



OPERATOR'S MANUAL

MCV 300

FANUC



Machine
Type:

☐ MCV 300

Machine
Number:

Approve:

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MODIFICATION RECORDS

DATE	PAGE	ORIGINAL	MODIFIED	ED	MEMO
2005/08/16	9		ADD LABEL	D03	
	97-110		6.1-6.8		
	111-121		ADD 7,8		
2005/10/14	102-103	NONE	6.1.1 SAFETY CIRCUIT AND DVICE	D04	
	47	4.4.1	CHECK		
	115-116	NONE	4.4.1		
	96	NONE	6.6.4 CIRCUIT DIAGRAM OF AIR SYSTEM		
	9-17		M80-M87		
2005/12/8	P26		ADD LABEL	D05	
	P28	NONE			
	P64		ADD FIG2.4.2 GRAVITY CENTER		
	P103-104	NONE	ADD mm		
	P119	NONE	AFTER CHANGEA AND B.		
		5541-8180-100	ADD 5541-3342-100		
2006/6/9	P25	NONE	5541-8180-200	D06	
	P49	NONE			
	P113	NONE	SUPPLY.FREQUENCY		
	P114		6.6.1 A. e .IT IS SUGGESTED		
	P115		FIG. 6.6.1		
	P116	NONE	FIG. 6.6.2		
2007/9/7			6.6.3 AIR TANK	D07	
2010/12/24	P70		Chp4.5,5,6,7,8	D08	
			增加直立式面板圖		

1. SAFETY INTRODUCTION

**WARNING: FAILURE TO FOLLOW THESE RULES MAY CAUSE
RESULT IN SERIOUS PERSONAL INJURY**

- IN ORDER TO MAINTAIN THE INITIAL MACHINING ACCURACY AND PERFORMANCE, THE MACHINE MUST BE CORRECTLY USED UNDER THE FAVORABLE ENVIRONMENTAL CONDITIONS.
- INADEQUATE OPERATION MAY CAUSE DAMAGES TO THE MACHINE ITSELF AND EXTREME CAUSE SERIOUS ACCIDENT TO OPERATOR.
- TO PREVENT SUCH TROUBLES, PLEASE READ THIS INSTRUCTION MANUAL CAREFULLY UNTIL YOU REACH COMPLETE UNDERSTANDING AND THEN OPERATE THE MACHINE.
- THE FOLLOWING CAUTIONS ARE PARTICULARLY IMPORTANT TO BE OBSERVED FOR SAFE OPERATION.

1.1 FOREWORD

- MCV300
- THE MCV300 MACHINING CENTER IS IN THE RANGE OF PROFESSIONAL MACHINERY FOR WORKING OF METAL CUTTING, MADE BY LONG CHANG MACHINERY CO., LTD.
- SINCE THE MODEL DESIGN IS NOT ONLY FOR THE DOMESTIC MARKET BUT ALSO THE EUROPEAN MARKET. DURING DESIGN & CONSTRUCTION OF THIS MACHINE, THE ADDITIONAL RELATIVE EUROPEAN STANDARD, FOR THE SAFETY REGULATION HAS BEEN TAKING INTO ACCOUNT BEFORE THE APPLICATION OF CERTIFICATION.

1.2 USING RESTRICTION

1.2.1 THE FORESEEN USE OF THE MACHINE

A. THE PERSON TO USE THIS MACHINE:

ONLY THE TECHNICIAN WHO HAVE BEEN TRAINE TO USE THE MILLING MACHINE AND TO USE THE CNC CONTROL SYSTEM AND ELDER THEN 18 YEARS OLD CAN USE THIS MACHINE.

B. MACHINING MATERIAL:

CASTING, CARBON STEEL, STANDLESS STEEL, COPPER, AND ALUMINUM.

C. MACHINING METHOD :

a. MACHINING BY PROGRAM:

1. MILLING: FACE, OBLIQUE, END, SIDE MILLING, ETC.
2. DRILLING: FRONT AND OBLIQUE DRILLINGS.
3. BORING: FRONT AND OBLIQUE BORINGS BY CUTTERS INSTALLED.
4. MOLDING: PROCESSING OF IRREGULAR CURVES AND MOLD REMOVING ANGLES.
5. POLISHING: SURFACE POLISH ON METALLIC PARTS.

1.2.2 THE FORESEEN OTHER REASONABLE USE OF THE MACHINE

A. THE PERSON TO USE THIS MACHINE:

THE PERSON WHO HAS JUST TRAINED SOME SIMPLE FUNCTIONS (CYCLE START, FEED HOLD, EMERGENCY STOP ...) ----- MUST DIRECT BY TECHNICIAN PERSON DESCRIBED ABOVE.

B. MACHINING MATERIAL:

WOOD ----- THE WOOD DUST MIGHT RUNS INTO BEARING, SIDEWAYS AND CAUSE SOME DAMAGE.

C. MACHINING METHOD: MACHINING BY MANUAL. ----- SHOULD WEAR THE GOGGLES AND ONLY TECHNICIAN PERSON DESCRIBED IN 1.1.1 CAN OPERATE.

1.2.3 THE FORESEEN UNREASONABLE USE OF THE MACHINE

A. THE PERSON TO USE THIS MACHINE :

THE PERSON WHO HAVE NOT BEEN TRAINED OR UNDER 18 YEARS OLD.

1.3 SAFETY INSTRUCTIONS

1.3.1 REACTION WITH EMERGENCY SITUATION:

- A. IN CASE OF ANY EMERGENCY, PUSH THE EMERGENCY STOP BUTTON TO STOP ALL THE MOVEMENT AND THE POWER.
- B. ALL OF THE EMERGENCY STOP BUTTONS ARE COLORED RED, AND YELLOW BACKGROUND.
- C. THE STANDAR MACHINE PROVIDES ONE EMERGENCY STOP BUTTON IN THE OPERATION PANEL.
- D. FOR DIFFERENT OPTIONS THERE COULD BE MORE EMERGENCY STOP BUTTONS SUCH AS:
 - a. 24 / 32 TOOL CHANGER
 - b. FLAP TYPE CHIP CONVEYOR.
 - c. REMOVEABLE HANDWHEEL (MPG.)
- E. AFTER EMERGENCY STOP, FOLLOW THE NORMAL START UP PROCEDURE AND SUITABLE OPERATION.

1.3.2 SETTING UP THE MACHINE AND POWER

- A. THE ENVIRONMENT TO SET UP THE MACHINE
 - a. THAT THIS MACHINE CANNOT BE USED IN THE POTENTIAL EXPLOSIVE ENVIROMENT. GENERALLY, THIS MACHINE WILL BE INSTALLED ON THE FOLLOWING CONDITION.
 - 1. AMBIENT TEMPERTURE:5°~40°C
 - 2. RELATIVE HUMIDITY: NOT EXCEED 50% AT 40°C
(HIGHER RELATIVE HUMIDITY MAY BE PERMITTED AT LOWER TEMPERTURE, E.G. 90% AT 20°C)
 - 3. ATMOSPHERE: FREE FROM EXCESSIVE DUST, ACID FUME, CORROSIVE GASES AND SALT.
 - 4. AVOID ECPOSING TO DIRECT SUNLIGHT HEAT RAYS WHICH CAN CHANGE THE ENVIRONMENTAL TEMPERTURE.
 - 5. AVOID EXPOSING TO ABNORMAL VIBRATION.
 - 6. HAVE TO CONNECT TO EARTH.
(A TERMINAL FOR THE CONNECTION IF THE EXTENAL GROUND CONDUCTOR IS PROVIDED IN THE VICINITY OF THE ASSOCIATED PHASE CONDUCT TERMINAL WITH MARKED " PE". IT SHOULD MAKE SURE THE "PE" TERMINAL BEING CONNECTION BEFORE MACHINE OPERATE)
 - 7. THE LIMITE OF ATTITUDE: 0-1000 METER.
 - 8. ELECTRICAL EQUIPMENT SHALL WITHSTAND THE EFFERTS OF TRANSPORTATION AND STORAGE TEMPERTURE WITHIN A RANGE OF -25°C TO 55°C.
- B. CONNECTION AND DISCONNECTION OF POWER CABLE

- a. SUPPLY VOLTAGE: 0.9 - 1.1 NOMINAL SUPPLY VOLTAGE
- b. SOURCE FREQUENCY: 0.99 - 1.01 NOMINAL FREQUENCY
- c. WHEN THE POWER CABLE IS DISCONNECTED AND CONNECTED AGAIN, CARE SHOULD BE EXERCISED TO CONNECT EACH TERMINAL IN THE CORRECT PHASE (L1, L2, L3 PHASES).
- d. FOR DETAILS OF THE CONNECTION OF THE POWER CABLE, REFER TO CHAPTER 4.4 SWITCHING ON THE POWER SOURCE AND CHECKING."

1.3.3 WHEN OPERATING

- A. THE OPERATOR SHOULD WEAR SAFETY SHOES AND GOGGLES.
- B. WARM THE MACHINE 15 - 30 min. DAILY, BEFORE OPERATION.
- C. CHECK IF THE WORKPIECE IS SECURELY LOCKED ON THE TABLE BEFORE MACHINING.
- D. MOVE THE TOOLS AWAY FROM WORKPIECE BEFORE STARTS THE SPINDLE.
- E. MANUAL REFERENCE POINT RETURN AFTER TURNING ON THE POWER SWITCH.

AFTER THE POWER SWITCH IS TURNED ON, DO NOT FORGET TO RETURN THE SPINDLE HEAD, SADDLE AND TABLE TO THE REFERENCE POINT IN MANUAL OPERATION MODE.

- F. INSTALL PULL STUD TIGHTLY
 - a. THE PULL STUD SHOULD BE SECURELY INSTALLED TO THE GIVEN TOOL SHANK.
 - b. IF THE PULL STUD IS LOOSE DURING CUTTING, THE TOOL CANNOT BE SECURELY CLAMPED IN THE SPINDLE. SINCE LOOSENED TOOL IS VERY DANGEROUS, BE SURE TO CHECK THE PULL STUD BEFORE STARTING THE OPERATION.
- G. USE OF SPECIFIED PULL STUD
 - a. DO NOT USE A PULL STUD NOT SPECIFIED BY US, OTHERWISE THE TOOL CANNOT BE SECURELY CLAMPED IN THE SPINDLE.
 - b. THEREFORE, ALWAYS USE ONLY THE PULL STUD CONFORMED TO THE STANDARD.
 - c. DO NOT USE A PULL STUD MADE IN YOUR FACTORY.
- H. INSTALLATION AND REMOVAL OF TOOL TO AND FROM SPINDLE BY HAND
 - a. WHEN TOOL IS INSTALLED TO THE SPINDLE, CARE SHOULD BE TAKEN AS FOLLOWS:
 - 1. THE TOOL AND SPINDLE BORE TAPERS SHOULD BE CLEAN.
 - 2. DO NOT RELEASE HAND FROM THE TOOL UNTIL IT IS ASSURED THAT THE TOOL IS SECURELY CLAMPED IN THE SPINDLE.
 - 3. INSTALL THE TOOL UPRIGHT, BUT DO NOT TILT.

NOTICE: SINCE AIR FOR CLEANING OF THE SPINDLE BORE AND TOOL TAPER BLOWS FROM THE SPINDLE BORE WHEN THE UNCLAMP SWITCH ON THE OPERATION PANEL IS PRESSED, CAREFULLY AND SECURELY HOLD THE TOOL BY HAND AND PREVENT FROM DROPPING OF THE TOOL.

- I. WHEN THE TOOL IS REMOVED FROM THE SPINDLE BY HAND, CARE SHOULD BE TAKEN AS FOLLOWS:
 - a. AT THE SAME TIME AS THE UNCLAMP SWITCH ON THE OPERATION PANEL IS PRESSED, THE PULL STUD IS PRESSED DOWN AND THE TOOL GOES DOWN APPROXIMATELY 0.5mm (0.02 inch). SINCE AIR BLOW PRESSURE ENHANCES PRESSING DOWN MOVEMENT OF THE TOOL, SECURELY HOLD THE TOOL BY HAND.
 - b. AS MENTIONED ABOVE, THE TOOL GOES DOWN WHEN IT IS REMOVED, BE SURE TO RAISE THE SPINDLE HAND AT A POSITION HIGH ENOUGH TO PREVENT CONTACT OF THE TOOL WITH THE WORK OR TABLE.
- J. DO NOT ALLOW HAND TO GAIN ACCESS WITHIN THE MOVABLE RANGE OF ATC UNIT.

IT IS VERY DANGEROUS TO ALLOW YOUR HAND TO GAIN ACCESS WITHIN THE MOVABLE RANGE OF THE ATC UNIT OR TO TOUCH THE PERIPHERY OF THE ATC UNIT.
- K. WHEN THE SPINDLE IS UNDER ORIENTATION, DO NOT INSTALL AND REMOVE THE TOOL, WHICH IS PROHIBITED FROM USING A HOLDER IN THE SPINDLE UNDER ORIENTATION, TOGETHER WITH TOOL HOLDER, OTHERWISE THE SPINDLE MIGHT BE DAMAGED.
- L. DO NOT USE A HEAVY TOOL.
 - a. THE MAXIMUM WEIGHT OF THE TOOLS APPLICABLE TO THE MACHINE IS 7kg (20 TOOLS ATC) AND 8 kg (24 / 32 TOOLS ATC) .
 - b. DO NOT USE TOOLS HEAVIER THAN 7 kg OR 8 kg.
 - c. REFER TO PAGE 2-8
- M. DO NOT USE A LARGE TOOL.
 - a. FOR 18 TOOLS ATC

THE MAXIMUM DIAMETER OF THE TOOLS APPLICABLE TO THE MACHINE IS 80 mm (3.1 inch) WHEN TOOLS ARE ADJACENTLY ACCOMMODATED IN THE MAGAZINE. HOWEVER, THE TOOL HAVING THE MAXIMUM DIAMETER OF 140 mm (5.5 inch) IS APPLICABLE WHEN IT IS PLACED IN A MAGAZINE TOOL POST, BOTH THE ADJACENT TOOL POSTS OF WHICH ARE VACANT. DO NOT USE TOOLS LARGER THAN THESE DIAMETERS.
 - b. FOR 24 / 32 TOOLS ATC

THE MAXIMUM DIAMETER OF THE TOOLS APPLICABLE TO THE MACHINE IS 100 mm (3.9 inch)
 - c. REFER TO PAGE 1-8

N. THE FRONT DOOR PROTECTION

- a. NORMALLY OPERATOR SHOULD CLOSE THE DOOR BEFORE DOING ANY MOVMENT OF THE MACHINE.
- b. IF OPERATED BY OPENING THE FRONT DOOR AND MACHINING BY MANUAL, BE SURE TO WEAR THE GOGGLES, AND ONLY TECHNICIAN PERSON WHO HAS BEEN TRAINED CAN OPERATE IN THIS WAY.
- c. FOR MACHINE WITH CE MARK, THERE ARE SECURITY SWITCH FOR DOOR OPEN OPERATION, REFER TO CHPTER 5 FOR MORE INFORMATION.

O. CAUTION TO USE 10,000/min SPINDLE

IN ORDER TO HAVE LONGER LIFE TIME OF THE HIGH PRECISION SPINDLE, WE RECOMMEND TO WARM UP THIS SPINDLE EVERYDAY BEFORE PUT INTO HIGH SPEED MACHINING. PLEASE RUN THE SPINDLE IN LOWER SPEED BETWEEN 1,000 TO 3,000 /min ABOUT 15 - 30 min. AFTER THAT YOU ARE FREE TO RUN THE MAX. SPEED 10,000 /min.

P. SPINDLE CHILLIER SETTING

THIS OPTIONAL SYSTEM IS TO KEEP THE HEAD STOCK MORE STABLE. WE RECOMMEND TO SET THE TEMPERATURE TO 0 - -1⁰ C DEGREE. THIS SYSTEM MAY OPERATE AUTOMATICALLY COMPARE WITH THE ROOM TEMPERATURE.

1.3.4 LUBRICATION, AIR AND COOLANT

A. LUBRICATING OIL SHORTAGE

- a. IF LUBRICATING OIL RUNS SHORT, THE SLIDE WAYS AND BALL SCREWS IN X, Y AND Z AXIS WILL BE RAPIDLY WORN AND THE MACHINE IS DEGRADED.
- b. BE SURE TO CHECK AMOUNT OF LUBRICATING OIL EVERYDAY AND REPLENISH IF NECESSARY.
- c. IF THE LAMP LUBRICATION LEVEL LIGHTS, IMMEDIATELY REPLENISH.

B. AIR SOURCE

- a. SINCE EACH PNEUMATIC UNIT AND DEVICE IS DESIGNED TO WORK ON THE AIR SOURCE AT 5.5 bar, ALWAYS SUPPLY COMPRESSED AIR AT 6 bar TO THEM.
- b. THE AIR SOURCE SHOULD BE AT CONSTANT PRESSURE. ALTHOUGH AIR FILTER IS INSTALLED AT THE AIR INTAKE TO PROTECT THE PNEUMATIC UNIT, THE SUPPLIED AIR SHOULD BE FREE FROM MOISTURE, OIL AND DUST, AND PURIFIED BY AIR FILTER OF 5 MICRONS MESH.

NOTICE: FOR LONG-TERM USAGE OF THE MACHINE, THE QUALITY OF THE AIR IS VERY IMPORTANT. BED QUALITY OF THE AIR MAY DAMAGE THE PNEUMATIC DEVICES AND CAUSE FAILURE OF MECHANICAL MOTION

- c. TOO HIGH OR LOW AIR PRESSURE

1. THE REQUIRED PRESSURE OF THE AIR SOURCE GIVEN TO THE MACHINE IS 5.5 bar.
2. TOO HIGH AIR PRESSURE CAN CAUSE TROUBLE WITH PNEUMATIC UNIT OR DEVICE.
3. WHILE TOO LOW AIR PRESSURE CAN RESULT IN UNSTABLE OPERATION OF PNEUMATIC UNIT OR DEVICE.
4. IF AIR PRESSURE GOES DOWN BELOW 4 bar, THE LAMP AIR PRESSURE ON THE OPERATION PANEL LIGHTS, THE ALARM BUZZER SOUNDS AND TOOL CHANGE BECOMES IMPOSSIBLE.
5. SEE CHAPTER 6 FOR MORE INFORMATION.

C. COOLANT

- a. DO NOT TURN ON THE COOLANT PUMP, UNLESS THERE IS ENOUGH COOLANT IN THE TANK, OR THE COOLANT PUMP WILL BROKEN SHORTLY.
- b. WHEN CHANGE THE COOLANT, IT IS SUGGESTING OPERATED WITH PUMP EQUIPMENT TO FILL IN AND EMPTY THE LIQUID TO REACH THE LEVEL.
- c. IF THE LIQUID FLOW OVER TO GROUND, USE CLOTH TO CLEAN THE LIQUID IN ORDER TO PREVENT FORM ACCIDENT.
- d. IT IS SUGGEST USING COOLANT LIQUID WITH ENVIRONMENTAL PROTECTION APPROVAL.

D. PREVENT FROM FIRE

TO PREVENT FIRE, OBEY THE FOLLOWING INSTRUCTIONS FOR UN-MANNED OPERATION AT NIGHT OR FOR CASES WHEN OPERATOR HAS TO BE AWAY FROM THE MACHINE FOR A LONG TIME.

1. USE NON-FLAMMABLE COOLANT ONLY.
2. CHECK THAT LUBRICATION OIL AND COOLANT ARE SUFFICIENT AND ARE WORKING PROPERLY.
3. CHECK THE TOOL TIPS, CUTTING CONDITIONS, CYCLE TIME, TOOL LIFE, ECT.
4. NEVER PLACE FLAMMABLE ITEMS, SUCH AS WOODEN BLOCKS, PAPER, CLOTH, ECT., AROUND THE MACHINE.

1.3.5 HEALTHY AND SAFETY PROTECTION

A. NOISE OF THE MACHINE

- a. CONDITIONS :
 1. PLACEMENT/INSTALLATION : FLOOR-STANDING
 2. HIGHT ABOVE THE FLOOR : STANDING OPERATOR.
 3. MEASUREMENT DISTANCE $d = 1\text{m}$
 4. MEASUREMENT TIME PER POSITION = 30s
 5. MESUREMENT POSITION = 26 POSITIONS
- b. SUMMERY

1. A WEIGHTED SOUND PRESSURE UNDER NO LOAD
2. $L_{p,eq} = 73.9 \text{ dB(A)}$.
3. A WEIGHTED SOUND PRESSURE UNDER LOAD
4. $L_{p,eq} = 79.4 \text{ dB(A)}$.

NOTICE: CUTTING DIFFERENT WORKPIECE MAY CAUSE LOUDER NOISE. WHEN WORKING LONG TIMES IN CUTTING WORKPIECE BE WARE TO WEAR EARPLUGS.

1.3.6 MAINTENANCE AND CHECK

- A. MOVE THE TOOLS AWAY FROM WORKPIECE BEFORE MAINTENANCE OR ANY CHECK OF THE MACHINE OR WORKPIECE.
- B. SWITCH OFF THE MAIN POWER BEFORE MAINTANCE.

1.3.7 RESCUE THE PERSON WHO TRAPPED INTO MACHINE

IF OPERATOR FALLS INTO MACHINE SHUT OFF THE EMERGENCY SWITCH IMMEDIATELY AND KEEP THE FRONT DOOR OPEN. THEN SAVE THE PERSON FROM FRONT DOOR OR SIDE WINDOWS.

1.4 WARNING LABEL AND POSITION

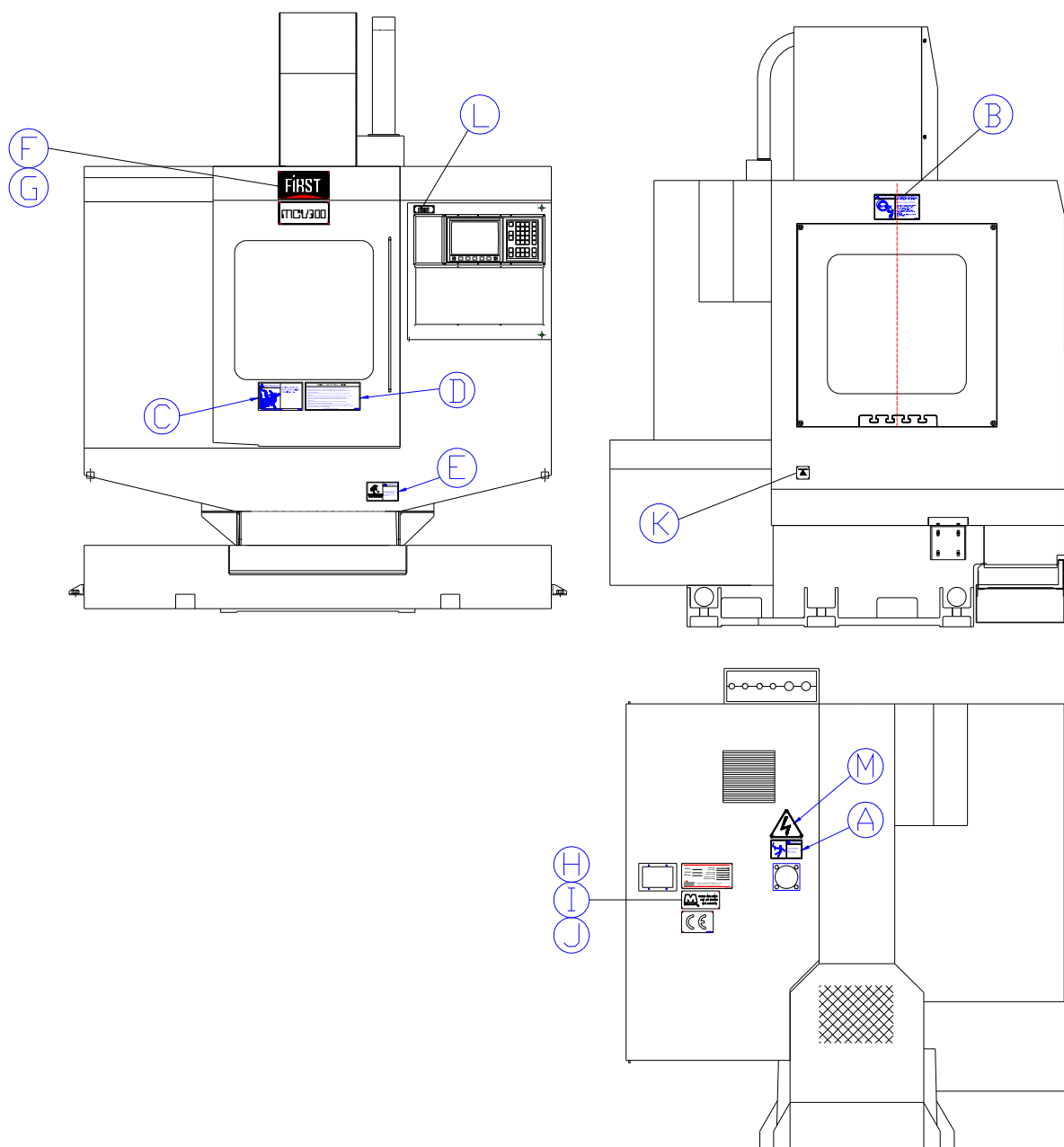
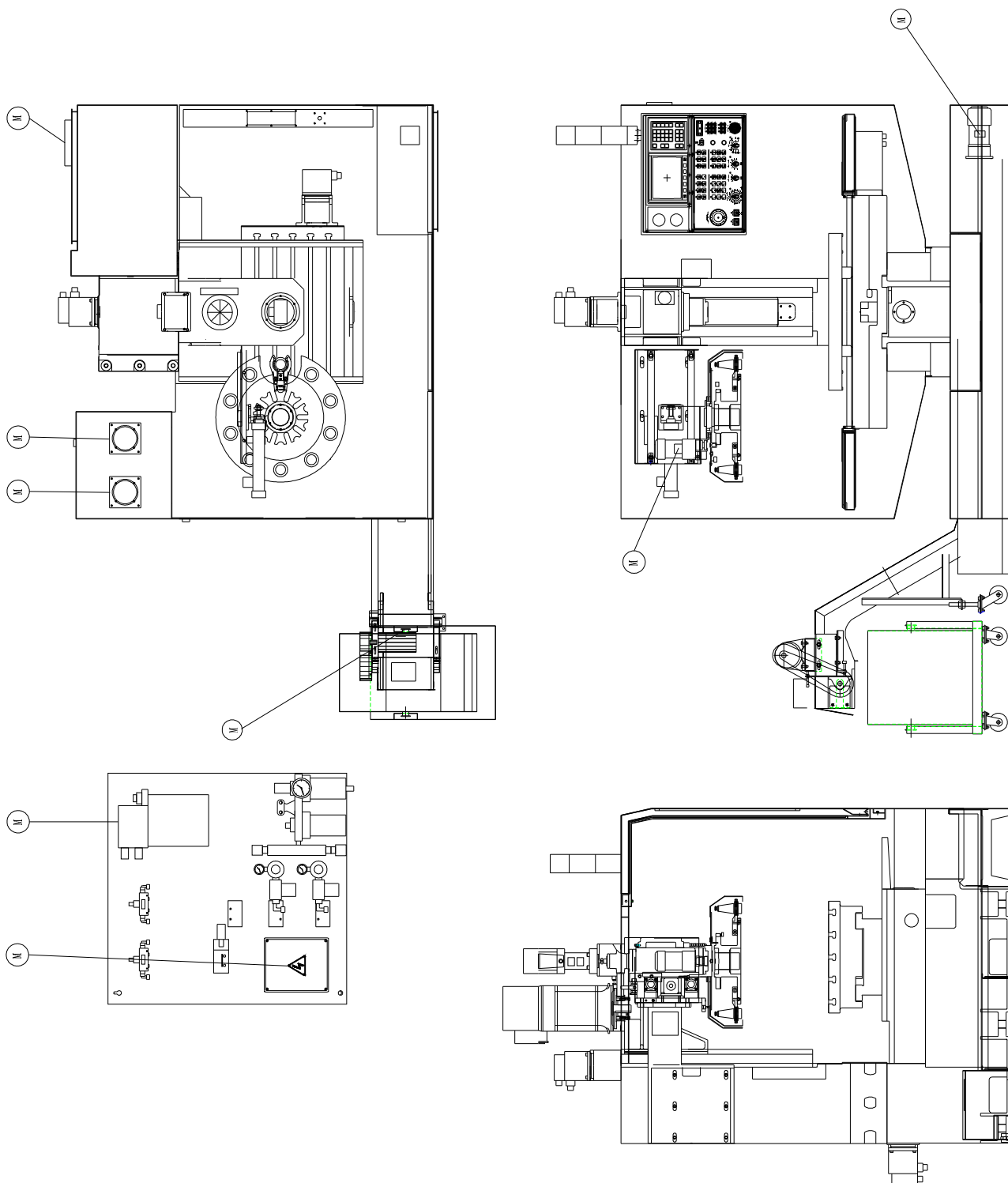
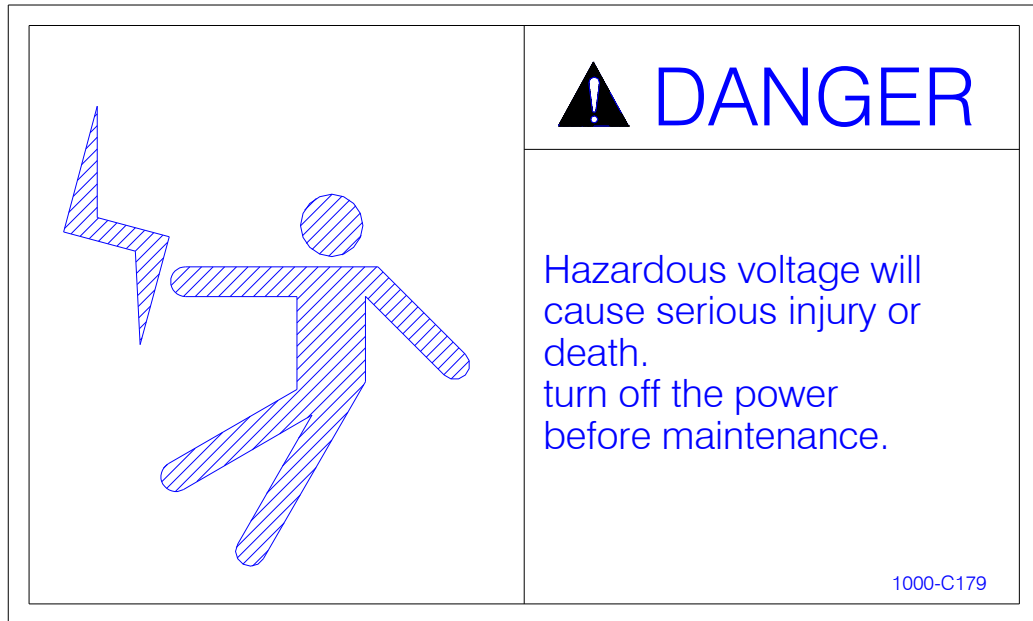


FIG. 1.4.1 WARNING LABEL POSITION

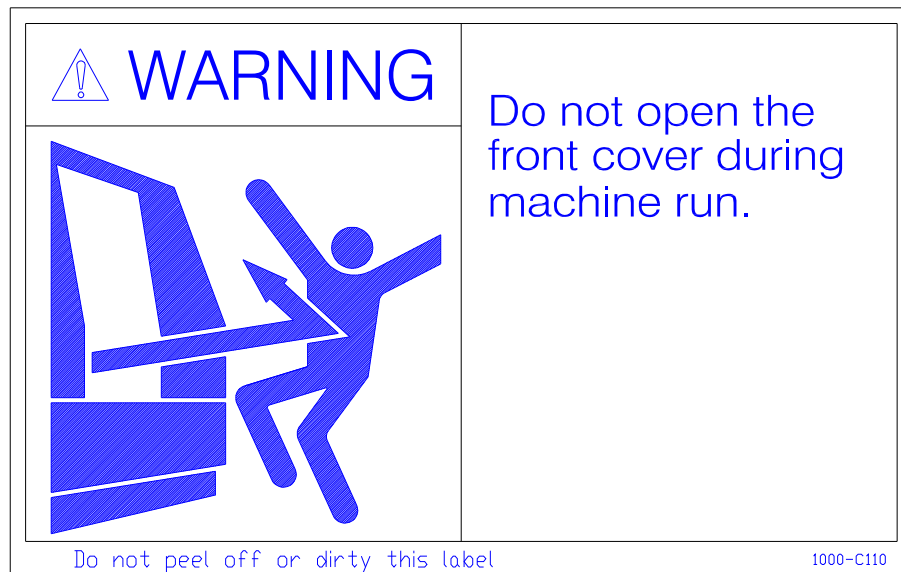




LABEL A



LABEL B



LABEL C

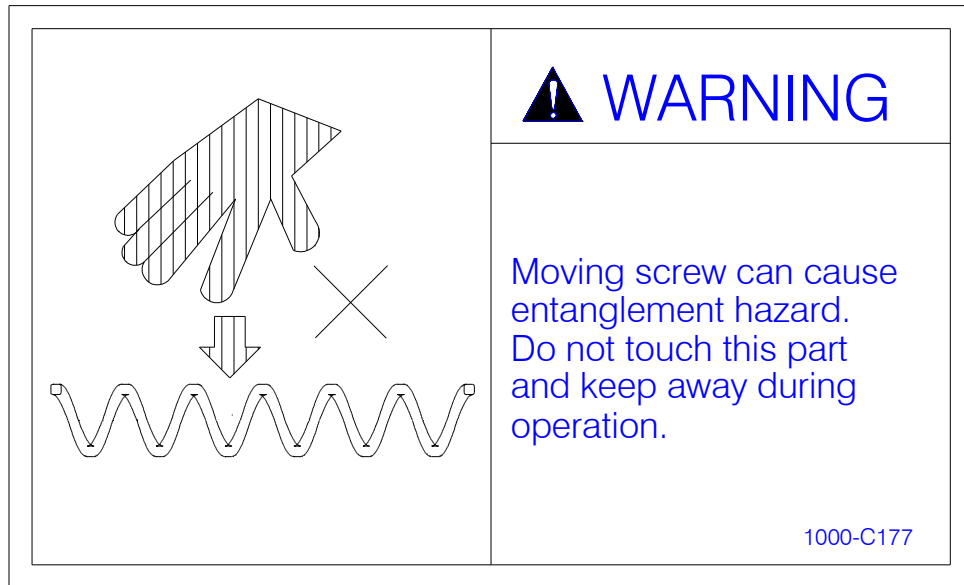
GENERAL SAFETY PRECAUTIONS

1. Before operating the machine, read intensively the Instruction Manual. In particular, read carefully the description for safety and maintenance, and follow its instruction.
 2. During operation, close the doors and covers, and avoid access to the rotating and moving parts of the machine.
 3. Do not operate the machine with protective covers. Inter locks and the other safety devices removed.
 4. Be sure to clamp the workpiece and cutting tools, and do not place a used tool on the moving parts. Also, for proper machining, select the optimum feedrate and spindle speed.
 5. Wear proper habiliments (working clothes, shoes, cap, protective glasses, etc.) to ensure safety work.
 6. Repair the machine only by the approved personnel following the Instruction Manual.
- in addition, turn the power switch OFF during repair.
- Execute safety work on user's own responsibility by observing the safety precautions provided on the Instruction Manual and the WARNING label attached on the machine. Negligence of warning could cause personal injury or machine damage.

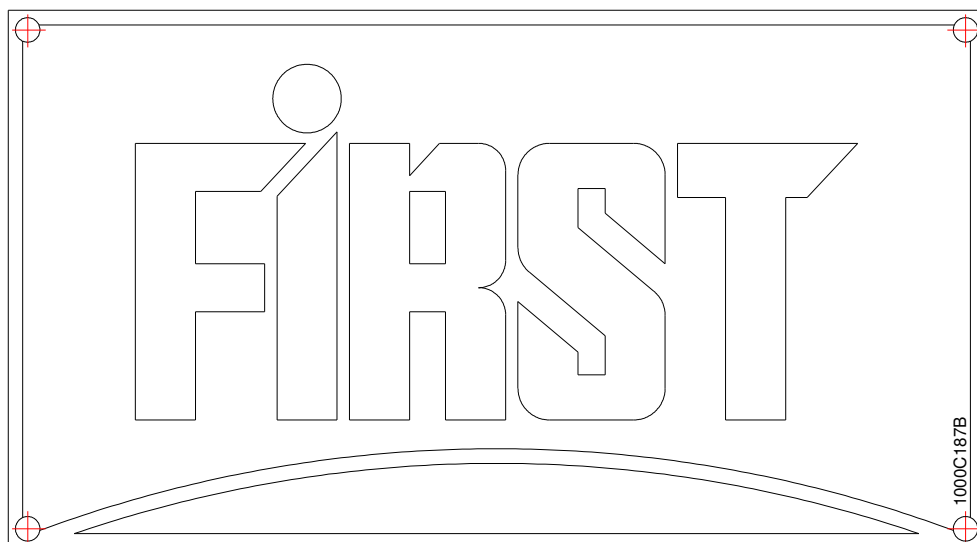
Do not peel off or dirty this plate.

1000-C109B

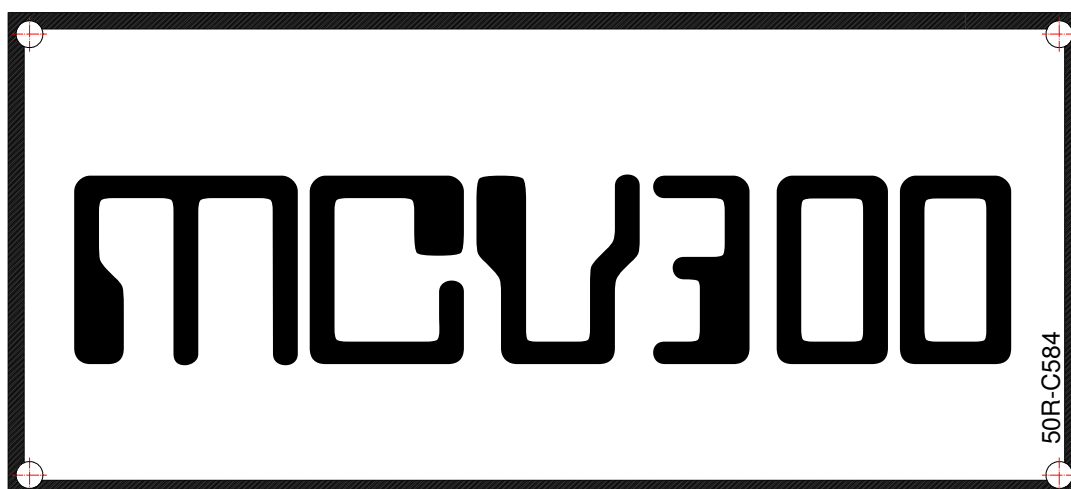
LABEL D



LABEL E



LABEL F



LABEL G

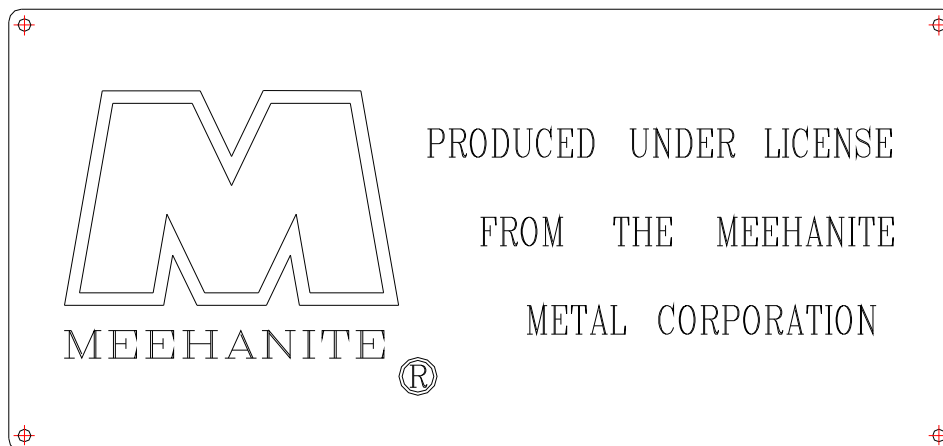
MODEL: _____	Rated power: _____ kVA
MFG NO: _____	Power supply: 3~ _____ V Hz
MFG Date: _____	Full load current: _____ A
	Machine weight: _____ kg
	Pneumatic pressure: _____ > 5.5 bar
	Spindle speed range: Max. _____ /min



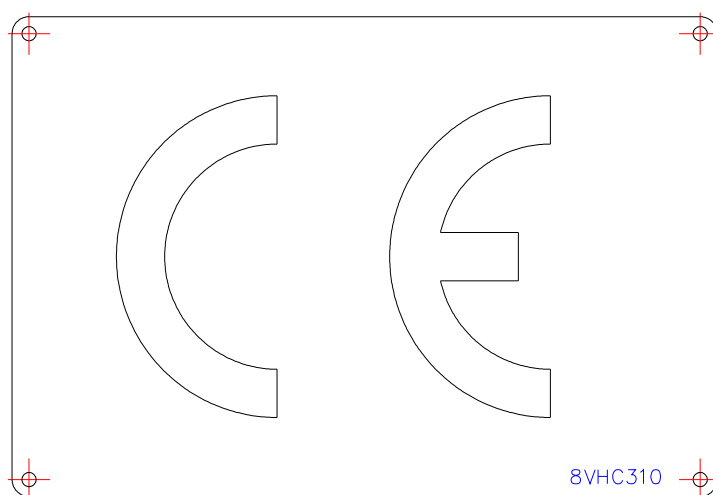
LONG CHANG MACHINERY CO., LTD.
 NO.52,CHARN AN EAST ROAD, TAIPING, TAICHUNG, TAIWAN,R.O.C.
 TEL: +886-4-2392-1001 FAX: +886-4-2392-1037 <http://www.first.com.tw>

18VH-C270E

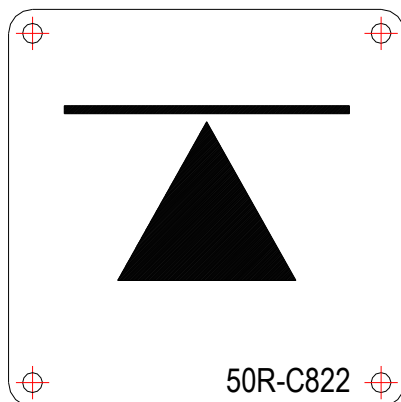
LABEL H



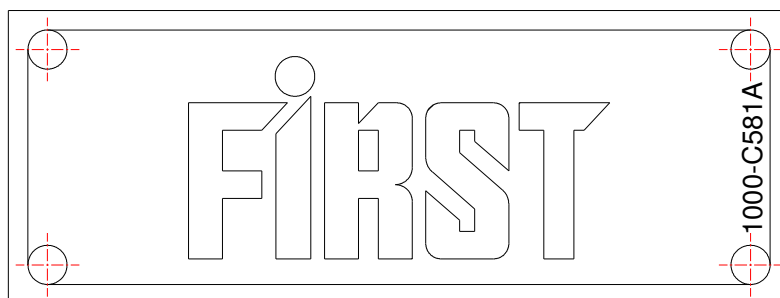
LABEL I
(OPTION)



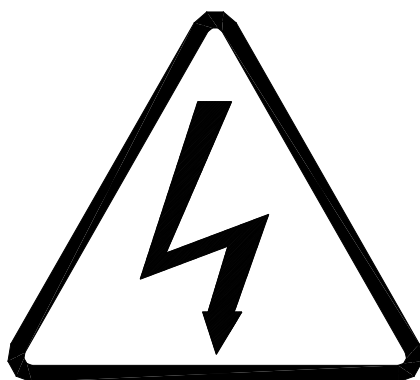
LABEL J



LABEL K



LABEL L



LABEL M

1.5 OPERATION AREA

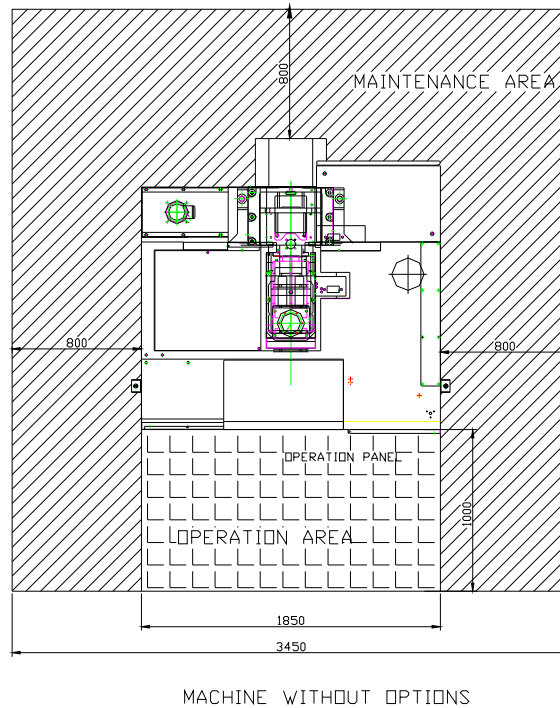


FIG 1.5.1 OPERATOR POSITION

1.6 DISPOSE OF WASTE

- A. ALL THE WASTE SHOULD BE TAKING CARE BY THE RULE OF LOCAL GOVERNMENT.
- B. THE CUTTING CHIP WASTE IS ALWAYS SHARP, DO NOT TOUCH, OR CLEAN THE CHIPS DIRECTLY BY HAND.
- C. MOST OF THE CUTTING CHIP ARE RECYCLABLE IT IS SUGGESTED TO RECYCLE THE CUTTING CHIP BY LOCAL RECYCLE AGENT.
- D. DISPOSE OF LIQUID WASTE SUCH AS WASTE OIL AND COOLANT IS NECESSARY TO ASSOCIATE WITH LOCAL RECYCLE AGENT.

1.7 OTHER NOTICES

- A. IF THE WORK PIECE IS HEAVIER THAN 10kg, PLEASE USE SHOP HANGING EQUIPMENT TO MOVE THE WORK PIECE.

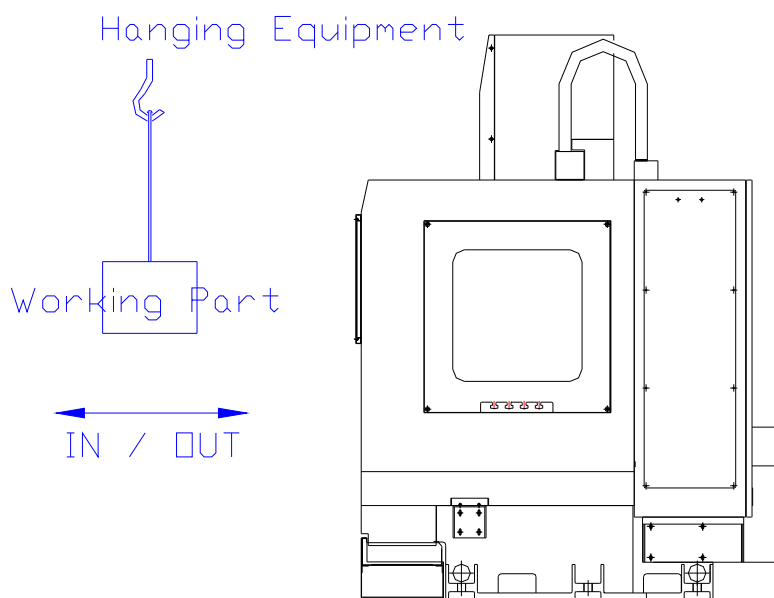


FIG 1.6 HEAVY PART HANGING

- B. IN CASE OF MAINTENANCE, SERVICING, AND PARTS CHANGES, PLEASE CONTACT OUR SALES AGENCIES OR BUSINESS DEPARTMENT DIRECTLY.
- C. SUGGESTIONS FOR IMPROVEMENTS OF THE MACHINE STRUCTURE AND / OR INQUIRIES, INCLUDING PLANT VISITATIONS, ARE CORDIALLY WELCOME.
- D. THE MANUFACTURER REVERSES THE RIGHT TO MODIFY THE DESIGN, OPERATIONS, STRUCTURE ETC. ALL OF THE MACHINE WITHOUT ANY PRIOR NOTICE.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE MACHINE

- A. THE MODEL MCV600/800/1000 IS THE VERTICAL SPINDLE MACHINING CENTER FEATURING ELECTRONIC CONTROL EQUIPMENT BUILT-IN COMPACT DESIGN, PERFORMANCE, ACCURACY AND RELIABILITY.
- B. THE MODEL BASICALLY CONSISTS OF THE FOLLOWINGS:
 - a. MACHINE BODY (INCLUDING SPINDLE HEAD, SPINDLE, COLUMN, BED, SADDLE AND ATC)
 - b. OPERATION PANEL
 - c. NC SYSTEM
 - d. ELECTRIC (POWER SUPPLY) CABINET
 - e. PNEUMATIC UNIT
- C. THE APPEARANCE AND PRINCIPAL DIMENSIONS OF THE MACHINE AND THE NAME OF EACH PRINCIPAL COMPONENT ARE AS SHOWN IN FIG. 2.1.1, 2.2.2

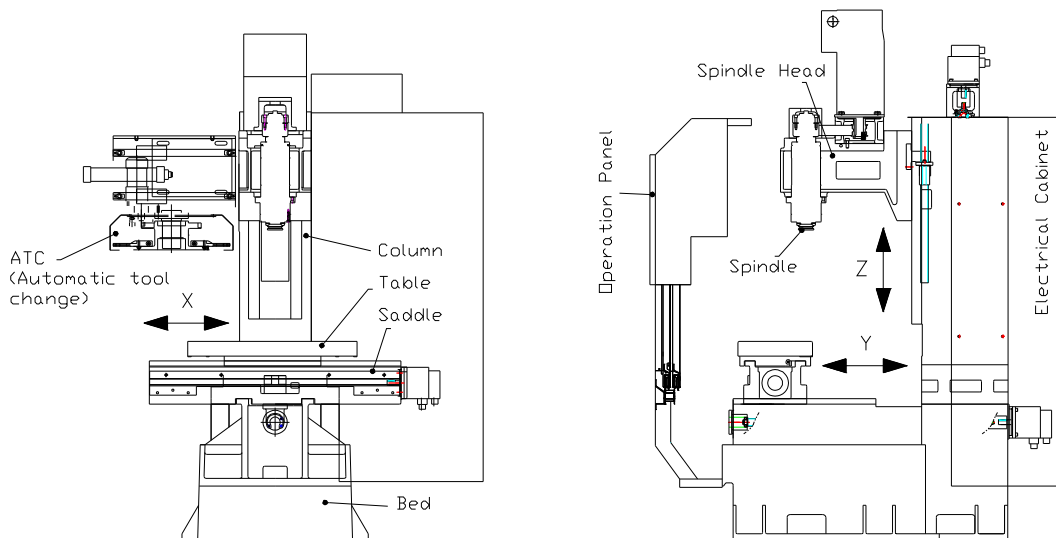


FIG. 2.1.1 PRINCIPAL COMPONENT NAME

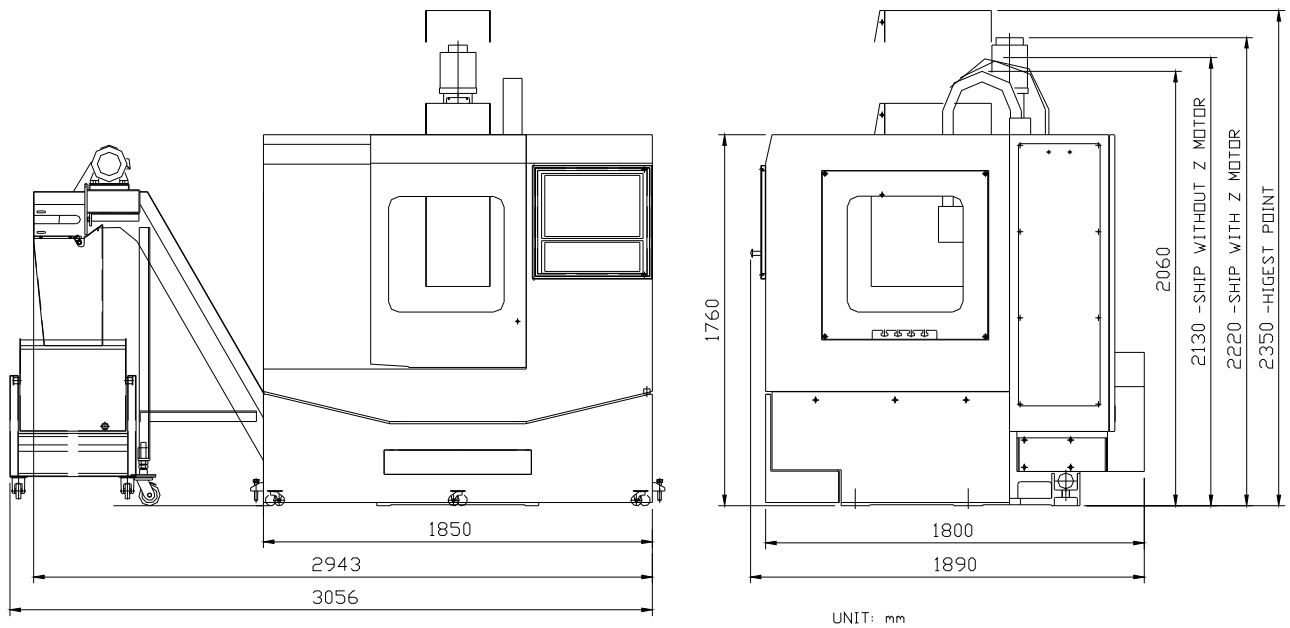


FIG. 2.1.2 APPEARANCE AND PRINCIPAL DIMENSION OF THE MACHINE

2.2 DETAILS OF PRINCIPAL COMPONENT

2.2.1 SPINDLE HEAD

- A. THE SPINDLE HEAD IS MOUNTING ON THE SQUARE SLIDE WAYS, WHICH IN TURN ARE VERTICALLY INSTALLING ON THE COLUMN FRONT.
- B. THE SPINDLE HEAD IS VERTICALLY (IN Z AXIS) MOVES ALONG THE SLIDE WAYS.
- C. A PRACTICALLY MAINTENANCE-FREE AC BRUSHLESS MOTOR IS USED TO DRIVE THE SPINDLE ASSURING IN ASSOCIATION WITH LARGE DIAMETER BEARING SYSTEM, EXTREMELY HIGH PERFORMANCE.
- D. CARTRIDGE SPINDLE IS SUPPORTING BY ACCURATE AND GREASED PACKED BEARINGS.
- E. TOOL HOLDER RETAINER AND AIR BLOW THAT REMOVES CHIPS FROM THE SPINDLE AND TOOL TAPER ARE INCORPORATE IN THE SPINDLE.
- F. THE SPINDLE HEAD FEATURES SIMPLE STRUCTURE AND RELIABLE PERFORMANCE.

2.2.2 COLUMN

- A. THE COLUMN IS FIRMLY BOLTED TO THE BED, AND DESIGNED TO HAVE PARTICULAR RIGIDITY. THE SLIDE WAYS ALONG WHICH THE SPINDLE HEAD MOVES ARE OF SQUARE TYPE, AND ELABORATELY GROUND AFTER HARDENING. A TURCITE-B SHEET IS APPLIED TO THE SLIDE SURFACE OF THE SPINDLE HEAD, PROVIDING GOOD ACCOMMODATION TO THE SLIDE WAYS.
- B. THE ATC (AUTOMATIC TOOL CHANGER) IS LOCATED AT THE LEFT OF THE COLUMN AND THE PNEUMATIC VALVES IS AT THE BACK OF THE ATC.
- C. THE MOTOR THAT DRIVES THE SPINDLE HEAD IN Z AXIS (VERTICAL MOVEMENT) IS INSTALLED ON THE TOP OF THE COLUMN.

2.2.3 BED

- A. THE BED IS PROVIDED WITH LEVELING BOLTS AT ITS FEET, AND HAS THE SECTION WHERE THE COLUMN IS INSTALLED AS WELL AS THE SLIDE WAYS OF SQUARE TYPE ON THE TOP OF THE BED.
- B. THE Y AXIS (CROSSWISE MOVEMENT) FEED MOTOR ARE INSTALLED ON THE BACK WALL OF THE BED.
- C. SINCE THE BED SUSTAINING THE WEIGHT OF THE COLUMN MUST ASSURE RELIABLE Y AXIS MOVEMENT, AND LARGELY AFFECTS CUTTING ACCURACY, IT IS DESIGNED TO HAVE EXTREME RIGIDITY.
- D. IT IS ALSO CONSIDERED IN DESIGNING THE BED THAT CHIPS AND CUTTING OIL CAN BE READILY ELIMINATED AND COLLECTED.

2.2.4 TABLE

- A. THE TABLE IS THE ONLY PLACE WHERE YOU CAN LOCK YOUR WORK PIECE ON IT AND MACHINING, IT MOVES ON THE SADDLE IN LENGTHWISE DIRECTION (X AXIS).

2.2.5 ATC (AUTOMATIC TOOL CHANGER)

- A. THE ATC IS INSTALLED ON THE LEFT WALL OF THE COLUMN. THE ATC PERMITTING DIRECT TOOL CHANGE; ANY TOOL CAN BE IMMEDIATELY AND RELIABLY CHANGED.
- B. THE FEATURES OF THE ATC INCLUDE PNEUMATICALLY DRIVE SYSTEM, SIMPLE STRUCTURE, FAST MOVEMENT, AND RAPID BI-DIRECTIONAL RANDOM TOOL SELECTION IS DIRECTLY DESIGNATED TOOL NO. WITH T CODE. (24 / 32 TOOLS CAM TYPE ATC ARE AVAILABLE AS AN OPTION)

2.2.6 OPERATION PANEL

- A. THE OPERATION PANEL IS LOCKED IN THE RIGHT FRONT OF THE MACHINE, AND BASICALLY CONSISTS OF THE NC OPERATION PANEL, IN WHICH PROGRAM LOADING FROM TAPE TO THE MEMORY, PROGRAM EDITING AND MID OPERATION ARE PERFORMED, AND THE OPERATION PANEL (OPERATOR'S STATION) HAVING CONTROL SWITCHES AND PUSH BUTTONS ON THE PANEL AND FUNCTIONAL SWITCHES IN THE PANEL.
- B. ALMOST ALL CONTROL SWITCHES AND PUSH BUTTONS NECESSARY TO OPERATE THE MACHINE ARE INSTALLED ON THE OPERATION PANEL, THUS THE OPERATOR CAN READILY CONTROL THE MACHINE OPERATION AT THE FRONT OF THE OPERATION PANEL.

2.2.7 NC SYSTEM

- A. THE NC SYSTEM READS SIGNIFICANT INFORMATION FROM THE PROGRAM, AND PRODUCES COMMAND OR INSTRUCTION TO SEQUENTIALLY CONTROL THE MACHINE MOVEMENT AND OPERATION.
- B. THE NC SYSTEM IS NORMALLY LOCATED IN THE ELECTRIC CABINET.

2.2.8 ELECTRIC CABINET

- A. THE ELECTRIC CABINET RECEIVES THE COMMAND SIGNALS FROM THE NC SYSTEM, AND DRIVES THE MACHINE. IN THE ELECTRIC CABINET, RELAY CIRCUIT AND POWER SOURCE CIRCUIT ARE INCORPORATED.

2.2.9 PNEUMATIC UNIT

- A. THE FUNCTIONS OF THE PNEUMATIC UNIT INCLUDE
 - a. TOOL UNCLAMPING AT THE SPINDLE,
 - b. AIR BLOWING FOR CLEANING THE SPINDLE AND TOOL TAPER.
 - c. ATC CROSSWISE MOVEMENT AND ATC MAGAZINE VERTICAL MOVEMENT.(20 ATC)
 - d. TOOL POT UP/DOWN (24/32 ATC)
- B. ONLY STRICTLY SELECTED PARTS AND DEVICES ARE USED IN THE PNEUMATIC UNIT, THUS ASSURING STABLE AND RELIABLE OPERATION

2.3 MACHINE SPECIFICATIONS

SPECIFICATION MAY DIFFERENT ACCORDING TO CUSTOM REQUEST OR OPTIONS.

TABLE

	MCV 300
WORKING SURFACE (X X Y)	700 X 308 mm (27.56 X 12.13 inch)
T SLOT (NO. X WIDTH X PITCH)	4 X 16 X 63.5 mm (4 X 0.6 X 2.5 inch)
TABLE STROKE (X X Y)	610 X 305 mm (24 X 12 inch)
CUTTING FEEDRATE	1-10,000 mm/min (0.04-393 inch / min)
RAPID TRAVERSE (X , Y)	20,000 mm/min (787 inch /min)
RAPID TRAVERSE (Z)	18,000 mm/min (708 inch /min)
X,Y FEED MOTOR (AC SERVO UNIT)	X:ALPHA C 3/2000 3Nm AC MOTOR Y:ALPHA C 6/2000 6Nm AC MOTOR
Z FEED MOTOR (AC SERVO UNIT)	Z:ALPHA C 12/2000 12Nm AC MOTOR
TABLE LOAD CAPACITY	350 kg (770 lbs)

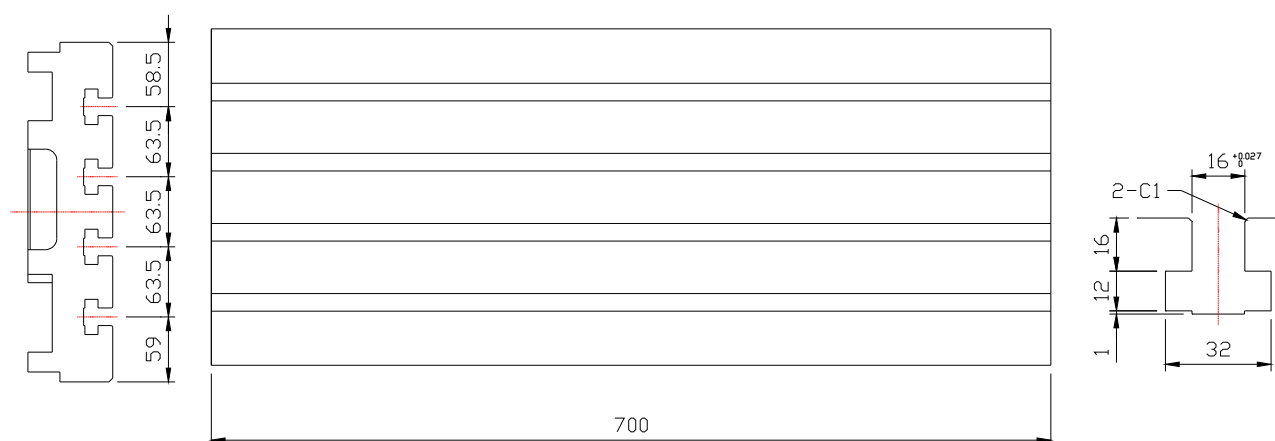


FIG. 2.3.1 PRINCIPAL DIMENSIONS OF TABLE

SPINDLE

	MCV 300
STROKE (Z)	460 mm (18.1 inch)
TABLE TO SPINDLE END (MIN./MAX.)	70 / 530 mm (2.7 / 20.8 inch)
SPINDLE MOTOR	AC VARIABLE FREQUENCY MOTOR INFINITELY VARIABLE 5.5 kW CONTINUOUS RATING / 30 MINUTES RATING 7.5 kW
SPINDLE ROTATION SPEED RANGE	120-8,000 /min 180-10,000 /min (OPTION)
MAX. SPINDLE MOMENT OF INERTIA	138 Nm

AUTOMATIC TOOL CHANGE

	TOOL STORAGE CAPACITY		
	10T	16T	24T
TOOL CHANGE TIME (TOOL TO TOOL)	7.5 sec.		3.2 sec
TOOL CHANGE TIME (CHIP TO CHIP)	9.1 sec		5.5 sec
MAX. ADJACENT TOOL DIAMETER	110 mm (4.3")		76 mm (3")
MAX. TOOL WEIGHT	8 kg (17.6 lbs)		7 kg (15lbs)
MAX. TOOL LENGTH	230 mm (9.1")		
CUTTING TOOL SHANK	MAS-BT40		
MAX. TOOL POT WEIGHT	10 kg (22 lbs)		
MAX. TOOL CHANGE MOMENT OF WERTIA	0.3042 kgm ²	0.457 kgm ²	0.3703 kgm ²

GENERAL INFORMATION

	MCV 300
AIR POWER REQUIRED	5.5 bar
SPINDLE CENTER TO COLUMN	415 mm (16 inch)
FLOOR TO TABLE	835 mm (33 inch)
MACHINE HEIGHT	2,400 mm (94.4 inch)
MACHINE WEIGHT	2,500 kg (5,500 lbs)
FLOOR AREA REQUIRED	2,600 (W) X 2,600 (D) mm (102.3 X 102.3 inch)

2.4 MACHINING AREA

- IT IS RECOMMEND TO PUT THE MACHINING PARTS OR FIXTURE NEAR THE CENTER OF THE TABLE.
- BIG FIXTURE OR PARTS MAY HIT MACHINE BODY OR COVER WHEN TRAVELLING AXIS. MAKE A SLOW TEST RUN REFORE MACHINING.
- BIG OR LONG TOOLS MAY HIT MACHINE BODY OR COVER WHEN TRAVELLING AXIS. MAKE A SLOW TEST RUN REFORE MACHINING.
- BEFORE STOP MACHINE, IT IS RECOMMEND MOVING THE TABLE TO THE CENTER OF X, Y AXIS. TO PERVENT FROM BENDING OF THE MACHINE.

2.4.1 MCV300 MACHINING AREA

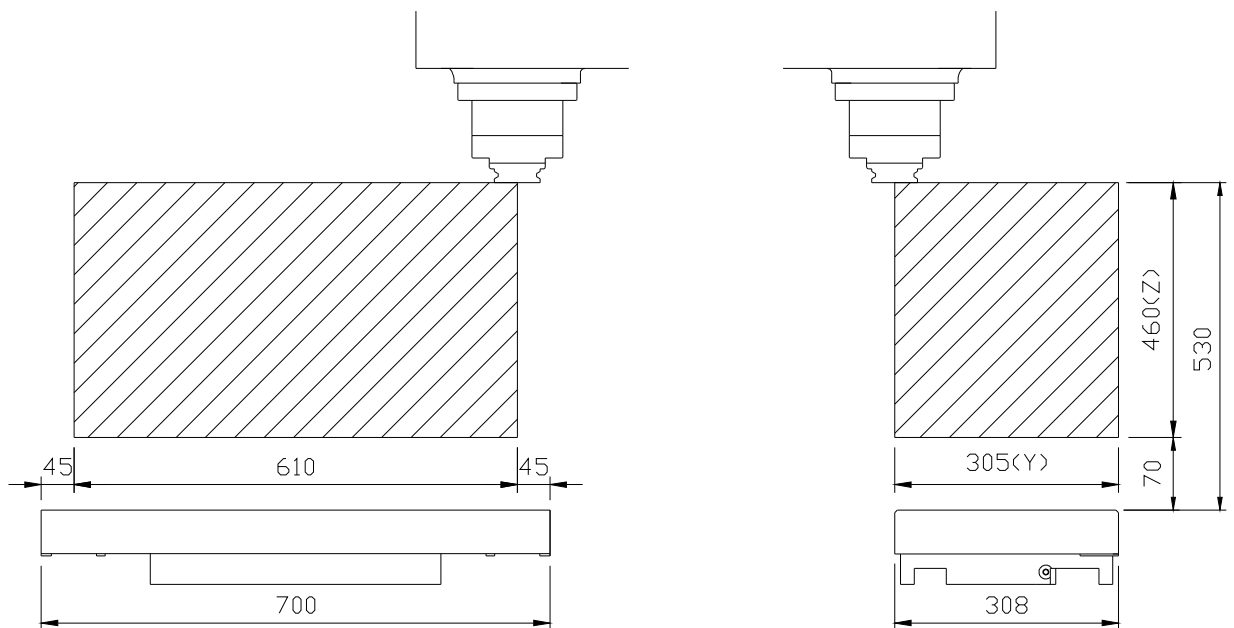


FIG. 2.4.1 MCV300 MACHINING AREA

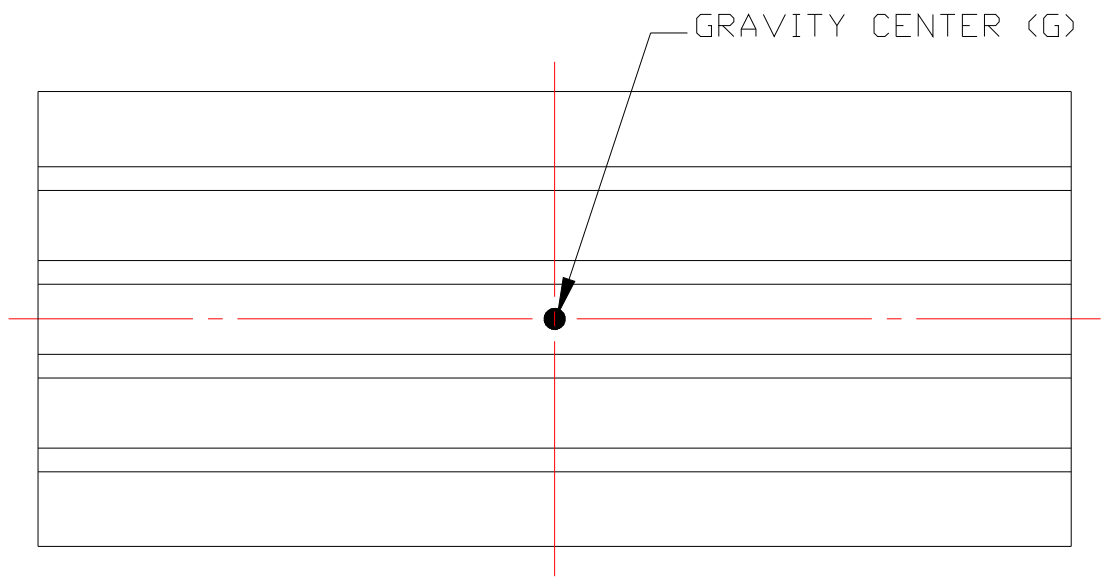
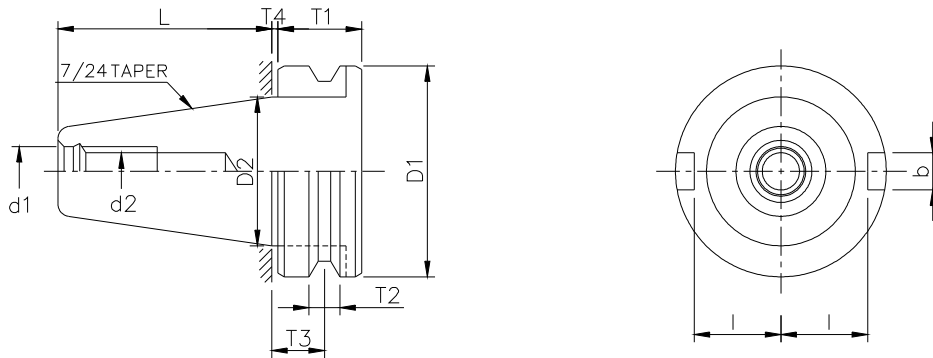


FIG. 2.4.2 MCV300 GRAVITY CENTER

2.5 TOOL SHANK AND STUD

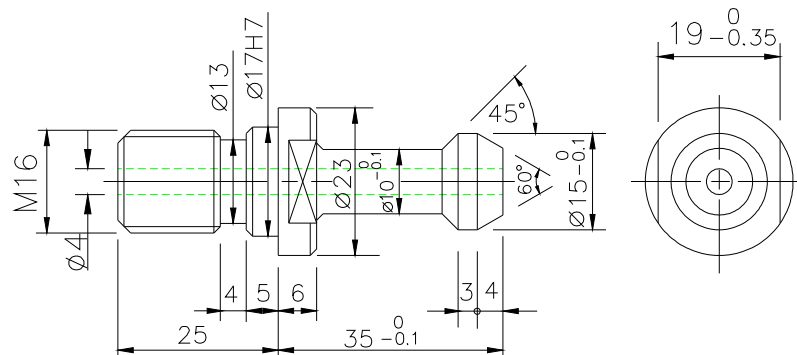
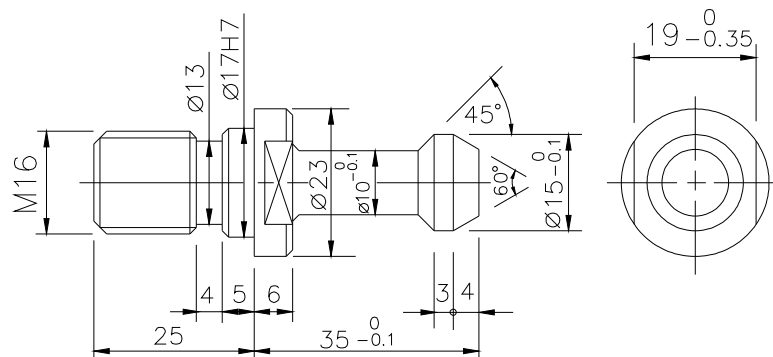
BT SHANK



Unit: mm

Model No.	D1	D2	d1	d2	L	T1	T2	T3	T4	b	l
BT40	63	44.45	17	M16	65.4	25	10	16.6	2	16.1	22.6

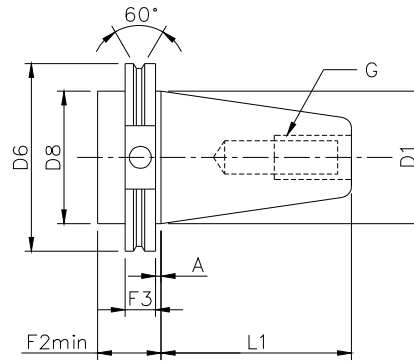
BT40 STUD



Cooling through spindle

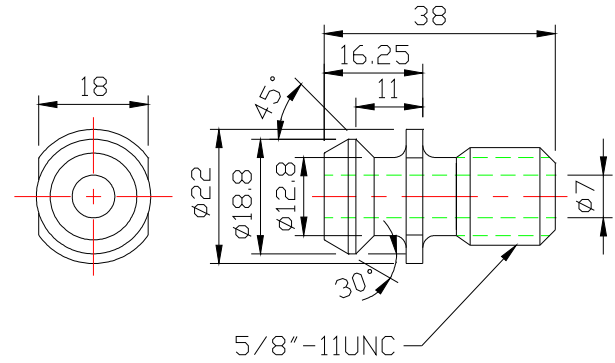
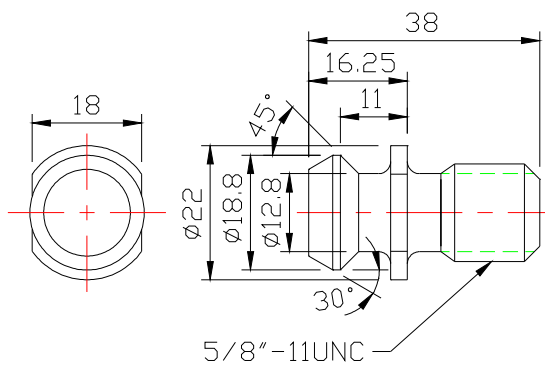
CAT SHANK TAPER (ANSI B5.50-78)

UNIT: inch
(mm)



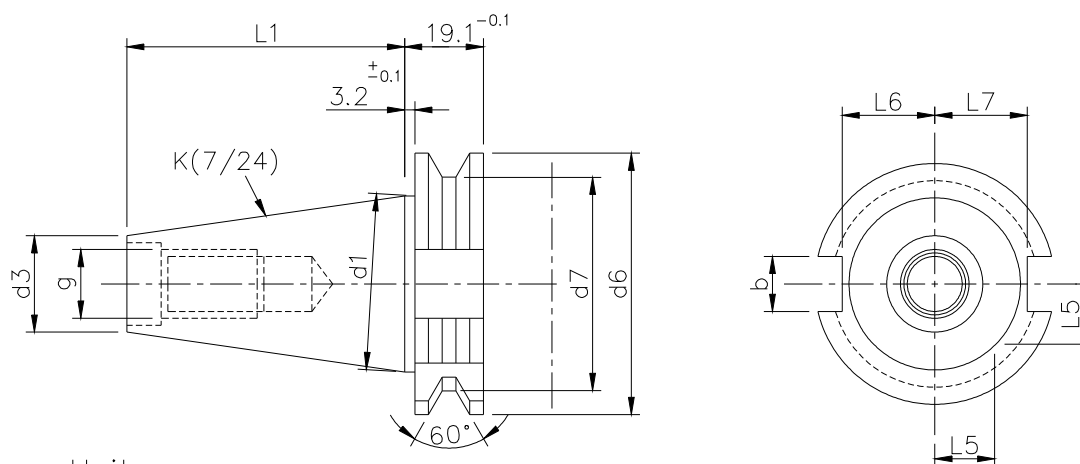
	D1	D6	D8	L1	F2	F3	A	G
CAT40	1.750 (44,45)	2.500 (63,05)	1.750 (44,45)	2.687 (68,25)	1.375 (35,00)	.750 (19,05)	.125 (3,18)	5/8-11 thread

CAT40 STUD



Cooling Though Spindle

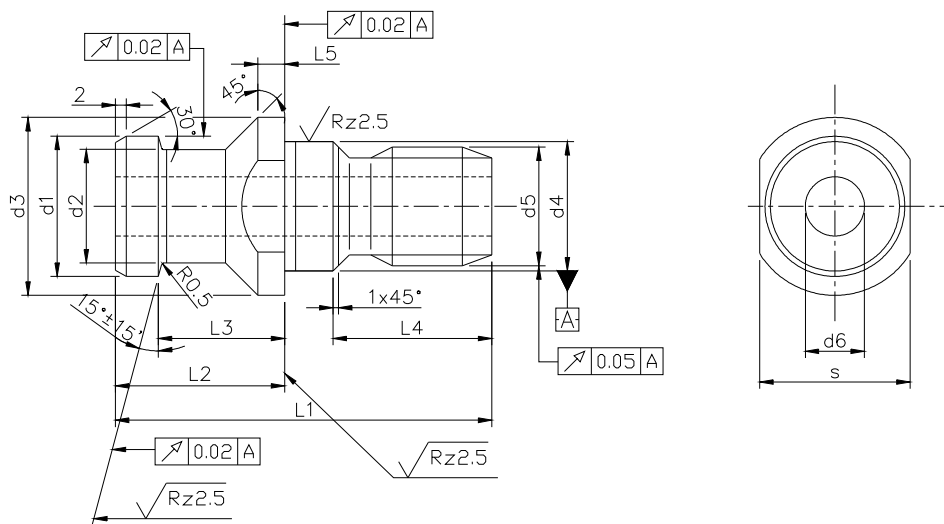
DIN69871A



Unit: mm

Taper	b H12	d1	g	d3 H7	d6 -0.1	d7	L1 -0.3	L5 -0.3	L6 -0.4	L7 -0.4
40	16.1	44.45	M16	17	63.55	56.25	68.4	18.5	22.8	25

DIN STUD



	d1 f7	d2 0 -0.1	d3 0 -0.2	d4 g6	d5	d6 +0.1 0	L1	L2 ±0.1	L3 ±0.1	L4 +0.5 0	L5	s 0 -0.1
DIN 40	19	14	23	17	M16	7	54	26	20	21	4	19

3. TRANSFER AND INSTALLATION OF MACHINE

3.1 HANGING OF MACHINE

BEFORE HANGING AND TRANSFERRING THE MACHINE, BE SURE TO CHECK THE TRANSFERRING ROUTE FOR SAFETY. LOCATE THE SADDLE BY THE COLUMN, AND THE TABLE AT THE CENTER OF ITS STROKE TO BALANCE THE MACHINE.

WE BALANCED THE MACHINE BEFORE SHIPPING.

MACHINE WEIGHT:

MCV300
2,500 kg (5500lbs)

- A. CHECK THE HOOK, HANGING DEVICE AND LIFT FORK CAREFULLY BEFORE HANGING AND LIFTING FOR SAFTY OPERATION.
- B. DURING MOVING THE MACHINE, FOR SAFTY OPERATION, EVACUATE THE MACHINE MOVING AREA, NO PEOPLE SHOULD NEAR THE MACHINE.
- C. WHEN LOCATE THE MACHINE BE WARE TO CLEAR THE LOCATION AREA (MAKE SURE THERE IS NO PIPE, CABLE ...)
- D. BEFORE HANGING THE MACHINE, TAKE OFF THE UPPER COVER OF COLUMN AS SHOWN IN FIG. 3.1.1 TO PREVENT FROM DAMAGE OF THE MACHINE.
- E. THE MACHINE HAS HOOKS. TO HANG THE MACHINE, APPLY TWO WIRE ROPE, OR SLING, TO THE HOOKS AS SHOWN IN FIG. 3.2.1.
- F. BEFORE HANGING THE FRONT POINT OF THE MACHINE, TAKE OFF THE FRONT COVER OF Y AXIS TO FIND OUT THE HANGING POINT.
- G. BE SURE TO USE A WIRE ROPE OF A SIZE LARGER THAN HOOK SIZE AND MAKE SURE THAT THE WIRE ROPE DOES NOT LEAVE THE HOOKS DURING TRANSFERRING OF THE MACHINE.
- H. PUT A RUBBER SHEET OR RAG ON THE MACHINE SURFACE WITH WHICH THE WIRE ROPE CAN COME INTO CONTACT TO PREVENT DAMAGE TO THE MACHINE SURFACE (PAINT).
- I. DURING HANGING AND TRANSFERRING OF THE MACHINE, USE CARE NOT TO GIVE DETRIMENTAL VIBRATION OR SHOCK TO THE MACHINE, AND TO MAINTAIN THE MACHINE UPRIGHT.

NOTICE: THAT THE MACHINE IS LIABLE TO TILT BECAUSE THE ELECTRICAL UNIT EQUIPPED VERTICAL MACHINING CENTER HAS THE CENTER OF GRAVITY RELATIVELY HIGH POSITION.

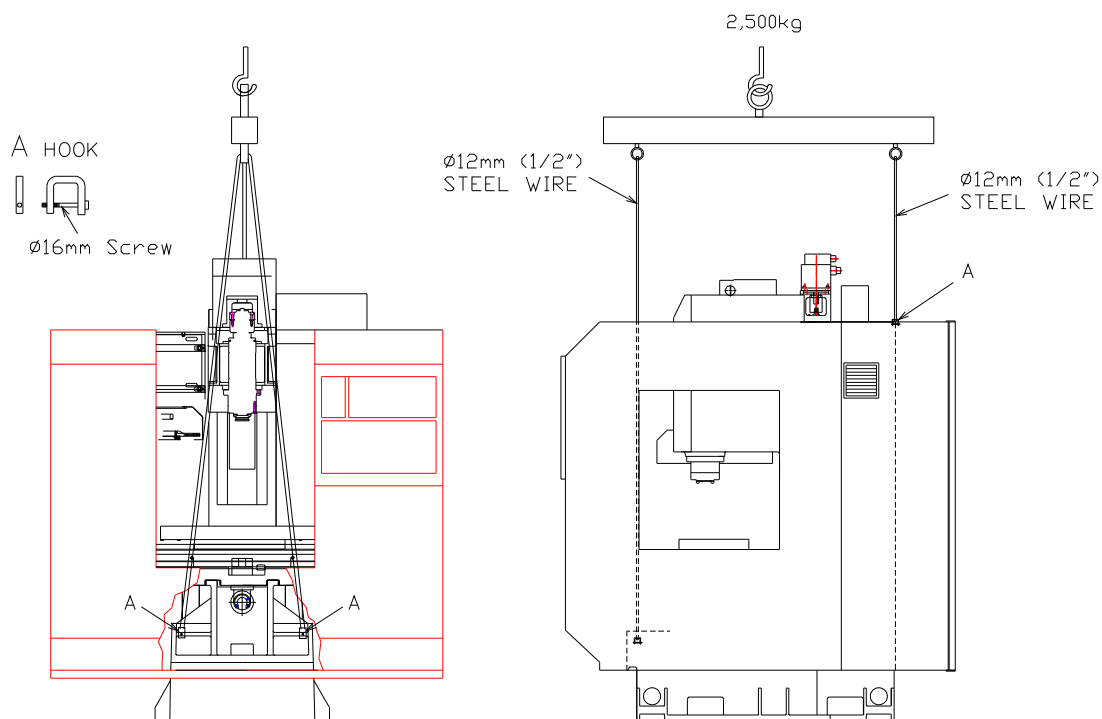


FIG 3.1.1 HANGING THE MACHINE

3.2 REFERENCE DIMENTIONS FOR HANGING

200x200 mm H SHAPE STEEL,
WELD SUPPORTED STEEL ON BOTH SIDE.

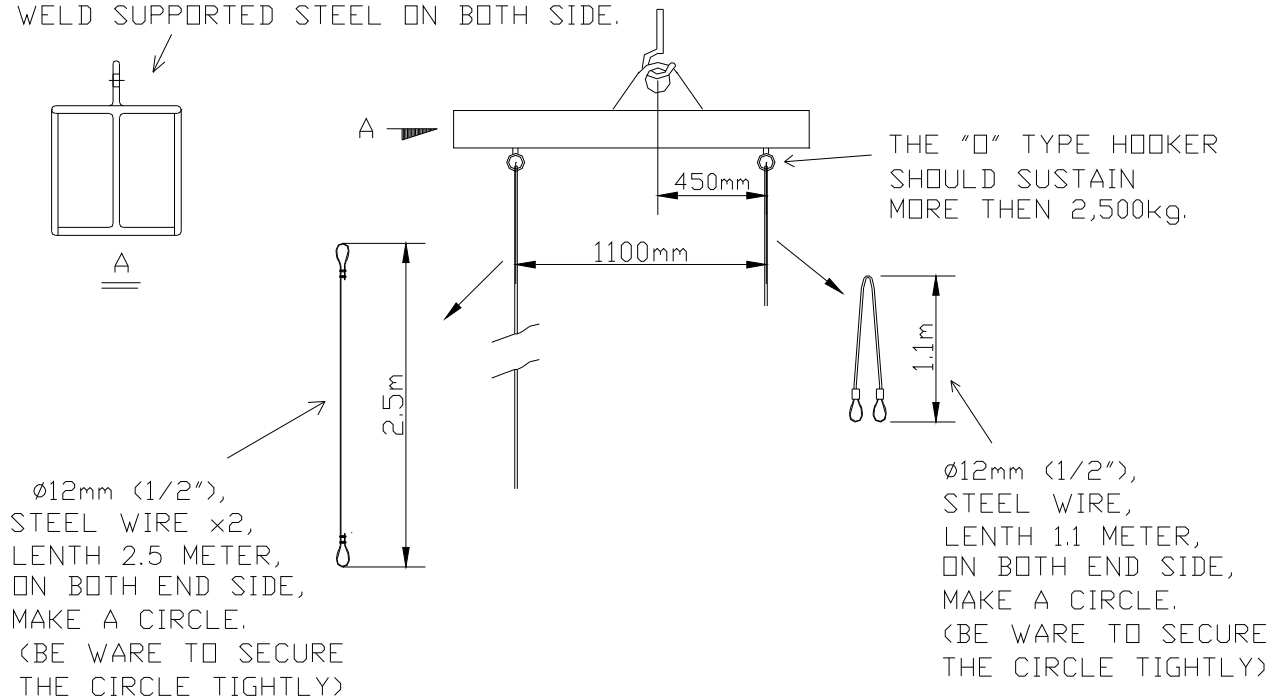


FIG 3.2.1 HANGING DIMENSIONS AND POSITION

3.3 MACHINE TRANSPORT BY FORK LIFT

USE A FORK LIFT WITH MINIMUM CAPACITY OF 6 kN

THE LENGTH OF THE FORK MUST LONGER THEN 1800mm.

WHEN MOVING MACHINE KEEP THE POSITION LOWER AND MOVE IT SMOOTH AND SLOWER.

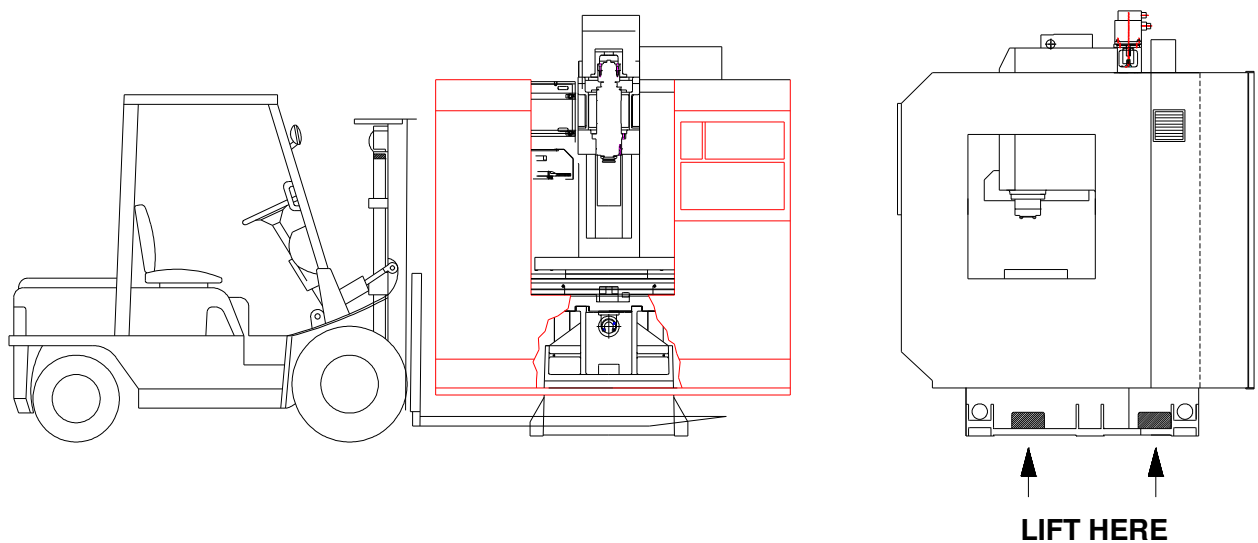


FIG 3.3.1 MACHINE TRANSPORTED BY FORK LIFT

3.4 HANGING OF PARTS AND ACCESSORIES

3.4.1 COOLANT TANK

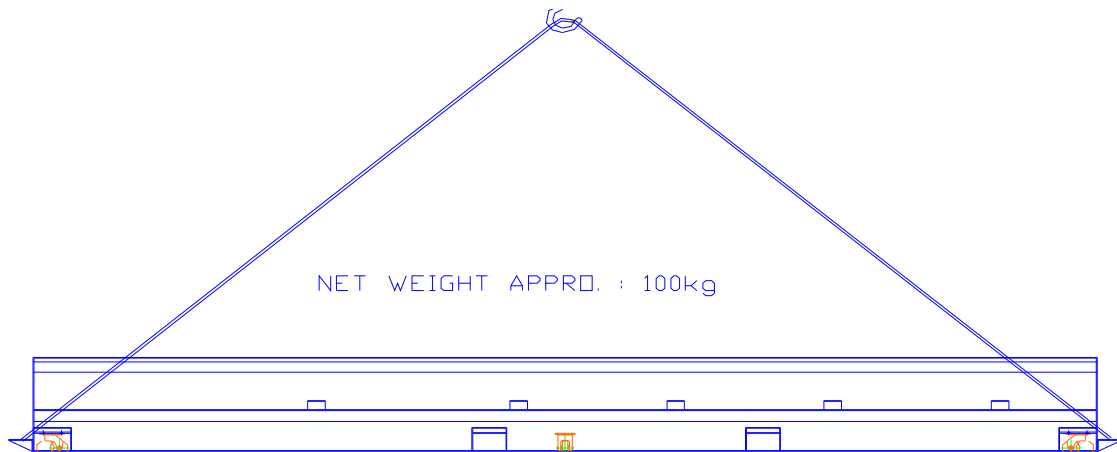


FIG 3.4.1 HANGING OF COOLANT TANK

3.4.2 CHIP CONVEYER

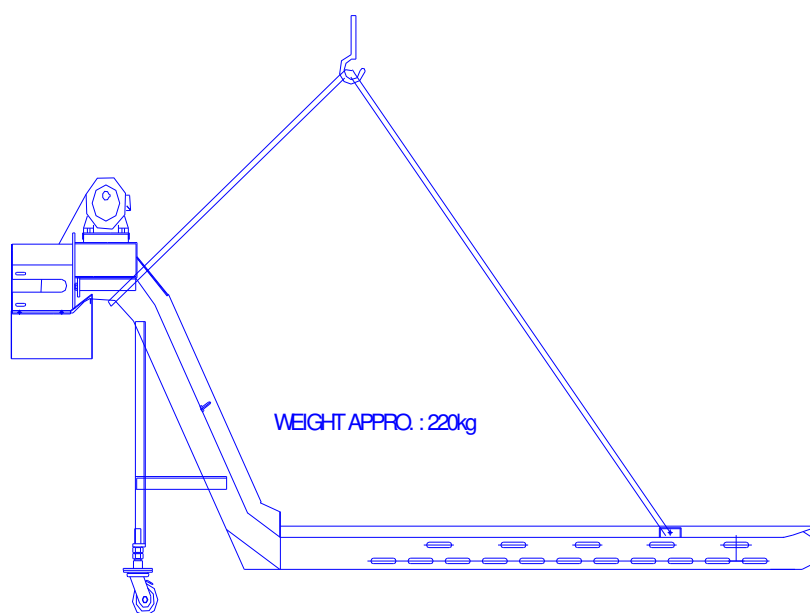


FIG 3.4.2 CHIP CONVEYER HANGING

3.4.3 COOLANT SYSTEM

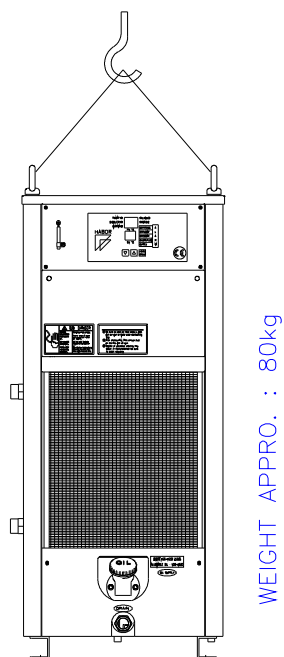


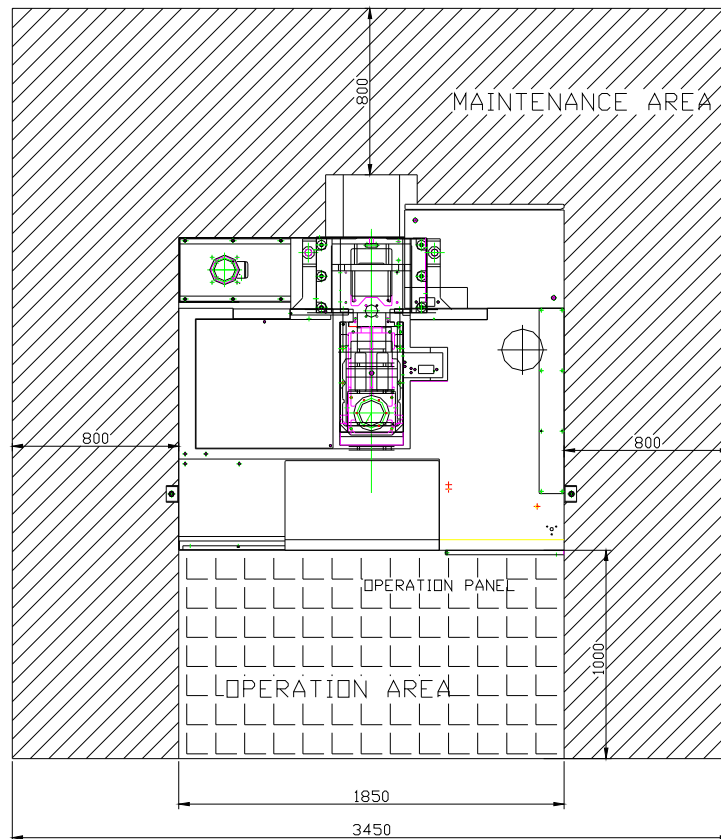
FIG 3.4.3 COOLAN SYSTEM HANGING

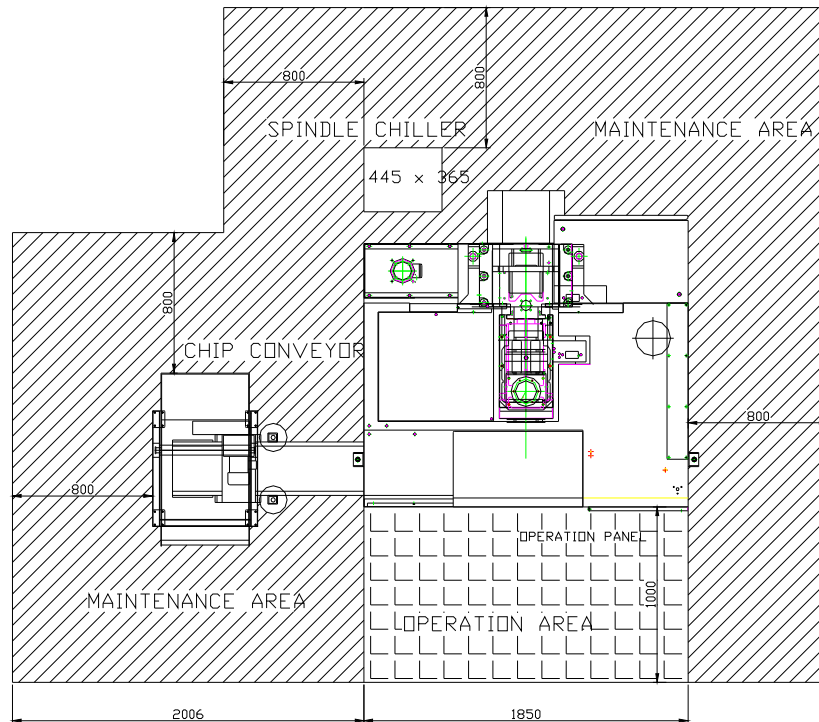
3.4.4 OTHER ACCESSORIES

FOR OTHER ACCESSORIES NOT LIST HERE, CHECK WITH YOUR MACHINE AGENT FOR SAFETY HANGING INFORMATION.

3.5 INSTALLATION SPACE

- RESERVED SPACE FOR OPERATION AREA AND MAINTANCE AREA IS NECESSARY FOR SAFTY AND EFFENCY USE OF THE MACHINE AFTER INSTALLATION, FIG 3.5.1.
- IT IS NOT USUAL FOR THIS MACHINE TO HAVE VACUM SYSTEM, IF YOU HAVE THIS OPTION YOU NEED MORE SPACE FOR INSTALLATION, CHECK WITH YOUR AGENT.
- IF YOU HAVE ANY QUESTION ABOUT INSTALLTION SPACE, CHECK WITH YOUR MACHINE AGENT BEFORE INSTALLTION.





MACHINE WITH OPTIONS

FIG 3.5.1 INSTALLATION SPACE

3.6 INSTALLATION

THIS INSTALLATION IS ROUGHLY PUT THE MACHINE APPROPRIATELY ON THE SUPPORTING PADS, FOR DETAIL ADJUSTING LEVELING REFER TO CHAPTER 4.

3.6.1 FOUNDATION

- A. THE FOUNDATION ON WHICH THE MACHINE INSTALLED SHOULD BE RIGIDLY CONSTRUCTED WITH CONCRETE.
- B. SINCE MACHINING ACCURACY IS LARGELY GOVERNED BY THE ADEQUACY OF FOUNDATION AND INSTALLATION, ELABORATELY CONSTRUCT THE FOUNDATION AND INSTALL THE MACHINE ON IT.
- C. THE MACHINE SHOULD BE LOCATED WHERE IS NOT SUBJECTED TO VIBRATION FROM OTHER MACHINERY, AND TO DIRECT SUNBEAM.
- D. THE THICKNESS AND SIZE OF THE CONCRETE FOUNDATION SHOULD BE DETERMINED CONSIDERING THE GROUND CONDITION.
- E. WHEN FOUNDATION BOLT IS NOT USED, USE LEVELING PADS FURNISHED TO THE MACHINE TO INSTALL THE MACHINE.

3.6.2 INSTALLATION

- A. CLEAN THE REVERSE SURFACE OF THE LEVELING PADS AND THE SUPPORTING PADS. AND PLACE THE LEVELING PADS AND THE SUPPORTING PADS ACCORDING TO THE FLOOR PLAN FIG 3.6.2
- B. CAREFULLY LOWER THE HUNG MACHINE SO THAT EACH FOOT OF THE MACHINE CAN REST ON THE RECESS OF EACH LEVELING PADS. THEN ADJUST THE LEVEL OF THE MACHINE BY THE LEVELING BOLTS.
- C. WHEN ANCHOR BOLT IS USED, INSTALL THE MACHINE ACCORDING TO THE PLAN.
- D. BECAUSE MORTARED HOLD MAY SINK WITH TIME UNTIL THE MORTAR IS COMPLETELY SET, PERIODICALLY CHECK THE LEVEL OF THE MACHINE FOR 6 TO 8 MONTHS AFTER THE INSTALLATION AND READJUST IF NECESSARY.
- E. FOR CHECKING THE LEVEL, USE A LEVEL VIAL WITH SCALE OF 0.02mm / 1000mm.

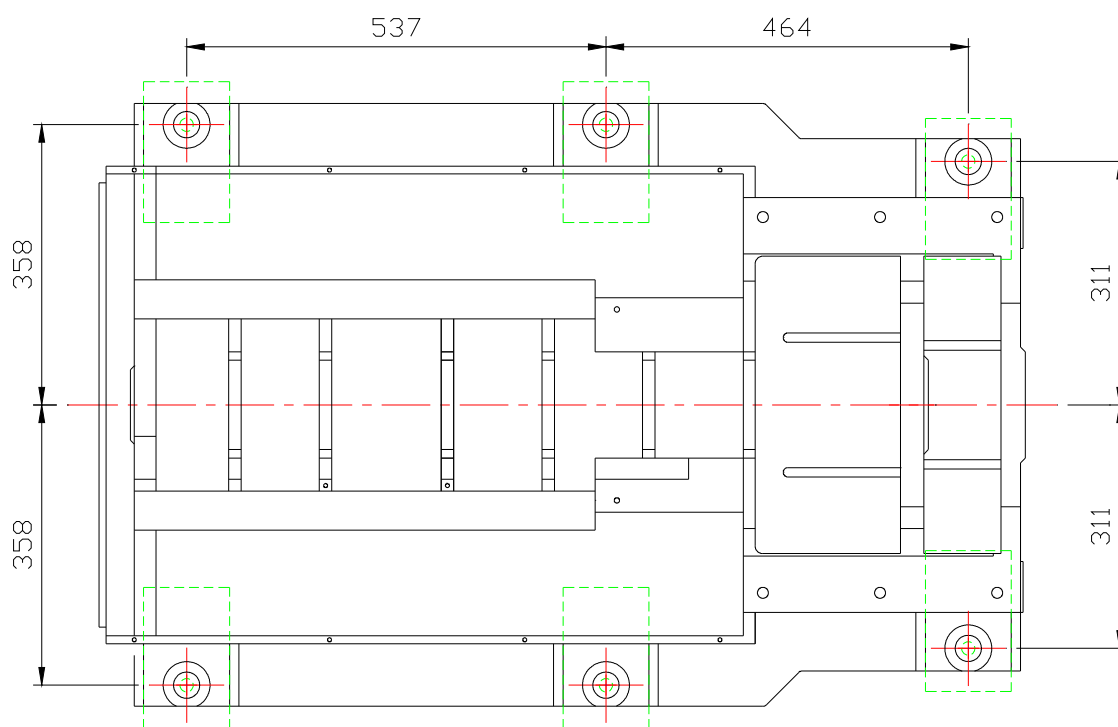


FIG. 3.6.1 FLOOR PLAN (MCV 300)

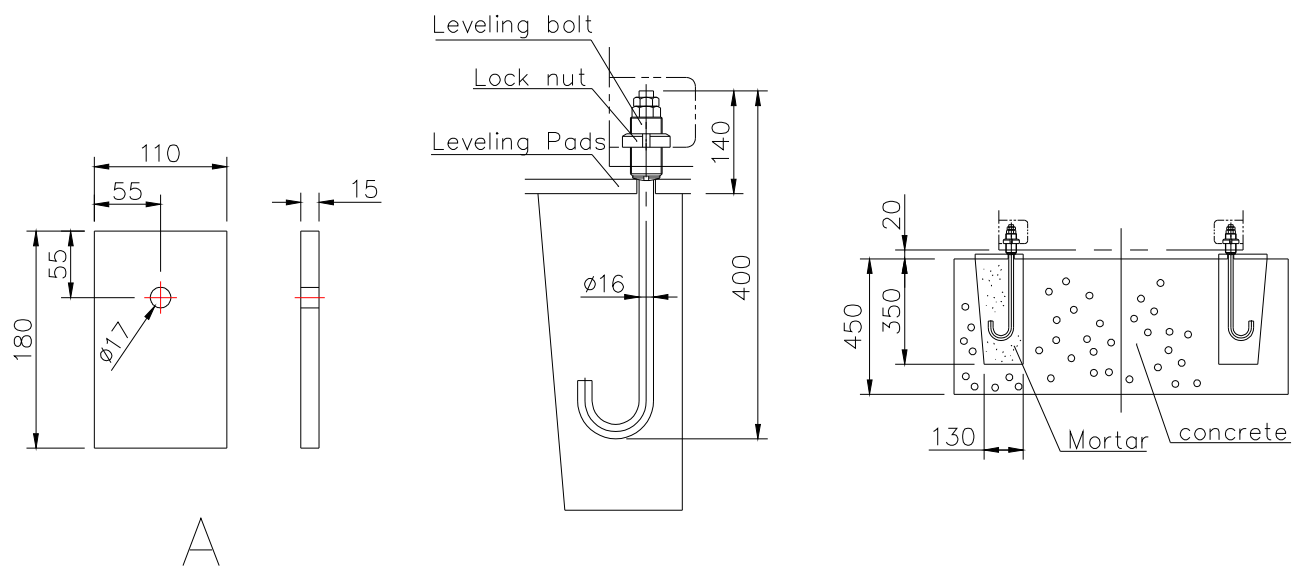


FIG. 3.6.2 FOUNDATION DRAWING

3.7 INSTALLATION ENVIRONMENT

PLEASE REFER TO CHAPTER 1.3.2 FOR MORE INFORMATION.

4. ASSEMBLY PROCEDURE AND TEST RUN

WARNING: ALL ELECTRIC, HYDRAULIC, COOLANT SYSTEM, PNEUMATIC CONNECTING, AND MACHINE ASSEMBLY MUST BE DONE BY QUALIFIED TRAINED AND AUTHORIZED TECHNICAL PERSON.

QUICK REFERENCE

- 1. CLEANING OF MACHINE**
- 2. REMOVAL OF LOCKING DEVICES**
- 3. LUBRICATION AND AIR PIPING**
- 4. SWITCHING ON THE POWER SOURCE AND CHECKING**
- 5. TAKE OFF SPINDLE HEAD SUPPORT DEVICE**
- 6. LEVELING CHECK**
- 7. ASSEMBLE OF PARTS AND DEVICES**
- 8. DEVICE PIPING INSTRUCTION**
- 9. COOLANT**

4.1 CLEANING OF MACHINE

- A. ANTICORROSIVE AGENT HAS BEEN APPLIED ON THE MACHINE TO PREVENT CORROSION.
- B. REMOVE THE ANTICORROSIVE AGENT BEFORE STARTING TEST RUN.
NOTICE THAT ANY MOVABLE PART OF THE MACHINE, SUCH AS TABLE, SPINDLE HEAD AND ATC, SHOULD NOT BE MOVED BEFORE THE ANTICORROSIVE AGENT HAS BEEN THOROUGHLY REMOVED.
- C. PARTICULAR CARE SHOULD BE GIVEN TO THOROUGHLY REMOVE THE ANTICORROSIVE AGENT FROM THE SLIDE WAYS, ATC AND SPINDLE TAPER.

4.2 REMOVAL OF LOCKING DEVICES

- A. ACCORDING TO THE DRAWING FIG. 4.2.1, REMOVE ALL LOCKING DEVICES USED TO SECURE THE MOVABLE COMPONENTS OF THE MACHINE DURING THE TRANSPORT, SUCH AS Y AXIS LOCKING DEVICES (2 AND 3), X AXIS LOCKING DEVICES (4 AND 5) AND ATC LOCKING DEVICE (1) (18 TOOLS ATC).
- B. HOWEVER, DO NOT REMOVE THE SPINDLE HEAD SUPPORT DEVICE (9) WHICH SHOULD BE REMOVED AFTER THE POWER SOURCE IS GIVEN TO THE MACHINE. (SHOULD CONTINUE TO READ THIS MANUAL UNTIL 7.8 FOR REMOVING ALL LOCKING DEVICES.)
- C. IF THE SURFACE IS FOUND FOUL AFTER THE REMOVAL OF LOCKING DEVICE OR SCREW THOROUGHLY CLEAN.
- D. ONCE REMOVED PACKING MATERIAL. AND LOCKING DEVICES ARE NO LONGER USED.PUT THEM ASIDE FOR SAFE WORK.

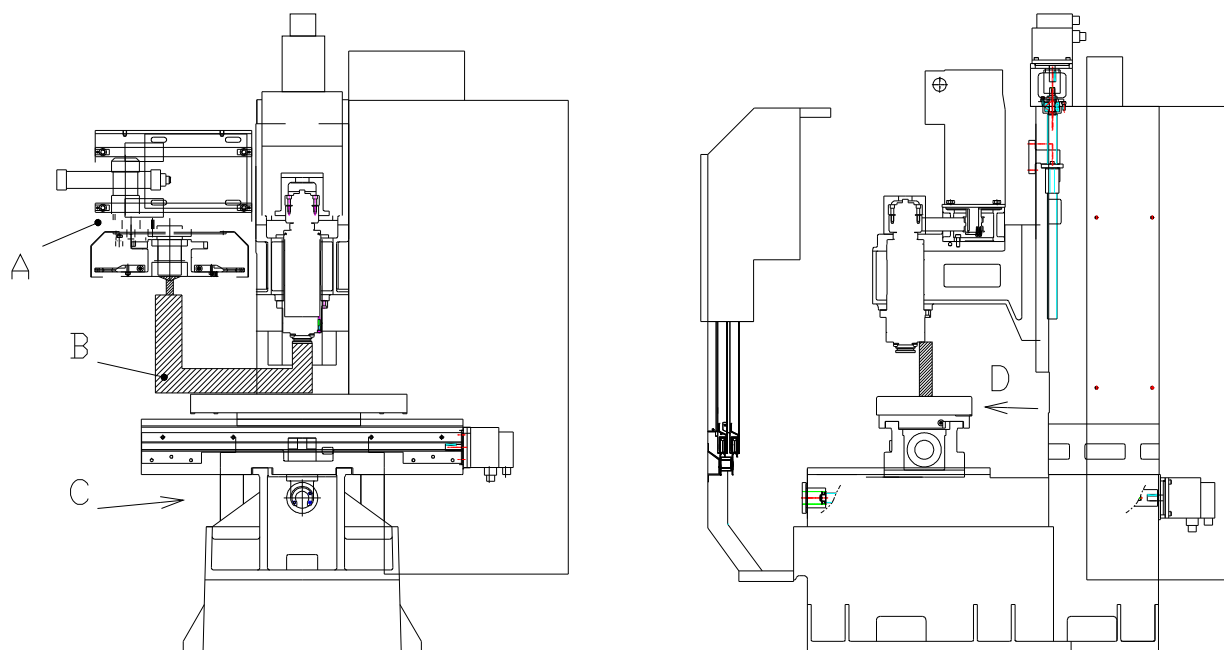


FIG. 4.2.1 LOCKING DEVICE

4.3 LUBRICATION AND AIR PIPING

4.3.1 LUBRICATION

- A. BEFORE STARTING THE OPERATION, THE MACHINE SHOULD BE PROPERLY OILED.
- B. USE A HIGH QUALITY, PURE OIL SPECIFIED IN THE LUBRICATION TABLE AND FILL EACH PART. BEFORE STARTING THE TEST RUN,
- C. THE FOLLOWING PARTS SHOULD BE OILED

PART TO BE OILED	Q'TY	LUBRICANT	REMARKS
LUBRICATION PUMP	4.6L	1	
LUBRICATOR OF PNEUMATIC	0.17L	4	

LUBRICANT	SHELL	ESSO	MOBIL
1	SHELL TONNAOIL	FEBIS K68	MOBIL VACTRA OIL NO.2
4	SHELL TURBIN OIL T32	TERESSO 32	MOBIL DTE OIL LIGHT

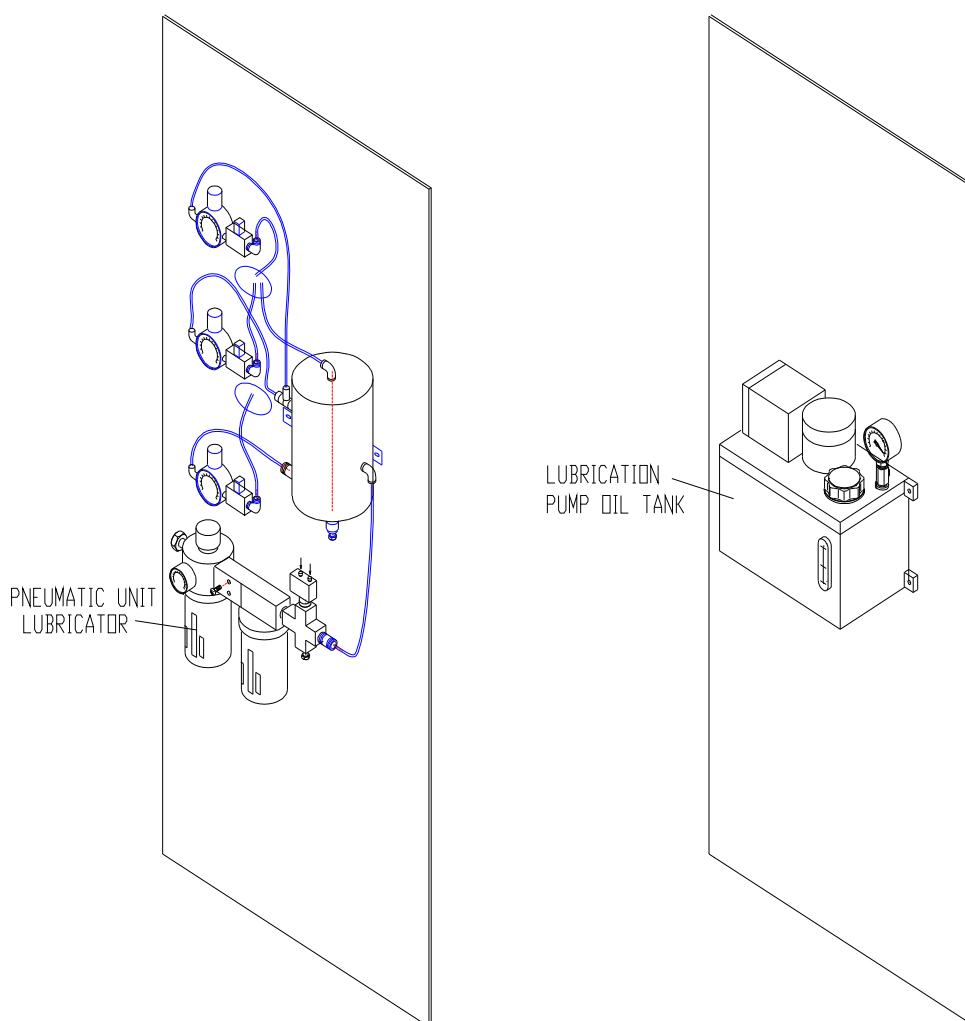


FIG. 4.3.1 LUBRICATION

4.3.2 AIR PIPING

- A. CONNECT THE PIPES TO THE AIR INLET OF THE PNEUMATIC UNIT.
- B. THE PNEUMATIC DEVICES ARE DESIGNED TO WORK WITH COMPRESSED AIR AT 5.5 bar.
- C. THEREFORE, USE AN AIR SOURCE AT CONSTANT PRESSURE OF AT LEAST 6 bar.
- D. THE AIR PRESSURE HAVE BEEN PROPERLY SET UP BEFORE SHIPPING OUT THE MACHINE, IF ANY PROBLEM PLEASE CHECK CHAPTER 6.

NOTICE: FOR LONG-TERM USAGE OF THE MACHINE, THE QUALITY OF THE AIR IS VERY IMPORTANT. BAD QUALITY OF THE AIR MAY DAMAGE THE PNEUMATIC DEVICES AND CAUSE FAILURE OF MECHANICAL MOTION

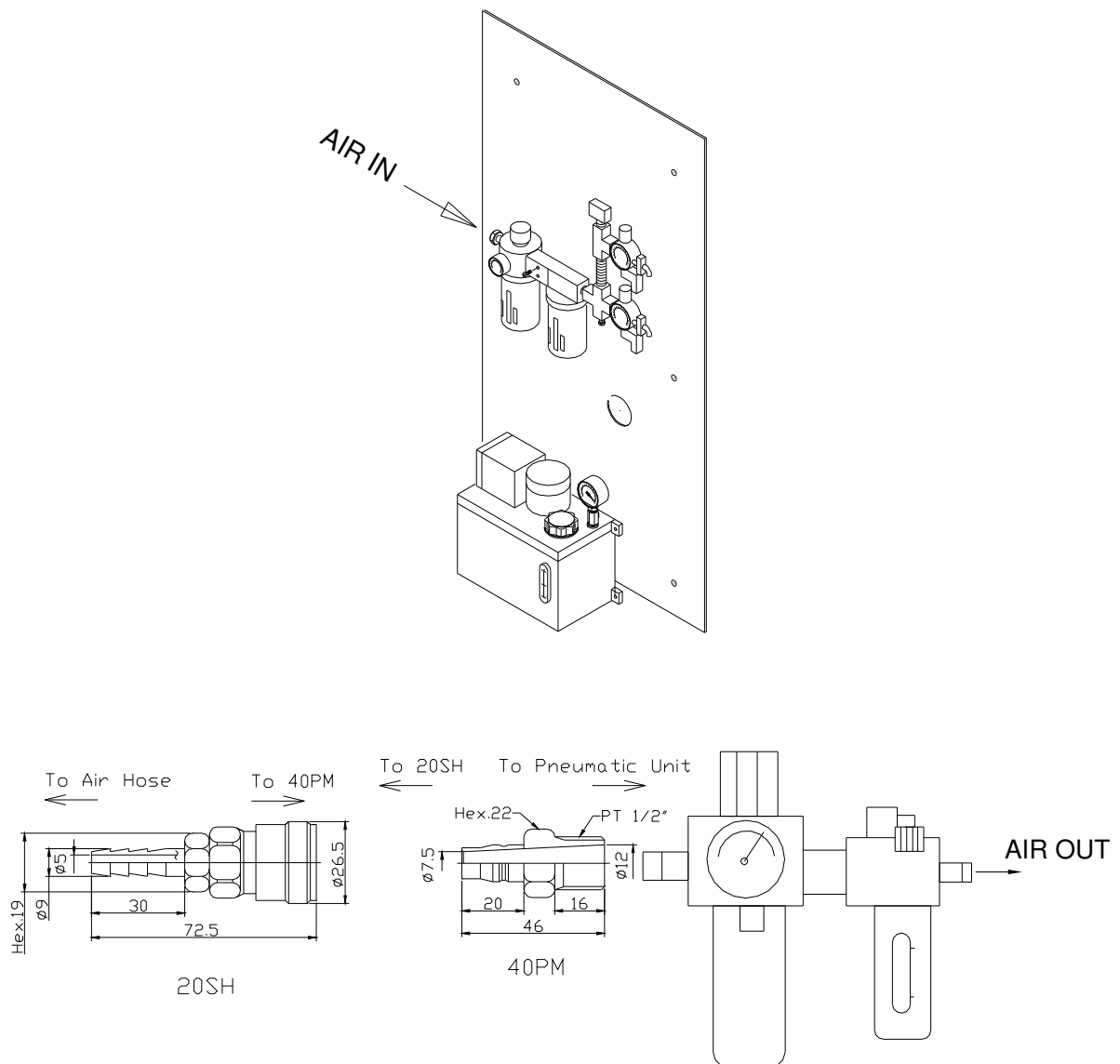


FIG. 4.3.2 AIR PIPING

4.4 SWITCHING ON THE POWER SOURCE AND CHECKING

- FOR TRANSPORT REASON, SOMETIMES THE Z AXIS MOTOR, Y AXIS MOTOR OR OTHER MOTOR COULD BE TAKEN OFF BEFORE SHIPPING, IN THIS CASE, ASSEMBLE THESE MOTORS BEFORE THIS PROCEDURE.
- ONLY AUTHORIZED PERSON CAN DO THE MOTOR ASSEMBLY.

4.4.1 WIRING CABLE AND PLACE SEE FIG 4.4.1

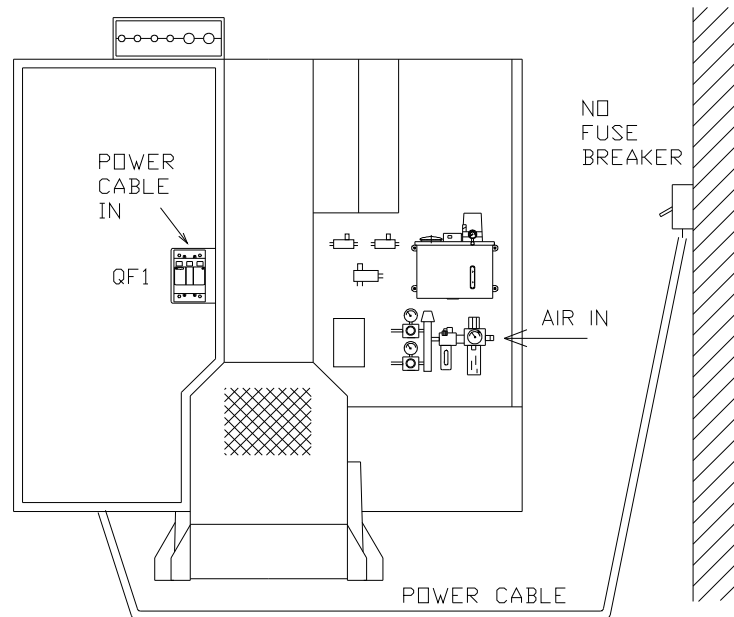
NOTICE: MAKE SURE THE VOLTAGE AND CAPACITY IS SAME AS REQUIRED BEFORE WIRING.

PE WIRE (mm ²)	SUPPLY WIRE (mm ²)
10.0	10.0

- SUPPLY VOLTAGE: 0.9 - 1.1 NOMINAL SUPPLY VOLTAGE
- SOURCE FREQUENCY: 0.99 - 1.01 NOMINAL FREQUENCY
- WHEN THE POWER CABLE IS DISCONNECTED AND CONNECTED AGAIN, CARE SHOULD BE EXERCISED TO CONNECT EACH TERMINAL IN THE CORRECT PHASE (L1, L2, L3 PHASES).
 - MAKE SURE THAT CLEANING OF MACHINE OILING AND OIL PIPING HAVE BEEN COMPLETED

4.4.2 TO CONNECT THE POWER CABLE

OPEN ELECTRIC CABINET AND CONNECTED TO QF1 AND PE IN THE ELECTRIC CABINET. THE POWER CABLE SHOULD HAVE CRAMP TERMINALS AND EACH TERMINALS SHOULD BE FULLY TIGHTENED WITH PLUS SCREWDRIVER,



POWER SOURCE

ALIMENTATION : 3PH 50/60Hz L1,L2,L3+PE

SUPPLY : WIRING VOLTAGE MAY DIFFERENT PLEASE CHECK

CABLE LENGTH : MAX: 3m

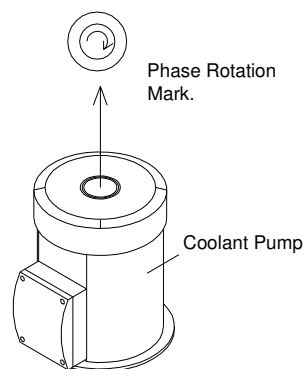
SUPPLY VOLTAGE: 0.9 - 1.1 NOMINAL SUPPLY VOLTAGE

SOURCE FREQUENCY: 0.99 - 1.01 NOMINAL FREQUENCY

FIG. 4.4.1 POWER SOURCE DRAWING

- TURN ON THE POWER SWITCH TO "ON" POSITION MAKE SURE INTO THE CONTROL POWER SOURCE IS REQUIRED AND FAN WILL ON.
- HOLD DOWN THE PUSH-BUTTON "POWER ON" ON THE NC CONTROL PANEL FOR 2-3 sec. DURING WHICH THE POWER SOURCE WILL BE GIVEN TO THE SERVO SYSTEM, INVERTER AND OTHER ELECTRIC UNITS AND DEVICES, THEN PERFORM THE FOLLOWING CHECKING

- A. CHECK IF ANY ALARM MESSAGE APPEARS? (CRT OR OP PANEL LED)
- B. CHECK COOLANT PUMP ROTATION, SPINDLE FAN ROTATION, OR ATC ROTATION FOR CORRECT DIRECTION OF POWER SOURCE.



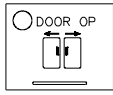
- C. IF ALARM MESSAGE OCCURS REFER TO CHAPTER 7 TROUBLE SHOOTING USING ERROR MESSAGE#, TNC MESSAGE AND ELIMINATE THE CAUSE OF THE ALARM
- D. IF MOTOR DIRECTION RUN WRONG DIRECTION STEP AS NEXT
 - a. TURN POWER OFF ON OPERATION PANEL
 - b. ALSO TURN MAIN POWER SWITCH OFF
 - c. OPEN CABINET (LEFT SIDE) CHANGE POWER CABLE CONNECTION 2 OF 3 WIRES (L1,L2,L3) AGAIN CHECK MOTOR DIRECTION

NOW POWER CABLE CONNECTION HAS BEEN COMPLETED

4.5 TAKE OFF SPINDLE HEAD SUPPORT DEVICE

4.5.1 OPERATE IN DOOR OPEN STATUS WITH NON CE DOOR INTERLOCK SWITCH (OPTION)

- A. WHEN NON CE DOOR INTERLOCK SWITCH IS MOUNTED, PRESS THIS

KEY  TO RELEASE DOOR INTERLOCK.

- B. RELEASE DOOR INTERLOCK IN ANY MODE.
- C. CAN OPERATE ONLY IN JOG AND HANDWHEEL MODE WHEN DOOR OPENED
- D. DUE TO SAFETY REASON, WHILE DOOR OPEN THE MACHINE CAN ONLY OPERATE IN FOLLOWING STATUS.
- a. SPINDLE SPEED UNDER 50/min
 - b. CAN OPERATE ONLY IN JOG AND HANDWHEEL MODE.
 - c. AXIS FEED RATE UNDER 2000mm/min.
- E. CLOSE DOOR TO RESUME SYSTEM.

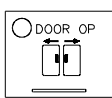
4.5.2 OPERATE IN DOOR OPEN STATUS WITH CE DOOR INTERLOCK SWITCH (OPTION)

- A. CONDITION IN DOOR OPEN STATUS

DUE TO CE REGULATION AND SAFETY REASON, WHILE DOOR OPEN THE MACHINE CAN ONLY OPERATE IN FOLLOWING STATUS.

- a. SPINDLE SPEED UNDER 50 /min.
- b. CAN OPERATE ONLY IN JOG AND HANDWHEEL MODE.
- c. AXIS FEEDRATE UNDER 2000 mm/min

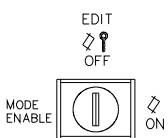
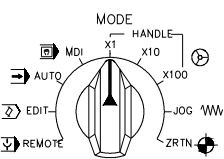
- B. HOW TO OPERATE IN DOOR OPEN STATUS

- a. PUSH DOOR OPEN  BUTTON.
- b. AFTER ENABLE THIS BUTTON, THE LAMP IN THE BUTTON LIGHTS.

NOTICE: ONCE YOU PUSH THIS BUTTON, YOU MUST EXECUTE OPEN AND CLOSE DOOR PROCEDURE TO RESUME THE SYSTEM.

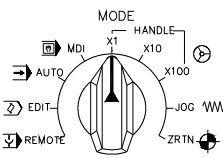
- c. OPEN THE DOOR.
- d. CLOSE DOOR TO RESUME SYSTEM.

- C. MOVE THE AXIS OR TURN THE SPINDLE IN MANUAL MODE.

- a. SWITCH KEY  TO MODE ENABLE.
- b. SWITCH MODE  TO "MANUAL" (HANDLE, JOG.)
- NOTE: MAKE SURE NOW MAGAZINE ON INITIAL POSITION.
- c. BEFORE ANY MOVEMENT, KEEP PUSHING THE PERMISSIVE
- BOTTOM 
- FOR MACHINE WITH REMOVEABLE HANDWHEEL, THE BUTTON IS ON THE SIDE OF THE HANDWHEEL.
 - FOR MACHINE WITHOUT REMOVEABLE HANDWHEEL, THIS BUTTON IS ON THE OPERATION PANEL.
- d. DURING ANY MOVEMENT, YOU MEST KEEP PUSHING PERMISSIVE BUTTON TO ENABLE THE MOVEMENT.

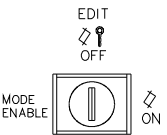
NOTICE: DON'T RELEASE THE PERMISSIVE BUTTONS BEFORE STOP THE MOVEMENT. IT WILL CAUSE THE FAILURE OF THE MOVEMENT.

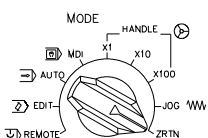
4.5.3 PROCEDURE TO TAKE OFF

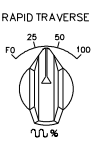
-  TO  HANDLE X10 MODE , AND ADJUST FEEDRATE OVERRIDE LOWER
- A. SELECT MODE TO HANDLE X10 MODE , AND ADJUST FEEDRATE OVERRIDE LOWER
- B. USE HANDWHEEL Z+ (OR PUSH Z+ BUTTON) TO RAISE THE HEAD, AND THEN TAKE OFF THE SUPPORT DEVICE.
- C. IF YOUR MACHINE IS WITH OPTION OF Z AXIS COUNTERWEIGHT, PROCESS FOLLOWING...
- a. USE HANDWHEEL Z- , UNTIL THE COUNTERWEIGHT CHAIN HAS TIGHTEN .
 - b. REFER TO FIG 4.2.1 TAKE OFF LOCK SCREW 7 AND 8. (ADJUST PROPER Z AXIS POSITION FOR EASIER TAKE OFF LOCK SCREW)

4.5.4 MOVE AXIS TO REFERENCE POINT

MOVE SPINDLE HEAD (Z AXIS), SADDLE (Y AXIS), TABLE (X AXIS) TO THE REFERENCE POINT (COORDINATE ZERO)

- A. SWITCH KEY  TO MODE ENABLE

- B. SET THE MODE SWITCH  TO ZERO POSITION.

- C. SET THE SWITCH "RAPID OVERRIDE"  TO 25%.

- D. PRESS THE PUSH BUTTON  UNTIL THE ZERO (REFERENCE POINT) LAMP "Z" LIGHTS (THEN,  FOR X AXIS AND  FOR Y AXIS)

- E. WHEN THE LAMP LIGHTS, THE SPINDLE HEAD REACHES THE REFERENCE IN Z AXIS. REPEAT THE STEPS ABOVE TO RETURN THE SADDLE AND TABLE TO THE REFERENCE POINT IN Y AXIS X AXIS RESPECTIVELY.

NOTICE: WHEN OPERATION IS RESUMED AFTER THE POWER SOURCE IS ONCE TURNED OFF OR EMERGENCY STOP BUTTON PUSHED PERFORM THE OPERATION TO RETURN THE REFERENCE POINT AND THEN START THE OPERATION AGAIN

NOTE: AFTER ZERO RETURN COMPLETED ON/OFF AGAIN TO MAKE SURE EVERYTIME SAME POSITION.

4.6 LEVELING CHECK

- A. PLACE TWO PRECISION LEVEL VIAL
 - a. MOVE AND PLACE THE TABLE IN THE CENTER OF THE X AND Y AXIS MOVEMENT,
 - b. FOR CHECKING THE LEVEL, USE A LEVEL VIAL WITH SCALE OF 0.02 mm / 1000 mm.
 - c. PLACE TWO PRECISION LEVEL VIAL NEAR THE CENTER SURFACE OF TABLE (FIG 4.6.1)

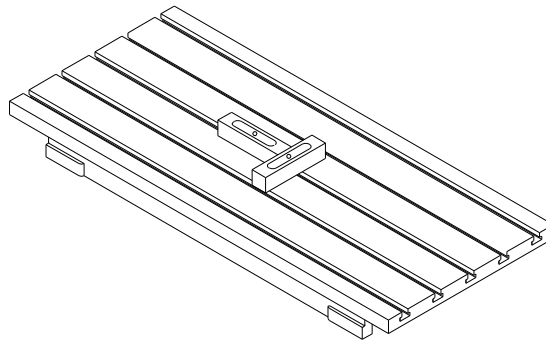


FIG. 4.6.1 LEVELING CHECK

- B. ADJUST THE LEVEL OF THE MACHINE BY THE LEVELING BOLTS
 - a. ADJUST THE LEVEL OF THE MACHINE BY THE LEVELING BOLTS (FIG. 4.6.2)
 - b. MAKE SURE EVERY LEVELING PADS ARE FIRMLY SECURED BY LEVELING BOLTS.
 - c. ONCE YOU HAVE SET UP THE LEVELING, AFTER USING THE MACHINE 6 MONTH IT IS SUGGESTED TO CHECK THE LEVELING AGAIN, THEN YOU HAVE TO CHECK THE LEVELING ONCE A YEAR,

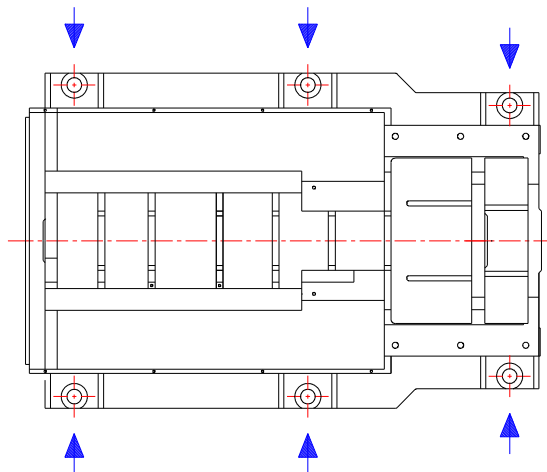


FIG. 4.6.2 LEVELING ADJUST

4.7 ASSEMBLE OF PARTS AND DEVICES

- BE WARE TO SWITCH OFF THE MAIN POWER WHILE ASSEMBLE OF PARTS AND DEVICES.
- FOR HANNING INFORMATION OF PARTS AND DEVICES PLEASE REFER TO CHAPER 3.

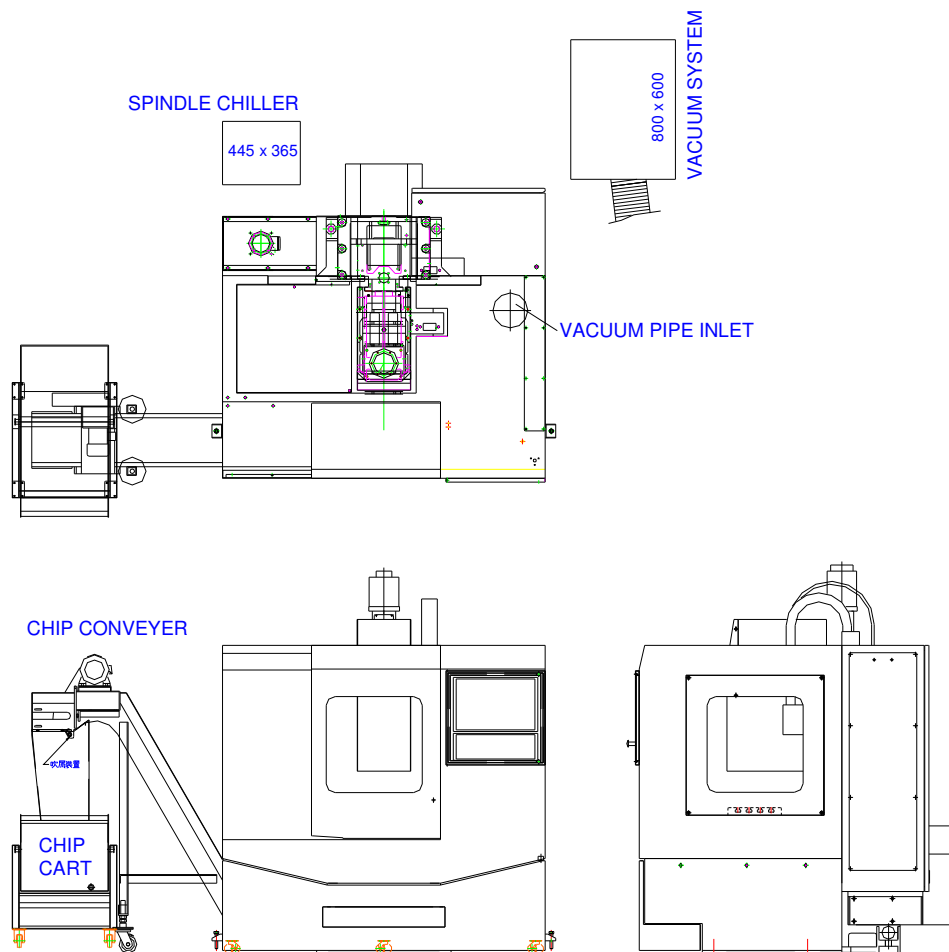
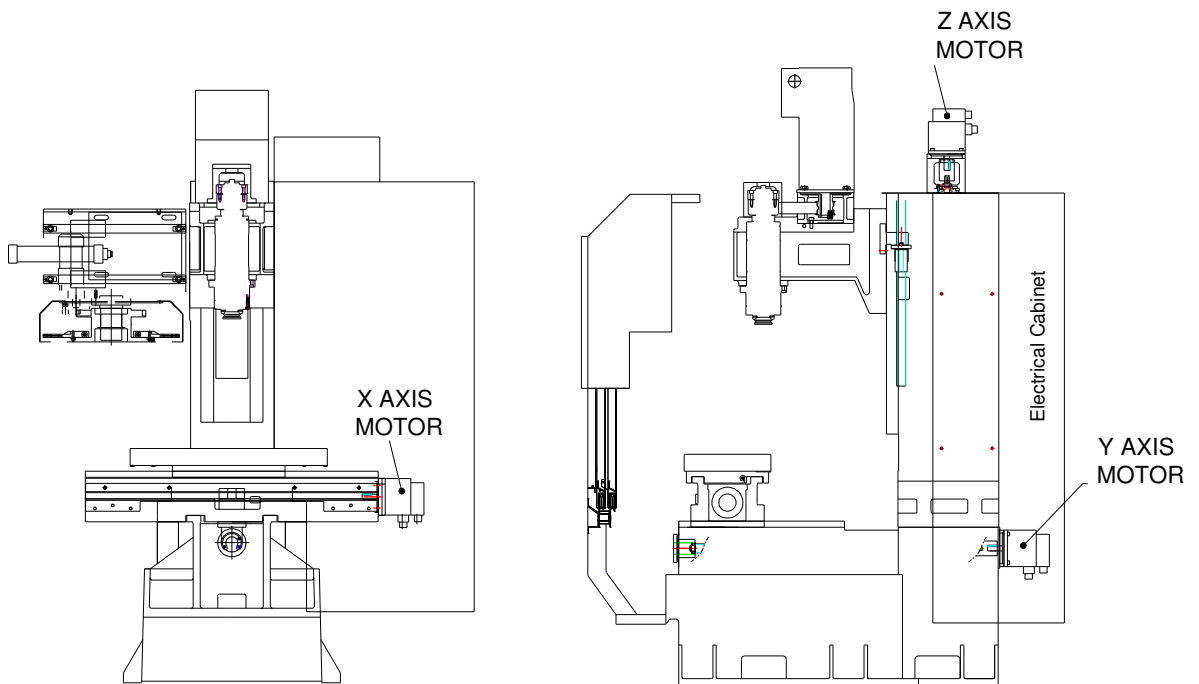


FIG. 4.7.1 ASSEMBLE OF PARTS AND DEVICES

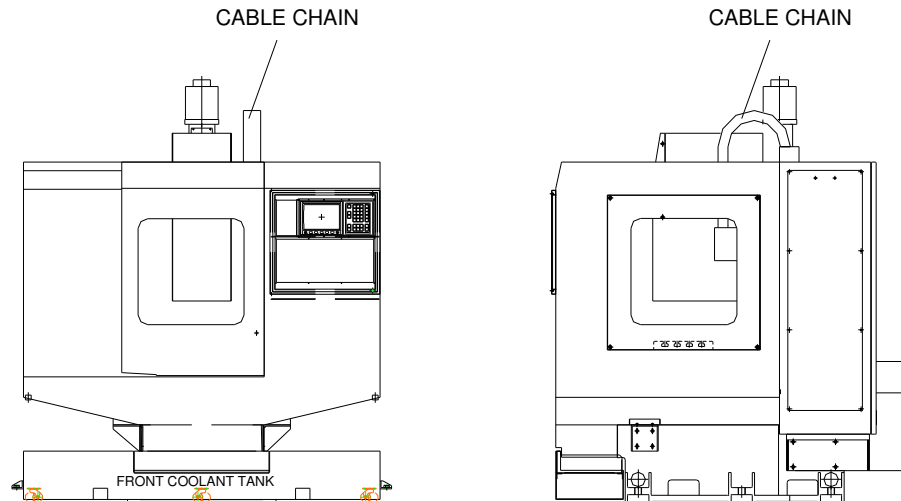
4.7.1 MOTORS

- A. SOMETIMES DUE TO TRANSPORT REASON THE Z AXIS, Y AXIS, OR OTHER MOTOR COULD BE TAKEN OFF BEFORE TRANSPORT.
- B. ASSEMBLE THESE MOTOR BEFORE POWER WIRING.
- C. ONLY OTHERIZED PERSON CAN DO THE MOTOR ASSEMBLE.
- D. FOR MORE INFORMATION, CHECK YOUR MACHINE AGENT.

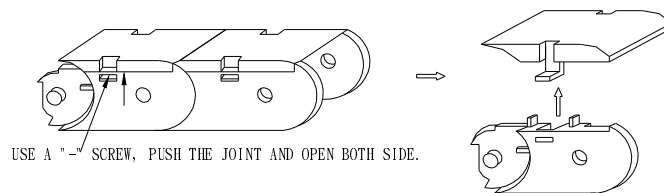


4.7.2 .CABLE CHAIN

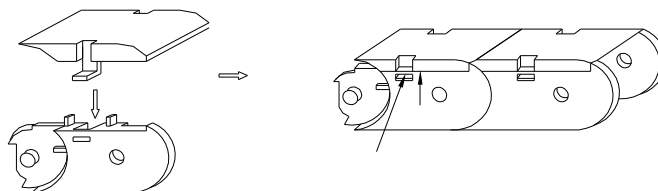
- A. CABLE CHAIN COULD BE RELEASED FOR TRANSPORTATION REASON.
- B. TO OPEN, CLOSE AND ADJUST CABLE CHAIN AS FIG 4.7.2



OPEN CABLE CHAIN COVER



CLOSE CABLE CHAIN COVER



ADJUST LENGTH OF CABLE CHAIN

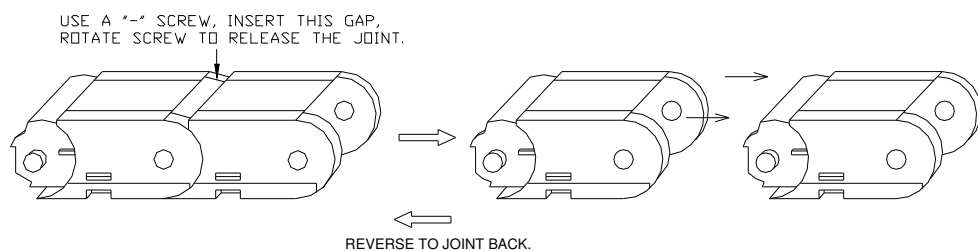
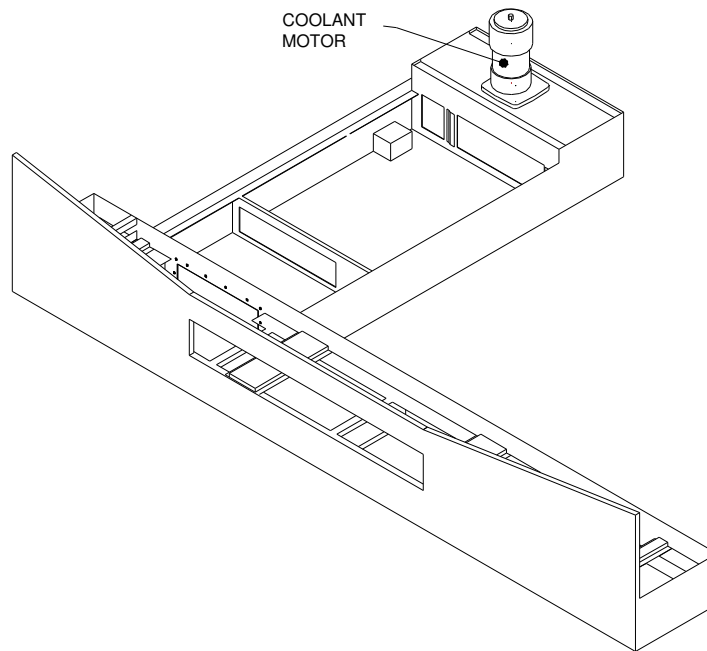


FIG. 4.7.2 CABLE CHAIN

4.7.3 COOLANT MOTOR

- A. BEFORE SETTING UP THE TANK, DO NOT FILL COOLANT LIQUIDE INTO THE TANK.
- B. SECURE COOLANT MOTOR, ON THE TANK, FOR PIPING AND WIRING, REFER TO NEXT SECTION "DEVICE PIPING INSTRUCTION".
- C. THERE ARE ALSO WHEELS AND LOCK SCREW UNDER THE TANK.



4.7.4 COOLANT TANK

- A. BEFORE SETTING UP THE TANK, DO NOT FILL COOLANT LIQUIDE INTO THE TANK.
- B. THERE ARE WHEELS AND LOCK SCREW UNDER COOLANT TANK.
- C. PUSH COOLANT UNDER THE MACHINE.
- D. FOR USERS WHICH HAVE CHIP CONVEYOR OPTION, IT IS NECESSARY TO PUT CONVEYOR ONTO COOLANT TANK, THAN PUSH THE WHOLE SET UNDER THE MACHINE.

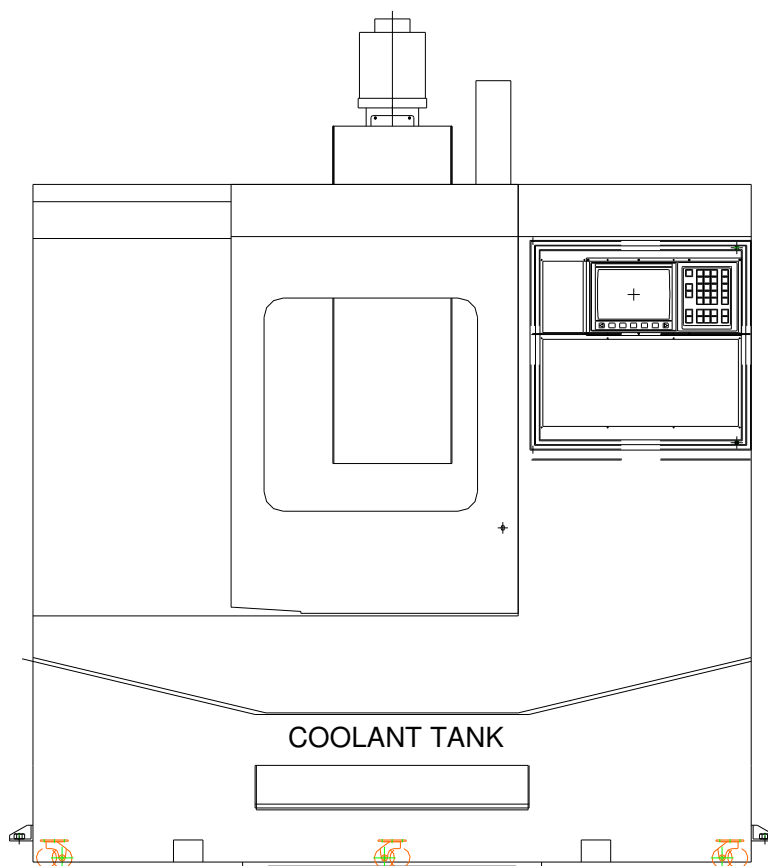
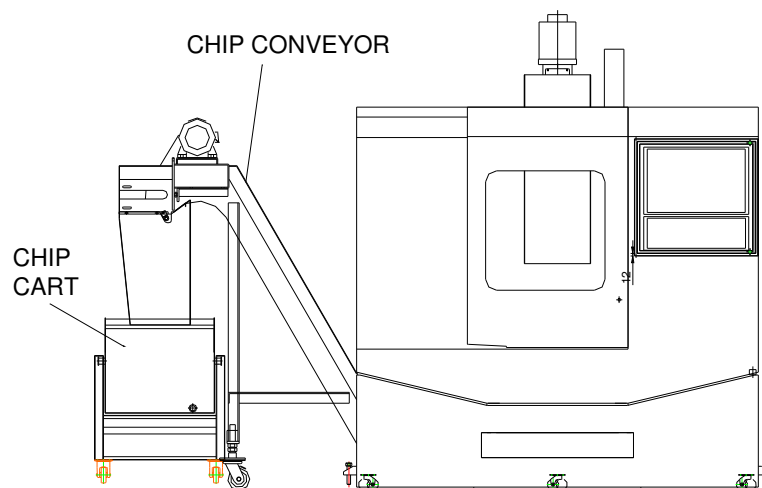
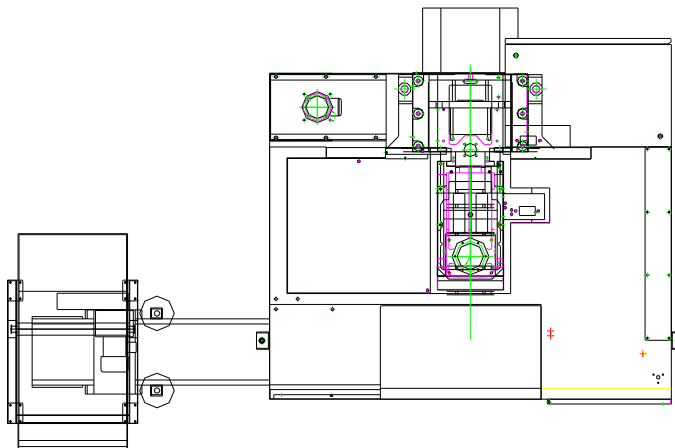


FIG. 4.7.4 FRONT COOLANT TANK

4.7.5 CHIP CONVEYOR (OPTION)

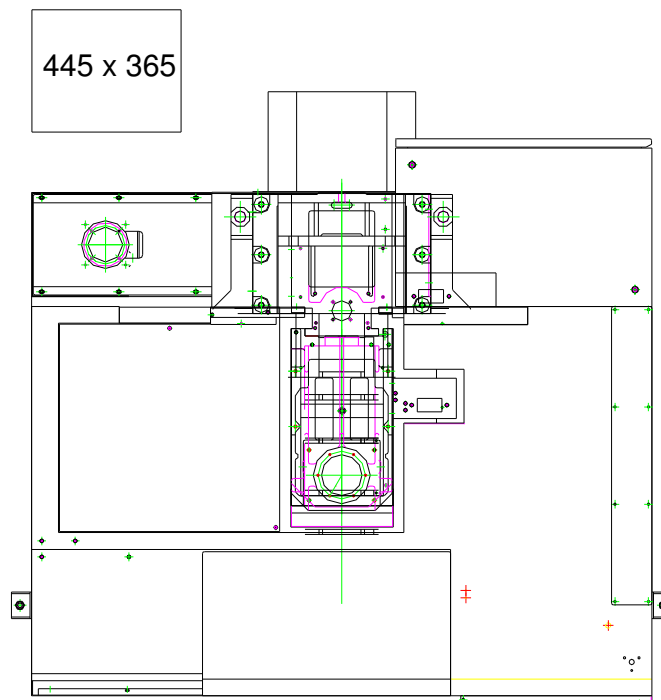
- A. PUT CONVEYOR ONTO COOLANT TANK, THAN PUSH THE WHOLE SET UNDER THE MACHINE.
- B. THERE ARE TWO TYPES OF CHIP CONVEYOR, SCREW TYPE AND FLAT TYPE.
- C. THIS OPTION INCLUDES A CHIP CART, WHICH HAVE WHEELS UNDER THE CART.



4.7.6 SPINDLE CHILLER (OPTION)

- A. AS SET THE SPINDLE CHILLER IN POSITION.
- B. IT IS IMPORTANT TO KEEP THE SPINDLE CHILLER IN STANT POSITION DURING MOVING. (CAN NOT ROTATE THE CHILLER)
- C. ACCORDING TO THE REFRIGERANT LIQUID IN THE CHILLER, BEFOR START THE CHILLER IT IS NECESSARY TO WAIT 30 min. AFTER MOVING THE CHILLER.
- D. REFER TO SPINDLE CHILLER'S OPERATIONAL MANUAL FOR MORA INFORMATION

SPINDLE CHILLER

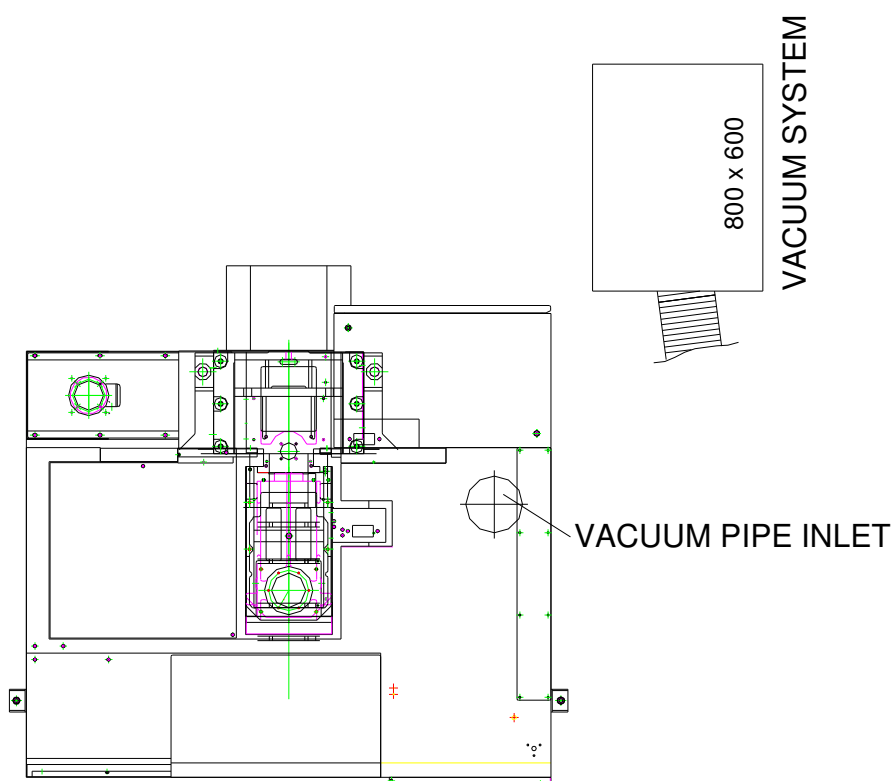


4.7.7 EXHAUST (VACUUM) SYSTEM (OPTION)

A. SPECIFICATION

TYPE	DIMENTION			POWER	INLET	AIR CAPACITY	WEIGHT
	H	W	D				
TS300	2000mm	800mm	600mm	2.3 kW	Ø200mm	30-45 m ³ /min	120kg

- B. AS FIG 4.7.1 SET THE EXHAUST (VACUUM) SYSTEM IN POSITION. REMEMBER TO GIVE PLACE FOR MAINTENANCE.
- C. CONNECT THE EXHAUST (VACUUM) PIPE TO THE TOP OF THE MACHINE.
- D. CONNECT THE POWER TO THE SIDE OF POWER CABINET. (BE WARE TO SWITCH OF MAIN POWER)
- E. REFER TO VACUUM SYSTEM'S OPERATIONAL MANUAL FOR MORA INFORMATION



4.7.8 OTHER OPTIONS

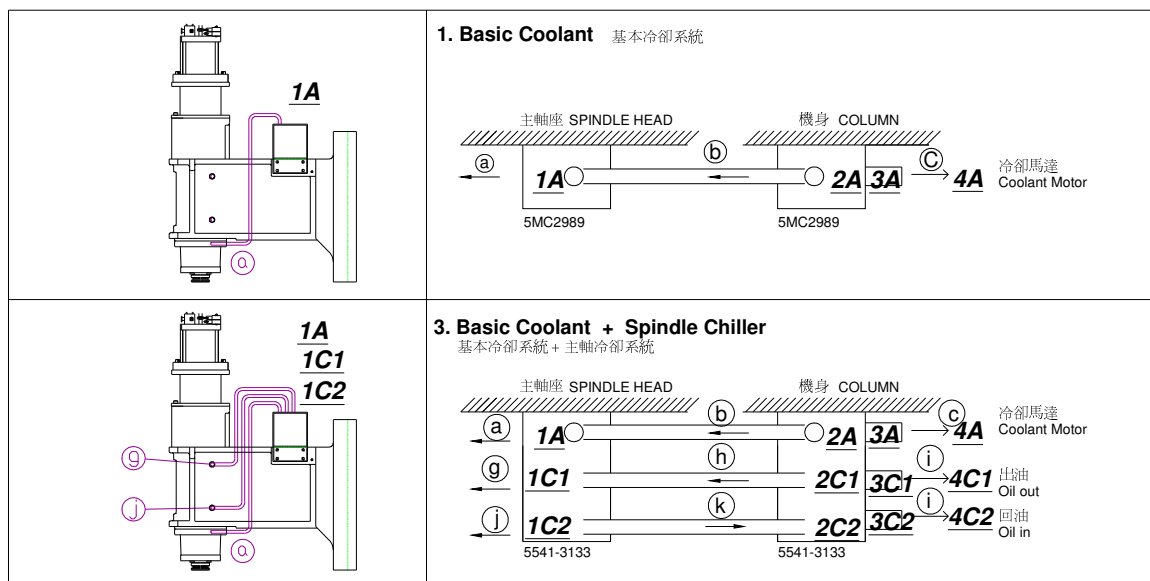
FOR OTHER OPTIONS NOT LIST ABOVE, CHECK YOUR MACHINE
AGENT FOR INSTALLTION PROCEDURE.

4.8 DEVICE PIPING INSTRUCTION

4.8.1 PIPE LIST

NO	PARTS NO.	TYPE	SPEC.	Q	REMARK
Ⓐ	1051-2638-100	A	1/2"(18.50mm) x0.8 m	1	
Ⓑ	1000-2435-100	B	1/2" (18.50mm) x1.15 m	1	
Ⓒ	1051-2238-100	C	3/4" (24.00mm) x2.5 m	1	
Ⓓ	1051-2735-100	C	3/4" (24.00mm) x1.2 m	1	
Ⓔ	1051-2736-100	C	3/4" (24.00mm) x2 m	1	
TYPE A: RESIST COMPRESSION PIPE. TYPE B: NYLON PIPE TYPE C: OIL RESIST PIPE					

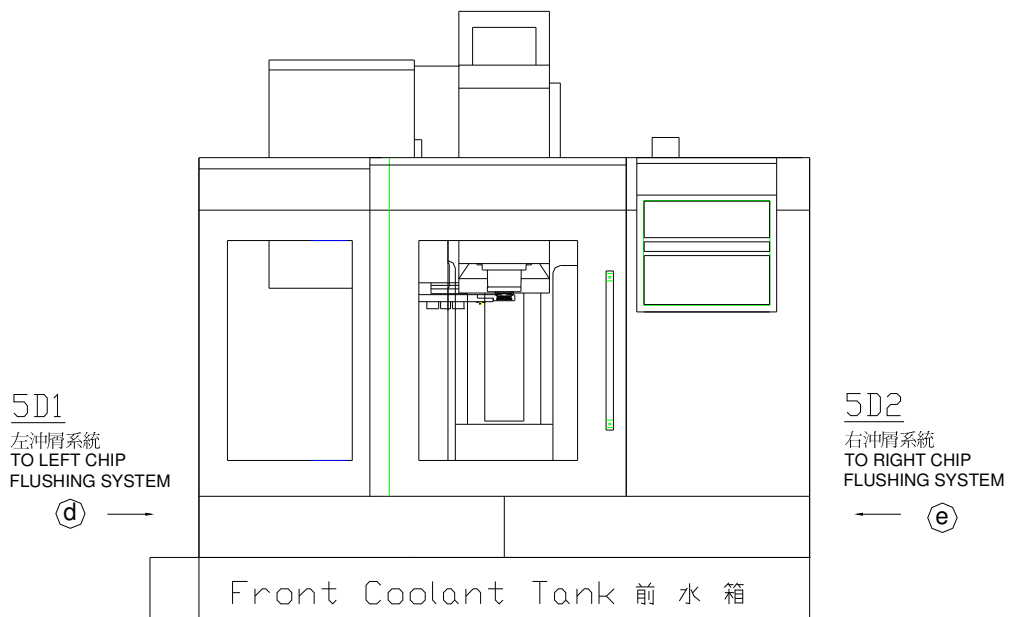
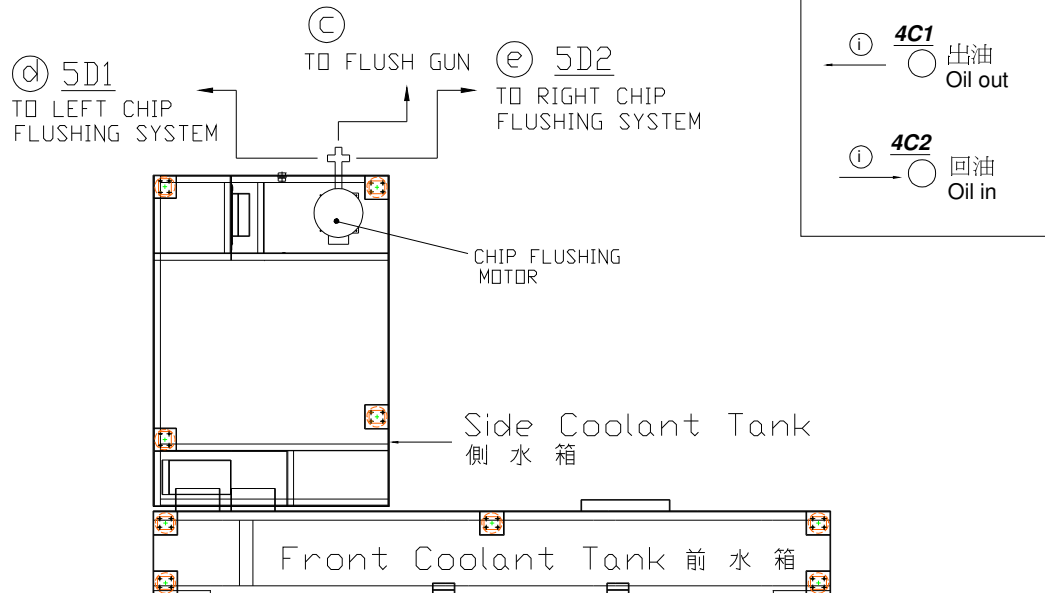
4.8.2 PIPING ON TOP OF THE MACHINE



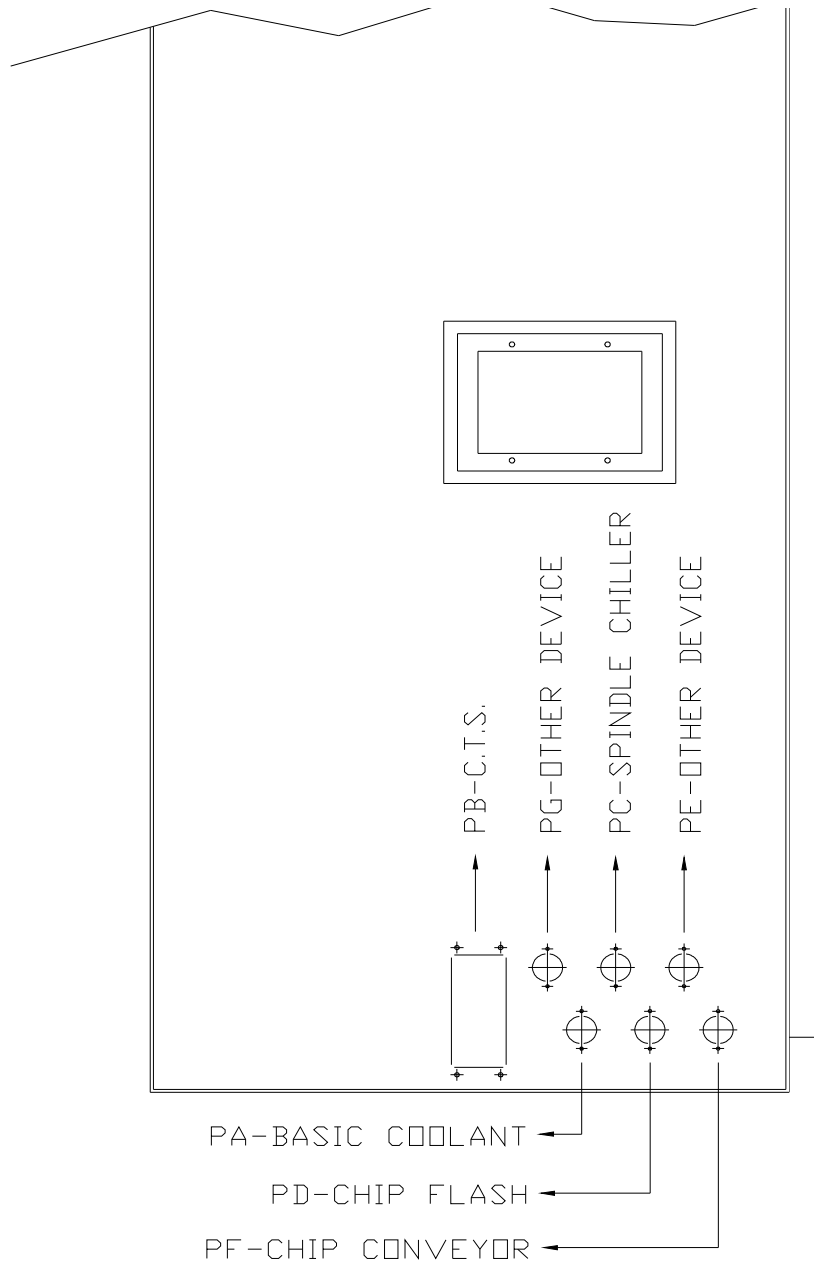
4.8.3 PIPING ON DEVICES

SPINDLE CHILLER

主軸冷卻機



4.8.4 POWER CONNECTOR ON ELECTRIC CABINET



4.9 COOLANT

4.9.1 QUANTITY OF COOLANT

THE APPROXIMATELY QUANTITY FOR COOLANT TANK AS FOLLOWS:

MCV300
160 Liter

4.9.2 TYPE OF COOLANT

- A. THERE ARE TWO TYPES OF COOLANT, WATER SOLUBLE, AND NON-WATER SOLUBLE, RESPECTIVELY OF WHICH HAVE MANY VARIATIONS. THE SUITABLE COOLANT DEPENDS ON CUTTING CONDITION AND OTHERS. THE FOLLOWING TABLE IS ONLY FOR REFERENCE. FIND YOUR COOLANT DEALER FOR MORE INFORMATION.

BRAND REFERENCE	MATERIAL			
1. AVANTIN 620 2. CIMCOOL MB-602-S	CASTING	STEEL	ALLOY STEEL	ALUMINUM
DILUTE WITH WATER (COOLANT : WATER)	1:20	1:20-25	1:15-20	1:10-25

4.9.3 SAFETY NOTICE

- A. TO PREVENT FIRE, OBEY THE FOLLOWING INSTRUCTIONS FOR UNMANNED OPERATION AT NIGHT OR FOR CASES WHEN OPERATOR HAS TO BE AWAY FROM THE MACHINE FOR A LONG TIME.
- USE NON-FLAMMABLE COOLANT ONLY.
 - CHECK THAT LUBRICATION OIL AND COOLANT ARE SUFFICIENT AND ARE WORKING PROPERLY.
 - CHECK THE TOOL TIPS, CUTTING CONDITIONS, CYCLE TIME, TOOL LIFE, ETC.
 - NEVER PLACE FLAMMABLE ITEMS, SUCH AS WOODEN BLOCKS, PAPER, CLOTH, ETC., AROUND THE MACHINE.

5. OPERATION OF MACHINE

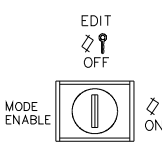
5.1 SWITCHING ON THE POWER SOURCE TO MACHINE.

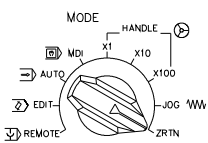
5.1.1 APPLY THE POWER SOURCE TO THE MACHINE ITSELF AS FOLLOWS:

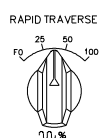
- A. MAKE SURE THE FRONT DOOR IS CLOSED.
- B. MAKE SURE THAT NO TROUBLE OCCURS WITH THE MACHINE REFERRING TO THE DESCRIPTION OF CHAPTER 6.1 CHECKING BEFORE STARTING THE MACHINE, WRITTEN IN THE DAILY CHECKING SCHEDULE.
- C. TURN ON THE POWER SWITCH ON THE ELECTRIC BOX. THE SPINDLE MOTOR AND THE COOLING FAN IN THE ELECTRIC BOX WILL START RUNNING.
- D. HOLD DOWN THE PUSH BUTTON POWER ON THE NC OPERATION PANEL FOR 2 OR 3 sec. THE POWER SOURCE WILL BE GIVEN THROUGHOUT THE MACHINE.
- E. REFERRING TO THE DESCRIPTION OF CHECKING BEFORE STARTING THE MACHINE IN DAILY CHECKING BEFORE STARING THE MACHINE IN DAILY CHECKING SCHEDULE 6.1, MAKE SURE NO TROUBLE IS FOUND IN THE MACHINE AND THEN START THE OPERATION.

5.1.2 MOVE AXIS TO REFERENCE POINT (MANUALLY)

MOVE SPINDLE HEAD (Z AXIS), SADDLE (Y AXIS), TABLE (X AXIS) TO THE REFERENCE POINT (COORDINATE ZERO)

- A. SWITCH KEY  TO MODE ENABLE

- B. SET THE MODE SWITCH  TO ZRTN POSITION.

- C. SET THE SWITCH "RAPID OVERRIDE"  TO 25%.

- D. PRESS THE PUSH BUTTON  UNTIL THE ZERO (REFERENCE POINT) LAMP "Z" LIGHTS (THEN,  FOR X AXIS AND  FOR Y AXIS)

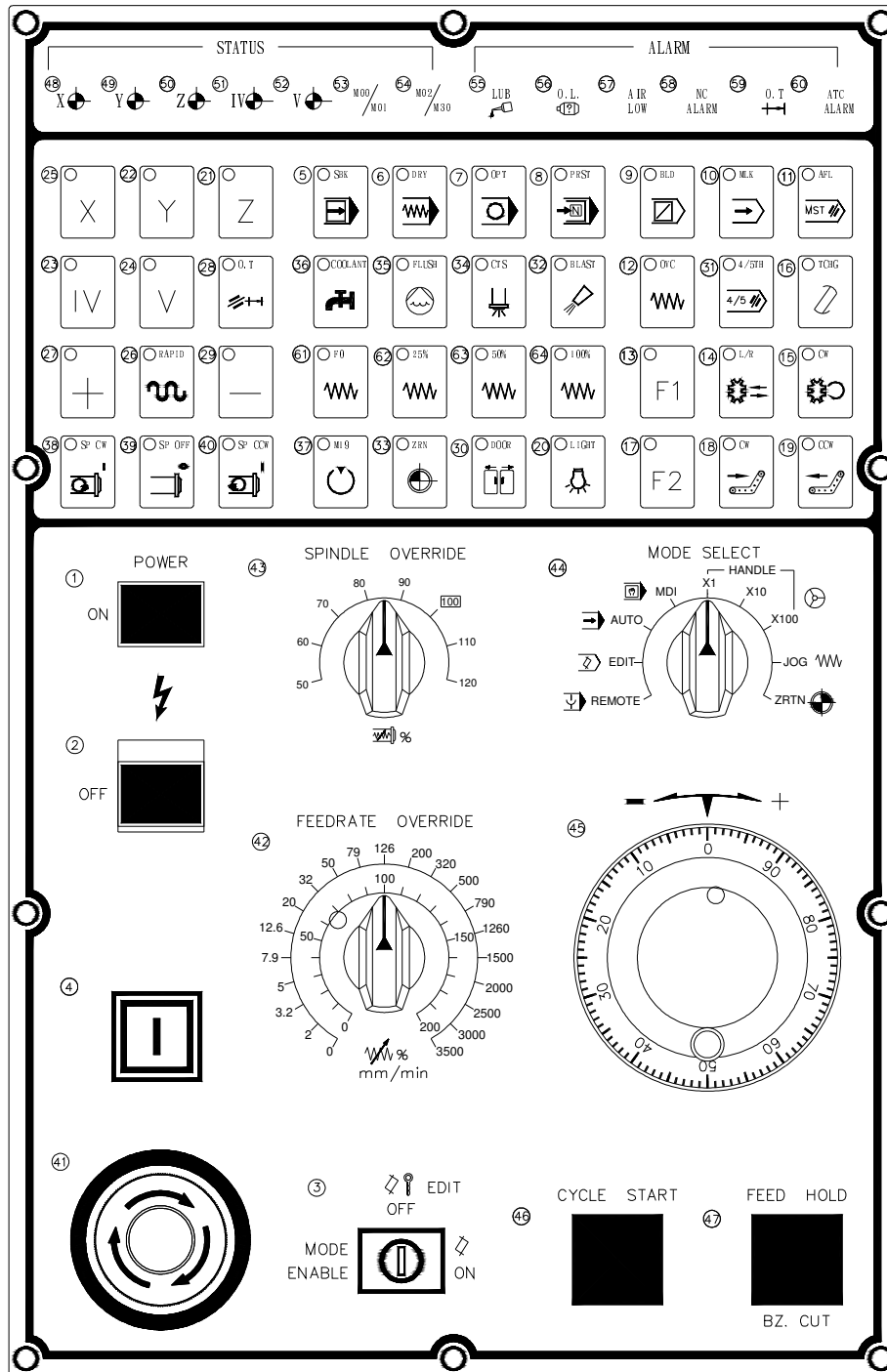
5.2 SWITCHING OFF THE POWER SOURCE

TO TURN OFF, PROCEED AS FOLLOW:

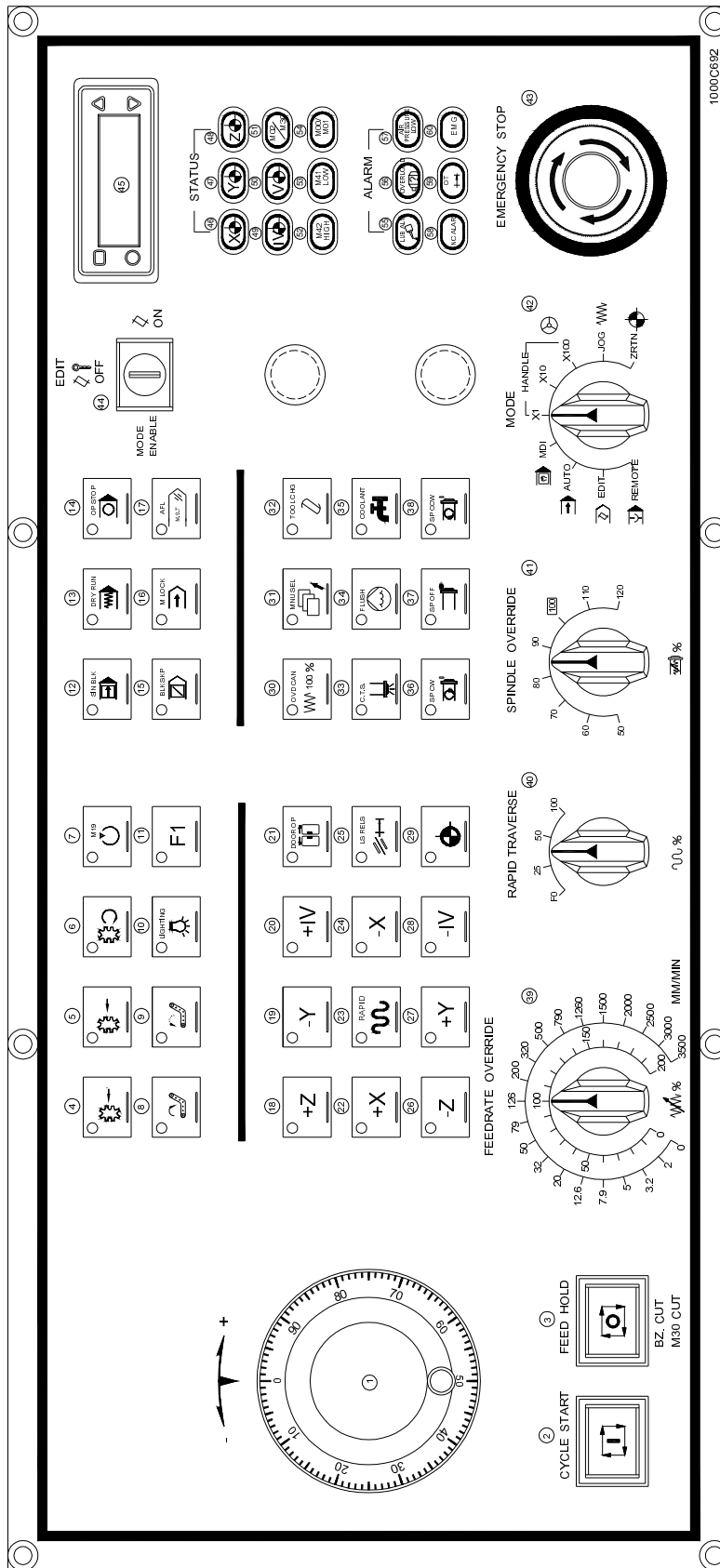
- A. MAKE SUR THE FRONT DOOR IS CLOSED
- B. MAKE SURE THAT THE LAMP OF THE CYCLE START ON PUSH BUTTON ON THE OPERATION PANEL DOES NOT LIGHT.
- C. MAKE SURE THAT ALL MOVABLE PARTS OF THE MACHINE ARE IN STANDSTILL.
- D. WHEN TAPE PUNCH UNIT (ASR33 OR RS-232C) IS USED, TURN OFF THE UNIT.
- E. THEN HOLD THE PUSH BUTTON POWER OFF ON THE NC OPERATION PANEL FOR 1 OR 2 SEC.
- F. TURN OFF THE POWER SWITCH ON THE ELECTRIC BOX.

5.3 EMERGENCY STOP

REFERRING TO THE DESCRIPTION OF CHAPTER 5.4 SWITCH 43.

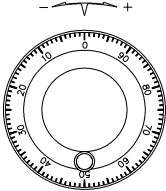
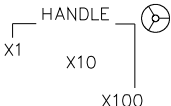
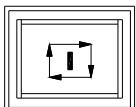
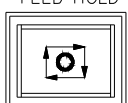
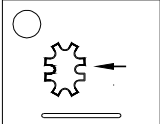
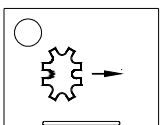


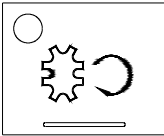
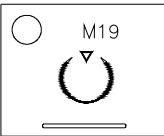
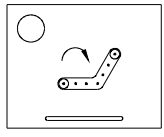
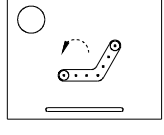
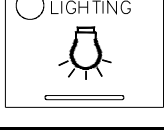
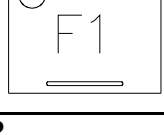
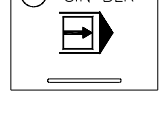
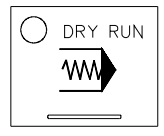
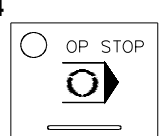
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|------------------------------------|----------------------------------|------------------------------------|---------------------------------|
| 1. Power ON | 17. Spare Function F1 | 33. Auto Zero Return | 49. Y Axis Zero Position Lamp |
| 2. Power OFF | 18. Chip Conveyor ON/OFF | 34. Coolant Through Spindle ON/OFF | 50. Z Axis Zero Position Lamp |
| 3. Program Protect & Mode Enable | 19. Chip Conveyor Reverse ON/OFF | 35. Chip Flush ON/OFF | 51. 4th Axis Zero Position Lamp |
| 4. Machine Ready ON | 20. Working Lamp ON/OFF | 36. Coolant ON/OFF | 52. 5th Axis Zero Position Lamp |
| 5. Single Block | 21. Manual Feed + Z | 37. Spindle Orientation | 53. Optional Stop Lamp |
| 6. Dry Run | 22. Manual Feed - Y | 38. Spindle on Clockwise | 54. Finish Lamp |
| 7. Optional stop | 23. Manual Feed + IV | 39. Spindle Stop | 55. Lubrication Low Level lamp |
| 8. Program Restart | 24. Manual Feed + V | 40. Spindle On Counter Clockwise | 56. Motor Overload Lamp |
| 9. Optional Block Skip | 25. Manual Feed + X | 41. Emergency Stop | 57. Air Pressure Low Level Lamp |
| 10. Machine Lock | 26. Rapid | 42. Feedrate Override | 58. NC Alarm Lamp |
| 11. M.S.T. Code Lock | 27. Axis Move + | 43. Spindle Override | 59. O.T. Detect Lamp |
| 12. Override Cancel | 28. OT Release | 44. Mode Select | 60. ATC Alarm Lamp |
| 13. Spare Function F2 | 29. Axis Move - | 45. Handwheel | 61. Rapid Traverse F0 |
| 14. Tool Magazine Forward/Backward | 30. Operation Guard Release | 46. Cycle Start | 62. Rapid Traverse 25% |
| 15. Tool Magazine Turn Clockwise | 31. 4/5th Axis Neglect | 47. Feed Hold | 63. Rapid Traverse 50% |
| 16. Tool Change | 32. Air Blast ON/OFF | 48. X Axis Zero Position Lamp | 64. Rapid Traverse 100% |

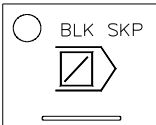
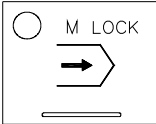
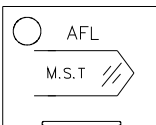


- | | | | |
|---------------------------------|------------------------------------|-----------------------------------|---------------------------------|
| 1. Manual Pulse Generator | 25. Limit Switch Remove | 37. Spindle Stop | 49. 4th Axis Zero Position Lamp |
| 2. Cycle Start | 26. Manual Feed - Z | 38. Spindle On Counter Clockwise | 50. 5th Axis Zero Position Lamp |
| 3. Feed Hold | 27. Manual Feed + Y | 39. Feedrate Override | 51. Program Finish Lamp |
| 4. Tool Magazine Backward | 28. Manual Feed - IV | 40. Rapid Traverse | 52. Low Gear Lamp |
| 5. Tool Magazine Forward | 29. Auto Zero Return | 41. Spindle Override | 53. High Gear Lamp |
| 6. Tool Magazine Turn Clockwise | 30. Override Cancel | 42. Mode Select | 54. Optional Stop Lamp |
| 7. Spindle Orientation | 31. Menu | 43. Emergency Stop | 55. Lubrication Low Level lamp |
| 8. Chip Conveyor ON/OFF | 32. Tool Change | 44. Program Protect & Mode Enable | 56. Motor Overload Lamp |
| 9. Chip Conveyor Reverse ON/OFF | 33. Coolant Through Spindle ON/OFF | 45. Tool NO. Indicator | 57. Air Pressure Low Level Lamp |
| 10. Work Lamp ON/OFF | 34. Chip Flush ON/OFF | 46. X Axis Zero Position Lamp | 58. NC Alarm Lamp |
| 11. Spare Function for Option | 35. Coolant ON/OFF | 47. Y Axis Zero Position Lamp | 59. O.T. Detect Lamp |
| 12. Single Block | 36. Spindle on Clockwise | 48. Z Axis Zero Position Lamp | 60. Emergency Stop Lamp |

5.4 EXPLANATION FOR USE OF OPERATION PANEL

SWITCH	DESCRIPTION
1 	PULSE GENERATOR (HANDWHEEL) USED ON MODE  IF YOU HAVE A OPTION OF REMOVEABLE HANDWHEEL, THERE WILL BE NO HANDWHEEL ON THE OPERATION PANEL.
2 CYCLE START 	CYCLE START THIS IS A LIGHTING PUSH BUTTON, AND USED TO START OPERATION IN (41) AUTO OR MDI OPERATION MODE. WHEN THE PUSH BUTTON IS PRESSED, THE LAMP IN THE PUSH BUTTON LIGHTS. THE PUSH BUTTON IS PRESSED TO RESTART OPERATION AFTER OPERATION STOP WHEN THE PUSH BUTTON FEED HOLD (37) OR SINGLE BLOCK (9) IS OPERATED, OR WHEN OPERATION MODE IS CHANGED.
3 FEED HOLD  BZ. CUT M30 CUT	FEED HOLD THIS PUSH BUTTON IS USED TO STOP OPERATION IN AUTO OR MDI OPERATION MODE. WHEN THE PUSH BUTTON IS PRESSED, THE LAMP IN THE PUSH BUTTON CYCLE START GOES OUT. WHEN THE PUSH BUTTON IS PRESSED IN THE COURSE OF COORDINATE DISPLACEMENT, THE MOVEMENT IS DECELERATED AND STOPS WHILE THE OPERATION DOES NOT IMMEDIATELY STOP, WHEN THE PUSH BUTTON IS DEPRESSED DURING EXECUTION OF M, S OT T FUNCTION, BUT STOPS AFTER THE COMPLETION OF THE FUNCTION. THE PUSH BUTTON IS NOT EFFECTIVE DURING TAPPING CYCLE (G84), (G74) OR DWELL (G04). HOWEVER OPERATION IS STOPPED DURING EXECUTION OF CANNED CYCLE BY OPERATING THE PUSH BUTTON SINGLE BLOCK, THE LAMP IN THE PUSH BUTTON LIGHTS INDICATING THE EXECUTION PUSH BUTTON LIGHTS INDICATING THE EXECUTION OF THE CANNED CYCLE. BUZZER CUT THIS PUSH BUTTON CAN BE USED TO STOP THE BUZZER SOUND.
4 	TOOL MAGAZINE BACKWARD USED ONLY IN 20 TOOLS MAGAZINE (UMBRELLA TYPE) IN MANUAL MODE, SPINDLE ORIENTATION, K7.0=1 (MAINTENANCE MODE) PUSH TO MOVE THE MAGAZINE BACKWARD.
5 	TOOL MAGAZINE FORWARD USED ONLY IN 20 TOOLS MAGAZINE(UMBRELLA TYPE), IN THE CONDITION OF "MANUAL MODE"Z AXIS ON TOOL CHANGE POINT AND M19 STATUS AND WITHOUT TOOL INTERFERENCE, PUSH THIS BUTTOM TO MOVE MAGAZINE FORWARD.

6 	TOOL MAGAZINE TURN CLOCKWISE PUSH THIS BUTTOM TO ROTATE TOOL MAGAZINE CLOCKWISE, RELEASE TO STOP (IN MANUAL MODE)
7 	M19 SPINDLE ORIENTATION PUSH THIS BUTTOM TO ORIENTATE SPINDLE (M19)
8 	CHIP CONVEYOR ON / OFF (JOG) PUSH THIS BUTTOM TO START THE CHIP CONVEYOR PUSH AGAIN TO STOP
9 	CHIP CONVEYOR REVERSE ON / OFF PUSH THIS PUTTON TO REVERSE THE CHIP CONVEYOR RELEASE TO STOP IT
10 	WORK LAMP ON/OFF PUSH TO LIGHT THE WORK LAMP, PUSH AGAIN TO TURN OFF.
11 	SPARE FUNCTIONFOR OPTION
12 	SINGLE BLOCK THE SWITCH IS APPLIED TO EXECUTE TAPE PROGRAM OR MEMORY PROGRAM STEP BY STEP. WHEN THE PUSH BUTTON IS SET TO ON AND THE PUSH BUTTON CYCLE START (2) IS PRESSED. THE MACHINE EXECUTES ONE BLOCK OF THE PROGRAM AND STOPS. WHEN THE PUSH BUTTON SINGLE BLOCK IS PRESSED DURING MEM MODE OPERATION, THE MACHINE STOPS AFTER EXECUTED OF THE CURRENT BLOCK.
13 	DRY RUN WHEN THE SWITCH IS SET AT ON, FEED COMMAND (F CODE) IN THE PROGRAM IS IGNORED DURING. MEM, MDI OPERATION MODE AND THE FEED SPEED SELECTED BY THE SELECT SWITCH JOG FEEDRATE (39) BECOMES EFFECTIVE. THE RAPID TRAVERSE SPEED CAN BE ALSO CHANGED BY THE SWITCH DRY RUN.
14 	OPTIONAL STOP BY SETTING THIS SWITCH, THE OPTIONAL STOP FUNCTION OF M 01 IS IGNORED OR NOT IGNORED DURING MEM OPERATION MODE. WHEN THE SWITCH IS SET AT ON, THE BLOCK WITH M 01 IS EXECUTED AND THE OPERATION STOPS AFTER THE EXECUTION OF THE BLOCK.

15 		OPTIONAL BLOCK SKIP BY SETTING THIS SWITCH, THE BLOCK HAVING "/" (SLASH) AT ITS HEAD IS IGNORED OR NOT IGNORED. WHEN THE SWITCH IS AT ON, THE BLOCK HAVING "/" AT ITS HEAD IS IGNORED. THE SWITCH IS NOT EFFECTIVE FOR THE BLOCK IN EXECUTION AND THE BLOCK READ IN THE BUFFER, AND BECOMES EFFECTIVE FROM THE NEWLY READ BLOCK.					
16 		MACHINE LOCK TO LOCK THE AXIS MOVEMENT DURING EXECUTE PROGRAM. IN AUTO OR MDI OPERATION MODE, THE PROGRAM CAN BE SIMULATED, THAT IS, THE MACHINE DOES NOT ACTUALLY WORK, BUT THE DISPLAY APPEARS AS IF THE MACHINE ACTUALLY DOES. NOTICE: M,S,T CODE STILL EXECUTE. (SPINDLE ROTATION, TOOL CHANGE STILL EXECUTE) TO  CANCEL PUSH M,S,T, CODE LOCK.					
17 		M.S.T. CODE LOCK TO CANCEL THE EXECUTION OF M, S, T, CODE IN THE PROGRAM. NOTICE: AXIS MOVEMENT (G CODE) STILL EXECUTE, TO CANCEL, PUSH  MACHINE LOCK.					
18 	19 	20 	22 	24 	26 	27 	28 

MANUAL FEED $\div$ / $-$

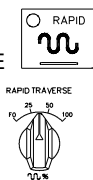
A. IN HANDLE  **MODE USE** X_+  , Y_+  , Z_+  , IV_+  **TO SELECT AXIS.**

B. IN JOG MODE USE THESE BUTTON TO MOVE DESIRE DIRECTION.

- SET THE JOG FEED SPEED BY FEEDRATE SELECT SWITCH

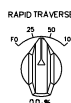


- WHEN RAPID MODE IS PRESSED ALTOGETHER .SET THE RAPID SPEED BY RAPID OVERRIDE



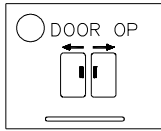
SELECT SWITCH

C. IN ZERO RETURN ZRTN MODE, USE  +X  +Y  +Z  +IV TO EXECUTE ZERO RETURN.



- THE TRAVEL SPEED WILL REFER TO  RAPID TRAVERSE SWITCH

21



OPERATION GUARD RELEASE (CE)

A. CONDITION IN DOOR OPEN STATUS

DUE TO CE REGULATION AND SAFETY REASON, WHILE DOOR OPEN THE MACHINE CAN ONLY OPERATE IN FOLLOWING STATUS.

- SPINDLE SPEED UNDER 50 /min.
- CAN OPERATE ONLY IN JOG AND HANDWHEEL MODE.
- AXIS FEEDRATE UNDER 2000 mm/min

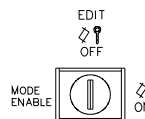
B. HOW TO OPERATE IN DOOR OPEN STATUS

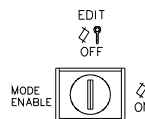


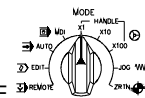
- PUSH DOOR OPEN  BUTTON.
- OPEN THE DOOR.
- CLOSE DOOR TO RESUME SYSTEM.

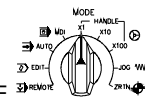
NOTICE: ONCE YOU PUSH THIS BUTTON, YOU MUST EXECUTE OPEN AND CLOSE DOOR PROCEDURE TO RESUME THE SYSTEM.

C. MOVE THE AXIS OR TURN THE SPINDLE IN MANUAL MODE.



- SWITCH KEY  TO MODE ENABLE.



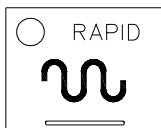
- SWITCH MODE  TO "MANUAL" (HANDLE, JOG.)

PER
-MISSIVE

- BEFORE ANY MOVEMENT, KEEP PUSHING THE PERMISSIVE BOTTON
 - FOR MACHINE WITH REMOVEABLE HANDWHEEL, THE BUTTON IS ON THE SIDE OF THE HANDWHEEL.
 - FOR MACHINE WITHOUT REMOVEABLE HANDWHEEL., THIS BUTTON IS ON THE OPERATION PANEL.
- DURING ANY MOVEMENT, YOU MUST KEEP PUSHING PERMISSIVE BUTTON TO ENABLE THE MOVEMENT.

NOTICE: DON'T RELEASE THE PERMISSIVE BUTTONS BEFORE STOP THE MOVEMENT. IT WILL CAUSE THE FAILURE OF THE MOVEMENT.

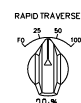
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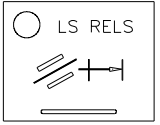
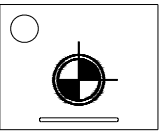
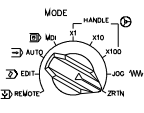
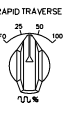
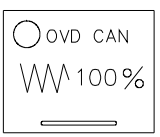
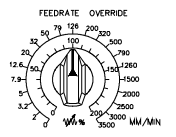
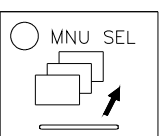


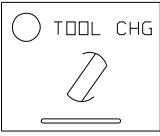
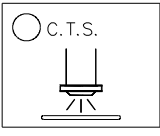
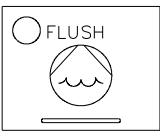
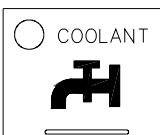
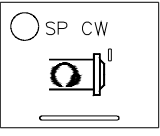
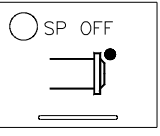
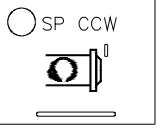
RAPID

IN JOG MODE, PUSH THIS BUTTON TOGETHER WITH X+ X- Y+ Y- Z+ Z- IV+ IV- TO MOVE THE AXIS RAPIDLY.

SET THE RAPID SPEED BY RAPID OVERRIDE SELECT SWITCH



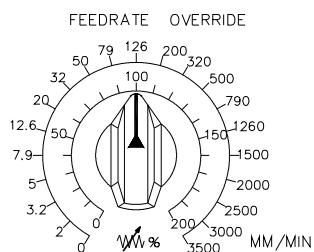
25 	2ND LIMIT SWITCH REMOVE IN USUAL CONDITION, FOR THE AXIS TRAVEL, OVER-TRAVEL CAN BE DETECTED BY THE STORED STROKE LIMIT AT THE FIRST STAGE ANOTHER OVER TRAVEL LIMIT SWITCH IS PROVIDING AT THE SECOND STAGE TO DETECT MORE OVER-TRAVEL IF IT IS NOT STOP AT THE FIRST STAGE. IN SUCH A CASE, ALARM (EMERGENCY STOP) TAKES PLACE, AND IMMEDIATELY STOP THE MACHINE. KEEP PUSH THIS SWITCH TO ELIMINATE THE EMERGENCY STOP STATUS, SO THAT YOU CAN MOVE THE TRAVEL TO NORMAL POSITION. NOTICE: ONCE YOU PUSH THIS BUTTON, THE AXIS TRAVEL IS NOMORE PROTECTED, WRONG DIRECTIONAL MOVEMENT MAY DAMAGE THE MACHINE. IT IS SUGGEST TO USE HANDWHEEL WITH SMALL MOVEMENT TO ELIMINATE THE STATUS.
29 	AUTO ZERO RETURN THE SWITCH IS USED TO RETURN THE SPINDLE HEAD(Z), SADDLE(Y) AND TABLE (X) TO THE REFERENCE POINT (COORDINATE ZERO). THE OPERATION IS AS FOLLOWS:  SET THE MODE SWITCH TO ZRTRN, PUSH THIS BUTTOM.  THE TRAVEL SPEED WILL REFER TO RAPID TRAVERSE SWITCH NOTICE: IF START POSITION FOR REFERENCE POINT RETURN IS LOCATED WITHIN 50mm (2 inch) FROM THE REFERENCE POINT (DECELERATION RANGE) THE AXIS WILL GOES REVERSE DIRECTION UNTIL PROPER DISTANCE.
30 	OVERRIDE CANCEL  PUSH TO RESET THE FEEDRATE TO 100%, AND IGNORE THE SETTING FROM OVERRIDE SELECT SWITCH. NOTICE: PUSH THIS BUTTON MAY CAUSE THE SUDDEN CHANGE OF THE CUTTING FEED.
31 	MENU CHANGE THE SCREEN MENU TO "SOFTKEY SELECTION" THERE SOME FUNCTIONS ARRENGED ON THE SCREEN MENU: A. MANUAL ABS.: THERE ARE TWO KIND OF COORADINATE SYSTEM , ABSOLUTE AND INCREMENTAL, USE THIS SOFT KEY TO EXCHANGE. B. AUTO POWER OFF: PUSH THIS BUTTOM AND AFTER PROGRAM READS M30, THE MACHINE WILL SHOOT DOWN THE MAIN POWER AUTOMATICLLY (OPTION FUNCTION) C. PROGRAM RESTART: PUSH THIS BUTTON AND WHEN TOOL BROKE DURING RUNS A PROGRAM, YOU DON'T HAVE TO START THE PROGRAM FROM THE BEGINNING. FOR DETAIL OPERATION, REFER TO THE CONTROL SYSTEM OPERATOR'S MANUAL. (FANUC OPERATOR'S MANUAL 4.4 PROGRAM RESTART) (OPTION FUNCTION)

32 	TOOL CHANGE PUSH THIS BUTTON TO EXECUTE TOOL CHANGE (OPTION) . Z AXIS MUST IN TOOL CHANGE POSITION.	
33 	COOLANT THROUGH SPINDLE ON/OFF PUSH TO START COOLANT THROUGH SPINDLE, PUSH AGAIN TO STOP.	
34 	CHIP FLASH ON/OFF PUSH TO START CHIP FLASH, PUSH AGAIN TO STOP.	
35 	COOLANT ON / OFF PUSH TO START COOLANT, PUSH AGAIN TO STOP. PRIORITY IS GIVEN TO THE SETTING OF THE SWITCHES OVER M FUNCTION SUCH AS M08 (COOLANT ON) AND M09 (COOLANT OFF).	
36  MO3 SPINDLE ON CLOCKWISE	37  SPINDLE STOP	38  MO4 SPINDLE ON COUNTERCLOCKWISE
TO START OR STOP THE SPINDLE IN RAPID, JOG OR HANDLE MANUAL OPERATION MODE, THESE SWITCHES ARE USED. A. SET THE MODE SELECT SWITCH TO MDI POSITION AND SET SPINDLE SPEED IN MDI OPERATION AS FOLLOW.. IN FANUC 0i CONTRAL KEYIN SXXXX THEN "INPUT" PUSH (2) CYCLE START TO EXECUTE IN FANUC 18iMC CONTROL KEYIN SXXXX; PUSH (2) CYCLE START TO EXECUTE B. SELECT THE DESIRED MODE AMONG RAPID, JOG AND HANDLE MODES BY THE MODE SELECT SWITCH C. PRESS THE PUSH BUTTON SPINDLE CW OR CCW ,THE SPINDLE WILL START RUNNING AT THE SET SPEED AT STEP A. D. THE SPINDLE STOPS WHEN THE PUSH BUTTON SPINDLE OFF IS PRESSED. E. TO START AGAIN, PRESS THE PUSH BUTTON SPINDLE ON THE SPINDLE STARTS RUNNING AT THE SET SPEED AT STEP A. AGAIN. TO CHANGE SPINDLE SPEED REPEAT STEPS A. – E. AFTER SETTING PUSH THE CYCLE START BUTTOM THE SPINDLE		

WILL RUN AT THE NEWLY SET SPEED. NOTE : DOOR MUST CLOSED TO MATCH COMMAND'S SPEED.

F. WHEN DOOR OPEN NEED TO RUN SPINDLE KEEP PRESS PERMISSIVE BUTTON PRESS SP CW OR SP CCW FOR JOG RELEASE TO STOP SPINDLE.

39



OVERRIDE SELECT SWITCH (%)

JOG FEEDRATE SELECT SWITCH (mm / min)

A. THE SELECT SWITCH PERMITS OVERRIDING THE FEED SPEED SPECIFIED BY F CODE IN AUTO OR MDI MODE OPERATION WITHIN A RANGE FROM 0 TO 200% WITH INCREMENT OF 10%.

HOWEVER, THE OVERRIDE SELECTION REMAINS INEFFECTIVE WHEN SWITCH LOCATED OVER THE OVERRIDE SELECT SWITCH IS SET AT CANCEL POSITION. THE OVERRIDE SELECT SWITCH DOES NOT EFFECT THE TAPPING FEED SPEED IN TAPPING CYCLE (G84).

B. THE FEED SPEED CAN BE PRESET BY THIS SELECT SWITCH IN AUTO OR MDI

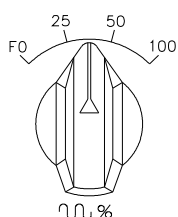
MODE WHEN THE SWITCH DRY RUN  IS SET AT ON.

THE SPEED IS SELECTABLE WITHIN A RANGE FROM

0 TO 3,500 mm / min

40

RAPID TRAVERSE



RAPID OVERRIDE SELECT SWITCH

RAPID SPEED CAN BE OVERRIDDEN BY 100%, 50% 25% F0.

WHEN THE RAPID TRAVERSE SPEED IS AT 20 m / min, AND OVERRIDDEN BY 50%, FOR EXAMPLE, THE SPEED IS REDUCED TO 10 M / min.

F0 IS SET TO 100 mm / min. THE OVERRIDE FUNCTION IS APPLICABLE TO THE FOLLOWING RAPID TRAVERSE.

A. RAPID TRAVERSE IN GOO.

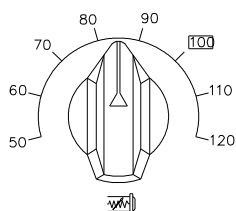
B. RAPID TRAVERSE DURING EXECUTION OF CANNED CYCLE.

C. RAPID TRAVERSE IN G27,28,29.

D. MANUAL RAPID TRAVERSE IN RAPID MODE OPERATION.

41

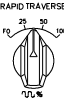
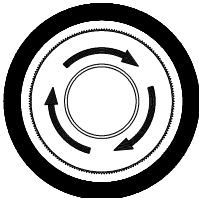
SPINDLE OVERRIDE



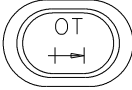
SPINDLE SPEED OVERRIDE SELECT SWITCH

THIS SWITCH CAN OVERRIDDEN THE SPINDLE SPEED FROM 50 % TO 120 % , 10 % PER STEP.

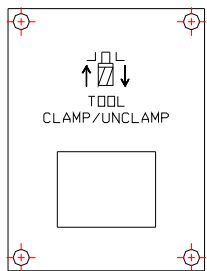
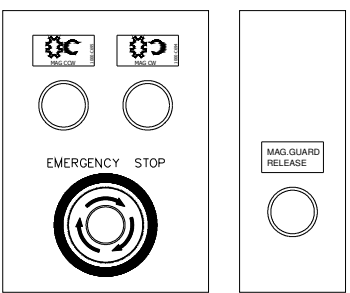
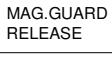
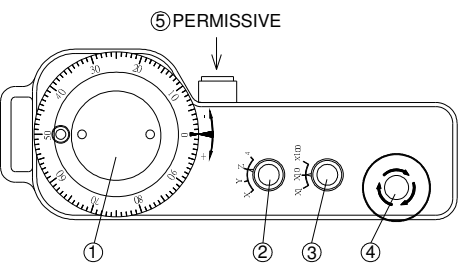
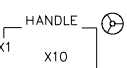
42		MODE SELECT SWITCH USE THIS SWITCH TO CHANGE OPERATION MODE. (CE) BEFORE CHANGE MODE, TURN THE KEY SWITCH TO "MODE ENABLE", TO RELEASE THE CHANGE MODE PROTECTION. AFTER MODE CHANGE, TURN THE KEY BACK TO OFF POSITION.
DESCRIPTION OF MODE SELECT SWITCH		DNC (REMOTE) MODE USE THIS MODE TO RUN THE PROGRAM (MACHINING) FROM YOUR CONNECTED PERSONAL COMPUTER, AND THE OPERATION METHOD DEPENDS ON THE DNC SOFTWARE IN YOUR COMPUTER .
		EDIT MODE THIS MODE IS SELECTED TO STORE PROGRAM IN THE MEMORY AND TO EDIT THE PROGRAM STORED IN THE MEMORY.
		AUTO (MEMORY) MODE THIS MODE IS SELECTED TO EXECUTE THE PROGRAM STORED IN THE MEMORY, OR TO SEARCH THE SEQUENCE NO. OF PROGRAM STORED IN THE MEMORY.
		MDI MODE THIS MODE IS SELECTED WHEN DATA IS MANUALLY ENTERED (KEY IN).
		HANDLE MODE THIS MODE IS SELECTED WHEN USING PULSE GENERATOR HANDWHEEL TO MOVE AXIS MANUALLY THE AXIS SELECTED BY THE AXIS SELECT BUTTON X+ , Y+ , Z+ , IV+ (OR FROM REMOVEABLE HANDWHEEL) AFTER SELECTED THE LAMP OF THE BUTTOM WILL BLINK SCALE MULTIPLE: X1 = 0.001 mm (OR 0.0001 inch IN inch SYSTEM). X10 = 0.01 mm (OR 0.001 inch IN inch SYSTEM). X100 = 0.1 mm (OR 0.01 inch IN inch SYSTEM).
		JOG MODE THIS MODE IS SELECTING TO MANUALLY MOVE COORDINATE IN THE AXIS, SELECTED BY THE AXIS SELECT BUTTOM X+ X- Y+ Y- Z+ Z- A+ A- FOR JOG OPERATION.

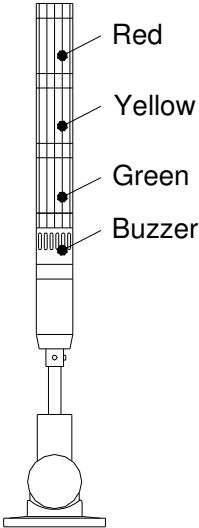
	ZR TN	ZERO RETURN MODE SELECT THIS MODE THEN PUSHING +X  TO MOVE X TO ZERO POINT +Y  TO MOVE Y TO ZERO POINT +Z  TO MOVE Z TO ZERO POINT +IV  TO MOVE IV TO ZERO POINT YOU CAN PUSH 2 OR 3 AXIS TOGETHER OR IN THIS MODE PUSH AUTO ZERO RETURN BUTTON  TO MOVE THREE AXIS TOGRTHHER TO ZERO POINT. THE TRAVEL SPEED WILL REFER TO  RAPID TRAVERSE SWITCH
43	EMERGENCY STOP 	EMERGENCY STOP THE PUSH BUTTON IS USED IMMEDIATELY STOP THE MACHINE OPERATION IN CASE OF EMERGENCY. AT THE SAME TIME AS THE PUSH BUTTON IS PRESSED, THE SERVO SYSTEM OF THE MACHINE IS SHUT OFF THE POWER SOURCE AND THE NC EQUIPMENT IS RESET. TO START THE MACHINE AGAIN AFTER THE EMERGENCY STOP , PROCEED AS FOLLOWS: A. ELIMINATE THE CAUSE OF EMERGENCY STOP AND SET UP THE MACHINE TO BE READY FOR OPERATION. B. WHEN THE EMERGENCY STOP PUSH BUTTON IS PRESSED, THE PUSH BUTTON IS LOCKED. TO RELEASE THE PUSH BUTTON FROM LOCKING, ROTATE OR PULL IT . C. PRESS RESET BUTTON ON THE NC OPERATION PANEL. D. AFTER RESETTING FROM THE EMERGENCY STOP, BE SURE TO PERFORM ZERO RETURN OF ALL AXIS IN MANUAL OPERATION.

44		EDIT OFF MODE ENABLE ON			PROGRAM PROTECT AND MODE ENABLE THERE ARE TWO FUNCTIONS ON THIS PROTECT KEY SWITCH A、PROGRAM EDIT PROTECT FOR PROTECT THE PROGRAM STORED IN THE MEMORY FROM ERRONEOUS OPERATION. THE SWITCH SHOULD NORMALLY SET AT OFF POSITION. WHEN THE SWITCH IS SET AT ON, THE FOLLOWING FUNCTIONS ARE AVAILABLE. ●STORING AND EDITION OF PROGRAM. ●RESETTING OF COORDINATE SYSTEM WHEN THE SWITCH ZERO RETURN IS PRESSED WITH X, Y OR Z AXIS SPECIFIED, THE ABSOLUTE VALUE OF THE CORRESPONDING AXIS TURN TO "O". SETTING OF TOOL POSITION OFFSET, TOOL DIAMETER OFFSET AND TOOL SETTING UP. B、MODE ENABLE WHEN CHANGE MODE SELECT SW (42) MUST ON THEN OFF TO CONFIRM MODE CHANGE.				
45		TOOL NO. INDICATOR THE TWO NUMBER ON THE LEFT SHOWS THE TOOL NUMBER OF STANDBY TOOL POT. THE TWO NUMBER ON THE RIGHT SHOWS THE SPINDLE TOOL NUMBER.							
46		47		48		49		50	
LAMP X Y Z IV AND V AXIS ZERO POSITION THE LAMP INDICATES THAT THE TABLE (X AXIS). SADDLE (Y AXIS) AND SPINDLE HEAD (Z AXIS) ARE AT THE REFERENCE POINT (COORDINATE ZERO). THE LAMP LIGHTS WHEN REFERENCE POINT IS COMPLETED BY MANUAL OPERATION, OR RETURN TO REFERENCE POINT (G28). OR REFERENCE POINT RETURN CHECK (G27). THE LAMP GOES OUT WHEN THE TABLE, SADDLE OR SPINDLE OR SPINDLE HEAD LEAVES THE REFERENCE POINT.									
51		PROGRAMFINISH WHEN PROGRAM EXECUTE M02 OR M30 THIS LAMP LIGHTS							
52		LAMP LOW GEAR INDICATES THE LOW GEAR OF THE SPINDLE (NOT USED ON MCV-600/800/1000)							

53 	LAMP HIGH GEAR INDICATES THE HIGH GEAR OF THE SPINDLE (NOT USED ON MCV-600/800/1000)
54 	LAMP OPTIONAL STOP THE LAMP LIGHTS WHEN THE PROGRAM RUNS TO THE OPTIONAL STOP (M01) OR THE PROGRAM RUNS TO THE END (M00) , .
55 	LAMP LUBRICATION LEVEL (FAILURE) IF AMOUNT OF LUBRICATING OIL DECREASES TO ABOUT ONE FOURTH OF THE LUBRICATING OIL TANK CAPACITY, THE LAMP LIGHTS. SINCE THE MACHINE DOES NOT STOP AUTOMATICALLY WHEN THE LAMP LIGHTS, IMMEDIATELY STOP THE MACHINE AND REPLENISH NECESSARY AMOUNT OF OIL WHEN THE IS FOUND LIGHTING. WHEN THE OIL TANK IS FILLED. THE LAMP GOES OUT.
56 	LAMP OVERLOAD · THE LAMP LIGHTS IF OVERLOAD OCCURS WITH THE COOLANT PUMP, LUBRICATION PUMP OR ATC MAGAZINE DRIVE MOTOR. SINCE THE MACHINE DOES NOT STOP AUTOMATICALLY WHEN THE LAMP LIGHTS, STOP THE MACHINE IMMEDIATELY AND EXAMINE THE THERMAL RELAYS FOR CAUSE IF THE LAMP LIGHTS. TO RESUME THE OPERATION, ELIMINATE THE CAUSE OF THE OVERLOAD.
57 	LAMP AIR PRESSURE (FAILURE) THE LAMP LIGHTS IF COMPRESSED AIR PRESSURE GOES DOWN BELOW 4 bar . THE ALARM BUZZER ALSO SOUNDS AND TOOL CHANGE BECOMES IMPOSSIBLE WHEN THIS LAMP LIGHTS. WHEN THE LAMP LIGHTS, STOP THE MACHINE OPERATION, CHECK AIR PRESSURE IN THE PNEUMATIC UNIT THROUGH PRESSURE GAUGE AND AIR PRESSURE TO 5.5 bar .THEN PRESS CYCLE START TO CANCEL ALM.
58 	LAMP NC ALARM WHEN GENERATE SEQUENCE ERROR, THIS LAMP LIGHTS
59 	OT DETECT WHEN X, Y, Z OR 4TH AXIS DETECT THE HARDWARE OVERTRAVEL THIS LAMP LIGHTS
60 	EMERGENCY STOP IN EMERGENCY STOP STATUS, THIS LAMP LIGHTS.

5.5 OTHER SWITCHES AND SIGNAL

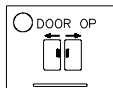
	TOOL CLAMP / UNCLAMP INFRONT OF THE SPINDLE, IN MANUAL MODE, PUSH TO UNCLAMP TOOL, RELEASE TO CLAMP. (IN DOOR OPEN STATUS)
 24/32T TOOL CHANGE SWITCH BOX	24/32 TOOL CHANGE SWITCH BOX (OPTION) THIS SWITCH BOX LOCATED ON THE LEFT BACK OF THE MACHINE. THIS SWITCH BOX AND A TOOL CHANGE WINDOW BESIDE PROVIDE YOU TO LOAD OR UNLOAD TOOLS FROM HERE.  TOOL MAGAZINE TURNS COUNTER CLOCKWISE.  TOOL MAGAZINE TURNS CLOCKWISE.  EMERGENCY STOP (FUNCTION AS ON OPERATER PANEL)  MAGAZINE GUARD RELEASE (CE). TO OPEN MAGAZNE GUARD (WINDOW): • IN MANUAL MODE • KEEP PUSH THIS BUTTON, AND OPEN GUARD. • RELEASE BUTTON. (NOW THE NC IS IN SERVO OFF STATUS)
	REMOVEABLE HANDWHEEL (OPTION) THIS HANDWHEEL ONLY EFFECTIVE IN  MODE 1. HANDWHEEL: FUNCTION AS ON PANEL. 2. AXIS SELECT SWITCH: TO SELECT AXIS, HAS HIGER PRIORITY FUNCTION AS     , IN MANUAL MODE FOR AXIS SELECT.

	3. HANDWHEEL SCALE MULTIPLE HAS HIGHER PRIORITY FUNCTION AS 4. EMERGENCY STOP FUNCTION AS ON OPERATION PANEL. 5. PERMISSIVE BUTTON. (CE) FOR OPERATION IN DOOR OPEN STATUS.
PER -MISSIVE	PERMISSIVE BUTTON (CE) ON OPERATION PANEL FOR OPERATION IN DOOR OPEN STATUS.
	SIGNAL LIGHT AND BUZZER A. RED (BLANKING): ALARM SIGNAL (SUCH AS OVER LOAD, LUBRICATION LOW, AIR LOW, NC ALARM, BATTERY ALARM) ELIMINATE ALARM TO CUT SIGNAL. B. YELLOW (BLANKING): PROGRAM END (M00/M01/M30) PUSH  FEED HOLD SWITCH TO CUT SIGNAL. C. GREEN (BLANKING): PROGRAM EXECUTING. D. BUZZER: WHEN ALARM ACCRUES THE BUZZER SOUNDS. TO CUT OF THE BUZZER, JUST PUSH  FEED HOLD SWITCH.

5.6 OPERATE IN DOOR OPEN STATUS

5.6.1 OPERATE IN DOOR OPEN STATUS WITH NON CE DOOR INTERLOCK SWITCH (OPTION)

- A. WHEN NON CE DOOR INTERLOCK SWITCH IS MOUNTED, PRESS THIS KEY



TO RELEASE DOOR INTERLOCK.

- B. RELEASE DOOR INTERLOCK IN ANY MODE.
- C. CAN OPERATE ONLY IN JOG AND HANDWHEEL MODE WHEN DOOR OPENED
- D. DUE TO SAFETY REASON, WHILE DOOR OPEN THE MACHINE CAN ONLY OPERATE IN FOLLOWING STATUS.
- a. SPINDLE SPEED UNDER 50/min
 - b. CAN OPERATE ONLY IN JOG AND HANDWHEEL MODE.
 - c. AXIS FEED RATE UNDER 2000mm/min.
- E. CLOSE DOOR TO RESUME SYSTEM.

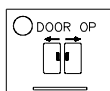
5.6.2 OPERATE IN DOOR OPEN STATUS WITH CE DOOR INTERLOCK SWITCH (OPTION)

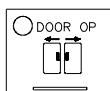
- A. CONDITION IN DOOR OPEN STATUS

DUE TO CE REGULATION AND SAFETY REASON, WHILE DOOR OPEN THE MACHINE CAN ONLY OPERATE IN FOLLOWING STATUS.

- a. SPINDLE SPEED UNDER 50 /min.
- b. CAN OPERATE ONLY IN JOG AND HANDWHEEL MODE.
- c. AXIS FEEDRATE UNDER 2000 mm/min

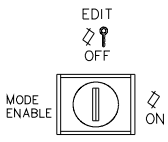
- B. HOW TO OPERATE IN DOOR OPEN STATUS

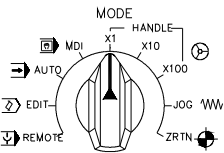


- a. PUSH DOOR OPEN  BUTTON.
- b. AFTER ENABLE THIS BUTTON, THE LAMP IN THE BUTTON LIGHTS.

NOTICE: ONCE YOU PUSH THIS BUTTON, YOU MUST EXECUTE OPEN AND CLOSE DOOR PROCEDURE TO RESUME THE SYSTEM.

- c. OPEN THE DOOR.
 - d. CLOSE DOOR TO RESUME SYSTEM.
- C. MOVE THE AXIS OR TURN THE SPINDLE IN MANUAL MODE.

- a. SWITCH KEY  TO MODE ENABLE.

- b. SWITCH MODE  TO "MANUAL" (HANDLE, JOG.)

NOTE: MAKE SURE NOW MAGAZINE ON INITIAL POSITION.

- c. BEFORE ANY MOVEMENT, KEEP PUSHING THE PERMISSIVE

BOTTON 

- FOR MACHINE WITH REMOVEABLE HANDWHEEL, THE BUTTON IS ON THE SIDE OF THE HANDWHEEL.
 - FOR MACHINE WITHOUT REMOVEABLE HANDWHEEL, THIS BUTTON IS ON THE OPERATION PANEL.
- d. DURING ANY MOVEMENT, YOU MEST KEEP PUSHING PERMISSIVE BUTTON TO ENABLE THE MOVEMENT.

NOTICE: DON'T RELEASE THE PERMISSIVE BUTTONS BEFORE STOP THE MOVEMENT. IT WILL CAUSE THE FAILURE OF THE MOVEMENT.

5.7 WHEN TOOL CHANGE MOVEMENT IS INTERRUPTED BY EMERGENCY STOP OR RESET

5.7.1 10/16 TOOLS ATC (UMBRELLA TYPE)

- A. THE ATC MAGAZINE AND SPINDLE TAKES FOLLOWING CONDITIONS WHEN TOOL CHANGE MOVEMENT INTERRUPTED BY EMERGENCY STOP OR RESET.
 - a. ATC MAGAZINE KEEPS THE POSITION WHEN EACH MOVEMENT OF ATC MAGAZINE HAS COMPLETED.
 - b. THE ATC MAGAZINE ROTATING MOVEMENT JUST STOPS THE POSITION WHEN EMERGENCY STOP OR RESET GENERATES.
 - c. THE SPINDLE TAKES CLAMP CONDITION DURING THE ATC MAGAZINE IS MOVING ON FORWARD - BACK SPACE.
 - d. THE SPINDLE TAKES UNCLAMP CONDITION DURING THE Z AXES IS MOVING ON UP - DOWN SPACE.
 - e. THE SPINDLE ORIENTATION MOVEMENT IS JUST STOPPED THE POSITION WHEN EMERGENCY STOP OR RESET GENERATES.

◆ HOW TO MAKE RESTART IN CASE OF (b)

- a. ELIMINATE THE CAUSE OF EMERGENCY STOP STATUS OR RESET AND SET UP THE MACHINE TO BE READY FOR OPERATION.
- b. WHEN THE ATC MAGAZINE DID NOT STOP AT INDEXING POINT, IN

ZRTN MODE, PRESS  MAGAZINE TURN CLOCKWISE KEY

AND  CYCLE START KEY TOGETHER, MAGAZINE WILL GO TO POCKET 1 (MAGAZINE REFERENCE POSITION) AUTOMATICALLY.

- c. CHECK SPINDLE CLAMP SWITCH BEING ON CLAMP CONDITION.
- d. WHEN MAGAZINE ON MIDDLE OF STROKE SETTING KEEP RELAY K7.0=1(MAINTENANCE MODE)

【MAGAZINE BACKWARD】

PRESS  TO MOVE BACK

MAGAZINE TO INITIAL POSITION.

- e. PRESS POWER OFF BUTTON ON THE NC OPERATION PANEL. THEN, PRESS THE POWER ON BUTTON.
- f. PERFORM REFERENCE POINT RETURN OF ALL AXES IN MANUAL OPERATION. (ATC REFERENCE ALSO)

5.7.2 24 TOOLS ATC (ARM TYPE)

- A. THE TOOL CHANGER ARM IS IN POSITION
 - a. ELIMINATE THE CAUSE OF EMERGENCY STOP AND SET UP THE MACHINE TO BE READY FOR OPERATION.
 - b. PRESS POWER OFF BUTTON ON THE NC OPERATION PANEL. THEN, PRESS THE POWER ON BUTTON.
 - c. PERFORM ZERO RETURN OF ALL AXES IN MANUAL OPERATION.

- B. THE TOOL CHANGER ARM IS NOT IN POSITION
 - a. ELIMINATE THE CAUSE OF EMERGENCY STOP
 - b. ROTATE THE ARM MANUALLY (USE ALLEN KEY) FROM THE MOTOR UPON TOOL CHANGER , UNTIL

0iM	18iMB/21iMA
X10.2	X24.2
X10.3	X24.3
X10.1	X24.1

- C. SET UP THE MACHINE TO BE READY FOR OPERATION.
- D. CHECK IF THE TOOL POT NUMBER AND TOOL NUMBER IS CORRECT.
CHECK G.DATA SETTING
PLEASE REFER TO "PARAMETER LIST " DATA TABLE SETTING"
FOR THE CORRECT G.DATA SETTING.

- E. IF TOOL NUMBER IS NOT CORRECT REFER TO CHAPTER 7 TROUBLESHOOTING, FOR ATC

WARNING ! ONLY AUTHORIZED PERSON CAN DO THE OPERATION ABOVE. AND WHEN DOING THE OPERATION BE WARE NOT TO MOVE THE MACHINE. TO PREVENT FROM DANGEROUS PUSH EMERGENCY STOP BEFORE OPERATION.

WARNING ! PLEASE ALWAYS CHECK THE TOOL TABLE G. DATA SETTING SHOULD BE CORRECT BEFORE AUTOMATIC MACHINING .
WRONG TOOL TABLE MAY CAUSE INCORRECT TOOL CHANGE AND CRUSH THE MACHINE.

5.8 WHEN INSTALL OR REMOVE THE TOOL MANUALLY

TO MANUALLY INSTALL OR REMOVE THE TOOL FROM / TO SPINDLE
PROCEED AS FOLLOWS:

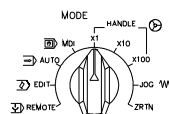
A. INSTALLATION OF TOOL

- a. STOP THE SPINDLE AND COORDINATE DISPLACEMENT IN EACH AXIS.

- b. DOOR OPEN



- c. SET THE MODE SELECT SWITCH TO HANDLE POSITION, MAKE SURE THAT THE SPINDLE TAPER BORE AND THE TOOL TAPER ARE CLEAN..



- d. MAKE SURE THAT THE SPINDLE TAPER BORE AND THE TOOL TAPER ARE CLEAN.



- e. PRESS THE UNCLAMP SWITCH CLAMP/UNCLAMP .
- f. INSERT THE TOOL INTO THE SPINDLE TAPER BORE.
- g. WHEN THE TOOL IS SECURELY SET UP IN THE SPINDLE, PRESS THE UNCLAMP SWITCH, NOW THE SPINDLE HAS BEEN CLAMPED IN THE SPINDLE.
- h. AFTER MAKING SURE THE TOOL HAS BEEN SET UP IN THE SPINDLE, RELEASE HAND FROM THE TOOL.

NOTICE: AT STEP C), AIR BLOW OUT TO REMOVE FINE METALLIC PARTICLES AND DUST FROM THE TOOL TAPER AND THE SPINDLE TAPER BORE, WHEN THE UNCLAMP SWITCH IS PRESSED. CARE SHOULD BE TAKEN TO SECURELY HOLD THE TOOL TO PREVENT BLOWING OFF OF THE TOOL

B. REMOVAL OF TOOL

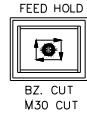
- a. PERFORM STEPS a) AND b) INSTRUCTED ABOVE.
- b. PRESS THE UNCLAMP SWITCH THE PULL STUD WILL BE PRESSED AND THE TOOL SINKS BY APPROXIMATELY 0.5 mm (0.02 inch).
- c. REMOVE THE TOOL.
- d. PRESS THE UNCLAMP SWITCH.

NOTICE: SINCE THE TOOL GOES DOWN AT STEP b), AND IS SUBJECTED TO THE AIR BLOW PRESSURE, SECURELY HOLD THE TOOL BY HAND. WHEN THE TOOL IS REMOVED, BE SURE TO REMOTELY LOCATE THE SPINDLE HEAD (Z AXIS) TO PREVENT CONTACT OF THE TOOL WITH THE WORK OR TABLE.

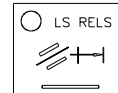
5.9 .WHEN OVERTRAVEL IS DETECTED BY 2ND LIMIT SWITCH.

TO RESET FROM THE ALARM STATUS, OPERATE SWITCHES AS FOLLOWS:

- A. STOP THE BUZZER BY OPERATING THE BUZZER STOP SWITCH



- B. PRESS THE 2ND LS REMOVE SWITCH



- C. THE SWITCH (PUSH BUTTON) SHOULD BE HELD DOWN UNTIL THE RESETTING IS COMPLETED. WHEN 2ND LS REMOVE SWITCH IS PRESSED, THE POWER SOURCE IS GIVEN TO THE MACHINE.
- D. SET THE AXIS IN WHICH OVER TRAVEL OCCURRED AND THEN PRESS THE MANUAL FEED SWITCH OF THE DIRECTION ("+" OR "-") REVERSE TO THE OVER-TRAVEL DIRECTION. THE COORDINATE SHOULD BE DISPLACED AT LEAST 50 mm (2 inch) FROM STOPPED POSITION.
- E. PRESS RESET BUTTON ON THE NC OPERATION PANEL TO CLEAR THE ALARM CONDITION. NOW THE MACHINE HAS BEEN RELEASED FROM THE ALARM (EMERGENCY STOP) CONDITION. IF IT IS PRESUMABLE THAT OPERATION MAY BECOME OUT OF CONTROL AGAIN WHEN THE 2ND LS REMOVE SWITCH IS PRESSED AT STEP B), CONSULT, WITH OUR SERVICE ENGINEER.
- F. NOTE: BEFORE TURNING ON THE POWER SOURCE, PERFORM REFERENCE POINT RETURN IN MANUAL OPERATION IN ALL AXES.
- G. IF THE COORDINATE IS DISPLACED TO THE STROKE END IN - DIRECTION WITHOUT PERFORMING REFERENCE POINT RETURN, IT MAY NOT BE DETECTED AT THE STORED STROKE END (1ST STAGE), BUT DETECTED BY THE 2ND LIMIT SWITCH CAUSING STOP TO THE MACHINE. THEREFORE, IF EMERGENCY STOP OCCURS, IDENTIFY THE CAUSE OF EMERGENCY STOP (WHETHER IT IS CAUSED BY FAILURE OF REFERENCE POINT RETURN, OR BY OTHER TROUBLE).
- H. WHEN THE EMERGENCY STOP IS DUE TO FAILURE OF REFERENCE POINT RETURN, OPERATE THE 2ND LS REMOVE SWITCH TO RELEASE THE MACHINE FOR EMERGENCY STOP CONDITION AND THEN RESUME USUAL OPERATION.

5.10 FANUC OPERATION PANEL

5.10.1 MD1 KEYBOARD AND CRT

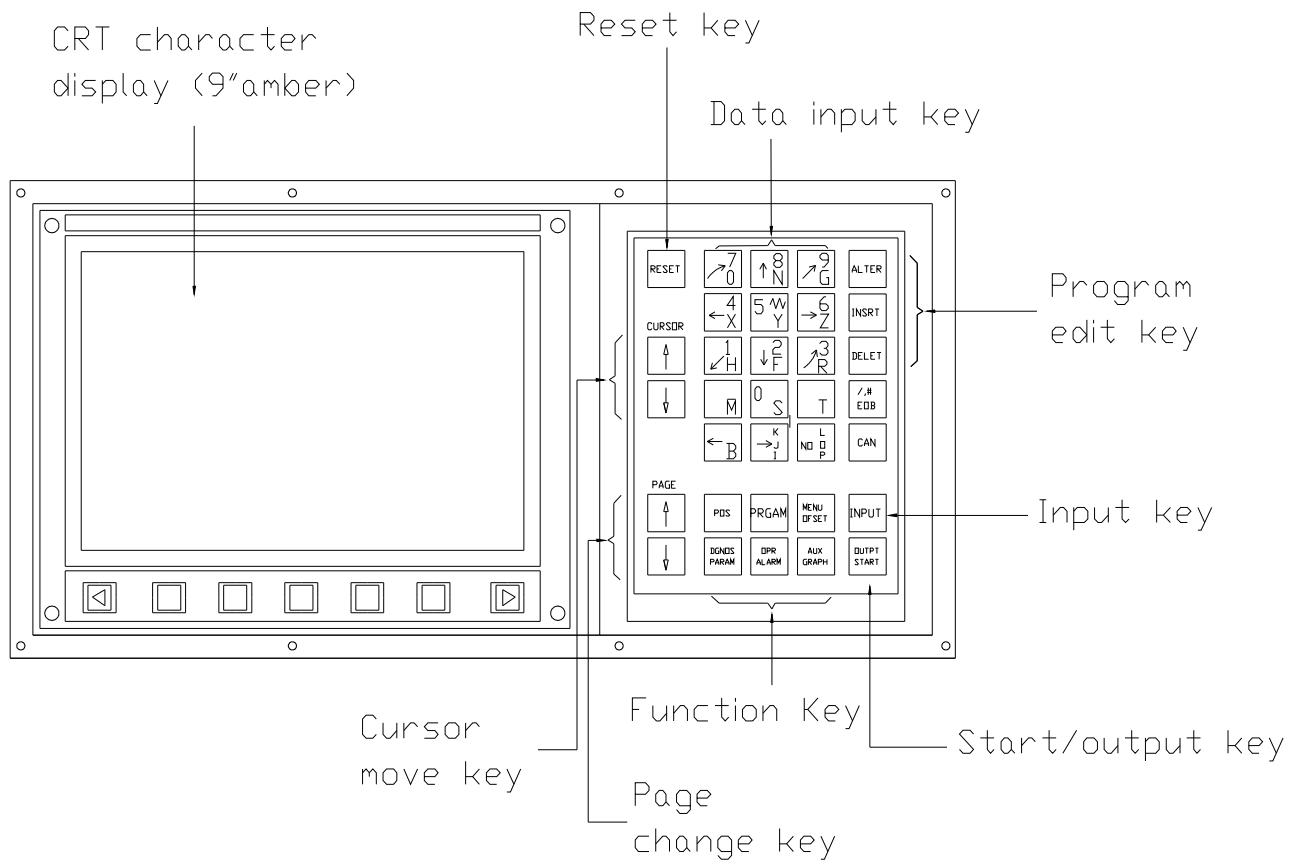


FIG. 5.9 MDI KEYBOARD

FOR MORE INFORMATION PLEASE REFER TO FANUC OPERATOR'S MANUAL

5.10.2 LIST OF OPERATION

CLASSIFICATION	FUNCTION	KEY SWITCH	SETTING PWE=1	MODE SWITCH BUTTON	FUNCTION BUTTON	OPERATION
CLEAR	MEMORY ALL CLEAR			POWER ON	—	[RESET] AND [DELETE]
	PARAMETER AND OFFSET		○	POWER ON	—	[RESET]
	CLEARING STORED PROGRAM		○	POWER ON	—	[DELETE]
RESET	RUN TIME			—	—	[R/3] → [CAN]
	PARTS NUMBER			—	—	[P/Q] → [CAN]
	OT ALARM			POWER ON	—	[P/Q] AND [CAN]
DATA INPUT FROM MDI	PARAMETER			MDI	PARAM	[P/Q] → PARAM. NO. → [INPUT] → [DATA] → [INPUT] → PWE=0 → [RESET]
	OFFSET VALUE		○	—	OFFSET	[P/Q] → OFFSET NO. → [INPUT] → OFFSET DATA → [INPUT]
	SETTING DATA			MDI	PARAM	[P/Q] → 0 → [INPUT] → DATA → [INPUT]
	PMC PARAMETER	○			DGNOS	[P/Q] → DIAGRAM NO. → [INPUT] → DATA → [INPUT]
	TOOL LENGTH MEASUREMENT			JOG	POS OFFSET	[POS] (RELATIVE) → [Z] → [CAN] → [OFFSET] → MOVE TOOL TO MEASURING POSITION →
						[P / Q] → OFFSET NO. → [EOB] AND [Z] → [INPUT]
DATA INPUT FROM TAPE	PARAMETER (TAPE TO MEMORY)		○	EDIT	PARAM	[INPUT]
	OFFSET VALUE	○		EDIT	OFFSET	[INPUT]
	PROGRAM INPUT			EDIT / AUTO	PRGRM	[INPUT]
TAPE PUNCH	PARAMETER			EDIT	PARAM	[START]
	OFFSET VALUE			EDIT	OFFSET	[START]

	ALL PROGRAM			EDIT	PRGRM	[0] → -999 → [START]
	ONE PROGRAM			EDIT	PRGRM	[0] → PROGRAM NO. → [START]
SEARCH	PROGRAM NO. SEARCH			EDIT / AUTO	PRGRM	→ [0] PROGRAM NO. → [↓] (CURSOR)
	SEQUENCE NUMBER SEARCH			AUTO	PRGRM	PROGRAM NO. SEARCH → [N] → SEQUENCE NO. → [↓] (CURSOR)
	ADDRESS WORD SEARCH			EDIT	PRGRM	SEARCHING ADDRESS AND DATA INPUT → [↓] (CURSOR)
	OFFSET NO.			—	OFFSET	[P/Q] → OFFSET NO. → [INPUT]
PROGRAM EDITING	PROGRAM MEMORY USED			EDIT	PRGRM	[P] → [INPUT]
	DELETION OF ALL PROGRAM	○		EDIT	PRGRM	[0] → [9999] → [DELETE]
	DELETION OF A PROGRAM	○		EDIT	PRGRM	[0] → PROGRAM NO. → [DELETE]
	DELETION OF SEVERAL BLOCKS	○		EDIT	PRGRM	[N] → SEQUENCE NO. → [DELETE]
	DELETION OF A BLOCKS			EDIT	PRGRM	[EOB] → [DELETE]
	DELETION OF A WORD	○		EDIT	PRGRM	SEARCH THE WORD TO BE DELETED → [DELETE]
	ALTERNATION OF A WORD	○		EDIT	PRGRM	SEARCH THE WORD TO BE ALTERED → NEW DATA → [ALTER]
	INSERTION OF A WORD	○		EDIT / AUTO	PRGRM	SEARCH THE WORD TO BE INSERTED → NEW DATA → [INSERT]
COLLATION	COLLATION IN MEMORY WITH TAPE			EDIT / AUTO	PRGRM	[INPUT]
INPUT / OUTPUT WITH FANUC CASSETTE	PROGRAM INPUT	○		EDIT / AUTO	PRGRM	[N] → FILE NO. → [INPUT] → [INPUT]
	OUTPUT ALL PROGRAM			EDIT	PRGRM	[0] → -9999 → [START]
	OUTPUT ONE PROGRAM			EDIT	PRGRM	[0] → PROGRAM NO. → [INPUT]

	SEARCHING FOR A HEAD OF A FILE			EDIT / AUTO	PRGRM	[N] → FILE NO. , -9999 OR - 9998 → [INPUT]
	DELETION OF FILE	○		EDIT	PRGRM	[N] → FILE NO. → [START]
	COLLATION OF PROGRAM			EDIT / AUTO	PRGRM	[N] → FILE NO. → [INPUT] → [INPUT]
PLAYBACK				TEACHIN JOG / HANDLE	PRGRM	MOVE MACHINE → [X], [Y] OR [Z] → [INSERT] → NC DATA [INSERT] → [EOB] → [INSERT]

FOR MORE INFORMATION PLEASE REFER TO FANUC OPERATOR'S
MANUAL

5.10.3 MDI KEYBOARD FUNCTIONS

NO.	NAME	FUNCTION
1	RESET KEY	PRESS THIS KEY TO RESET THE CNC, TO CANCEL AN ALARM, ETC.
2	START	PRESS THIS KEY TO START THE MDI COMMENDS, OR TO START THE AUTOMATIC OPERATION CYCLE.
3	ADDRESS AND NUMERICAL KEY	PRESS THIS KEYS TO INPUT ALPHABETIC, NUMERIC, AND OTHER CHARACTER.
4	INPUT KEY	WHEN AN ADDRESS OR A NUMERICAL KEY IS PRESSED, THE ALPHABET OR THE NUMERAL IS INPUT ONCE TO THE KEY INPUT BUFFER, AND IT IS DISPLAYED ON THE CRT SCREEN. TO SET THE DATA INPUT TO THE KEY INPUT BUFFER IN THE OFFSET REGISTER, ETC. , PRESS THE INPUT KEY. THIS KEY IS EQUIVALENT TO THE INPUT KEY OF THE SOFT KEYS, SO THE SAME RESULTS CAN BE OBTAINED BY PRESSING EITHER OF THEM.
5	CANCEL (CAN) KEY	PRESS THIS KEY TO CANCEL CHARACTER OR SIGN. (EXAMPLE) WHEN THE KEY INPUT BUFFER DISPLAY N0001, N0001 IS CANCELED WITH THIS KEY.
6	CURSOR SHIFT KEYS	THERE ARE TWO KINDS OF CURSOR SHIFT KEY DESCRIBED BELOW : ↑ : THIS KEY IS USED TO SHIFT THE CURSOR A SHOUT DISTANCE IN THE FORWARD DIRECTION. ↓ : THIS KEY IS USED TO SHIFT THE CURSOR A SHOUT DISTANCE IN THE REVERSE DIRECTION.
7	PAGE CHANGEOVER KEY	TWO KINDS OF PAGE CHANGEOVER KEYS ARE DESCRIBED BELOW : ↑ : THIS KEY IS USED TO CHANGEOVER THE PAGE ON THE CRT SCREEN IN THE FORWARD DIRECTION. ↓ : THIS KEY IS USED TO CHANGEOVER THE PAGE ON THE CRT SCREEN IN THE REVERSE DIRECTION.

8	SOFT KEYS	THE SOFT KEY HAVE VARIOUS FUNCTIONS, ACCORDING TO THE APPLICATIONS. THE SOFT KEY FUNCTIONS ARE DISPLAYED AT THE BOTTOM OF THE CRT SCREEN. LEFT-END SOFT KEY ← THIS KEY IS USED IN ODDER TO EXIT TO THE INITIAL STATES (CONDITION WHEN THE FUNCTION BUTTON IS DEPRESSED WHEN EACH FEATURE HAS BEEN OPERATED VIA SOFT KEYS) RIGHT-END SOFT KEY → THIS KEY IS USED WHEN OPERATE FUNCTIONS WHICH HAVE NOT YET BEEN DISPLAYED.
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5.11 M CODE LIST

M CODE	FUNCTION	DESCRIPTION	NOTE
M00	PROGRAM STOP	TO STOP THE PROGRAM (FEED HOLD). PUSH CYCLE START TO CONTINUE THE PROGRAM	
M01	OPTIONAL STOP	USE TOGETHER WITH THE OPTIONAL STOP BUTTON ON OPERATION PANEL TO HOLD THE PROGRAM (AS M00) PUSH CYCLE START TO CONTINUE THE PROGRAM	
M02	END OF PROGRAM	USED IN THE END OF PROGRAM AS FINISH. (THE CURSOR STAY IN THE END) USE M30 TO END THE PROGRAM AND MOVE THE CURSOR TO THE BEGINNING OF THE PROGRAM	
M03	SPINDLE CW	TURN ON THE SPINDLE CLOCKWISE	
M04	SPINDLE CCW	TURN ON THE SPINDLE COUNTERCLOCKWISE	
M05	SPINDLE STOP	STOP THE SPINDLE	
M06	AUTO TOOL CHANGE	CHANGE THE PREPARED TOOL AUTOMATICALLY	
M07	PARTS COUNT	PARTS COUNT	
M08	COOLANT PUMP ON	TURN ON THE COOLANT PUMP	
M09	COOLANT PUMP STOP	TURN OFF THE COOLANT PUMP	
M13	SPINDLE CW / COOLANT PUMP ON	TURN ON THE SPINDLE CLOCKWISE AND COOLANT PUMP	
M14	SPINDLE CCW / COOLANT PUMP ON	TURN ON THE SPINDLE COUNTERCLOCKWISE AND COOLANT PUMP	
M15	SPINDLE STOP / COOLANT PUMP OFF	STOP SPINDLE AND COOLANT PUMP	
M16	SPECIAL TOOL ASSIGNMENT	ASSIGN SPECIAL TOOL ON FIXING POT.	(OPTION)
M17	GUARD DOOR OPEN	GUARD DOOR OPEN	(OPTION)
M18	GUARD DOOR CLOSE	GUARD DOOR CLOSE	(OPTION)
M19	SPINDLE ORIENTATION	SPINDLE ORIENTATION FOR TOOL CHANGE	
M20	SPINDLE ORIENTATION RESET	RESET SPINDLE ORIENTATION	

M CODE	FUNCTION	DESCRIPTION	NOTE
M27	SKIP SIGNAL SWITCHING ON	SKIP SIGNAL SWITCHING ON	(OPTION)
M28	SKIP SIGNAL SWITCHING OFF	SKIP SIGNAL SWITCHING OFF	(OPTION)
M29	RIGID TAPPING	RIGID TAPPING MODE	
M30	PROGRAM END	USED IN THE END OF PROGRAM AS FINISH. (THE CURSOR MOVE TO THE BEGINNING OF THE PROGRAM) REFER TO M02 TO STAY THE CURSOR IN THE END.	
M31	MIRROR IMAGE X AXIS	TURN ON THE X AXIS MIRROR IMAGE FUNCTION	
M32	T MIRROR IMAGE Y AXIS	TURN ON THE Y AXIS MIRROR IMAGE FUNCTION	
M33	MIRROR IMAGE OFF	TURN OFF THE MIRROR IMAGE FUNCTION	
M36	AIR BLOW THROUGH SPINDLE ON	TURN ON AIR BLOW THROUGH SPINDLE	(OPTION)
M37	AIR BLOW THROUGH SPINDLE OFF	TURN OFF AIR BLOW THROUGH SPINDLE	(OPTION)
M38	SHOWER COOLANT ON	TURN ON THE SHOWER COOLANT	(OPTION)
M39	SHOWER COOLANT OFF	TURN OFF THE SHOWER COOLANT	(OPTION)
M40	SPINDLE CW / SHOWER COOLANT ON	TURN ON THE SPINDLE CLOCKWISE AND SHOWER COOLANT	(OPTION)
M41	SPINDLE CCW / SHOWER COOLANT ON	TURN ON THE SPINDLE COUNTERCLOCKWISE AND SHOWER COOLANT	(OPTION)
M42	SPINDLE STOP / SHOWER COOLANT OFF	STOP SPINDLE AND SHOWER COOLANT	(OPTION)
M43	COOLANT THROUGH SPINDLE ON	TURN ON THE COOLANT THROUGH SPINDLE SYSTEM	(OPTION)
M44	COOLANT THROUGH SPINDLE OFF	TURN OFF THE COOLANT THROUGH SPINDLE SYSTEM	(OPTION)
M45	SPINDLE CW / COOLANT THROUGH SPINDLE ON	TURN ON THE SPINDLE CLOCKWISE AND COOLANT THROUGH SPINDLE SYSTEM	(OPTION)
M46	SPINDLE CCW / COOLANT THROUGH SPINDLE ON	TURN ON THE SPINDLE COUNTERCLOCKWISE AND COOLANT THROUGH SPINDLE SYSTEM	(OPTION)
M47	SPINDLE STOP / COOLANT THROUGH SPINDLE OFF	STOP SPINDLE AND COOLANT THROUGH SPINDLE SYSTEM	(OPTION)
M48	CHIP FLUSH PUMP 1 ON	TURN ON THE CHIP FLUSH PUMP 1	

M CODE	FUNCTION	DESCRIPTION	NOTE
M49	CHIP FLUSH PUMP 1 OFF	TURN OFF THE CHIP FLUSH PUMP 1	
M50	SPINDLE CW / CHIP FLUSH PUMP 1 ON	TURN ON THE SPINDLE CLOCKWISE AND CHIP FLUSH PUMP 1	
M51	SPINDLE CCW / CHIP FLUSH PUMP 1 ON	TURN ON THE SPINDLE COUNTERCLOCKWISE AND CHIP FLUSH PUMP 1	
M52	SPINDLE STOP / CHIP FLUSH PUMP 1 OFF	STOP SPIDLE AND CHIP FLUSH PUMP 1	
M53	EXTERNAL AIR BLAST ON	TURN ON THE EXTERNAL AIR BLAST	(OPTION)
M54	EXTERNAL AIR BLAST OFF	STOP THE EXTERNAL AIR BLAST	(OPTION)
M55	SPINDLE CW / EXTERNAL BLAST ON	TURN ON THE SPINDLE CW AND EXTERNAL AIR BLAST	(OPTION)
M56	SPINDLE CCW / EXTERNAL BLAST ON	TURN ON THE SPINDLE CCW AND EXTERNAL AIR BLAST	(OPTION)
M57	SPINDLE STOP / EXTERNAL BLAST OFF	TURN OFF SPINDLE AND THE EXTERNAL AIR BLAST	(OPTION)
M58	CHIP CONVEYOR FORWARD	TURN ON THE CHIP CONVEYOR	(OPTION)
M59	CHIP CONVEYOR STOP	TURN OFF THE CHIP CONVEYOR	(OPTION)
M60	AUTO PALLET CHANGE	CHANGE PALLET	(OPTION)
M61	TOOL CHANGE / SPECIAL TOOL ASSIGNMENT	TOOL CHANGE FOR ASSIGNMENT OF SPECIAL TOOL	(OPTION)
M66	OIL MIST ON	TURN ON THE OIL MIST	(OPTION)
M67	OIL MIST OFF	TURN OFF THE OIL MIST	(OPTION)
M68	SPINDLE CW / OIL MIST ON	TURN ON THE SPINDLE CLOCKWISE AND OIL MIST	(OPTION)
M69	SPINDLE CCW / OIL MIST ON	TURN ON THE SPINDLE COUNTERCLOCKWISE AND OIL MIST	(OPTION)
M70	SPINDLE STOP / OIL MIST OFF	STOP SPINDLE AND OIL MIST	(OPTION)
M71	VACUUM DUST COLLECTOR ON	TURN ON VACUUM DUST COLLECTOR	(OPTION)
M72	VACUUM DUST COLLECTOR OFF	STOP VACUUM DUST COLLECTOR	(OPTION)
M73	WORKPIECE CHUCK UNCLAMP	UNCLAMP WORKPIECE CHUCK	(OPTION)
M74	WORKPIECE CHUCK CLAMP	CLAMP WORKPIECE CHUCK	(OPTION)
M75	CHIP FLUSH PUMP 2 ON	TURN ON THE CHIP FLUSH PUMP 2	(OPTION)
M76	CHIP FLUSH PUMP 2 OFF	TURN OFF THE CHIP FLUSH PUMP 2	(OPTION)

M CODE	FUNCTION	DESCRIPTION	NOTE
M77	SPINDLE CW / CHIP FLUSH PUMP 2 ON	TURN ON THE SPINDLE CLOCKWISE AND CHIP FLUSH PUMP 2	(OPTION)
M78	SPINDLE CCW / CHIP FLUSH PUMP 2 ON	TURN ON THE SPINDLE COUNTERCLOCKWISE AND CHIP FLUSH PUMP 2	(OPTION)
M79	SPINDLE STOP / CHIP FLUSH PUMP 2 OFF	STOP SPIDLE AND CHIP FLUSH PUMP 2	(OPTION)
M80	4TH AXIS UNCLAMP / B AXIS INDEX TABLE UNCLAMP	UNCLAMP 4TH AXIS	(OPTION)
M81	4TH AXIS CLAMP / B AXIS INDEX TABLE CLAMP	CLAMP 4TH AXIS	(OPTION)
M82	5TH AXIS UNCLAMP	UNCLAMP 5TH AXIS	(OPTION)
M83	5TH AXIS CLAMP	CLAMP 5TH AXIS	(OPTION)
M98	SUBPROGRAM CALL	SUBPROGRAM CALL	
M99	END OF SUBPROGRAM	END OF SUBPROGRAM	
MAINTENANCE M CODES FOR ATC			
M1000	TOOL POT V.	TOOL POT VERTICAL	
M1001	TOOL POT H.	TOOL POT HORIZONTAL	
M1004	ATC DOOR OPEN	OPEN ATC DOOR	(OPTION)
M1005	ATC DOOR CLOSE	CLOSE ATC DOOR	(OPTION)
M1006	TOOL CHANGE (MAINTENANCE MODE)	FOR MAINTENANCE, TO CHANGE TOOL STEP BY STEP. ● LET ATC IN NORMAL CONDITION, EXECUTE M19 / G91G30Z0. ● SET KEEP RELAY K6.6 = 1 ● IN MDI MODE REPEAT M1006 AND CYCLE START. THE MOVEMENT SEQUENCE WILL BE : 1. TOOL POT V. (M1000) 2. TOOL CHANGE (ARM 900 / TOOL UNCLAMP) (M1006) 3. TOOL CHANGE (ARM DOWN / ROTATE / UP) (M1006) 4. TOOL CHANGE (TOOL CLAMP / ARM RETURN) (M1006) 5. TOOL POT H. (M1001)	
M1007	MAGAZINE FORWARD	MAGAZINE FORWARD MOVEMENT	(FOR ARMLESS TYPE ATC)
M1008	MAGAZINE BACKWARD	MAGAZINE BACKWARD MOVEMENT	

M CODE	FUNCTION	DESCRIPTION	NOTE
M1009	TOOL SHIFT CYLINDER1 IN	TOOL SHIFT CYLINDER1 MOVE IN	(FOR HORIZONTAL MACHINE MAGAZINE)
M1010	TOOL SHIFT CYLINDER1 OUT	TOOL SHIFT CYLINDER1 MOVE OUT	
M1011	TOOL SHIFT CYLINDER2 IN	TOOL SHIFT CYLINDER2 MOVE IN	
M1012	TOOL SHIFT CYLINDER2 OUT	TOOL SHIFT CYLINDER2 MOVE OUT	
M1013	TOOL SHIFT CYLINDER3 IN	TOOL SHIFT CYLINDER3 MOVE IN	
M1014	TOOL SHIFT CYLINDER3 OUT	TOOL SHIFT CYLINDER3 MOVE OUT	
M1015	TOOL LOCK CYLINDER4 IN	TOOL LOCK CYLINDER4 IN	
M1016	TOOL LOCK CYLINDER4 OUT	TOOL LOCK CYLINDER4 OUT	
M1017	TL HOLDER ROTATE CYLINDER5 IN	TL HOLDER ROTATE CYLINDER5 IN	
M1018	TL HOLDER ROTATE CYLINDER5 OUT	TL HOLDER ROTATE CYLINDER5 OUT	
M1019	TL HOLDER MOVING CYLINDER6 IN	TL HOLDER MOVING CYLINDER6 IN	
M1020	TL HOLDER MOVING CYLINDER6 OUT	TL HOLDER MOVING CYLINDER6 OUT	
M1021	PUT STANDBY TOOL ON TOOL HOLDER	PUT STANDBY TOOL ON TOOL HOLDER	
M1022	RETURN SPINDLE TOOL ON MG POCKET	RETURN SPINDLE TOOL ON MG POCKET	
MAINTENANCE M CODES FOR APC			
M1030	B AXIS TAPER CONE UNCLAMP	UNCLAMP B AXIS (TABLE)	(OPTION)
M1031	B AXIS TAPER CONE CLAMP	CLAMP B AXIS (TABLE)	(OPTION)
M1032	PALLET UP	PALLET UP	(OPTION)
M1033	PALLET DOWN	PALLET DOWN	(OPTION)
M1034	PALLET CW	PALLET TURN CLOCKWISE	(OPTION)
M1035	PALLET CCW	PALLET TURN COUNTERCLOCKWISE	(OPTION)
SPARE M CODES			
M1060	M FUNCTION 1 ON	SPARE M FUNCTION 1 ON	(OPTION)
M1061	M FUNCTION 1 OFF	SPARE M FUNCTION 1 OFF	(OPTION)
M1062	M FUNCTION 2 ON	SPARE M FUNCTION 2 ON	(OPTION)
M1063	M FUNCTION 2 OFF	SPARE M FUNCTION 2 OFF	(OPTION)

M CODE	FUNCTION	DESCRIPTION	NOTE
M1064	M FUNCTION 3 ON	SPARE M FUNCTION 3 ON	(OPTION)
M1065	M FUNCTION 3 OFF	SPARE M FUNCTION 3 OFF	(OPTION)
M1066	M FUNCTION 4 ON	SPARE M FUNCTION 4 ON	(OPTION)
M1067	M FUNCTION 4 OFF	SPARE M FUNCTION 4 OFF	(OPTION)
M1068	M FUNCTION 5 ON	SPARE M FUNCTION 5 ON	(OPTION)
M1069	M FUNCTION 5 OFF	SPARE M FUNCTION 5 OFF	(OPTION)
M1070	M FUNCTION 6 ON	SPARE M FUNCTION 6 ON	(OPTION)
M1071	M FUNCTION 6 OFF	SPARE M FUNCTION 6 OFF	(OPTION)
M1072	M FUNCTION 7 ON	SPARE M FUNCTION 7 ON	(OPTION)
M1073	M FUNCTION 7 OFF	SPARE M FUNCTION 7 OFF	(OPTION)
M1074	M FUNCTION 8 ON	SPARE M FUNCTION 8 ON	(OPTION)
M1075	M FUNCTION 8 OFF	SPARE M FUNCTION 8 OFF	(OPTION)
TOOL DATA TABLE INITIALIZATION			
M2000	POCKET DATA TABLE INITIAL SETTING COMMAND	RESET MAGAZINE DATA TABLE REQUEST, MAG TURN TO POCKET 1	24/32 TOOL'S USING

5.12 S (SPINDLE) FUNCTION

- A. THE S FUNCTION IS USED TO COMMAND SPINDLE SPEED.
- B. THE SPINDLE SPEED CAN BE DIRECTLY COMMANDED WITH ADDRESS S FOLLOWED BY 4 OR 5 DIGIT NUMERIC VALUE WITHIN A RANGE FROM 90 TO 3000 /min OR 180 TO 6000 /min . IF SPEED OUT OF THE RANGE IS COMMENDED, ALARM OCCURS.

(NOTE : 10,000/min ABOVE CHOICE S 5 DIGIT)

- C. EXAMPLE:
- D. FOR SPEED OF 1234 /min, PROGRAM AS FOLLOW :
- E. S1234 (EOB)
- F. M03 OR M04 (EOB)

5.13 T (TOOL) FUNCTION

- A. THE T FUNCTION IS USED TO COMMAND THE NUMBER OF TOOL TO BE CHANGED.
- B. THE DESIRED TOOL CAN BE DIRECTLY COMMENDED WITH ADDRESS T FOLLOWED BY 2-DIGIT NUMERIC VALUE. TOOL FUNCTION IS AVAILABLE WITHIN A RANGE FROM T01 TO T20.24.32.40,

EXAMPLE :

- C. WHEN SPINDLE TOOL IS CHANGED TO NO. 2 TOOL, PROGRAM AS FOLLOW :

T02 (EOB)

M06 (EOB)

- NOW TOOL NO.2 WILL BE CHANGED TO SPINDLE.
- NOTE THAT THE COMMAND SHOULD BE TWO BLOCKS.

- D. WHEN SPINDLE TOOL IS CHANGED TO NO.2 TOOL AND CALL TOOL NO.3 AS THE PREPARED TOOL.

T02 (E0B)

M06 T03 (E0B)

- NOW TOOL NO.2 WILL BE CHANGED TO SPINDLE AND TOOL NO.3 WILL BE ROTATED TO STANDBY POSITION.

5.14 SPECIAL TOOL ASSIGNMENT STEPS (M16/M61)

5.14.1 DESCRIPTION

- A. THIS FUNCTION IS APPLIED TO SPECIAL TOOL (BIG DIAMETER).
- B. THE ASSIGNED SPECIAL TOOL WILL BE ON FIXED POCKET, BOTH SIDES OF THE SPECIAL TOOL WILL BE EMPTY.
- C. SUGGEST TO EXECUTE M2000 BEFORE ASSIGNMENT AND THERE IS NO TOOL ON THE MAGAZINE TO AVOID THE INTERFERENCE BETWEEN TOOLS.
- D. PLEASE REFER TO THE OPERATION MANUAL FOR THE MAX. TOOL WEIGHT.

5.14.2 EXAMPLE

- IN MDI MODE
- M16 T1005(EOB)
(ASSIGN TOOL NO.5 AS THE SPECIAL TOOL, LOCKED ON POCKET NO.5)
- CYCLE START (EXECUTE COMMAND)
MAGAZINE WILL ROTATE TO POCKET NO.5 AUTOMATICALLY
APPEAR MESSAGE 2121 LOAD THE SPECIAL TOOL INTO SPINDLE IN MANUAL MODE,.....
MAKE SURE THERE IS NO TOOL ON POCKET NO.4 AND POCKET NO.6.
- M61(EOB)
EXECUTE TOOL CHANGE
- CYCLE START (EXECUTE COMMAND)
THE ATC ARM WILL ROTATE AND PUT THE SPINDLE TOOL ON POCKET NO.5 AUTOMATICALLY
ORIGINAL TOOL ON POCKET NO.5 WILL BE PUT IN SPINDLE
APPEAR MESSAGE 2122 UNLOAD THE NORMAL TOOL FROM SPINDLE IN MANUAL MODE
CONFIRM THE ACTUAL TOOL NO. WITH TOOL DATA TABLE.
- FINISH
FOLLOW THE PREVIOUS PROCESS, M16 T1001 TO ASSIGN TOOL NO.1 AS THE SPECIAL TOOL, LOCKED ON POCKET NO.1
M16 T1020 TO ASSIGN TOOL NO.20 AS THE SPECIAL TOOL, LOCKED ON POCKET NO.20.

NOTE:

DO NOT PRESS RESET OR EMG STOP DURING THE PROCESS, OTHERWISE THE TOOL DATA WILL BE CONFUSED.
AFTER THE ASSIGNMENT IS FINISHED, CHECK THE TOOL DATA TABLE AND DO NOT CHANGE MANUALLY.

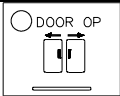
6. CHECKING AND MAINTENANCE OF MACHINE

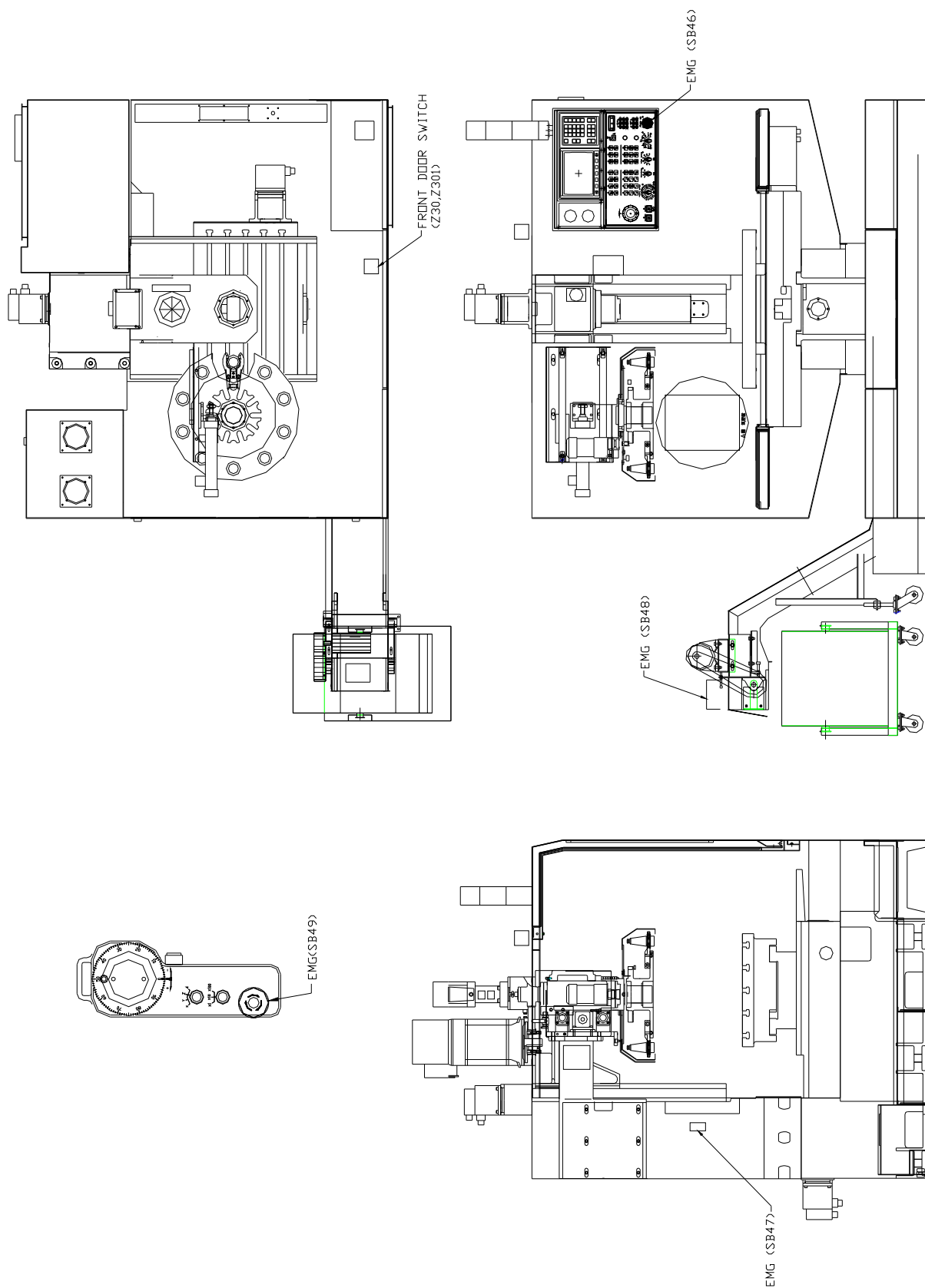
WARINING: ORDER TO GUARANTEE TROUBLE FREE, LONG USE OF THE MACHINE, IT IS VERY IMPORTANT TO ELABORATELY CHECK EACH PART OF THE MACHINE PERIODICALLY . IF ANY TROUBLE OR SIGN IF TROUBLE IS FOUND DURING CHECKING, BE SURE TO IMMEDIATELY REMEDY IT, THE DAILY CHECKING AND MAINTENANCE SCHEDULE THAT SHOULD BE AT LEAST PERFORMED BEFORE STARTING DAILY WORK IS SHOWN BELOW.

6.1 DAILY CHECKING

6.1.1 SAFETY CIRCUIT AND DEVICE CHECK

THE FAILURE OF SAFETY CIRCUIT AND DEVICE COULD CAUSE SERIOUS INJURY OR DEATH DURING OPERATION, CONTECT YOUR MACHINE AGENT TO SOVE THE PROBLEM BELOW.

A . BEFORE STARTING MACHINE	
1	CHECK IF THE FRONT DOOR AND TOOL MAGAZINE DOOR IS CLOSED, OTHERWISE CAN NOT TURN ON THE SYSTEM PROPERLY.
2	IF THE FRONT DOOR OR TOOL MAGAZINE DOOR IS NOT COSED PROPERLY AND STILL CAN START THE SYSTEM THAT MEANS... ● THE HARDWARE OF THE DOOR SWITCH IS MODIFIED OR DAMAGED. ● THE SOFTWARE HAVE BEEN MODIFIED. FRONT DOOR SWITCH NO. Z30. Z301 TOOL MAGAZINE DOOR SWITCH NO. Z60, Z601
B. AFTER STARTING MACHINE	
1	WHEN THE SYSTEM IS READY AND THE MACHINE IS NOT RUNNING, PUSH  BUTTON THEN OPEN THE FRONT DOOR THE MACHINE SHOULD CAN NOT EXCUTE ANY CONTRAL (SUCH AS AXIS MOVEMENT, SPINDLE RUNNING, TOOL CHANGE, COOLANT PUMP, CHIP CONVEYOR OR OTHER OPTION DEVICE) IF THE MACHINE CAN EXCUTE ANY DEVICE FUNCTION MEANS.. ● THE HARDWARE OF THE DOOR SWITCH IS MODIFIED OR DAMAGED. ● THE SOFTWARE HAVE BEEN MODIFIED. FRONT DOOR SWITCH NO. Z30. Z301
2	WHEN THE SYSTEM IS READY AND THE MACHINE IS NOT RUNNING, OPEN THE TOOL MAGAZINE DOOR. CHECK PROCEDURE AS ABOVE. TOOL MAGAZINE DOOR SWITCH NO. Z60, Z601
3	IN MANUAL MODE START THE SPINDLE RUNNING, PUSH ANY EMERGENCY STOP BUTTON (ON OPERATION PANEL SB46, TOOL MAGAZINE SB47, REMOVEABLE HANDWHEEL SB49, CHIP CONVEYOR SB48 OR ON OTHER OPERATIONAL DEVICE) SOULD STOP THE SPINDLE IMMEDIATELY, IF NOT, CHECK THE ELECTRIC CIRCUIT OR REPLACE THE SWITCH AND TEST AGAIN.
C. PARTS REPLACEMENT	
1	● TO REPLACE THE ELECTRICAL PARTS, REFER TO PARTS LIST IN THE ELECTRICAL DIAGRAM, FOR THE CORRECT SPECIFICATION OF PARTS. ● AFTER CHANGE PARTS, CONFIRM THE SAFETY CIRCUIT AND DEVICE CHECK AS ABOVE PROCEDURE A AND B. ● IF ANY QUESTION CONTECT YOUR MACHINE AGENT.



6.1.2 MACHINE DAILY CHECKING SCHEDULE

A . BEFORE STARTING MACHINE	
1	VISUALLY CHECK THE APPEARANCE OF THE MACHINE
2	CHECK IF ANY OBJECT IS LOCATED WITHIN THE MOVEABLE RANGE OF THE TABLE, SADDLE AND SPINDLE HEAD.
3	CLEAN THE SPINDLE BORE TAPER AND THE CIRCUMFERENCE OF THE SPINDLE
4	CHECK THE WIPERS FOR THE SPINDLE HEAD, SADDLE AND SADDLE SIDEWAYS.
5	CHECK THE GIBS USED IN X, Y AND Z AXIS.
6	CHECK THE SIDE WAYS FOR DAMAGE, SCORE OR DEFECTS. IF ANY DAMAGE OR SCORE IS FOUND, FLATTEN USING AN OIL STONE.
7	CHECK THE TOOL TAPER FOR CLEANLINESS AND CLEAN IF NECESSARY.
8	CHECK THE TOOL PULL STUD FOR LOOSENED. NOTICE THAT LOOSENED PULL STUD IS VERY DANGEROUS DAILY
9	CHECK LUBRICATION OIL IN THE LUBRICATION PUMP USING THE FURNISHED LEVEL GAUGE AND REPLENISH IF NECESSARY.
10	WHEN COOLANT UNIT (OPTION) IS USED, CHECK COOLANT LEVEL USING THE FURNISHED LEVEL GAUGE AND REPLENISH IF NECESSARY.
11	CHECK COMPRESSED AIR PRESSURE (TO BE 5.5 bar) THROUGH PRESSURE GAUGE INCORPORATED IN THE PNEUMATIC UNIT AND ADJUST IF NECESSARY.
B. AFTER STARTING MACHINE	
1	CHECK IF UNUSUAL SOUND, VIBRATION OR HEAT RISE OCCURS.
2	CHECK THAT LUBRICATING OIL IS SATISFACTORILY GIVEN TO EACH SIDE WAYS . DEPRESS THE INSTANT PUSH BUTTON OF THE LUBRICATION PUMP TO DELIVER OIL IF NECESSARY.
3	BEFORE STARTING THE OPERATION, LET RUN THE SPINDLE AT A LOW SPEED AND MOVE THE SPINDLE HEAD, SADDLE AND TABLE WITHIN THESE FULL STROKES WITHOUT LOAD FOR 10 - 20 min.
C. WHEN DAILY WORK ENDS	
1	WHEN DAILY WORK ENDS, BE SURE TO THOROUGHLY CLEAN THE MACHINE, PARTICULARLY SIDE WAYS. APPLY MACHINE OIL TO THE SPINDLE TAPER TO PREVENT CORROSION. WHEN DAILY WORK ENDS. DO NOT FAIL TO REMOVE THE OIL BEFORE STARTING THE MACHINE.
2	WHEN DAILY WORK ENDS, CHECK IF THE CUTTING CHIPS IS TOO MUCH THAT MAYBE EFFECT THE MOVEMENT OF X AND Y AXIS MOVEMENT, USE A EXHAUST (VACUUM) TO CLEAN IT FROM THE FRONT DOOR.

6.2 6 MONTH CHECKING

6 MONTH CHECKING SCHEDULE

	CHECK UP
1	ATC GREASE ON MAGAZINE ROTATION AND TOOL POT UP/DOWN PARTS. CHECK IF THE ROTATION AND MOVEMENT IS SMOOTHLY.
2	COUNTERWEIGHT ROLLER CHAIN (OPTION) CHECK IF THE ROLLER CHAIN IS IN GOOD CONDITION, GREASING TO COUNTERWEIGHT ROLLER CHAIN.
3	SPINDLE GEAR BOX (OPTION) REPLENISH IF OIL LEVEL IS FOUND BELOW THE SPECIFIED LEVEL CHECK IF THE GEAR BOX RUNNING SMOOTHLY.
4	SLIDEWAY GIB IN GENERAL PRACTICE, THE ADJUSTMENT SHOULD BE MADE IN 3 MONTHS AND 6 MONTHS AFTER INSTALLATION. AFTER THAT, CHECK SLIDE WAY LEVEL YEARLY AND ADJUST IT IF NECESSARY.
5	
6	

6.3 YEARLY CHECKING

YEARLY CHECKING SCHEDULE

	CHECK UP
1	ATC GREASE ON MAGAZINE ROTATION AND TOOL POT UP/DOWN PARTS. CHECK IF THE ROTATION AND MOVEMENT IS SMOOTHLY.
2	COUNTERWEIGHT ROLLER CHAIN (OPTION) CHECK IF THE ROLLER CHAIN IS IN GOOD CONDITION, GREASING TO COUNTERWEIGHT ROLLER CHAIN.
3	SPINDLE GEAR BOX (OPTION) REPLENISH IF OIL LEVEL IS FOUND BELOW THE SPECIFIED LEVEL CHECK IF THE GEAR BOX RUNNING SMOOTHLY.
4	SLIDEWAY GIB IN GENERAL PRACTICE, THE ADJUSTMENT SHOULD BE MADE IN 3 MONTHS AND 6 MONTHS AFTER INSTALLATION. AFTER THAT, CHECK SLIDE WAY LEVEL YEARLY AND ADJUST IT IF NECESSARY.
5	
6	

6.4 LUBRICATION OF MACHINE

6.4.1 LUBRICATION

- LUBRICATION IS VERY IMPORTANT AND NOT NEGLIGIBLE TO ASSURE LONG LIFE AND HIGH LEVEL OF ACCURACY OF THE MACHINE.
- SINCE THE MACHINE CENTER IS USUALLY OPERATED CONTINUOUSLY FOR LONG HOURS UNDER HEAVY DUTY AND THERE ARE MANY PARTS THAT REQUIRES LUBRICATION, THE MACHINE EMPLOYS THE LUBRICATION SYSTEM BEST SUITED FOR SUCH APPLICATION , REQUIRING ONLY MINIMUM CARE OF LUBRICATION TO OPERATOR.
- LUBRICATION TO EACH PART OF MACHINE IS AS FOLLOWS :
 - A. GREASE SEALED LUBRICATION IS EMPLOYED FOR SPINDLE BEARINGS.
(GREASE : KLUBER ISOFLEX NBU 15 (PA0040 - A26))
 - B. X,Y AND Z AXIS BALL SCREW AND SIDE WAYS ARE FORCIBLY OILED BY LUBRICATION PUMP.
 - C. GREASE IS APPLIED TO THE COUNTERWEIGHT CHAINS, AND CROSS ROLLER GUIDE WHICH IS INSTALLED FOR ATC CROSSWISE MOVEMENT.
 - D. FOR ALL OTHER BEARINGS, GREASE SEALED LUBRICATION IS EMPLOYED.

6.4.2 REOILING

IT IS MANDATORY TO MAINTAIN A SUITABLE AMOUNT OF OIL OR GREASE WHERE LUBRICATION IS REQUIRED TO ASSURE TROUBLE-FREE, LONG OPERATION OF THE MACHINE.

BE SURE TO REPLENISH THE HIGH QUALITY, PURE OIL OR GREASE SPECIFIED IN THE LUBRICATION TABLE, AS INSTRUCTED IN THE TABLE.

- A. REOILING TO LUBRICATION PUMP TANK
 - a. FOR DETAILS ABOUT LUBRICATION PUMP REFER 6.4.2 MAINTENANCE AND ADJUSTMENT OF LUBRICATION PUMP. THE LUBRICATION PUMP TANK (A) AS SHOWN IN FIG. 6.4.1 HAS A CAPACITY OF 4.6 L. WHEN THE POWER SOURCE IS TURNED ON, THE PUMP AUTOMATICALLY STARTS AND DELIVERS OIL TO THE SPEED REDUCTION GEARINGS. THE PUMP IS ADJUSTED BY US AT SHIPPING TO DELIVER OIL AT A RATE OF 6 cc FOR EVERY 15 min.
 - b. AS NECESSARY, ADJUST THE RATE IN ACCORDANCE WITH 6.4.2 MAINTENANCE AND ADJUSTMENT OF LUBRICATION PUMP.
 - c. WHEN THE PUMP IS LEFT OUT OF OPERATION FOR ANY LENGTH OF TIME, OIL LEVEL GO DOWN IN THE PIPING. THEREFOR, HOLD DOWN THE INSTANT PUSH BUTTON (B) OF THE PUMP BEFORE STARTING THE MACHINE OPERATION, UNTIL SUFFICIENT AMOUNT OF OIL IS DISTRIBUTED TO EACH SIDE WAY.

- d. REPLENISH OIL IN THE TANK TO THE SPECIFIED LEVEL THROUGH THE OIL FILLER HOLE (C) AT THE TOP OF THE TANK WITH A SUITABLE FREQUENCY (USUALLY ONCE TWO WEEKS) THAT DEPENDS ON THE SERVICE CONDITION.
- e. IF THE OIL LEVEL GOES DOWN TO ONE FOURTH OF THE SPECIFIED LEVEL, THE LAMP "LUBRICATION LEVEL" WILL LIGHTS, IMMEDIATELY REPLENISH OIL.

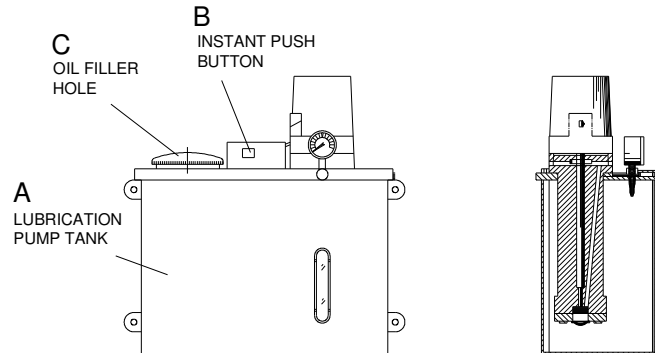


FIG. 6.4.1 REOILING LUBRICATION PUMP TANK

B. REOILING TO LUBRICATOR OF PNEUMATIC UNIT

REMOVE THE BOWL GUARD AS SHOWN IN FIG 6.4.2 TO REPLENISH OIL IN THE LUBRICATOR OF PNEUMATIC UNIT. THE LUBRICATION SHOULD BE FILLED WITH OIL UP TO THE UPPER LIMIT OF THE LEVEL GAUGE (ABOUT 80 % OF LUBRICATOR CAPACITY).

NOTICE: TO MUCH OIL MAY CAUSE STANDSTILL TO THE LUBRICATOR. CHECK OIL LEVEL WEEKLY AND REPLENISH OIL IF NECESSARY.

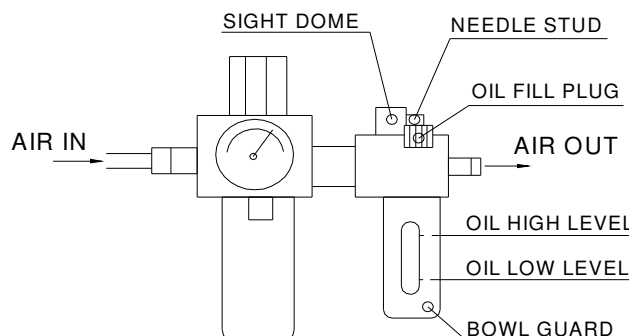


FIG. 6.4.2 REOILING TO LUBRICATOR OF PNEUMATIC UNIT

C. GREASING TO AUTOMATIC TOOL CHANGER SYSTEM

THE CROSS CAM MACHANISM GUIDE (A) AS SHOWN IN FIG 6.4.3 IS USED FOR ATC CROSSWISE MOVEMENT.

THE GENEVA MACHANISM (B) AS SHOWN IN FIG 6.4.3 IS USED FOR ATC TOOL DISK ROTATEING.

TO GREASE, REMOVE ATC MAGAZINE COVER. BE SURE TO GREASE EVERY 3 MONTHS.

CHECK ATC USER MANUAL FOR MARE INFORMATION.

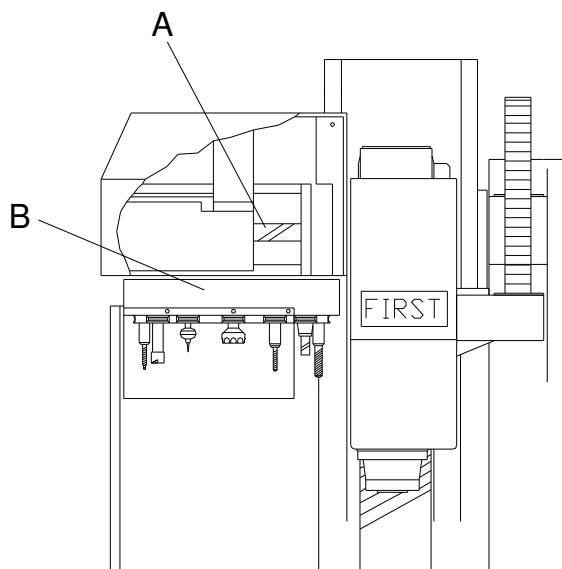


FIG. 6.4.3 GREASING TO AUTOMATIC TOOL CHANGER SYSTEM

6.5 LUBRICATION TABLE

	PART TO BE OILED	FREQUENCY	Q'TY	LUBRICANT	REMARKS
A	LUBRICATION PUMP	1-2 WEEKS	4L	1	CHECK OIL LEVEL IN THE TANK AND REPLENISH IF NECESSARY.
B	COUNTERWEIGHT ROLLER CHAIN	6 MONTHS		3	BRUSH LUBRICANT.
C	LUBRICATOR OF PNEUMATIC	WEEKLY	0.17L	2	IMMEDIATELY REPLENISH IF OIL LEVEL IS FOUND BELOW THE SPECIFIED LEVEL
D	ATC GEAR OIL	EVERY YEAR	5.5 L	2	IMMEDIATELY REPLENISH IF OIL LEVEL IS FOUND BELOW THE SPECIFIED LEVEL
E	TOOL MAGAZINE	6 MONTHS		3	BRUSH LUBRICANT
F	SPINDLE GEAR BOX	6 MONTHS	25 L	2	IMMEDIATELY REPLENISH IF OIL LEVEL IS FOUND BELOW THE SPECIFIED LEVEL

6.5.1 APPLICABLE LUBRICANTS

LUBRICANT	SHELL	ESSO	MOBIL
1	SHELL TONNAOIL	FEBIS K68	MOBIL VACTRA OIL NO.2
2	SHELL TURBIN OIL T32	TERESSO 32	MOBIL DTE OIL LIGHT
3	SHELL ALVANIA GREASE 2	TENPCEX N2	MOBIL UX 2

6.5.2 CAUTIONS ON OILING

- THE FOLLOWING CAUTIONS ARE VERY IMPORTANT WHEN OILING.
 - A. USE ONLY SPECIFIED OIL OR GREASE WITH SPECIFIED QUANTITY.
THE USE OF OIL OR GREASE OTHER THEN SPECIFIED AND TO MUCH AMOUNT OF OIL OR GREASE MAY ADVERSELY AFFECT THE PERFORMANCE OF THE MACHINE.
 - B. CLEAN THE SIDE WAYS, OIL FILLER HOLES, OIL TANK, ETC. BEFORE POURING OIL AND USE CARE NOT TO POLLUTE OIL WHEN POURING OIL.
 - C. WHEN POURING OIL, PLACE A FILTER OVER OIL FILLER HOLE TO ELIMINATE DUST AND CONTAMINATOR. IF FILTER IS NOT AVAILABLE, USE A WIRE NET OF 150 MESH OR FINER.
 - D. SUCCESSIVELY USE THE IDENTICAL OIL OR GREASE. NOTICE THAT THE USE OF OIL HAVING DIFFERENT PROPERTIES MIGHT DEGRADE THE OIL.
 - E. EVEN WHEN NEW OIL IS DRAINED, AND USED AGAIN FOR REASSEMBLING, REPLACEMENT OF PART OR ANY OTHER REASON, BE SURE TO FILTER THE OIL WHEN POURING THE OIL AGAIN.
 - F. DO NOT FULLY USE OIL OF OIL CAN, BUT LEAVE A SMALL QUANTITY OF OIL IN THE CAN. THIS CAUTIONS SHOULD BE FOLLOWED TO ELIMINATE MOISTURE AND SEDIMENT FROM OIL.

- G. LUBRICATION TANK SHOULD BE CLEAN EVERY 6 MONTH, CLEAN AND QUALIFY OIL IS CONCERNING MACHINE LIFE AND DISTRIBUTER OF OIL PIPING (MIGHT CAUSE STUCK AND SHORT THE MACHINE LIFE)

6.5.3 MAINTENANCE AND ADJUSTMENT OF LUBRICATION PUMP

- A. LUBRICATION PUMP WITH A PRESSURE GAUGE AND MANUAL SWITCH FOR MANUAL DISCHARGE. WHEN NECESSARY, THIS PUMP ARE CONTROL BY PLC 30 SECONDS OF RUNNING TIME AND 1000 SECOND OF INTERMITTENT TIME. THIS TIMER WAS BE PRESENTED INSIDE OF CNC PLC. PLEASE REFER TO YOUR LADDER DIAGRAM FOR DETAIL.
- B. AS A FLOAT SWITCH WAS EQUIPPED WHEN OIL LEVEL DROOPS. THE



LAMP WILL BE LIGHTED AND BUZZER SOUND AND SWITCH TO SINGLE BLOCK AUTOMATICALLY. PLEASE REPLENISH THE OIL FOR CONTINUE OPERATIONS.

6.6 MAINTENANCE AND ADJUSTMENT OF AIR SOURCE AND PNEUMATIC UNITS

THE FOLLOWING MOVEMENT AND FUNCTIONS ARE DRIVEN BY COMPRESSED AIR.

- A * SPINDLE TOOL UNCLAMP.
- B * SPINDLE AIR BLOW.
- C * TOOL POT MOVEMENT (UP / DOWN)
- D * SPINDLE TURNING AIR BLOW.
- E * COOLANT THROUGH SPINDLE AIR BLOW. (OPTION)

6.6.1 AIR SOURCE

A. THE PNEUMATIC AIR SOURCE.

- a. THE PNEUMATIC ARE DESIGNED TO WORK WITH COMPRESSED AIR AT 5.5 bar THERE FOR, USE AN AIR SOURCE AT CONSTANT PRESSURE OF AT LEAST 6 bar.
- b. THE PNEUMATIC AIR SOURCE HAS BEEN SET UP BEFORE SHIPPING OUT THE MACHINE.
- c. TO ADJUST THE AIR PRESSURE (SEE FIG. 6.6.1) PULL THE STUD (B) ADJUST IT TO 6 bar . IF THE AIR PRESSURES STILL NOT ENOUGH, CHECK THE AIR SOURCE.
- d. ALTHOUGH AIR FILTER IS PROVIDED TO PROTECT THE PNEUMATIC LINE, THE AIR FREE FROM MOISTER OIL AND DUST SHOULD BE SUPPLIED, AND PURIFIED BY AIR FILTER OF 5 MICRONS.
- e. IT IS SUGGESTED TO ADD A EXTRA MIST SEPARATOR INFRONT OF THE PNEUMATIC AIR SOURCE IF FOUND THE QUATILY OF THE AIR SOURCE CONTANT MUCH MOISTURE.
- f. FOR DETAIL OF THE AIR LINE, REFER TO THE AIR CIRCUIT DIAGRAM FIG 6.6.1.
- g. THE PNEUMATIC UNIT (THAT CONSISTS OF AIR FILTER, REDUCTION VALVE, PRESSURE GAUGE, LUBRICATOR, ETC.) MIST SEPARATOR REDUCTION VALVE AND PRESSURE SWITCH ARE INSTALLED AT THE BACK OF THE MACHINE.
- h. THE SOLENOID VALVES AND SPEED CONTROLLER AND EXHAUST CLEANER ARE INSTALLED ON THE TOP OF THE ATC.
- i. REFER TO PARTS LIST FOR DETAIL CONNECTION PARTS NO.

B. THE AIR PRESSURE DETECTOR

- a. IF THE AIR PRESSURE IS UNDER 6 bar , IT MAY CAUSE THE ERROR MOVEMENT OF THE MACHINE, THE AIR PRESSURE DETECTOR CAN MAKE SURE THE AIR PRESSURE ALWAYS HIGHER THEN 6 bar . IF THE AIR PRESSURE IS UNDER 4 bar , MACHINE ALARMS AND YOU HAVE TO CHECK THE AIR SOURCE.

- b. THE AIR PRESSURE DETECTOR HAVE BEEN SET UP BEFORE SHIPPING OUT THE MACHINE.
- c. TO ADJUST THE AIR PRESSURE DETECTOR, (SEE FIG. 6.61)
ADJUST (E) TO 0 (WITH DRIVE SCREW) AND ADJUST (F) TO 4 .

C. SPINDLE TOOL UNCLAMP

- a. AIR BLOW ACTIVE WHEN EXCUTE TOOL UNCLAMP.
- b. AS FIG 6.6.1 GAUGE (A) ADJUST THE AIR PRESSURE TO 6 bar ,
PULL THE STUD (B) TO ADJUST.

D. SPINDLE AIR BLOW

- a. AIR BLOW ACTIVE WHEN EXCUTE TOOL UNCLAMP..
- b. AS FIG 6.6.1 GAUGE (C) ADJUST THE AIR PRESSURE TO 2 bar ,
PULL THE STUD (D) TO ADJUST.

E. COOLANT THROUGH SPINDLE AIR BLOW

- a. AIR BLOW ACTIVE WHEN EXCUTE COOLANT THROUGH SPINDLE.
- b. AS FIG 6.6.1 GAUGE (G) ADJUST THE AIR PRESSURE TO 2 bar ,
PULL THE STUD (H) TO ADJUST.

F. SPINDLE TURNING AIR BLOW

- a. AIR BLOW ACTIVE WHEN SPINDLE TURNING.
- b. AS FIG 6.6.1 GAUGE (K) ADJUST THE AIR PRESSURE TO 2 bar ,
PULL THE STUD (L) TO ADJUST.

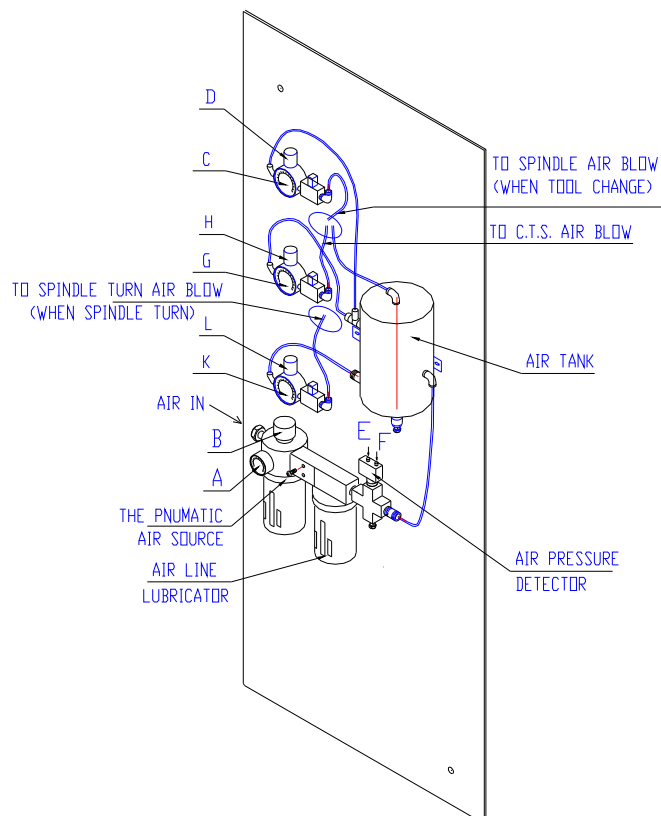


FIG. 6.6.1 AIR LINE LUBRICATOR

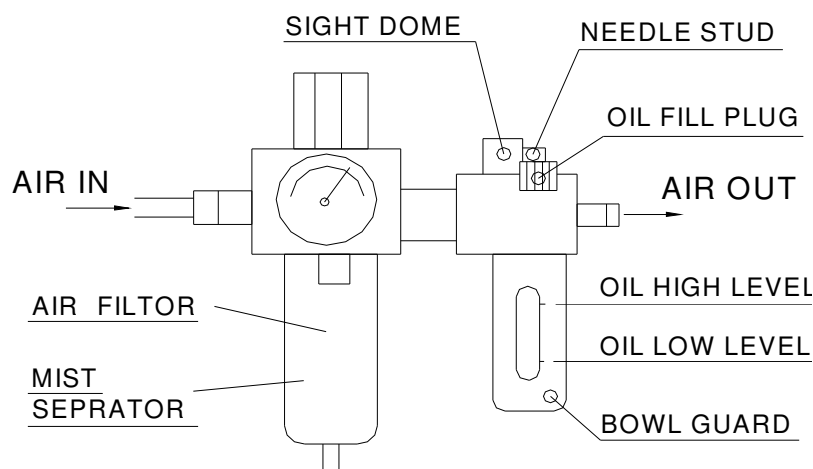


FIG. 6.6.2 AIR SOURCE ADJUSTMENT

6.6.2 AIR LINE LUBRICATOR (FIG. 6.6.2)

THIS DEVICE SUPPLIES LUBRICATING OIL, NECESSARY TO OIL EACH CYLINDER AND CYLINDER VALVE

A. SETTING UP:

- a. THE LUBRICATOR SHOULD BE FILLED WHILE UNDER LEVEL. JUST REMOVE THE OIL FILL PLUG AND FILL THE LUBRICATOR TO OIL LEVEL LIMIT LINE USING CLEAN AND PURE LUBRICANT.
- b. OIL FEED RATE CAN BE ADJUSTED BY THE NEEDLE STUDDED. CLOCKWISE ROTATION OF THE NEEDLE STUD DECREASES OIL FEED RATE.
- c. THE OIL FEED RATE OF AIR LINE LUBRICATOR HAS BEEN SET UP TP " 10 MOMENT WITH ONE DROP". CHECK THE DROP FROM THE SIGHT DOME.

B. MAINTENANCE :

IF OIL DOES NOT FLOW FROM OIL DRIP TUBE.

- a. MAKE SURE THE AIR INSTALLED IN THE CORRECT DIRECTION. IF NOT, REINSTALL IT.
- b. CHECK THE OIL LEVEL. ADJUST OIL QUANTITY IF THE LEVEL EXCEED THE LIMIT LINE OR DOES NOT REACH THE END OF SIPHON TUBE.
- c. IF OIL LEAKS AROUND THE NEEDLE STUD CHECK IF THE NEEDLE STUD IS OPEN EXCESSIVELY, IF SO, CLOSE IT TO THE RIGHT POSITION.
- d. TAKE OFF BOWL GUARD AND CHECK O RING (ON THE TOP OF THE BOWL GUARD), IF THE O RING IS DAMAGED, REPLACE IT.

CAUTION : DO NOT USE THE LUBRICATOR NEAR OR IN CONTACT WITH SUCH ORGANIC SOLVENTS AS LACQUER THINNERS, ALCOHOL, ETC., AS THE MATERIALS WILL DAMAGE THE PLASTIC BOWL. IF NECESSARY TO CLEAN THE PLASTIC BOWL, USE NEUTRAL CLEANSER ONLY.

TEMPERATURE AND OPERATING PRESSURE SHOULD NOT EXCEED THE MAXIMUM LIMITS MARKED ON THE LUBRICATOR BOWL.

6.6.3 AIR TANK

RELEASE THE MOISTURE RELEASE VALVE IN THE BOTTOM OF THE TANK EVERY WEEK, IF FOUND MANY WATER COMEING OUT, CHECK THE QUALITY OF THE INCOMING AIR.

HIGEST PRESSURE: 10 bar

6.6.4 JOINT AND HOSE

A. AIR HOSE

MARKER: U - KHAN

MODEL: POLYURETHANE 5 X 8 O.D. X I.D. : 8 X 5 mm

MINIMUM BENDING DIAMETER: 55 R mm

TEMP. : - 40 °C - 100 °C

HIGHTEST PRESSURE: 7 bar

B. QUICK-FIT JOINT

MARKER: NIHON LEGRIS

MODEL: CONNECTOR 31750813 ELBOW 31090813

- a. EACH PNEUMATIC DEVICE IS CONNECTED WITH NYLON RESIN HOSE AND QUICK-FIT TYPE JOINT IS USED. THE QUICK-FIT TYPE JOINT PERMITS HOSE TO BE IMMEDIATELY CONNECTED ONLY BY INSERTING THE HOSE IN THE JOINT.
- b. AFTER THE CONNECTION, MAKE SURE THE CONNECTOR IS SECURELY HELD IN THE COUPLING AND NO LEAKAGE OCCURS.
- c. FOR DISCONNECTION OF HOSE, PRESS DOWN THE RING-LIKE PART AND PULL THE HOSE AS FIG. 6.6.3.

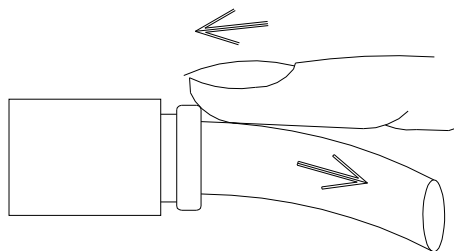
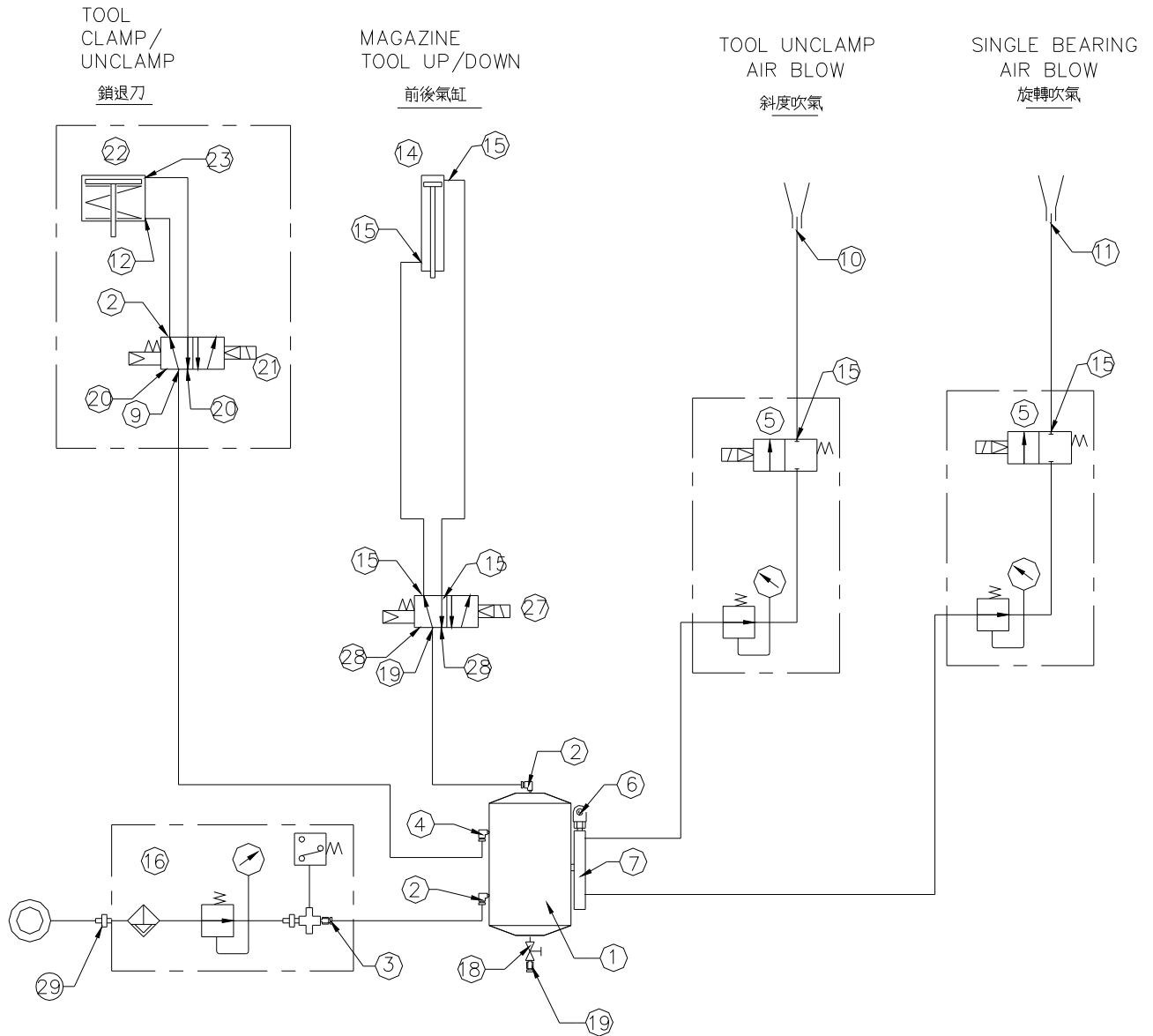


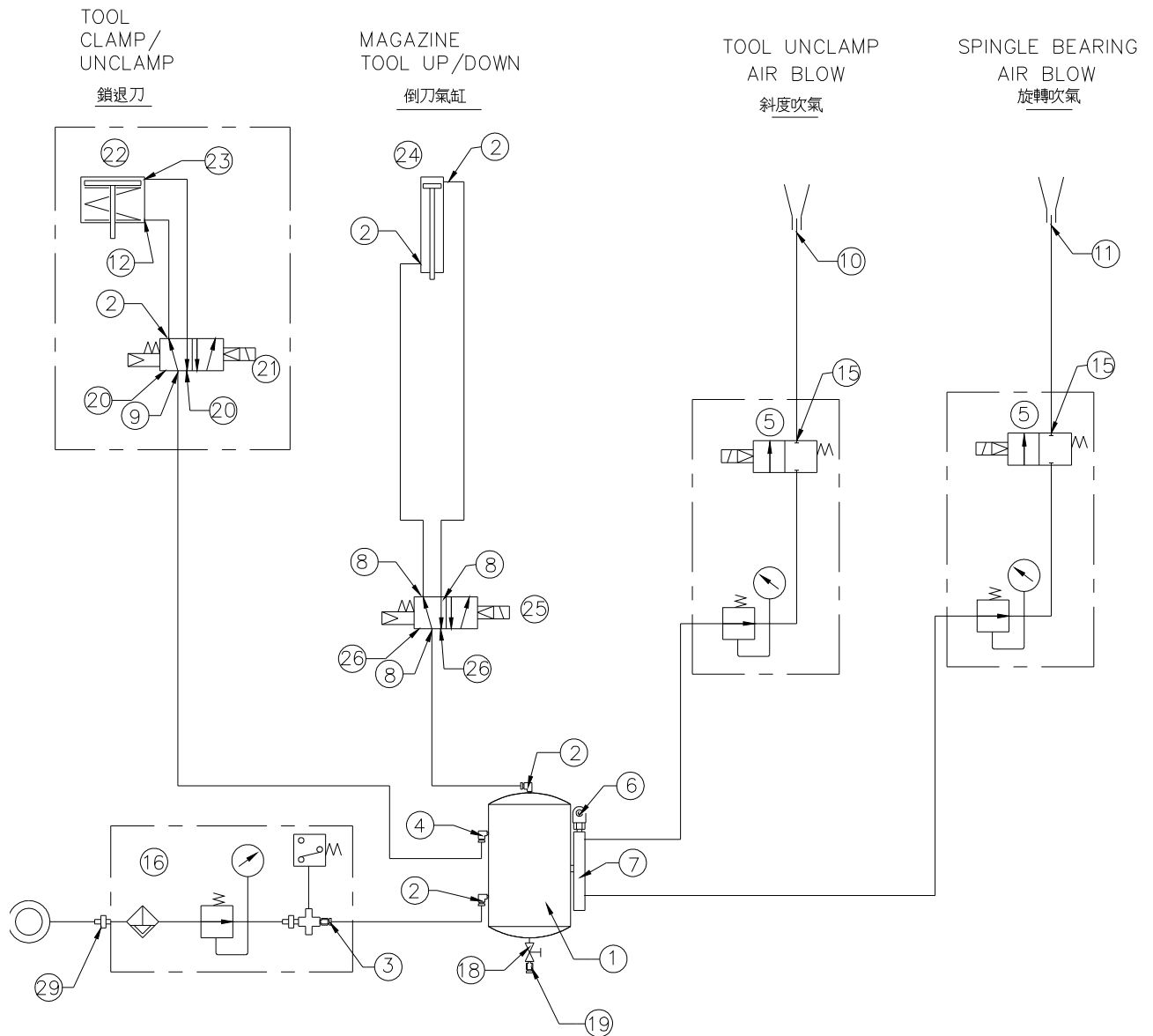
FIG. 6.6.3 DISCONNECTING OF HOSE

6.6.5 CIRCUIT DIAGRAM OF AIR SYSTEM

A. #40 SPINDLE (10/16T)



B. #40 SPINDLE (24T)



#40 SPINDLE AIR SYSTEM PARTS LIST

PARTS NO.		DESCRIPTION	REMARKS	
1	5541-3014-100	GAS TANK	儲氣桶	1
2	5541-3323-100	ONE TOUCH CONNECTOR	快速接頭	4
3	5541-3314-100	ONE TOUCH CONNECTOR	快速接頭	1
4	5541-3334-100	ONE TOUCH CONNECTOR	快速彎頭	1
5	5541-8180-200	ADJUSTABLE PRESSURE VALVE	調壓閥組	2
6	1000-2411-100	PRESSURESWITCH FOR HIGH PRESSURE COOLANT	壓力開關	1
7	1051-2603-100	5 PORT DISTRIBUTION	方形鋁塊五通	1
8	5541-3314-100	ONE TOUCH CONNECTOR	快速接頭	3
9	5541-3297-100	ONE TOUCH CONNECTOR	快速接頭	1
10	1500-1081-100	ONE TOUCH CONNECTOR	快速彎頭	1
11	1500-1081-100	ONE TOUCH CONNECTOR	快速彎頭	1
12	5541-3328-100	ONE TOUCH CONNECTOR	快速彎頭	1
14		CYLINDER	前後氣壓缸	1
15	5541-3262-100	ONE TOUCH CONNECTOR	快速彎頭	4
16	1051-8150-100	AIR UNIT SET	三點組合組	1
18	5511-3336-100	AIR COCK	小型拷克內外牙	1
19	5541-3261-100	ONE TOUCH CONNECTOR	快速接頭	1
20	5541-3208-600	AIR NOISE ELIMINATOR	銅消音濾清器	2
21	5541-3320-200	SINGLE SOLENOID	電磁閥	1
22	1200-1157-400	CYLINDER	倍力氣壓缸	1
23		CONNECTOR	3/8" (15.00mm)PT彎頭	1
24		CYLINDER	導刀氣壓缸	1
25	5541-3321-200	SINGLE SOLENOID	電磁閥	1
26	5541-3208-600	AIR NOISE ELIMINATOR	銅消音濾清器	2
27	5541-3205-300	SINGLE SOLENOID	電磁閥	1
28	5541-3208-400	AIR NOISE ELIMINATOR	銅消音濾清器	2
29	5541-3342-100		手動閥	1

6.7 PARAMETER FOR LUBRICATION

DGN TIMMER SETTING ADDR'S	DESCRIPTION	DEFAULT SETTING
2	LUBRICATOIN RUNNING TIME	19968 (ABOUT 20 sec)
3	LUBRICATION CYCLE TIME	999984 (ABOUT 17 min)



6.8 ADJUSTMENT OF SLIDEWAY GIBS

WITH TIME, THE SLIDE WAY WEAR AND THEREFORE MUST BE ADJUSTED THROUGH THE GIBS.

THE GIB ADJUSTING SCREW FOR X AXIS IS FOUND AT THE LEFT OF THE TABLE VIEWED FROM THE MACHINE FRONT, THE GIB ADJUSTING SCREW FOR Y AXIS AT THE FRONT OF THE SADDLE, AND THE GIB ADJUSTING SCREW FOR Z AXIS ON THE TOP OF THE COLUMN .

IN GENERAL PRACTICE, THE ADJUSTMENT SHOULD BE MADE IN 3 MONTHS AND 6 MONTHS AFTER INSTALLATION. AFTER THAT, CHECK SLIDE WAY LEVEL YEARLY AND ADJUST IT IF NECESSARY.

TO ADJUST SLIDE WAY LEVEL, PROCEED AS FOLLOWS : (AS SHOWN IN FIG. 6.8.1)

- A. LOOSEN 3 - 4 TURNS GIB LOCK SCREW.
- B. FULLY TIGHTEN GIB ADJUSTING SCREW.
- C. LOOSEN ONE TURN THE GIB ADJUSTING SCREW.
- D. TIGHTEN THE GIB LOCK SCREW.

NOTICE: THAT TOO TIGHTLY CLAMPED GIB MAY HINDER SMOOTH MOVEMENT, ACCELERATE WEAR AND, IN EXTREME CASE, RESULT IN SEIZURE. WHEN ADJUSTING SLIDE WAY GIBS. PLEASE INFORM OUR SERVICEMAN.

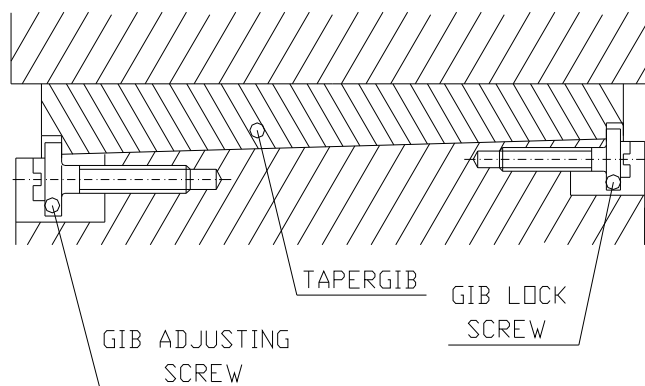
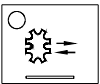
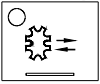


FIG.6.8.1 ADJUSTMENT OF SLIDE WAY GIBS

7. Trouble Shooting

Device	1. ATC													
Status	1.1 Wrong tool number (arm type)													
Reason 1	Contamination on magazine counter sensor													
Reason 2	Wrong operation													
Fix 1	1. Eliminate the contamination on magazine counter sensor. 2. Follow Fix 2 step.													
Fix 2	Reset the tool data table, "G.DATA" setting After you reset the tool data table, you also have to check the tool number on tool data table. - Execute M2000 and M2001 to confirm - The magazine will go reference to pot1 - Check tool data table, "G.DATA" setting Refer to parameter list "DGN SETTING" for the correct tool number.													
Status	1.2 Wrong tool number (armless type)													
Reason 1	Contamination on magazine counter sensor													
Reason 2	Wrong operation													
Fix 1	a. Eliminate the contamination on magazine counter sensor. b. Follow Fix 2 step.													
Fix 2	a. Check the tool data table, "G.DATA" setting, you also have to check the tool number on tool data table. a. Push power off/on b. Perform reference point return of all axes(ATC magazine also) c. The magazine will go reference to pot1 d. Check tool data table, "G.DATA" setting Refer to parameter list "DGN SETTING" for the correct tool number.													
Status	1.3 ATC Arm not in position (arm type)													
Reason 1	Because emergency stop button Pushed.													
Reason 2	Arm is in position. But sensor failure (no signal).													
Reason 3	Sensor failure.													
Reason 4	Motor break failure.													
Fix 1	1. Release emergency stop button 2. Rotate the ATC arm manually (use allen key) upon the tool changer motor, until <table border="1" data-bbox="421 1709 1165 1948"> <tr> <td>OiM</td><td>OiMate/18iMB/21iMA</td><td>18M</td></tr> <tr> <td>X10.2</td><td>X24.2</td><td>X1008.2</td></tr> <tr> <td>X10.3</td><td>X24.3</td><td>X1008.3</td></tr> <tr> <td>X10.1</td><td>X24.1</td><td>X1009.4</td></tr> </table> 3. Let the ATC arm be on the original position 4. In MDI mode, key in M1006, cycle start(2) to let tool pot be on horizontal position 5. Check tool data table, "G.DATA" setting		OiM	OiMate/18iMB/21iMA	18M	X10.2	X24.2	X1008.2	X10.3	X24.3	X1008.3	X10.1	X24.1	X1009.4
OiM	OiMate/18iMB/21iMA	18M												
X10.2	X24.2	X1008.2												
X10.3	X24.3	X1008.3												
X10.1	X24.1	X1009.4												

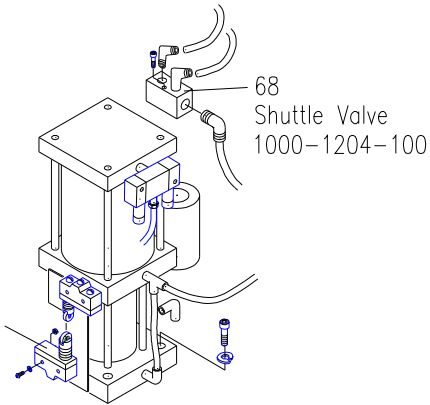
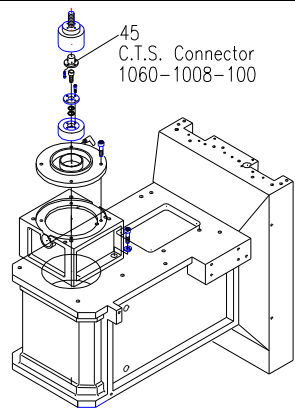
	Refer to parameter list "DGN SETTING" for the correct tool number.
Fix 2	Adjust the distance between sensor and DOG. 1. When arm is in position. 2. Release the lock screw of sensor. 3. Rotate the sensor clockwise slowly until touch the DOG. 4. Rotate the sensor anti-clockwise for 1 and 1/2 turn. 5. Secure the lock screw.
Fix 3	Change sensor
Fix 4	1. Turn off the power. 2. Rotate the ATC arm motor on the top of ATC, until arm in position. 3. If happen very often, change break.
Status	1.4 ATC not in position (armless type)
Reason 1	Because emergency stop button Pushed.
Fix 1	a. Release emergency stop button b. Select Manual mode c. Set keep relay K6.7=1, and place edit key on (44) d. (magazine forward)  press to go to spindle side(M19 first) (magazine backward) place edit key off (44)  press + feed hold(3) together to move back magazine to initial position e. Let the ATC magazine be on the original position f. Push power off/on g. Perform reference point return of all axes(ATC magazine also) h. Check tool data table, "G.DATA" setting Refer to parameter list "DGN SETTING" for the correct tool number.
Status	1.5 ATC home not in position (arm type)
Reason 1	Home DOG not in sensor detect position.
Fix 1	1. Turn off the power. 2. Take off the ATC cover. 3. Rotate the fan of tool magazine motor. 4. Until the DOG reach the detect position. 5. Turn on the power again.
Status	1.6 ATC magazine can not rotate or not smooth (armless type)
Reason 1	Motor breakdown
Reason 2	Foreign matter jammed in the CAM system.
Reason 3	Tool magazine twist.
Fix 1	Change motor
Fix 2	1. Turn off the power 2. Eliminate the foreign matter.
Fix 3	Change tool magazine.

Device	2. Air system
Status	2.1 Air pressure low
Reason 1	Inlet of air pressure to low.
Reason 2	Air leaking
Reason 3	Air filter blocked.
Reason 4	Magnetic valve failure.
Fix 1	Check the inlet pressure.
Fix 2	1. Check the leaking 2. Replace the pipe or connector.
Fix 3	Clean the air filter
Fix 4	Replace the magnetic valve.

Device	3. Spindle coolant system
Status	3.1 Can not reach the setting temperature.
Reason 1	Wrong setting.
Reason 2	Filter blocked.
Reason 3	Cycling coolant oil not enough.
Reason 4	Refrigerative not enough.
Fix 1	Set the temperature difference to -2 (compare with room temperature)
Fix 2	Clean the filter.
Fix 3	1. Refill the coolant oil 2. Check if oil pipe leaking.
Fix 4	1. Refill Refrigerative. 2. This operation need to be done by certificate technical person. Warning!! Do not operate by yourself. 3. Call your machine agent for replacement.
Status	3.2 Function failed
Reason 1	Overload of motor protective switch
Reason 2	Motor defective
Reason 3	Wrong power inlet phase
Fix 1	1. Check motor protective switch 2. Check oil pipe 3. Check oil
Fix 2	Check motor power line isolation
Fix 3	Change power inlet phase

Device	4. Chip Flush and coolant
Status	4.1 Coolant flow rate to low
Reason 1	Coolant filter blocked.
Reason 2	Coolant pipe leaking or blocked
Fix 1	Clean the filter
Fix 2	Check if any leaking or blocked of the pipe.

Status	4.2 Function failed
Reason 1	Low coolant level
Reason 2	Overload of motor protective switch
Reason 3	Motor defective
Reason 4	Wrong power inlet phase
Fix 1	Refill the coolant.
Fix 2	1. Check motor protective switch 2. Chip jammed, clean the filter, remove the chip
Fix 3	Check motor power line isolation
Fix 4	Change power inlet phase

Device	5. Coolant through spindle
Status	5.1 Coolant flow rate to low
Reason 1	Coolant filter blocked.
Reason 2	Coolant pipe leaking or blocked
Reason 3	Shuttle Valve failed
Reason 4	C.T.S. connector failed
Fix 1	Clean the filter
Fix 2	Check if any leaking or blocked of the pipe.
Fix 3	 1. Shuttle valve is on the top of the spindle over the tool clamping cylinder. (check parts list for detail) 2. there are two inlet on the top and one outlet on the side. 3. test with air blow from one of the inlet and check if there is leaking from another inlet. 4. if there is leaking replace the valve.
Fix 4	 1. C.T.S. connector is on the top of the spindle. (check parts list for detail) 2. check if the connector breakdown. (bracken or change shape) change a new one. 3. if the connector is dirt and stocked, clean it and reassemble. (in this case be ware to check the filter in the C.T.S. coolant tank)
Status	5.2 Function failed
Reason 1	Wrong tool shank and stud.
Reason 2	Low coolant level
Reason 3	Overload of motor protective switch
Reason 4	Motor defective

Reason 5	Wrong power inlet phase
Reason 6	level sensors fault
Fix 1	Must use tool shank and stud for coolant through spindle.
Fix 2	Refill the coolant.
Fix 3	1. Check motor protective switch 2. Chip jammed, clean the filter, remove the chip 3. Check coolant pipe
Fix 4	Check motor power line isolation
Fix 5	Change power inlet phase
Fix 6	Check level sensors

Device	6. Chip conveyor
Status	6.1 Noise or running not smooth
Reason 1	Chip stock on the conveyor.
Reason 2	Conveyor screw change shape. (spiral type)
Fix 1	1. Machine Power off. 2. Check and clean the chip stock in the conveyor.
Fix 2	1. Machine power off 2. Take off the screw and try to recover the shape. 3. If screw can not recover, contact your machine agent.
Status	6.2 Function failed
Reason 1	Overload of motor protective switch
Reason 2	Motor defective
Reason 3	Wrong power inlet phase
Fix 1	1. Check motor protective switch 2. Chip jammed, chip conveyor ccw to remove
Fix 2	Check motor power line isolation
Fix 3	Change power inlet phase

Device	7. Vacuum dust collector
Status	7.1 Weak vacuum power
Reason 1	Vacuum filter blocked.
Reason 2	Vacuum pipe leaking.
Fix 1	Clean the filter.
Fix 2	1. Check the vacuum pipe. 2. Replace if necessary.
Status	7.2 Function failed
Reason 1	Overload of motor protective switch
Reason 2	Motor defective
Reason 3	Wrong power inlet phase
Fix 1	1. Check motor protective switch 2. Powder jammed, clean the filter, remove the powder
Fix 2	Check motor power line isolation
Fix 3	Change power inlet phase

8. Alarm Message

- THE ALARM MESSAGE BELOW ARE REGARDING TO THE PLC MADE BY LONG CHANG MACHINERY.
- FOR THE ALARM MESSAGE REGARDING TO FANUC SYSTEM, PLEASE REFER TO FANUC OPERATOR'S MANUAL.

MESSAGE	1000 X AXIS OVER TRAVEL (ADDRESS A10.0)
REASON & SOLUTION	1. X AXIS EMG LIMIT (HARDWARE LIMIT -ON BOTH SIDE END) 2. EMERGENCY STOP CIRCULAR LIMIT SWITCH FUNCTION ON USING 2'ND REMOVES PB. KEEP PUSH PLACE HANDLE MODE MOVE BACK INTO STROKE& RE ZERO RETURN AGAIN 3. UN NORMALLY OFFSET OF COORNATE VALUE 4. LIMIT SWITCH OUT OF ORDER (DAMAGE) 5. CIRCULATE WIRING SIGNAL MISSING WIRE BROCKEN
MESSAGE	1010 Y AXIS OVER TRAVEL (ADDRESS A10.1)
REASON & SOLUTION	SAME AS ABOVE ON Y AXIS
MESSAGE	1020 Z AXIS OVER TRAVEL (ADDRESS A10.2)
REASON & SOLUTION	SAME AS ABOVE ON Z AXIS
MESSAGE	1030 LUBRICATION PUMP OVERLOAD (ADDRESS A10.3)
REASON & SOLUTION	1. CHECK LUBRICATION PUMP WIRING (TERMINAL CONNECTION; ANY SHORT ON WIRING; PUMP DAMAGE) AFTER CHECKING RESET 2. OVERLOAD RELAY
MESSAGE	1040 COOLANT PUMP OVERLOAD (ADDRESS A10.4)
REASON & SOLUTION	1. CHECK ANY STUCK THROUGH COOLANT SYSTEM (COOLANT TANK HOSE) 2. CHECK WIRING CONNECTION (PLUG; TERMINAL BLOCK; CONTECTER POINTER) 3. AFTER CHECKING RESET OVERLOAD RELAY
MESSAGE	1050 MAGAZINE ARM MOTOR OVERLOAD (ADDRESS A 10.5) FOR WITH ATC ARM TYPE ATC USE ONLY
REASON & SOLUTION	1. UNNORMAL LOAD TO ARM 2. . INSIDE OF CAM DRIVE SYSTEM DAMAG (YOU CAN PUSH ARM UP IF GOT MORE THEN 1MM BACKLASH) 3. ON TOP OF ARM MOTER BRAKE NOT RELEASE 4. WIRING OF MOTER CHECK VIA MOTER TO POWER SOURCE LOSE PHASE 5. MOTER SHORTAGE AFTER CHECKING RESET OVERLOAD RELAY
MESSAGE	1060 MAGAZINE RUN MOTOR OVERLOAD (ADDRESS A10.6)
REASON & SOLUTION	1. MAGAZINE MOTER OVERLOAD CHECK ANY STUCK ON MOVING TOOL POCKET & MOTER TO TRANSIMITION PART'S PROPERLY 2. WIRING FROM MOTER TO POWER SOURCE ANY SHORT OR LOOSE PHASE 3. CHECK LOAD OF TOOLS NORMALLY AFTER CHECKING RESET OVERLOAD RELAY

MESSAGE	1070 SPINDLE COOLANT PUMP OVERLOAD (ADDRESS A10.7)
REASON & SOLUTION	1. COOLANT OF SPINDLE CHILLER SYSTEM OVERLOAD PLEASE CHECK WIRING CONNECTING 2. FUSE BLOW OR OVERLOAD RELAY TRIP 3. CHECK OIL ANY STUCK ON PIPING IN & OUT 4. AFTER CHECKING RESET OVERLOAD RELAY AND RESET
MESSAGE	1100 CHIPCONVEYER OVERLOAD (ADDRESS A11.0)
REASON & SOLUTION	1. CHECK MOTOR WIRING LOSE PHASE OR SHORTAGE WIRING (COOLANT INSIDE MOTOR) 2. CHIPCONVEYER STUCK OR OVER DESIGN OF LOAD CHECK & REMOVE STUCK 3. AFTER CHECKING CHIPCONVEYER MOTION SMOOTHLY AND GREASESING RESET OVERLOAD RELAY
MESSAGE	1110 TAPPING OIL PUMP OVERLOAD (ADDRESS A11.1) OPTION FUNCTION
REASON & SOLUTION	1. CHECK WIRING & OIL DENSITY & PIPING OF PUMP REMOVE STUCK 2. RESET OVERLOAD RELAY AFTER CHECKING
MESSAGE	1120 SPINDLE COOLANT PUMP OVERLOAD (ADDRESS A11.2) CTS
REASON & SOLUTION	1. DUST OR CHIP STUCK ON PUMP CLEANING AND CLEAN COOLANT 2. FILTER 3. CHECK MOTOR WIRING SUPPLY VOLTAGE OR PLUG OF POWER 4. LINE SHORTAGE 5. AFTER CHECKING RESET OVERLOAD RELAY
MESSAGE	1130 COOLANT PUMP OVERLOAD (ADDRESS A11.3)
REASON & SOLUTION	1. DUST OR CHIP STUCK COOLANT PUMP CLEAN FILTER & STUCK 2. CHECK PUMP WIRING; SUPPLY VOLTAGE; ANY SHOTAGE CAUSE 3. AFTER CHECKING; RESET OVERLOAD RELAY
MESSAGE	1140 RECYCLE PUMP OVERLOAD (ADDRESS A11.40)
REASON & SOLUTION	1. STUCK OR AIR INSIDE PIPING –CLEAN COOLANT TANK & OPEN 2. COOLANT PUMP FILL PLUG FULL PIPING THEN TIGHTEN PLUG 3. CHECK WIRING PLUG ANY LOOSEN OR SHORTAGE 4. AFTER CHECKING RESET OVERLOAD RELAY 5. CHECK ANY LEAKAGE OF PUMP – OPEN PUMP RE SEALING
MESSAGE	1150 CHIP CLEAN PUMP OVERLOAD (ADDRESS A11.5)
REASON & SOLUTION	1. VALVE BEING CLOSED 2. STUCK ON COOLANT PUMP—CLEAN TANK REMOVE STUCK CLEAN PUMP FILTER 3. CHECK WIRING –VOLTAGE ANY SHORTAGE 4. AFTER CHECKING RESET OVERLOAD RELAY
MESSAGE	2000 M CODE OCCUPIED (MF1)(ADDRESS A12.0)
REASON & SOLUTION	
MESSAGE	2030 M30 PROGRAM END (ADDRESS A12.3)
REASON &	WHEN PROGRAM READ M30 PROGRAM END WILL DISPLAY & AND BUZZER

SOLUTION	ON ---PRESS BUZZER CUT TO STOP
MESSAGE	2040 M02 PROGRAM END (ADDRESS A12.4)
REASON & SOLUTION	WHEN PROGRAM READ M02 PROGRAM END WILL DISPLAY & AND BUZZER ON ---PRESS BUZZER CUT TO STOP
MESSAGE	2050 M01 PROGRAM OPTIONAL STOP (ADDRESS A12.5)
REASON & SOLUTION	WHEN SINGLE BLOCK FUNCTION ON – PROGRAM READ M01 WILL STOP & DISPLAY MESSAGE PRESS CYCLE START TO CONTINUE PROGRAM
MESSAGE	2060 M00 PROGRAM STOP (ADDRESS A12.6)
REASON & SOLUTION	WHEN PROGRAM READING M00 CODE PROGRAM WILL STOP --- CYCLE START TO CONTINUE PROGRAM
MESSAGE	2070 4TH NOT ZERO RETURN (ADDRESS A12.7)
REASON & SOLUTION	WITH 4 TH AXIS-- WHEN EXCUTION 4 TH COMMAND BUT NOT DOING ZERO RETURN WILL DISPLAY –DOING ZERO RETURN TO CANCEL ALM (K16.5 X 102.0)
MESSAGE	1300 LUBRICATION OIL LOW LEVEL (ADDRESS A13.0)
REASON & SOLUTION	1. LUBRICATION OIL LEVEL LOW SINGLE BLOCK WILL LIGHT ON REFILL OIL TO START PROGRAM 2. LUBRICATION LEVEL SWITCH DAMAGE
MESSAGE	1310 AIR LOW PRESSURE (ADDRESS A13.1)
REASON & SOLUTION	1. AIR SOURCE LOWER THEN SETTING PRESSURE (4.0~4.7bar) 2. PRESSURE GAUGE DAMAGE 3. C.WIRING DISCONNECTING
MESSAGE	1320 FANUC BATTERY LOW (ADDRESS A 13.2)
REASON & SOLUTION	WHEN CONTROLLER BATTERY LOW WILL DISPLAY ON SCREEN --- KEEP POWER ON TO CHANGE BATTERY OTHERWISE WILL LOST PROGRAM & PARAMETER
MESSAGE	1340 COOLANT TANK LOW LEVEL (O) ADDRESS A 13.4
REASON & SOLUTION	CTS SYSTEM COOLANT TANK LOW LEVEL SENSOR ON LOW LEVEL SENSOR DAMAGE
MESSAGE	1350 COOLANT TANK HIGH LEVEL (O) ADDRESSES A 13.5
REASON & SOLUTION	1. CTS SYSTEM COOLANT TANK HIGH LEVEL SENSOR ON 2. COOLANT TANK HIGH LEVEL SENSOR DAMAGE
MESSAGE	1400 SPINDLE ALM
REASON & SOLUTION	1. WHEN SPINDLE SYSTEM GOT ALM WILL DISPLY ON SCREEN – PLEASE OPEN CONTROL CABINET TO SEE SPINDLE AMPRIFLY DISPLAY NO –REFERENCE MAINTANCE TO CHECK CAUSE REASON 2. CHECK TEMP. OF SPINDLE MOTOR FAN FUNCTION NORMALLY 3. CHECK WIRING WHEN DOING M19 CAUSE ALM CHECK ORIENTATION SENSOR & WIRING

MESSAGE	1420 SPINDLE RUN WITHOUT S CODE (ADDRESS A14.2)
REASON & SOLUTION	BEFORE LET SPINDLE RUNNING IF NOT WITH S**** CODE TO START PROGRAM WILL DISPLAY MESSAGE
MESSAGE	1430 SPINDLE ORIENTATION ALM (ADDRESS A14.3)
REASON & SOLUTION	1. WHEN DOING M19 COMMAND CANNOT FIND ORIENTATION ALM WILL DISPLY – CHECK SENSOR & WIRING 2. CHECK PARAMETER SETTING (4000~4017)
MESSAGE	1440 SP. RIGID TAP MODE REST (ADDRESS A14.4)
REASON & SOLUTION	1. WHEN AFTER RIGID TAPPING DID NOT CANCEL MODE ALM MESSAGE DISPLY ---MDI MODE G80 TO CANCEL RIGID TAPPING TO CONTINUE PROGRAM 2. WHEN DOING RIGID TAPPING ON MIDDLE OF PROGRAM TO EXCUTE RIGID TAPPING ---MISSING M29; G84... CHANGE OR ADD PROGRAM TO RESET ALM
MESSAGE	1500 TOOL CLAMP LIMIT ERROR (ADDRESS A15.0)
REASON & SOLUTION	1. WHEN DOING M03/M04/M06 TOOL CLAMP SENSOR NOT ON PROPER POSITION --- CHECK SENSOR & SET SCREW FIXED 2. CLAMP SENSOR WIRING CHECK (CONNECTING MANUAL CAN VIA DGN SCREEN TO CHECK SIGNAL)
MESSAGE	1510 TOOL UNCLAMP LIMIT ERROR (ADDRESS A15.1)
REASON & SOLUTION	1. WHEN DOING M03/M04/M06 TOOL UNCLAMP SENSOR NOT ON PROPER POSITION --- CHECK SENSOR & SET SCREW FIXED 2. UNCLAMP SENSOR WIRING CHECK (CONNECTING MANUAL –CAN VIA DGN SCREEN TO CHECK SIGNAL)
MESSAGE	1530 TOOL UN CLAMP SOL ERROR (ADDRESS A15.3)
REASON & SOLUTION	1. DOING M06 PROCESS TOOL UNCLAMP COMMAND TOO LONG TIME NOT LET CYLINDER TO UNCLAMPING POSITION ALM WILL DISPLAY 2. SOLENOID DAMAGE (PLACE ON TOP OF SPINDLE –TOOL CLAMP/UNCLAMP UNIT) 3. LIMIT SWITCH NOT ON PROPER POSITION (ADJUST UNCLAMPING LIMIT SWITCH TO PROPER POSITION) 4. AIR SUPPLY PRESSURE DROP (AIR SOURCE LOWER THEN 6 bar; AIR PIPING TOO SMALL INSIDE DIAMETER SMALLER THEN 6mm)
MESSAGE	1700 MAGAZINE DOWN LIMIT ERROR (O) (ADDRESS A17.0)
REASON & SOLUTION	1. ATC WITH UP/DOWN MOTION MAGAZINE UP/DOWN –DOWN LIMIT SWITCH NOT CONFIRM (CHECK LIMIT SWITCH) 2. BRAKE OF UP/DOWN CYLINDER NOT RELEASE (SCREW IN PULL UP TO CHECK FUNCTION) 3. CHECK UP/DOWN THROW VALUE (SPPED ADJUSTOR) 4. CHECK AIR PRESSURE – DID WATER IN PIPING? ANY LEAKAGE AIR PIPING?
MESSAGE	1710 MAGAZINE UP LIMIT ERROR (O)(ADDRESS A 17.1)
REASON & SOLUTION	1. ATC WITH UP/DOWN MOTION MAZATION UP/DOWN –DOWN LIMIT SWITCH NOT CONFIRM (CHECK LIMIT SWITCH) 2. BRAKE OF UP/DOWN CYLINDER NOT RELEASE (SCREW IN PULL UP TO CHECK FUNCTION) 3. CHECK UP/DOWN THROW VALUE (SPPED ADJUSTOR)

	4. CHECK AIR PRESSURE – DID WATER IN PIPING? OR ANY PIPE INSIDE LEAKAGE
MESSAGE	1720 MAGAZINE DOWN SOL ERROR (O)(ADDRESS A17.2)
REASON & SOLUTION	1. ATC WHEN UP/DOWN MOTION MAGAZINE SHOULD UP/DOWN – BUT WHEN TIME OUT NOT REACH POSITION WILL CAUSE ALMS 2. CHECK SOL OR LIMIT SWITCH (UP/DOWN LIMIT SWITCH 3. CHECK ANY STUCK OR AIR LEAKAGE
MESSAGE	1750 MAGAZINE FORWARD LIMIT ERROR (ADDRESS A17.5)
REASON & SOLUTION	1. ADJUST &CHECK MAGAZINE FORWARD LIMIT SWITCH (SENSOR) 2. SENSOR DAMAGE CHANGE SENSOR
MESSAGE	1740 MAGAZINE BACKWARD LIMIT ERROR (ADDRESS A17.4)
REASON & SOLUTION	1. ADJUST & CHECK MAGAZINE BACKWARD LIMIT SWITCH (SENSOR) 2. SENSOR DAMAGE REPLACE IT
MESSAGE	1810 MAGAZINE NOT IN POSITION (ADDRESS A18.1)
REASON & SOLUTION	1. IF AT SAME TIME MAGAZINE MOTOR OVERLOAD RESET OVERLOAD RELAY 2. IF NOT PLACE MODE SELECT SWITCH TO MANUAL MODE – GO TO G91 G30 Z0; FIRST THEN M19 –TURN MAGAZINE MANUALLY & CHECK WAITING POCKET CORRECT? VIA OUR DATA SHEET TO SETTING BACK SETTING 3. TURN MAGAZINE TO POCKET 1 SETTING DATA –G DATA TO MATCH SETTING
MESSAGE	1820 Z AXIS NOT HOME (ADDRESS A18.2)
REASON & SOLUTION	1. RE DOING Z AXIS ZERO RETURN (MODE PLACE ZRN PUSH 2. Z+ UNTIL Z AXIS HOME LED LIGHT ON)
MESSAGE	1900 RETURN TO ALL AXIS REF. POS. (ADDRESS A19.0)
REASON & SOLUTION	1. BEFORE EXECUTION AUTO START ALL AXIS NEED DOING ZERO RETURN TO CONFIRM ALL COORDINATE CORRECT SCREEN WILL SHOW & DISPLAY MESSAGE 2. EMERGENCY STOP OR NEED TO RE CONFIRM COORDINATE WILL SHOW ALL AXES GO TO ZERO POSITION
MESSAGE	1930 FLOW CIRCULATION ERROR (ADDRESS A19.3)
REASON & SOLUTION	1. WHEN ADD CTS COOLANT SUCTION BACK FROM MAIN TANK ANY STUCK WILL 2. CAUSE SENSOR PRESSURE HIGH REMOVE STUCK 3. CHECK PRESSURE SENSOR
MESSAGE	1940 NOT AT ATC POINT (ADDRESS A19.4)
REASON & SOLUTION	1. DOING Z AXIS TO ZERO POSITION 2. DOING COMMAND TO TOOL CHANGE POINT (G91G30Z0;) 3. CHECK ATC CHANGE CONFIRMS DOG TOUCH SWITCH? IF NOT ADJUST IT OF COURSE NEED TO CHECK MAGAZINE AGAIN
MESSAGE	1950 SPINDLE POCKET WITH TOOL (ADDRESS A19.5)
REASON & SOLUTION	1. TAKE OFF WAITING POCKET TOOL (SPINDLE & WAITING POCKET BOTH HAVE TOOLING WILL CLASH) 2. ADJUSTMENT EMPTY CHECK SENSOR IF NO TOOLING ON WAITING POCKET

MESSAGE	1960 T CODE ERROR (ADDRESS A19.6)
REASON & SOLUTION	1. WHEN COMMAND CALLING TOOLING OUT SIDE OF TOOL NO. WILL CAUSE ALMS CORRECT PROGRAM 2. CONFIRM SPINDLE TOOL NO. & WAITING POCKET NO. & CORRECT IT
MESSAGE	2020 LUBRICATION SYSTEM ERROR (ADDRESS A20.2)
REASON & SOLUTION	1. CHECK LUBRICATION SYSTEM PIPING ANY LEAKAGE? REPAIR IT 2. CHECK LUBRICATION PUMP PRESSURE? REPLACE LUBRICATION PUMP