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1. BASIC MACHINE INFORMATION

Bed type mill and machining center are high precision and CNC controlled machine. Therefore, before operating this type of the machine, please read this manual carefully, and make sure you have the knowledge to operate this machine properly. If you have any question, please contact our local distributor. We will answer your question promptly.

1-1. Machine Specification

Model Number	
Table Size	14" x 54"
T Slot Dimension	5/8" x 3 x 3 1/2
Travel: X Axis	40"
Y Axis	22.44"
Z Axis	20"
Spindle Nose to Table Top	4"~24"
Spindle Center to Column Side	22.83"
Spindle Taper	CAT #40 or BT #40
Spindle Speeds	80~8,000 rpm
Table Travel Speed (X, Y, Z)	320/320/272"
ATC (Arm type)	20 Standard; 16/24 Optional
Spindle Power Rated	10 HP continuous/15 peak 30 min.
Coolant Pump	1/8 HP
Max Table Load	1,980lbs
General Specification : Total Power Rated	Max. 24HP@90A
Air Pressure	96 psi
Operating Area Req.	144" x 115" x 103"
Foundation Area Req.	130" x 96" x 94"
Net Weight	8,360 lbs
Gross Weight	8,500 lbs

1-2. Accessories of the Machine

1-2-1. Standard Accessories

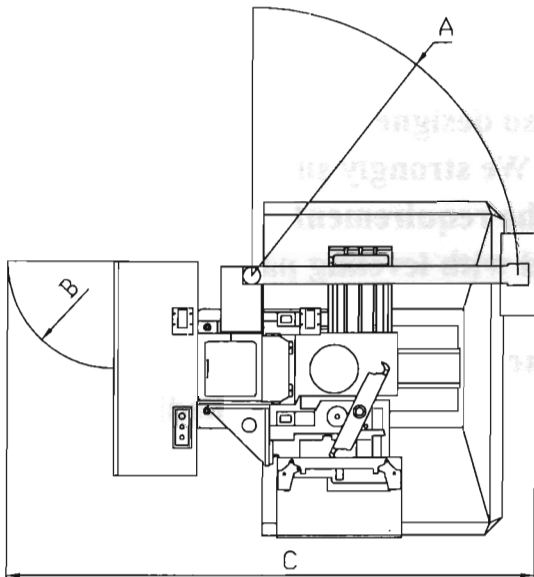
- a. Coolant system**
- b. Three axes C5x2B ball screw**
- c. Automatic lubrication system**
- d. Column side guard (2 pcs)**
- e. Halogen light**
- f. Leveling pads & screws**
- g. Tool box w/ tools**
- h. Chip pan**
- i. Three axis CNC control**
- j. Rigid tapping**
- k. Operational & electrical manuals**
- l. Tabletop splash guard**
- m. Y axis front & back steel telescopic way cover**

1-2-2. Optional Accessories

- a. Rotary table 6", 8", 10"**
- b. Tool holder and pull stud**
- c. Tool locking base**

1-3 Floor Space of Machine

Shown with Optional Accessories



A	71"	1800mm
B	27.55"	700mm
C	121"	3075mm
D	22.83"	579mm
E	100.4"	2550mm
F	20.47"	520mm
G	54"	1372mm
H	24"	610mm
I	32.28"	820mm
J	26.37"	670mm
K	137.8"	3500mm

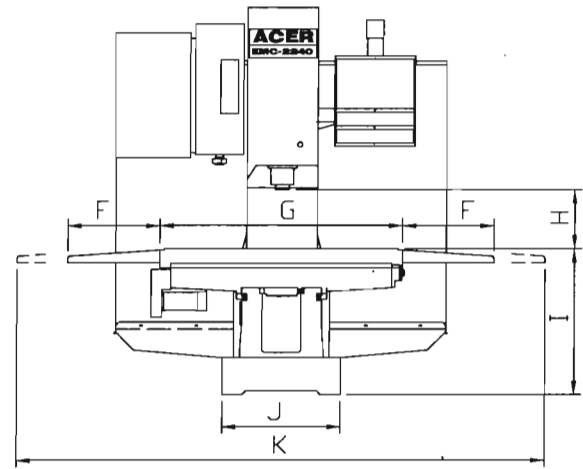
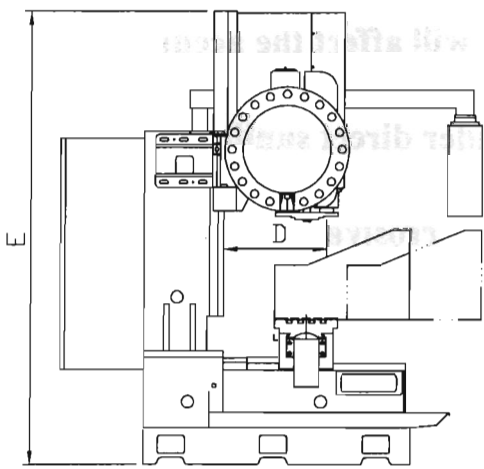


Figure 1

2. INSTALLATION

2-1. Machine Foundation Requirement

Incorrect foundation will affect machine's accuracy. Only correctly done foundation will avoid machine vibration, reduce machine malfunction, and loosening level of the machine. All these will contribute to machine's machining accuracy.

Various name-brand machine has a different control and is also weighed differently. The fact is they are also designed differently. Therefore they need a different foundation. We strongly suggest customers to build the foundation according to the requirement (shown on fig. 2 & 3). All new machines, we have supplied with leveling pads and screws. They are used to level the machine, and reduce the vibration. All accessories are shipped with the machine. Please check for any missing items and contact your distributor for replacement immediately.

2-2. Installation & Its Site

To prolong the life of the machine and its accuracy, please carefully select the proper installation site. The criteria are:

- a. Find the site where there is vibration-free and there is no power shortage. Please avoid install the machine around press, shaping machine etc. They will affect the accuracy and surface finish of the work piece.**
- b. Never install the machine under direct sunlight or where humidity is high.**
- c. Avoid the site where there is corrosive powder and mist.**

2-3. Level & Leveling Screws

The method of building the foundation is as figure 2. Please build the foundation 15 days before machine arrive. The procedure is as follow:

- a. Check the foundation map before digging.**
- b. Dig the foundation area to the proper depth, flatten it, fill it with rocks, and use rubbles to fill the gaps.**
- c. Make the screw molds for selected leveling screw area. Make sure they are not out of straight or penetrate out of shape.**
- d. Concrete mix ratio is 1:2:4 (concrete: sand: small rubbles)**

They need to be mixed thoroughly, and make sure the concrete mix has the right elasticity and color content.

- e. Before pouring in the concrete mix, place the screw molds in place. They are prepared for J type locating screws.**
- f. After concrete solidified, you may remove the molds. In summer, the time required for concrete to solidify is 4~5 days, and in winter, it is 8~10 days.**
- g. When the machine is shipped to the location, install the J type locating screws through leveling screws and screw on the hex nuts, then slowly settling down the machine on the foundation site. Be sure to match each J screw position before completely lowering down the machine.**
- h. After adjust each J screws' length to 6" above the ground, the concrete can be poured into the J screw positions.**
- i. After the concrete is solidified, you may then adjust the level of the machine.**
- j. Machine level in X and Y axes has to be within 0.0004/12" or better.**

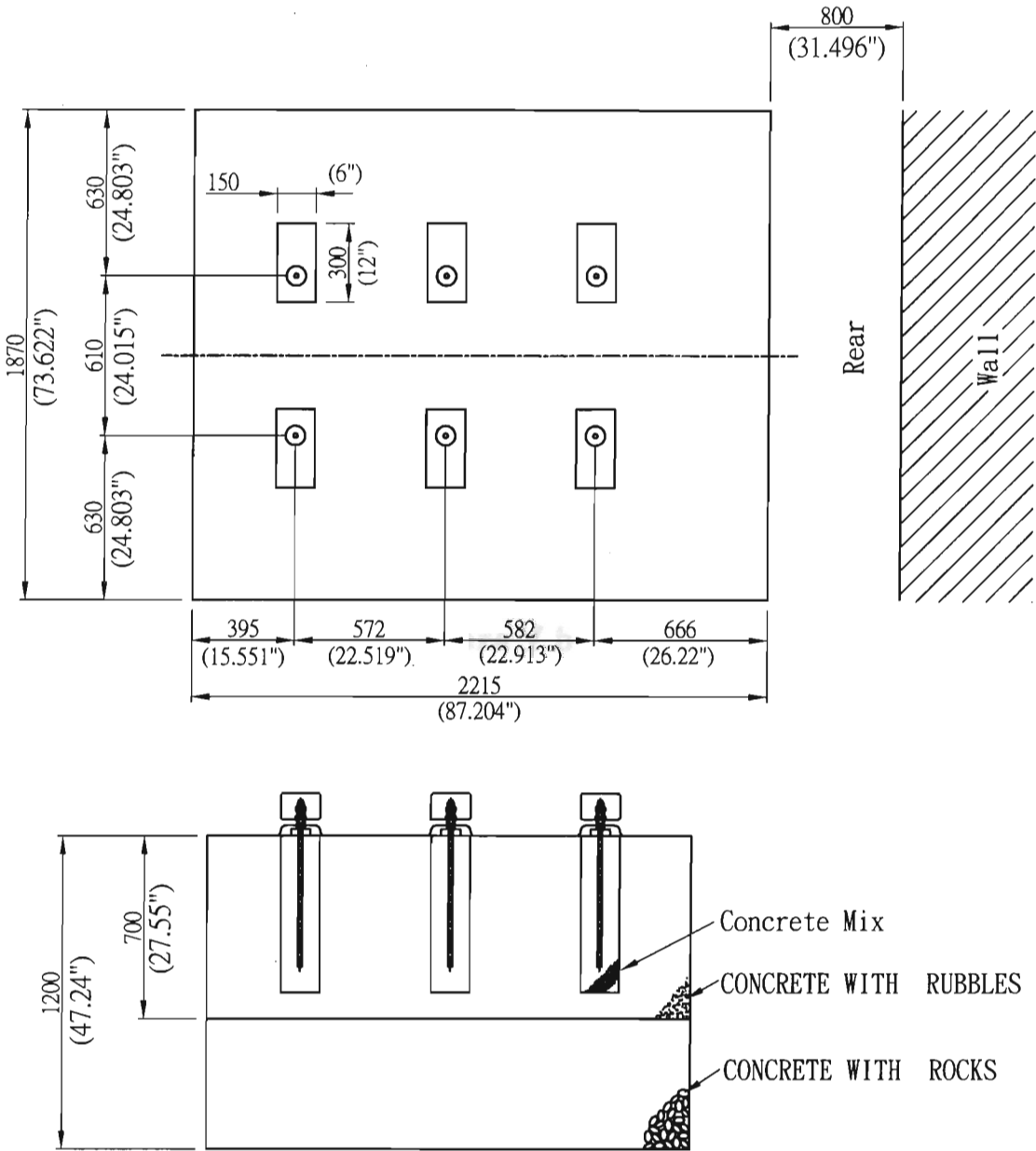


Figure 2

FOR INCH DIMENSION ,THE VALUE IS SHOWN IN PARENTHESIS.

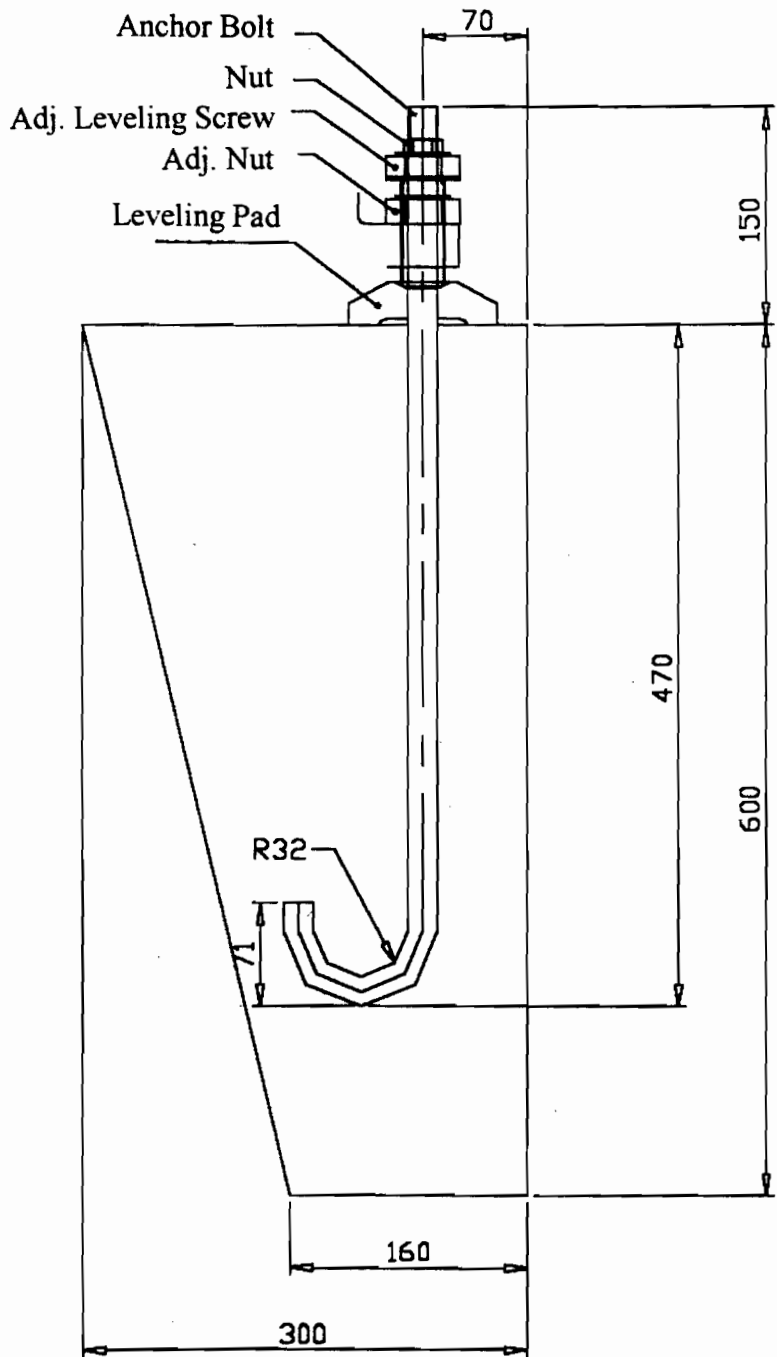


Figure 3

3. MACHINE PACKAGE & ITS METHOD

To make sure quality and accuracy of the machine are maintained. Before machine is shipped out, we carefully inspect packaging procedure and check the final packaging pallet. Until they are done properly, we will not ship it out.

Package Method Before Shipping:

On the pallet, a PE plastic bag is set on top of it. Then the machine is lowered on the pallet, and is screwed tight onto the pallet. Before the PE plastic bag is wrapped up, absorbent bags are placed and machine is sprayed with cosmoline. Please see the following picture for sample.

To reduce the vibration when shipping, all movable items are fixed and screwed at a particular position. The positions are as follow:

- a. Table is fixed to rear right side of the saddle.**
- b. Z axis is fixed by the wooden block under the spindle housing.**
- c. Balancing block is tighten at column and to the bottom of the base.**
- d. Automatic tool changer is located at left side of the column.**
- e. Control box is support on top of the pallet with wooden frame.**

To make sure all locating fixtures are released, please carefully inspect the machine before operating the machine.

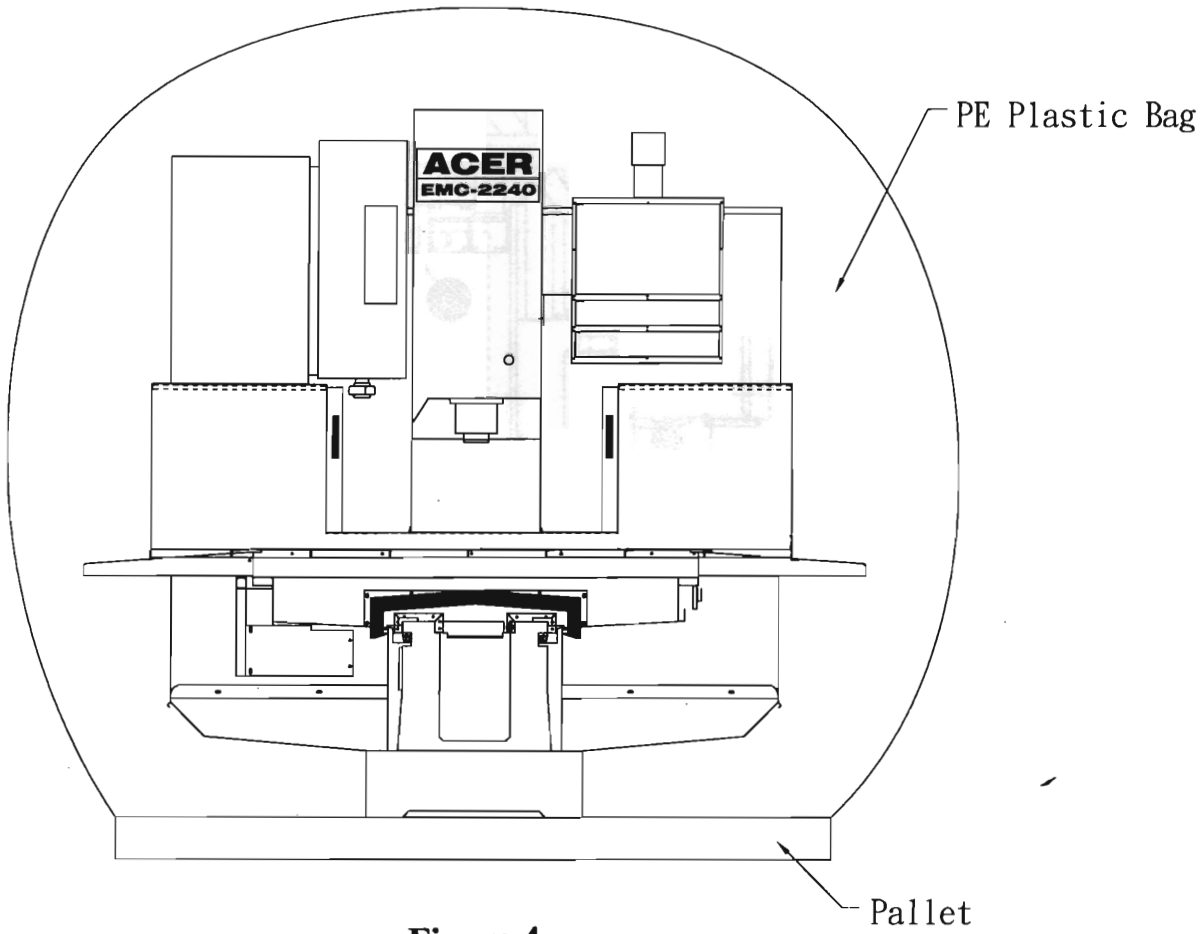


Figure 4

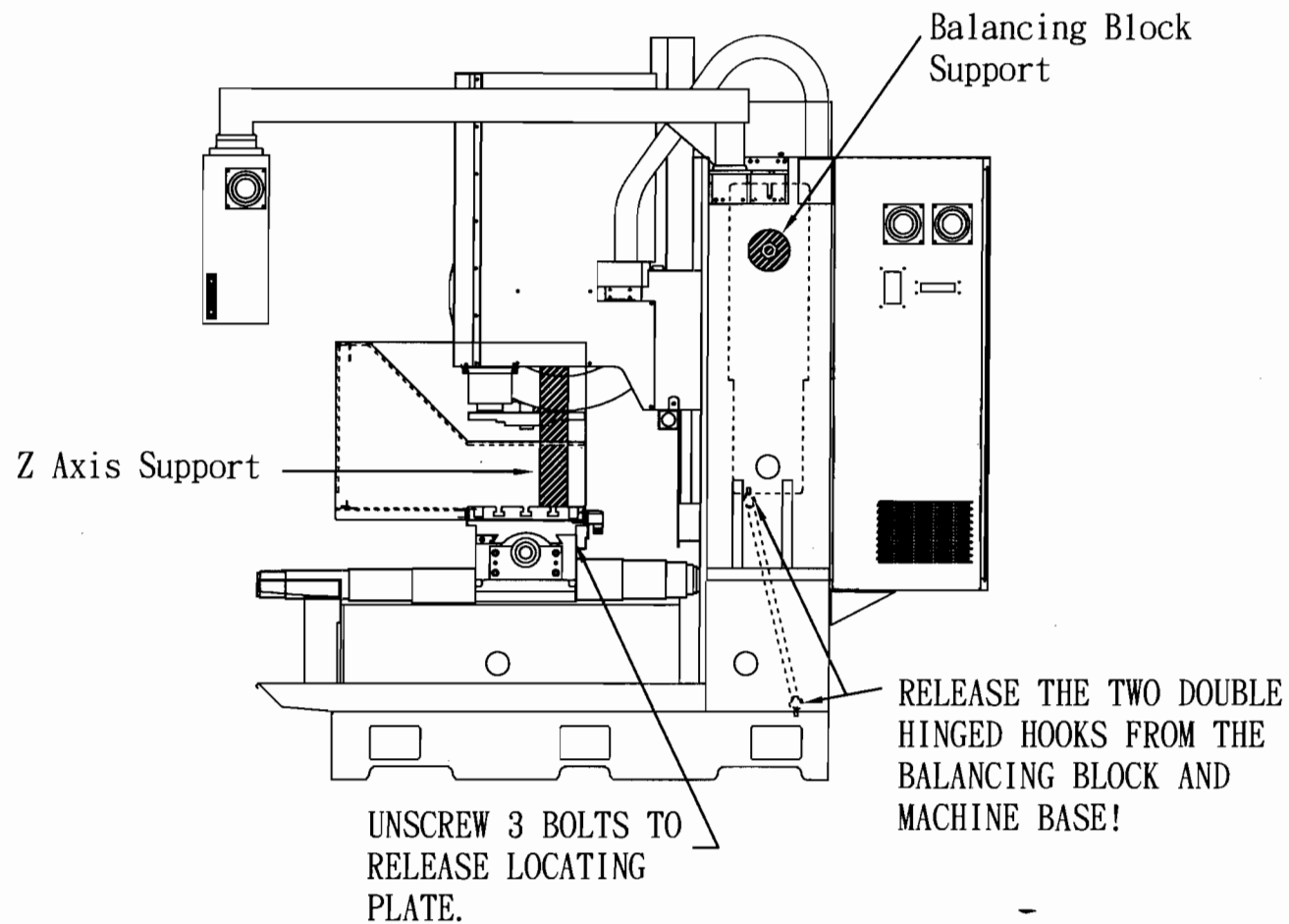


Figure 5

4. UN-PACKAGING & INSTALLATION ON SITE

When the machine arrives to the site, unscrew the locating bolts and nuts before lifting the machine. Transporting the machine onto the site is very dangerous. So please follow the instructions below:

- a. Before settling the machine, make sure the locating plate and bolts are not taken off.**
- b. On the way to transport the machine to the site, make sure there is no obstacle or make sure all personnel are out of the way.**
- c. After removing from the pallet, the transporting equipment must have a capacity over 9,000 lbs to move or lift the machine.**
- d. When lifting, the machine must stay balanced. It might tip over and damage the machine if it is not balanced.**
- e. When transporting, do not vibrate the machine too much. Vibration will cause the machine to lose its accuracy.**

Installation of machine:

Depending on the term, customer can request help from the factory or distributor. Both of them can help the installation and train the customer.

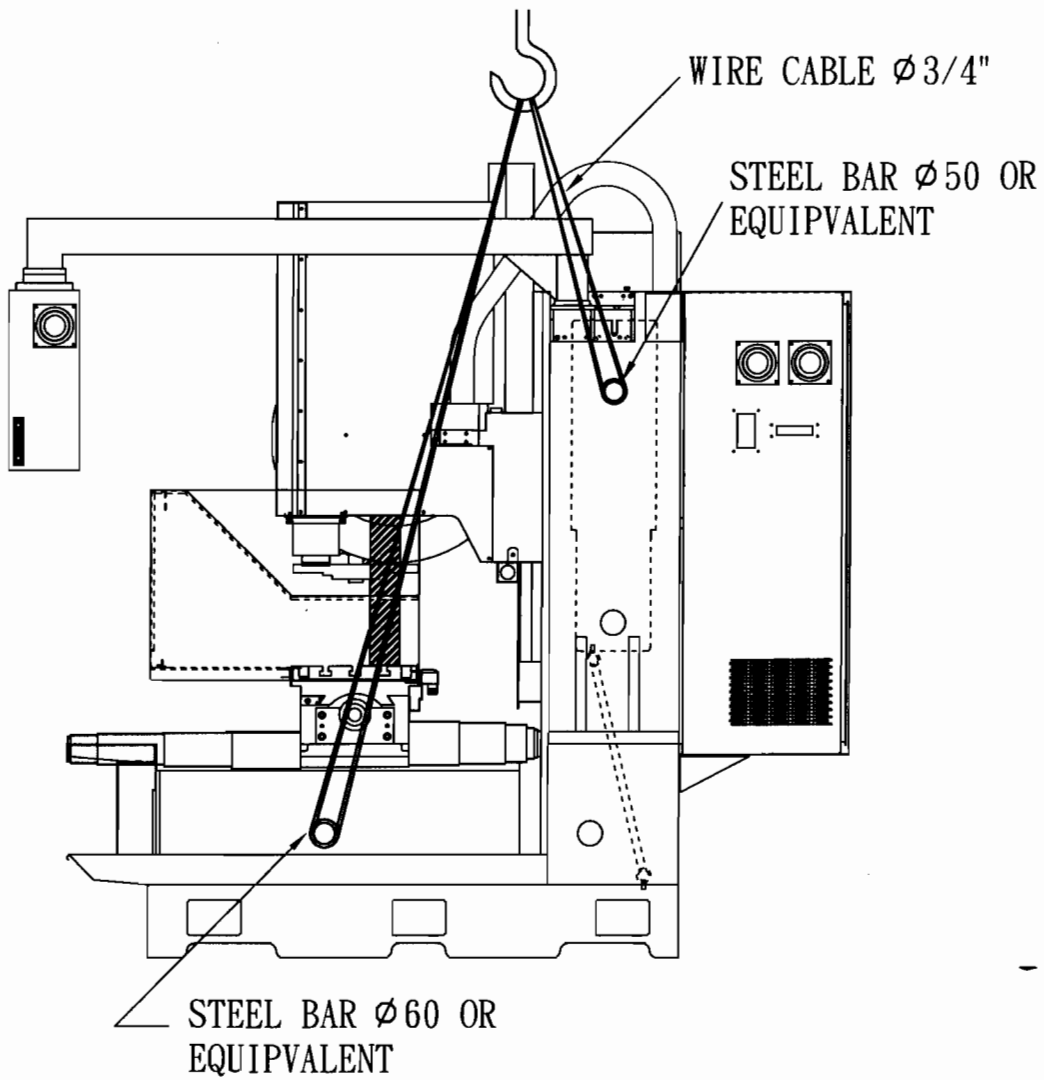


Figure 6

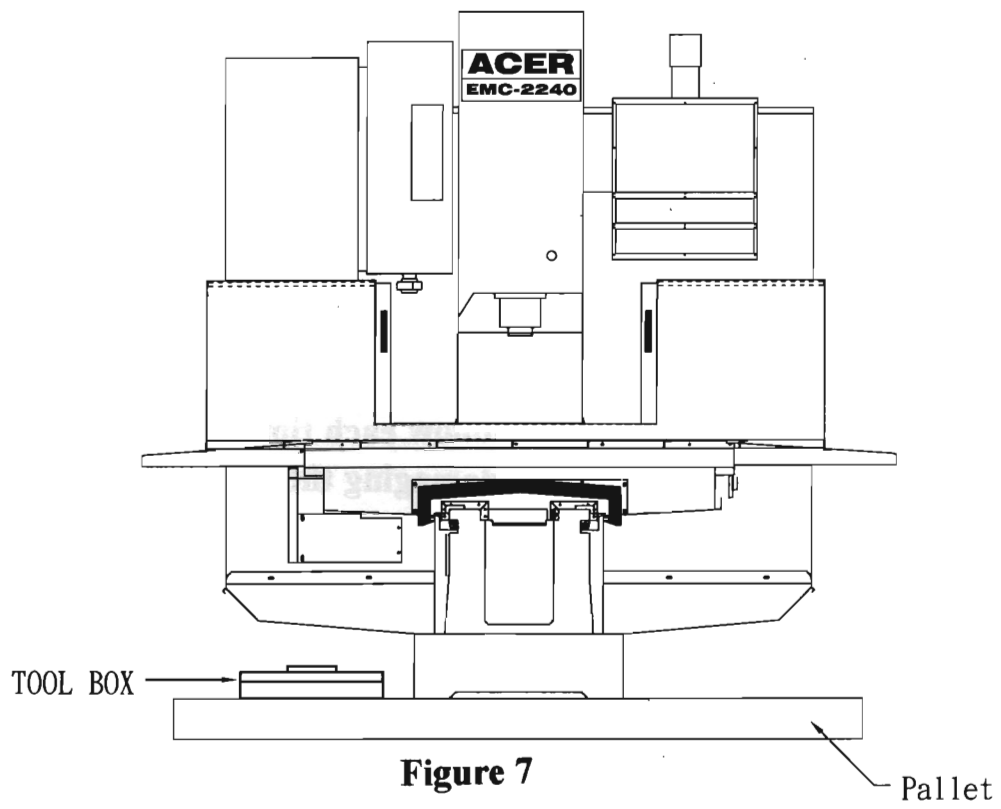


Figure 7

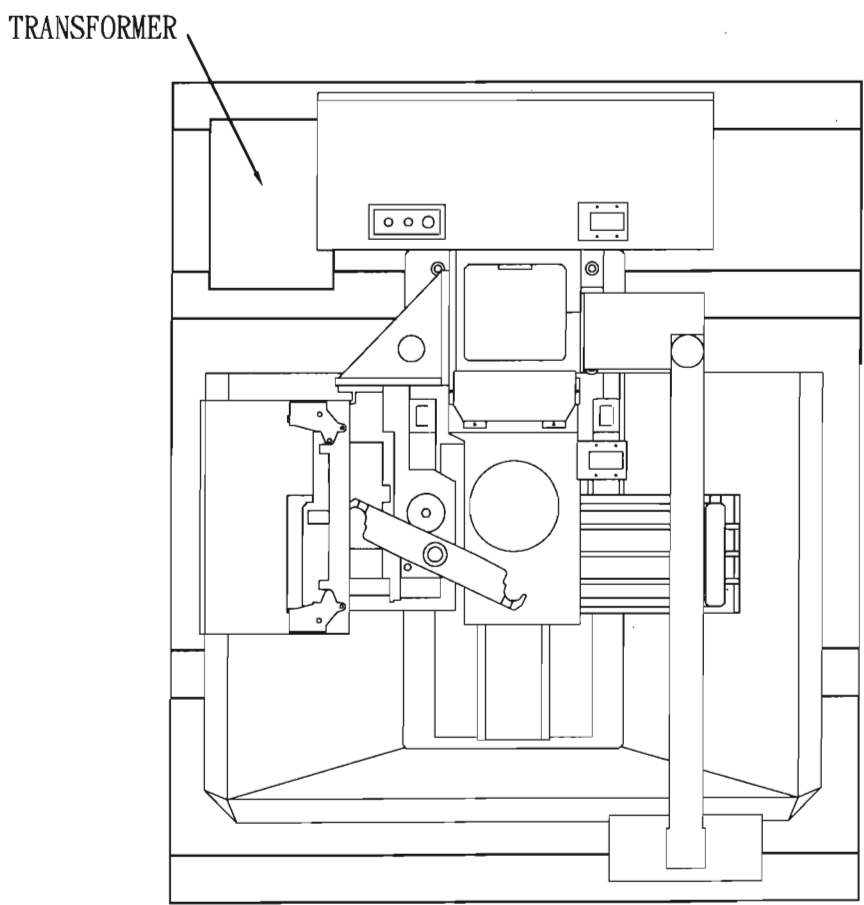


Figure 7-1

5. PROCEDURE BEFORE INTIAL OPERATION

To increase operation efficiency and maintain machine accuracy, please check the following points:

- a. Is power source within 10 % of 230V or 460V?**
- b. Is compressor pressure within specification?**
- c. All locating plate and bolts are removed?**
- d. Are all cosmoline cleaned?**
- e. Are all movable items removed from the machine?**

The above instructions must follow each time before operation. This is done to reduce the chance of damaging the machine, and might otherwise hurt the operator also.

6. PREVENTIVE MAINTENANCE

6-1. Everyday maintenance:

- 1. Check the oil level of lubrication pump. Add more if it is below low level. (Note: buzzer will also sound when oil level is low!)**
- 2. Check all lubrication points to see if oil is present.**
- 3. Check compressor pressure to be 96 psi.**
- 4. Check all air hoses for leaking. Must fix the air leak if it is found.**
- 5. Check oil level of air filter gauge. Add if not to the level.**
- 6. Remove all movable items from the machine to reduce the chance of damaging the machine and operator.**
- 7. Check coolant system to see if it is operational?**
- 8. After each day's work, clean the machine and lubricate all moving parts.**
- 9. Spindle taper must be clean and lubricated each day.**
- 10. If any false signal is present, please stop the machine and repair the machine immediately.**

6-2. Weekly maintenance:

- 1. Please use clean rags or paper towels to clean halogen light and control panel to keep them readable.**
- 2. Use water based solvent to clean air filter. This is to keep air pressure normal and machine operational.**
- 3. Make sure spindle taper is smooth and chip-less.**
- 4. Check all lubrication points and lubrication pump to see if they are function normally.**
- 5. Make sure ATC exchange movement is smooth.**

6-3. Six month maintenance:

- 1. Check taper run-out of spindle to see if it is still within accuracy.**
- 2. Check all machine's screws and nuts to see if they are still tight?**
- 3. Check the tightness of the gibs. Are they still within specification?**

- 4. Inspect all electrical terminals and wires. Make sure they are normal and functional. Clean the dust within the electric cabinet.**
- 5. Inspect the servo drive and its parameters. Make sure they are adjusted.**

6-4. Yearly maintenance

- 1. Check all electric components on the control panel to see if they are still sensitive.**
- 2. Remove all carbon deposit on the magnetic contactors.**
- 3. Check balancing block mechanism. Are they functional?**
- 4. Replace coolant liquid with new one to ensure machining accuracy.**
- 5. Clean and replace lubrication pump's oil reservoir with new waylube oil.**
- 6. Check leveling and adjust the machine to maintain machine accuracy.**

6-5. Points to watch on doing maintenance

- 1. All scheduled maintenance must exercise and recorded.**
- 2. During mechanical maintenance such as gibs adjustment, etc., all power must be shut-off to prevent accidental injury.**
- 3. When inspecting servo drive boards outside of their sockets, do not supply power. It might cause servo motor to rotate in its high speed state and cause injury.**
- 4. In any unable maintenance situation, please contact authorized distributor or manufacturer.**
- 5. Before doing any maintenance work, user must concur with manual to disconnect power or not. This is to reduce accidental injury.**

7. LUBRICATION SYSTEM

7-1. Lubrication of the machine

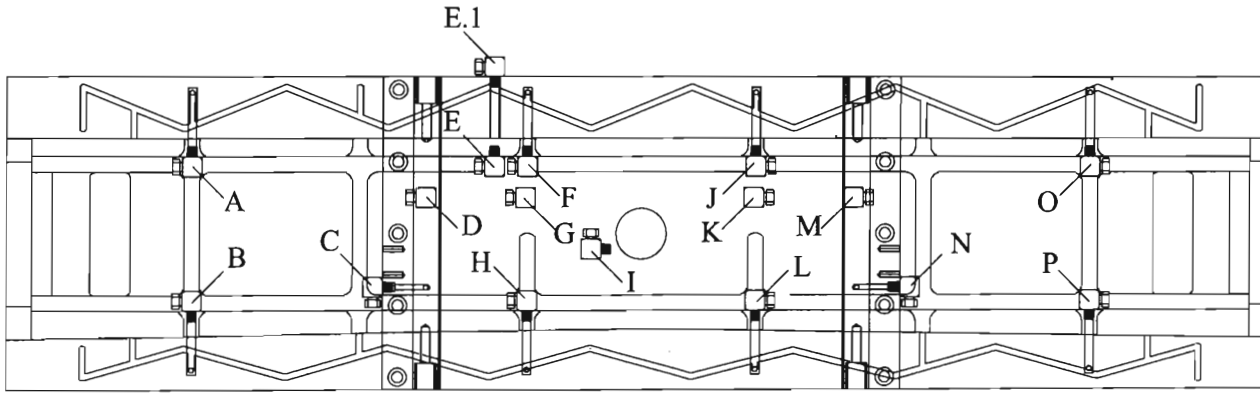
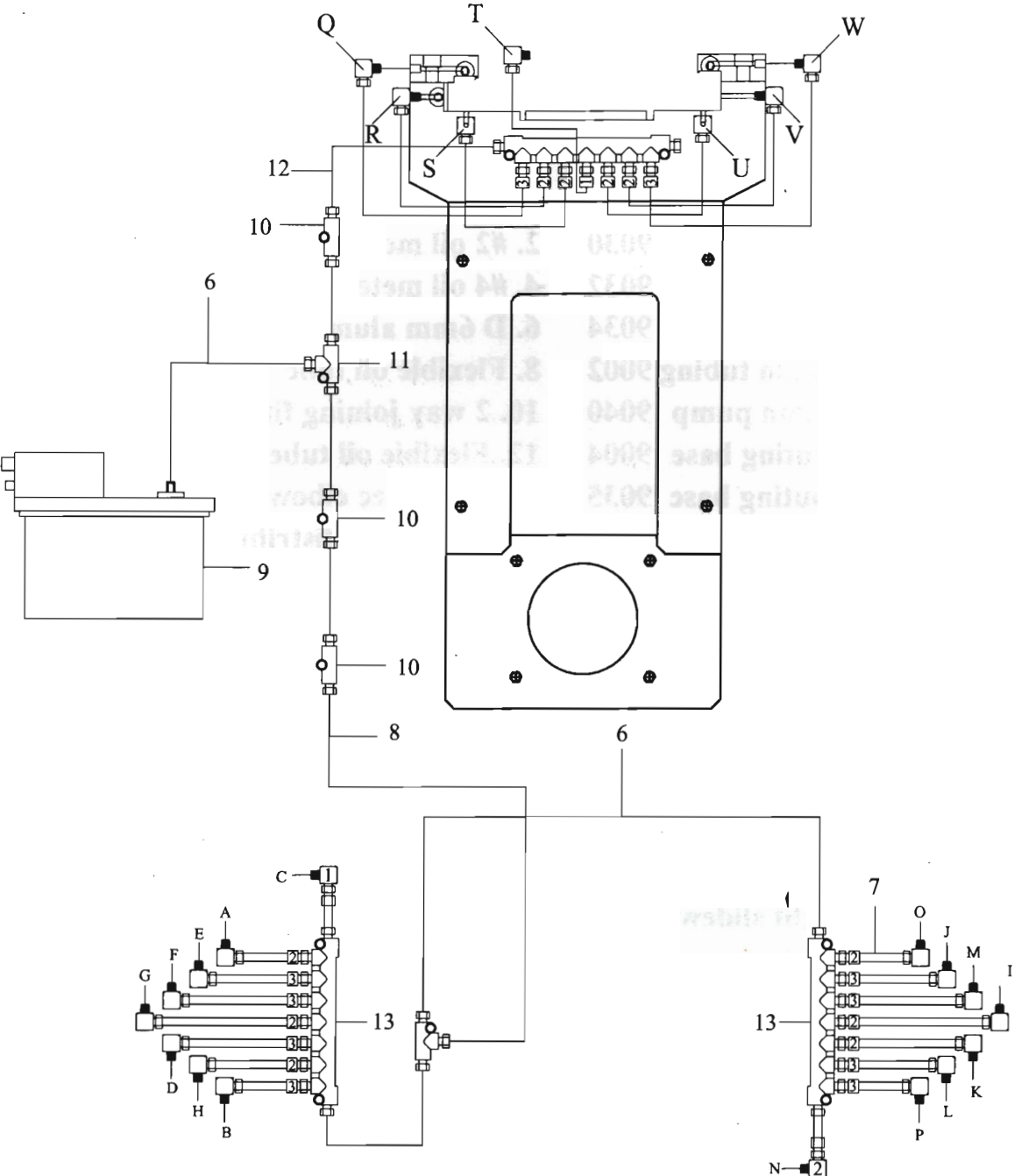
All machines have lubrication system. To maintain their accuracy, users must check and inspect lubrication system every so often. A properly lubricated machine will extend its life-span and maintain its accuracy longer. All sections of a machine need to be lubricated, but there are few parts that particularly need more attention:

- a. Spindle bearing has seal packed high pressure & temperature grease. It needs to be inspected for its condition every 6 months. Recommended grease type: Kluber LDS 18 or equivalent.**
- b. Slideways and gibs are coated with Turcite-B to reduce wear and vibration. The waylube oil for this type of material must have high viscosity, and it is tolerable to high pressure and very wear resistance. Recommended oil type: Mobile Vactra # 2 waylube, Chevron Waylube #68 or equivalent.**
- c. All ball screws must be lubricated. They need oil present at all time. Recommended oil type: See above.**
- d. Balance block's chain mechanism need to be greased when needed. Recommended grease type: Any lithium based grease is OK.**
- e. Air filter unit needs #10 spindle oil when below recommended level.**
- f. ATC: Please see ATC section**

7-2. Lubrication Chart

Lubrication Area	Table, Saddle, Slideways, X, Y, Z Ball Screws	Cutting Tool	Air Filter Unit	Chain, Chain Gear	Pressure Unit
Volume	2 Liters	Circulation	Mist Lub.	Hand Grease	Hand add Oil
Schedule Changing	Add if Below Level	Every Year	Add if Below Level	Every 6 Months	Every Year
Oil Type	*Viscosity ISOVG68 *Thickness > 100 *High Pressure, Friction Resist. *Anti-rust, Bubbleless, Oxidization Resistance	*High Heat Resistance *High Pressure Resistance	*Viscosity ISOVG32 *Thickness >95 *Anti-rust, Bubbleless, Oxidization & Colourization Resist. *Stable, not Easy to Change	Lithium Based	*Viscosity ISOVG32 *Thickness >95 *Anti-rust, Bubbleless, Oxidization & Colourization Resist
Suggestion	*Mobile Vactra #2 *Esso Febisck 68 *Shell Tonna T68 *Chevron Way-NT68	*Esso Pennex #47 *Shell Dromus B	*Mobile DTE Oil #26 *Shell Tellus #32 *Esso Nuto H32	*Esso #2 *Shell Alvaia R-2	*Mobile DTE Oil #26 *Esso Nuto H32 *Shell Tellus #32
Lube Pump Position	Lower Column	Coolant Tank	Left Column Side		

7-3. DISTRIBUTION OF LUBRICATION SYSTEM



7-3. DISTRIBUTION OF LUBRICATION SYSTEM

For EMC 2240A

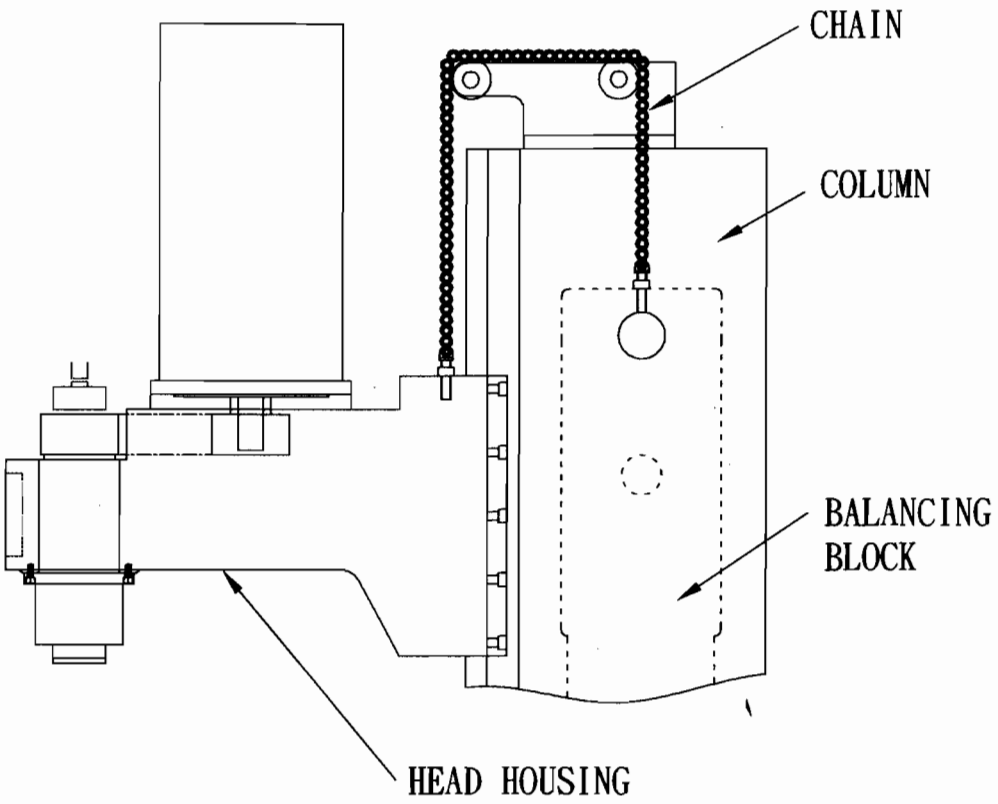
Part list of lubrication system

Description	Part #	Description	Part #
1. #1 oil metering valve	9030	2. #2 oil metering valve	9031
3. #3 oil metering valve	9032	4. #4 oil metering valve	9033
5. #5 oil metering valve	9034	6. D 6mm aluminum tubing	9036
7. D 4mm aluminum tubing	9002	8. Flexible oil tube x 550L	9037
9. CESD lubrication pump	9040	10. 2 way joining fitting	9038
11. 3 way distributing base	9004	12. Flexible oil tube x 180L	9039
13. 9 way distributing base	9035	14. 90 degree elbow fitting	9041
		(for A~W distribution point on the diagram)	

Distribution point of lubrication oil on saddle

A. saddle left/rear	B. saddle left/front
C. lower left saddle gib	D. lower left slideway
E. to E1 (Y axis ball screw)	F. saddle 2 nd left/rear
G. saddle side left slideway	H. saddle 2 nd left/front
I. X axis ball screw	J. saddle 2 nd right/rear
K. saddle side right slideway	L. saddle 2 nd right/front
M. lower right slideway	N. lower left saddle gib
O. saddle right/rear	P. saddle right/front
Q. left housing gib/slideway	R. left side gib
S. left slideway	T. Z axis ball screw
U. right slideway	V. right side slideway
W. Right housing gib/slideway	

7-4. Manual Lubrication Area



7-5. ATC Section

Lubrication oil for ATC gear unit

Brand name	Viscosity (in ISO VG)	
Shell	Omala EP	150~220
French Total	Garter EP	150~220
Mobil	Mobil gear	150~220
Esso	Spartan EP	150~220
Castrol	ALPHA SP (EP)	150~220
China Oil CPC	Multi-purpose gear oil	85W/90

1. Notice for changing ATC oil

Drain gear oil from ATC gear unit, and make sure this unit is clean from residue. Do not use reprocessed oil to replenish. Please only replace the gear unit with new gear oil!

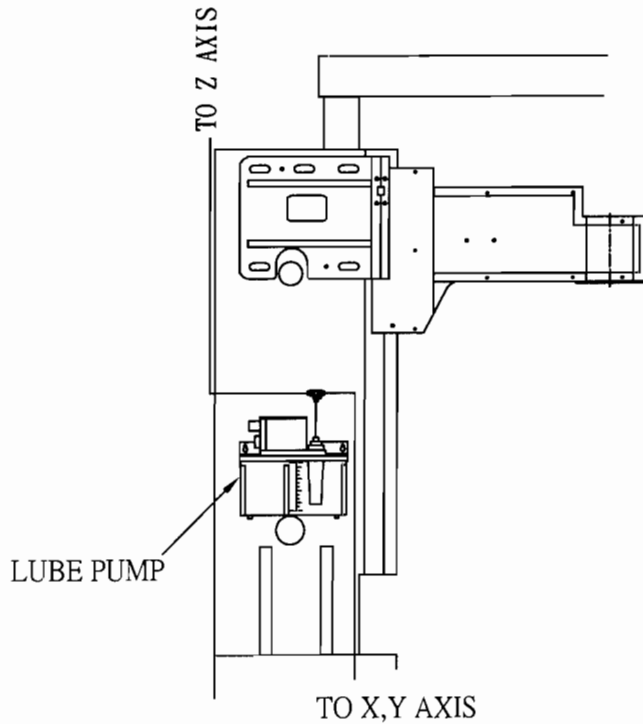
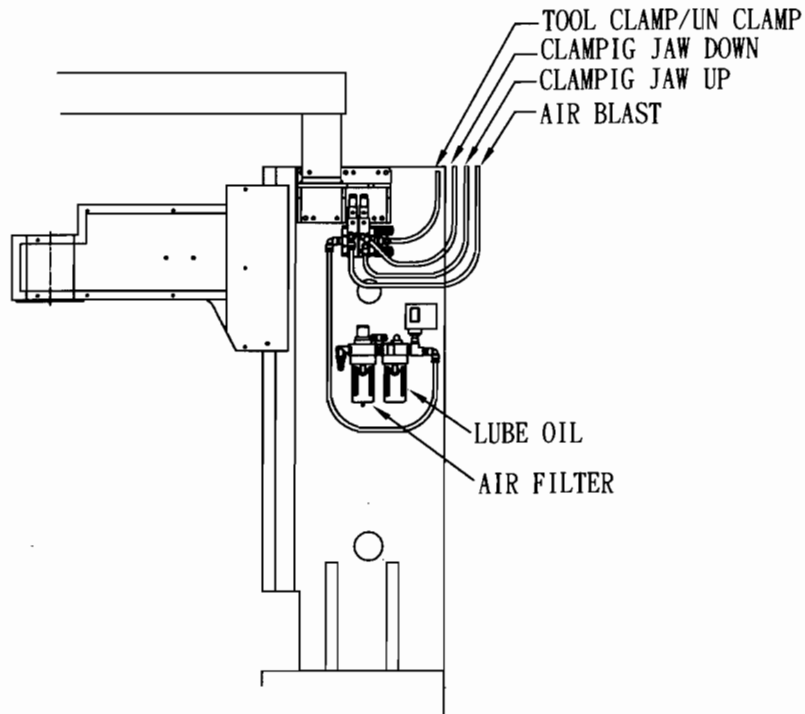
2. Time schedule for gear oil replacement

After running for 2,400 hours, please replace the gear unit with new oil. This is to maintain the ATC, and extend its operation time.

3. Maintenance

- A. Before turning on power, check the oil gauge on ATC. Add more oil if necessary.
- B. Please replace or add gear oil with correct viscosity.
- C. Make sure the wires of the motor have enough voltage tolerances, and they are correctly wired.

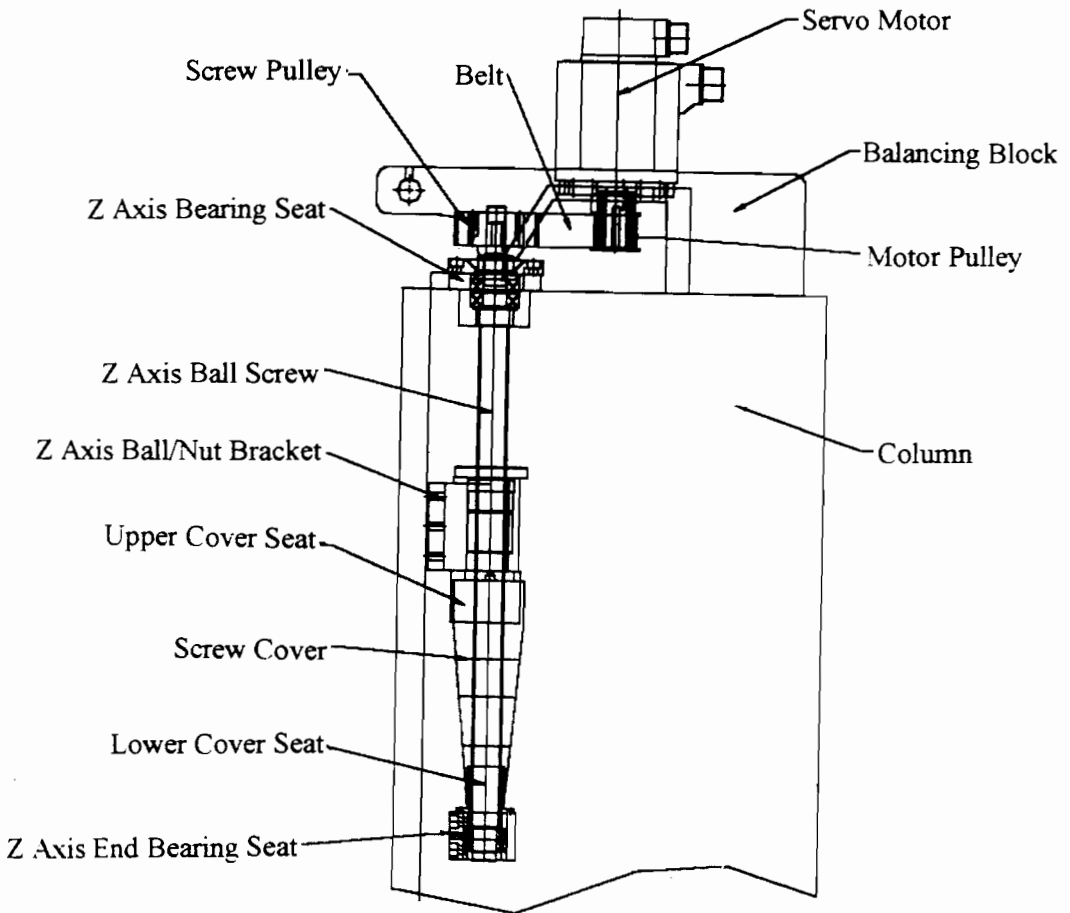
7-6 POSITION OF LUBRICATION PUMP AND AIR FILTER UNIT



8. X, Y, & Z AXES TRANSMISSION METHOD

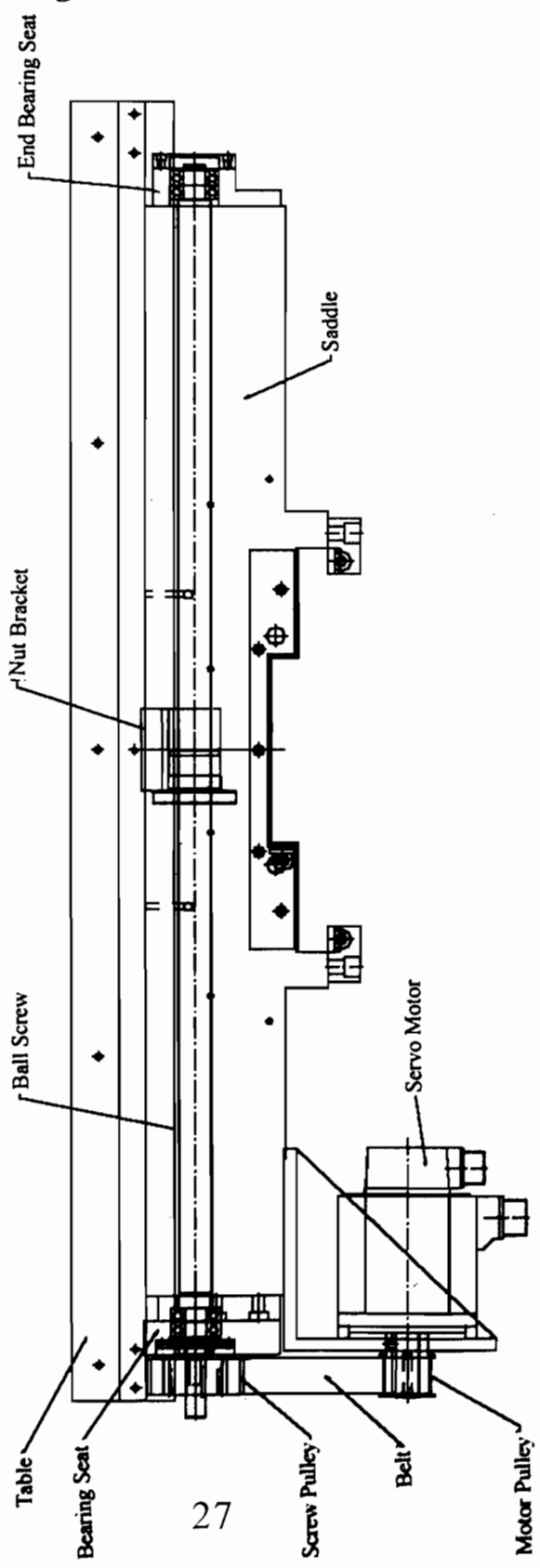
8-1. Z axis transmission method

Z axis is driven by AC servo motor. The brand name varies with control brand. Between the servo motor and the ball screw, there are two timing belt pulleys and a timing belt. The head housing moves up and down when servo motor rotates the ball screw in either direction. Please see drawing below:



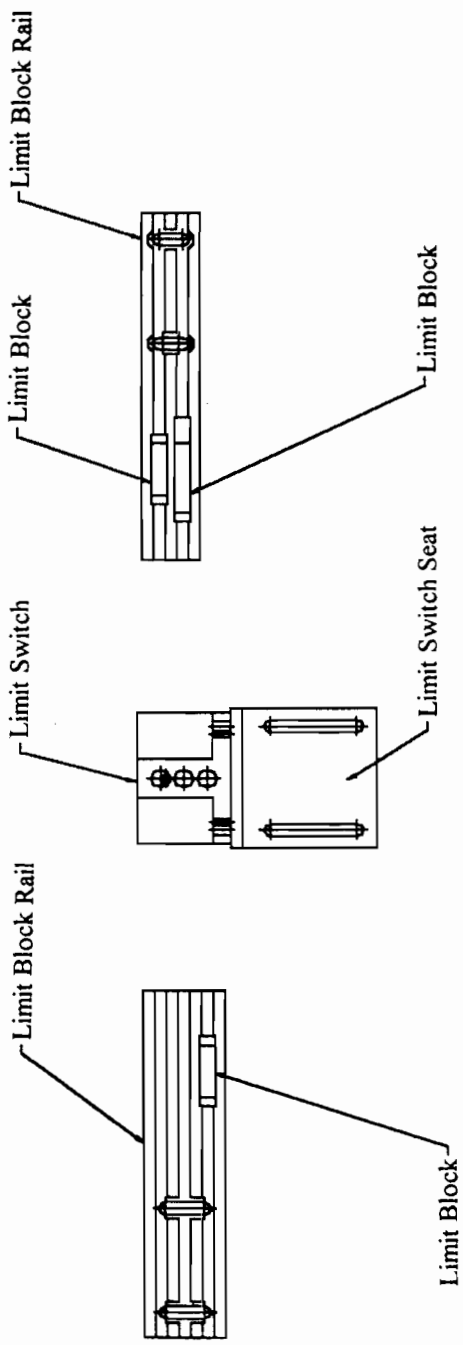
8-2. X & Y axes transmission method

X & Y axes' motion is control by AC servo motor. Name brand is also tagged with control. The servo motors drive the ball screws through two pulleys and a timing belt. Both axes will move when servo motor rotate. The items in motion arc saddle and working table. Please see the drawing below:



8-3. Travel adjustment of X, Y, & Z axes

The control package usually comes with maximum travel setting design. This design is to avoid damage when user sets the travel over the travel limit. When machine over travels (on all axes), a sensor block will bump a limit switch. The limit switch will send a signal to the control, which will then stop all motions on the machine. Please see drawing for the design below.

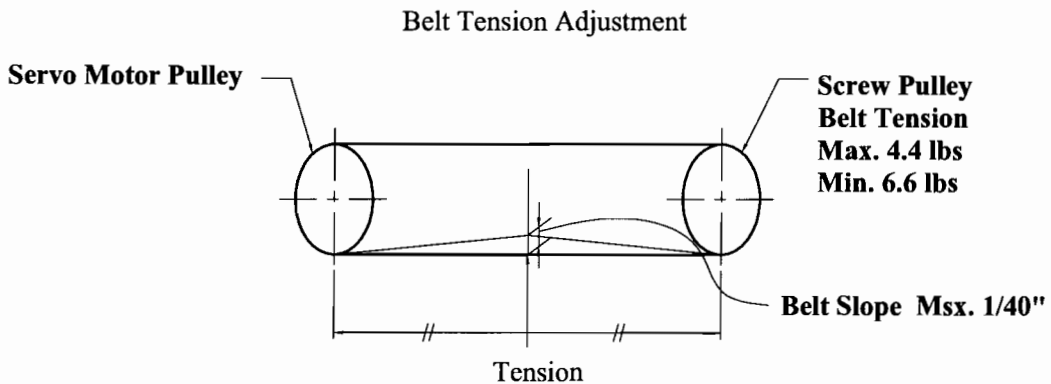


9. ADJUSTMENT OF THE TIMING BELT

Because all three axes are drive through using a timing belt, it is essential to keep the tension on the timing belt at constant. please check the belts every six months and adjust them when needed.

The method of adjustment is as following:

- a. Release servo motor by unscrewing the locating bolts.
- b. Re-adjust the motor distance from the ball screw by feeling the tension on the timing belt. The pressure on the timing belt should be between 4.4 to 6.6 lbs.
- c. Screw tight on the motor locating bolts.



**Belt Tension in Between Pulley
Center**

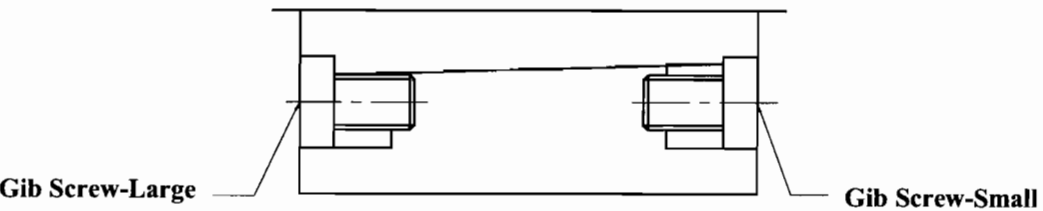
10. ADJUSTMENT OF THE GIBS

For adjustment of gibs on Y & Z axes:

During machine motions, there will be wears on the moving items, and will create backlashes on all three axes. To compensate for this situation, user can adjust gibs to minimize effect.

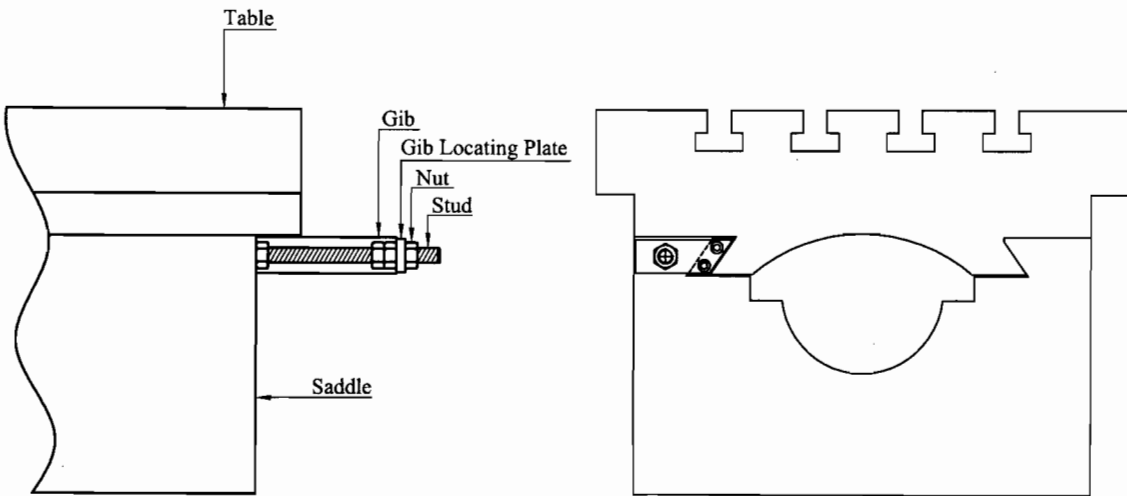
The procedure for adjusting gibs:

- a. Release the smaller taper end gib by unscrewing the gib screw half turn.**
- b. Rotate the axis toward the smaller taper end to close the gap between the sliding surfaces.**
- c. Screw in the gib screw on the big taper end side.**
- d. Repeat the procedure until surface pressure on the gib is 3.5kg/cm².**
- e. Check gibs pressure once every six months.**



For adjustment of gibs on table:

- a. Unscrew the inner side hex nuts on the stud (show as A on the figure).
- b. Use an open-end wrench to screw in the outer hex nut to proper tension (about 5kg/cm^2). Note: Turn the nut clockwise!
- c. When the hex nut is turned about $1/4$ turn, move the table left and right to test the tightness of the gib. Repeat this procedure until proper tension is achieved.
- d. Check gib pressure once every six months.



Electrical Diagram & Its Parts List

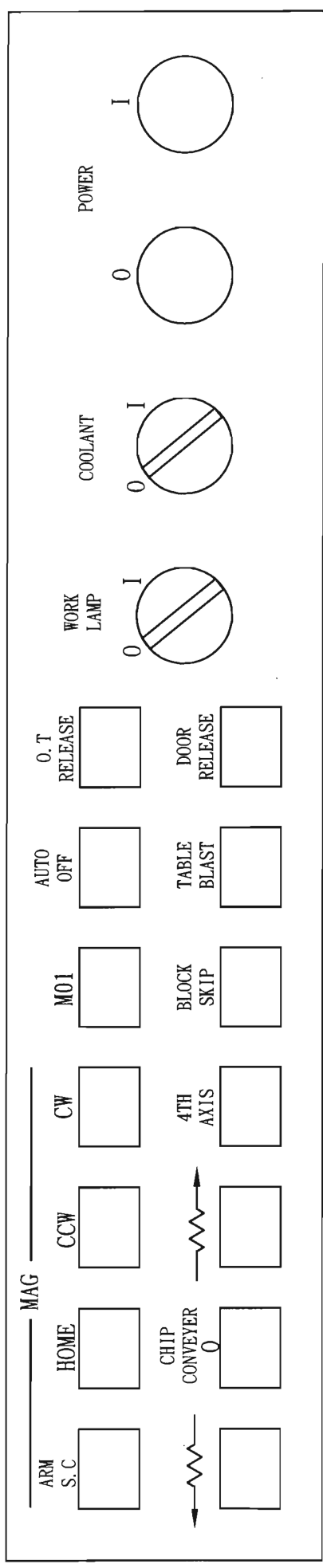
To order parts, please have the following information ready:

1. Year of production
2. Model and serial number
3. Item number and description
4. Quantity

Note: If the machine is shipped with CNC control, in order to get its parts information, please refer to its supplied control manuals to find the correct part number and specification. And please contact the original control manufacturer for the ordering instructions.

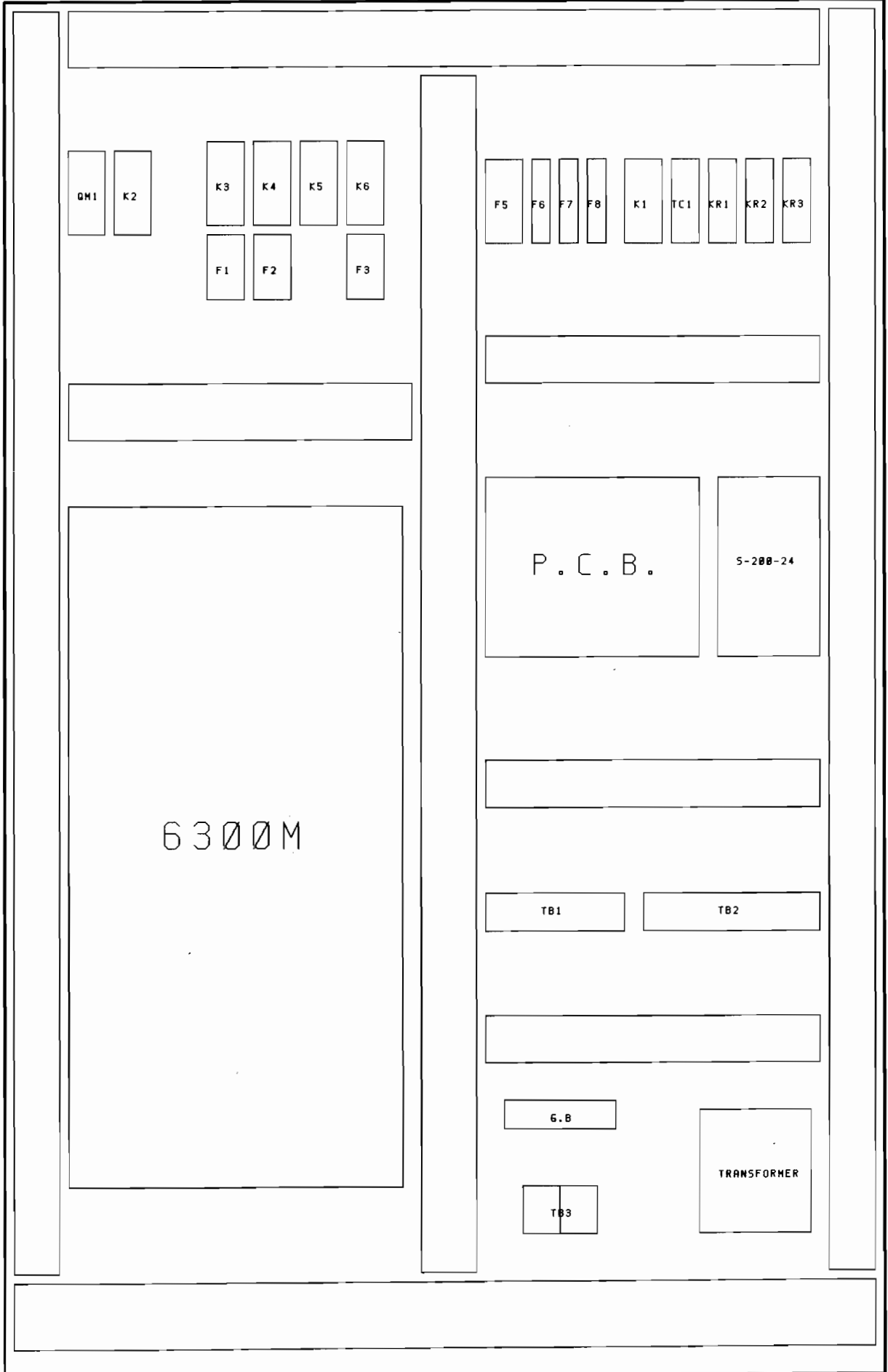
****Trouble shooting on the control? Please contact control manufacturer's service department, they can get your answer solved and get you going quickly. Any other question, please contact our service department. The phone number is 714-632-9701 at CA or 732-752-9100 at NJ. Or visit our website, and leave us with your questions, we will response quickly. Thank you for your attention.

11-1. Lower Section of the Control Panel

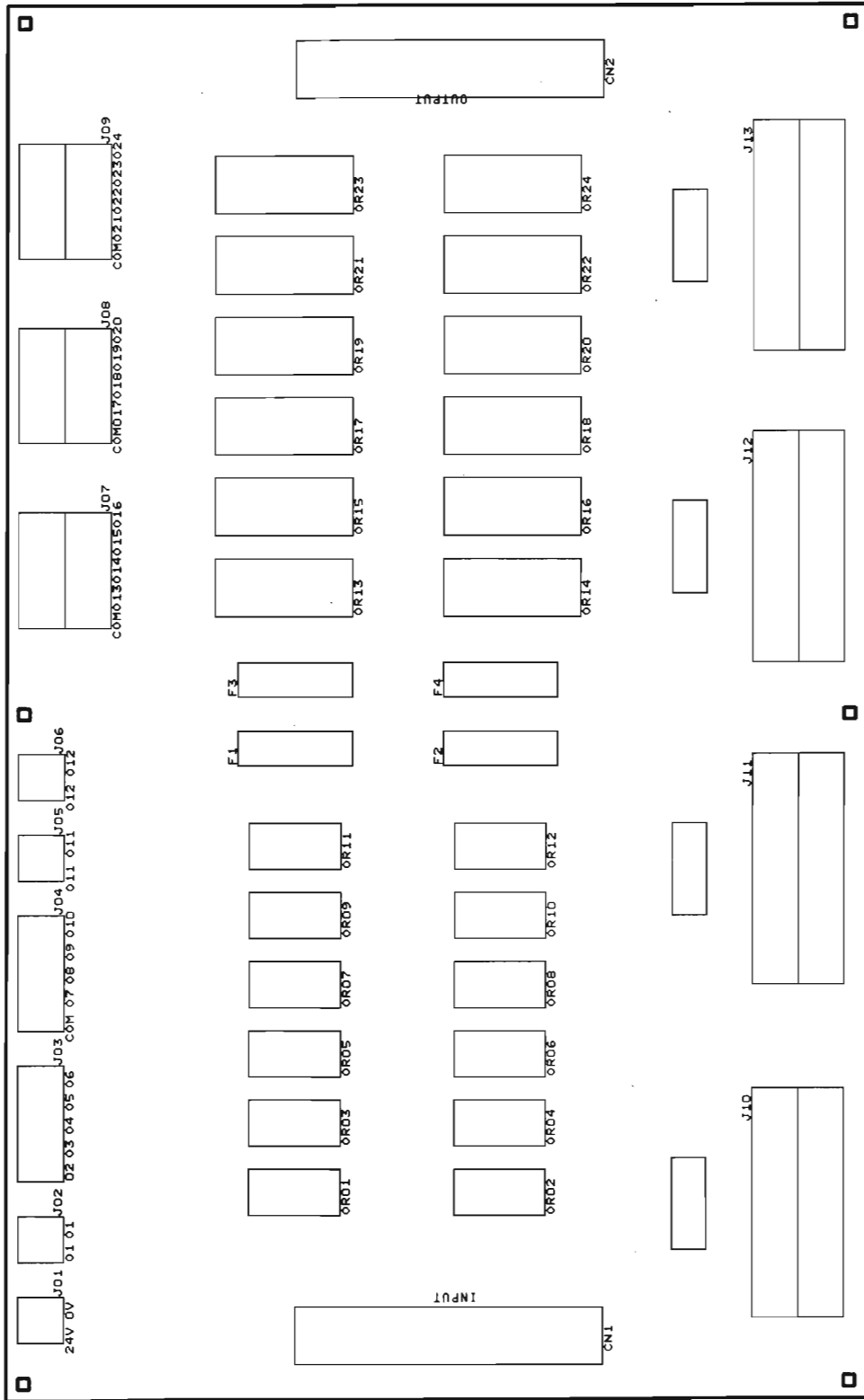


PART POSITION	DESCRIPTIONS	PART #	PART POSITION	DESCRIPTIONS
POWER I	MC2240A-POWER I	MC2240A-PB 15	PB 15	CHIP CONVEYER
POWER 0	MC2240A-POWER 0	MC2240A-PB 14	PB 14	BLOCK SKIP
PB 1	MC2240A-PB 1	MC2240A-PB 15	PB 15	TABLE BLAST
TESW 1	MC2240A-TESTW 1			DOOR RELEASE
PB 5	MC2240A-PB 5			
PB 4	MC2240A-PB 4			
PB 3	MC2240A-PB 3			
PB 2	MC2240A-PB 2			
PB 11	MC2240A-PB 11			
PB 8	MC2240A-PB 8			
PB 13	MC2240A-PB 13			

11-2. Location of Electric Components (in cabinet)



11-3. P.C.B. Board Connection Diagram



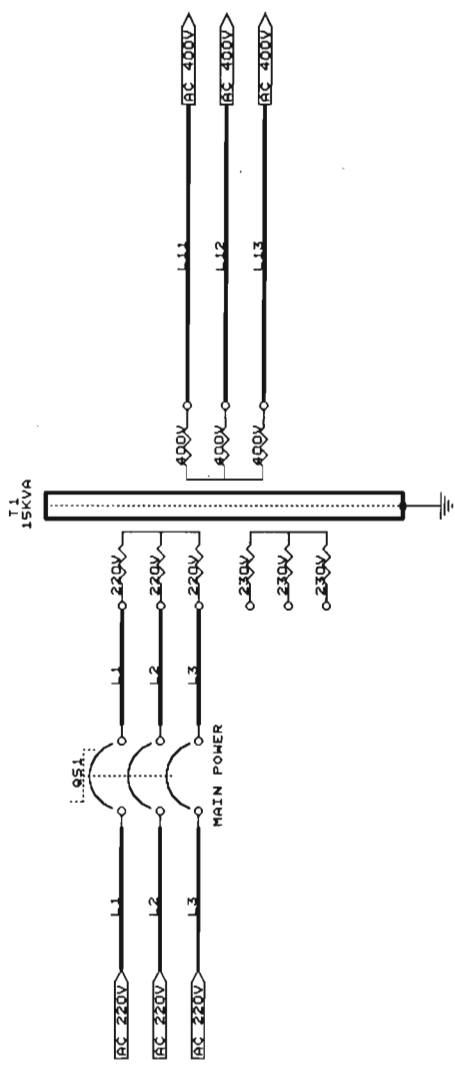
11-4. Description of Electric Part List

PART NAME	SPEC	Q'TY	BRANDS	CODE	REMARKS
BREAKER	EA103B	1	TAIAN	QS1	POWER
MCB	062 90	1	LEGRAND	QM1	DRIVER POWER
TRANSFORMER	1KVA	1	CHUNG YA	T1	
CONTACTOR	LC1 D32 B7	1	TE	K2	SERVO
	LC1 D09 B7	1		K3	COOLANT
	LC1 D09 B7	1		K4	MAG CW
	LC1 D09 B7	1		K5	MAG CCW
	LC1 D09 B7	1		K6	ARM CW
	LC1 D09 B7	1		K1	POWER ON
	LC1 D09 B7	1		K7	CHIP CONVEYOR CW
	LC1 D09 B7	1		K8	CHIP CONVEYOR CCW
O.L RELAY	LRD046	1	TE	F1	COOLANT
	LRD056	1		F2	MAG
	LRD066	1		F3	ARM
	LRD066	1		F4	CHIP CONVEYOR
FUSE	10*38 2P	1	LEGRAND	F5	CONTROL
	10*38 1P	1		F6	
	10*38 1P	1		F7	
	10*38 1P	1		F8	
RELAY	94.74+55.34	1	FINDER	KR1	DRV. ENABLE
RELAY	94.74+55.34	1	FINDER	KR2	CNC ON
RELAY	94.82+55.32	1	FINDER	KR3	DRV ENA.2
RELAY	95.75+44.52S	1	FINDER	KR4	S/COOLANT ALARM
TIMER	RE8RB 11BU	1	TE	TR1	DELAY ENA
LIMIT SW	SN02 D12-502	1	EUCHNER	LS1	X AXIS LIMIT
LIMIT SW	SN02 D12-502	1	EUCHNER	LS2	Y AXIS LIMIT
LIMIT SW	SN02 D12-502	1	EUCHNER	LS3	Z AXIS LIMIT
LIMIT SW	XCSTE7311+ XCS Z11	1	TE	LS5	DOOR LOCK LIMIT
POWER SUPPLY	S-200-24V	1	M/W		DC POWER
P.B SW	XB5-AW33B5	1	TE	HPB1	POWER ON
P.B SW	XB5-AW33B5	1	TE	HPB2	POWER OFF
P.B SW	XB5-AA31	1	TE	PB7	M / TOOL UNCLAMP
SELECTOR SW	ZB5AD2+ZB5 -AZ101	1	TE		WORK LAMP
SELECTOR SW	ZB5AD2+ZB5 -AZ101	1	TE	SW1	M / COOL ANT
P.B SW	01P-RM40.Q1 P+V	1	META	PB1	MAG CW
P.B SW	01P-RM40.Q1 P+V	1	META	PB2	MAG CCW
P.B SW	01P-RM40.Q1 P+V	1	META	PB3	MAG HOME

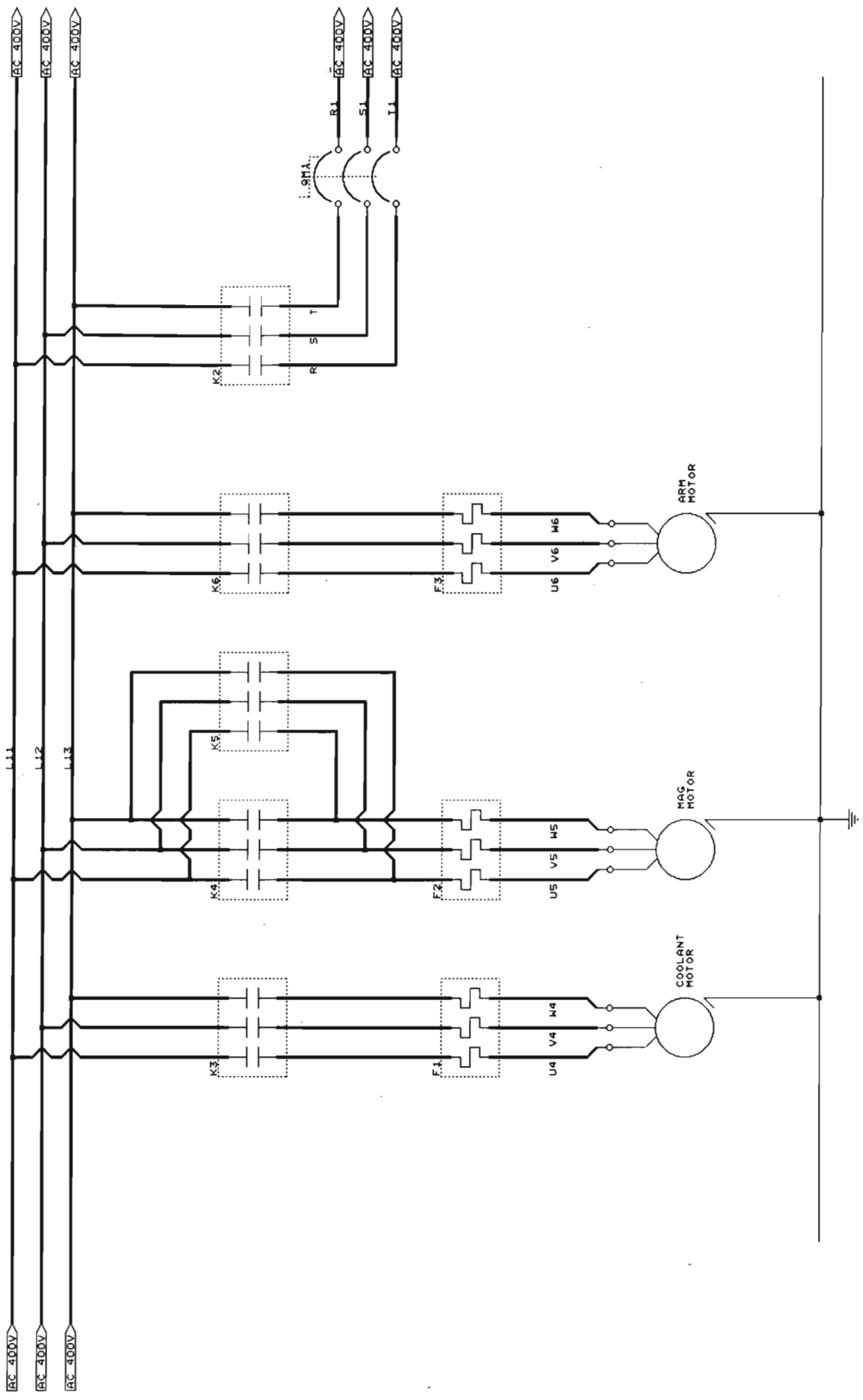
P.B SW	01P-RM40.Q1 P+R	1	META	PB4	MAG S.C
P.B SW	01P-RM40.Q1 P+Y+L24	1	META	PB5	DOOR RELEASE
P.B SW	01P-RA40.Q1 P+W+L24	1	META	PB6	AUTO OFF
P.B SW	01P-RM40.Q1 P+V	1	META	PB8	TABLE BLAST
P.B SW	01P-RA40.Q1 P+R+L24	1	META	PB10	M01
P.B SW	01P-RA40.Q1 P+R+L24	1	META	PB11	BLOCK SKIP
P.B SW	01P-RA40.Q1 P+B	1	META	PB12	O . T RELEASE
P.B SW	01P-RM40.Q1 P+R	1	META	PB13	CHIP CONVEYOR STOP
P.B SW	01P-RM40.Q1 P+G+L24	1	META	PB14	CHIP CONVEYOR CW
P.B SW	01P-RM40.Q1 P+G+L24	1	META	PB15	CHIP CONVEYOR CCW
PCB	REV:C	1	JIN DOER		
FLASH LAMP	TPWL-24L-2	1	TEND		M30+ALARM LAMP

ACER-L

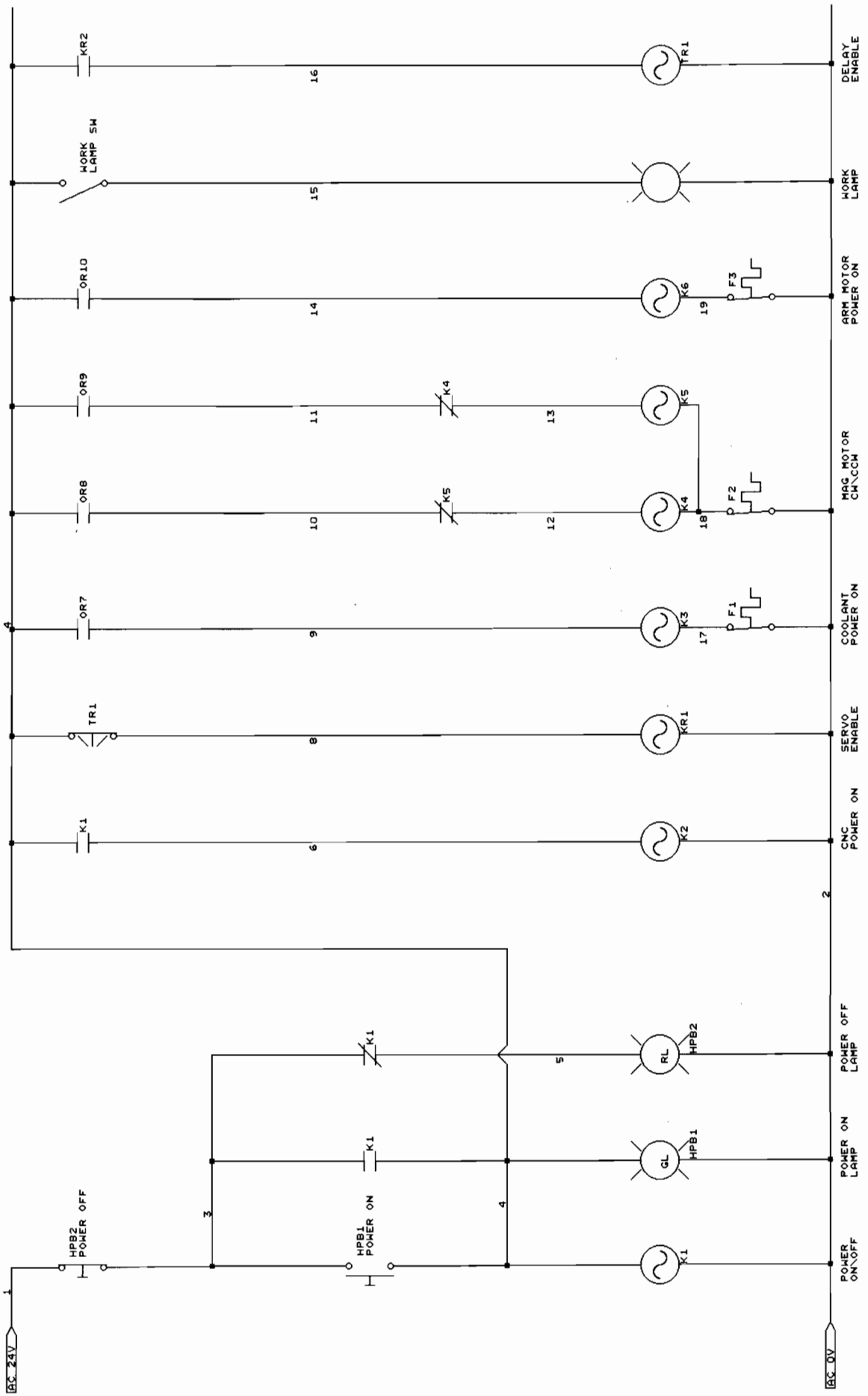
11-5. Electrical Wiring Diagram



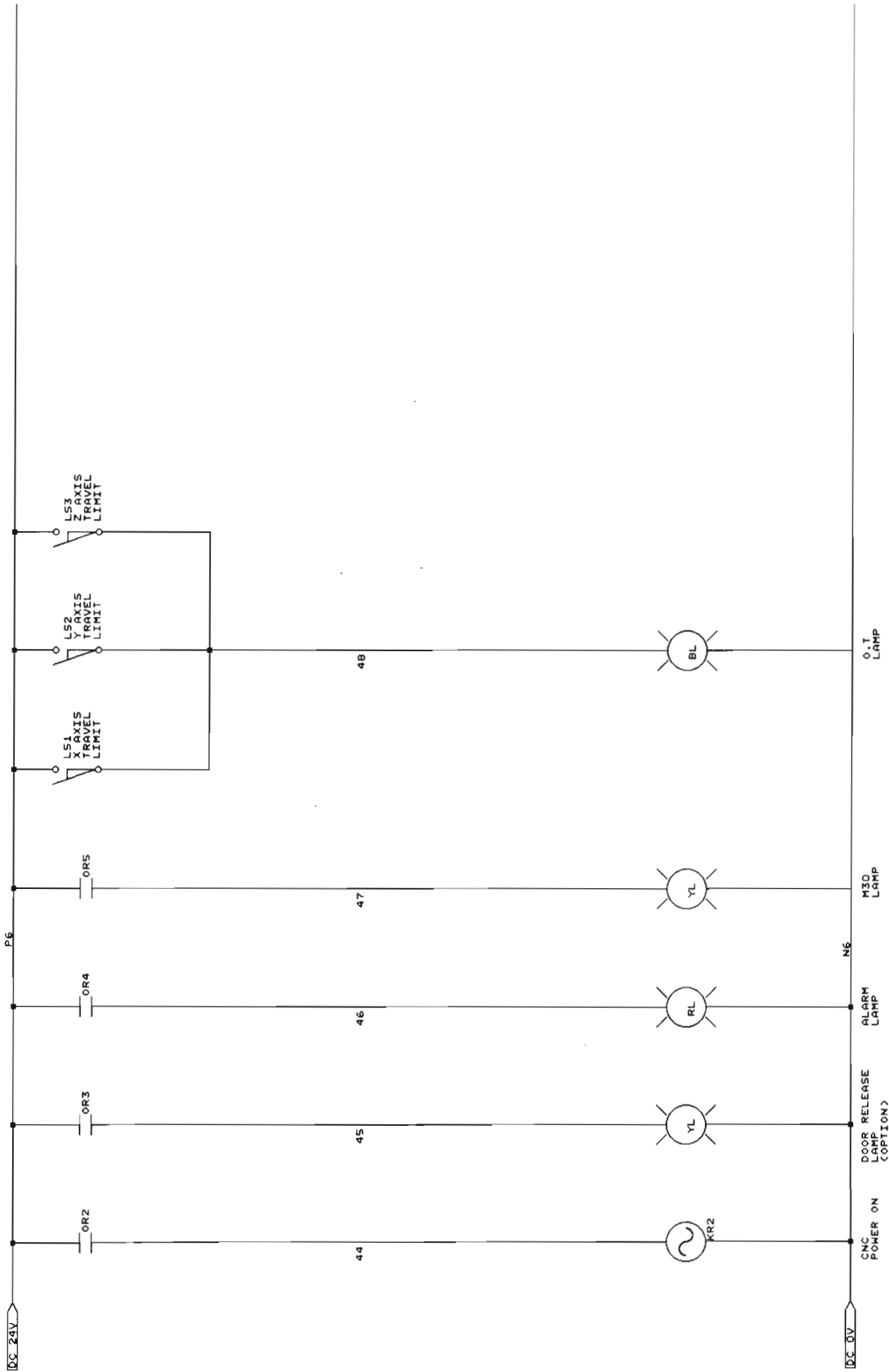
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Size	Document Number
A3	POWER SYSTEM UNIT-2
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of	

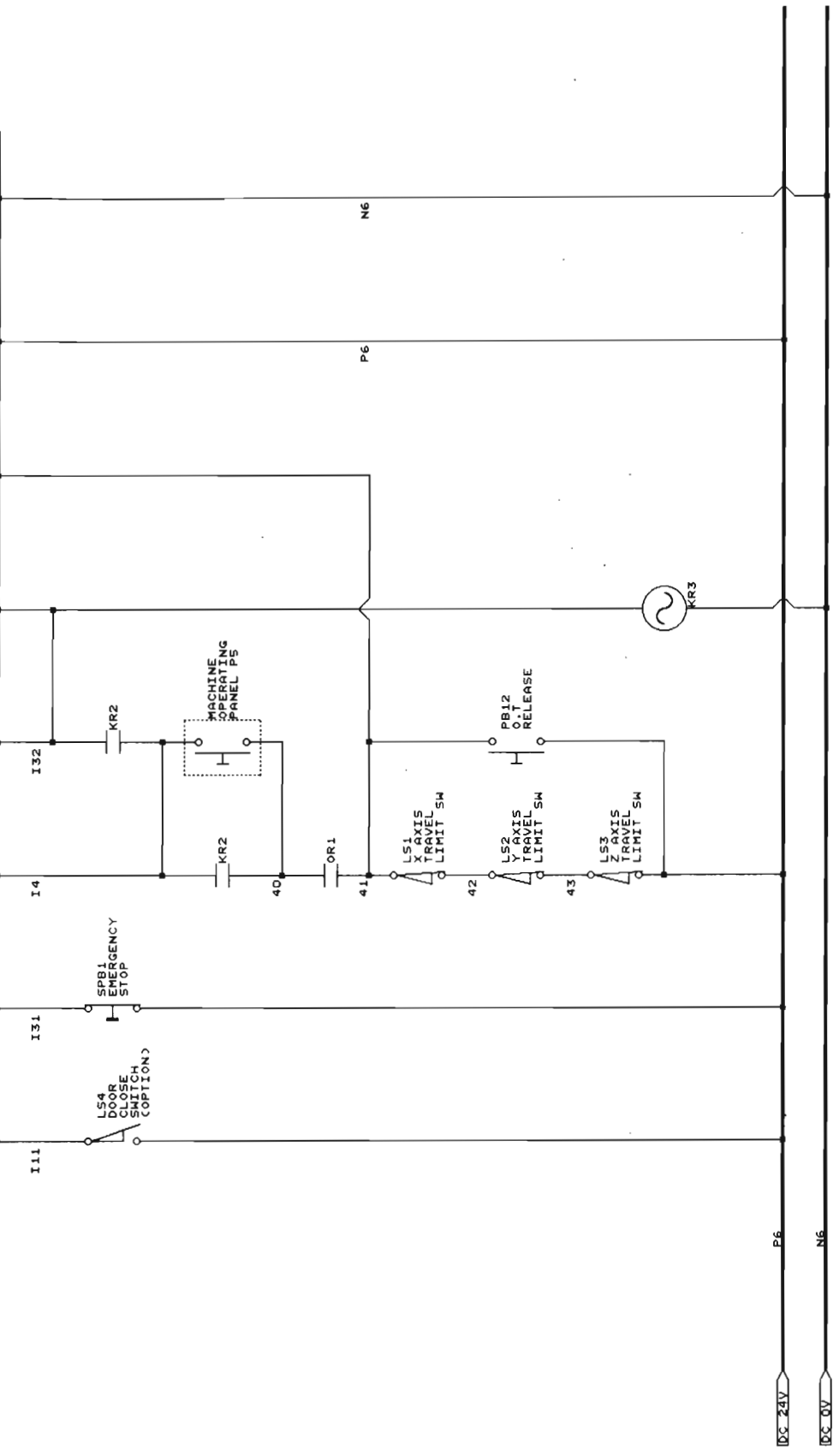


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Size Document Number	REV
A3	CONTROL DIAGRAM-1
Date: July 11, 2002	Sheet 4 of 4



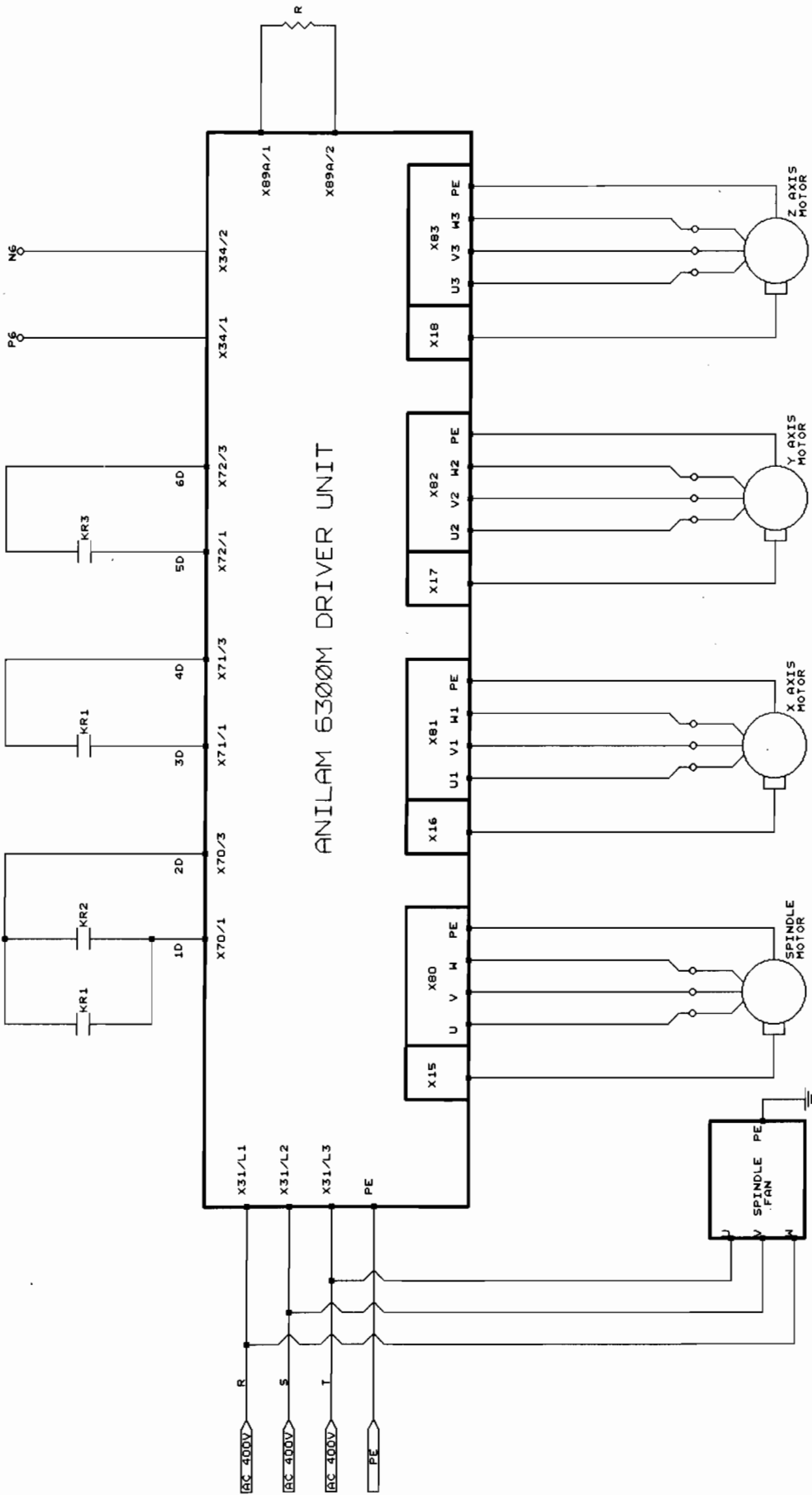
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A3	CONTROL DIAGRAM-2	
Date:	JULY 29, 2001	Sheet of
		5
		REV

PORT		X42 (INPUT PORT)					X44-CONNECTOR	
INTERFACE	ADDRESS	X0.10	X0.30	X0.3	X0.31	X0.32		
	CNC PIN NO.	X42-11	X42-31	X42-4	X42-32	X42-33	X44-1	X44-2
	RELAY CARD PIN ON.	CN1-7	CN1-17	CN1-22	CN1-36			



DC 24V

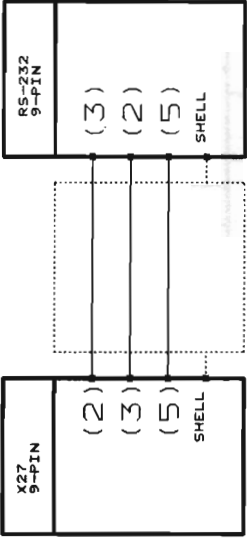
DC 0V



ANILAM 6300M DRIVER UNIT

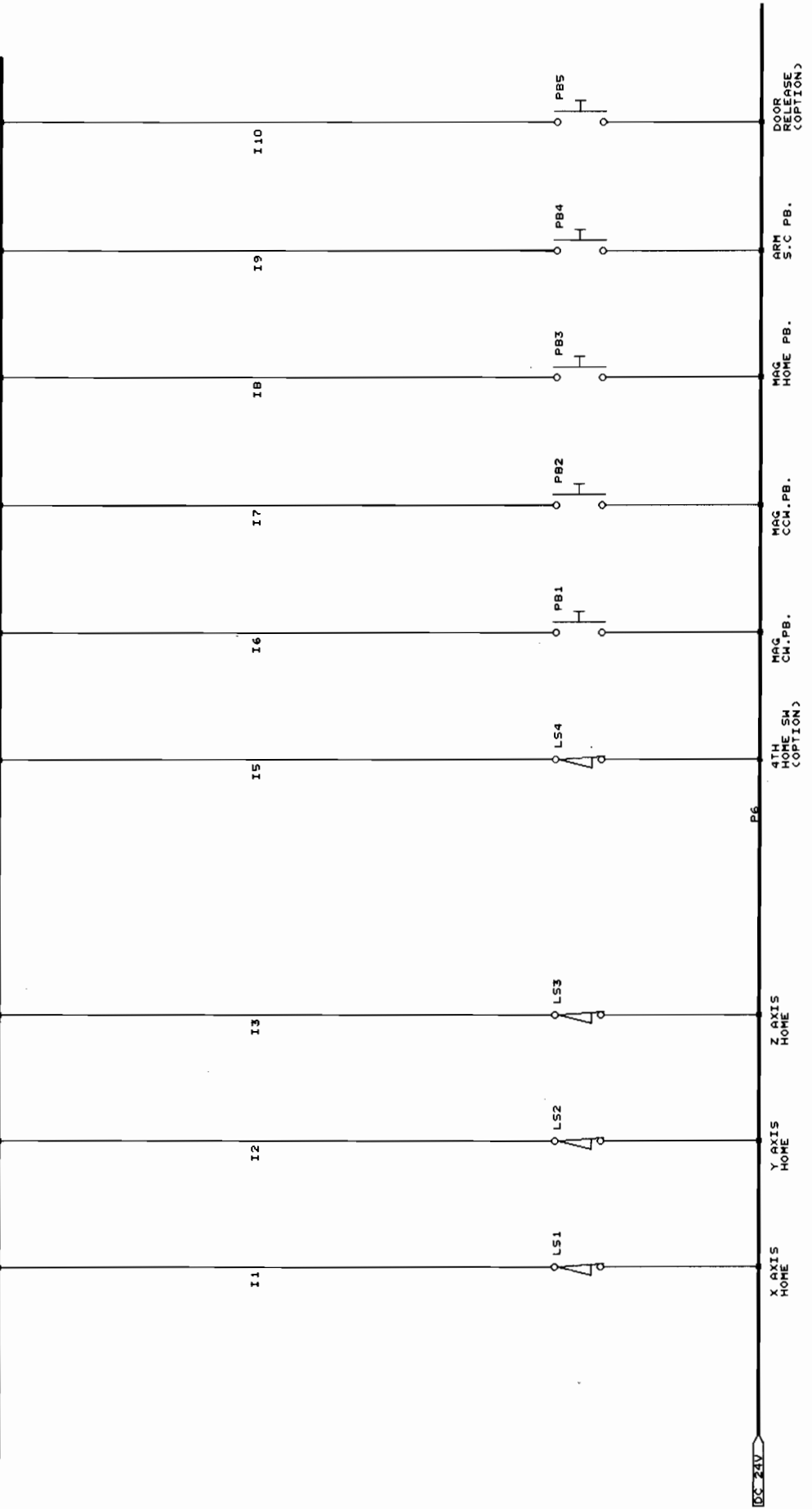
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DRIVER WIRING	
Date: July 29, 2001	Sheet of

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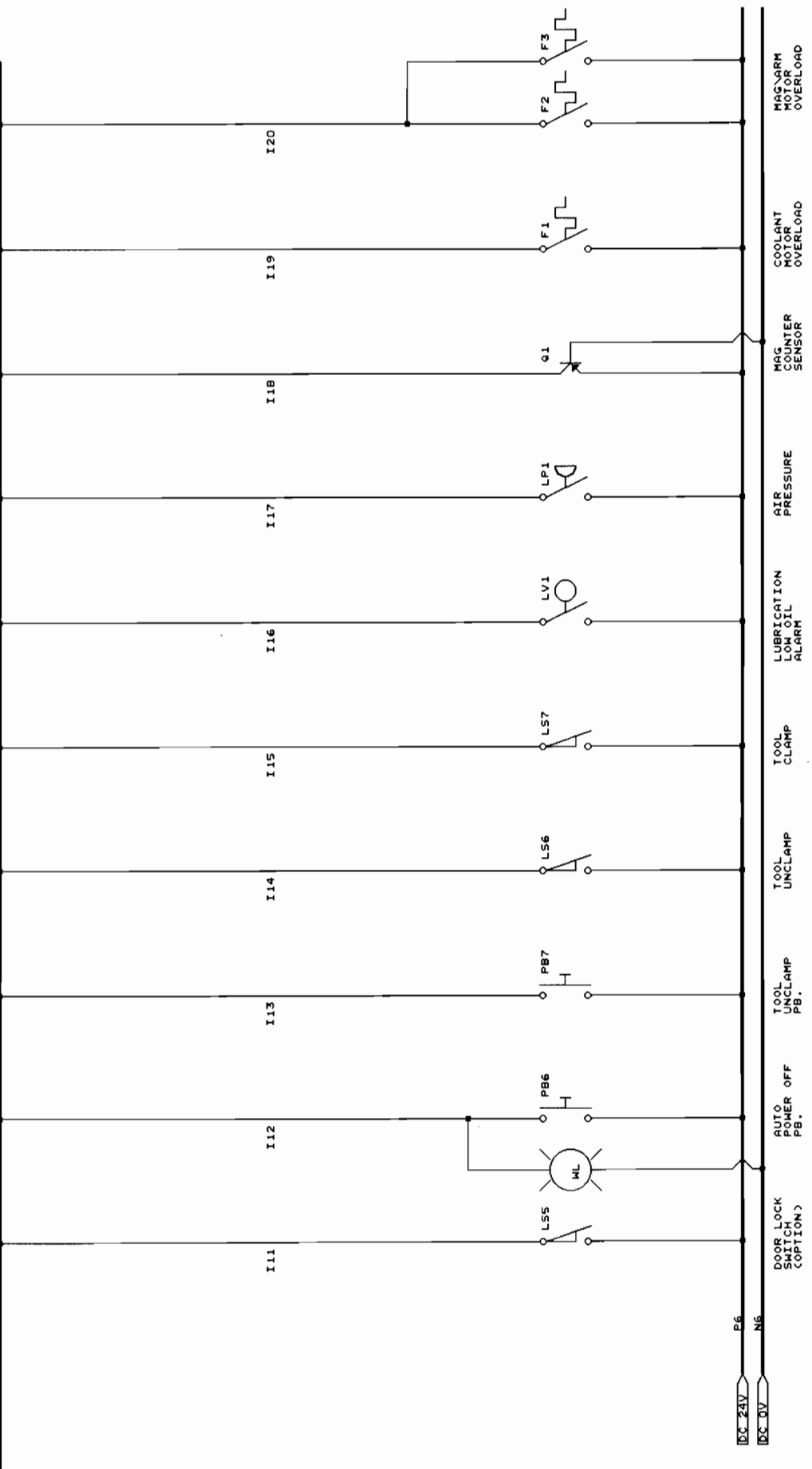
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Size	Document Number
A3	CONNECTOR DIAGRAM
Date:	July 11, 2002
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of	

X42 (INPUT PORT)										
INTERFACE	PORT									
ADDRESS	X0.0	X0.1	X0.2	X0.3	X0.4	X0.5	X0.6	X0.7	X0.8	X0.9
CNC PIN NO.	X42-1	X42-2	X42-3	X42-4	X42-5	X42-6	X42-7	X42-8	X42-9	X42-10
RELAY CARD PIN NO.	CN1-2	CN1-21	CN1-3	CN1-22	CN1-4	CN1-23	CN1-5	CN1-24	CN1-6	CN1-25



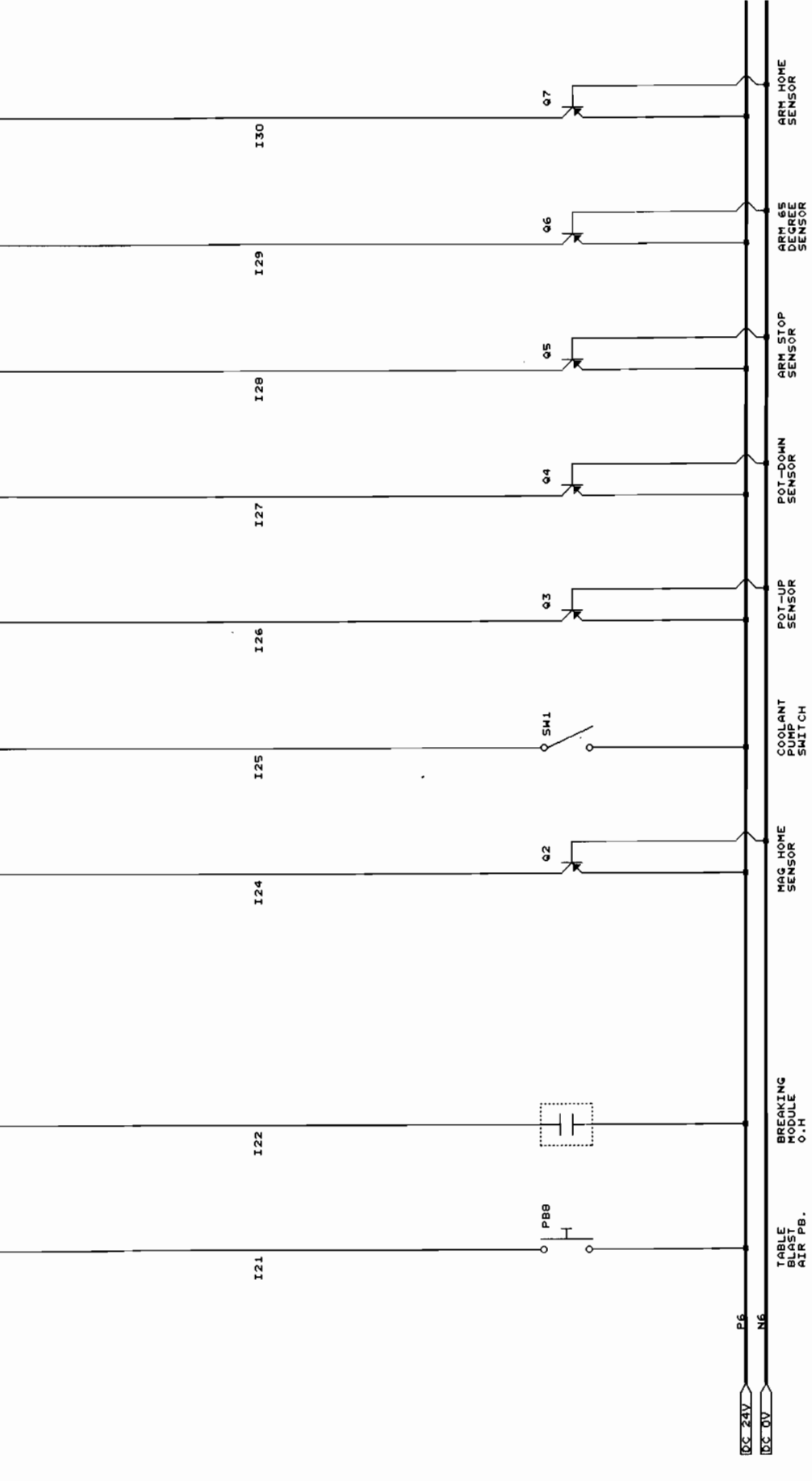
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 A3 I/O DIAGRAM-1
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X42 (INPUT PORT)										
PORT INTERFACE										
ADDRESS	X0.10	X0.11	X0.12	X0.13	X0.14	X0.15	X0.16	X0.17	X0.18	X0.19
CNC PIN NO.	X42-11	X42-12	X42-13	X42-14	X42-15	X42-16	X42-17	X42-18	X42-19	X42-20
RELAY CARD PIN NO.	CN1-7	CN1-26	CN1-8	CN1-27	CN1-9	CN1-28	CN1-10	CN1-29	CN1-11	CN1-30



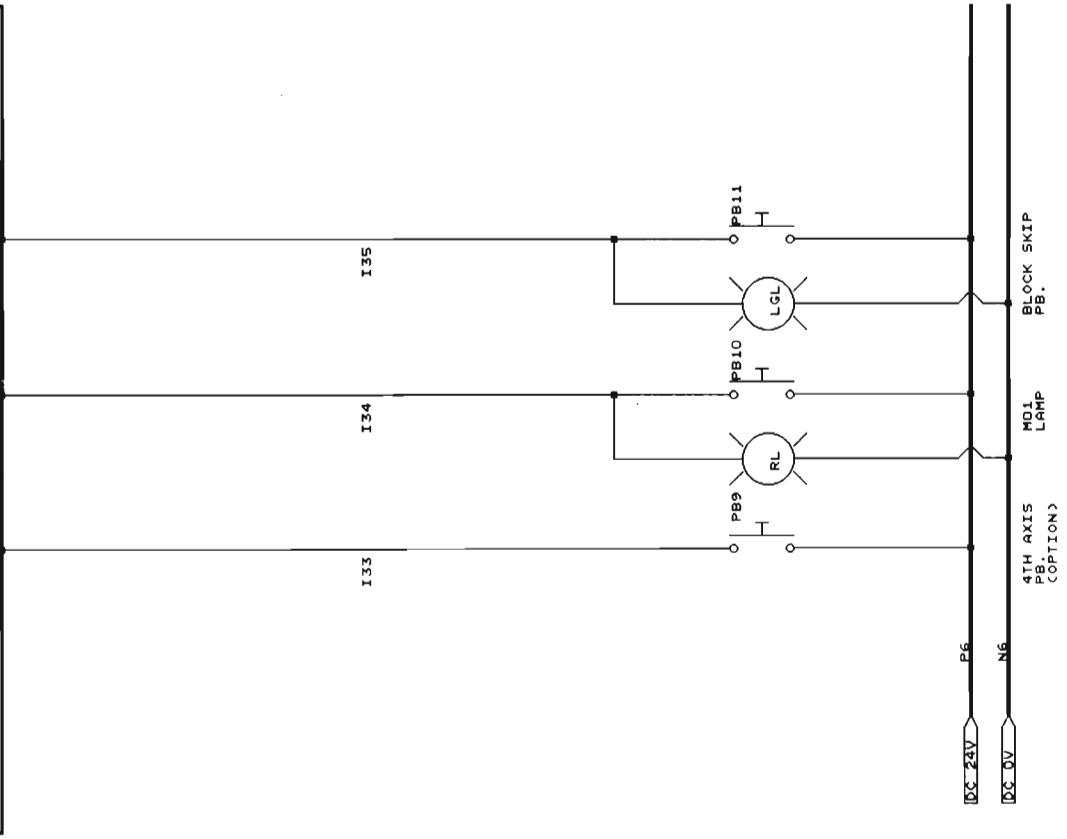
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A3	I/O DIAGRAM-2	11
Date:	July 29, 2001	Sheet of

PORT INTERFACE		X42 INPUT PORT									
ADDRESS		X0.20	X0.21	X0.22	X0.23	X0.24	X0.25	X0.26	X0.27	X0.28	X0.29
CNC PIN NO.		X42-21	X42-22	X42-23	X42-24	X42-25	X42-26	X42-27	X42-28	X42-29	X42-30
RELAY CARD PIN NO.		CNI-12	CNI-31	CNI-13	CNI-32	CNI-14	CNI-33	CNI-15	CNI-34	CNI-16	CNI-35

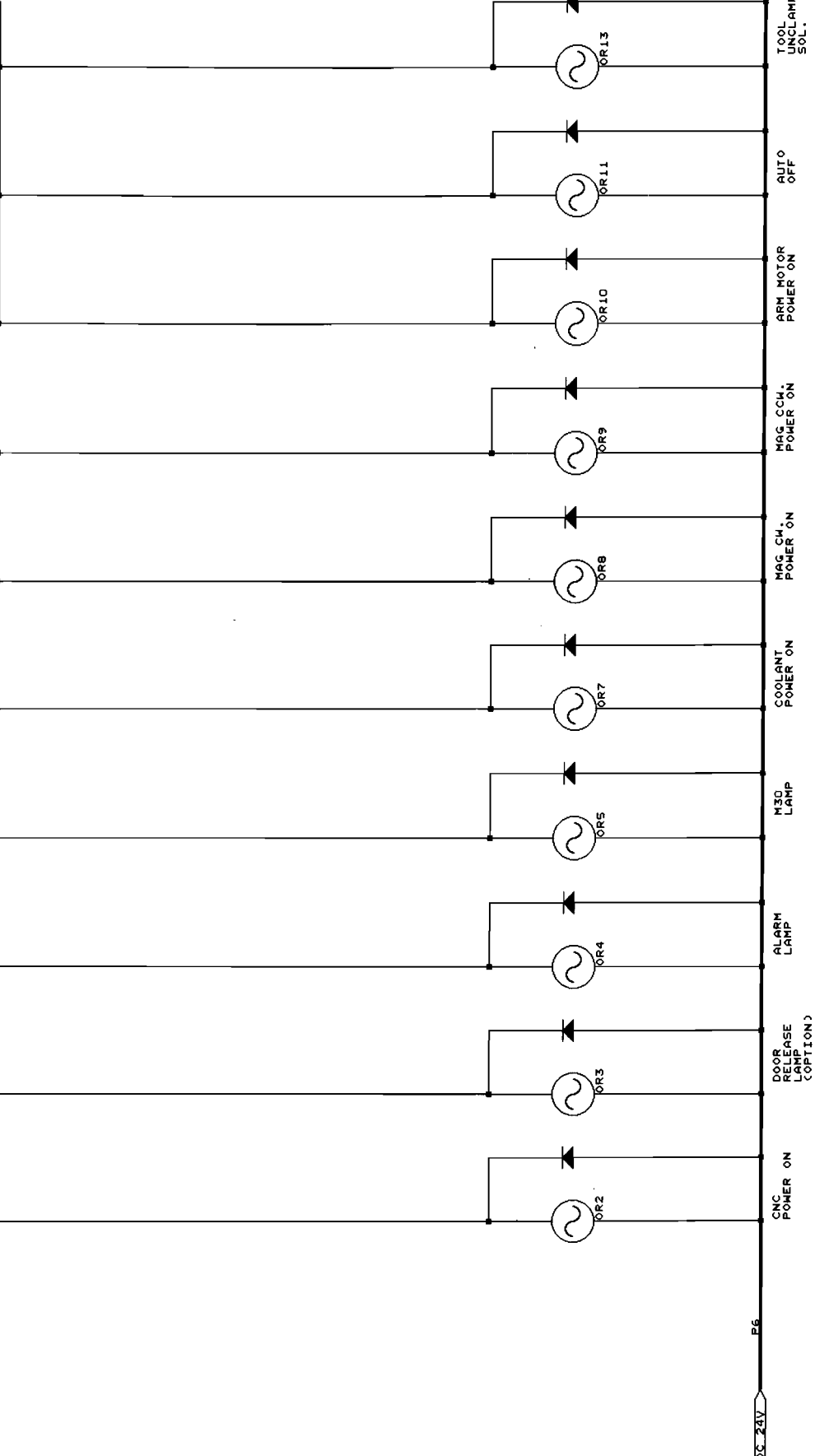


ACER-B	
Size	Document Number
A3	I/O DIAGRAM-3
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PORT	PNL (INPUT PORT)			
INTERFACE				
ADDRESS	X0.122	X0.123	X0.124	
CNC PIN NO.	P4-3	P4-4	P4-5	

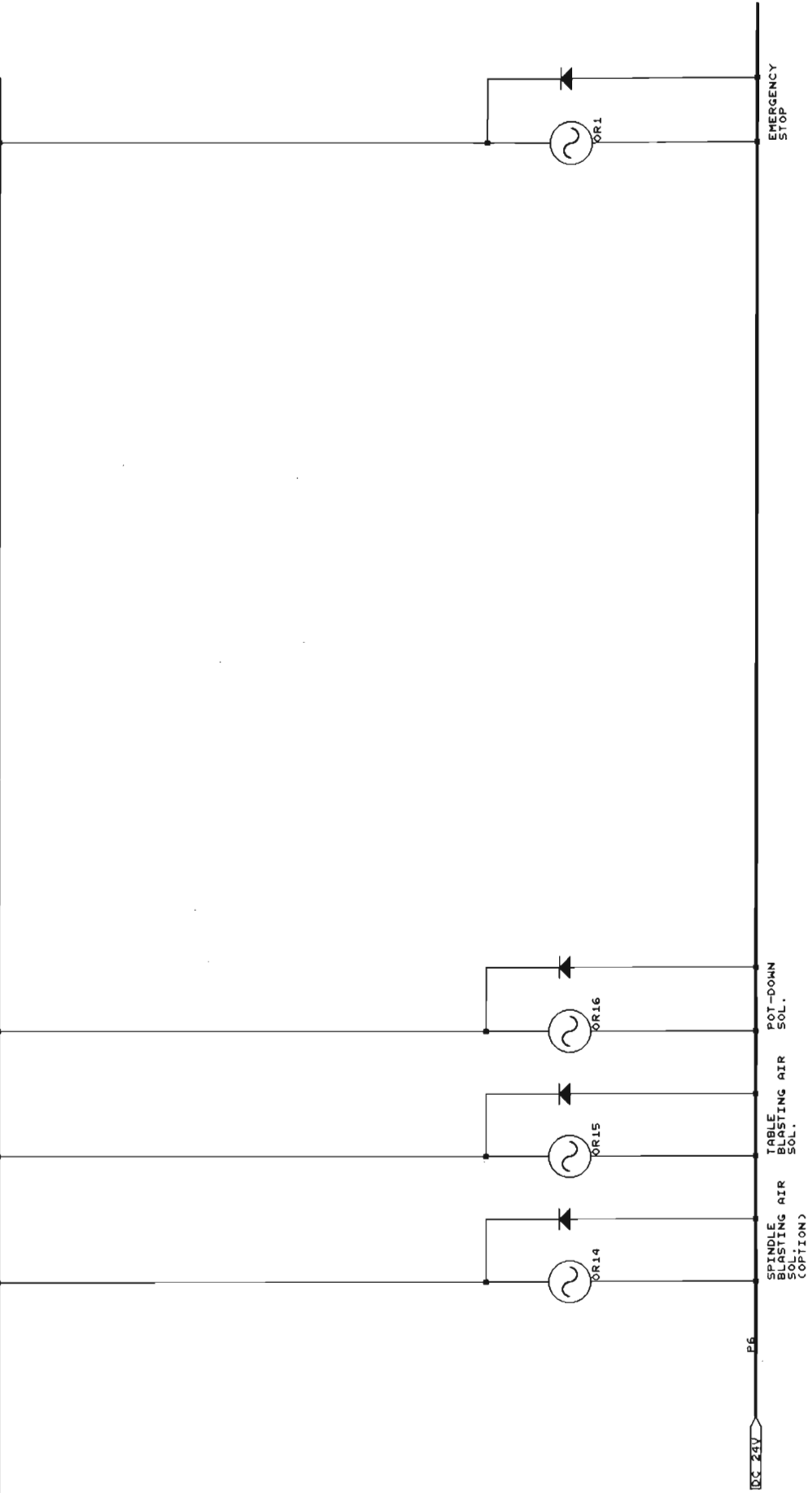


X41 (OUTPUT PORT)											
PORT											
INTERFACE	Y0.0	Y0.1	Y0.2	Y0.3	Y0.4	Y0.5	Y0.6	Y0.7	Y0.8	Y0.12	
ADDRESS											
CNC PIN NO.	X41-9	X41-10	X41-11	X41-12	X41-13	X41-14	X41-15	X41-16	X41-17	X41-21	
RELAY CARD PIN NO.	CN2-21	CN2-3	CN2-22	CN2-4	CN2-5	CN2-24	CN2-6	CN2-25	CN2-7	CN2-8	



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A3 I NO DIAGRAM-5	14
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PORT. INTERFACE		X41 (OUTPUT PORT)													
ADDRESS	YO.13	YO.14	YO.15	YO.16	YO.17	YO.18	YO.19	YO.20	YO.21	YO.22					YO.22
CNC PIN NO.	X41-22	X41-23	X41-24	X41-25	X41-26	X41-27	X41-28	X41-29	X41-30	X41-31					X41-31
RELAY CARD PIN NO.	CN2-27	CN2-9	CN2-28	CN2-10	CN2-29	CN2-11	CN2-30	CN2-12	CN2-31	CN2-2					CN2-2



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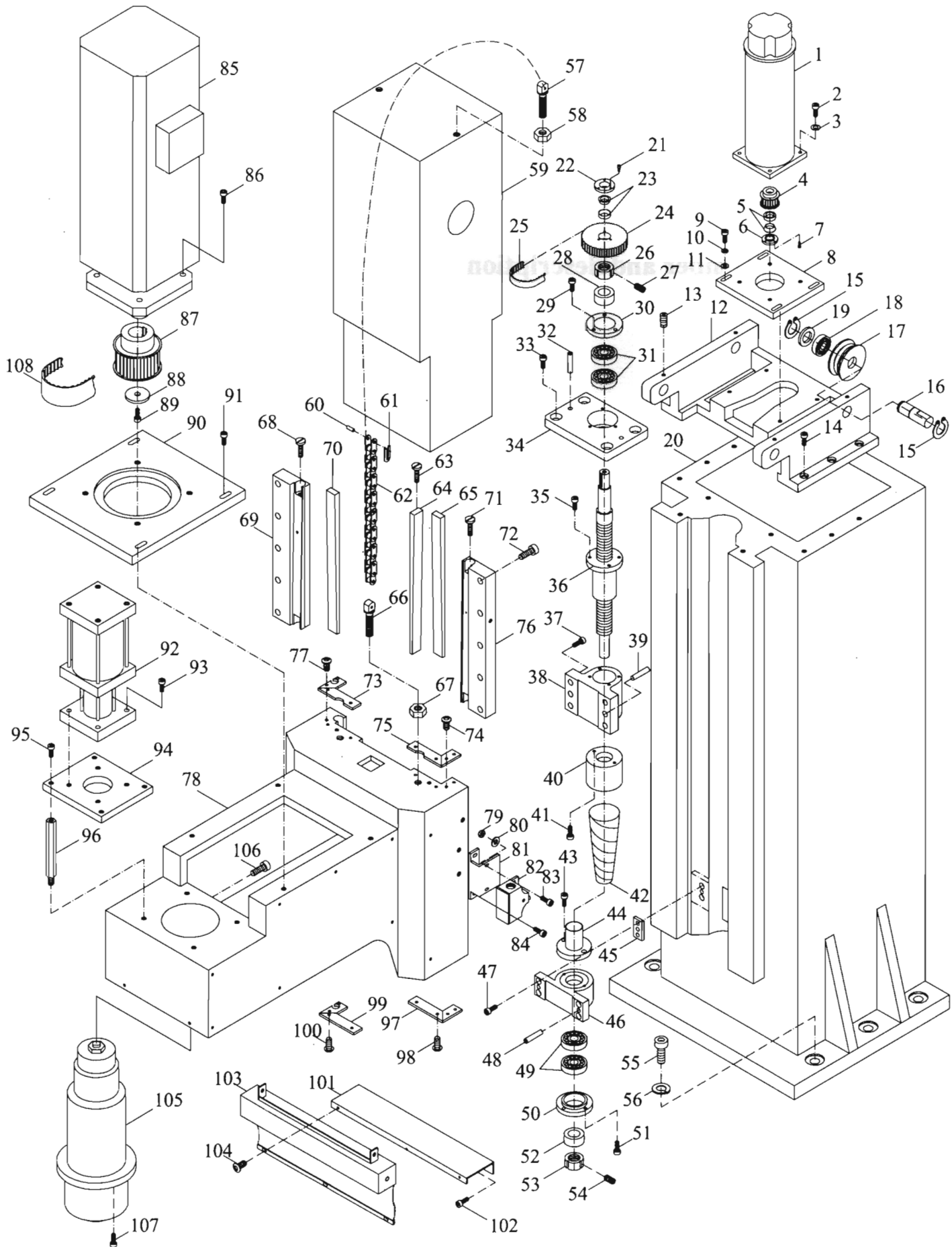
ACER-B

Mechanical Parts List

To order parts, please have the following information ready:

- 1. Year of production**
- 2. Model and serial number**
- 3. Item number and description**
- 4. Quantity**

EMC-2240 Z AXIS SECTION



EMC - 2240 Z AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QTY
1	MCCP-004	Servo Motor	1
2	MBSHS0830	Socket Head Cap Screw	4
3	MBSWM08	Spring Washer	1
4	MCCP-005	Motor Pulley (5GT30T)	1
5	MCCP-006	Pulley Sleeve Set (2428)	1
6	MCCP-007	Pulley End Cap	1
7	MBSHS0625	Socket Head Cap Screw	3
8	MBCZ-001	Z Axis Motor Plate	1
9	MBSHS0830	Socket Head Cap Screw	4
10	MBSWM08	Spring Washer	4
11	MBWM08	Washer	4
12	MBCZ-002	Chain Roller Seat	1
13	MBSS0806	Set Screw	8
14	MBSHS0825	Socket Head Cap Screw	6
15	MBSR25	Snap Ring	4
16	MBCZ-003	Chain Roller Shaft	4
17	MBCZ-004	Chain Wheel	4
18	MBNA4905	Ball Bearing NA4905R	4
19	MBCZ-005	Spacer	4
20	MBCZ-006	Column	1
21	MBSHS0625	Socket Head Cap Screw	3
22	MCCP-003	Pulley End Cap (2025)	1
23	MCCP-002	Pulley Sleeve Set	1
24	MCCP-001	Ball Screw Pulley (5GT60T)	1
25	MCTB5GT-600	Timing Belt	1
26	MBYSF-M25*1.5P	Lock Nut	1
27	MBSS0604	Set Screw	3
28	MBCZ-007	Spacer	1
29	MBSHS0615	Socket Head Cap Screw	3
30	MBCZ-008	Bearing Retainer	1
31	MBBST2562	Ball Bearing (Angular)	2
32	MBTP4#	Taper Pin	2

EMC - 2240 Z AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QTY
33	MBSHS1235	Socket Head Cap Screw	4
34	MBCZ-009	Z Axis Bearing Seat	1
35	MBSHS0612	Socket Head Cap Screw	5
36	MBCZ-010	Z Axis Ball Screw W/Nut	1
37	MBSHS1225	Socket Head Cap Screw	4
38	MBCZ-011	Ball Screw Nut Seat	1
39	MBTP4#	Taper Pin	2
40	MBCZ-012	Ball Screw Upper End Cover	1
41	MBSHS0612	Socket Head Cap Screw	2
42	MBCZ-013	Ball Screw Cover	1
43	MBSHS0612	Socket Head Cap Screw	2
44	MBCZ-014	Ball Screw Lower End Cover	1
45	MBCZ-015	Spacer Plate	2
46	MBCZ-016	Z Axis Ball Screw Bracket	1
47	MBSHS0825	Socket Head Cap Screw	4
48	MBTP4#	Taper Pin	2
49	MBTVP7205B	Ball Bearing (Angular)	2
50	MBXYZ7842	Bearing Retainer (X. Y. Z.)	1
51	MBSHS0615	Socket Head Cap Screw	3
52	MBXYZ4217	Spacer	1
53	MBYSR-M25*1.5P	Lock Nut	1
54	MBSS0604	Set Screw	3
55	MBSHS2080	Socket Head Cap Screw	7
56	MBSWM20	Spring Washer	7
57	MBCZ-017	Balancing Block Screw	2
58	MBNUTM14	Hex Nut	2
59	MBCZ-018-1	Balancing Block	1
60	MBRP5	Roller Pin (5/8x68+ 2)	2
61	MBSR5	Clip Ring (5/8x68+ 2)	2
62	MCCZ-001	Chain (5/8x68+ 2)	2
63	MB-3028	Gib Adj-Screw	2
64	MCCZ-002	Center Housing Gib (7x32x520)	1

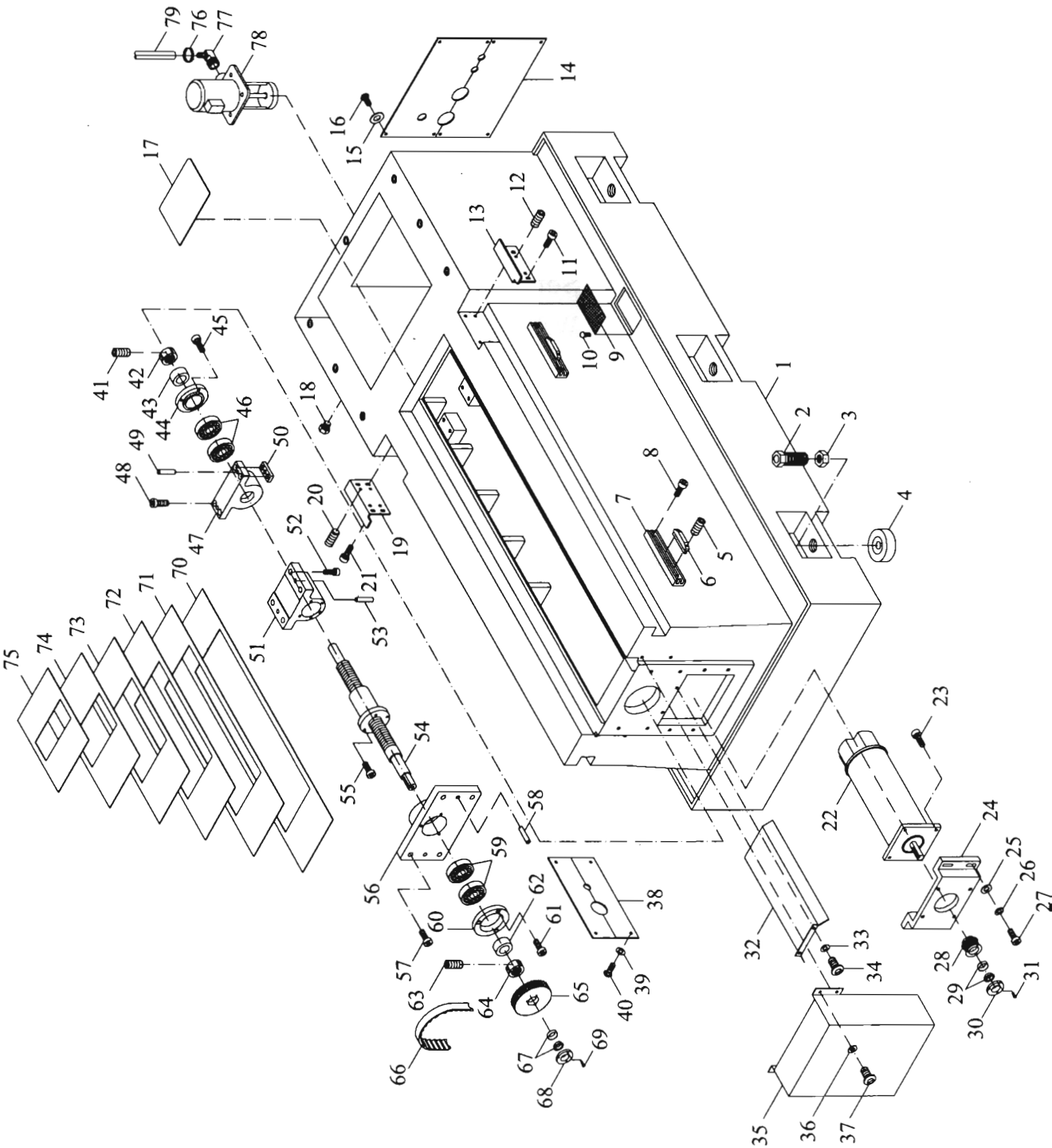
EMC - 2240 Z AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QTY
65	MCCZ-003	Right Housing Gib (7x25x520)	1
66	MBCZ-017	Balancing Block Screw	2
67	MBM14P2	Hex. Nut	2
68	MB-3028	Gib Adj-Screw	2
69	MCCZ-004	Left Gib Plate (32x77x420)	1
70	MCCZ-003	Left Housing Gib	1
71	MB-3028	Gib Adj-Screw	2
72	MBSHS1240	Socket Head Cap Screw	10
73	MBCZ-022	Left Housing Wiper (Top)	1
74	MBRHS0510	Round Head Socket Cap Screw	4
75	MBCZ-023	Right Housing Wiper (Top)	1
76	MCCZ-006	Right Gib Plate (32x77x420)	1
77	MBRHS0510	Round Head Socket Cap Screw	4
78	MCCZ-007	Spindle Housing	1
79	MBM06P1	Hex Nut	2
80	MBWM06	Washer	2
81	MCCZ-008	Travel Limit Bracket	1
82	MCCP-008	Travel Limit Switch	1
83	MBSHS0625	Socket Head Cap Screw	2
84	MBSHS0616	Socket Head Cap Screw	2
85	MCCZ-009	Spindle Servo Motor	1
86	MBSHS1235	Socket Head Cap Screw	4
87	MCCZ-010	Spindle Motor Pulley	1
88	MCCZ-011	End Washer	1
89	MBSHS1235	Socket Head Cap Screw	1
90	MCCZ-012	Spindle Motor Plate	1
91	MBSHS1240	Socket Head Cap Screw	4
92	MCCZ-013	Air Cylinder Ass'y	1
93	MBSHS1055	Socket Head Cap Screw	4
94	MCCZ-014	Air Cylinder plate	1
95	MBSHS1030	Socket Head Cap Screw	4
96	MCCZ-015	Cylinder Support Shaft	4

EMC - 2240 Z AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QT'Y
97	MBCZ-028	Right Housing Wiper (Lower)	1
98	MBRHS0510	Round Head Socket Cap Screw	4
99	MBCZ-029	Left Housing Wiper (Lower)	1
100	MBRHS0510	Round Head Socket Cap Screw	4
101	MBCZ-030	Bracket	1
102	MBSHS0608	Socket Head Cap Screw	2
103	MBCZ-031-1	Way Cover Assembly	1
104	MBRHS0506	Round Head Socket Cap Screw	3
105	MCCZ-016	Spindle Ass'y	1
106	MBSHS0635	Socket Head Cap Screw	1
107	MBSHS0825	Socket Head Cap Screw	6
108	MCTB8YU800	Leather Belt	1

EMC-2240 Y AXIS SECTION



EMC -2240 Y AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QT'Y
1	MBBY-001	Machine Base	1
2	MBBY-002	Leveling Screw	6
3	MBBY-003	Nut	6
4	MBBY-004	Leveling Pad	6
5	MBCP003	Special Set Screw	4
6	MBCP002	Limit Block	2
7	MBCP001	Limit Block Travel Rail	2
8	MBSHS0616	Socket Head Cap Screw	4
9	MBSMS-004	Filter	2
10	MBRD-001	Round HD Drive Screw	8
11	MBSHS0612	Socket Head Cap Screw	4
12	MBSS0610	Set Screw	4
13	MBSMS-005	Way Cover Bracket	1
14	MCBY-001	Base Back Cover Set	1
15	MBWM08	Washer	8
16	MBSHS0610	Socket Head Cap Screw	8
17	MBSMS-007	Y Axis Way Cover Plate	1
18	MB1/2PT	Plug	1
19	MBSMS-008	Way Cover Bracket	1
20	MBSS0610	Set Screw	4
21	MBSHS0612	Socket Head Cap Screw	4
22	MCCP-004	Servo Motor	1
23	MBSHS0830	Socket Head Cap Screw	4
24	MCBY-002	Y Axis Motor Plate	1
25	MBWM08	Washer	4
26	MBSWM08	Spring Washer	4
27	MBSHS0825	Socket Head Cap Screw	4
28	MCCP-005-1	Motor Pulley (5GT45T)	1
29	MCCP-006	Pulley Sleeve Set	1
30	MCCP-007	Pulley End Cap	1
31	MBSHS0625	Socket Head Cap Screw	3
32	MBSMS-009	Y Axis Motor Upper Cover Plate	1

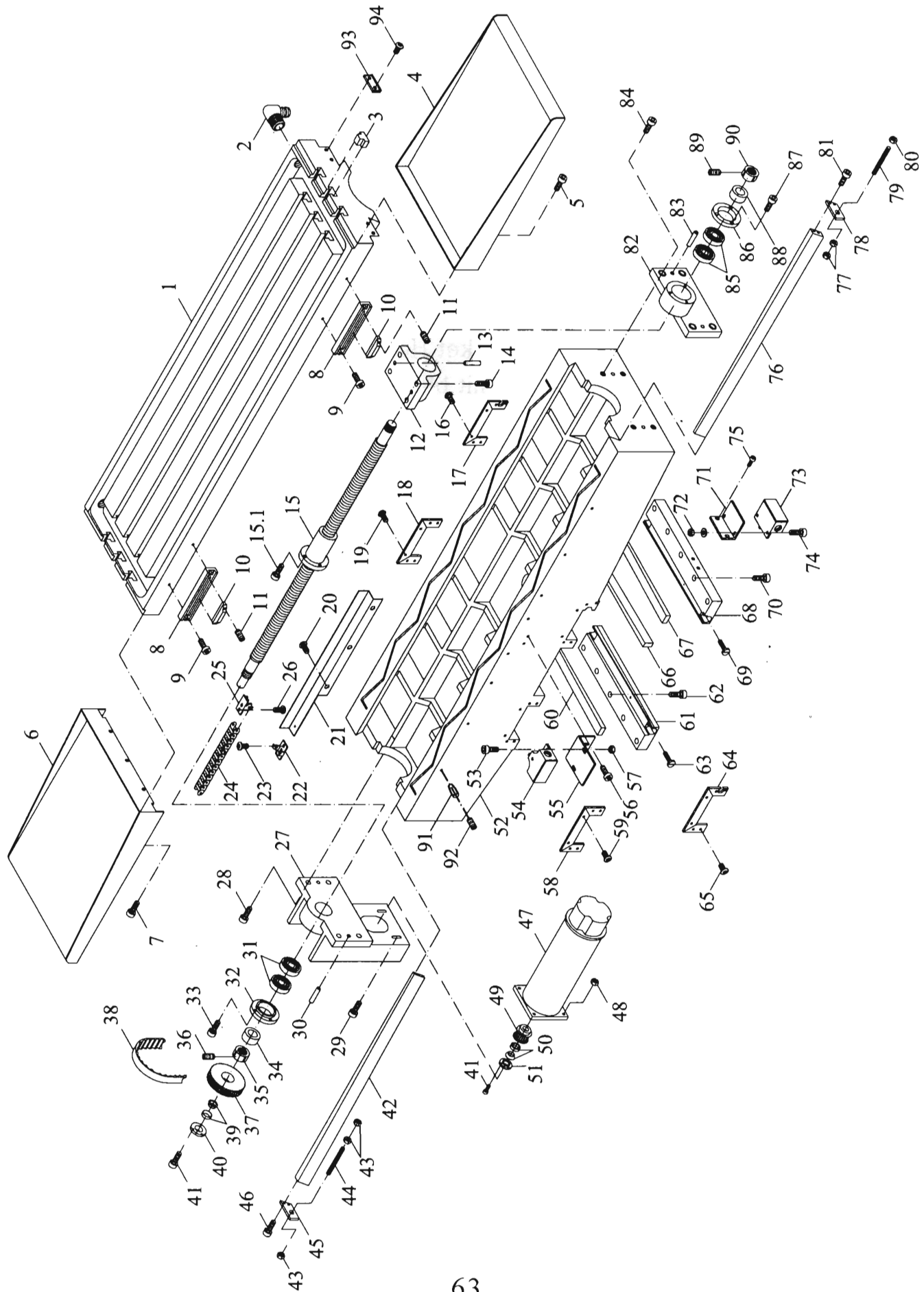
EMC -2240 Y AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QTY
33	MBWM06	Washer	2
34	MBSHS0610	Socket Head Cap Screw	2
35	MBSMS-010	Base Front Cover	1
36	MBWM06	Washer	4
37	MBSHS0610	Socket Head Cap Screw	4
38	MCBY-003	Left Cover Set	1
39	MBWM06	Washer	6
40	MBSHS0610	Socket Head Cap Screw	6
41	MBSS0604	Set Screw	3
42	MBYSR-M25*1.5P	Locknut	1
43	MBXYZ4217	Spacer	1
44	MBXYZ7842	Bearing Retainer	1
45	MBSHS0615	Socket Head Cap Screw	3
46	MBTVP7205B	Ball Bearing (Angular)	2
47	MBBY-005	Y Axis Ball Screw Bracket	1
48	MBSHS0825	Socket Head Cap Screw	4
49	MBTP4#	Taper Pin	2
50	MBCZ-015	Spacer Plate	2
51	MBTSX-003	Ball Screw Nut Seat	1
52	MBSHS1225	Socket Head Cap Screw	4
53	MBTP4#	Taper Pin	2
54	MBBY-006	Y Axis Ball Screw W/Nut	1
55	MBSHS0612	Socket Head Cap Screw	5
56	MBCZ-009	Y Axis Bearing Seat	1
57	MBSHS1235	Socket Head Cap Screw	4
58	MBTP4#	Taper Pin	2
59	MBBST2562	Ball Bearing (Angular)	2
60	MBTSX-007	Bearing Retainer	1
61	MBSHS0612	Socket Head Cap Screw	3
62	MBXYZ5017	Spacer 50X25X17	1
63	MBSS0604	Set Screw	3
64	MBYSR-M25*1.5P	Locknut	1

EMC -2240 Y AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QT'Y
65	MCCP-001	Ball Screw Pulley	1
66	MCTB5GT-600	Timing Belt	1
67	MCCP-002	Pulley Sleeve	1
68	MCCP-003	Pulley End Cap	1
69	MBSHS0625	Socket Head Cap Screw	3
70	MBSMS-012	Y Axis Way Cover Plate	1
71	MBSMS-012A	Y Axis Way Cover Plate	1
72	MBSMS-012B	Y Axis Way Cover Plate	1
73	MBSMS-012C	Y Axis Way Cover Plate	1
74	MBSMS-012D	Y Axis Way Cover Plate	1
75	MBSMS-012E	Y Axis Way Cover Plate	1
76	MBHC1/2	Hose Clamp	1
77	MB1/2PT1/2PE	Coolant Hose Connector (90 Degree)	1
78	MB1/8HP*2P-380	Coolant Pump	1
79	MBH1/2"	Coolant Hose	1

EMC-2240 X AXIS SECTION



EMC - 2240 X AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QT'Y
1	MBTSX-001	Table	1
2	MB1"PT*1E	90 Degree Coolant Hose Connector	2
3	MBTSX-002	Rubber Plug	6
4	MBSMS-001	Right Table End Cover	1
5	MBSHS0816	Socket Head Cap Screw	3
6	MBSMS-002	Left Table End Cover	1
7	MBSHS0816	Socket Head Cap Screw	3
8	MBCP001	Limit block Travel Rail	2
9	MBSHS0616	Socket Head Cap Screw	4
10	MBCP002	Limit block	4
11	MBCP003	Special Set Screw	8
12	MBTSX-003	Ball Screw Nut Seat (X. Y.)	1
13	MBTP4#	Taper Pin	2
14	MBSHS1225	Socket Head Cap Screw	4
15	MBTSX-004	X Axis Ball Screw W/Nut	1
15-1	MBSHS0612	Socket Head Cap Screw	5
16	MBRHS0510	Round Head Socket Cap Screw	6
17	MBTSX-005	Right Saddle Way Wiper (Rear)	1
18	MBTSX-006	Left Saddle Way Wiper (Rear)	1
19	MBRHS0510	Round Head Socket Cap Screw	6
20	MBRHS0608	Round Head Socket Cap Screw	3
21	MBSMS-003	Guide Rail	1
22	MBSQ604-U	Protector Flange	1
23	MBRHS0406	Round Head Socket Cap Screw	2
24	MBSQ604-R20	Cable Protector Housing	1
25	MBSQ604-L	Protector Flange	1
26	MBRHS0406	Round Head Socket Cap Screw	2
27	MBTSX-001	X Axis Servo Motor Bracket	1
28	MBSHS1225	Socket Head Cap Screw	4
29	MBSHS0830	Socket Head Cap Screw	4
30	MBTP4#	Taper Pin	2
31	MBBST2562	Ball Bearing (Angular)	2
32	MBTSX-007	Bearing Retainer	1

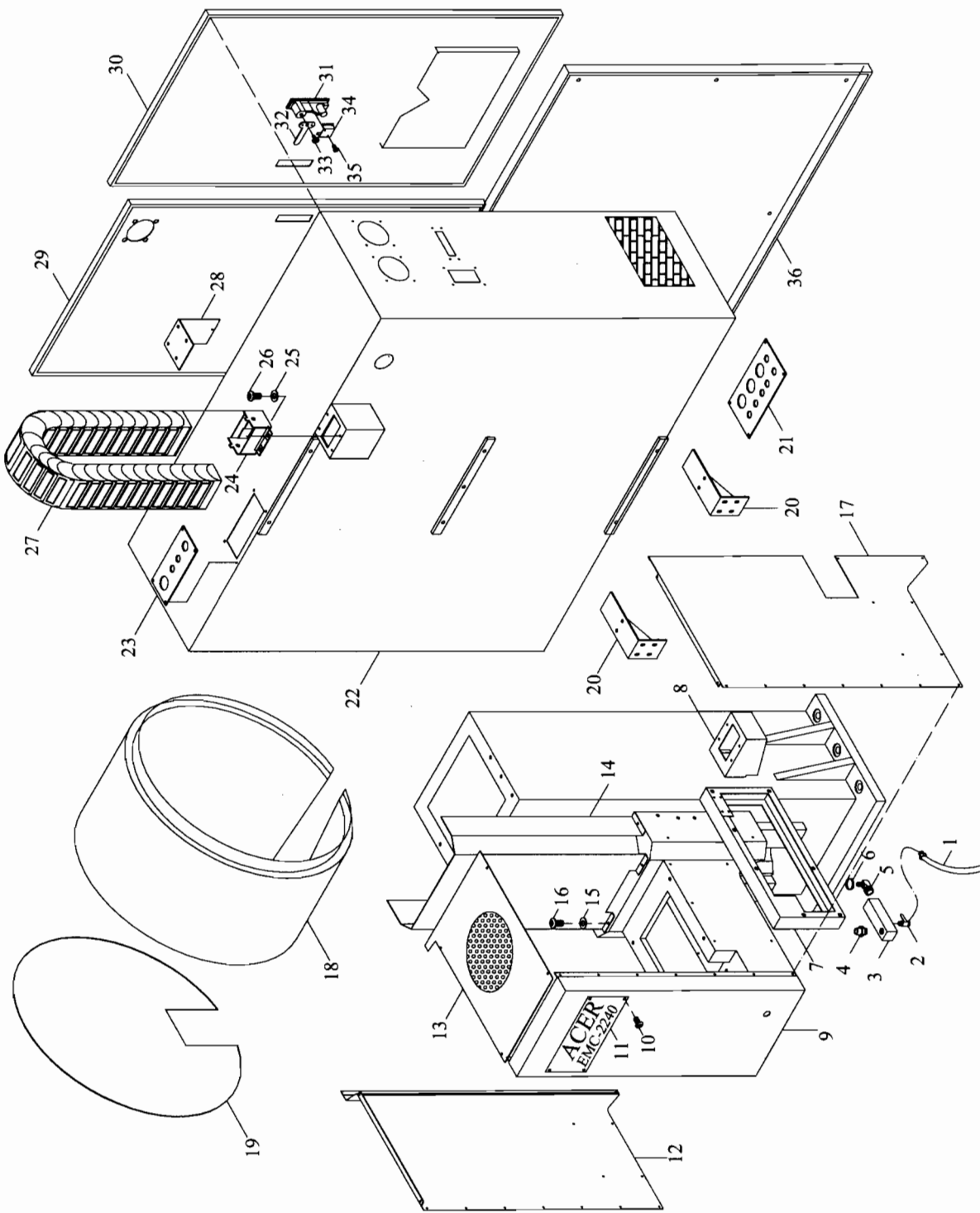
EMC - 2240 X AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QTY
33	MBSHS0615	Socket Head Cap Screw	3
34	MBXYZ5017	Spacer 50X25X17	1
35	MBYSR-M25*1.5P	Lock Nut	1
36	MBSS0604	Set Screw	3
37	MCCP-001	Ball Screw Pulley	1
38	MCTB5GT600	Timing Belt	1
39	MCCP-002	Pulley Sleeve Set (2025)	1
40	MCCP-003	Pulley End Cap	1
41	MBSHS0625	Socket Head Cap Screw	6
42	MBTSX-008-1	Left Table Gib	1
43	MBNUTM10	Hex Nut	2
44	MBTSX-009	Threaded Stud	1
45	MBTSX-010	Gib Detent Plate	1
46	MBSHS0612	Socket Head Cap Screw	2
47	MCCP-004	Servo Motor	1
48	MBNUTM08	Hex Nut	4
49	MCCP-005-1	Motor Pulley (5GT45T)	1
50	MCCP-006	Pulley Sleeve Set (2428)	1
51	MCCP-007	Pulley End Cap	1
52	MBTSX-011	Saddle	1
53	MBSHS0620	Socket Head Cap Screw	2
54	MCCP-008	Travel Limit Switch	1
55	MCTSX-002	Travel Limit Switch Bracket	1
56	MBSHS0612	Socket Head Cap Screw	2
57	MBNUTM05	Hex Nut	2
58	MBTSX-013	Left Saddle Way Wiper (Front)	1
59	MBRHS0510	Round Head Socket Cap Screw	6
60	MBTSX-021	Left Lower Adj-Gib	1
61	MBTSX-014	Left Gib Plate	1
62	MBSHS1240	Socket Head Cap Screw	5
63	MB-3028	Gib Adj-Screw	2
64	MBTSX-015	Right Saddle Way Wiper (Front)	1

EMC - 2240 X AXIS SECTION

ITEM NO.	PART NO.	DESCRIPTION	QT'Y
65	MBRHS0510	Round Head Socket Cap Screw	6
66	MBTSX-016	Center Adj-Gib	1
67	MBTSX-021	Right/Lower Gib	1
68	MBTSX-017	Right/Lower Gib Plate	1
69	MB-3028	Gib Adj-Screw	4
70	MBSHS1240	Socket Head Cap Screw	5
71	MCTSX-003	Travel Limit Switch Bracket	1
72	MBNUTM05	Hex Nut	2
73	MCCP-008	Travel Limit Switch	1
74	MBSHS0620	Socket Head Cap Screw	2
75	MBSHS0612	Socket Head Cap Screw	2
76	MBTSX-008	Right Table Gib	1
77	MBNUTM10	Hex. Nut	2
78	MBTSX-010	Gib Detent Plate	1
79	MBTSX-009	Threaded Stud	1
80	MBNUTM10	Hex Nut	2
81	MBSHS0612	Socket Head Cap Screw	2
82	MBTSX-020	X Axis Bearing Seat	1
83	MBTP4#	Taper Pin	2
84	MBSHS1235	Socket Head Cap Screw	4
85	MBTVP7205B	Ball Bearing (Angular)	2
86	MBXYZ7842	Bearing Retainer	1
87	MBSHS0615	Socket Head Cap Screw	3
88	MBXYZ4217	Spacer	1
89	MBSSW5/16	Set Screw	3
90	MBYSR-M25*1.5P	Lock Nut	1
91	MBTSX-024	Saddle Lock Plunger 20LX62	2
91-1	MBTSX-025	Saddle Lock Plunger 25LX6	6
92	MBSSW1/2	Set Screw	8
93	MBTSX-023	Table Wiper	4
94	MBRHS0510	Round Head Socket Cap Screw	8

EMC-2240 SHEET METAL SECTION I



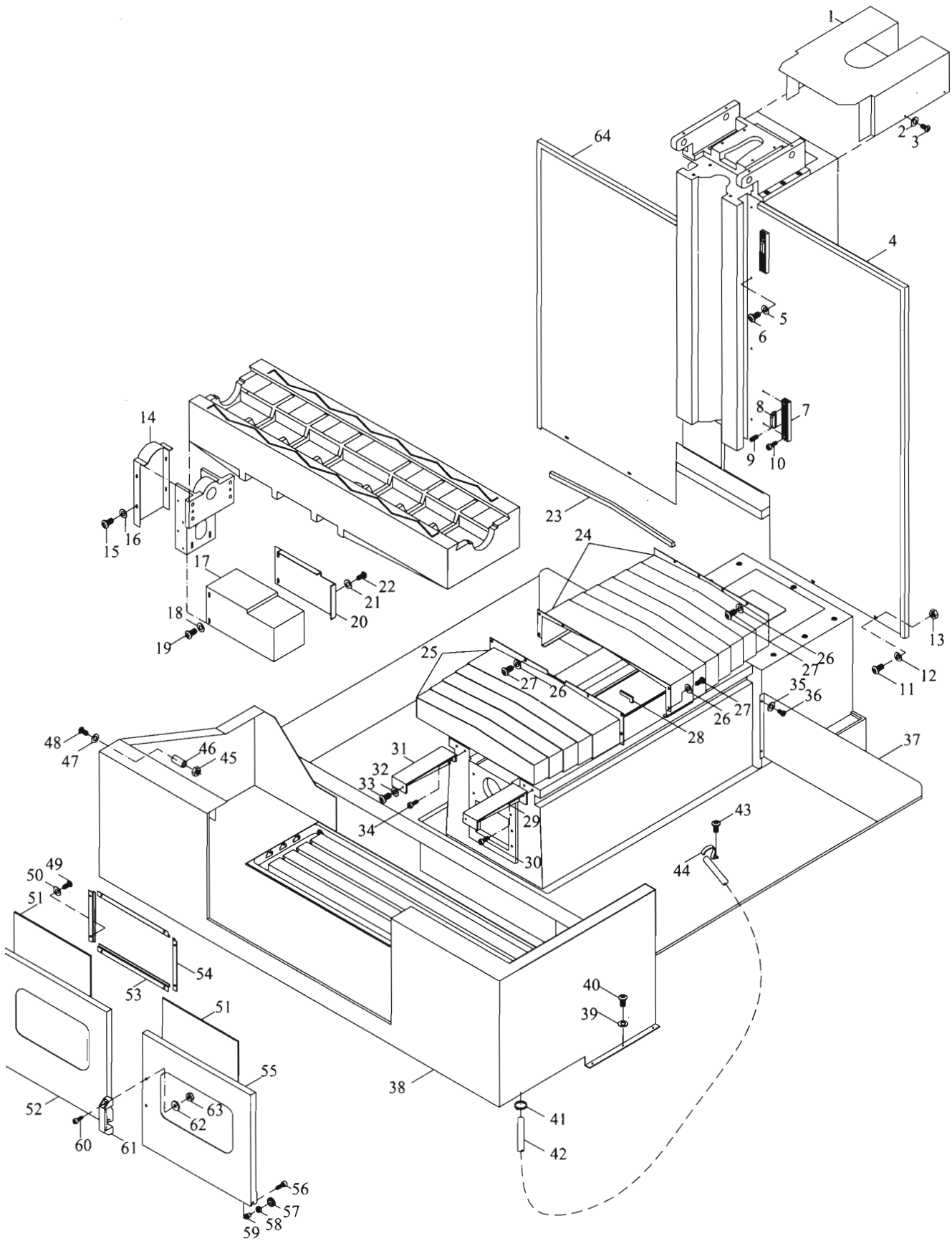
EMC-2240 SHEET METAL SECTION I

ITEM NO.	PART NO.	DESCRIPTION	QT'Y
1	MCSMS-002	Coolant Nozzle	4
2	MCSMS-003	Valve	4
3	MCSMS-004	Coolant Distributor	1
4	MCSMS-005	Air Blast Fitting	1
5	MB1/2PT5/8PT	90 Degree Elbow Fitting	1
6	MBHC1/2	Hose Clamp	1
7	MCSMS-006	Housing Coolant Bracket	1
8	MCSMS-007	Head Housing Connector Box	1
9	MCSMS-008	Front Housing Cover	9
10	MBRHS0608	Round Head Socket Cap Screw	4
11	MBEMC-2240	ACER Name Plate	1
12	MCSMS-009	Light Housing Cover	1
13	MCSMS-010	Top Housing Cover	1
14	MBSMS-022	Upper Housing Cover	1
15	MBWM06	Washer	4
16	MBRHS0612	Round Head Socket Cap Screw	4
17	MCSMS-011	Right Housing Cover	1
18	MCSMS-012	ATC Disk Cover	1
19	MCSMS-013	ATC Cover (Acrylic)	1
20	MCSMS-014	Bracket	2
21	MCSMS-015	Wire Connection Plate	1
22	MCSMS-016	Electric Cabinet	1
23	MCSMS-017	Wire Connection Plate	1
24	MBSQ-302B	Cable Protector Housing Bracket	1
25	MBWM06	Washer	4
26	MBRHS0612	Round Head Socket Cap Screw	4
27	MBSQ-302	Cable Protector Housing	1
28	MCSMS-018	Main Power Bracket	1
29	MCSMS-019	Right Cabinet Door	1
30	MCSMS-020	Left Cabinet Door	1
31	MCSMS-021	Main Door Lock Body	1
32	MCSMS-022	Door Lock Swing Arm	1

EMC-2240 SHEET METAL SECTION I

ITEM NO.	PART NO.	DESCRIPTION	QTY
33	MCSMS-023	Round Head Special Screw	1
34	MCSMS-024	Swing Arm Locating Plate	1
35	MBRHS0406	Round Head Socket Cap Screw	2
36	MCSMS-028	Electric Assemole Plat	1
	MCSMS-027	Table Fixed Slice	1

EMC-2240 SHEET METAL SECTION II



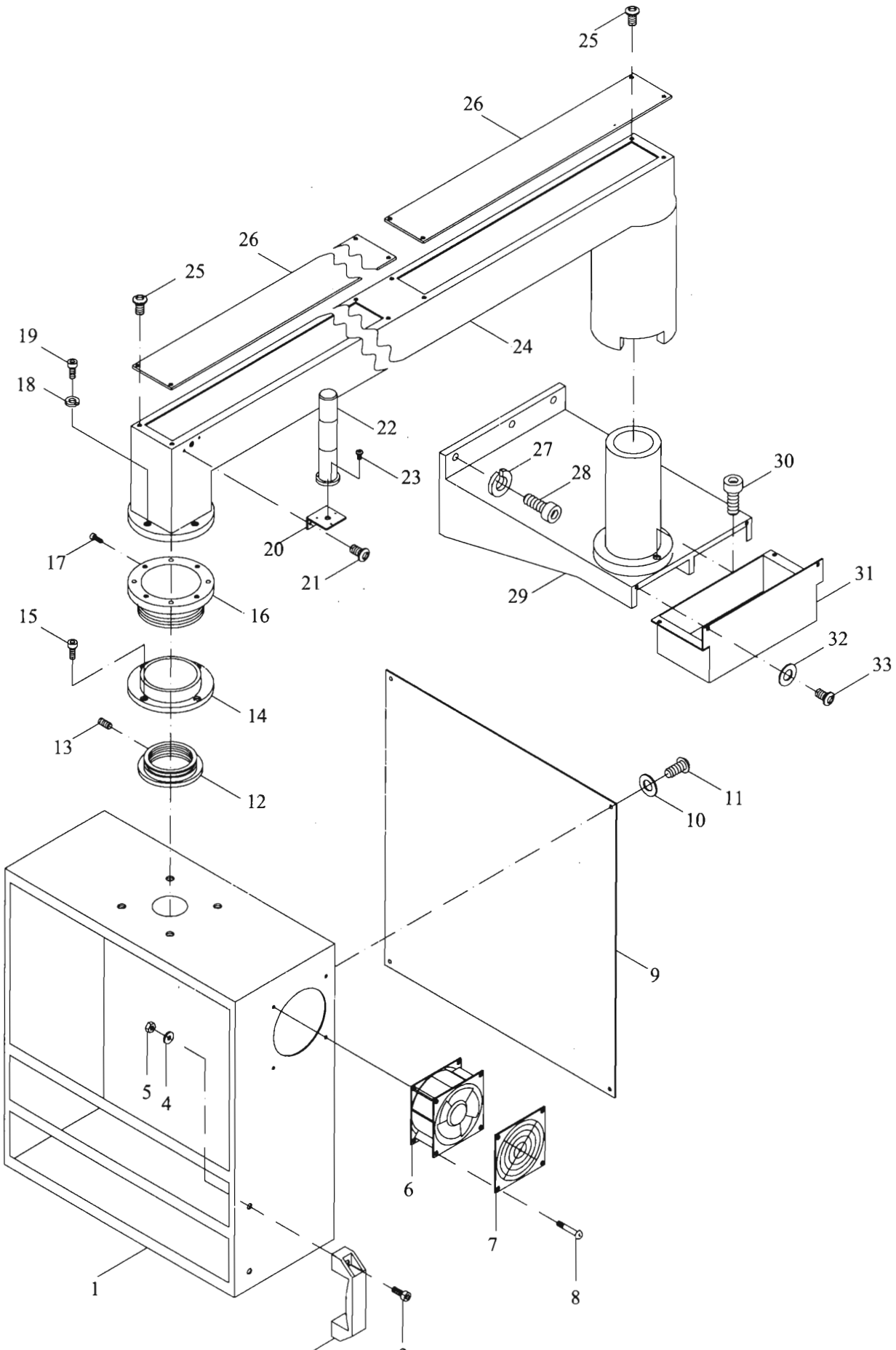
EMC-2240 SHEET METAL SECTION II

ITEM NO.	PART NO.	DESCRIPTION	QTY
1	MBSMS-016	Column Top Cover	1
2	MBWM06	Washer	10
3	MBRHS0608	Round Head Socket Cap Screw	10
4	MBSMS-019	Right Column Side Guard	1
5	MBWM06	Washer	6
6	MBRHS0608	Round Head Socket Cap Screw	6
7	MBCP-001	Limit Block	4
8	MBCP-002	Limit Block Travel Rail	2
9	MBCP-003	Special Set Screw	4
10	MBSHS1240	Socket Head Cap Screw	4
11	MBRHS0608	Round Head Socket Cap Screw	4
12	MBWM06	Washer	4
13	MBNUTM06	Hex Nut	4
14	MBSMS-023	X Axis Motor Bracket Cover	1
15	MBRHS0608	Round Head Socket Cap Screw	4
16	MBWM06	Washer	4
17	MCSMS-025	X Axis Motor Cover	1
18	MBWM06	Washer	2
19	MBRHS0608	Round Head Socket Cap Screw	2
20	MCSMS-026	X Axis Motor Side Cover	1
21	MBWM06	Washer	4
22	MBRHS0608	Round Head Socket Cap Screw	4
23	MBCP-004	Wiper Plate	10
24	MBCP-005	Back Metal Way Cover	1
25	MBCP-006	Front Metal Way Cover	1
26	MBWM06	Washer	16
27	MBRHS0608	Round Head Socket Cap Screw	16
28	MBCP-007	Plastic Guide	18
29	MBSMS-026	Right Way Cover Bracket	1
30	MBSHS1240	Socket Head Cap Screw	2
31	MBSMS-027	Left Way Cover Bracket	1
32	MBWM06	Washer	2

EMC-2240 SHEET METAL SECTION II

ITEM NO.	PART NO.	DESCRIPTION	QTY
33	MBRHS0608	Round Head Socket Cap Screw	2
34	MBSHS1240	Socket Head Cap Screw	2
35	MBWM06	Washer	4
36	MBRHS0608	Round Head Socket Cap Screw	4
37	MBSMS-028	Coolant Chip Pan	1
38	MBSMS-029	Table Splash Guard	1
39	MBWM06	Washer	25
40	MBRHS0608	Round Head Socket Cap Screw	25
41	MBCH1"	Hose Clamp	2
42	MBH1"	Hose	2
43	MBRHS0608	Round Head Socket Cap Screw	2
44	MBCP-008	Hose Set Clamp	2
45	MBNUTM06	Hex Nut	2
46	MBCP-009	PU Plastic	2
47	MBWM06	Washer	2
48	MBRHS0608	Round Head Socket Cap Screw	2
49	MBRHS0608	Round Head Socket Cap Screw	16
50	MBWM06	Washer	16
51	MBCP-010	Acrylic Board	2
52	MBSMS-030	Left Moving Door	1
53	MBSMS-031	Acrylic Cocating Plate Long	4
54	MBSMS-032	Acrylic Cocating Plate Short	4
55	MBSMS-033	Right Moving Door	1
56	MBSHS1240	Socket Head Cap Screw	6
57	MBCP-011	Roller Wheel	6
58	MB627	Bearing 627ZZCNM/1KT	6
59	MBCP-012	Special Nut	6
60	MBSHS0825	Socket Head Cap Screw	4
61	MCCB-002	Side Handle	2
62	MBWM08	Washer	4
63	MBNUTM08	Hex Nut	4
64	MCSMS-001	Left Column Side Guard	1

EMC-2240 CONTROL BOX & ITS ARM ASSEMBLY



EMC-2240 CONTROL BOX SECTION

ITEM NO.	PART NO.	DESCRIPTION	QTY
1	MCCB-001	Control Box	1
2	MCCB-002	Side Handle	1
3	MBSHS0825	Socket Head Cap Screw	2
4	MBWM08	Washer	2
5	MBNUT08	Hex Nut	2
6	MCCB-003	Fan (110V)	1
7	MCCB-004	Fan Cover	1
8	MBRSH0455	Round Head Socket Cap Screw	4
9	MCCB-005	Brack Cover	1
10	MBWM04	Washer	6
11	MBRSH0410	Round Head Socket Cap Screw	6
12	MBVCB12A	Bracket Ring Cover	1
13	MBSS0806	Set Screw	1
14	MBVCB02A	Box Ring Adaptor	1
15	MBSHS0625	Socket Head Cap Screw	4
16	MBVCB03A	Control Arm Ring Adaptor	1
17	MBSHS0825	Socket Head Cap Screw	1
18	MBSWM06	Spring Washer	4
19	MBSHS0620	Socket Head Cap Screw	4
20	MCCB-006	Bracket Of Warning Light	1
21	MBRSH0612	Round Head Socket Cap Screw	2
22	MCCB-007	Warning Light (3 Color)	1
23	MBRSH0410	Round Head Socket Cap Screw	3
24	MCCB-008	Control Arm	1
25	MBRSH0506	Round Head Socket Cap Screw	8
26	MBVCB016A	Arm Cover	2
27	MBSWM10	Spring Washer	6
28	MBSHS1025	Socket Head Cap Screw	6
29	MCCB-009	Connector Bracket	1
30	MBSHS0816	Socket Head Cap Screw	1
31	MCCB-0010	Connector Bracket Cover	1
32	MBWM06	Washer	4
33	MBRSH0612	Round Head Socket Cap Screw	4
34	MCCB-0011	Transformer Fixed Seat & Prop Sta	1

13. ATC Operation Manual & Parts List

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CAT-40 & BT-40 ARM-TYPE AUTOMATIC TOOL CHANGING SYSTEM INSTRUCTION

- 1. This system uses gear-box and cylindrical cam reel to reduce the speed. The stepping motor with an automatic brake drives the cylindrical cam reel to produce the index angle, thus repositioning the tool pot. While the tool pot is on position, the pneumatic cylinder will push the ratchet cam to make the clamping jaws to go up and down. The motion of the clamping jaws, then drive the tool pot to rotate horizontally and vertically. This in turn will make the tool change quickly and smoothly.**
- 2. Every rotation of the cylindrical cam will drive the magazine for one tool movement. On each 360° rotation of the cylindrical cam, the cam only moves 270°. And the remaining 90° angle, the cam will have no motion. This design will ensure the motor brakes and stops on position. (The rotation angle of the braking motor will be 45°±20°)**
- 3. The effective rotation angle for the clamping cam is approximately 100°±10°.**
- 4. The motor is 3Phase/ 200V/200W. The gear reducing ratio is 1 : 20.**

The attached automatic motor brake can rotate either clockwise (CW) or counter clockwise (CCW). For every indexing, the moving time, in theory, is 0.7 second, and the complete indexing cycle (20/24 index) will take 14/16.8 seconds.

- 5. The dimension of the clamping cylinder is 50mm×100mm. Its travel distance is detected by a magnetic ring.**
- 6. The solenoid valve is 2 phases, 24V, 1/4"PT. (For pneumatic ATC).**
- 7. The proximity sensors: BALLUFF(ISO-9001) REG NO: 19279-01**

Specification : M12×1, detecting distance 2mm, Voltage:10-30V DC ≤

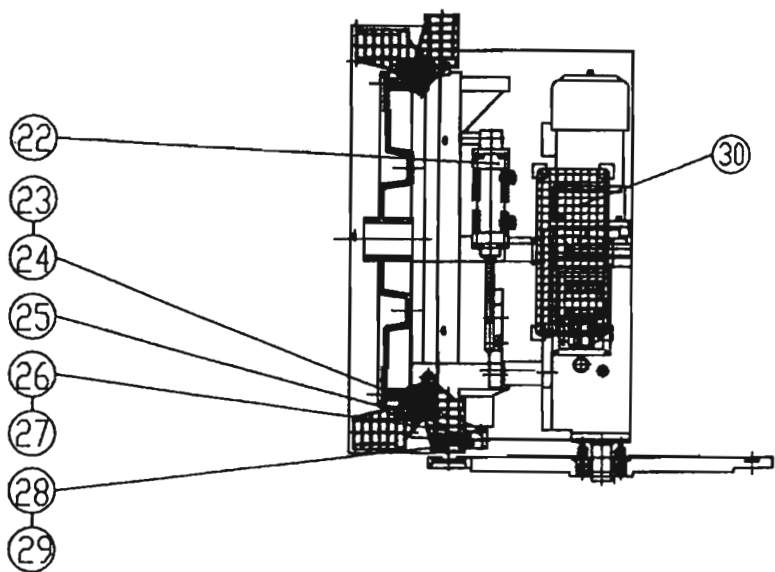
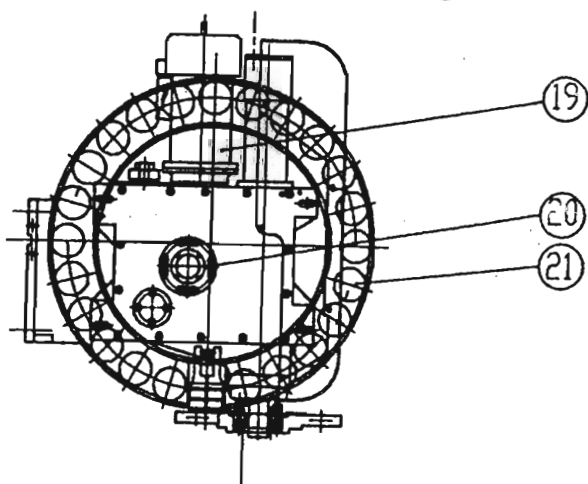
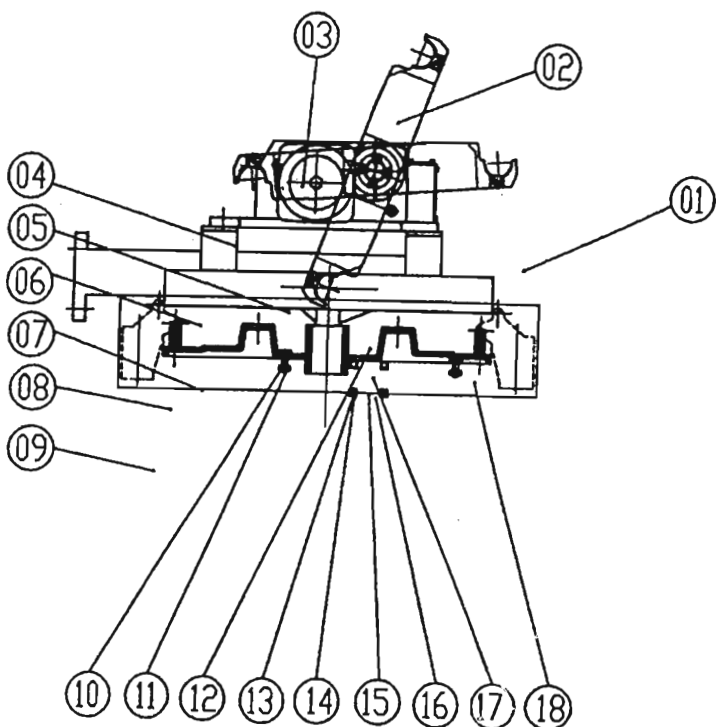
130mA ≤ 800HZ PNP 3 cords.

- 8. The distribution diagram of the pneumatic cylinder and electro magnetic valve & cam-type connecting diagram of circuit are in showed fig (1). (For pneumatic ATC).**
- 9. Tool capacity: 20/24 tool magazine with tool holders; Max. Tool size: 80mm.**
- 10. Max. Tool length: 300mm.**
- 11. Max. Tool Weight: 80kg.**
- 12. The material of the tool pot is nylon mixes with 33% of fiberglass. It is one piece injection molded, with a weight tolerance of up to 100kg, and its thermo tolerance is 120°C to -20°C.**
- 13. The counting and positioning of the rotation is controlled by a PLC. It**

uses proximity switches to detect, and execute tool indexing by selecting the nearest path. This tool change design can rotate clockwise (CW) or counterclockwise (CCW) depending on selection.

14. The total weight of the automatic tool changing system is approximately 140kg with exclusion of the clamping arm and cover. Note: the weight of the tool body and plate is light, but they still have high rigidity. The cylinder and drive motor are located on the back-side of the tool magazine. This will allow for convenient maintenance and repair.
15. For the drawing and the size of the tool magazine, please refer to fig (2).

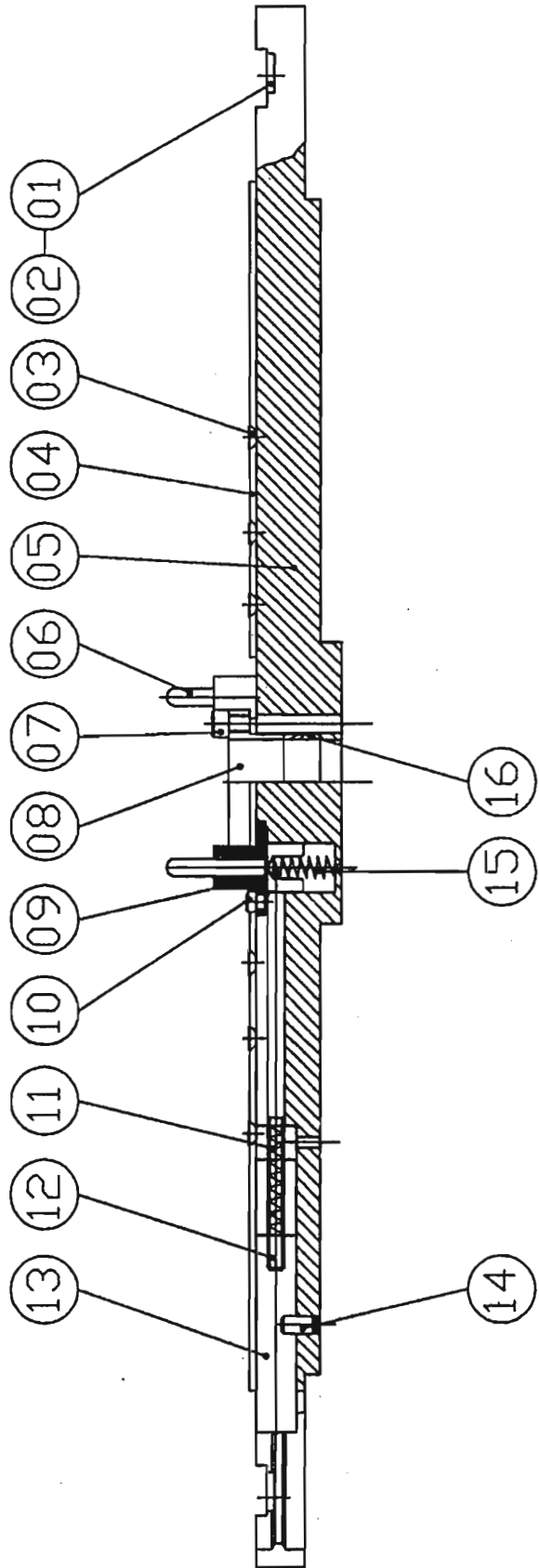
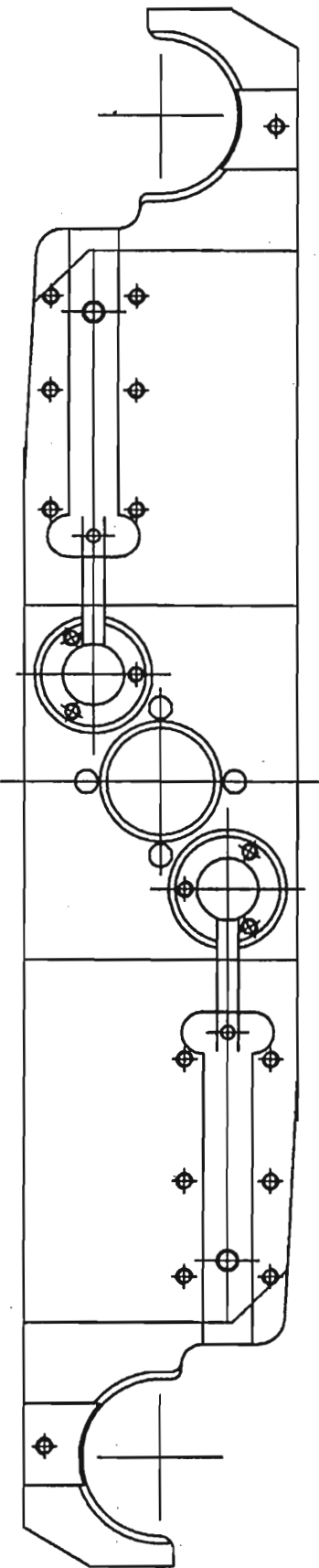
Body & Magazine Plate Assembly Parts Diagram



BODY & MAGAZINE PLATE ASSEMBLY PARTS DIAGRAM

Item	Part no.	Description	Material/Specification	Quantity	Remark
1	MB-4049-2	ATC Cover	SPHC	1	
2	MB-403	Arm Assembly		1	
3	MB-405	DEX II Assembly		1	
4	MB-4064-5	Plate	S45C	1	
5	MB-401	MOTOR/CAM Assembly		1	
6	MB-4001	Pot Body	FC-25	1	
7	MB-404	Tool Pot Assembly		1	
8					
9	MB-4037	Body Cover	SPHC	1	
10	Commercial Products	Bearing	CF-10	24	
11	Commercial Products	Hex Nut	M10*p1.5	24	
12	Commercial Products	Socket HD Cap Screw	M10*p1.5*35L	1	
13	Commercial Products	Bearing	6008ZZ	2	
14	Commercial Products	Set Screw	M6*1.0P*6L	4	
15	Commercial Products	Socket HD Cap Screw	M8*1.25P*20L	1	
16	MB-4004	Shaft Cover	S45C	1	
17	MB-4003-1	Shaft	S45C	1	
18	MB-4002	Disk	FC-25	1	
19					
20	MB-4067	Number Plate	Acrylic	1	
21	Commercial Products	Number Mark		1	
22	MB-402	Pot Up-Down Assembly		1	
23	Commercial Products	Socket HD Cap Screw	M8*1.25P*25L	2	
24	Commercial Products	Spring	φ 8	2	
25	MB-4007-1	Tool Support	FC-25	1	
26	Commercial Products	Socket HD Cap Screw	M8*1.25P*25L	2	
27	Commercial Products	Spring	φ 8	2	
28	Commercial Products	Set Screw	M8*1.25P*35L	2	
29	Commercial Products	Nut	M8*1.25P	2	
30	MB-5304	Cover	Acrylic	1	

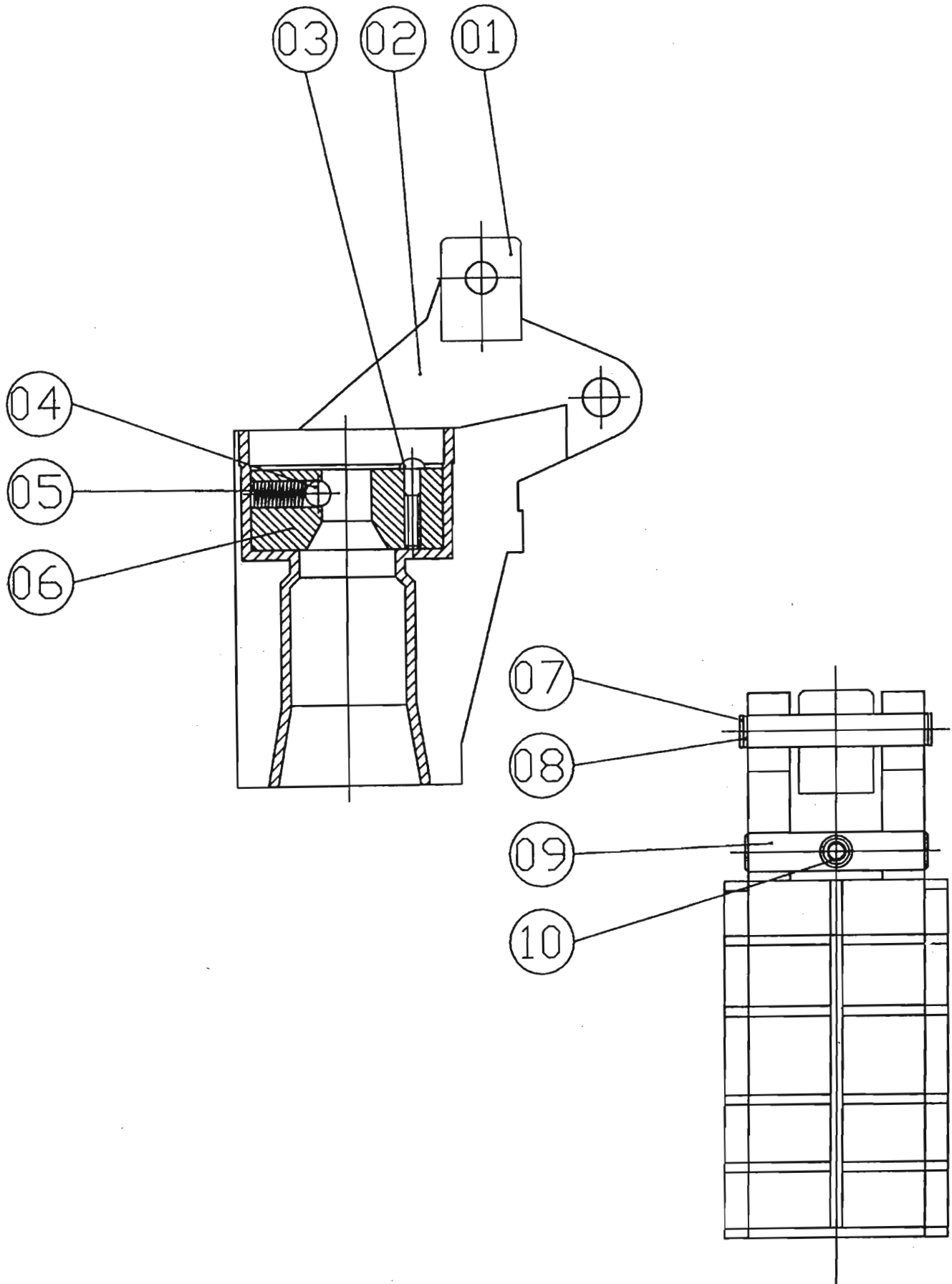
Arm Assembly Parts



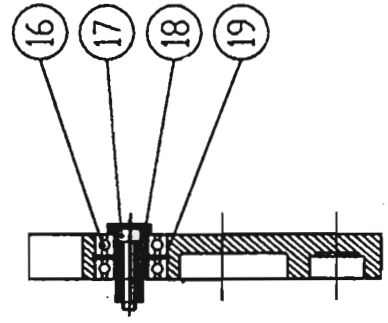
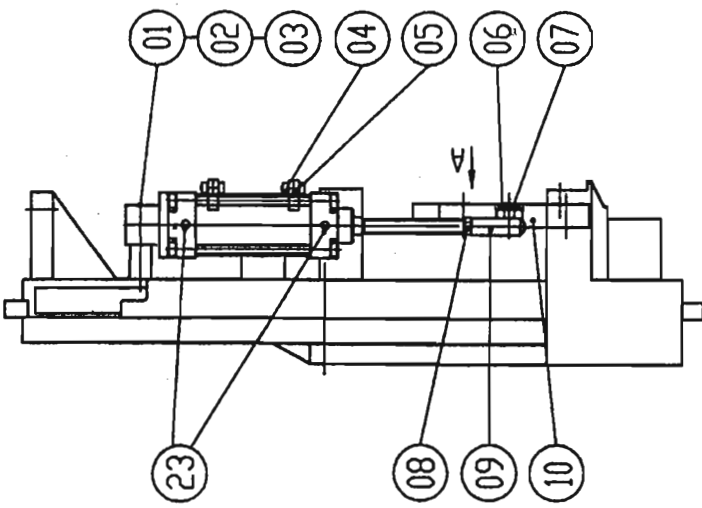
ARM ASSEMBLY PARTS

No.	Part no.	Description	Specification	Dimension	Quantity
1	MB-4034	Home key	60°		2
			65°		2
			70°		2
2	Commercial Products	Socket Flat Cap Screw	M6*1.0p*15L		2
3	Commercial Products	Socket Flat Cap Screw	M6*1.0p*15L		12
4	MB-4028	Case	430mm	114mm	2
			460mm	129mm	2
			500mm	149mm	2
			530mm	164mm	2
			600mm	199mm	2
5	MB-4025	Arm	BT · CAT · HSK	430mm	1
				460mm	1
				500mm	1
				530mm	1
				600mm	1
6	MB-4030	Pin	BT	64mm	2
			460mm	129mm	2
			500mm	149mm	2
			530mm	164mm	2
			600mm	199mm	2
7	Commercial Products	Socket HD Cap Screw	M8*1.25p*50L		4
8	MB-4035	Case			1
9	MB-4033	Pin Plate	Standard	24mm	2
			Dex2	21mm	2
10	Commercial Products	Socket HD Cap Screw	M6*1.0p*15L		6
11		Spring 1	φ 1.1 × φ 9 × 14T × 41L		2
12	MB-4029	Motion pin	430mm	65mm	2
			460mm	80mm	2
			500mm	100mm	2
			530mm	115mm	2
			600mm	150mm	2
13	MB-4032	Stop Movement			2
14	MB-4031	Pin		φ 8 × 16L	2
15		Spring 2	φ 1.2 × φ 11 × 20T × 78.5L		2
16	Commercial Products	Taper Sleeve Set	φ 40 × φ 45		1

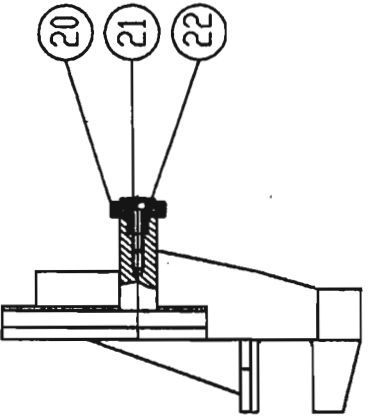
Tool Pot Assembly Part Diagram



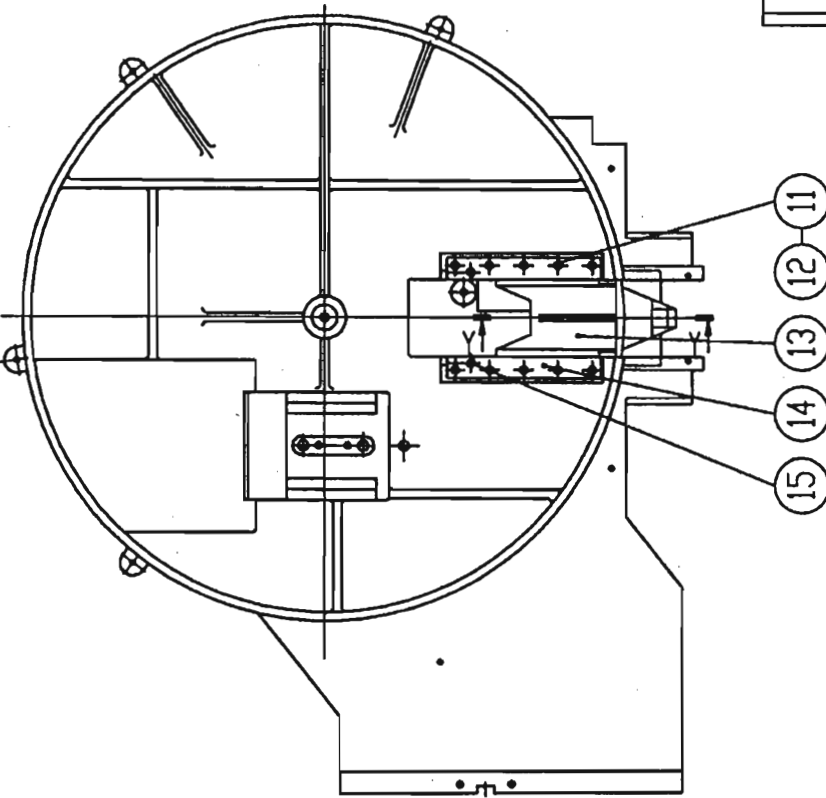
Tool Pot up-down Mechanism Assembly Part Diagram



Z-Z 剖视图, S=2/1



Y-Y 剖视图, S=2/1

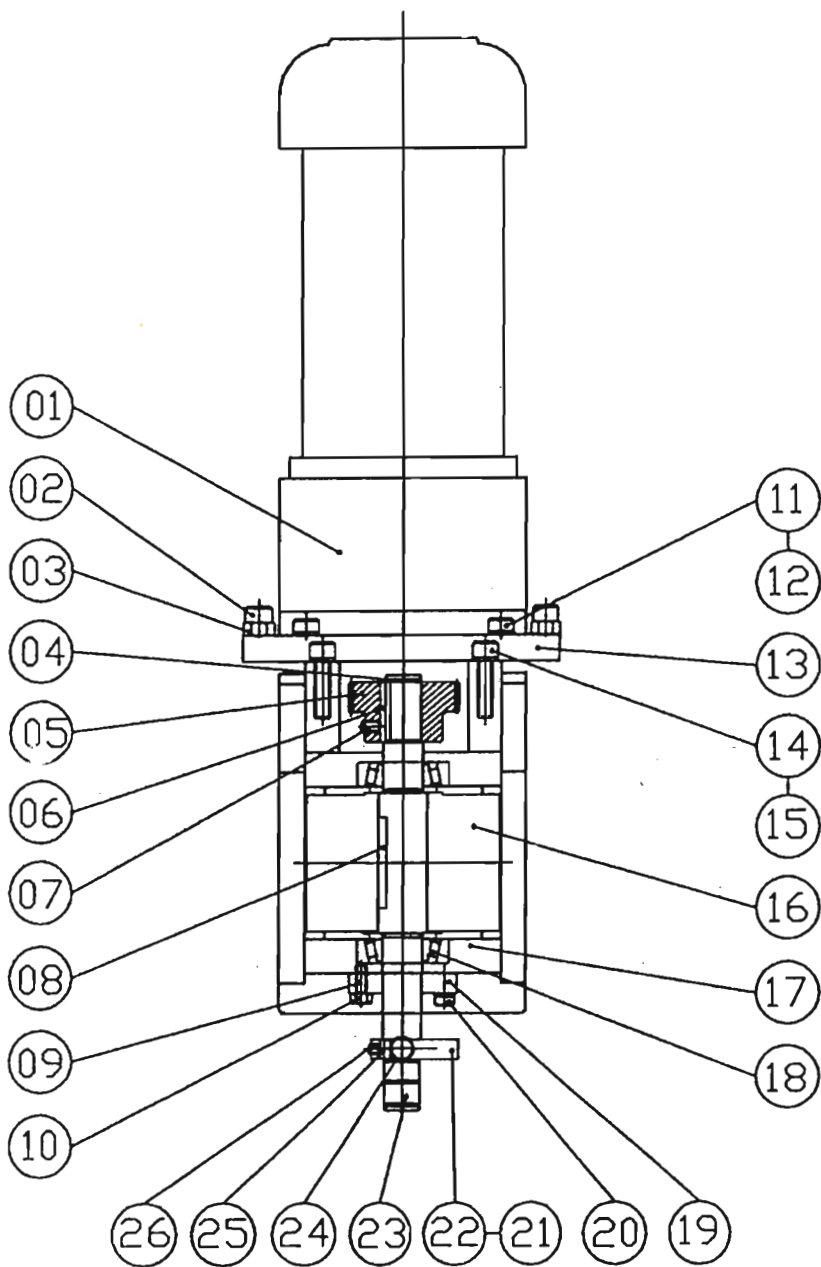


A 视图, S=1/1

TOOL POT UP-DOWN MECHANISM ASSEMBLY PART DIAGRAM

Item	Part no.	Description	Material/Specification	Quantity	Remark
1	MB-4011	Shaft	S45C	1	
2	Commercial Products	Socket HD Cap Screw	M8*1.25P*55L	1	
3	Commercial Products	Spring	φ 8	1	
4	Commercial Products	Sensor	SD-LB	2	
5	Commercial Products	Sensor Housing		2	
6	Commercial Products	Snap Ring-C	S18	2	
7	MB-4012	Adaptor	S45C	1	
8	Commercial Products	Hex Nut	M6*p1.0	1	
9	MB-4066	I Joint	S45C	1	
10	MB-4009	Cam	FCD60	1	
11	Commercial Products	Socket HD Cap Screw	M6*1.0P*20L	10	
12	Commercial Products	Spring	M6	10	
13	MB-4104	Sprawl	FCD55	1	
14	MB-4008	Plate	S45C	1	
15	Commercial Products	Oil Joint	1/8 PT	2	
16	Commercial Products	Ball Bearing	6004ZZ	2	
17	Commercial Products	Socket HD Cap Screw	M8*1.25P*40L	1	
18	MB-4010	Shaft	S45C	1	
19	Commercial Products	Snap Ring-R	R42	1	
20	MB-4039	Collar	S45C	1	
21	Commercial Products	Socket HD Cap Screw	M6*1.0P*25L	1	
22	MB-4006	Sleeve	S45C	1	
23	Commercial Products	CA- φ 63×100L(+Adjusting Valve)	CA- φ 63× 100L(1/4PT× φ 8*2)	1	

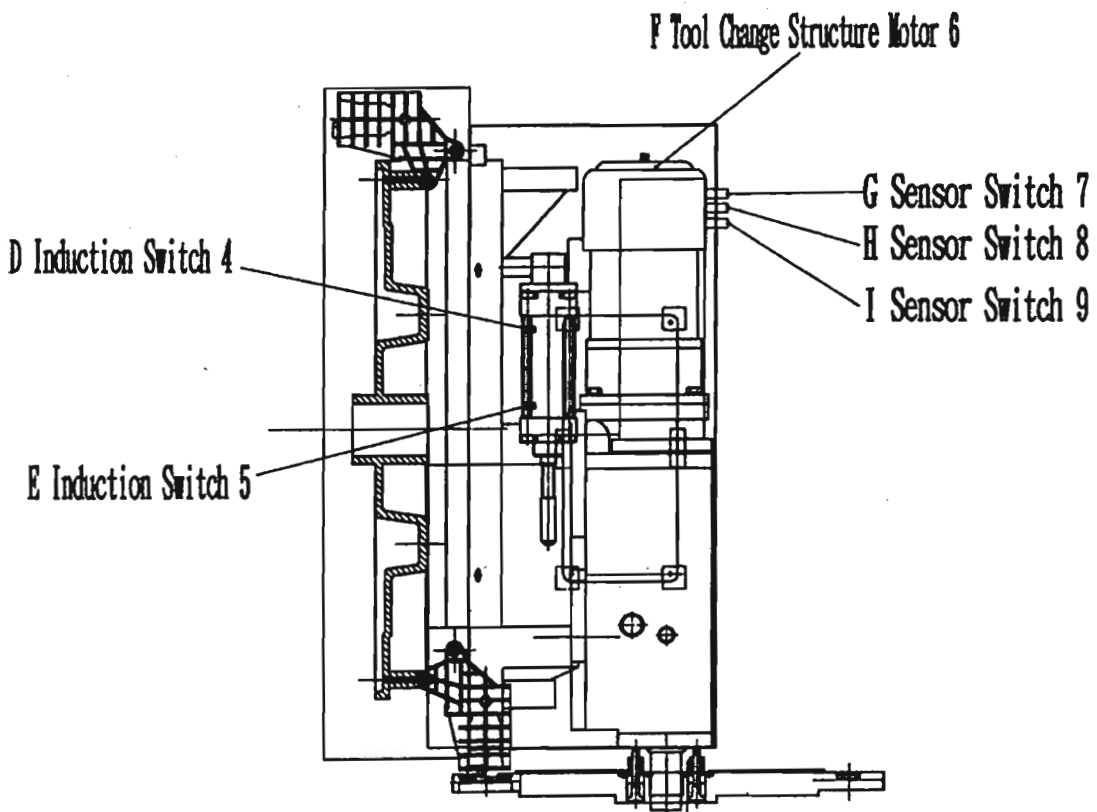
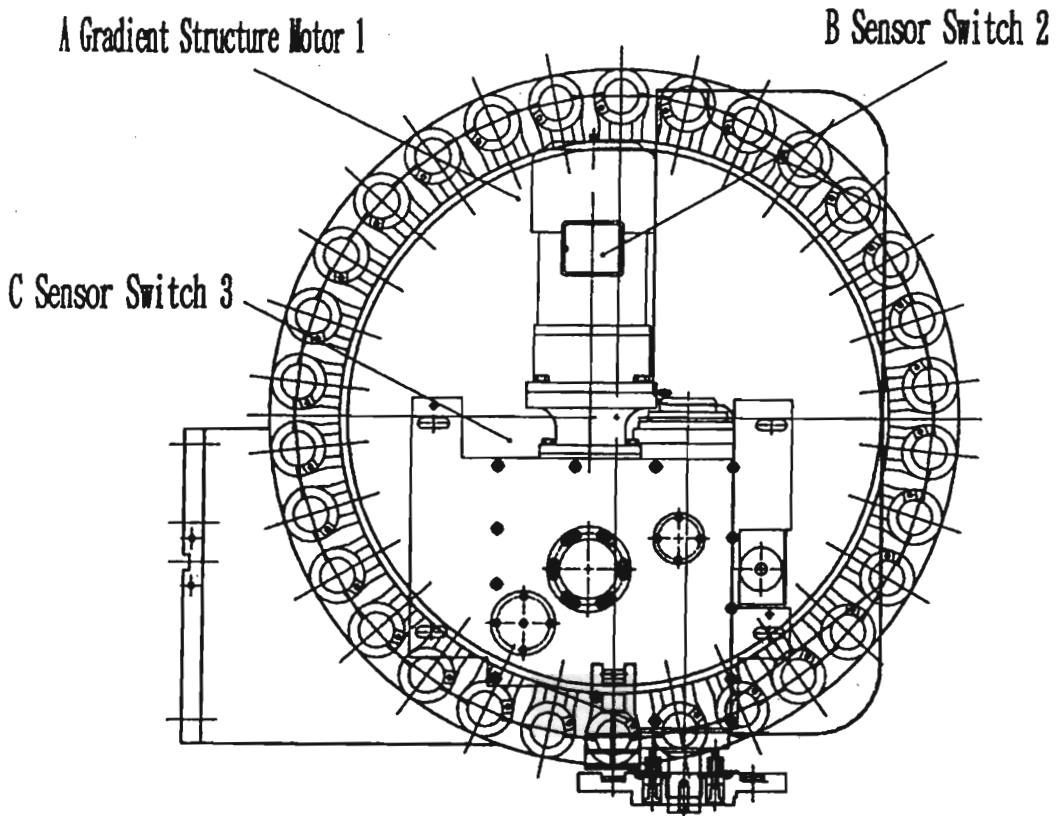
Motor & Cam Assembly Part Diagram



MOTOR & CAM ASSEMBLY PART DIAGRAM

Item	Part no.	Description	Material/Specification	Quantity	Remark
1	Commercial Products	Motor	4P/380V/4HP/1:20	1	
2	Commercial Products	Socket HD Cap Screw	M8*1.25P*25L	2	
3	Commercial Products	Hex Nut	M8*1.25P	2	
4	Commercial Products	SnapRing-C	S18	1	
5	MB-4013	Gear 36T	S45C	2	
6	Commercial Products	Square Key	5×5×30L	1	
7	Commercial Products	Set Screw	M6*1.0P*6L	2	
8	Commercial Products	Square Key	8×8×45L	1	
9	Commercial Products	Set Screw	M6*1.0P*20L	4	
10	Commercial Products	Hex Nut	M6*1.0P	4	
11	Commercial Products	Socket HD Cap Screw	M8*1.25P*16L	4	
12	Commercial Products	Spring	φ 8	4	
13	MB-4014	Motor Support	SS41	1	
14	Commercial Products	Socket HD Cap Screw	M8*1.25P*16L	4	
15	Commercial Products	Spring	φ 8	4	
16	MB-4017	Cam	SCM435	1	
17	MB-4015	Cam Housing	FCD55	1	
18	Commercial Products	Bearing	30204JR	2	
19	MB-4018	Adjusting Plate	S45C	1	
20	Commercial Products	Set Screw	M6*1.0P*20L	4	
21	Commercial Products	Proximity Sensor	M12*p1.0/PNP/4mm	1	
22	MB-4019	Sensing Device	Powder Metallurgy	1	
23	MB-4016	Shaft	S45C	1	
24	Commercial Products	Snap Ring-C	S18	1	
25	Commercial Products	Square Key	5×5×6L	1	
26	Commercial Products	Set Screw	M5*0.8p*5L	1	

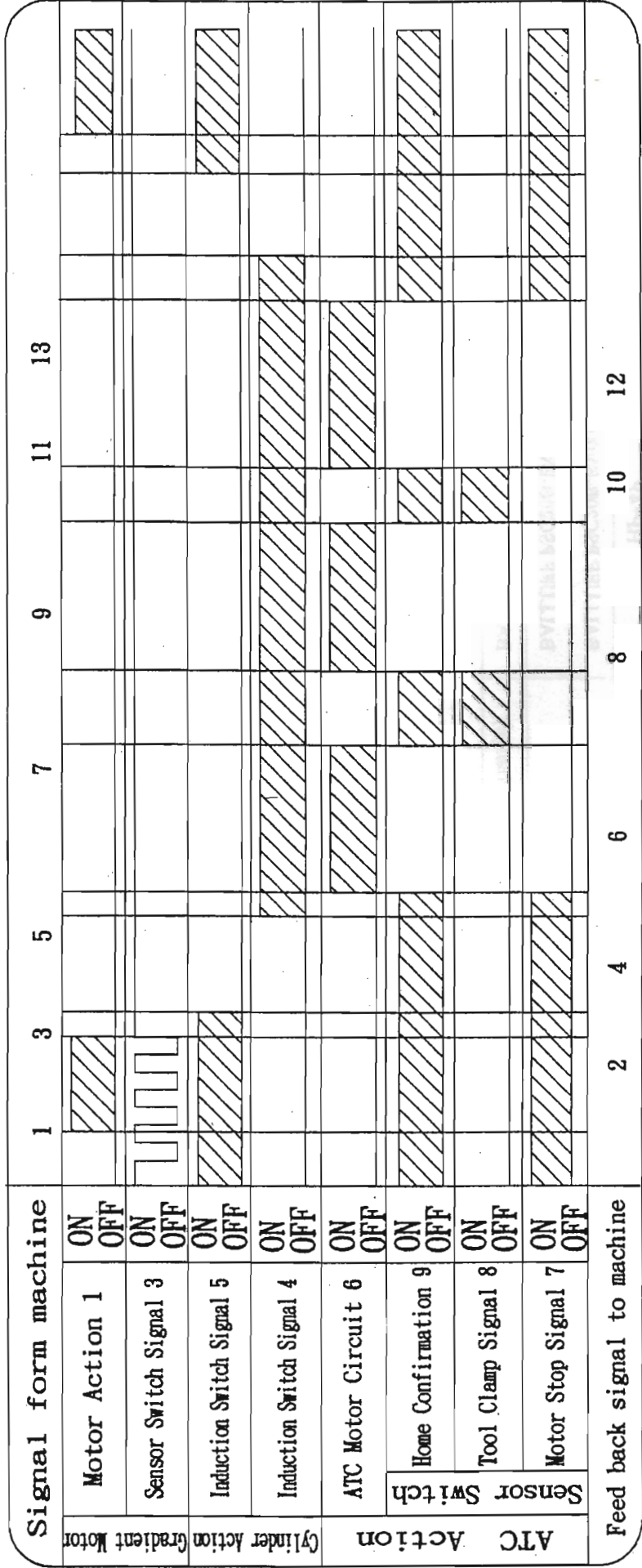
Control Element Position Explanatory Drawing



CONTROL ELEMENT POSITION EXPLANATORY DRAWING

No.	Control Element	Function	Specification Affirmed		Q'ty	Remark
			DISK TYPE IS050-24DV			
A	Gradient Structure Motor 1	Control tool disk position reverse turn	1/2HP*4P		1	3 ϕ 220V 60HZ
B	Sensor Switch 2	Tool change original point number one tool signal	BALLUFF PSC40F-BV00-002		1	ϕ 12 DC24V(PNP)
C	Sensor Switch 3	Positioning signal of tool falling(contracting of cylinder)	BALLUFF PSC40F-BV00-002		1	ϕ 12 DC24V(PNP)
D	Induction Switch 4	Positioning signal of tool falling(protruding of cylinder)	ADSENS CS2050-4AD		1	DC24V
E	Induction Switch 5	Positioning signal of tool falling(protruding of cylinder)	ADSENS CS2050-4AD		1	DC24V
F	Tool Change Structure Motor 6	Tool change structure power source	1 HP*4P		1	3 ϕ 220V 60HZ
G	Sensor Switch 7	Stop signal of motor (tool change)	BALLUFF PSC20B-BV00-002		1	ϕ 12 DC24V(PNP)
H	Sensor Switch 8	Tool clamp signal (tool change)	BALLUFF PSC20B-BV00-002		1	ϕ 12 DC24V(PNP)
I	Sensor Switch 9	Origin point confirmation signal (tool change)	BALLUFF PSC20B-BV00-002		1	ϕ 12 DC24V(PNP)

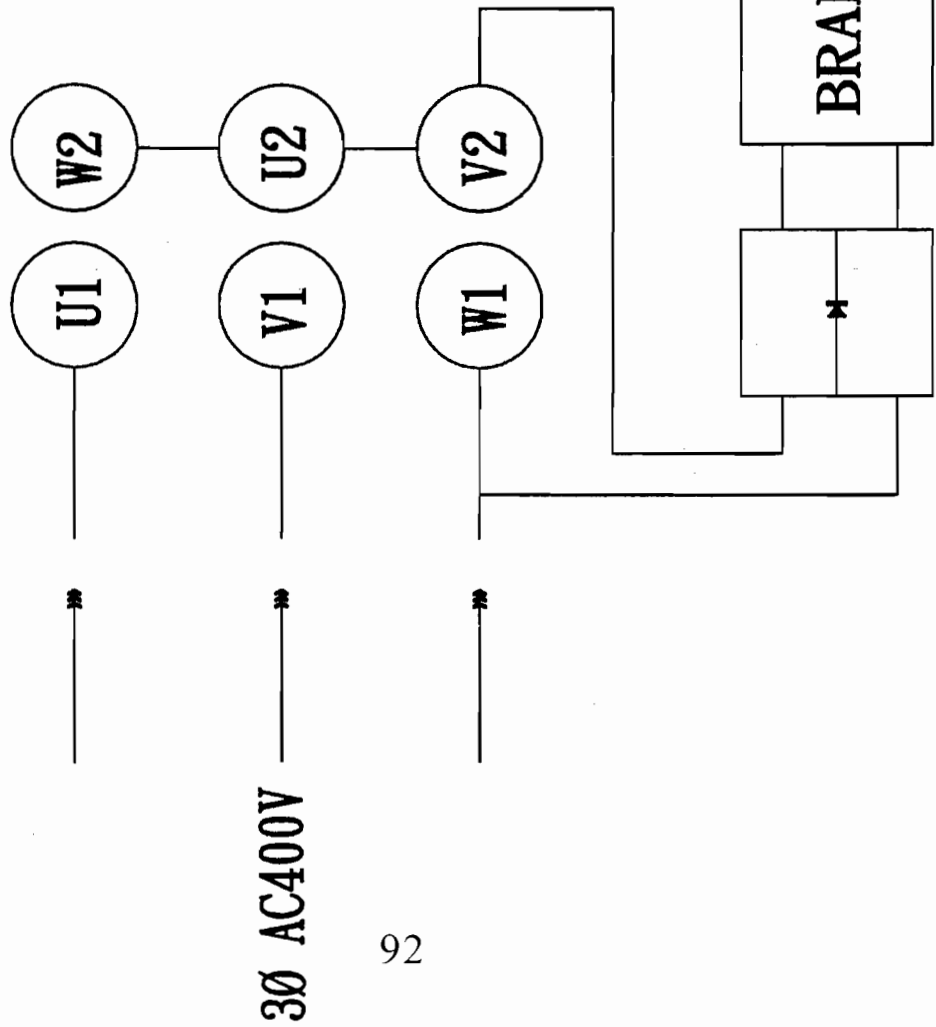
Sequence diagram of electric action



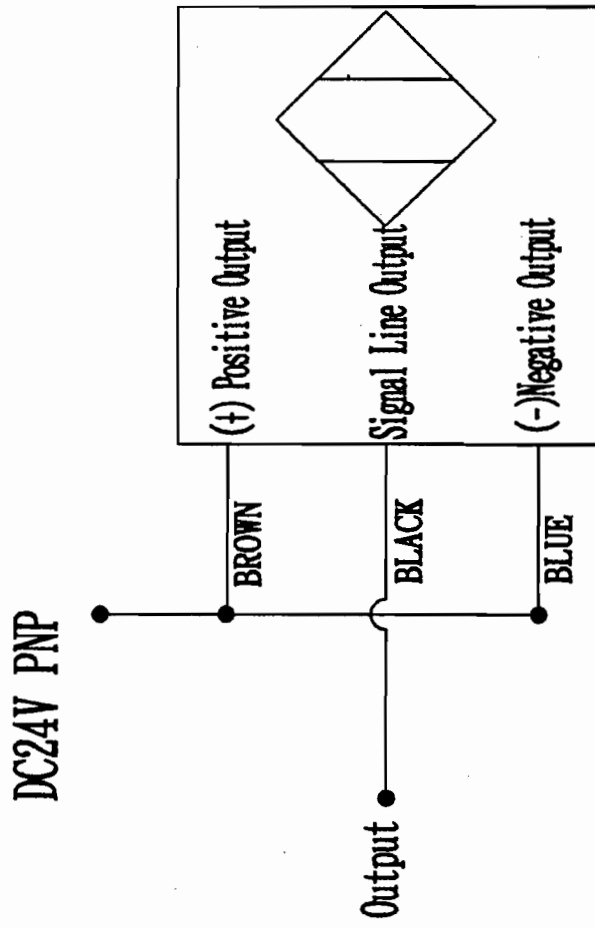
1. Tool selection (Tool selection power for C.W or C.C.W. - tool to tool)
2. Tool counter & positioning signal (to stop indexing motor)
3. Power on for tool clamping cylinder
4. Positioning signal of tool falling (contracting of cylinder)
5. Tool change motor start (from home)
6. Tool clamping confirmation, tool release signal, motor stop
7. Tool release finish, motor power on
8. Tool change confirmation, tool clamping signal
9. Arm power on & home position
10. Motor stop & home confirmation
11. Protruding of cylinder starts, tool pot home position
12. Protruding of cylinder positioning signal (Tool change finish)
13. Indexing motor rotating to next order-pot

Motor & Limits Switch Wiring Diagram

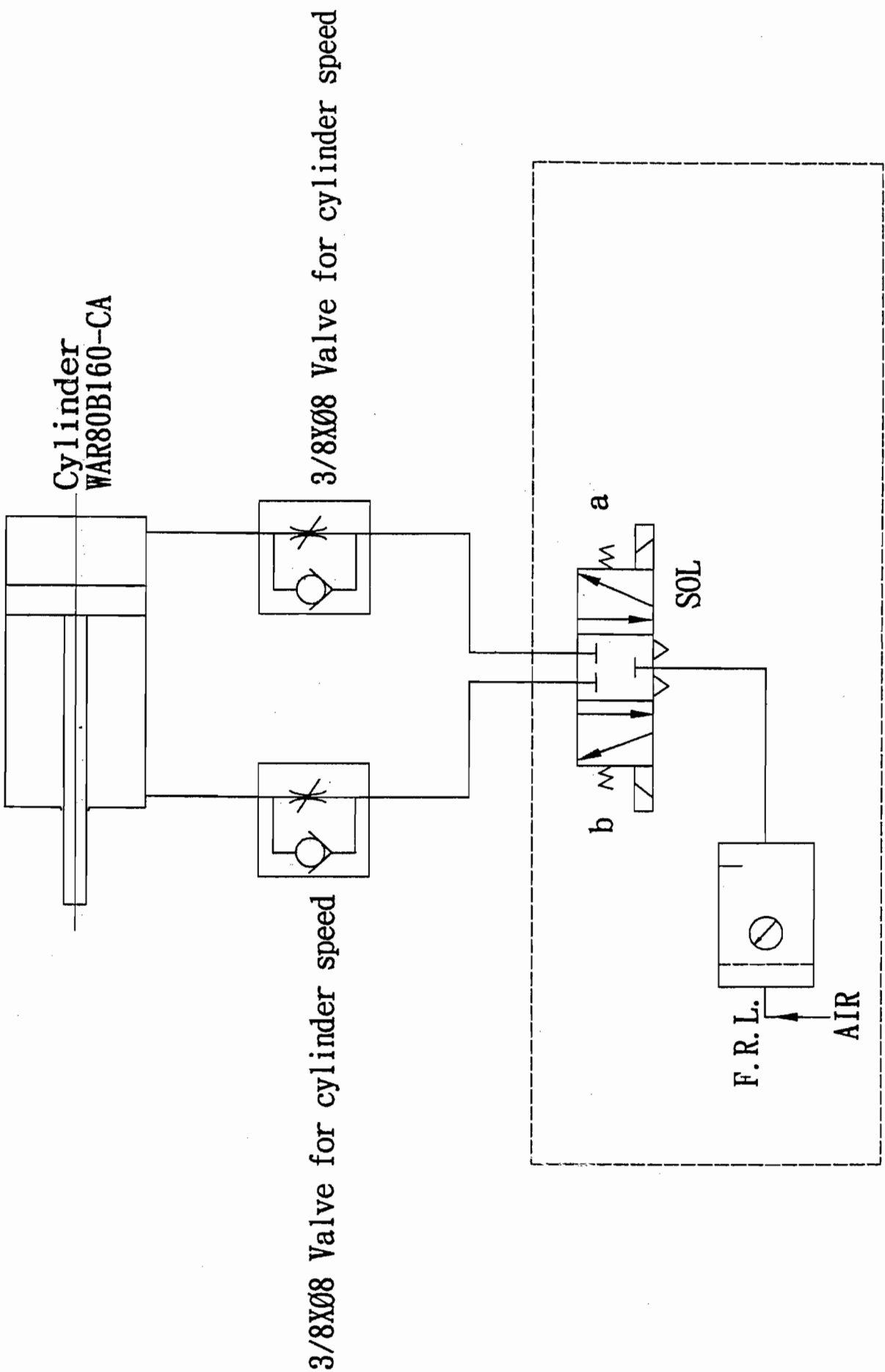
3Ø Motor Wiring Diagram



Sensor Switch

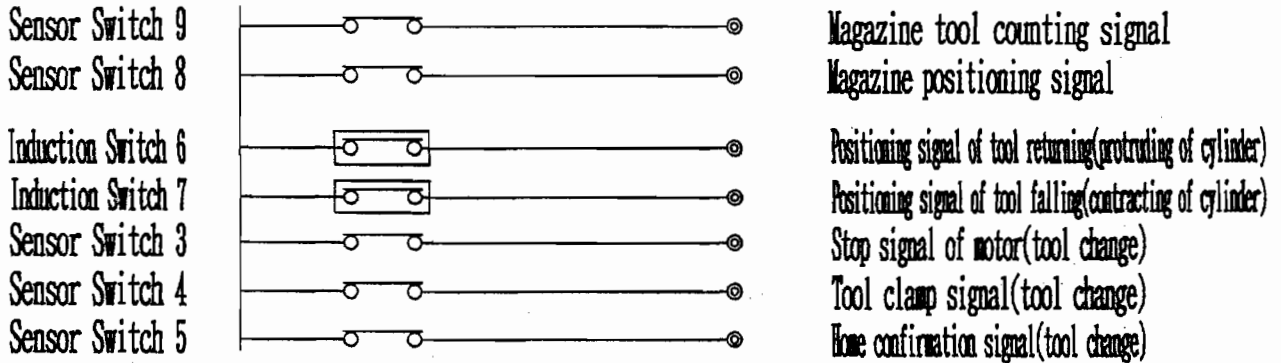


Air Pressure Wiring Diagram

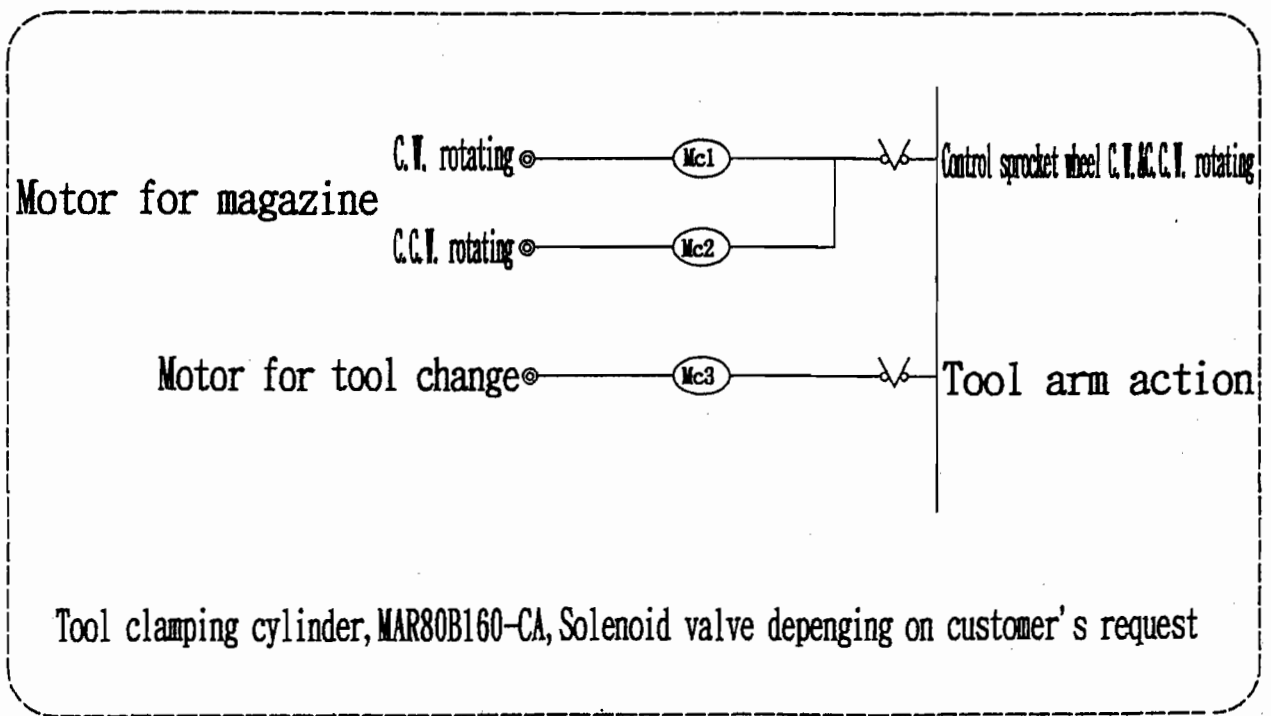


Control Circuit Reference Diagram

Voltage DC24V(Please choose positive or negative output voltage by PNP or NPN)

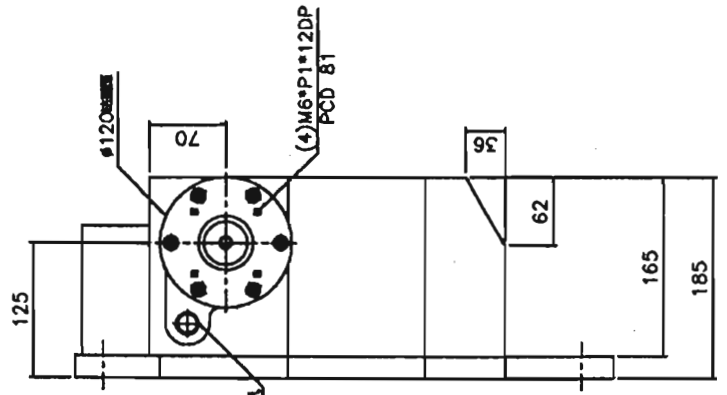
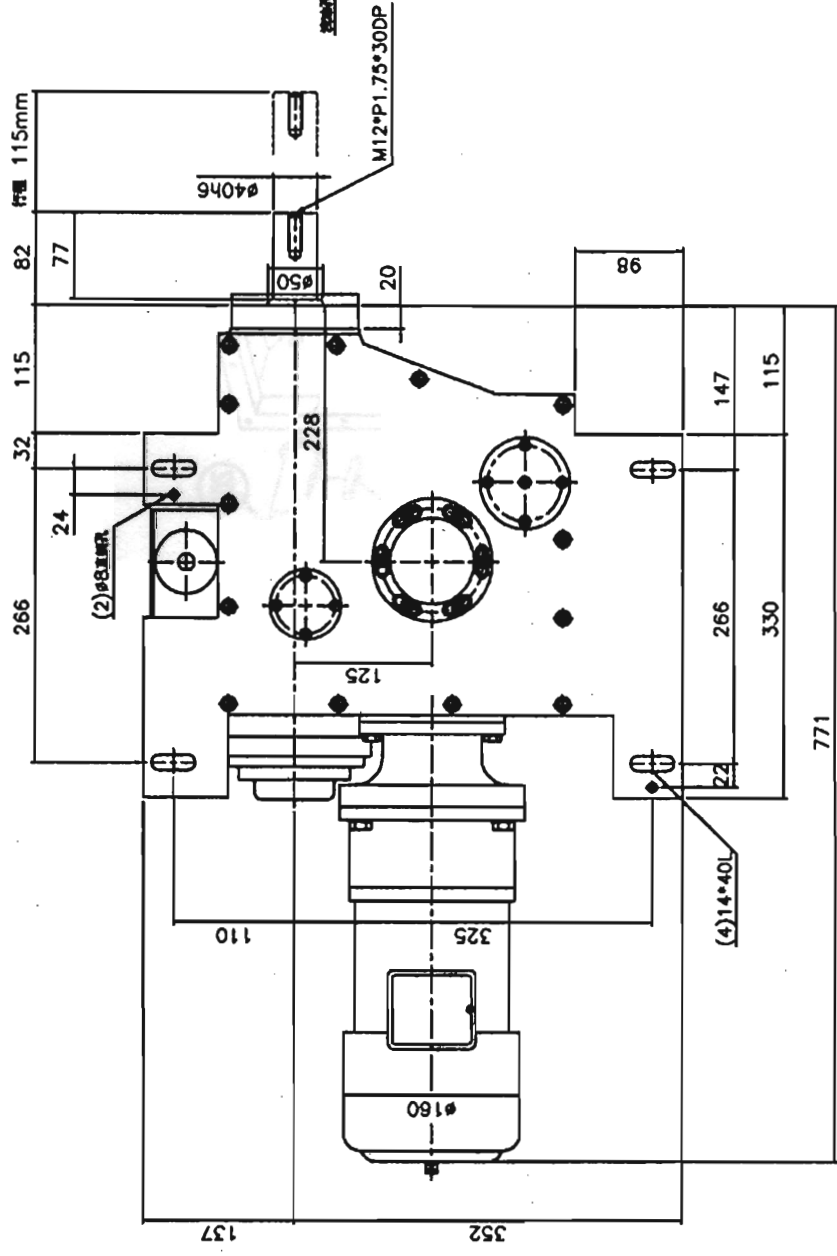
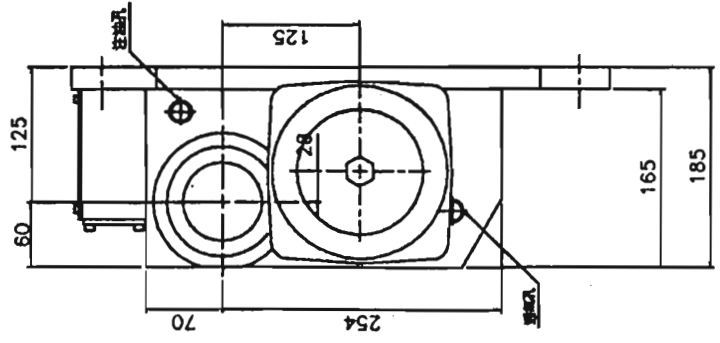
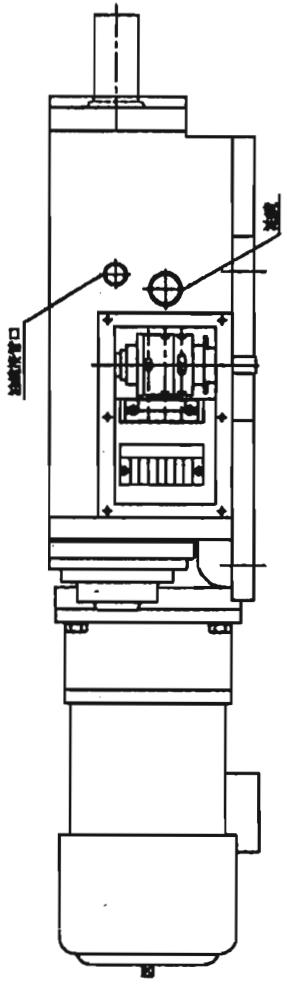


Voltage 220V 60HZ DC24V



Explanatory of ATC Assembly

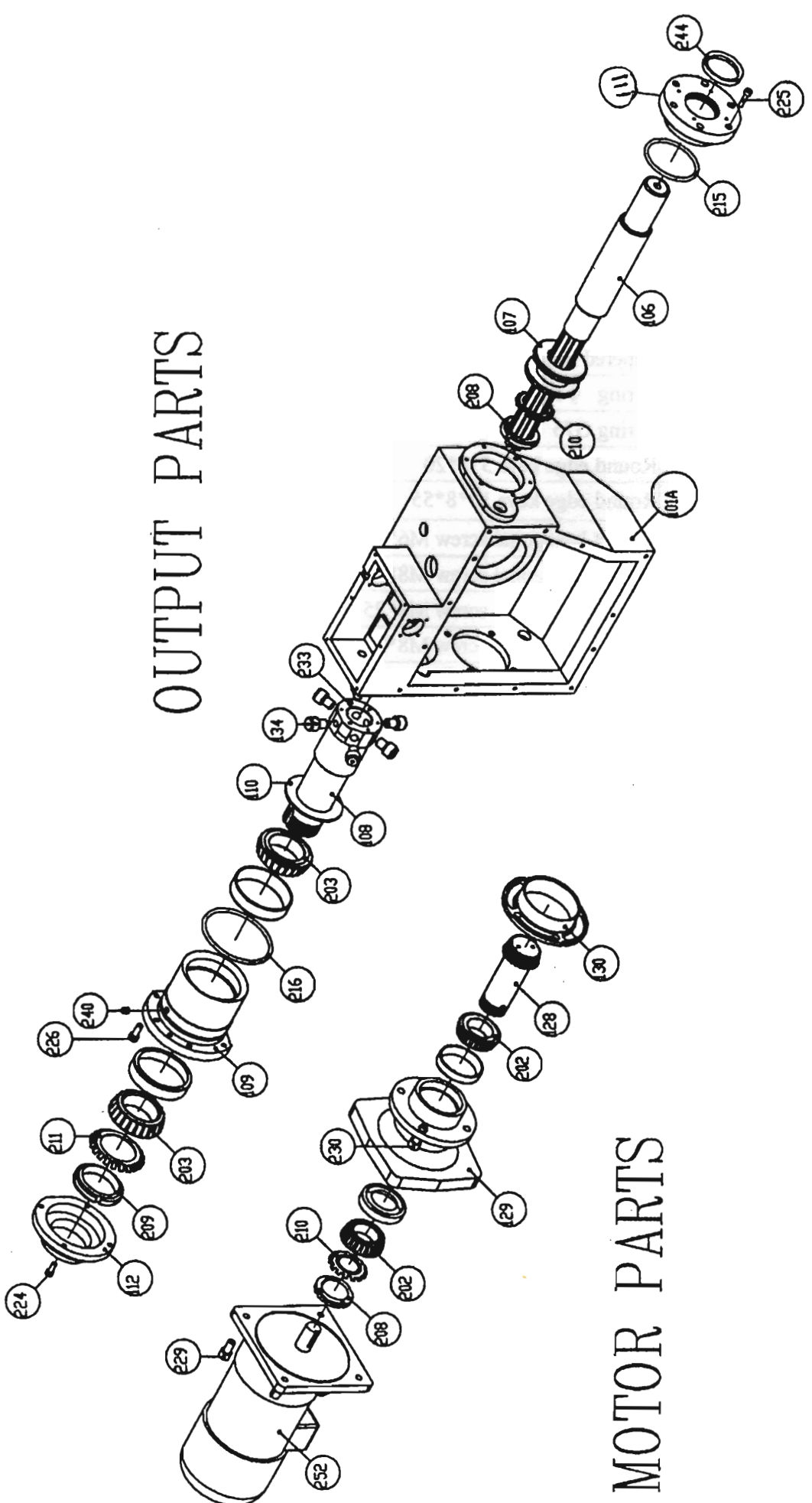
使用機型	A402
夾刀角度	65°
上下行程	115mm
訊號規格	PNP-3條-φ4
換刀時間	50Hz=2.0sec 60Hz=1.8sec
馬達規格	1/2HP 煞車 DC-90V 速比 1:12



INPUT SHAFT

	Parts No.	Specification	Q'ty
101A	A4020SC000A1	Case	1
101B	A4020SC000B1	Case cap	1
102	A402A0100001	Cam shaft	1
103	A402A0200001	Side cover	2
104	A402A0300001	Side cover cap	2
105	A402A0400001	Cam shaft sprocket	1
114	A402C0100070	Cam (70 degree)	1
127	A402F0100001	Big umbrella gear	1
201	HR30206	Tapered roller bearings 30206	2
213	O-55*2	O ring ϕ 55*2	2
214	G75	O ring G75	2
218	DFK5*5*20	Round edge keys 5*5*20	1
219	DFK10*8*55	Round edge keys 10*8*55	1
224	HI-M6*16L	Socket hexagonal screw M6*16L	12
226	HI-M8*20L	Socket hexagonal screw M8*20L	2
227	HI-M8*25L	Socket hexagonal screw M8*25L	13
228	HI-M8*35L	Socket hexagonal screw M8*35L	2
241	PT1/2"	Oil plug PT1/2"	4
242	OI-28	Oil gauge (ϕ 28mm)	1
246	PIN-T-8*32L	Taper pin ϕ 8*32L(1:50)	3
247	PIN-T-8*30L	Roll pin ϕ 8*30L	2

OUTPUT PARTS



MOTOR PARTS

OUTPUT PARTS

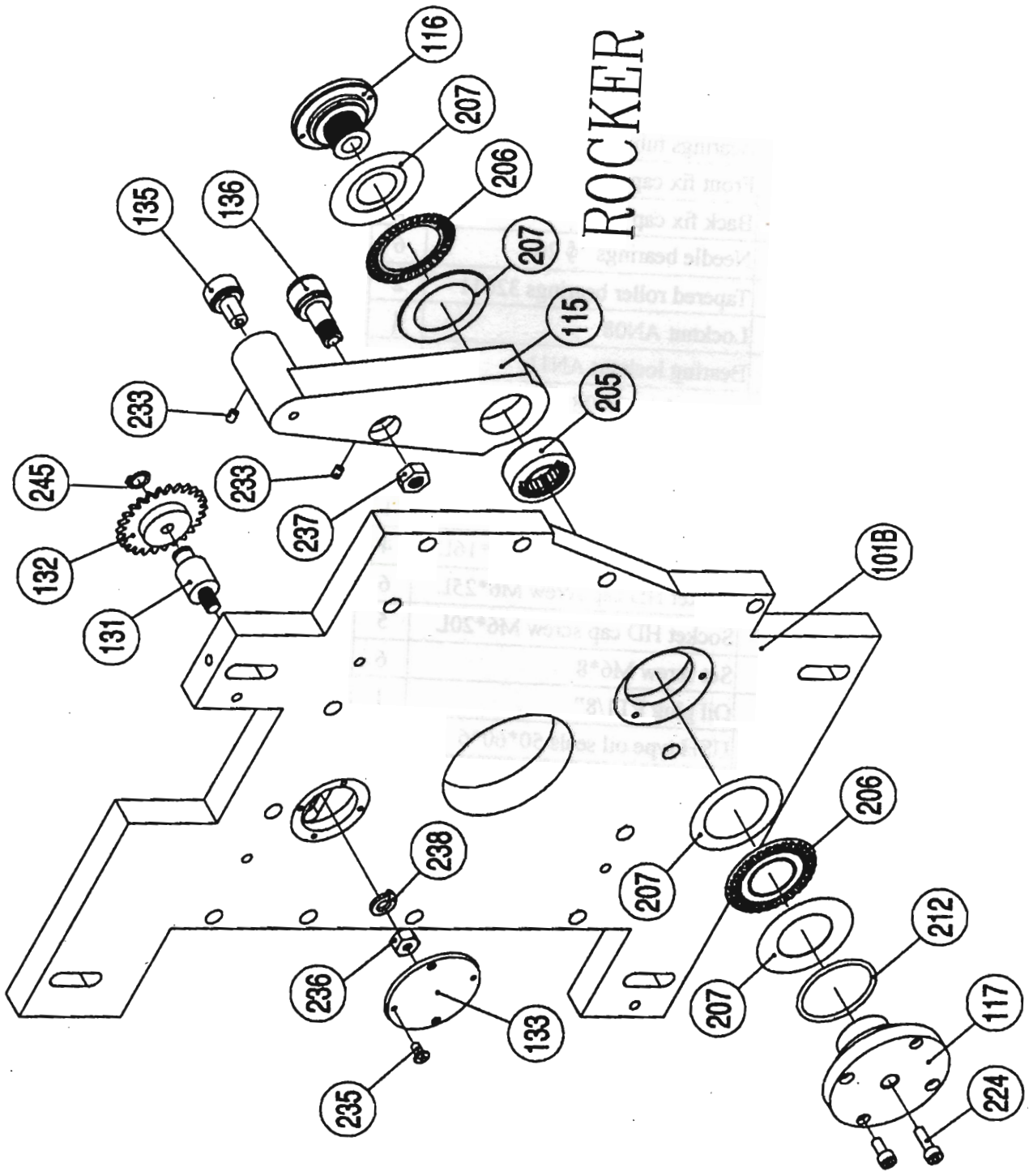
No.	Parts No.	Specification	Q'ty
101A	A4020SC000A1	Case	1
106	A402B0100001	Spline shaft (output)	1
107	A402B0200001	Transmit wheel	1
108	A402B0300001	Bearings tube	1
109	A402B0400001	Bearings tube fixture	1
110	A402B0500001	Bearings tube gasket	1
111	A402B0600001	Front fix cap	1
112	A402B0900001	Back fix cap	1
134	RB00020000A1	Needle bearings ϕ 20	6
203	HR32011	Tapered roller bearings 32011	2
208	AN08	Locknut AN08	1
209	AN11	Bearing locknut AN11	1
210	AW08	Set washer AW08	1
211	AW11	Set washer AW11	1
215	G80	O ring G80	1
216	G100	O ring G100	1
224	HI-M6*16L	Socket HD cap screw M6*16L	4
225	HI-M6*25L	Socket HD cap screw M6*25L	6
226	HI-M6*20L	Socket HD cap screw M6*20L	5
233	HS-M6*8L	Set screw M6*8	6
240	PT 1/8"	Oil plug PT1/8"	1
244	USH 50*60*6	USH type oil seals 50*60*6	1

MOTOR PARTS

128	A402F0200001	Small umbrella gear	1
129	A402F0300001	Motor locating plate	2
130	A402F0900001	Adjustment sleeve	1
202	HR32008	Tapered roller bearings 32008	2
208	AN08	Locknut AN08	1
210	AW08	Set washer AN08	1
229	HI-M10*20L	Socket HD cap screw M10*20L	4
230	HI-M10*30L	Socket HD cap screw M10*30L	4
252	MR1/2HP-DC9-1 2	Motor 1/2HP-4 poles	1

IDLER SPROCKET

ROCKER PART



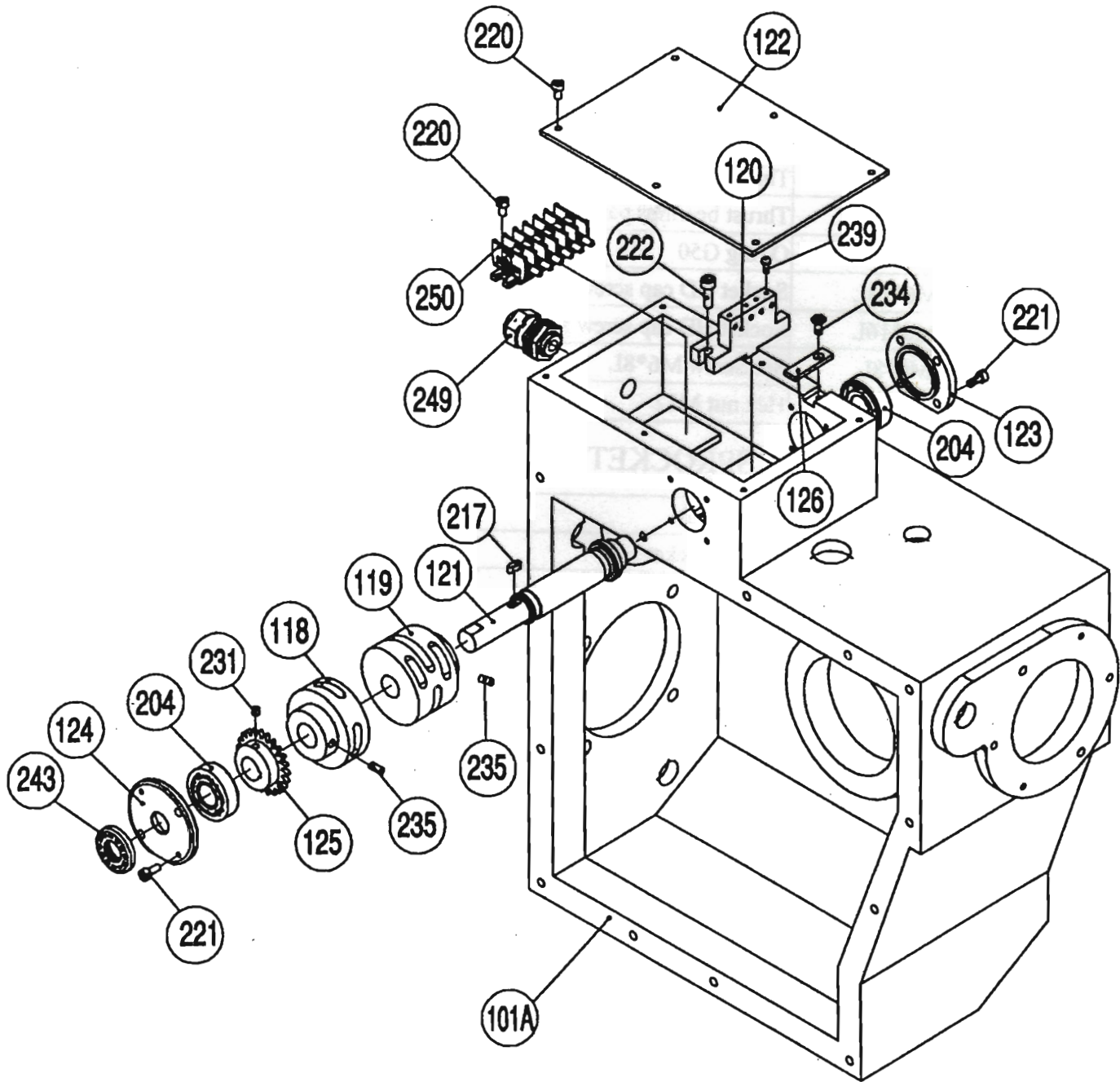
ROCKER PART

No.	Parts No.	Specification	Q'ty
101B	A402D01000B1	Case cap	1
115	A402D0100001	Rocker	1
116	A402D0200001	Rocker shaft	1
117	A402D0300001	Rocker stand packing cap	1
135	RB00022000A1	Needle bearings ϕ 22	1
136	RB00024000A2	Needle bearings ϕ 24	1
205	HK3516	Needle bearings HK3516	8
206	AXK1108	Thrust bearings AXK1108	2
207	AS1108	Thrust bearings parcel AS1108	1
212	G50	O ring G50	2
223	HI-M6*14L	Socket HD cap screw M6*14L	4
224	HI-M6*16L	Socket HD cap screw M6*16L	1
233	HS-M6*8L	Set Screw M6*8L	1
237	SC-M12	Hex nut M12	1

IDLER SPROCKET

131	A402J0100001	Idler Shaft	1
132	A402J0200001	Idler sprocket	1
133	A402J0300001	Idler outside cap	1
235	CO-M5*8L	Round cap Screw M5*8L	4
236	SC-M10	Hex nut, M10	1
238	WS-M10	Washer, M10	1
245	C12S	Snap Ring- C12	1

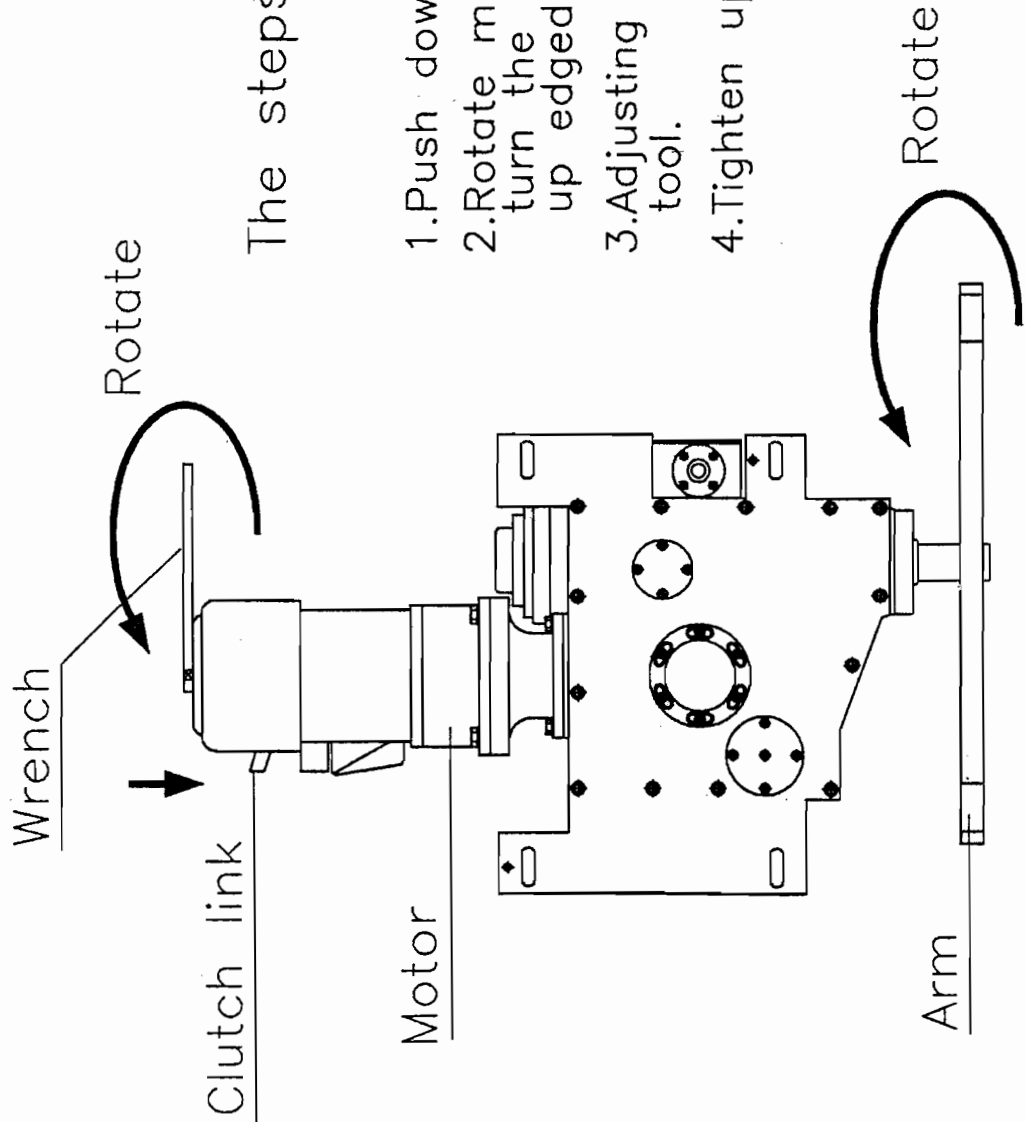
SIGNAL PARTS



SIGNAL PARTS

No.	Parts No.	Specification	Q'ty
101A	A4020SC000A1	Case	1
118	A402E01000A1	Brake signal wheel	1
119	A402E01000B1	Cam signal wheel	1
120	A402E0200001	Signal fixture	1
121	A402E0300001	Signal shaft	1
122	A402E0400001	Dust proof cap	1
123	A402E0500001	Signal cap	1
124	A402E0600001	Signal cap (have hole)	1
125	A402E0700001	Signal sprocket	1
126	A402E0800001	Signal parcel	1
204	BR6202	Ball gearings 6202	4
217	DFK4*4*10	Round edge keys 4*4*10	4
220	HI-M4*8L	Socket HD cap screw M4*8L	8
221	HI-M4*10L	Socket HD screw M4*10L	8
222	HI-M5*16L	Socket HD cap screw M5*16L	2
231	HS-M5*5L	Set screw M5*5L	1
232	HS-M5*10L	Set screw M5*10L	2
239	PF-308	Plastics screw M3*8L(KSS)	4
243	TC15*24*5	TC type oil seals 15*24*5	1
249	AG-16	Wire connectors (KSS)	1
250	TM-10A600V	Connection terminal	1

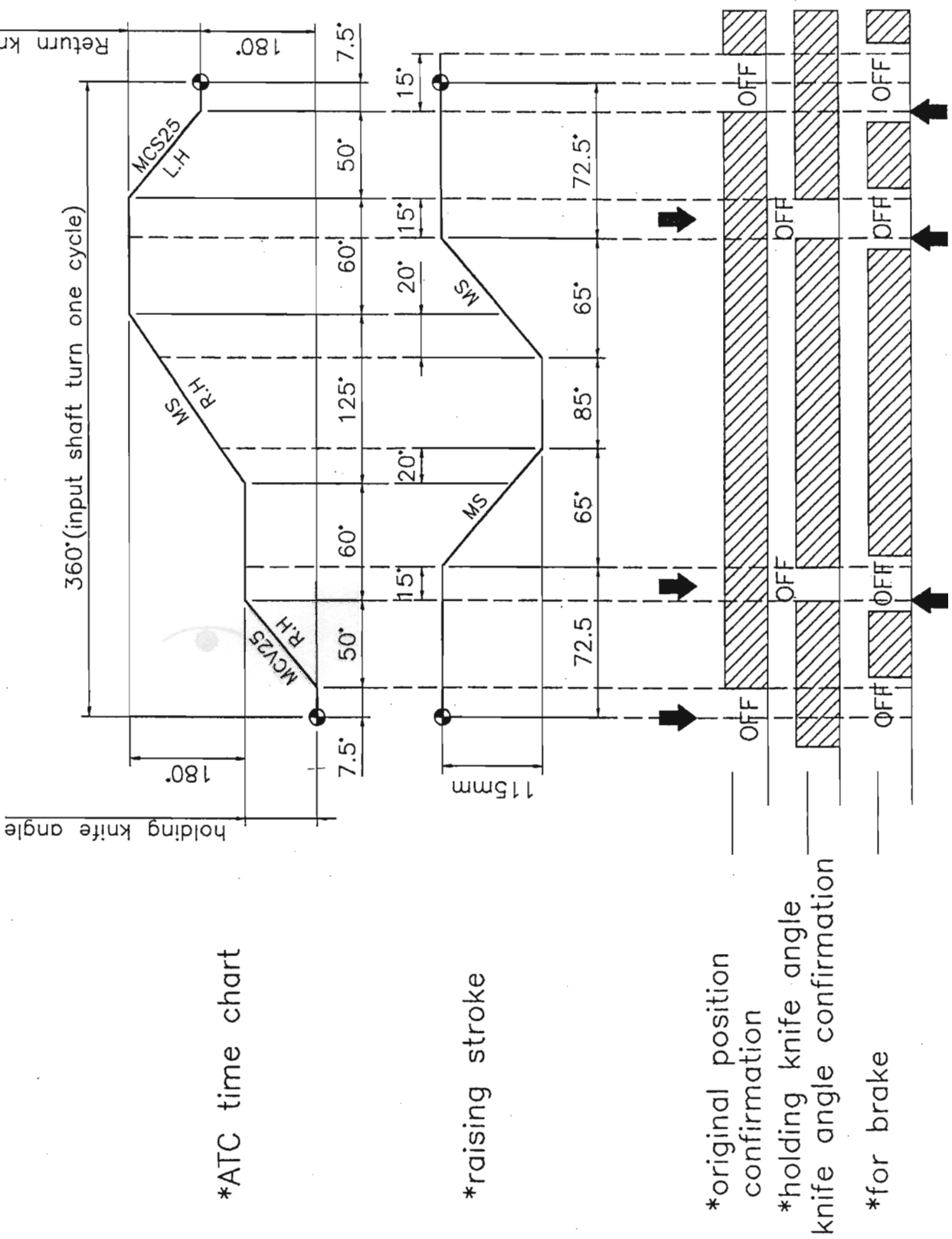
Adjustment of Arm



The steps of arm adjustment

1. Push down clutch link.
2. Rotate motor by using the wrench and turn the arm to the angle of setting up edged tool.
3. Adjusting the arm to hold the edged tool.
4. Tighten up the setup screws.

DEX-2 TIME CHART

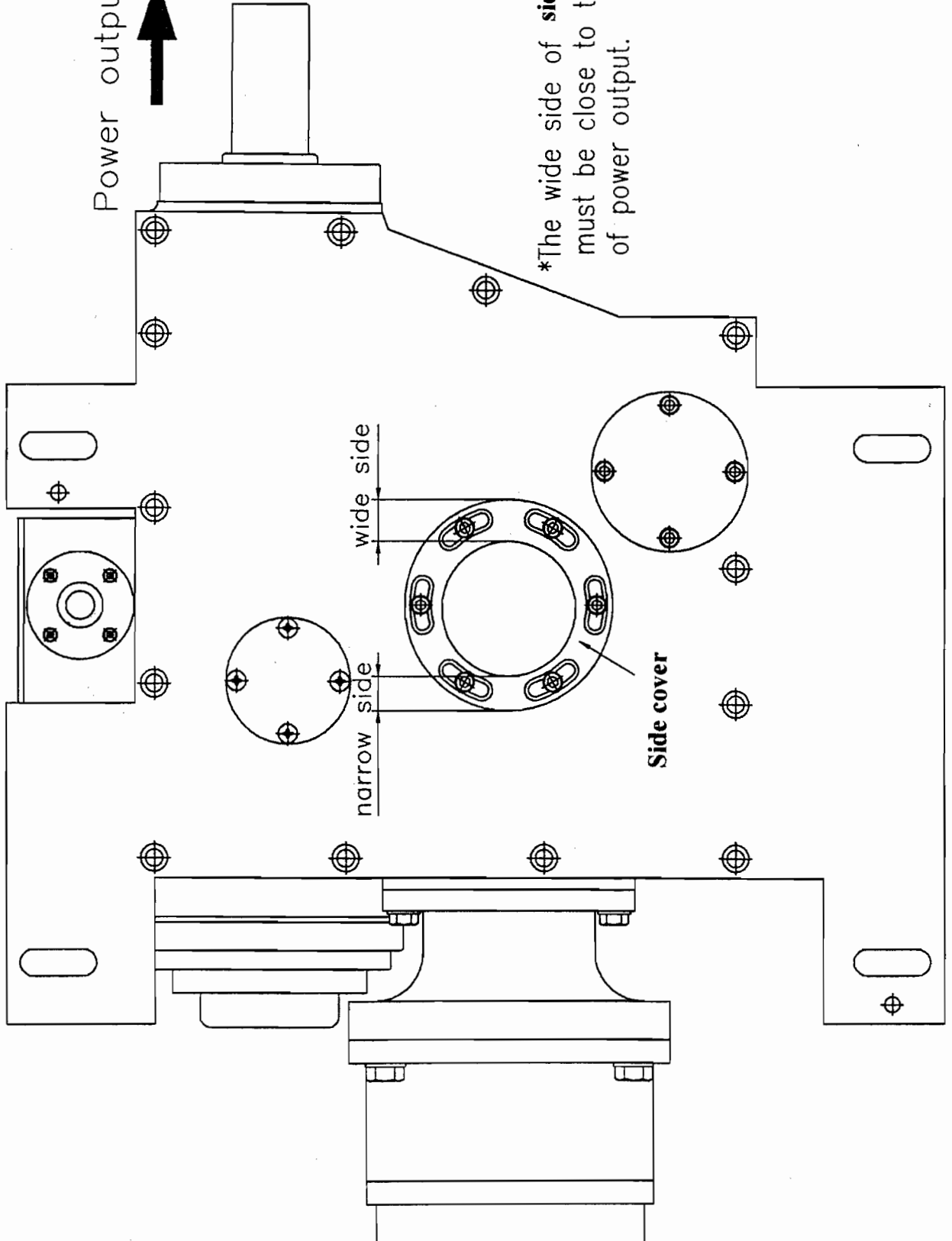


Adjustment of Side Cover

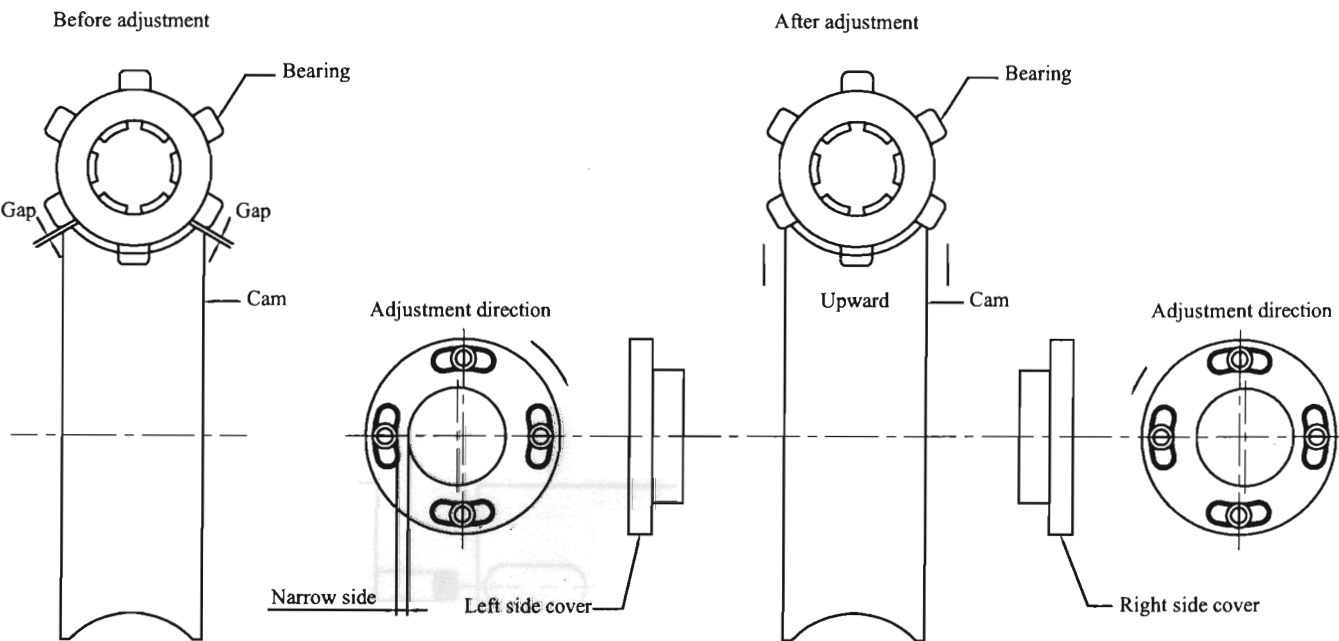
Power output direction



*The wide side of **side cover** must be close to the direction of power output.



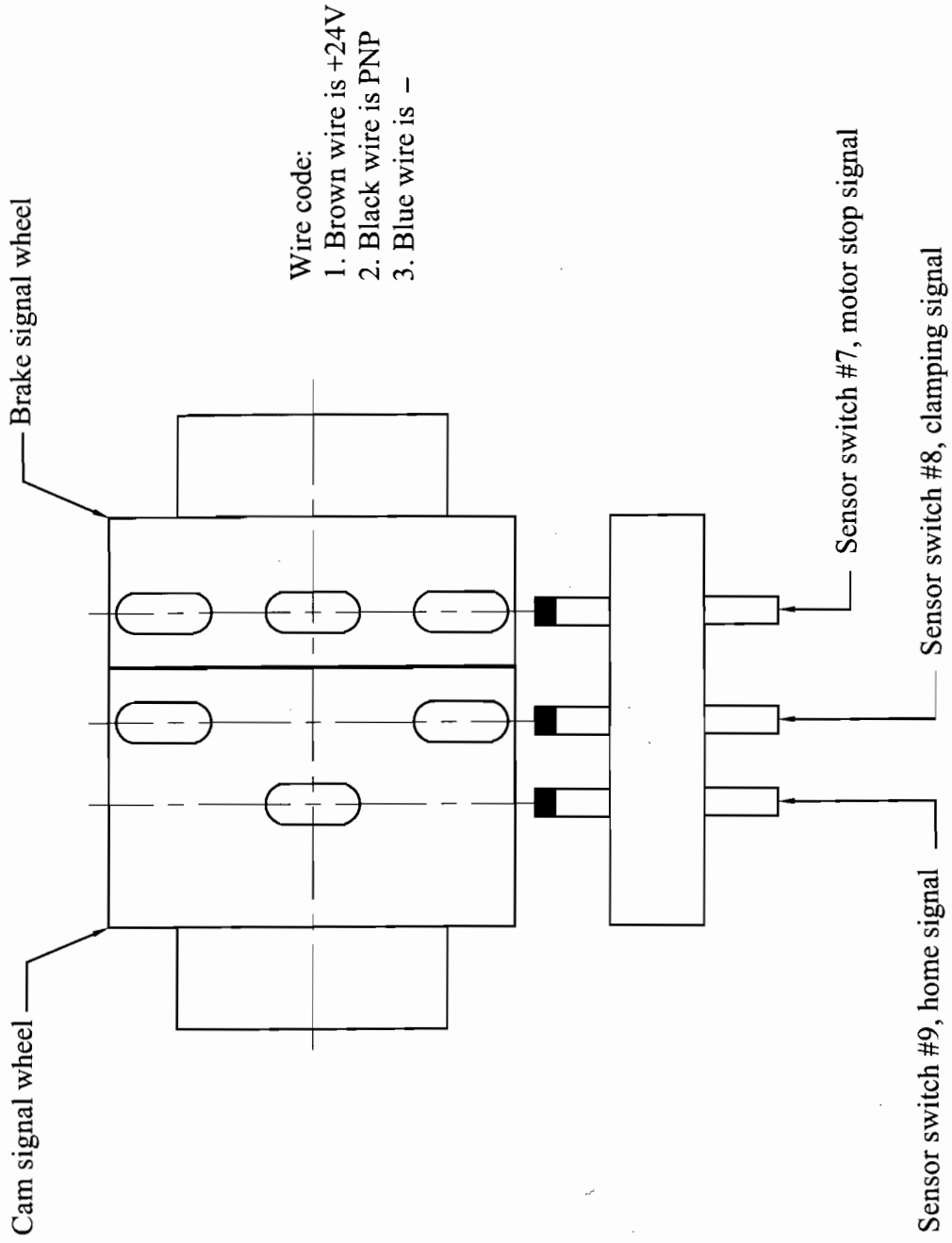
Adjustment between Cam & Bearings



Method for adjustment

1. Release the locking screws on the side covers.
2. Move the side covers up and down to adjust the gaps between the bearings and the cam. Make sure the cam is evenly in contact with the bearings! (shown in the drawing: adjustment may move cam upward or downward)
3. Move the side cover cap left and right to adjust the gaps between the bearings and the cam. Make sure the cam is evenly in contact with the bearings!

Signal of Sensor Switch on cam



Dismantling procedure :

How to take the spline (output) shaft :

1. Turn to the start position, remove the pins (246) and screws (227) of the case cap (101B).
2. Remove the case cap.
3. Loose Socket HD cap screws (225); remove the front fix cap (111).
4. Remove the spline (output) shaft (106), and transmit wheel (107), locknut (208), set washer (210), and get the new shaft.
5. Assemble this section back in reverse order. And make sure all parts are installed!

Change the bearings on bearing tube :

1. Turn to start position, remove the pins (246) and screws (227) of the case cap (101B).
2. Remove the case cap.
3. Rotate the bearings tube (108).
4. Remove the side set screws (233).
5. Use special tool to remove the bearings (134). Take the new bearings, and use Loctite to fix the set screws (223) in position.
6. Reassemble this section in reverse order. And make sure all parts are installed.

Take rocker apart in many steps :

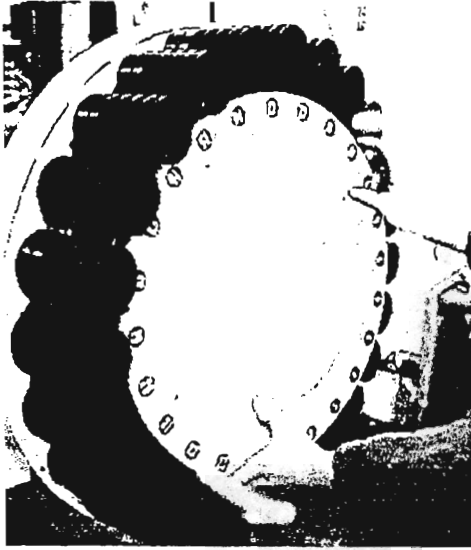
1. Turn to start position, remove the pins (246) and screws (227) of the case cap (101B).
2. Remove the case cap.
3. Then remove the set screws (233) of the rocker.
4. Use the tear down tool to remove the rocker shaft (116).
5. Remove the thrust bearing AXK1108 (206) (207), and needle bearings HK3516 (205).
6. Remove two bearings (135) and (136). Now the rocker is taken apart, and it is replaceable.
7. Reassemble the rocker section in reverse order, and make sure all parts are installed!

TROUBLE SHOOTING

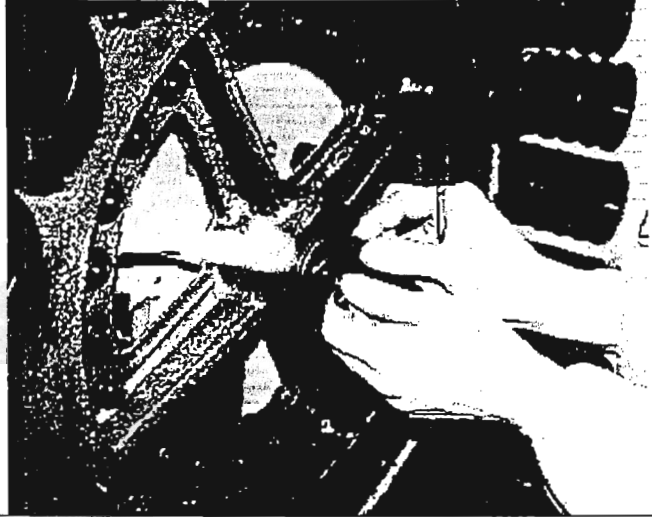
Condition	Reason	Trouble Shooting
Tool disk stops at wrong Position.	<ol style="list-style-type: none"> 1. Brake fails to work or stops over braking range 2. Sensor switch is too far. 	<ol style="list-style-type: none"> 1. Please check brake wiring for connection problem, or electric brake fails to work 2. Move sensor switch closer to sensor
Tool disk rotates continuously.	<ol style="list-style-type: none"> 1. Sensor switch failed 2. Sensor switch is too far. 	<ol style="list-style-type: none"> 1. Replace sensor switch 2. Move sensor switch closer to sensor
Tool pot breaks	Tool disk rotates while tool pot is clamping	Replace new tool pot & adjust clamping arm position again
Shaking during tool clamping & returning	<ol style="list-style-type: none"> 1. Cam lacks lubrication 2. Cylinder is not at constant speed 	<ol style="list-style-type: none"> 1. Grease the cam 2. Adjust cylinder pressure & speed valve
Tool pot is not at position when clamping & returning	Positioning bolts or locating bolts for tool pot are loose.	Adjust the tool pot to normal position & tighten
Tool disk does not work during tool selection	<ol style="list-style-type: none"> 1. Induction switch does not sense 2. Induction switch failed 3. Motor failed 4. Electronic brake failed 	<ol style="list-style-type: none"> 1. Adjust induction switch to normal position 2. Replace induction switch 3. Repair or replace motor 4. Check wiring & replace parts 5. Check sensor switch
Cylinder does not work during tool change	<ol style="list-style-type: none"> 1. Proximity switch for tool counter positioning has failed. 2. Tool disk is not positioning 3. Cylinder has no pneumatic pressure 4. ATC arm is not at home position. 	<ol style="list-style-type: none"> 1. Replace proximity switch 2. Make sure tool disk has positioned. 3. Check input air source, and solenoid valve see if they are functional. 4. Rotate motor shaft manually to get ATC arm to home position 5. Check induction switch
ATC fails to work during tool change	<ol style="list-style-type: none"> 1. Tool clamp positioning induction switch fails to work 2. Induction switch break down 	<ol style="list-style-type: none"> 1. Adjust induction switch to proper position 2. Replace new induction switch
ATC motor over-heat	<ol style="list-style-type: none"> 1. Brake is not released 2. Brake has failed 3. Current regulator has failed 	<ol style="list-style-type: none"> 1. Check current regulator had power or not? 2. Replace brake 3. Replace current regulator
ATC failed to work after tool clamping; ATC failed to work after 180° degrees tool change; ATC stops at home, but sensor switch does not work	<ol style="list-style-type: none"> 1. Sensor is in wrong position 2. Sensor switch has failed 	<ol style="list-style-type: none"> 1. Adjust sensor to proper position 2. Replace sensor switch
ATC stops out of position	<ol style="list-style-type: none"> 1. Sensors are at wrong position 2. Sensing ring for sensor switches is at wrong angle 	<ol style="list-style-type: none"> 1. Adjust all 3 sensors to proper angle & position 2. Rotate sensing ring, adjust all 3 sensor switches to proper angle & position
ATC tool clamping is clamping at wrong position	ATC's clamping arm & spindle are not aligned properly	Loosen taper ring sleeve & re-align it again

A. POT CHANGE SEQUENCE

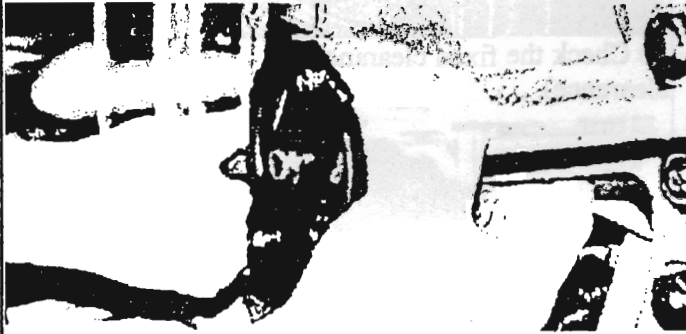
1. Take down the peripheral metal sheet and numeral acrylic cover.



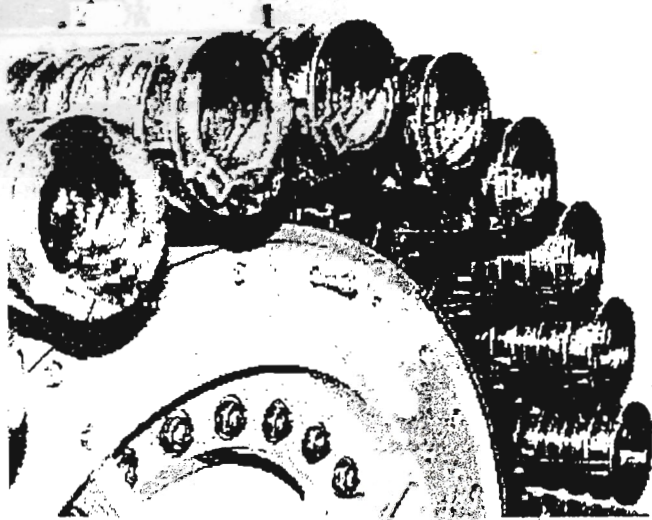
2. Unlock the hexagonal screw bolt M10 and recede 10mm on the shaft cover. (remark: do not move the 4 pieces fixing bolt)



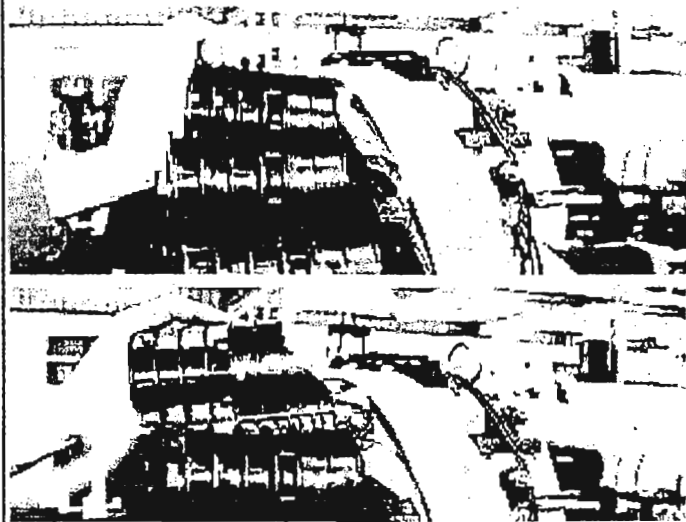
3. Pull out the plate to the M10 screw bolt position.



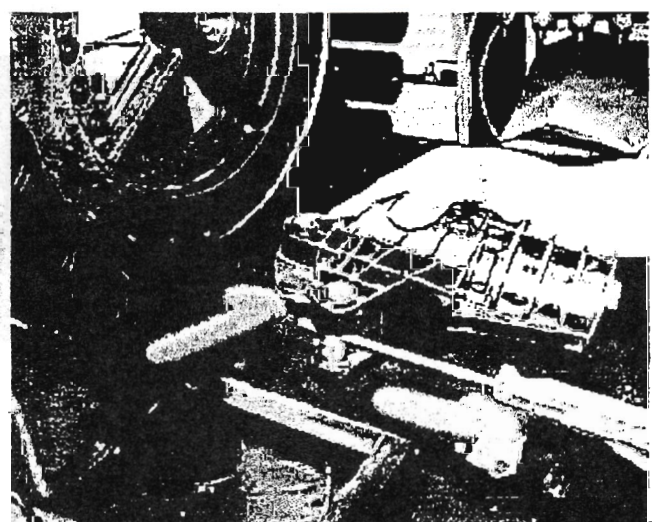
4. Strip down the hexagonal screw bolt M6 which be instead pot.



5. Take down the broken pot (push the pot forward inner side and take the pot upward, then extract it).

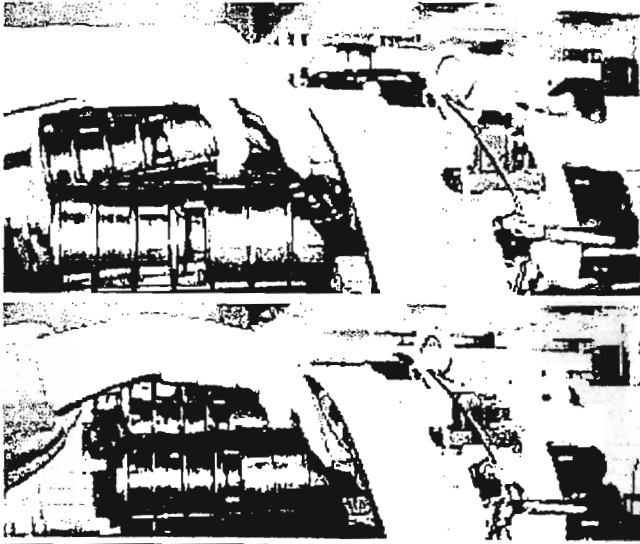


6. Confirm the fixing bolt and knob the correct position for the new pot.

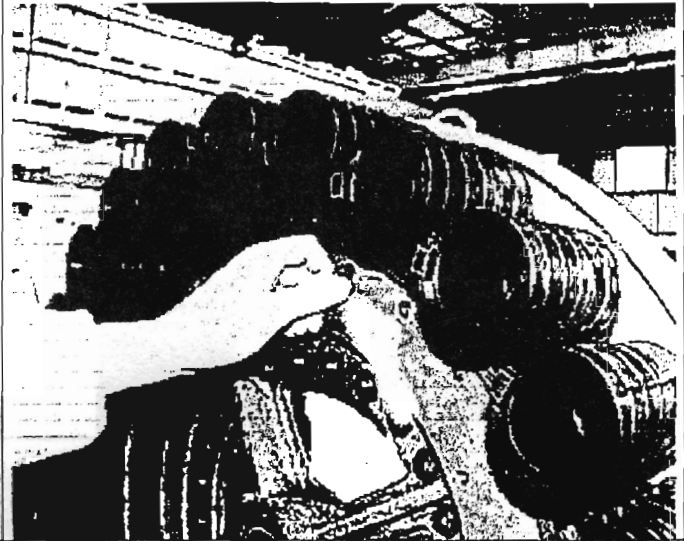


POT CHANGE SEQUENCE

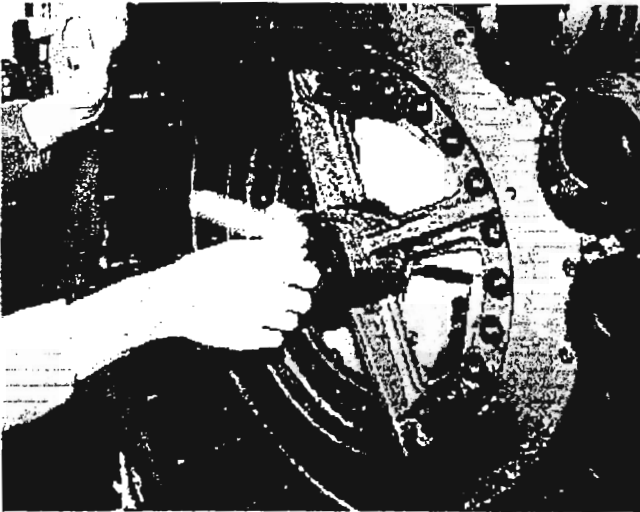
7 Stow down the new pot(the surface of knob recline the pot body and push forward into the plate.



8 Lock the hexangular screw bolt M6 which the new pot.



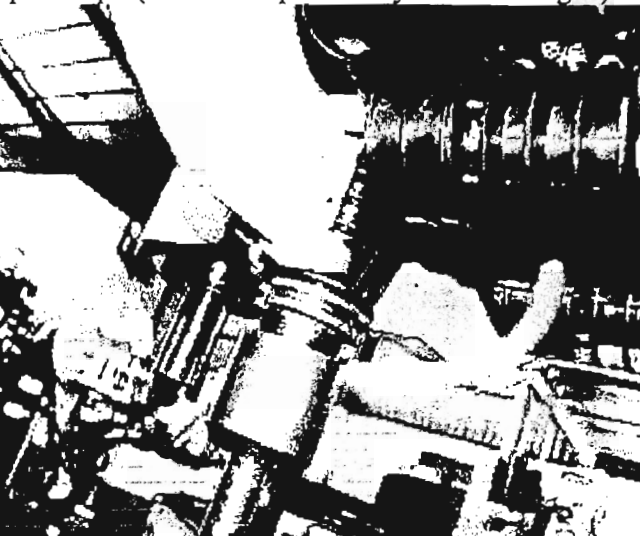
9 Push the plate to the original position and lock it.



10 Check the fixed clearance of the plate.(can not have clearance).



11 Check the correct angled 90 degree which the replaced pot(test on the practically tool exchanged).



B. Procedure of magazine motor replacement

1. Power off.
2. Take out motor wires from the wiring terminal box.
3. Unscrew four M8 bolts from motor seat, and then disassemble the motor.
4. Release the (S18) snap ring & M6 set screw from the worm gear. Take the worm gear and snap ring install onto the new motor.
5. Please make sure the motor specification is correct before you replace it.
6. Reconnect the wires to the terminal box.

C. Cylinder replacement

1. Turn off the power to the compressor & release air from the cylinder.
2. Take out cover sheet metal and ϕ 8mm air hose.
3. Before removing the induction switches, please mark the original positions of the induction switches.
4. Unscrew cylinder locating bolts (M8) & snap ring (S12) on the cylinder shaft.
5. Please replace the cylinder with the same specifications. Then locate the induction switches to original positions.

D. Induction switches replacement

1. Turn power off from machine.
2. Remove wires of induction switches from the terminal box.
3. Please loosen the locating plate of induction switches & take the whole assembly out.
4. Replace new switches & make sure the position of the switches is correct by push them up & down until they are located to the end of their edges.
5. Re-attach the wires to the terminal box

E. Sensor switch of tool magazine replacement method

1. Turn off power.

2. Release the wires of sensor switch from the terminal box.
3. Take out the front cover & outer sheet metal cover.
4. Unscrew the M12 hex nut from the proximity switch.
5. Replace switch & make sure the sensing distance is 4mm.
6. Re-attach the wires to the terminal box.

F. Procedure of ATC motor replacement

1. Turn off power
2. Disconnect motor wires from the terminal connection box.
3. Unscrew the four M10 socket HD cap screws from the motor flange
4. Replace motor with the same specifications and make sure the keyed shaft direction is matched.
5. Re-attach the motor wires to the terminal box.

G. Replacement of sensor switches in the ATC

1. Turn off power.
2. Disconnect wires of the sensor switches from the terminal box.
3. Take out the brown acrylic cover from the front ATC section
4. Replace the new sensor switches & make sure the sensing distance is about 4mm.
5. Re-connect the sensor wires to terminal box.

Magazine maintenance

Item	Description	Method	Tool	Routine	Remark
1 Lubrication	A Disk	Take off number plate & fill in grease manually	Grease Gun	Six months	Grease
	B Pot body slideway	Take off outer sheet metal cover & fill in grease manually	Grease Gun		Grease
	C Arm sliding block & position pin	Take off sheet metal cover, clean & fill in grease manually			Grease
	D Cam Slide	Take off ATC cover, fill in grease manually	Grease Gun		Grease
	E Motor Gear	Take off front cover & outer sheet metal	Grease Gun		Grease
2 Cleaning	A Inner taper of tool pot	Clean tool pot with solvent		Once a month	SHELL TELLUS32
	B Replace inner lubrication oil of ATC	Drain the used oil, and fill in the new lube oil			
3 Loose	A Sensor switch of magazine is loose or not?	Check manually		Half year	
	B Sensor switch of ATC is loose or not?	Check manually			
	C Induction switch of cylinder is loose or not?	Check manually			
	D Bolts on cylinder are loose or not?	Check manually & optically			
	E Bolts on arm assembly are loose or not?	Check manually			
	F Shake the clamping arm to see if the backlash is too big	Check manually, backlash value within 2mm.			
	G Check to see if magazine is loose or not?	Check manually			
4 Other check	A Steel balls on tool pot are intact?	Check optically		Half year	
	B Noise or heat on gear motor?	Check manually			
	C Solenoid valve of cylinder is out of air?	Check manually			
	D ATC up-down shaft has oil leak?	Check optically			
	E V edges of the Clamping arm have worm?	Check optically			
	F Oil level of ATC's oil reservoir is too low?	Check optically			Before power on

Note!

1. Please use proper tools during maintenance & repair procedure.
2. We suggest you replace the parts from the original manufacturer.
3. Please read and make sure the part's specifications before replacement.

The specifications are shown in the part lists.

4. Please check and make sure the sensing distance during proximity switch & induction switches replacement.
5. Please mark down the wire numbers & location in case you have to replace the wiring connection.
6. In any case of abnormal or malfunction on the ATC, please call for authorized personnel to check the product. We strongly suggest the serviceman has to be well trained technician or qualified engineer to check or repair the problem. This is to ensure the safety of the operator & the serviceman.
7. Before disassemble the ATC, please make sure there are enough people to support the load. If there are not enough people, please prepare and use overhead crank or forklift or any other mean to support the weight.