deta *International*

#40 DISK TYPE TOOL CHANGER SYSTEM

USER MANUAL

This manual is applicable to model:

R4DK4/R4DE4

BT40/CAT40/DIN40/HSK63

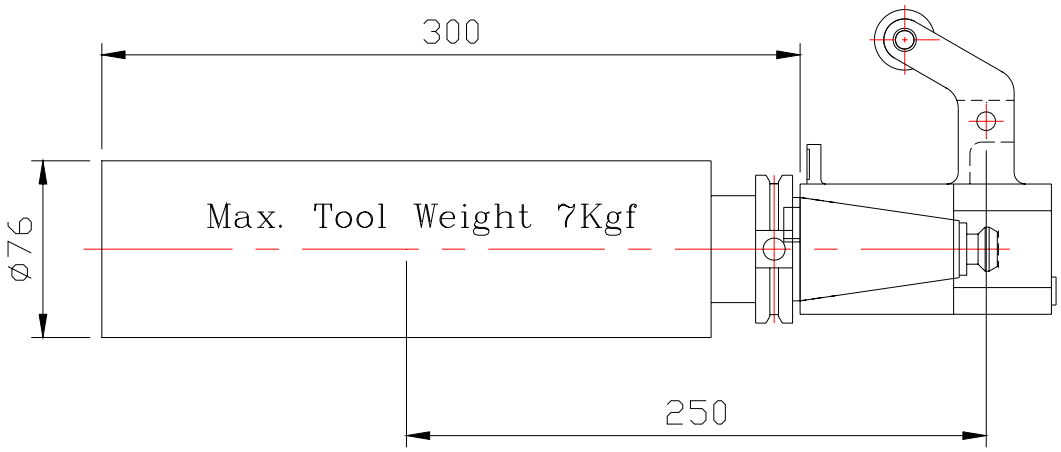
Contents Page

1、Tool Changer System Mechanical Specification & Drawings :

1-1. Specification:

Item / Model	R4DK4/R4DE4
Tool Capacity	20T
Maximum Tool Diameter	76mm
Max. Tool Length	300mm
Max. Tool Weight	7Kgf
Total Tool Weight	100 Kgf
Max. Unbalance on disk	Kgf-cm
Max. Tool Inertia	210 Kgf-cm
CAM BOX Speed (CAM BOX Only)	1.5 sec. (60Hz)
Magazine Speed	0.6 sec. / tool (60Hz)
Tool Selection	Two Way Random Selection

1-2. Maximum Tool Rotational Inertia Diagram: Drawing:

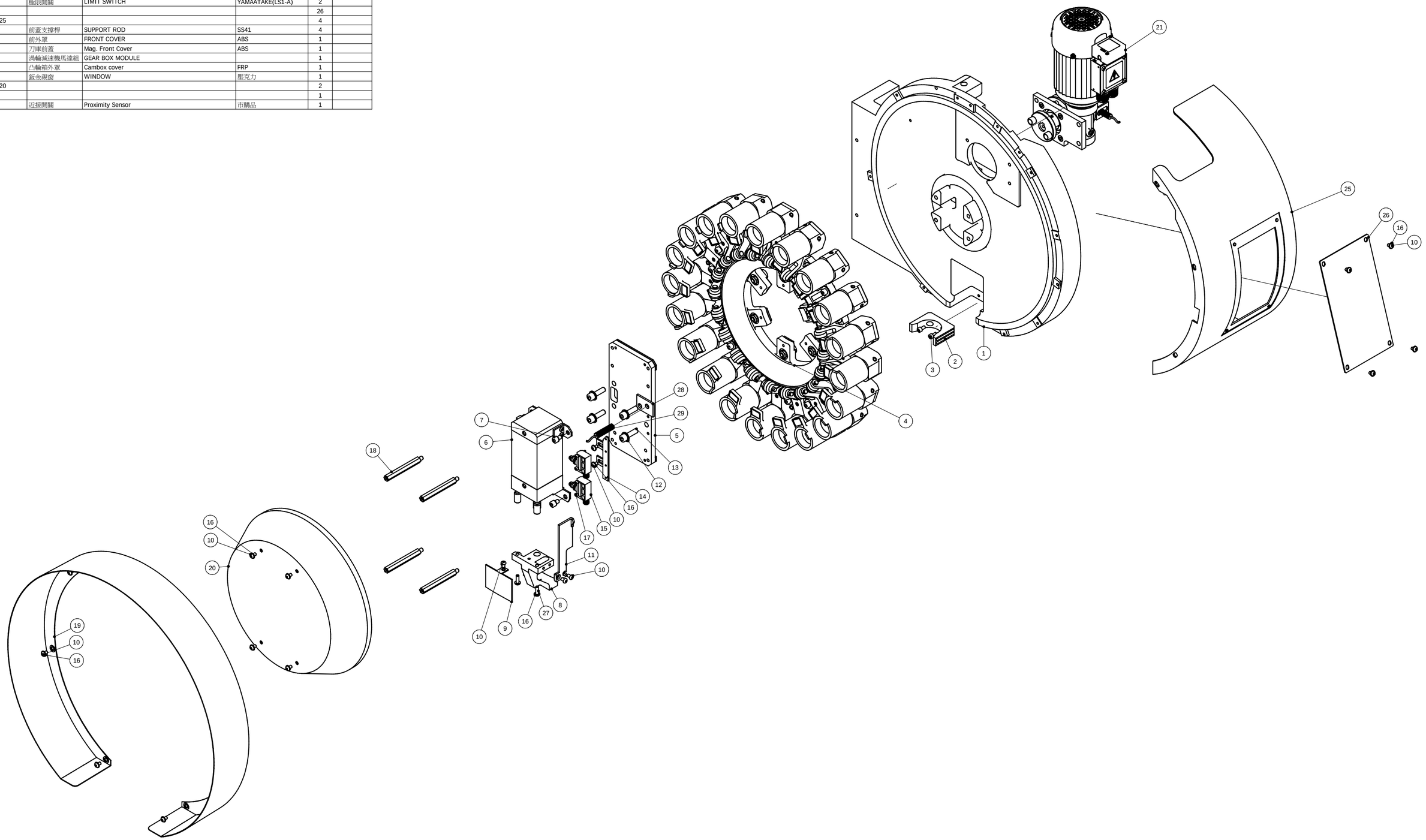


1-3. Drawings:

Assembly drawing and part list for disk type tool magazine, CAM BOX and tool changing arm as per attached drawings and list.

零件表

項目	零件號碼	中文名稱	英文名稱	材質	數量	NOTE
1	R4DK20001A11	刀庫本體	MAIN BODY	FC30	1	
2	MR4AK0025A04	倒刀定位座	Pocket posItioning seat	尼龍6+礦纖維40%	1	
3	JIS B 1176 - M6 x 12				2	
4	R4DK2000002A	刀盤組	TOOL DISK MODULE		1	
5	R4DK2000003A	壓缸固定鈑組	CYLINDER MOUNTING PLATE MODULE		1	
6	MR4AK0005A08-10	倒刀壓缸	Pneumatic Cylinder	市購品	1	
7	JIS B 1176 - M8 x 12				4	
8	R4DK20004A01	倒刀塊	Tool tilt block	S45C	1	
9	MR4AK0018B01	倒刀蓋鈑	Cover Plate	SS41	1	
10	JIS B 1174 - M6 x 10				23	
11	MR4AK0026A04	極限開關碰塊	Limit Switch Sensing Dog	SS41	1	
12	JIS B1252 - 10 1L				4	
13	JIS B 1176 - M10 x 35				4	
14	R4DK20005A02	極限開關固定鈑	Limit switch block	SS41	1	
15	SQCCW000SL1A	極限開關	LIMIT SWITCH	YAMAATAKE(LS1-A)	2	
16	JIS B1252 - 6 1L				26	
17	JIS B 1176 - M4 x 25				4	
18	MR4AK0010A06	前蓋支撐桿	SUPPORT ROD	SS41	4	
19	R4DKH0022A05	前外罩	FRONT COVER	ABS	1	
20	R4DK20015A02	刀庫前蓋	Mag. Front Cover	ABS	1	
21	R4DK40003A00	渦輪減速機馬達組	GEAR BOX MODULE		1	
25	R4DK40006A02	凸輪箱外罩	Cambox cover	FRP	1	
26	MR4A-0017D01	鈑金視窗	WINDOW	壓克力	1	
27	JIS B 1174 - M6 x 20				2	
28	R4DK20014A01				1	
29	SR4000000003	近接開關	Proximity Sensor	市購品	1	



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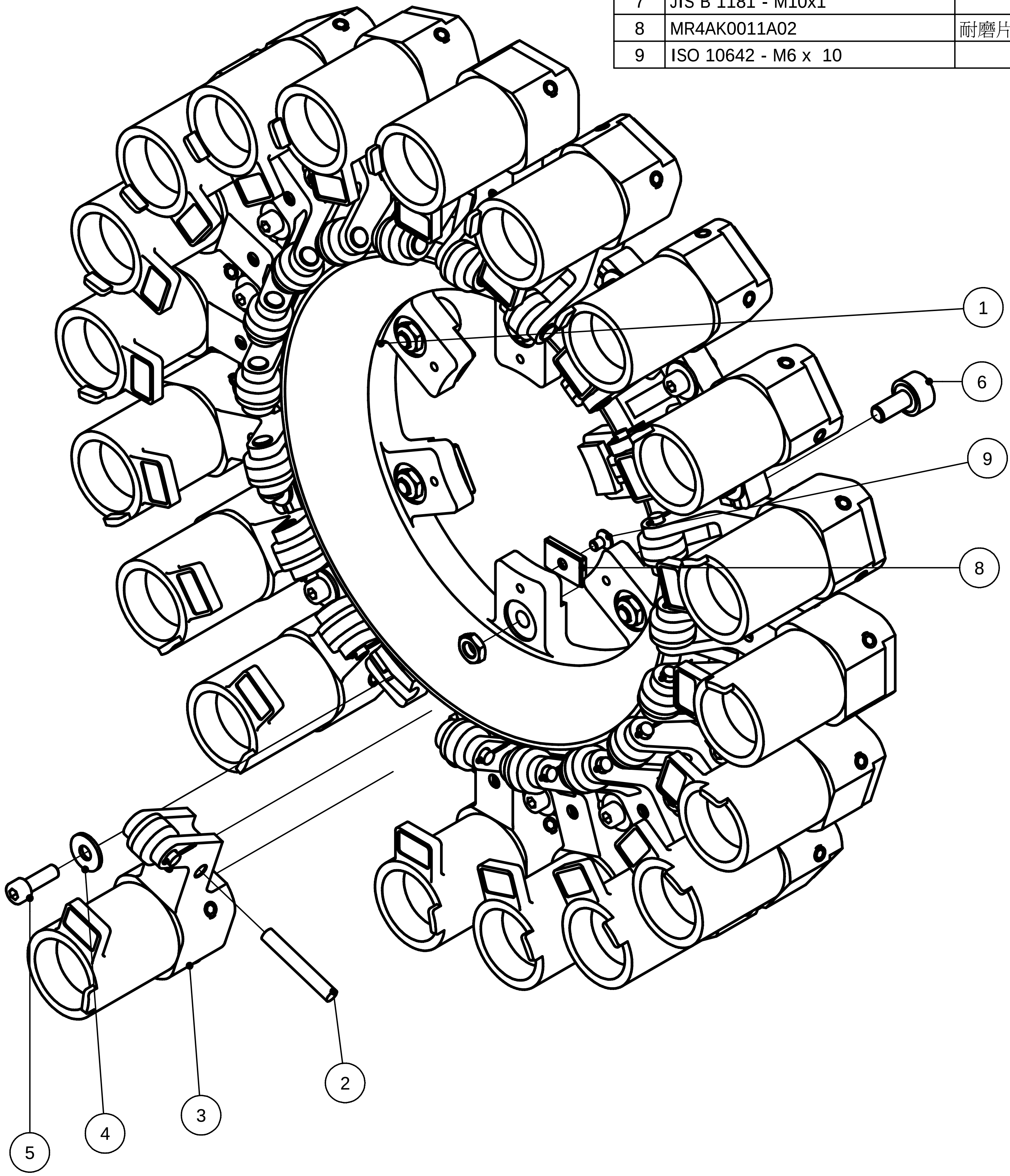
						圖框更新版本 2009/12/29	>0 ±0.1 >6 ±0.2 >30 ±0.3 >120 ±0.5 >350 ±0.8 >1000±1.2
						TITLE	
deta *INTERNATIONAL*		DRAWING DESING	CHECK APPROVE	PART NO.	SCALE	R4DK4(#40X20T)	
TEL:886-4-25617722 FAX:886-4-25617177	NAME	a-may2010/11/24		R4DK40000A01		R4DK4(#40X20T)	

零件表						
項目	零件號碼	中文名稱	英文名稱	材質	數量	NOTE
1	R4DK20002A03	刀盤	TOOL DISK	FC30	1	
2	MR4AK0013A02	刀套固定桿	SHAFT	S45C	20	
3	P40K-0800112-01	刀套	POCKET		20	OPTION
4	WA0000000008	墊片	Washer	市購品	20	
5	JIS B 1176 - M8 x 25				20	
6	BE00000CF10G	曲線滾輪軸承CF10G	Roller	市購品	6	
7	JIS B 1181 - M10x1				6	
8	MR4AK0011A02	耐磨片	WEAR RESISTANT STRIP	POM聚縮醛樹脂CL-500CL	6	
9	ISO 10642 - M6 x 10				6	



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		UNIT NO.	QUANTITY		圖框更新版本 2009/12/29
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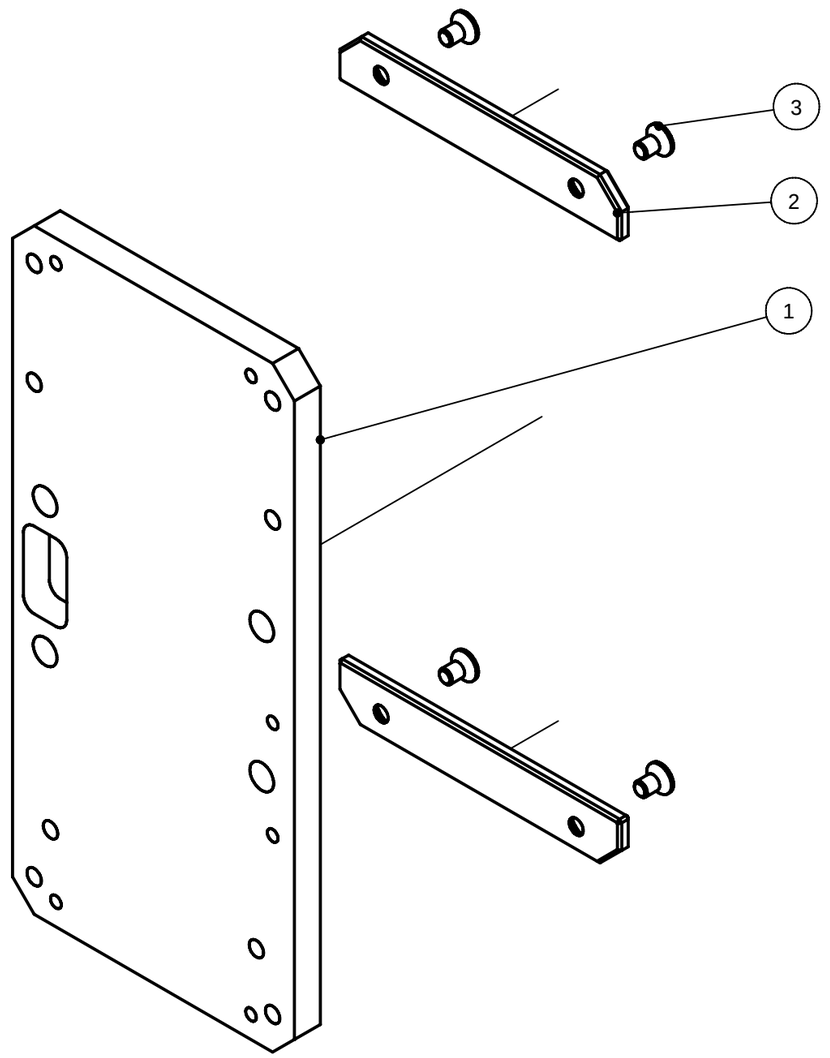
deta INTERNATIONAL	DRAWING DESING	CHECK APPROVE	PART NO.	SCALE	刀盤組
TEL:886-4-25617722 FAX:886-4-25617177	NAME a-may2010/11/24		R4DK2000002A		TOOL DISK MODULE

>0 ±0.1
>6 ±0.2
>30 ±0.3
>120 ±0.5
>350 ±0.8
>1000±1.2

零件表

項目	零件號碼	中文名稱	英文名稱	材質	數量
1	R4DK20003A03	壓缸固定鈑	CYLINDER MOUNTING PLATE	AL-6061-T6	1
2	MR4AK0012A03	耐磨片	WEAR RESISTANT STRIP	UP	2
3	ISO 10642 - M6 x 10				4



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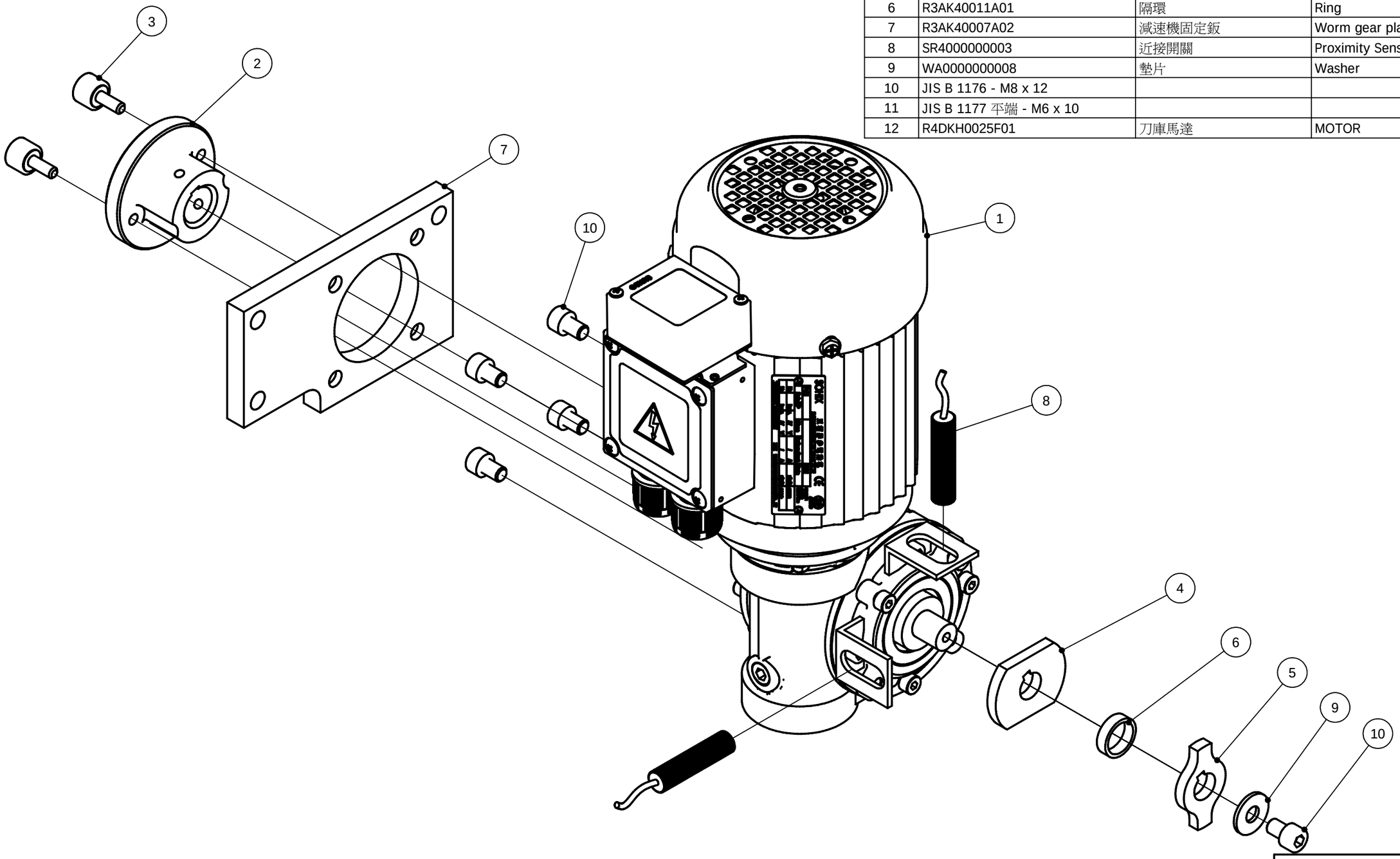
				UNIT NO.	QUANTITY		圖框更新版本 2009/12/29
						TITLE	
deta *INTERNATIONAL* TEL:886-4-25617722 FAX:886-4-25617177		DRAWING DESING	CHECK APPROVE	PART NO.	SCALE	壓缸固定鈑組	
	NAME	a-may2010/11/24		R4DK2000003A		CYLINDER MOUNTING PLATE MODULE	

>0 ±0.1
>6 ±0.2
>30 ±0.3
>120 ±0.5
>350 ±0.8
>1000 ±1.2

零件表

項目	零件號碼	中文名稱	英文名稱	材質	數量
1	R3AK40008A01	渦輪減速機	WORM GEAR	市購品	1
2	R4DK40003A01	驅動輪	Driver	S45C	1
3	BE000000CF6G	曲線滾輪軸承CF6G	Roller	市購品	2
4	R4DK40004A01	提前煞車感應片	Dog(I)	SS41	1
5	R4DK40005A01	定位感應片	Dog(II)	SS41	1
6	R3AK40011A01	隔環	Ring	SS41	1
7	R3AK40007A02	減速機固定鈑	Worm gear plate	AL-6061-T6	1
8	SR4000000003	近接開關	Proximity Sensor	市購品	2
9	WA0000000008	墊片	Washer	市購品	1
10	JIS B 1176 - M8 x 12				5
11	JIS B 1177 平端 - M6 x 10				1
12	R4DKH0025F01	刀庫馬達	MOTOR		1



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				UNIT NO.	QUANTITY		圖框更新版本 2009/12/29	>0 ±0.1 >6 ±0.2 >30 ±0.3 >120 ±0.5 >350 ±0.8 >1000±1.2
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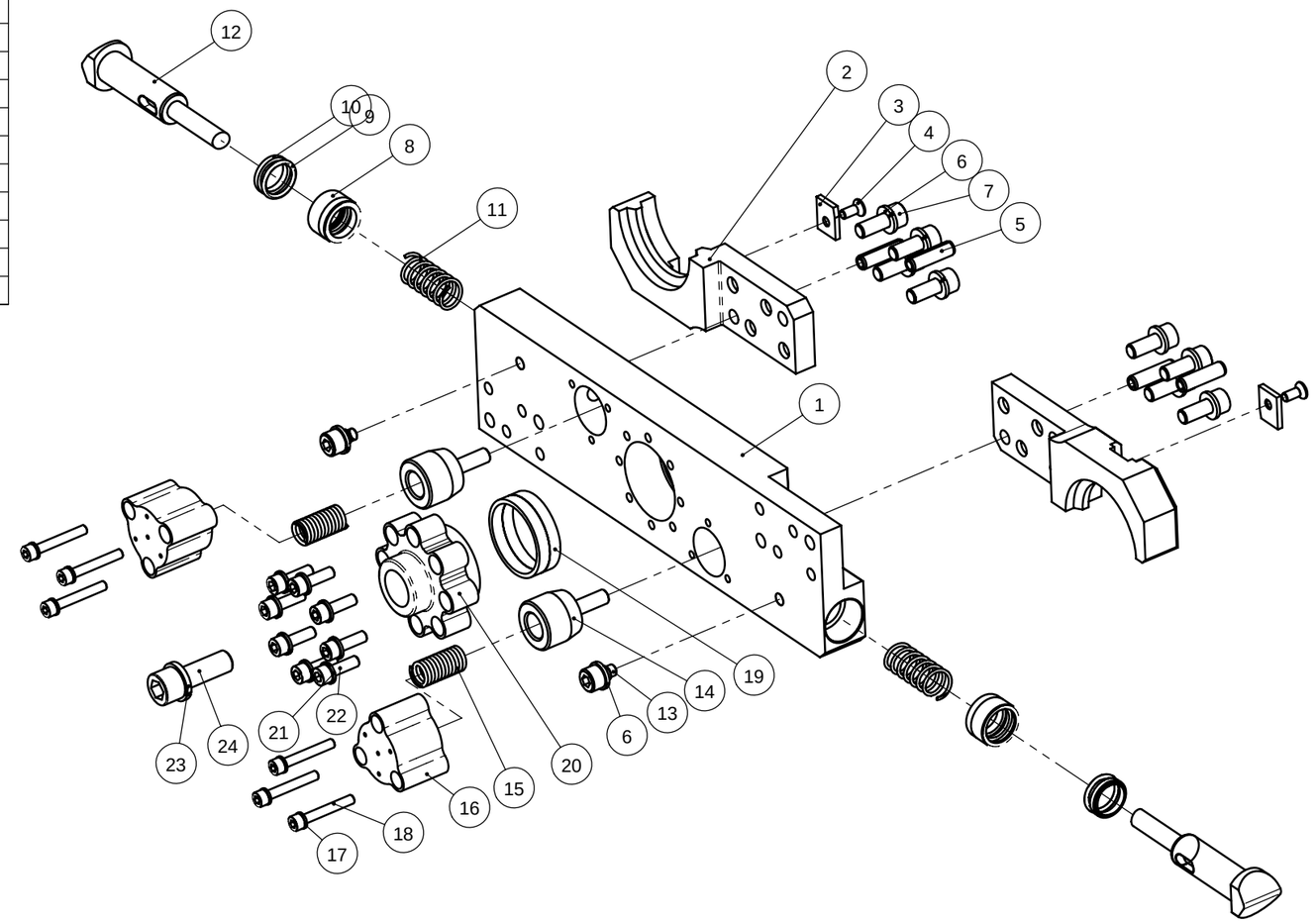
deta *INTERNATIONAL*		DRAWING DESING	CHECK APPROVE	PART NO.	SCALE	渦輪減速機馬達組		
TEL:886-4-25617722 FAX:886-4-25617177	NAME	watson2010/10/20		R4DK40003A00		GEAR BOX MODULE		

ITEM NO.	PART NO.	QTY.	MATERIAL	TITLE-C	TITLE-E	NOTE
1	A40C-001AC04	1	S50C	刀臂本體(R=200)	Main Body	
2	A40C-0002A03	2	S50C	扣刀爪	Gripper(BT)	OPTION
3	A40C-0004A01	2	S45C	定位鍵	KEY(BT,CAT,DIN)	OPTION
4	M5XP0.8X12L	2		內六角皿頭螺栓	Socket Countersunk Head Screw	
5	M8x28L	4		彈簧銷	Spring Pin	
6	M8	10		彈簧墊圈	Spring Lock Washer	
7	M8XP1.25X20L	8		內六角承窩頭螺栓	Hexagon Socket Heard Screw	
8	A40C-0020B01	2	黃銅	銅套	Copper Cover	
9	OR0000000P18	2	SER-18	O型環	O-RNIG	
10	OT00000SER18	2	SER-18	刮刷環	SEAL	
11	A40C-0007B02	2	SWC	頂刀爪彈簧	Finger Spring	
12	A40C-003AC01	2	S50C	頂刀爪(R200)	Finger	
13	A40C-0013A03	2	市購品	頂刀爪限位銷	SKT,HD,CAP SCR	
14	A40C-0005A03	2	S45C	安全頂銷	SAFETY PIN	
15	A40C-0008A02	2	SWPB	安全頂銷彈簧	Pin Spring	
16	A40C-0006A04	2	SS41	彈簧蓋鈑	SPRING COVER	
17	M5	6		彈簧墊圈	Spring Lock Washer	
18	M5XP0.8X35L	6		內六角承窩頭螺栓	Hexagon Socket Heard Screw	
19	CX0000d40D45	2		迫緊環	TAPER SNAP RING	
20	A40C-0009A03	1	SCM4	迫緊環蓋	COX COVER	
21	M6	8		彈簧墊圈	Spring Lock Washer	
22	M6XP1X20L	8		內六角承窩頭螺栓	Hexagon Socket Heard Screw	
23	M12	1		彈簧墊圈	Spring Lock Washer	
24	M12XP1.75X35L	1		內六角承窩頭螺栓	Hexagon Socket Heard Screw	



deta *International*
TEL : 886-4-25617722 FAX : 886-4-25617177

	DRAWING DESIGN	CHECK APPROVE
NAME	TIM 2007/1/6	

NUIT NO.	SHEET	MATERIAL	NO:	
	1 / 1		D4-02-04	TOLERANCE
PART NO.	SCALE	TITLE	2001/12	>0 ±0.1 >6 ±0.2 >30 ±0.3 >120 ±0.5 >315 ±0.8 >1000 ±1.2
A40K-2000111-01	1:4	#40刀臂組(R200) Arm Assembly		

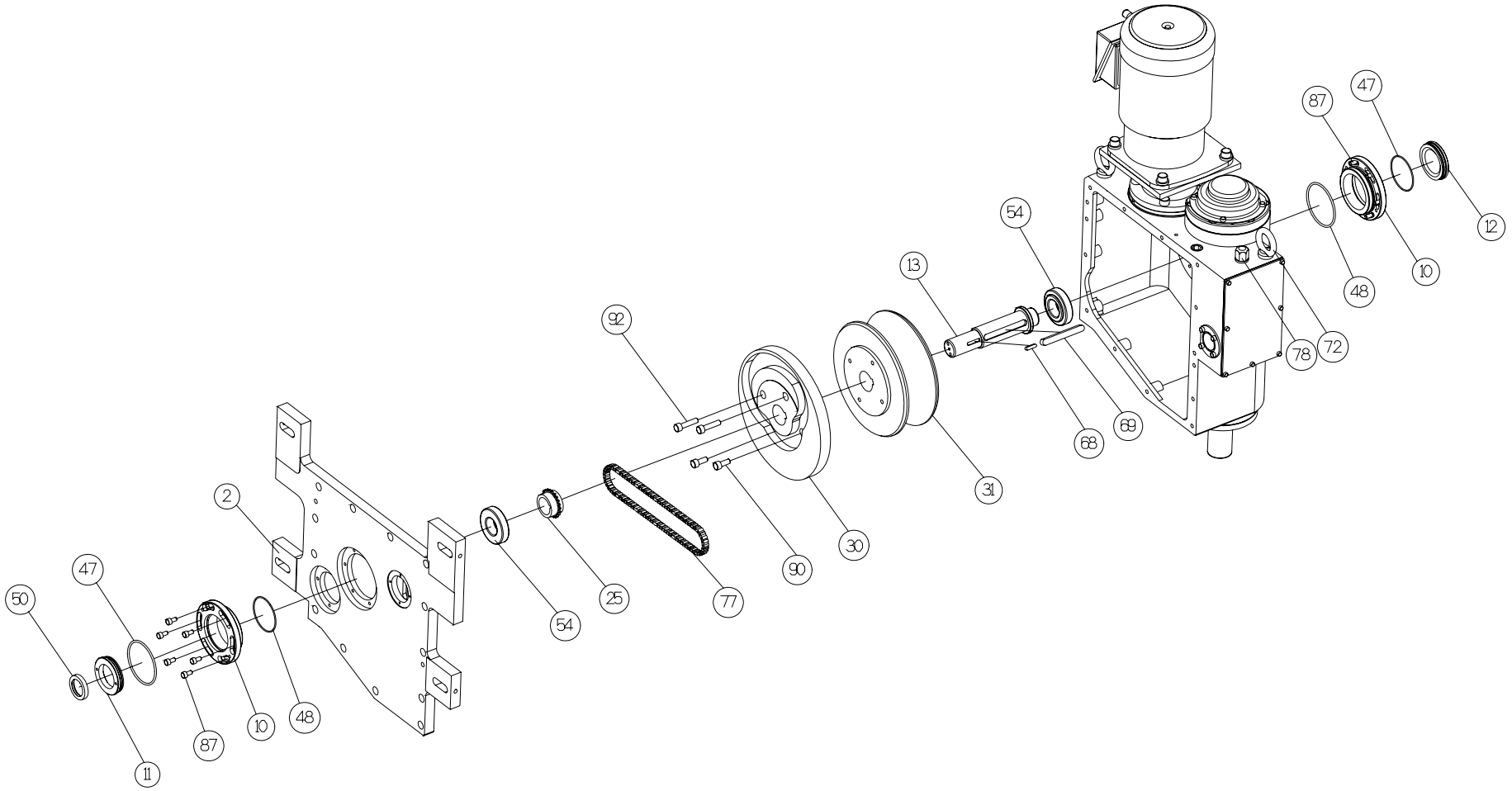
Gizin Cambox(GZ2) Part list

NO.	Parts No.	Specification	Q'TY	NO.	Parts No.	Specification	Q'TY	NO.	Parts No.	Specification	Q'TY
1	A01-001	Cambox	1	25	A01-023	Chain Wheel	1	49	G80	O Ring	1
2	A01-002	Box Cover	1	26	A01-024	Chain Wheel	1	50	TC30427	Oil Seal	1
3	A01-003	Cover	1	27	A01-025	Proximity Switch Holder	1	51	TB4 507212	Oil Seal	1
4	A01-004	Bearing Bracket	1	28	A01-126	Shaft Bracket	1	52	32005	Roller Bearing	1
5	A01-005	Motor Bracket	1	29	A01-027	Flange	1	53	32008	Roller Bearing	2
6	A01-006	Move Arm	1	30	A01-028	Plate Cam	1	54	30206	Roller Bearing	2
7	A01-007	Arm Shaft	1	31	A01-029	Roller Gear Cam	1	55	32011	Roller Bearing	2
8	A01-008	Arm Bracket	1	32	A01-031	Cover	1	56	6202ZZ	Ball Bearing	2
9	A01-009	Cover	1	33	A01-032	Position indicator	1	57	NTB40603	Thrust Bearing	1
10	A01-010	Bearing Bracket	2	34	A01-033	Needle Bearing	1	58	LBB5020	Bearing	1
11	A01-011	Cover	1	35	A01-133	Ring	1	59	AN05	Locking Nut	1
12	A01-012	Cover	1	36	A01-233	Washer	2	60	AN08	Locking Nut	1
13	A01-013	Cam Shaft	1	37	A01-034	Needle Bearing	1	61	AN08	Locking Nut	1
14	A01-014	Driving Gear	1	38	A01-134	Ring	1	62	AN11	Locking Nut	2
15	A01-015	Turret	1	39	A01-035	Dog Shaft	1	63	AW05	Washer	1
16	A01-016	Checking Dog	1	40	A01-036	Cover	2	64	AW08	Washer	1
17	A01-017	Braking Dog	1	41	A01-037	Needle Bearing Holder	1	65	AW11	Washer	1
18	A01-018	Idle Wheel Shaft	1	42	A01-038	Adjusting Ring	1	66	S12	Ring	1
19	A01-019	Idle Wheel	1	43	A01-040	Cover	1	67	4x8x4mm	Key	1
20	A01-020	Fork	1	44	A01-052	Rubber Seal	1	68	5x20x5mm	Key	1
21	A01-021	Spling Shaft	1	45	AS031	O Ring	1	69	10x85x8mm	Key	1
22	A01-022	Needle Bearing	6	46	AS033	O Ring	1	70	#6x38L	Taper Pins	2
23	A01-122	Ring	6	47	AS035	O Ring	2	71	1/2"10L	OIL Plug	2
24	A01-222	Washer	6	48	G75	O Ring	2	72	M12	Hook Ring	2

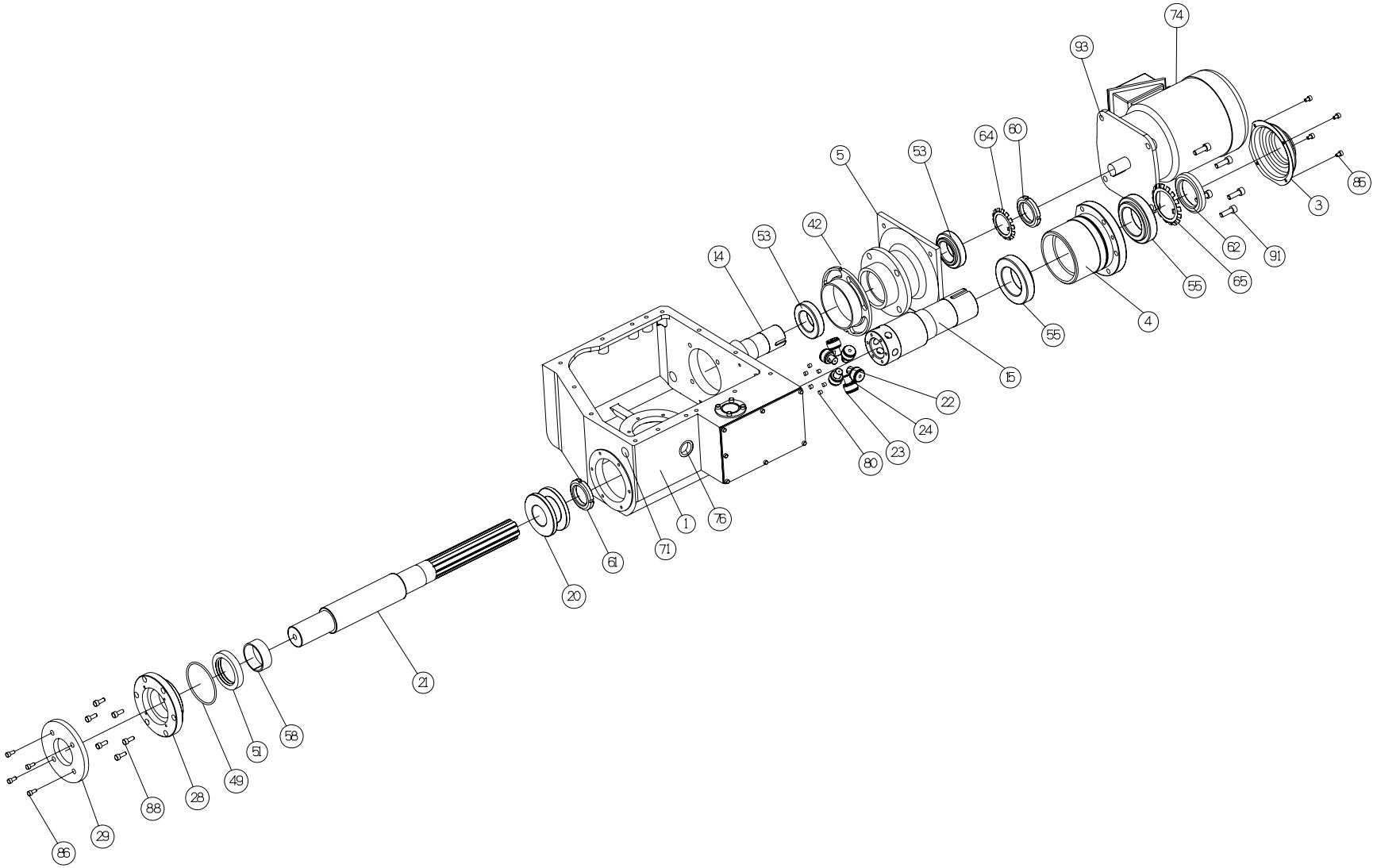
Gizin Cambox(GZ2) Part list

NO.	Parts No.	Specification	Q'TY	NO.	Parts No.	Specification	Q'TY	NO.	Parts No.	Specification	Q'TY
73	6P	Terminal Block	1	97	M12xP1.5	Nut	1				
74	3/4HP	Motor	1								
75	E2E-CR8B1	Sensor	3								
76		Oil Gauge	1								
77	RS25x597L(94)	Chain	1								
78	M16x1.5	Cable Gland	1								
79	M5x6	Set Screw	5								
80	M6x5	Set Screw	14								
81	M4x6	Screw	5								
82	M4x8	Screw	9								
83	M4x10	Screw	3								
84	M4x16	Cable Gland	2								
85	M5x8	Set Screw	12								
86	M5x12	Set Screw	10								
87	M6x12	Screw	16								
88	M6x16	Screw	6								
89	M6x25	Screw	3								
90	M8x20	Screw	3								
91	M8x25	Screw	18								
92	M8x35	Screw	2								
93	M10x25	Screw	4								
94	M10x30	Screw	4								
95	M4XP0.7	Nut	3								
96	M10xP1.25	Nut	1								

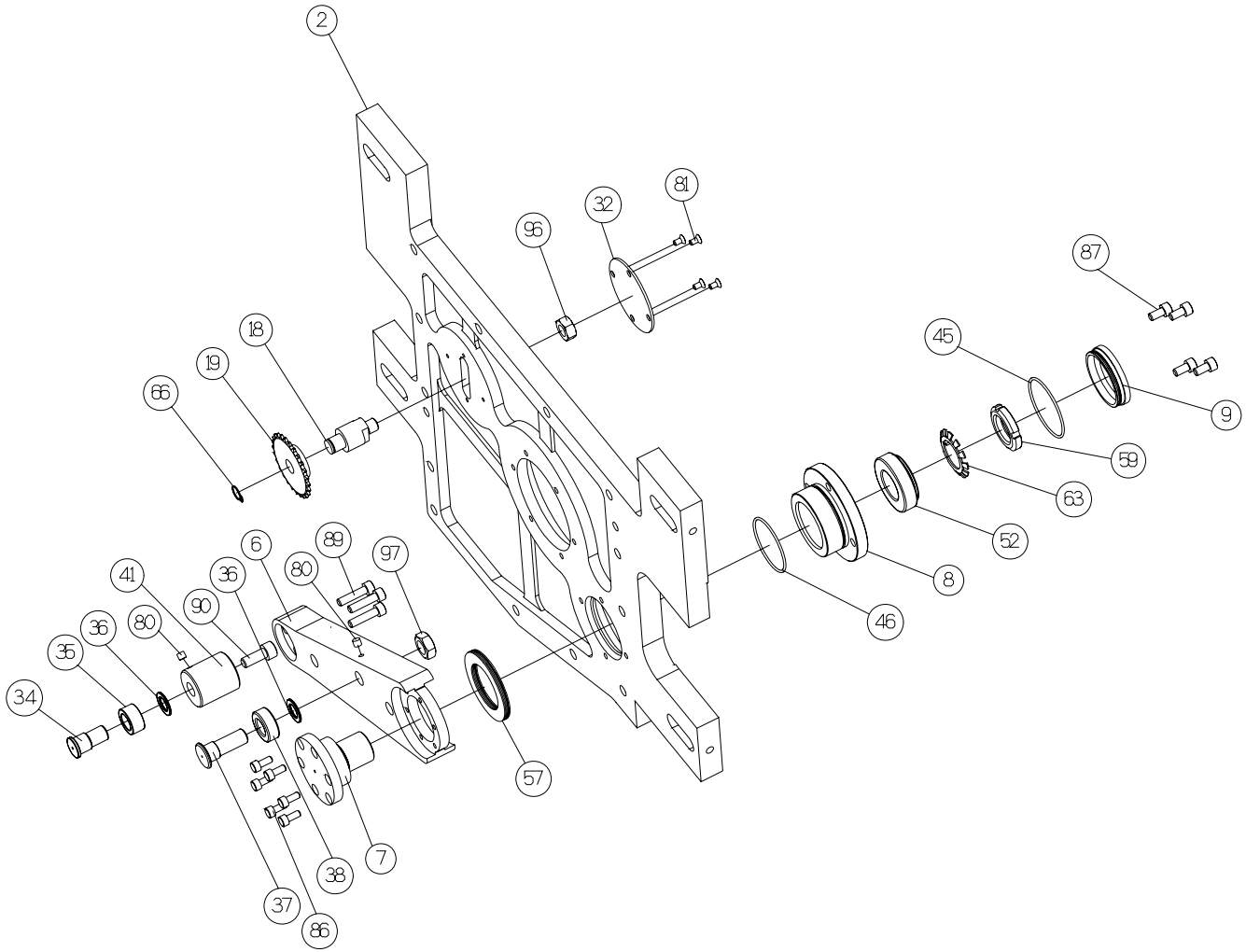
Gizin Cambox (GZ2)



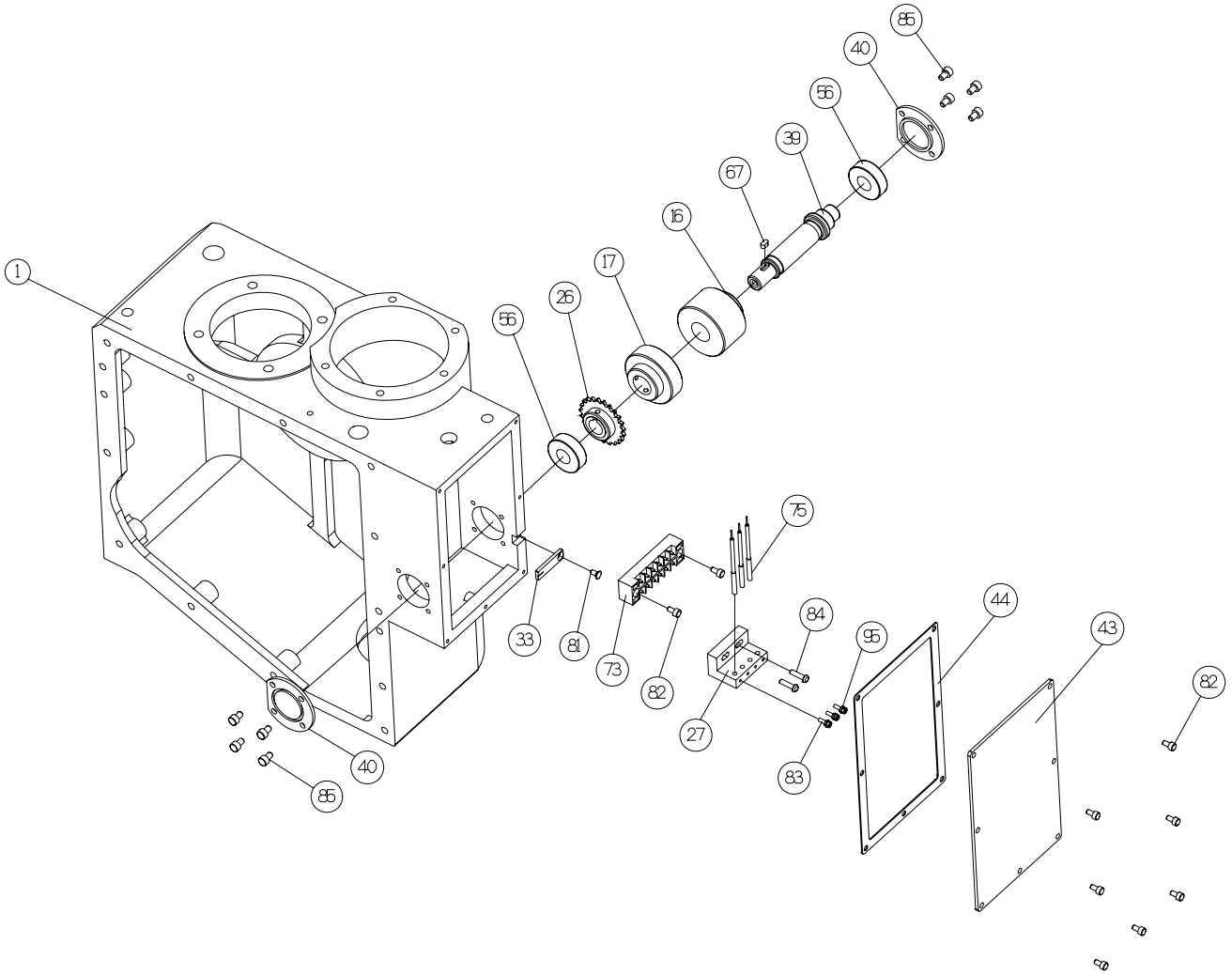
Gizin Cambox (GZ2)



Gizin Cambox (GZ2)



Gizin Cambox (GZ2)



2、Power Supply Specification for Electrical Control:

2-1. Follow the table listed below if disk type tool-changing system's power supply is not specified:

Power Supply Category	Electrical	Pneumatic
Specification	Electrical Power Supply: 3 Phase 220V (50/60Hz) Signal Power Supply: DC 24V	5 BAR (Filtered through three- points assembly)

2-2. Specification of Sensor Used In disk Type Tool Changer System Are as Followed:

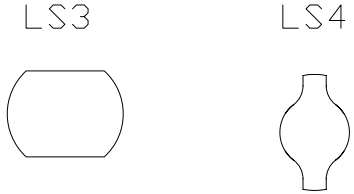
Sensor	Tool Magazine Positioning and Counting	Tool-Changing Mechanism
Specification	M12 PNP 24V Normal Open Shielded Distance = 0.6mm	Φ4 PNP DC24V Normal Open Shielded Distance = 0.8mm

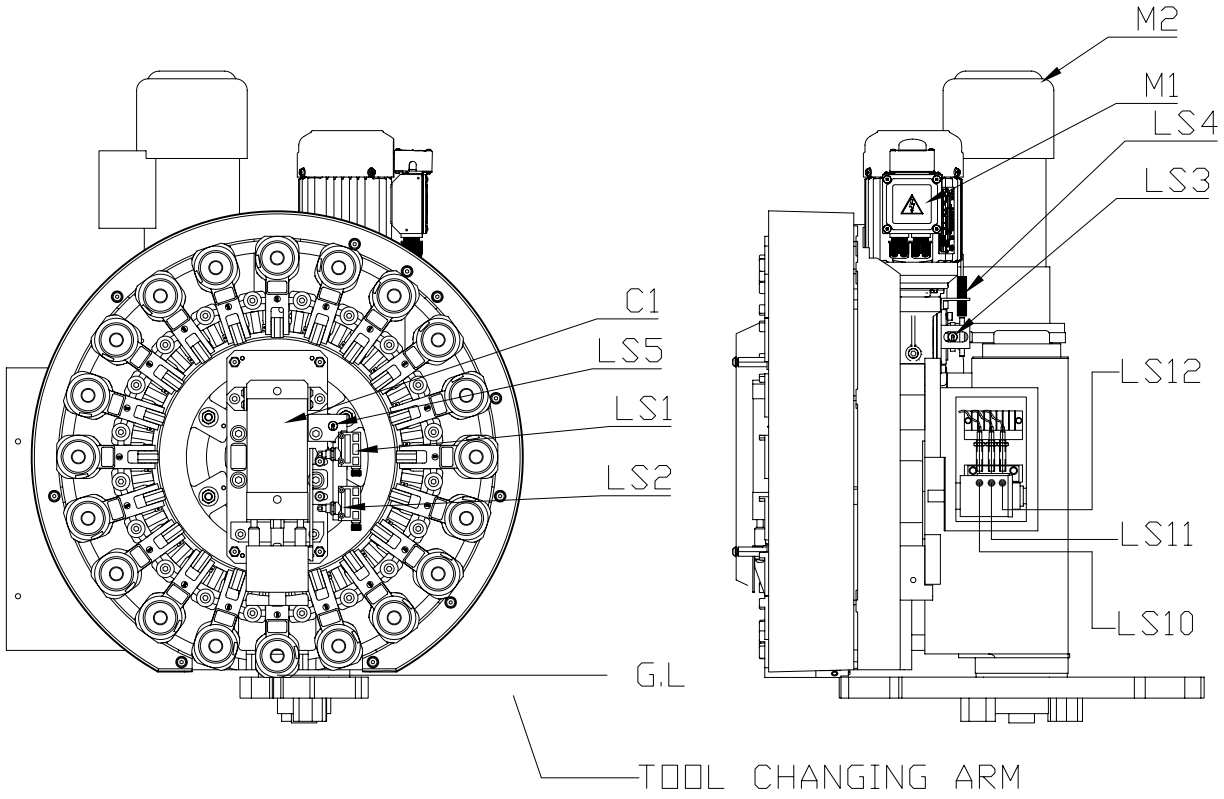
3、Electrical Control:

deta INTERNATIONAL #40 DISK TYPE CONFIGURATION DRAWING FOR ELECTRONIC CONTROL COMPONENTS

Code Description:

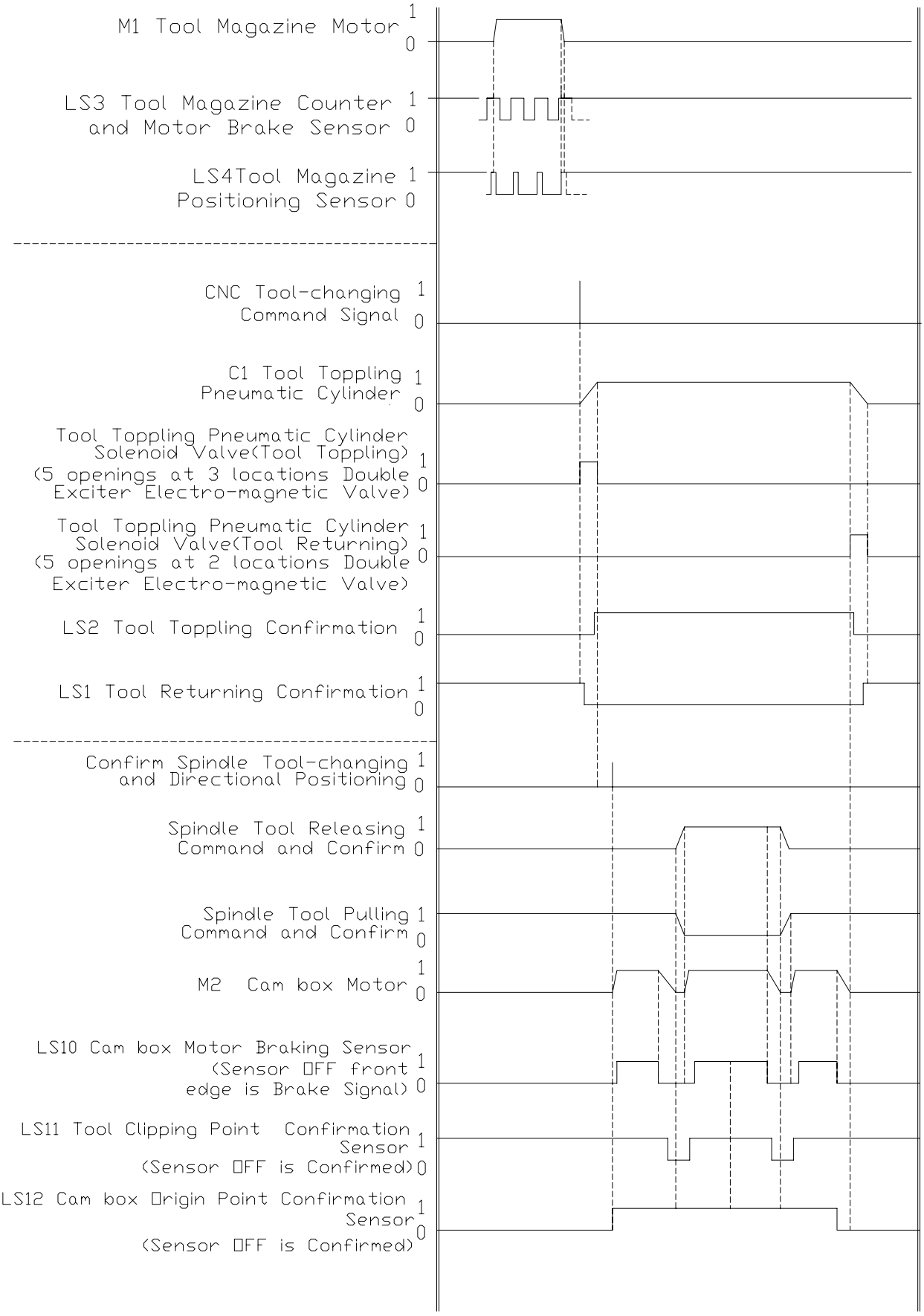
- M1 :Tool Magazine Motor
- M2 :Cam box Motor
- C1 :Tool Pot Tool Toppling Pneumatic Cylinder
- LS1 :Tool Pot Tool Returning Limits Switch
- LS2 :Tool Pot Tool Toppling Limits Switch
- LS3 :Tool Magazine Motor Brake Sensor
- LS4 :Tool Magazine Counter & Positioning Sensor
- LS5 :Tool Magazine Point of Origin Sensor (Optional)
- LS10 :Cam box Brake Sensor
- LS11 :Cam box Tool Clipping Point Position Confirmation Sensor
- LS12 :CAM BOX Point of Origin Position





				UNIT NO.	QUANTITY	MATERIAL	NO: D4-02-03 2001/12
							TOLERANCE: >0 ±0.1; >6 ±0.2; >30 ±0.3; >120 ±0.5; >315 ±0.8; >1000 ±1.2
deta International		DRAWING DESIGN	CHECK APPROVE	PART NO.	SCALE	TITLE	
TEL:886-4-25617722 FAX:886-4-25617177	NAME	AMAY20110222		DR4DK4000A01-01			

deta INTERNATIONAL #40 DISK TYPE TOOL-CHANGING SYSTEM SEQUENCE DRAWING



Note:1.LS3,LS4 are Type M12 PNP NO Proximity Switches used on the Tool Magazine Counter,
2.LS1,LS2 are Limits Switches.
3.LS10,LS11,LS12 are Type ø4 PNP NO Proximity Switches used n the Cam box .(Cam box concave dog)
4.Tool Magazine Motor is a Three Phaes Three Cable 220V 1/4HP Motor.
5.Cam box Motor is a Three Phaes Three Cable 220V 3/4HP Motor.

NO:	D4-02-03 2001/12	TOLERANCE	
		>0	±0.1
		>6	±0.2
		>30	±0.3
		>120	±0.5
		>315	±0.8
		>1000	±1.2

UNIT NO.	QUANTITY	MATERIAL	TITLE
PART NO.	SCALE		
DR4DK4000A01-02			

	CHECK	APPROVE
DRAWING	DESIGN	
NAME	AMAY	2006/12/28

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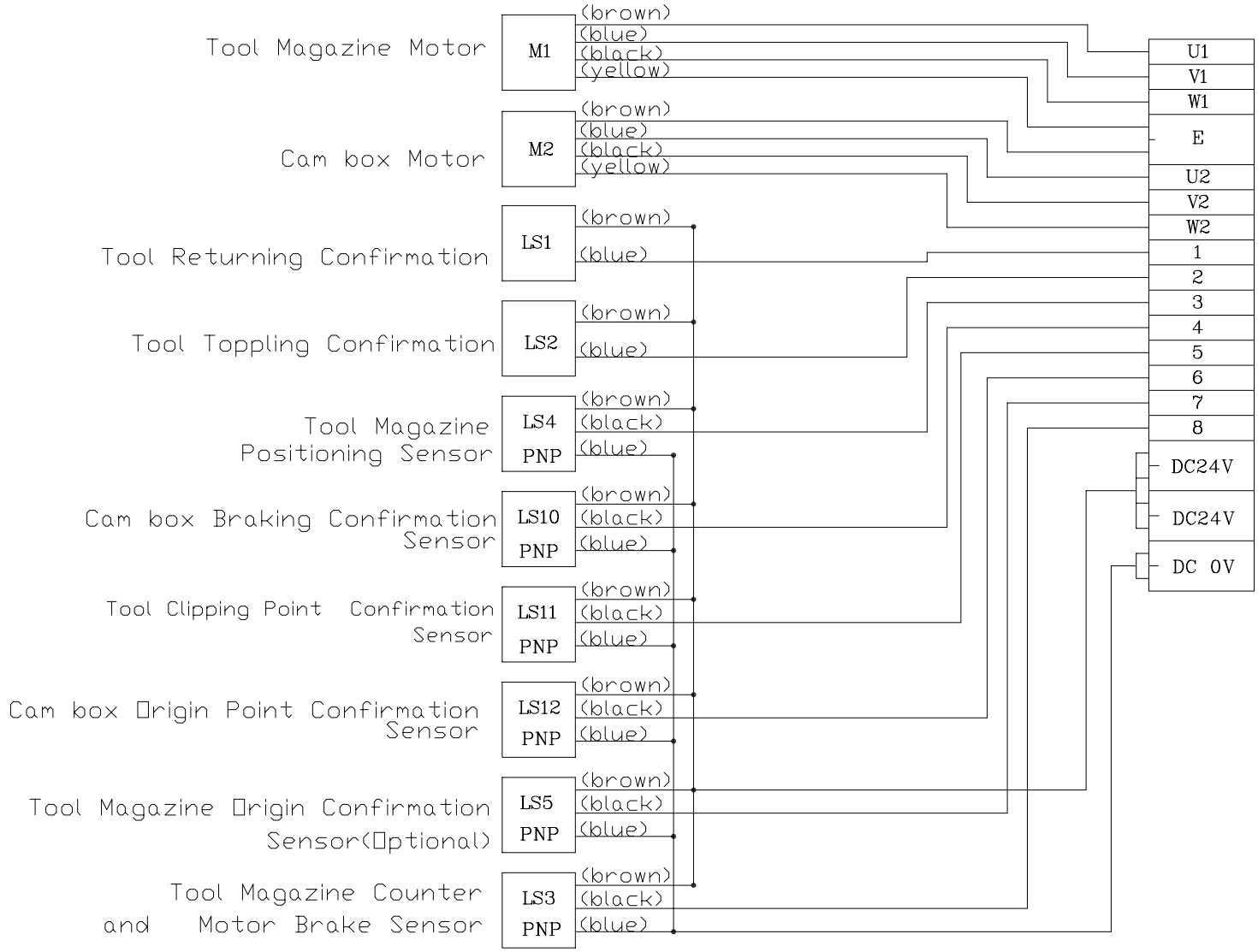
#40 DISK TYPE TOOL MAGAZINE STANDARD WIRING DIAGRAM



				UNIT NO.	QUANTITY	MATERIAL	NO:
							D4-02-03 2001/12
deta *International*		DRAWING DESIGN	CHECK APPROVE	PART NO.	SCALE	TITLE	TOLERANCE
TEL:886-4-25617722 FAX:886-4-25617177	NAME	AMAY20110222		DR4DK4000A01-03			>0 ±0.1 >6 ±0.2 >30 ±0.3 >120 ±0.5 >315 ±0.8 >1000 ±1.2

deta INTERNATIONAL DISK TYPE TOOL MAGAZINE MOTOR WIRING DIAGRAM

NO:	D4-02-03 2001/12

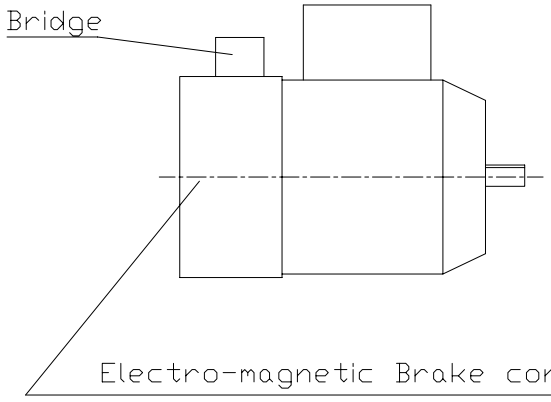
TOLERANCE

>0	±0.1
>6	±0.2
>30	±0.3
>120	±0.5
>315	±0.8
>1000	±1.2

UNIT NO.	MATERIAL	TITLE
QUANTITY		SCALE
	PART NO.	DR4DK4000A01-04

CHECK APPROVE	
DRAWING DESIGN	
NAME	AMAY20110222

Tool Magazine Motor external view



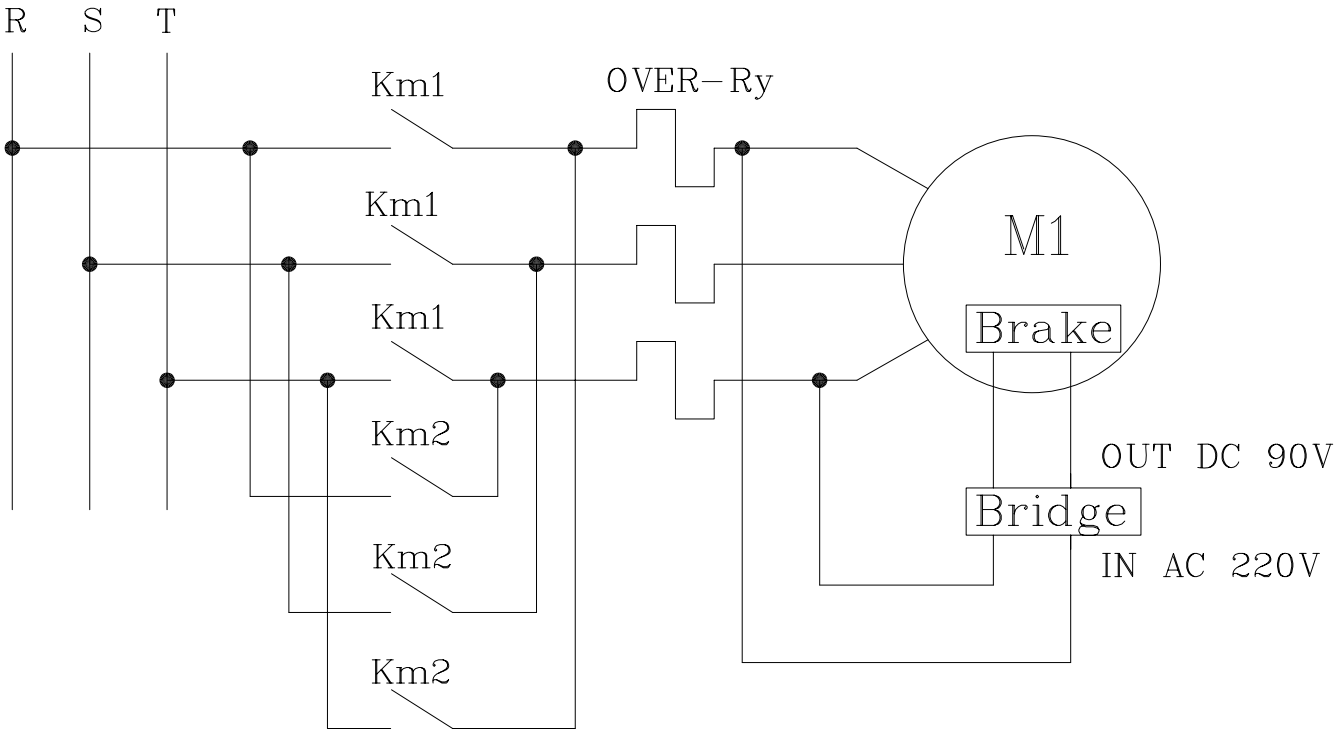
Tool Magazine Motor Electrical Specification:

1.Horse Power:	1/4HP	6.Insulation Resistance:	100M
2.No.Of Poles:	4P	7.No Load Current:	0.68A
3.voltage:	60HZ,220V	8:Full Load Current:	1.2A
4.Rotational Speed:	1720R.P.M.	9:Brake Gap:	0.3~0.35mm
5.Hi Pot:	1800VA.C		

A.The tool magazine motor is a 1/4HP three phaese induction motor with electro-magnetic brake (Power Off Braking).

wiring diagram as follow

AC 415V 3 phaes



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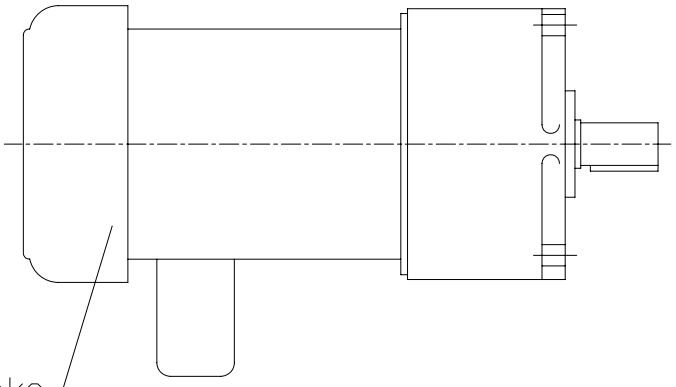
deta INTERNATIONAL #40 DISK TYPE CAM BOX MOTOR WIRING DIAGRAM

MOTOR EXTERNAL VIEW



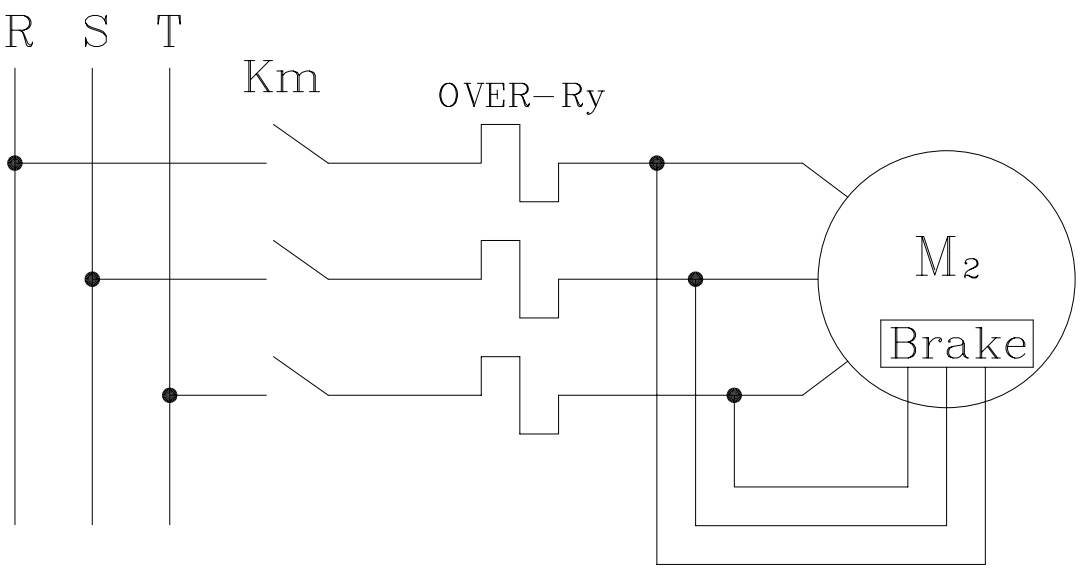
Electro-magnetic Brake
concealed inside

Cam box Motor Electrical Specification:

1.Horse Power:	3/4HP
2.No.Of Poles:	4P
3.voltage:	60HZ,220V
4.Rotational Speed:	1720R.P.M.
5.Hi Pot:	1800VA.C
6.Insulation Resistance:	100M
7.No Load Current:	1.15A
8:Full Load Current:	2.8A
9:Brake Gap:	0.25~0.3mm

Note:Electro-magnetic Brake Ivolage and Motor Voltage are the equal.

WIRING DIAGRAM AS FOLLOW
AC 415V 3 PHAES



NO:	TOLERANCE	
D4-02-03 2001/12	>0 ±0.1 >6 ±0.2 >30 ±0.3 >120 ±0.5 >315 ±0.8 >1000 ±1.2	

UNIT NO.	MATERIAL	TITLE
QUANTITY		SCALE
PART NO.	DR4DK4000A01-05	
CHECK APPROVE		
DRAWING DESIGN	AMAY20110222	
NAME		

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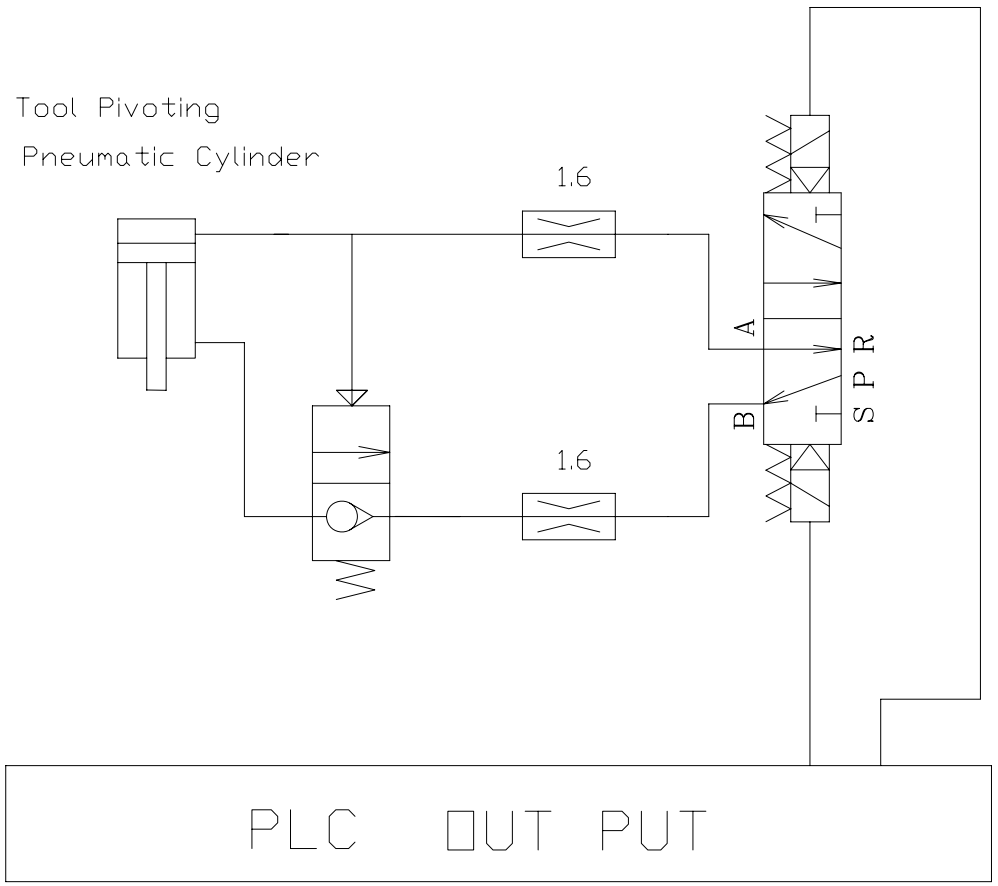
deta INTERNATIONAL DISK TYPE PNEUMATIC CIRCUIT DIAGRAM

1.We suggest using Double Exciter Electro-magnetic Valve (Voltage DC24V) with 5 openings at 2 locations. This is because during power failure, the pneumatic cylinder will not result in an unexpected movement.
2.Prior to POWER ON for the whole machine, please fill the pneumatic cylinder with air first, but no movement for the pneumatic cylinder. This is to prevent any danger caused by tool pivoting too fast at the first time used.



Note:Pneumatic Tube: 10mm

NO:		TOLERANCE	
D4-02-03 2001/12		>0	±0.1
		>6	±0.2
		>30	±0.3
		>120	±0.5
		>315	±0.8
		>1000	±1.2

UNIT NO.	QUANTITY	MATERIAL	TITLE

PART NO.	SCALE
DR4DK4000A01-06	

	CHECK	APPROVE
DRAWING	DESIGN	
NAME	AMAY20110222	

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4、Electrical Control Protection Programming:

(1) As Cam box and the tool magazine move extremely fast, the control program for all motor relays, sensors, and the I/O port of electromagnetic valves should be written on PLC Level 1 of the controller (where SCAN TIME reacts faster). This is to prevent the electronic control from having over slow reactions and causing the machine to make wrong movements.

(2) In the proceeding of tool changing, each movement has to be confirmed for its completion before continuing with the next movement. (Refer to the tool-changing flowchart diagram)

(3) Do not topple the tool if the sensor for the positioning of the tool magazine is not confirmed (i.e. LS4 is ON).

(4) Do not start the motor of the tool magazine or rotate the tool palette if LS2 is OFF in the proceeding of tool tilt and LS1 is ON before confirming the completion of tool tilt.

(5) Do not change the tool if tool tilt is not confirmed (i.e. LS1 is ON).

(6) Do not change the tool if the spindle of the machine has not returned to the tool changing position.

(7) Do not change the tool if the spindle orientation has not been completed.

(8) Do not move the spindle head if the arm has not return to its home position.

(9) Overload protection relay should be activated when overloading, so that the motor will not be burn off.

(10) The amperage of the motor's current has to be below the motor's full load current.
1/4 Hp: 1.2 A; 1/2 Hp: 2 A; 1 Hp: 3A ;1.5HP:4.4A (at 60Hz)

5、Installation Procedure:

Before installing our disk type tool-changing system, you should read this section carefully and understand it completely before proceeding with the installation procedure.

Adjustment of the arm and the tool magazine was done before the product left our factory, users do not have to spend time to work on it. Hence, users could treat the tool magazine, the tool-changing mechanism and the tool arm as a complete unit without having to do any adjustment when installing our Disk Type Tool Changing System. But the tool-changing point of the spindle and the tool-changing point of the arm have to be accurately adjusted.

The tool-changing point of the spindle and the tool-changing point of the arm have to be accurately overlapped, so that tool-changing movements will be smoothly carried out under normal usage without any collision noise. If the adjustment is inaccurate, not only tool-changing movements will not be smooth but it will also produce collision noises, which will have harmful effect on the life span of the tool. Hence, the only important point for installing our Disk Type Tool Changing System is “to overlap the tool-changing point of the spindle and the tool-changing point of the arm accurately”. We recommend users to follow the installation procedures below:

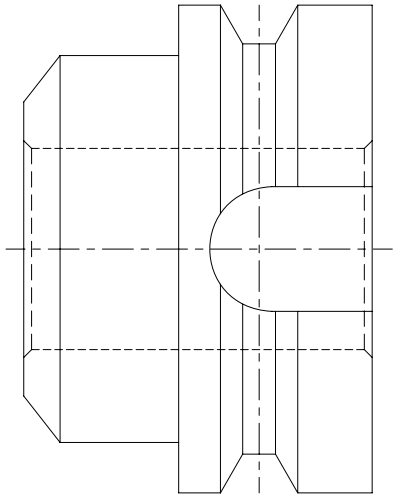
(1) Make an interfacing bracket as we have suggested, and lock it onto the vertical column after confirming the bilateral perpendicularity geometrical tolerance between the vertical column interface and the tool magazine interface.

(2) Make a three-stages tool-calibration fixture as we have suggested. (As per attached drawing)

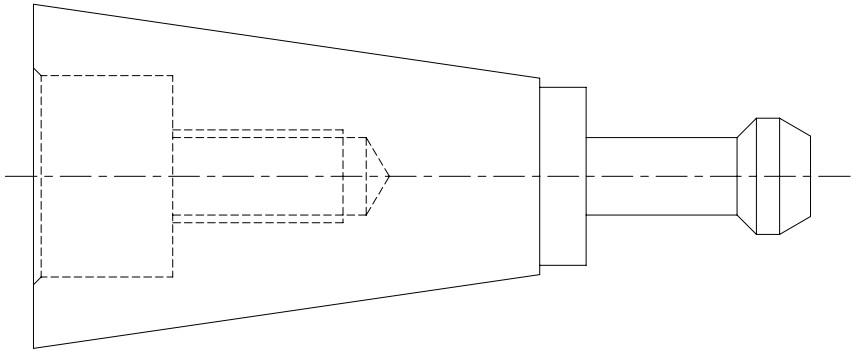
(3) Lock the disk type tool-changing system onto the interfacing bracket. Put the two rest blocks closely on the top of the interfacing bracket and ensure the horizontal accuracy is kept.

(4) Move the Z-direction of the spindle to the highest point.

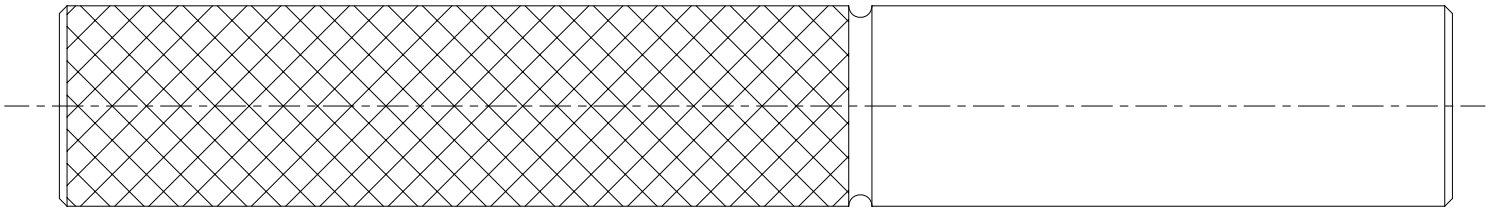
(5) Put adjustment fixture A into the spindle for the spindle to grip and let the tool-changing arm grip adjustment fixture B. Press and release the brake, which is on top of the tool-changing mechanism motor. Then use a hexagonal spanner to turn the screw, which is



FIXTURE B



FIXTURE A



FIXTURE C

				UNIT NO.	QUANTITY	MATERIAL	NO: D4-02-03 2001/12	TOLERANCE
								>0 ±0.1 >6 ±0.2 >30 ±0.3 >120 ±0.5 >315 ±0.8 >1000 ±1.2
deta International		DRAWING DESIGN	CHECK APPROVE	PART NO.	SCALE	TITLE		
TEL:886-4-25617722 FAX:886-4-25617177	NAME	AMAY20110131		DR4DK4000A01-07				

located at the top center of the motor, until the tool-changing mechanism reaches the tool-clipping position. (Keep turning the screw on top of the tool-changing mechanism motor, and the tool-changing arm will remain fixed for a period of time. This will ensure that the tool-clipping position has been reached).

(6) Use a level to adjust the interfacing bracket so that the tool-changing arm is perpendicular to the spindle.

(7) Move the Z-direction of the spindle to about 2mm from the top of the predicted tool-changing point.

(8) Adjust the X- and Y-direction of the tool-changing system so that the X- and Y-coordinate of the tool-changing points for the tool-changing arm and the spindle overlap. If adjusting the Fixture C allow it to pass through the Fixture B and entering the internal hole of the Fixture A that means the X and Y direction adjustment is completed.

(9) Measure the Z-direction coordinate for the tool-changing point of the down to approximately 0.3~0.5mm above the Z-direction coordinate of the tool-changing point for the tool-changing arm (the ideal distance would be 1/2 of the spindle clamp distance). And set this point as the coordinate for the tool-changing point. Again, use the hexagonal spanner to turn the screw on the top center of the motor in the opposite direction, until the tool-changing mechanism returns to its home position.

(10) Change the tool manually first, to check that the movements of tool pot toppling, the tool-changing mechanism performing the tool-change, the spindle catching and releasing tools, … etc coordinate well together without any error, then proceed with CNC automatic sequence program control. After trial tool-changing several times and making sure that no bad phenomena appear, the positioning pins can be fix into positions between the tool-changing system and the interfacing bracket, and between the interfacing bracket and the vertical column, respectively.

(11) Connect the circuit for electronic control, pneumatic valves, and pneumatic source according to the wiring diagram.

(12) Pour the hi-grade of circulation oil into the tool-changing mechanism until the surface of the oil can be seen from the oil-viewing window

6、Original Setting:

(1) The gap between the tool magazine orientation and the counter sensor (M12) and the sensor block should be adjusted to between 0.8~1.0 mm.

(2) The gap of tool magazine motor's brake pad should be adjusted to between 0.2~0.35 mm.

(3) The gap between the sensor (Φ4) on Cam box tool-changing mechanism and the sensing block should be adjusted to between 0.4~0.5 mm.

(4) The gap of Cam box motor's brake pad should be adjusted to between 0.25~0.35 mm.

7、Troubleshooting:

7-1. Unstable tool tilting:

We have made the best adjustment to the disk type tool-changing system before our product left our factory, and we would suggest users not to do any random adjustment. If tool tilt is unstable due to the transportation or human error, please follow the procedures below to check and make adjustment:

(1) Check whether the pneumatic source conform to the power supplying specification (refer to the section on the electrical control's power supply specification).

(2) Check whether the tool tilting mechanism has any damage to it. If so, please contact us and we will send someone over to repair it.

7-2. Tool Calibration Procedure

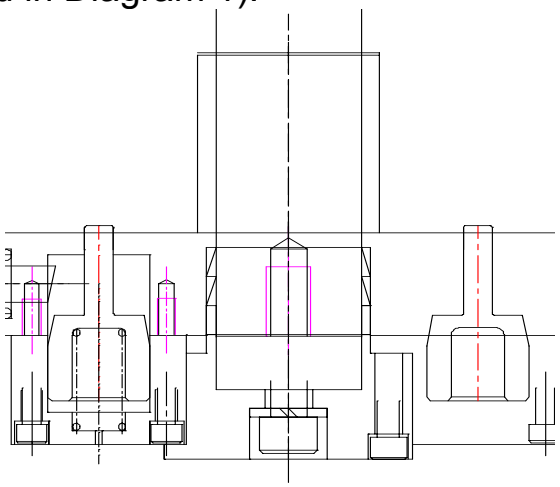
Please adjust the arm as following procedure when need:

(1) Use an overhead crane to lift the Cam box and inspect it externally for any flaw.

(2) Use M12×50L + spring washer + flat washer to fasten the Cam box onto the datum surface of the tool magazine's main structure, and pull the Cam box to the elongated holes on the outside.

(3) Open the power distribution box of the Cam box and connect it to the power supply of the electronic control box. Check to see if there is any abnormal phenomenon in the operation of the Cam box.

(4) Tighten the nut and sun washer on the Cam box shaft ◦ (as illustrated in Diagram 1).



(5)Use M5×35L bolt + spring washer to fasten the packing rings on the tool-changing arm, but do not tighten it temporarily.

(6) Sequentially insert the separation ring for the tool-changing arm and put the tool-changing arm into the Cam box axis, and fasten M12×35L bolt + spring washer onto the tool-changing arm with a bit tightness around the axis and without any gaps.

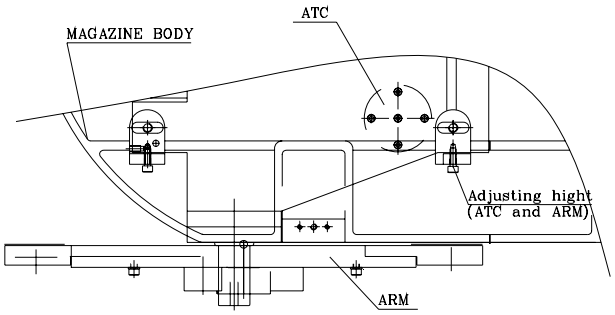
(7) Supply electrical power to Cam box to allow the Cam box axis to rotate to the tool-clipping angle.

(8) Use the three-point tool calibration fixtures to adjust the position of the tool-changing arm. The adjustment method is to insert Fixture

A into the tool pot, and Fixture B is placed at the tool clipper and coupled with the protuberance, but the tool pusher clip has to be placed into the arm first. Then, re-adjust the Cam box position, so that Fixture C can go through Fixture A and Fixture B and reach the arm at the position of the tool-clipping point, and line up with the center of the tool pot.

(9) Tighten the Cam box on the magazine with 4.M12X12L screws ◦

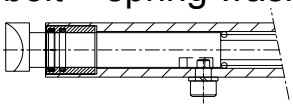
(10) Check the clearance between the flange of the clip and tool flange ,if the toper cleanses is equal to lower cleame are the same ◦ (the cleame is 0.8mm for BT and that is 0.2mm for CAT and DIN Tool shank)if the toper cleame is not equal to lower clew , one nut move the above set of Cam box and arm up or down ◦ (as illustrated in Diagram 2).



(11) In the process of tightening, use magnetic holder to hold the leveler on the Cam box. The pointer of the leveler should touch the tool clipper near the outer rim. Repeat the height measurement for both ends of the tool clipper, where the height at both ends should be within 0.1mm of difference.

(12) Place the tool pusher clip spring onto the end of the tool pusher clip, and after smearing some lubricating oil, fit it into the tool-changing arm. Fix M8 anti-revolving bolt + spring washer to the arm (as illustrated in Diagram 3).

(13) Turn the manual bolt behind the Cam box motor, so that the tool-changing arm descends about 50mm. Apply lubricant on the safety pusher pin of the tool-changing arm and then insert it into the lubricated spring of safety pusher pin. Then, insert the safety pusher pin into the tool-changing arm and fasten it with M5×35L bolt + spring washer (as illustrated in Diagram 1).



(14) After fastening the parts for the tool-changing arm, try several times to make sure that the safety pusher pin can spring upwards freely, and test to see if tool-changing movement is working properly by putting a tool into the tool pot.

7-3. When the tool palette not turning smoothly:

(1) Please check to see if there is any foreign object got stuck to the Geneva wheel or drive shaft (refer to the assembly drawing and part list). Please eliminate it.

(2) Please dismantle the motor and then electrify the motor, so it operates independently. Check to see if it rotates smoothly without any noise.

(3) If after going through above inspections without eliminating the breakdown, please contact our company.

7-4. When the tool arm motion not smooth:

(1) Please check to see if there is any damage to the tool-changing arm. If there is, please contact our company to have the parts replaced.

(2) Please check the tool-changing mechanism and main structure of the tool magazine to see if there is any change to the locking position (Check to see whether there is any damage to the positioning pin or it has already been shear off. If there is, please contact our company to have the parts replaced.

(3) Please check whether there is any loose movement between the tool-changing arm and axis of the tool-changing mechanism. If there is, please stop the machine and cut off the power supply and loosen the screw on top center of the motor with a hexagonal spanner until the tool-changing mechanism reach the tool clipping position. Push the tool-changing arm upward to the end and clip on the tool that has toppled down, then calibrate both end of the tool-changing arm so they are within (0.1mm) in height, (Refer to tool calibration procedure)

(4) Be sure not to self dismantle the tool-changing mechanism, if there is any breakdown, please contact our company.

7-5 When the tool-changing speed is too slow:

(1) Please check whether the motor produces any strange noise

(2) Please check whether the power supply conform to the specification.

(3) Please check whether the speed of spindle clamping and unclamping complies with the requirement.

(4) There is any other breakdown, please contact us.

7-6. Sudden power failure during the course of tool change by the tool-changing arm

(1) For short period of power failure, please re-start the machine, and manually return the tool-changing arm to its original position.

(2) For long period of power failure, please release the motor brake, rotating the tool-changing arm to its original point location by using a spanner to turn the spindle on top of the Cam box motor, and ensure the safety of the machinery by forcing the tool pot to return the tool.

8、Maintenance:

(1) The circulation oil inside the tool-changing mechanism should be changed after 2400 hours of continuous usage. And the oil level has to be checked non-periodically. A refill is in order if the oil falls below the required level.

(2)Check and see if there is still some lubricating oil in the bearing every three-month.

(3)If the brake for the tool-changing mechanism's motor and the tool magazine's motor reached the end of their useful life, please contact our company for adjustment or replacement.

Thank you for using our products. Please inform us if there is any defect so that we can make improvements and offer you more stable and better quality products.

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