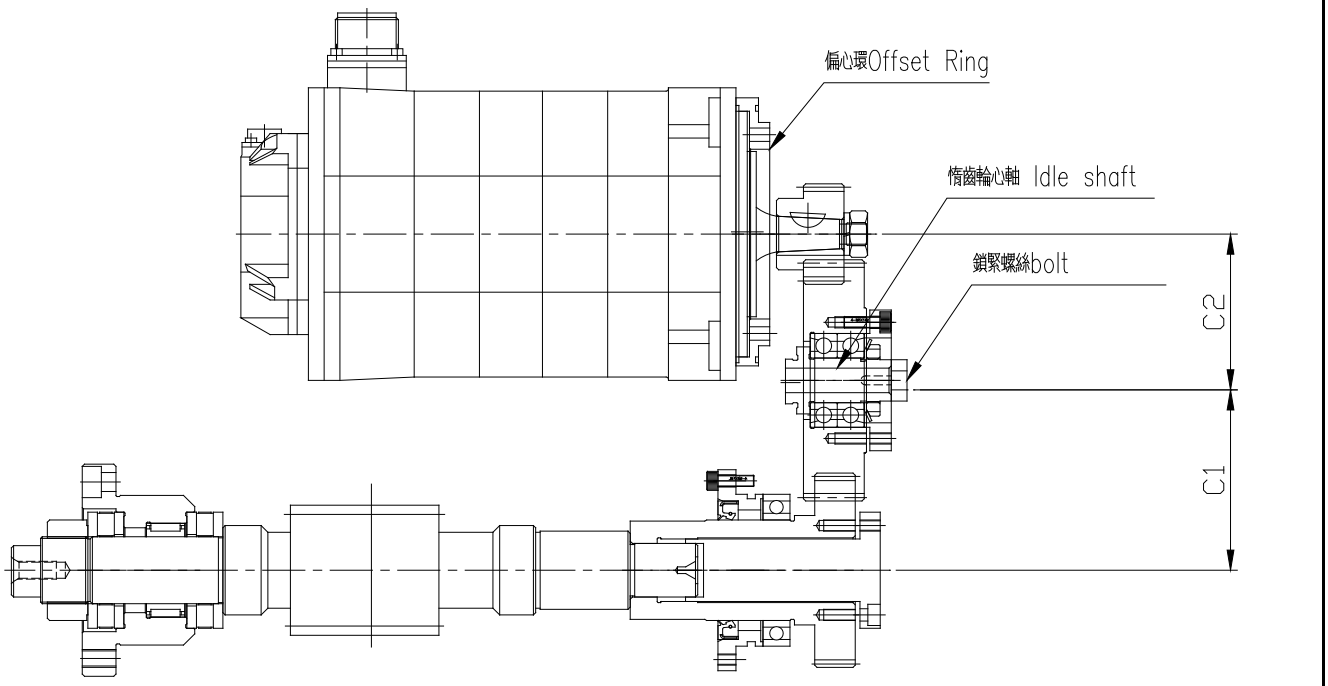
detron	
Item	**(11) Driving Gear Backlash Adjustment**

B: Tilting Axis Gear Backlash Adjustment procedure :

Adjustment of backlash C1：Loosen “locking bolt”→ turn the eccentric shaft to Obtain a proper Backlash around 0.03~0.04mm(the max. eccentricity:0.5mm)→ Re-tighten “locking blot “ .

Adjustment of backlash C2：Loosen ” the motor mounting bolt”→ turn the offset ring to obtain a proper backlash around 0.03~0.04mm(The ring max. eccentricity 0.5mm) → Re-tighten “the motor mounting bolt”.

※ Drain the oil of gear box before adjusting the backlash of gear sets:



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Item	**(12) Clamping Device**

To reach a high clamping torque; the air pressure should be 5 to 6kg/cm² and Supply air through the filter、regulator and lubricator. An end connection (PT 1/4) is provided at two locations, that is, on the top and the back. Use one of them, whichever is preferable。

When a work piece has been set-up, clamp the turntable. If a work piece is machined with the turntable unclamped, the worm gear will be worn out quickly or damaged. The tool and the work piece may also be damaged。
When positioning the turntable or performing continuous cutting, leave the turntable unclamped. To ensure the above operations, use the clamp and unclamp check signals。
Clamp and unclamp are switched on and off by the solenoid valve built into the table. When power is on, clamp is selected. Clamp piston moves forward by air pressure to press clamp disk to the frame. The frictional force at this part is the clamping torque。

(1) Check the clamp/unclamp air condition using clamp limit switch and unclamp limit switch。
(2) Under the standard operation, the table is clamped when the solenoid valve is turned on. If the table is unclamped when the solenoid valve is turned on, the solenoid valve or manifold should be replaced (optional) 。

※ **Strongly recommend to delay 500msec. after clamp/unclamp command; to avoid the mechanism broken or overheat to make the servo motor alarm.**

detron	
Item	**(13) Lubrication**

To maintain the CNC rotary table in the proper operating condition for a longer period of time, lubricating oil is indispensable.

Oil required on tilting axis around : 2.4 liter

Oil required on tilting axis gear box around : 2.4 liter

Oil required on rotary axis around : 1.6 liter

Oil required on rotary axis gear box around : 1.1 liters

※Recommended lubricating oil list is as bellow：：

製 造 廠 商	品 名
Shell	Omala 150
Esso	Spartanep 150
Mobile	Mobile Gear 629
JoMo	Reductus 100

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※Note the following:

(1) Take care so that no chips or dust is caught in the lubricating oil during oil supply.

(2) Any contamination may result in seizure of the worm gear, which is vital to the CNC Rotary Table, and may cause damage or wear to other major components.

(3) Supply lubricating oil up to the central line of the oil gauge (see P9.)。

(4) The cycle of oil replacement depends on the operation frequency. It is recommended that a complete oil change should be done semi-annually.。

detron	
Item	**(14) Trouble Shooting**

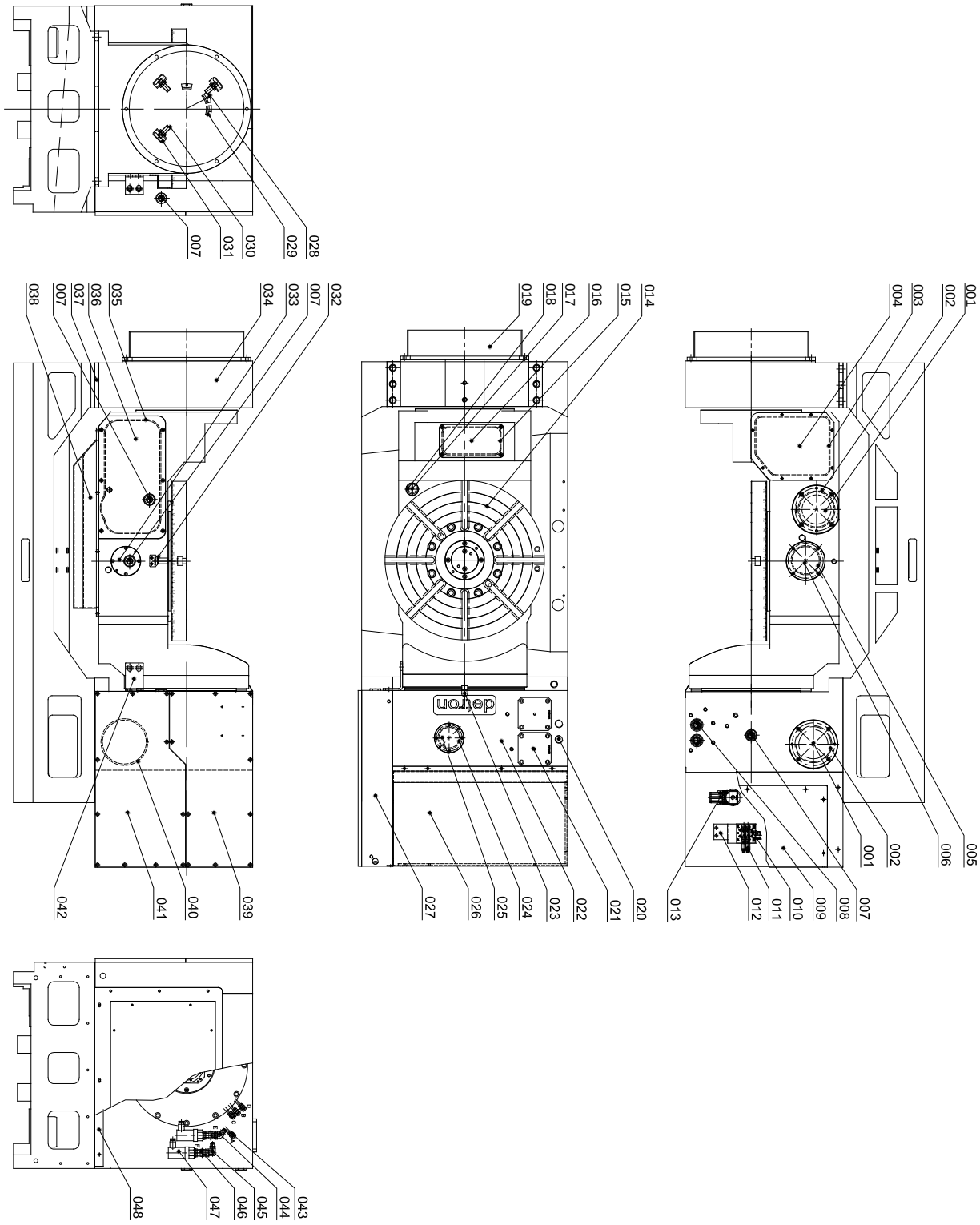
	Symptom	Probable cause	Isolation instruction	Remedy	Ref. Item in text
1	Turntable fails to rotate 1) Motor does not rotate 2) Motor rotates normally	• Burnout • Gear 1ocking s1eeve	• Check cab1e terminals • Check gears inside the gear case	• Reinstall	• E1ectrical diagram • Adjustment of gears in gear case
2	Rotation is not smooth **Abnormal noise is generated during rotation**	• Overload • Gears inside the gear case • Motor setup • Lubrication • Worm gear or gears in the gear case • Unclamping operation(residual pressure)	• Check weight and inertia of workpiece • Measure current values of motor • Check rotation during low speed operation • Check assembly • Measure backlash • Rotation conditions with motor by itself • Check oil level and impurities See clamping device and table clamp/unclamp limit switch unit	• Change workpiece cutting method and conditions • Reassembly adjustment • Replenish or replace • Correct tooth surface or rep[lace	• Specifications • Adjustment of gears in gear case • Lubrication
3	Current value rises	• Clamped table not released • Overload • Worm gear backlash too small or not uniform	• Inspect hydraulic hose and signal line, for connection • Check value function and LS signals • Check for residual pressure when table is unclamped • Check workpiece and cutting conditions	See clamping device and table clamp/unclamp limit switch unit • Change workpiece and cutting conditions	• Feeding oil pressure for table clamp deaeration

	Symptom	Probable cause	Isolation instruction	Remedy	Ref. Item in text
3		• Insufficient warm up or parameter setting	• Check program	• Correct program	• Routine checking work
		• Lube oil: Overfilling Over viscosity Low temp	• In these cases, current value often increases	• Replace oil	• Lubrication
4	Impaired accuracy 1) Index accuracy 2) Runout in table shaft hole	• Worm wheel tooth surface • Worm wheel; deformation or alignment • Bearing nut on shaft	• Measure backlash • Measure variations in backlash • Compare with specified value	• Adjust backlash • Contact detron or dealers	• Worm gear backlash adjustment
5	Chattering during cutting operation 1) When positioning cutting operation takes place	• External force • Clamping function • Excessive worm gear backlash • Excessive gear backlash • Worm shaft MSR locknut	• Check cutting conditions • Clamping device and table clamp/unclamp limit switch unit • Measure backlash • Measure backlash • Inspect look nut	• Correct cutting conditions • Backlash adjustment • Backlash adjustment • Retighten and lock worm nut, MSR	• Worm gear backlash adjustment • Adjustment of gears in gear case • Worm gear backlash adjustment

detron	
Item	**(14) Trouble Shooting**

	Symptom	Probable cause	Isolation instruction	Remedy	Ref. Item in text
6	1) No clamp signal	• Limit switch	• Table clamp/unclamp limit switch ass'y • Clamping sleeve • Check limit switch	• P9 • Contact detron to disassemble the table • replace	Clamping device and table clamp/unclamp limit switch unit
	2) No unclamp signal	• Limit switch dog position • Piston • Signal	• Check position • Check the motion	• Correct mounting positions • Replace O-ring spring, etc.	
	3) Unclamp signal delay 4) Clamp hydraulic fluid (oil) is leaking	• Hydraulic discharge line resistance excessive • Return spring fatigue • Hose connection	• Check lines including valves, hoses, etc. • Check for viscosity and impurities • Check piston fatigue	• Replace with large caliber pipes. • Replace • Correct setting or replace	
7	Zero resetting 1) Table fails to move	• Signal line connection			Zero return limit switch unit structure
	2) Table does not stop; decelerating speed reduction and stop are unattainable	• Limit switch	• Inspect limit switch	• Replace limit switch	
	3) Table does not stop	• MS dos stepping allowance • Dog position • Plunger	• Check dog operation • Check operation • Inspect parts for damage	• Remount and adjust • Readjust • Replace O-ring, spring	

detron	
Item	**(15) Parts List**



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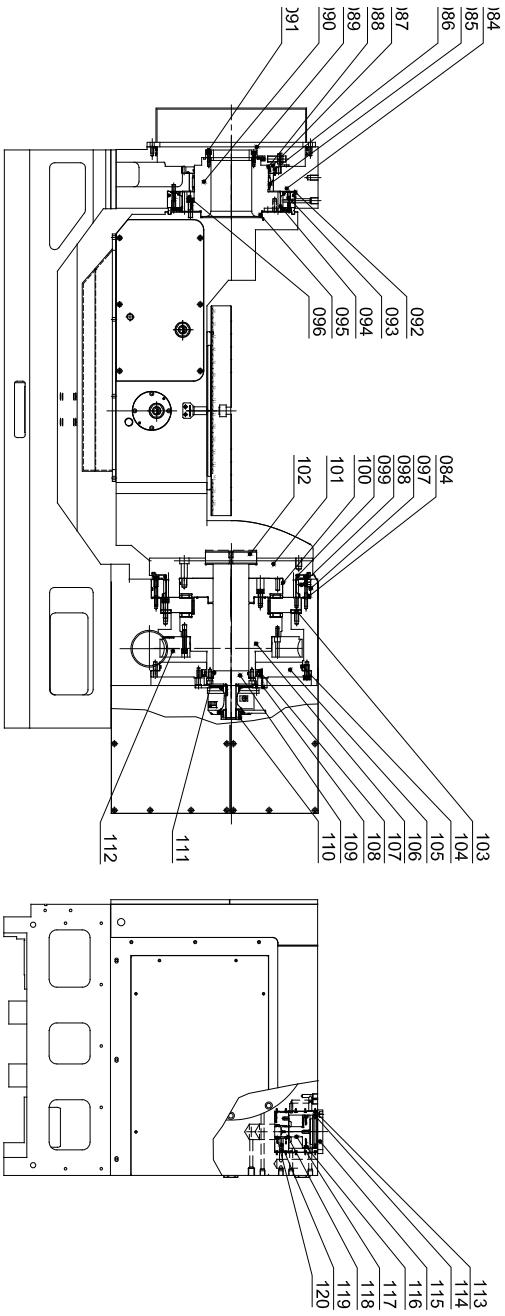
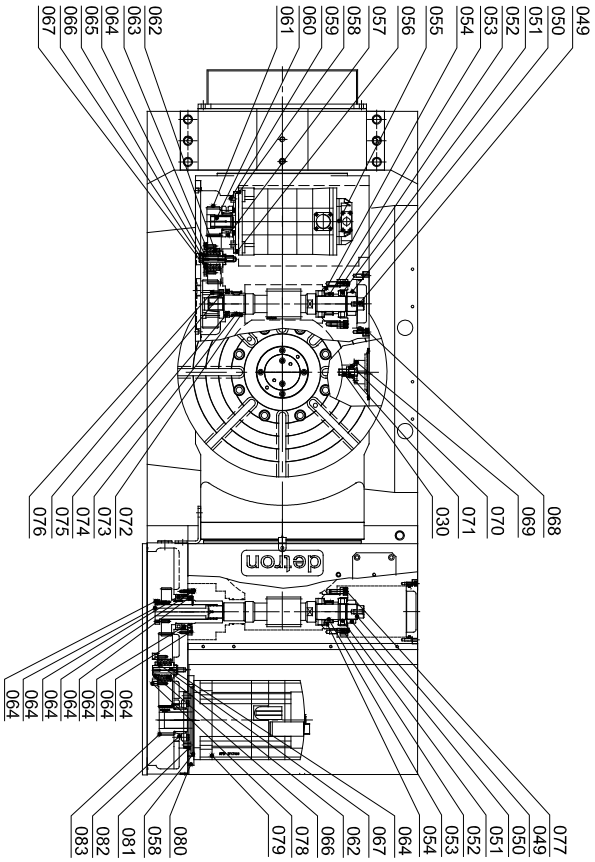
Item	**(15) Parts List**





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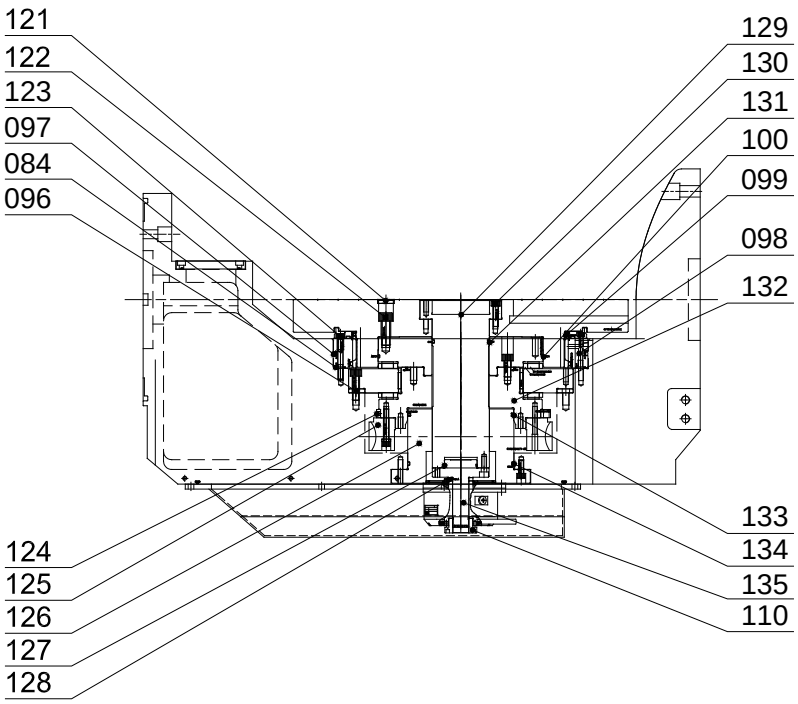
Item	**(15) Parts List**



detron	
Item	**(15) Parts List**

	Parts No.	Name	Qty	Specifications
1	GX320N0037B	End cap	1	
2	J260000G090	O ring	1	G90
3	J260000S200	O ring	1	S200
4	GF350N3027A01	Cover	1	
5	J260000S071	O ring	1	S71
6	GX125N0036C01	Cover	1	
7	A200CS0012F	Oil level	3	
8	A20GN74312F	Oil level	2	
9	GF350N0024A01	Cover	1	
10	VPMVSY100Z0	Main block	1	
11	VPMVSY100A1	Solenoid valve	2	
12	GF255N0029A	Bracket	1	
13	VPMAR2008A0	R. unit	1	MAR200-8A
14	GF350W0005A01	Worktable	1	
15	J260000G130	O ring	1	G130
16	GF255N3031B01	Cover	1	
17	GX170N0027A	Plug of oil	1	
18	J260000P022	O ring	1	P22
19	GF350N2022A01	Cover	1	
20	H36A000012T	Plug	2	
21	GF255N0025A	Cover	2	
22	GF350W0001A01	Main body of tilting	1	
23	GF210N0067D01	Zero plate	1	
24	J260000S055	O ring	1	S55
25	GX125N0036B	Plug	1	
26	GF350N0022A01	Cover	1	
27	GF350W0004A01	Main body of gear box	1	
28	GX170N0031C	Home dog	2	
29	GF255N2026A	Home dog(II)	1	
30	ES0E2EX3D20	Proximity switch	4	

detron	
Item	**(15) Parts List**

	Parts No.	Name	Qty	Specifications
31	GF255N2024B	Bracket	3	
32	GF210N0067C02	Zero plate	1	
33	GX125N0063C	End cap	1	
34	GF350W0002A01	Main body of tail	1	
35	J260000S255	O ring	1	S255
36	GF350N3026A01	Cover	1	
37	GF350N2021A01	Spacer of tail	1	
38	GF350N3025A01	Cover	1	
39	GF350N0028A01	Cover	1	
40	J260000G115	O ring	1	G115
41	GF350N0027A01	Cover	1	
42	GF255N0033A01	Plate	1	
43	H07A006D18T	Elbow connector	4	PL6-01
44	H09AA14T14H	Elbow connector	1	1/4"PTX1/4"PH
45	H07AB14T14H	Elbow connector	1	1/4"PTX1/4"PH
46	H08A00014PT	Tee	2	1/4"PT
47	ESMS0100SC0	Pressure switch	2	
48	GF350N0023A01	Plate;body of tilting	1	
49	GX320N0028D	Worm shaft	1	
50	A35JJ0PM300	Precision nut	1	
51	BL0081206TN	Bearing	2	
52	GX255N0061A	Skt.Set.Screw	4	
53	BH0RNA49050	Bearing	1	RNA4905
54	GX320N0035B	Sleeve of worm shaft	1	
55		Servo motor	1	α 8i
56	J26000AS046	O ring	1	ARP046
57	L10TLK60330	Expansion ring	1	
58	J26000AS044	O ring	1	ARP044
59	GX255N0044C01	Offset ring	1	
60	GX170N0048A	Sleeve	1	

(15) Parts List

	Parts No.	Name	Qty	Specifications
61	GX320N0068A	Gear	1	
62	BE0007004A0	Bearing	1	
63	GF210N0032B	Flange of gear	1	
64	GF255N3044A01	Gear shaft	1	
65	A07CB10X055	Hex.Hd.Screw	1	M10X55L
66	A34JJ00M020	Nut	1	
67	A45JJ0AW040	Washer	1	
68	A06CB06X016	Skt.Hd.Cap.Screw	4	M6X16L
69	GX170N0030A	Bracket	1	
70	J260000P018	O ring	1	P18
71	J260000P010	O ring	1	P10
72	C06000R0470	Retainer	2	R47
73	BH0RNA49060	Bearing	1	RNA4906
74	J28AE2066E0	Oil seal	1	TC35X52X7
75	GX320N0064A01	Flange of gear	1	
76	GX320N0063B02	Gear	1	
77	A06CB08X025	Skt.Hd.Cap.Screw	4	M8X25L
78	GX255N0043A	Flange of gear	1	
79		Servo motor	1	α 12i
80	GF350N0030A02	Plate	1	
81	GF350N0029A02	Offset ring	1	
82	L10TLK60344	Expansion ring	1	
83	GX320N0062A	Gear	1	
84	J260000P009	O ring	18	P9
85	BH0RNA48260	Bearing	1	RNA4826
86	J26000AS166	O ring	1	ARP166
87	GF255N2022C	Flange	1	
88	J2600AR4162	X ring	1	QRAR4162
89	GF255N2023A	Ring	1	
90	GF255N3030B03	Shaft	1	

(15) Parts List

	Parts No.	Name	Qty	Specifications
91	A06CB05X016	Skt.Hd.Cap.Screw	4	M5X16L
92	J26000AS272	O ring	1	ARP272
93	GX255A0001A	Brake	1	
94	J2600AR4266	X ring	1	QRAR4266
95	J260000G115	O ring	1	G115
96	A06CB08X030	Skt.Hd.Cap.Screw	10	M8X30L
97	J26000AS277	O ring	1	ARP277
98	GX320A0001B	Brake	1	
99	J2600AR4275	X ring	1	QRAR4275
100	J26000AS170	O ring	1	ARP170
101	GF320NW004A01	Plate	1	
102	GF320N3028A	Center ring	1	
103	GX320N0029B02	Spacer	1	
104	J26000AS275	O ring	1	ARP275
105	GF350N0021A01	Cover	1	
106	GX320A0002B	A axis spindle unit	1	
107	J28AE3984E0	Oil seal	1	TC95*115*13
108	GF320N0028A	Sleeve	1	
109	GF320N0029A02	Shaft	1	
110	GF210N0078A	Nut	1	
111	J260000G065	O ring	1	G65
112	GX320N0027F01	Worm	1	
113	J260000G075	O ring	5	G75
114	J260000G060	O ring	1	G60
115	GF255N0025A01	Cover	1	
116	J2600AR4330	X ring	1	QRAR4330
117	GF255N0028C01	Piston	1	
118	J2600001020	O ring	2	CO 0612
119	GF255N0026B	Front cap	1	
120	J2700ISI020	Oil seal	1	ISI20

(15) Parts List

	Parts No.	Name	Qty	Specifications
121	H36A00007C1	Plug	8	950007C1
122	A06CB10X030	Skt.Hd.Cap.Screw	10	M10X30L
123	A06CB06X080	Skt.Hd.Cap.Screw	12	M6X50L
124	GX320N0051D02	Home dog	1	
125	GX320N0027D	Worm	1	
126	GF350N3022A01	sleeve	1	
127	J26000AS028	O ring	1	ARP28
128	GF210N0080A	Spacer	1	
129	GF350N3021A01	Shaft	1	
130	A06CB06X025	Skt.Hd.Cap.Screw	4	M6X25L
131	J260000G065	O ring	1	G65
132	GF350A5003A	C axis spindle unit	1	
133	J2600AR4248	X ring	1	QRAR4248
134	J260000G125	O ring	1	G125
135	GF320N0029B01	Shaft	1	