LX-B

INSTRUCTION MANUAL

LEADERWAY CNC TECHNOLOGIES CO. Ltd.

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DOUBLE COLUMN MACHINE CRNTER

MODE : LX-B Series

INSTRUCTION MANUAL

CONTROLLER : FANUC 18i MC

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Preface

Safety is the first of all ! We do not product machines but care about you very much.

We are pleased to know that you have decided to purchase our CNC machine tool center. We are sure this machine, after operating on the production line of your factory, will be able to promote your products of high stability and excellent quality.

It is our pleasure to introduce the relevant information regarding the safe use of this machine and help you increase the production capability and operating this machine in proper way can not only keep it at high precision and stable condition but also keep you from damage or danger.

Before using this machine, please be sure to read all of the Operation Manual, Mechanical Manual and the safety regulations very carefully so as to ensure the safety for the people and the machinery.

Please put Manuals available around for the operator easy to get, do not put them away. Do not damage it and make good use of them to ensure your safety. Therefore, please good use of your experience, common sense and Manuals instruction to remind you. When train your employees always think safety is the first of all for all kinds of industries and job.
We have put our efforts on offering safety and excellent machinery for our customers in order to restore the normal operation and upgrade the technical standard of our factory. Please feel free and take down what have happened in detail and inform our factory or the nearest agent, service center to handle it for you.

Content

10. Lubrication unit

11. Pneumatic system

12. Coolant system

13. Cooler system

B01.MACHINE OPERATION PANEL

1 Safety

1-1 Safety precautions

This machine is provided with a number of safety devices to protect personnel and equipment from injury and damage. Operators should not rely solely upon these safety devices but should operate the machine after fully understanding what special precautions to take by reading the following statements thoroughly.

However, safe operation cannot be ensured if operators use a CNC Machine Center improperly or do not follow safety rules properly. Failure to comply with these rules may result in death, injury or damage to the machine and/or products.

1-2 The basic conditions of safety operation

1. Only qualified or trained personnel are permitted to maintain and/or operate this machine.
2. Read the instruction manual thoroughly and make sure the contents completely understand in order to operate a machine efficiently and safely.
3. Always keep this safety paragraph and instruction manual at a designated place near the machine so that they can be easily accessed whenever required.
4. The personnel who is charge of operation and maintenance must understand the location and function on the knob of Emergency.
5. The key of key-switch must keep by the senior and qualified personnel.
6. Wear safety shoes which are not damaged by oil, safety goggles with side covers, safety clothes and other relevant safety protection.
7. Be sure there are no articles or material around the machine.
8. Make sure the working area is clean and enough room for moving un case of tools, parts dropping.
9. A series machines start-up requires a PC with V24 interface for data transfer from/to the control system and an NC card. On the PC, WINPCIN Tool must be used.
10. Turn off the power source before going home, checking machine.
11. An internal data backup must be carried out whenever the control system is switched off longer than 50 hours.
12. The NC card must be plugged or removed only when the PC is turned off..

13. All persons concern with operation and maintenance of this machine must be aware of the Emergency stop button and switch location, function and operation.
14. All persons concern with operation and maintenance of this machine must be aware of the emergency stop button and main power switch location, function and operation.
15. In the event power is failure, turn off the main circuit breaker immediately.
16. Use the recommended hydraulic oil, lubricants and grease or acceptable equivalents.
17. Replacement fuses should have the proper current ratings.
18. Protect the NC system, operating panel, etc., from shocks, because of resulting failure or malfunction.
19. Do not change parameters, volumes and other electrical setting unnecessarily. If such change is unavoidable, record the values prior the change so that they can be returned to their original setting if necessary.
20. Do not soil, scratch or remove the caution plates.
21. Whenever operating forklift truck, crane or similar equipment, special car should be taken to prevent collisions and damage to surroundings.
22. Never touch the electric control knobs when your hand in wet.
23. Turn the power supply off when you replace fuse.
24. Never have chips, cutting oil, coolant fluid etc. on the floor of working area otherwise it will cause serious trouble when slip.
25. Make sure the push bottoms before pushing on of turning off.
    During the persons in service maintenance or in operating the machine, make sure all the process are clean to each other, otherwise, don’t move.

1-3 Safety labels

Danger

This symbol is used to draw the reader's attention to electrical hazards and high danger area which may cause serious damage if not pay attention to it.

Caution

This symbol is used to draw the reader's attention where precautions are to be taken.

Warning

This symbol is used to draw the reader's attention medium danger needs to keep attention-dangerous may cause damages or broken the machine.

This symbol means low degree of danger, but also will cause malfunction of machine if pay no attention to it during the period of operation.

1-4 Safety of operation machine

Warning

1. Always wear helmet, protecting glasses, safety shoes and other protecting equipments as required while operating machine.
2. The operations of this machine should not against the instruction of all manuals.
3. Do not settle down the machine near high electrical magnetic interference (EMI) machine.
4. Do not wear loose clothing or jewel that can be caught by moving parts of machine.
5. When performing heavy-duty machining, prevent carefully chips from being accumulated since hot chips can catch fire.
6. Before any rotation parts, moving articles or transmission feed stop completely, do not touch the cutter or work pieces.
7. Do not touch or press the buttons and switches with wet hands it might get shock.
8. Always remember the location of emergency stop button so that you can press the buttons right away if any unexpected accidence is occurred.
9. Never operate the machine or turn on the power source unless everything is completely set down and inspected all right.
10. Do not use fuses other than those specified or change parts for the sake of saving money.
11. Pay attention to and keep away from the high voltage devices or isolate with cover.
12. Stop machine before maintaining or adjusting the position of coolant hose, cutter or disposing the chips.
13. Cables, cords or electric wire whose insulation is damaged can produce current leaks and electric shocks. Before using check their condition.
14. Do not cut a kind of material, which are easy to catch fire on the machine, such as magnesium, magnesium ally or other material, which lower melting point.
15. Do not open the door or remove the covers of chip proof sheet metal, during machine performance.

16. Do not open the power cabinet door while the machine is operating. If it's necessary to open it, be sure the machine stops running totally.

17. Immediately turn off main power supply when power failure.

18. Please use the hydraulic oil, lubrication oil as recommended.

19. The fuse must be appropriate and easy to get.

20. Make sure the CNC unit, control box, electrical cabernet no electrical leakage.

21. Keep the warning stickers in a clean position.

1-5 Warning of before turning on

Warning

1. Before operating this machine must fully understand the function of this machine and the process.

2. The first time to operate the machine, after unpacking or keeping the machine idle for a long period each slide way surface must be freshly lubricated. Keep lubrication pump work till oil oozes out from wiper. Contact our service station or agents in connection with what procedure should be taken since it depends on the type of machine.

3. Ensure the hoisting rope, transportation blocks and packing stuff are removed completely before starting running the machine

4. The electrical wire on floor must be fully protected

5. Clean machine so that any abnormalities can be found.

6. Make sure the lubrication oil is properly supplied to the correct places.

7. Check coolant tank and oil reservoir are filled to indicated level.

8. Check cooler tank and oil (water) are filled to indicated level.

9. Check the air pressure gauge in right position.

10. It is safe that all parts, chips and waste oil should be removed by the operator and be placed to assigned storehouse and far from machine.

11. Please use work glass and working shoes to protect the eyes and toes of foot.

12. Check all the locks of CNC units, control box and electrical cabinet, etc.

13. Check all handles and knobs push buttons etc.

14. Following the instruction of lubrication sticker check all the points and use appropriate oil.

1-6 Warning of after turning on

1. Checking the lubrication system and see all slide ways and see if the lubricant is sufficient.
2. Check the coolant for cutting is enough.
3. Check motors, gearbox and other parts for abnormal noises.
4. Make sure the lubrication oil pressure; pneumatic pressure and hydraulic pressure indicate the correct values
5. Check joints or fasteners of pipe, hose, wire and cable there are any leakage or loose.
6. Turn on main power supply and turn on machine start dry run.

1-7 Preparation

ATTENTION!

1. All the tool and cutting tools must be applied to specification of this machine.
2. Any damage of tools or cutting tools are not allowed to use on this machine.
3. It will be sufficient light around working area.
4. Tools and cutting tools must be stored at its prepare place in a clean condition.
5. Please don’t put tools or cutting tools on sheet metal cover or any guarding.
6. Carefully checking the length of tools of cutting, be sure of no internee
7. After tools mounting on tool holder, please test run before getting into real operation.

1-8 Warm up

1-8-1 Spindle warm up

ATTENTION!

This is designed with high precision, a kind of automatic CNC machine center. For the spindle life, please before operating, follow up the table statements of spindle warming up :

CONDITION	SPINDLE REVOLUTION (rpm%)	TIME	CHECKING ITEM
Daily work	20% of Max. rev.	10 min.	1. Temperature raising must be less than 20℃ 2. Vibration 3. Noise level
Spindle stop rotating over 72 hrs and up	1. 25% of Max. rev. 2. 50% or 1/3 of Max. rev.	10 min. 10 min.	1. Temperature raising must be less than 20℃ 2. Vibration 3. Noise level
Spindle stop rotating over 2 weeks and up	1. 20% 2. 40% 3. 60% 4. 80% 5. full speed	15 min 15 min. ***30*** min. ***30*** min. ***40*** min.	1. Temperature raising must be less than 20℃ 2. Vibration 3. Noise level **4.** Each ***Time*** should wait till steady temperature then run the next step.

1. Do not rotate spindle unless the tool holder loaded into spindle already.
2. If the temperature raise over 20℃, please slow down the revolution of spindle to 800 rpm then wait about 5℃ higher than room temperature to operate following up the table instructions above.

1-8-2 Feed axis warm up

ATTENTION!

Dry run 10 to 20 minutes the feed rate, please set on half or 1/3 of normal operation.

1-9 Warning in operation

ATTENTION!

1. Operator with long hair must wear helmet or tie up a nut to prevent from traction into machine.
2. Please don’t wear glove during operation of machine.
3. If the work piece is too heavy please handle it with two persons.
4. Do not touch the chips and blade tip of the cutter with naked fingers.
5. Do not take the chips away or touch the rotating portion parts with naked fingers or other articles
6. Do not operate switches with gloves on, it will cause malfunction, etc.
7. When the machine spindle is in dead-stop position, then we can adjust the coolant nozzle.
8. When the spindle stop, make sure there is enough clearance between tool and work piece, then you can remove the work piece.
9. When the spindle is running, please don’t clean the chips with hand or rap.
10. Don’t turn on the machine if the protection cover is not ready putting on or door is not closed.
11. Don’t clean the cutting tool in hand, better use brush.
12. Magnesium alloy cutting, please wear eye glass to protect the eyes.

Attention!!!!

ATTENTION!

1. During machine running, please don't open the door of machine.
2. Be care for the chip flying out during heavy cutting.

1-10 Note for job finished

1. Please turn off the power before leaving the machine.
2. After machine stop completely, clean the chips, coolant, etc.
3. Put aside all cutting tools, tools and parts to suitable place.
4. Check all switch, turn off machine before leaving.

2 Specification

2-1Application:

This machine includes spindle, Tool magazine, x, y, z axis, lubrication system, hydraulic system, pneumatic system etc. all are combined in one unit and operating under the control system of CNC, Also, this machine can be operated manually and automatically, it is a stable, accurate machine.

This machine is suitable for cutting parts of auto industry, mold industry, defense industry and aerospace industry etc.

Its function is in drilling, tapping, milling, boring and chamfering for different material such as steel cast iron, aluminum alloy etc.

This machine can not operate under an environment of explosive gas or substance.

If you have any question please contact agent or our sales department.

2-2 Specification

Item	Unit	LX3220	LX3225	LX4225
Spindle				
Spindle speed	rpm	60-6000		
Spindle taper		#50		
Gear ratio		1:4(low)/1:1(high)		
Max. torque	N.m	380/470		
Max. torque speed	rpm	375		
Main motor	Fanuc	A15/7000i		
Motor power(cont.)	KW/HP	15/20		
Motor power(30 min)	KW/HP	18.5/25		
Travel				
X axis	mm	3,200	3,200	4,200
Y axis	mm	2,000	2,500	2,500
Z axis	mm	800		
Spindle nose to table	mm	410~1,210		
Span of gantry	mm	2020	2520	
Table				
Size(W x L)	mm	1,800x3,000	2,300x3,000	2,300x 4,000
T slot		9-22Tx200	11-22T x 200	
Load	kg	8,000	12,000	15,000
Feed rate				
Rapid X/Y/Z	M/min	15/15/10	15/10/10	10/10/10
Feed X/Y/Z	M/min	1-10		
Pneumatic				
System pressure	bar	6~7		
Compressed air consumption	l/min	400		
Lubrication				
Pump power	kw	0.025		
Pump flow rate	cc/min	200		
Pump pressure	bar	1~15		
Tank capacity	liter	4		
Coolant system				
Pump power	kw	0.96		
Pump flow rate	l/min	66		
Pump pressure	bar	Max. 1.3		
Tank capacity	liter	660	770	
Power supply				
Power capacity	KVA	40		
Weight	kg	30,000	34,000	40,000

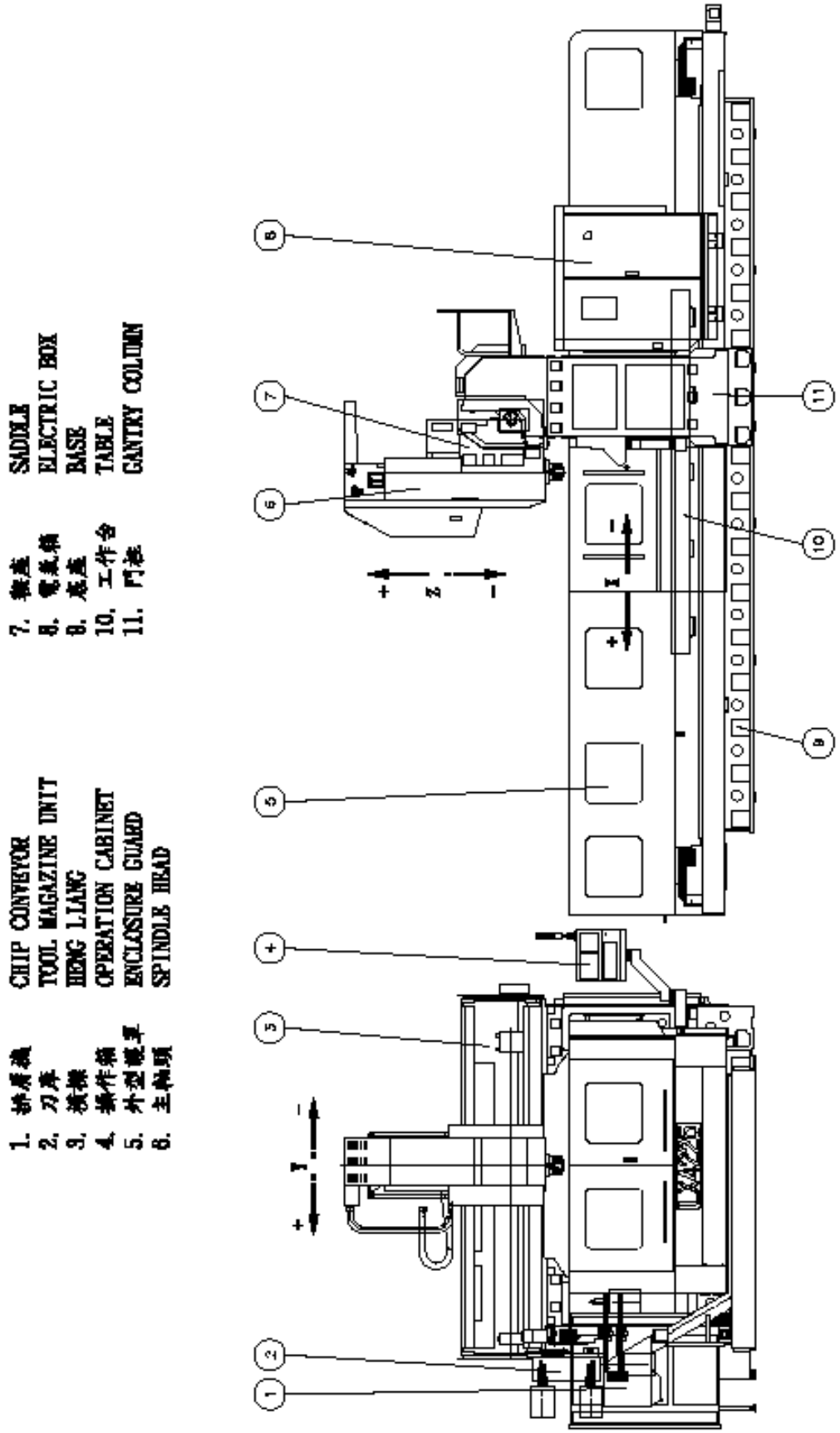
2-3 Stand accessories

Automatic Tool change system
Full enclosure guard
Tool box
Spindle air purge
Spindle air blow
2 coolant nozzle
Separate MPG
RS232 link slot
M30 Auto power off
3 color indicating light
Halogen working light
Rigid tapping
Chain type chip conveyor
Double screw chip conveyor
Automatic lubrication system
Coolant tank and pump
Heat exchange

2-4 Option accessories

Coolant thru spindle
20 bar Filter system for CTS
TS-27R tool setter
Transformer
Extension column
Rotary table
90 degree milling head (manual)
Scale feedback on x/y/z
Water gun
Touch probe

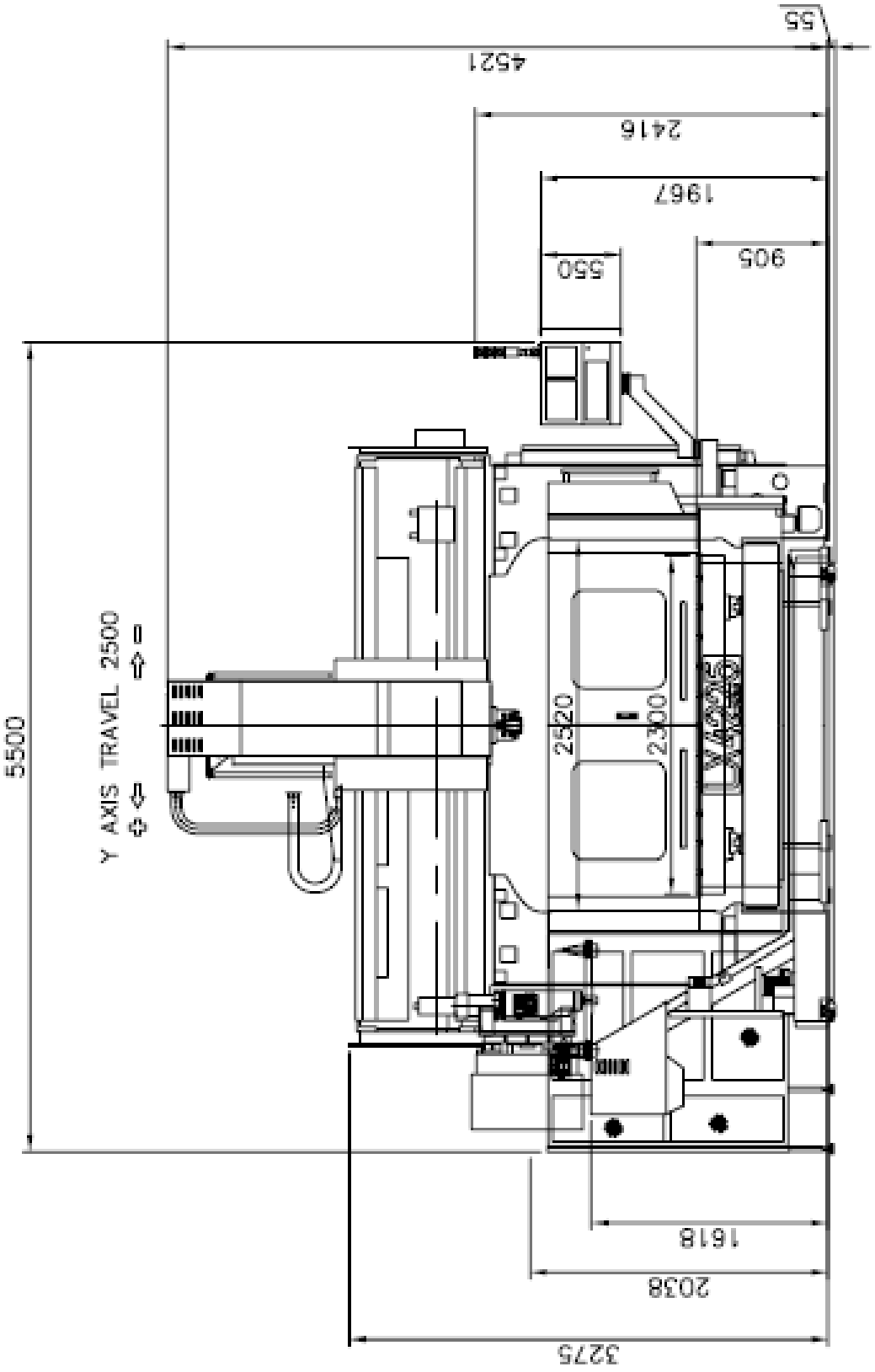
2-5 Main components



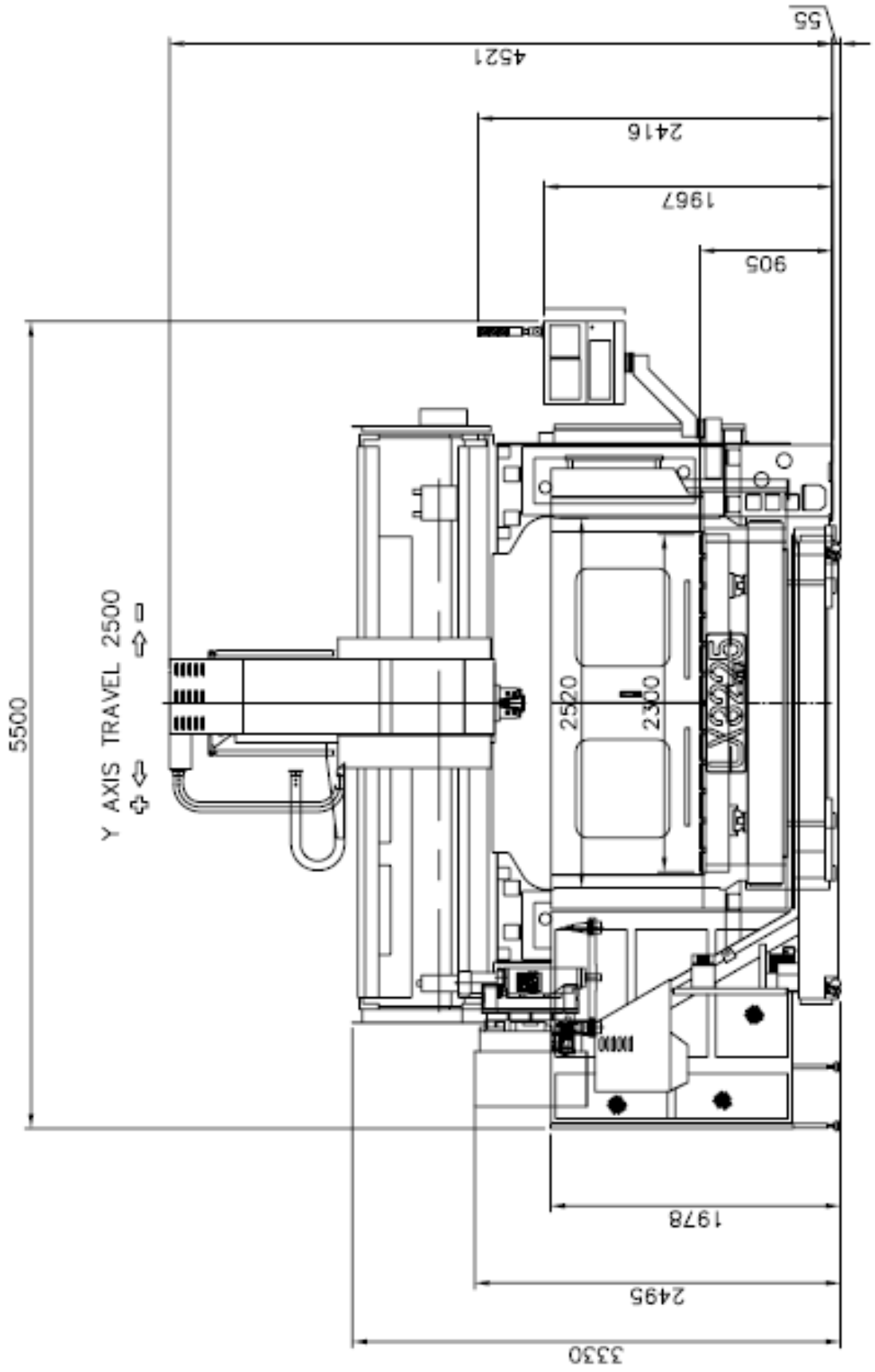
2-6 Outline dimensions

2-6-1 Front view

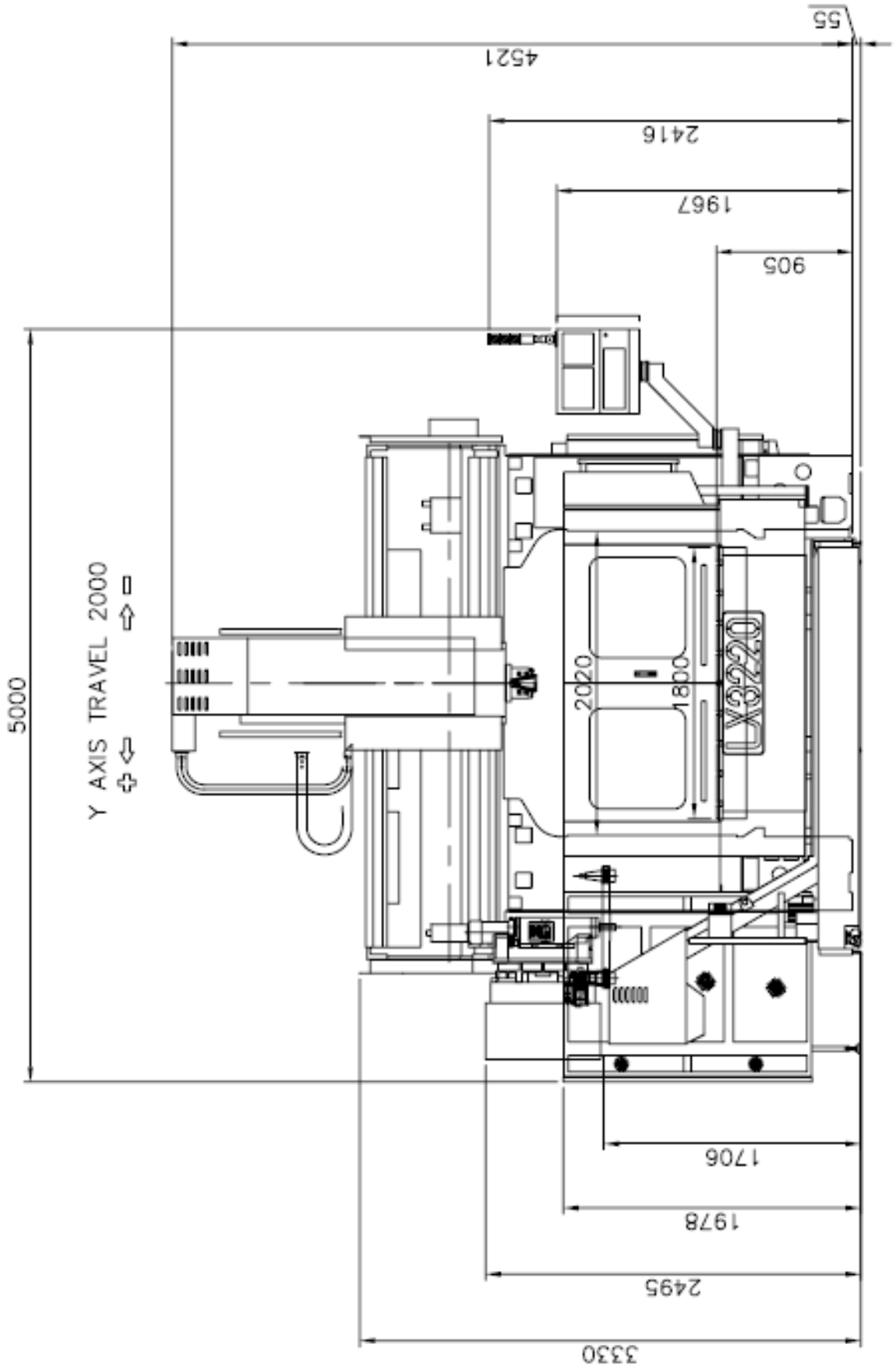
2-6-1-1 LX4225-8150134



2-6-1-2 LX3225-8150218

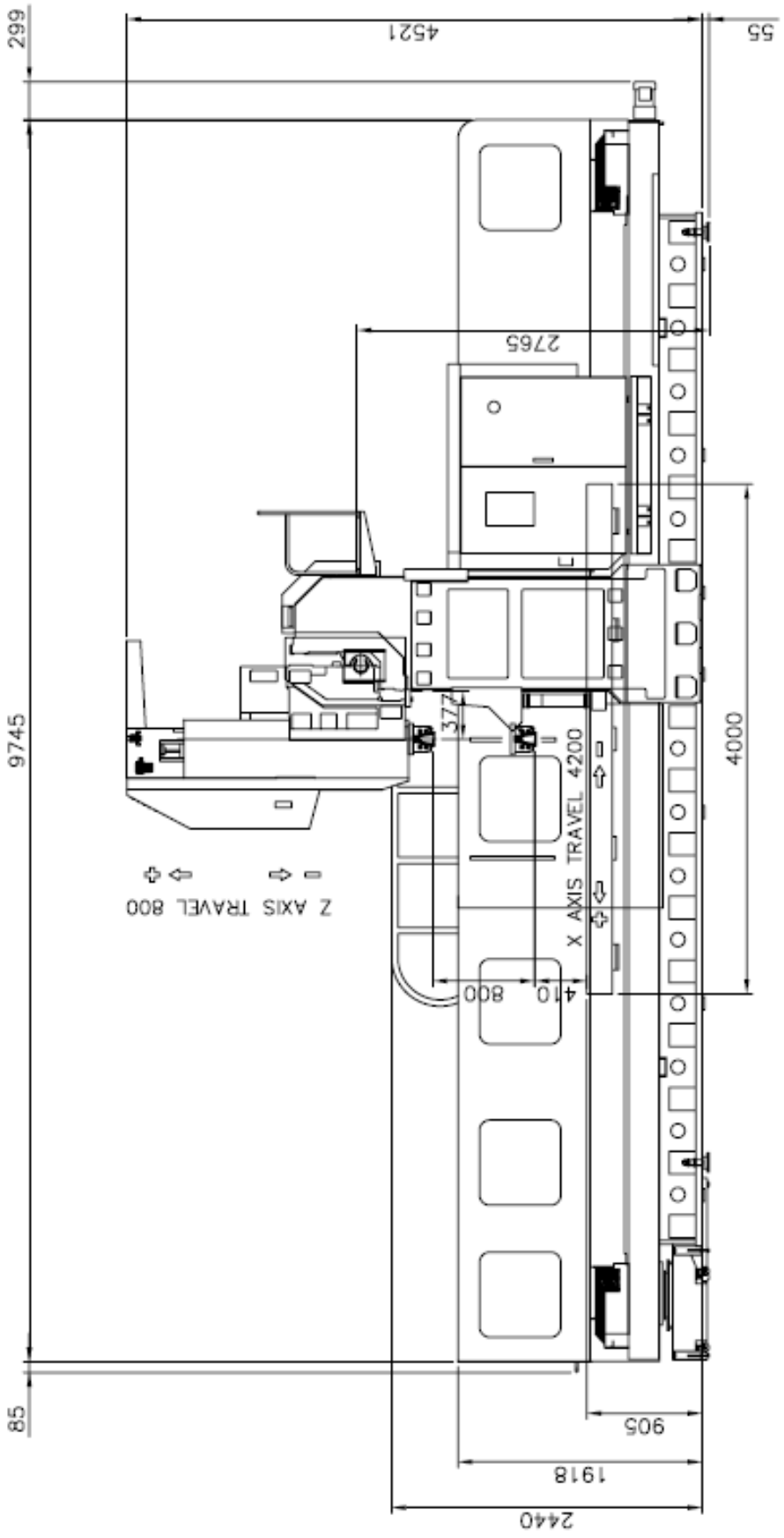


2-6-1-3 LX3220-8150208

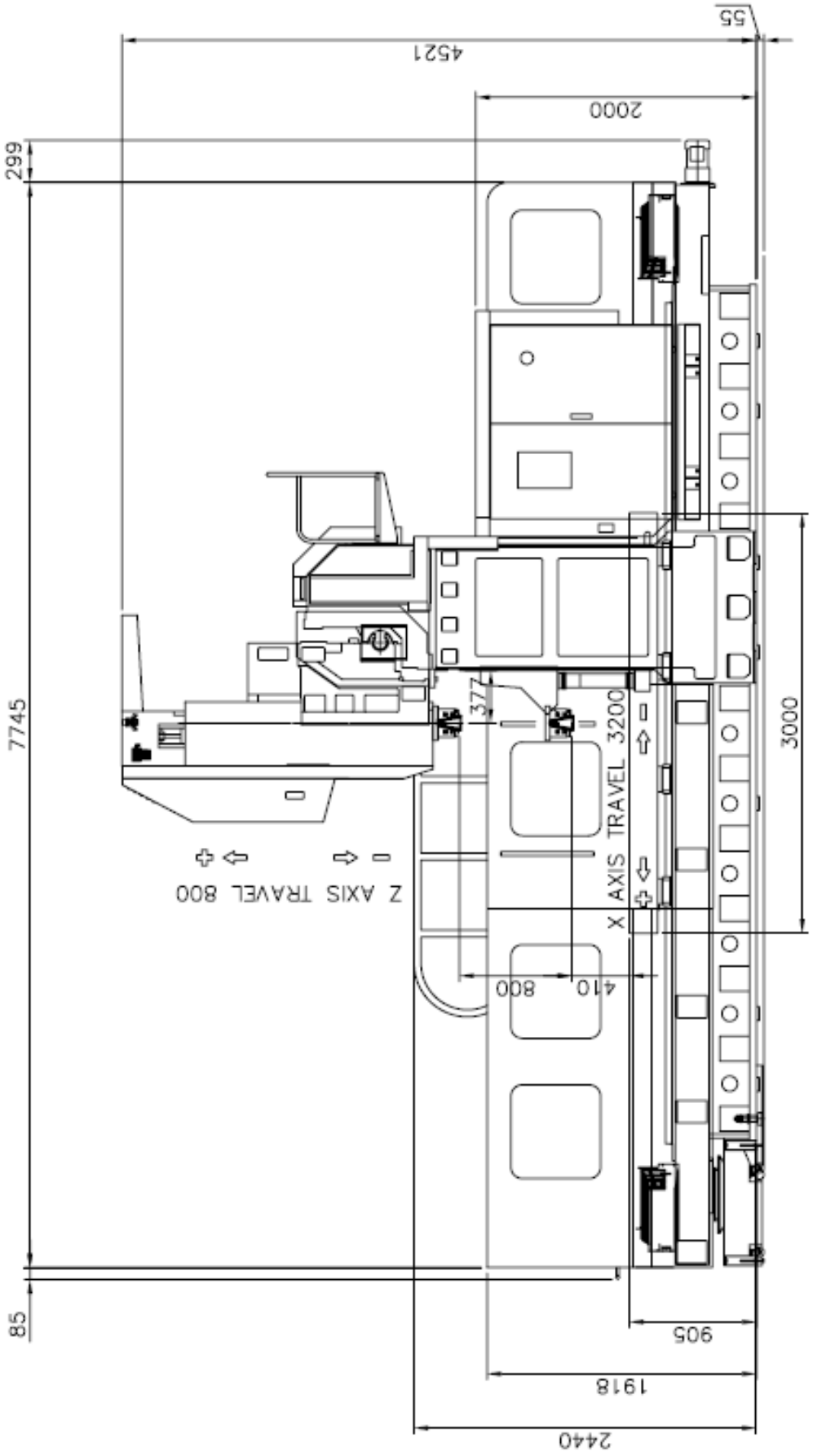


2-6-2 Side view

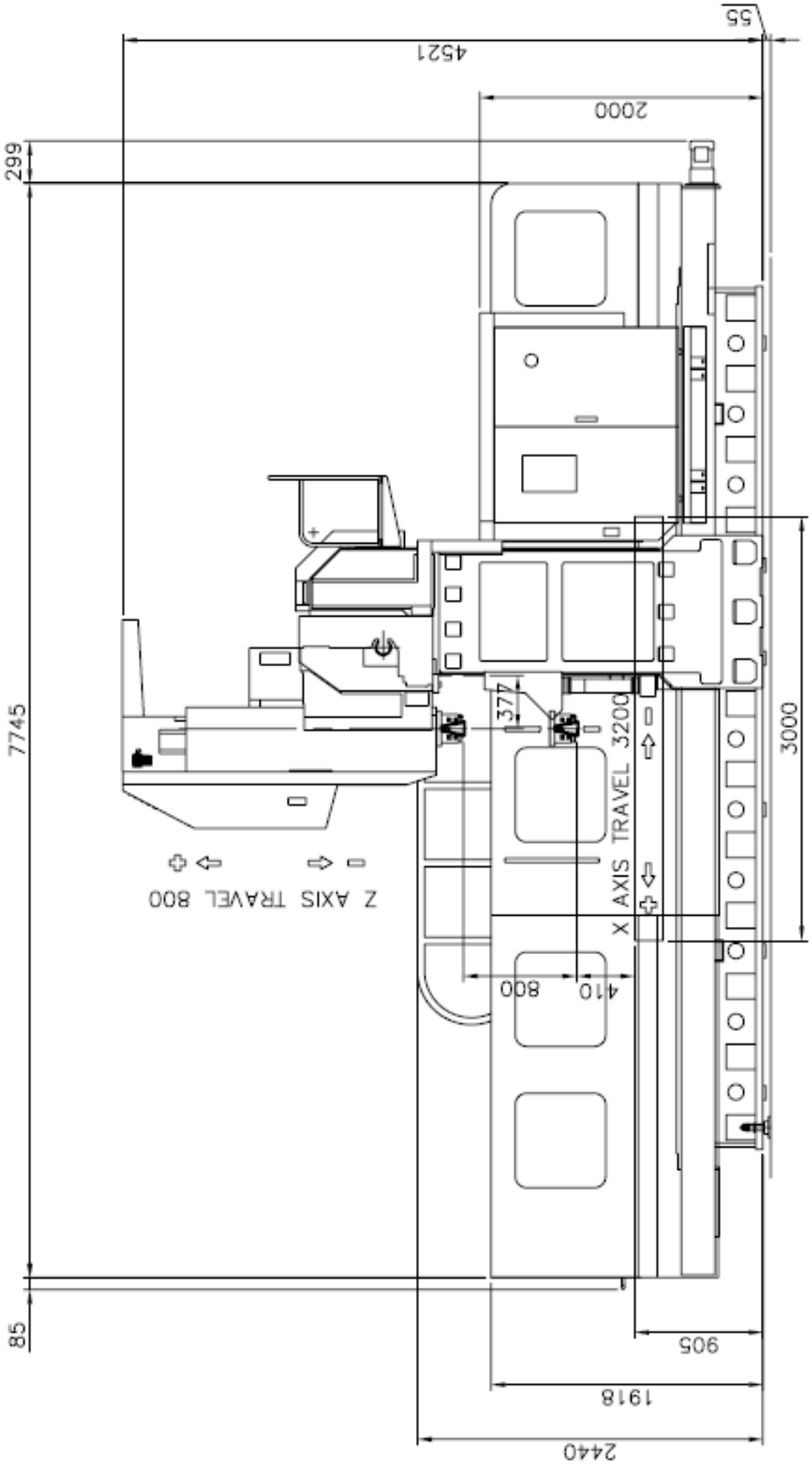
2-6-2-1 LX4225-8150134



2-6-2-2 LX3225-8150218

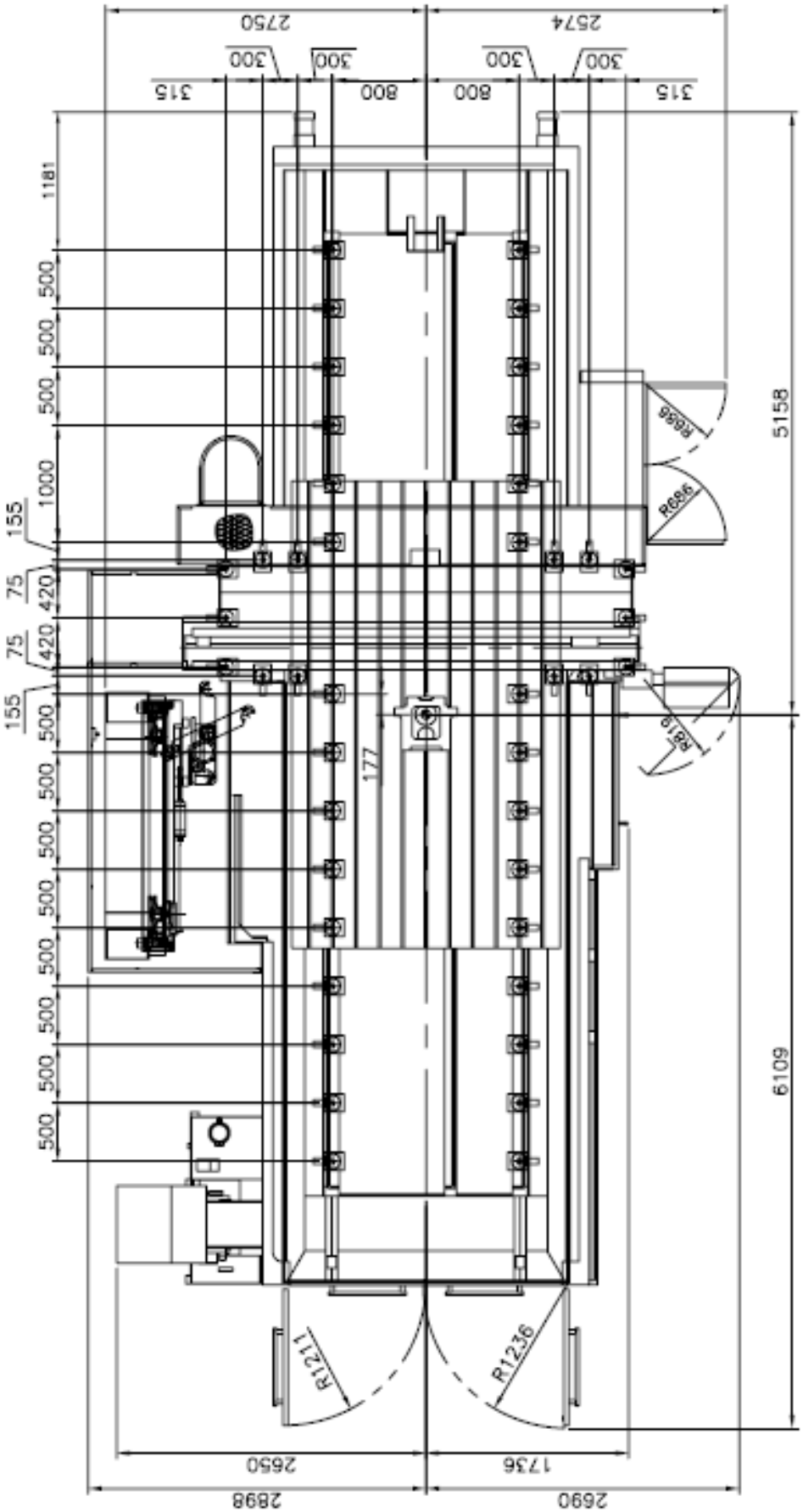


2-6-2-3 LX3220-8150208

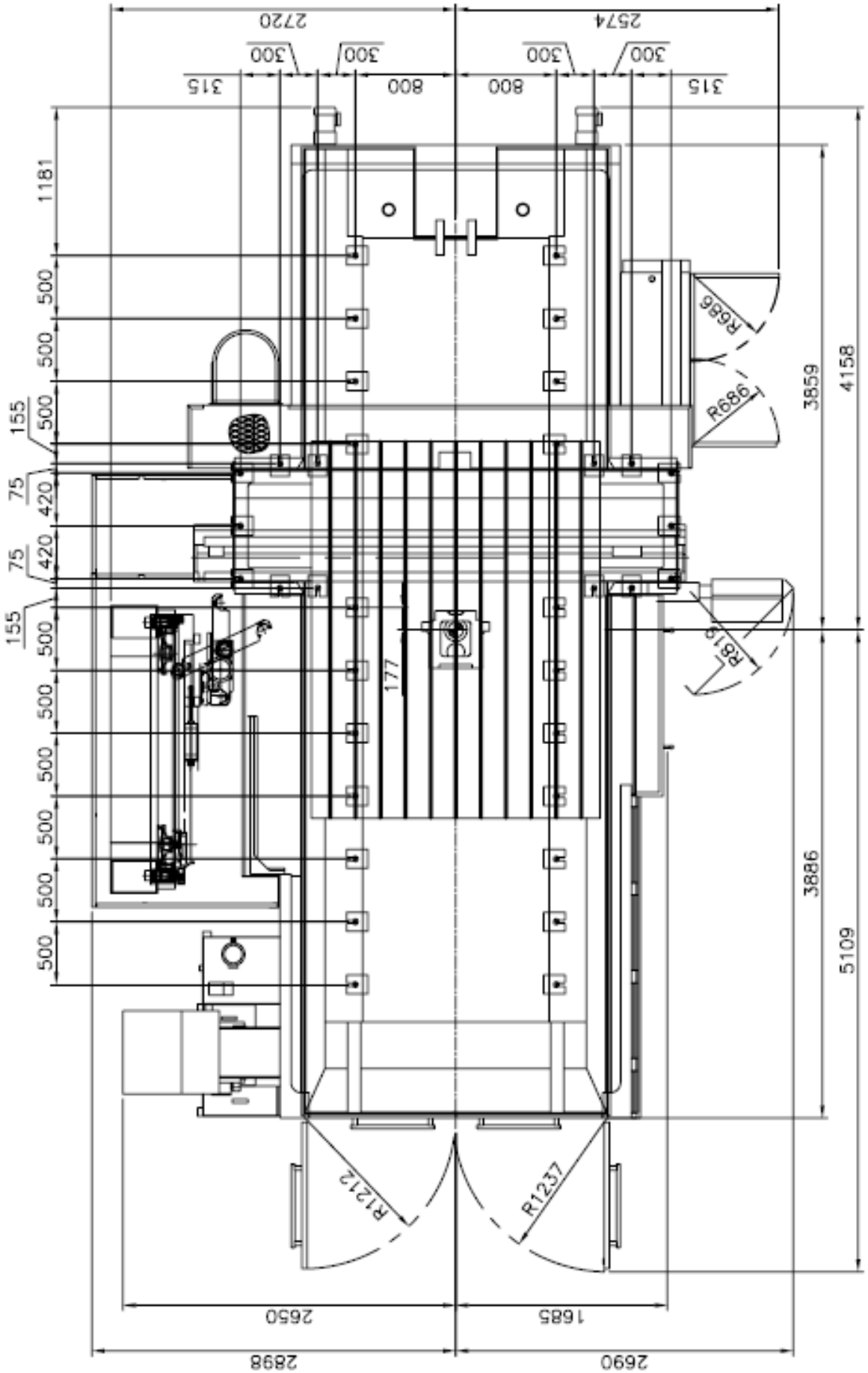


2-6-3 Top view

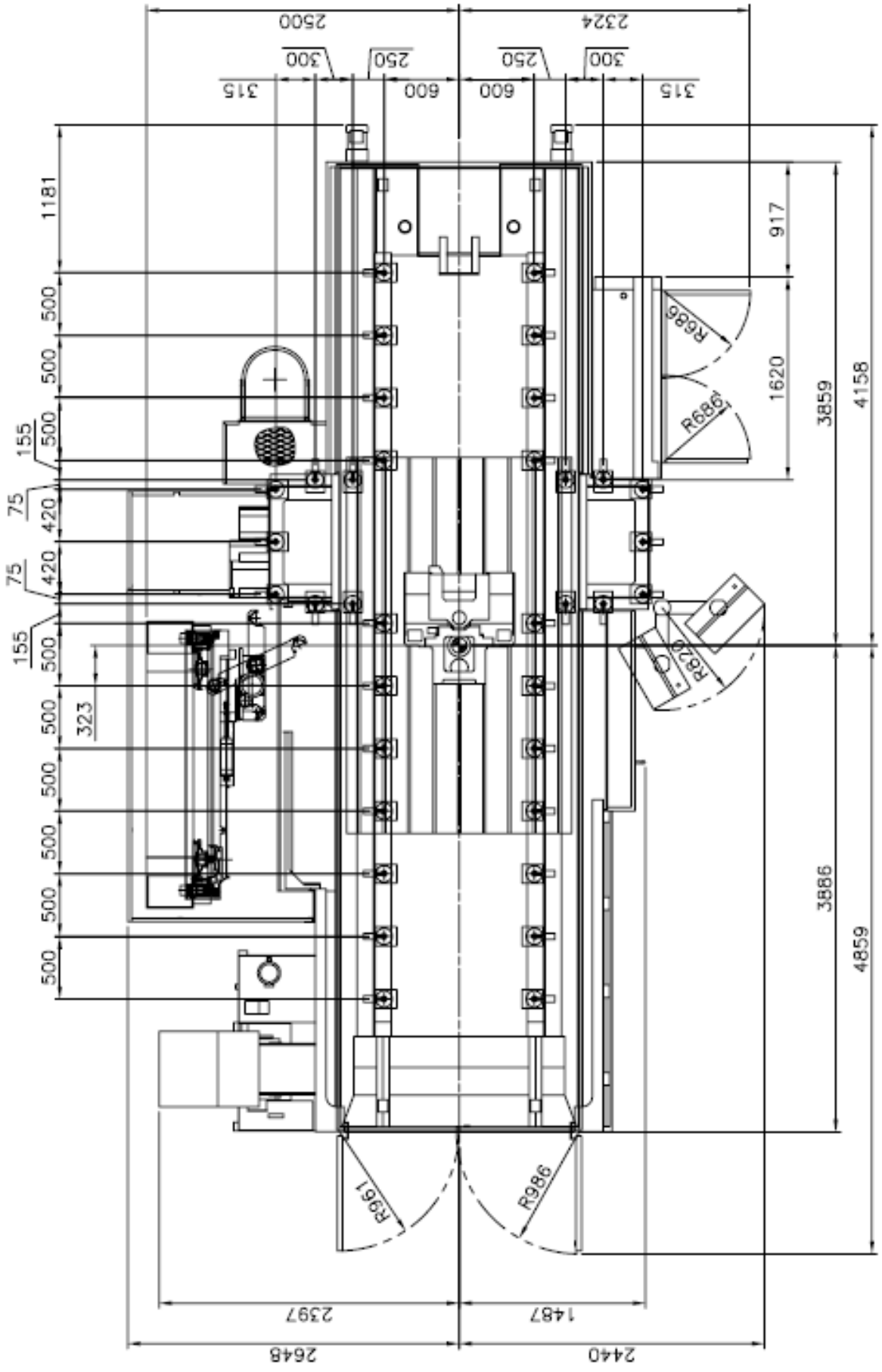
2-6-3-1 LX4225-8150134



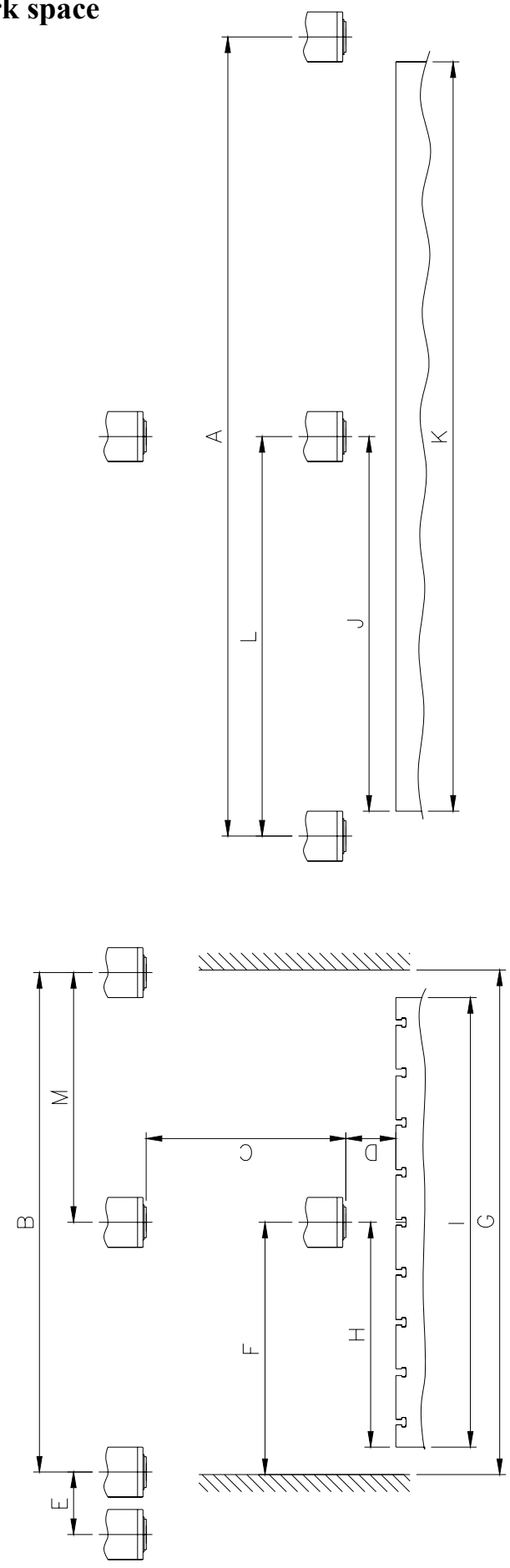
2-6-3-2 LX3225-8150218



2-6-3-3 LX3220-8150208

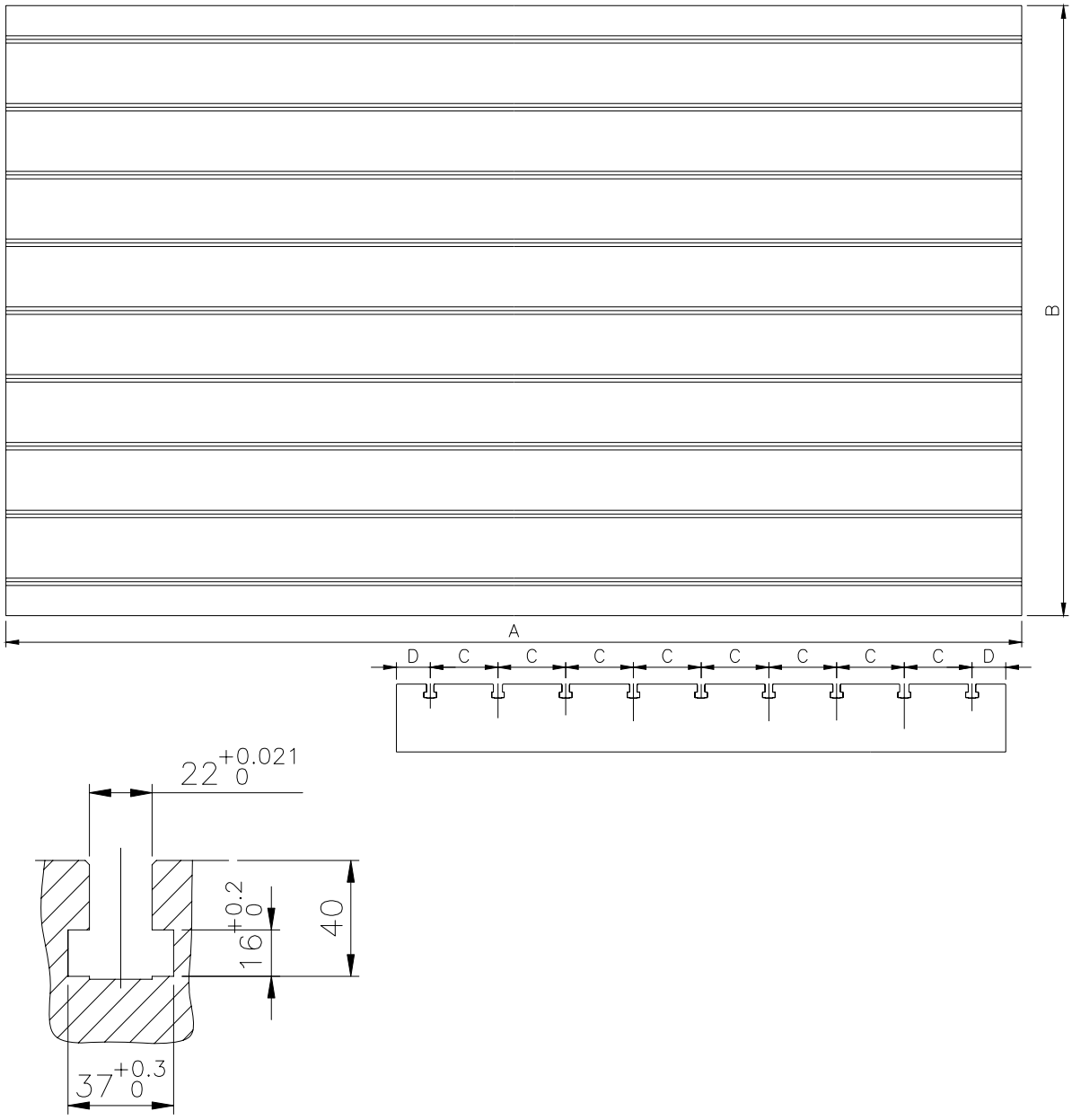


2-7 Work space



	A	B	C	D	E	F	G	H	I	J	K	L	M
LX-3220A	3200	2000	800	200	250	1010	2020	900	1800	1500	3000	1600	1000
LX-3220B	3200	2000	800	400	250	1010	2020	900	1800	1500	3000	1600	1000
LX-3220C	3200	2000	1000	200	250	1010	2020	900	1800	1500	3000	1600	1000
LX-3225A	3200	2500	800	200	250	1260	2520	1150	2300	1500	3000	1600	1250
LX-3225B	3200	2500	800	400	250	1260	2520	1150	2300	1500	3000	1600	1250
LX-3225C	3200	2500	1000	200	250	1260	2520	1150	2300	1500	3000	1600	1250
LX-4225A	4200	2500	800	200	250	1260	2520	1150	2300	2000	4000	2100	1250
LX-4225B	4200	2500	800	400	250	1260	2520	1150	2300	2000	4000	2100	1250
LX-4225C	4200	2500	1000	200	250	1260	2520	1150	2300	2000	4000	2100	1250

2-8 Table dimension



	A	B	C	D
LX-3220	3000	1800	200	100
LX-3225	3000	2300	200	150
LX-4225	4000	2300	200	150

3 Transportation and Installation

3-1Safety regulation

1> Only trained, qualified workers should operate forklift trucks, cranes or similar equipment and apply slings.
2> Use only wires of dimensions specified in the manual. They must be strong enough to support the weight of machine.
3> Before hoisting the machine, make sure that each of the units is fixed securely.
4> Be careful during remove the machine to proper site and install it.
5> Keep clean around the machine and floor.
6> Be sure electrical cables and wire will not be damaged during installing machine.
7> After installation and clean, connect the wire to the power source and ensure the requirement of power capacity is proper.
8> Before using, remove the anti-rusty oil by rags with paraffin or fuel oil. Toluene compounds must not be use.

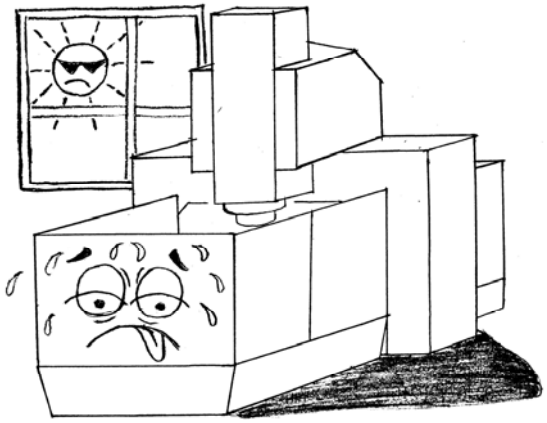
3-2 Installation point

The performance of a machine is depends on proper set up.
Even if the accuracy is high, CNC control is top grade, the machine can not reach its performance without suitable setting up.
The following setup are correct way to set up.

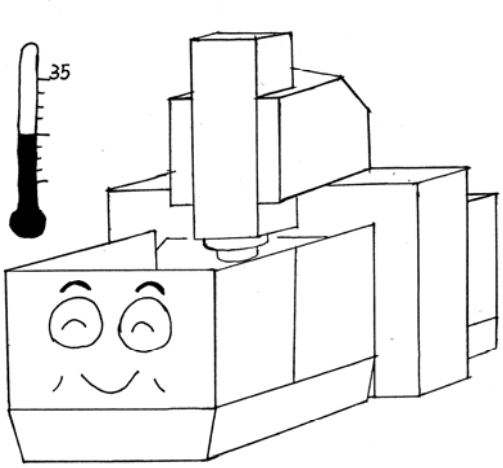
1> Put the machine on the location reserved.
2> Put the foundation bolts and pads the holes of setting position.
3> Lifting the machine and mount the bolts and pads to the foundation set.
4> Tie up the bolts to its foundation hole.
5> Pour in the cement, the concrete cement should use proper combination ratio, be sure no shrinkage after cement is dried out.
6> Second time pouring the cement into foundation for leveling purpose.
7> After real leveling up them tie up all the bolts and nut.

3-3 Environment Required

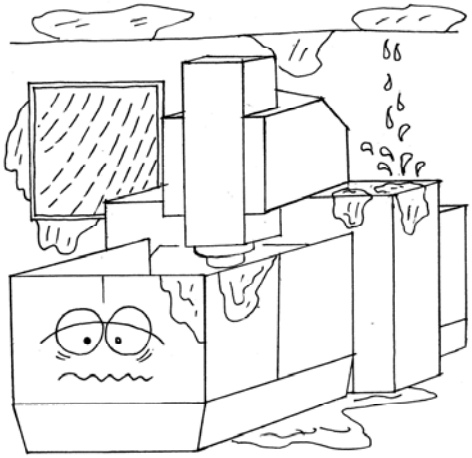
The following environments should be considered a\when install the machine.



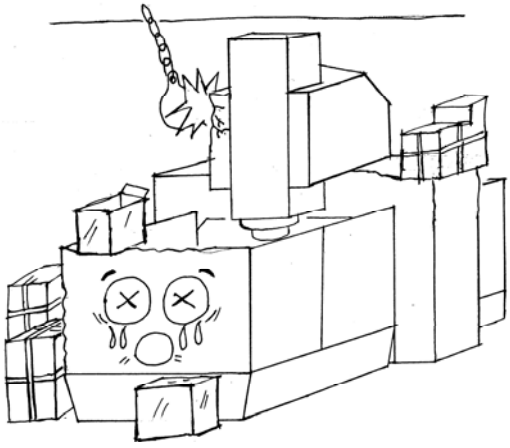
1> The machine and the NC must not be subject to direct sunlight.



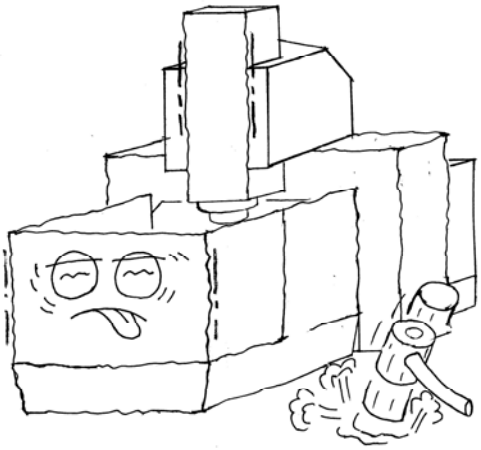
2> The ambient temperature must be between 0 and 30℃



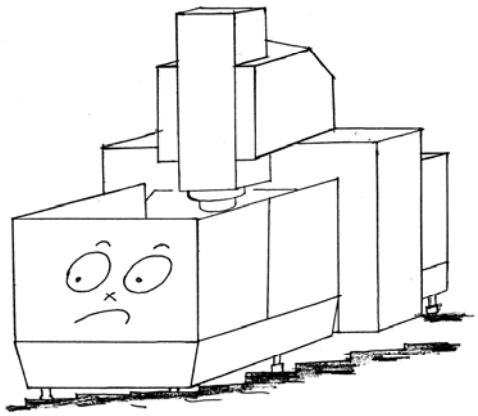
3> The ambient humidity must be less then 75% and free of condensation. Because many electronic parts are used in the machine and the NC, excessive humidity must be avoided.



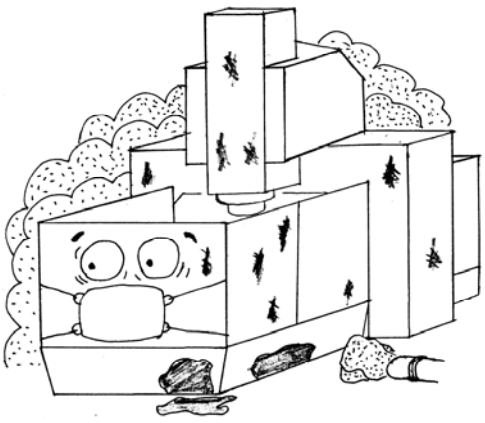
4> Maintenance space must be secured. The door must be able to open without inference.
The chip conveyor, chip bucket and coolant tank must be about to pulled out from the machine without interference.



5> The ground must be capable of absorbing the vibration of other machines, such as presses. If vibration is felt where the machine is installed, measure is magnitude with a vibrate meter.

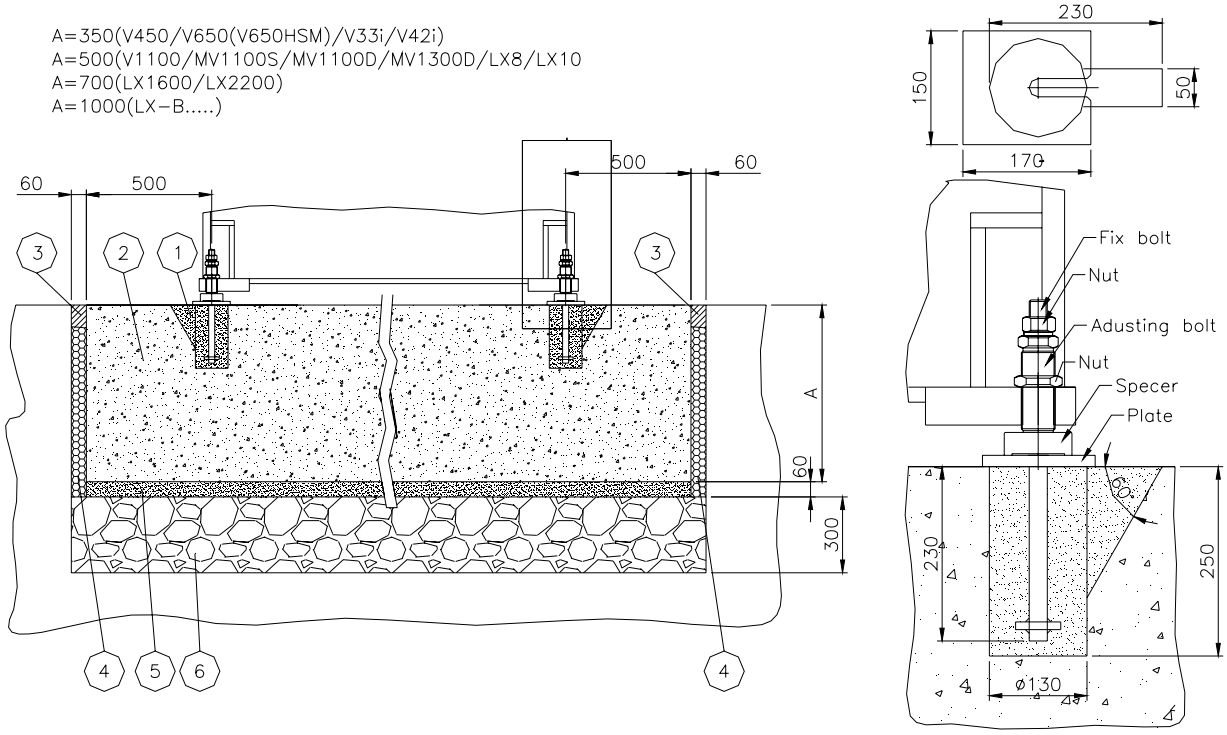


6> The surface where the machine installed must be smooth and flat.



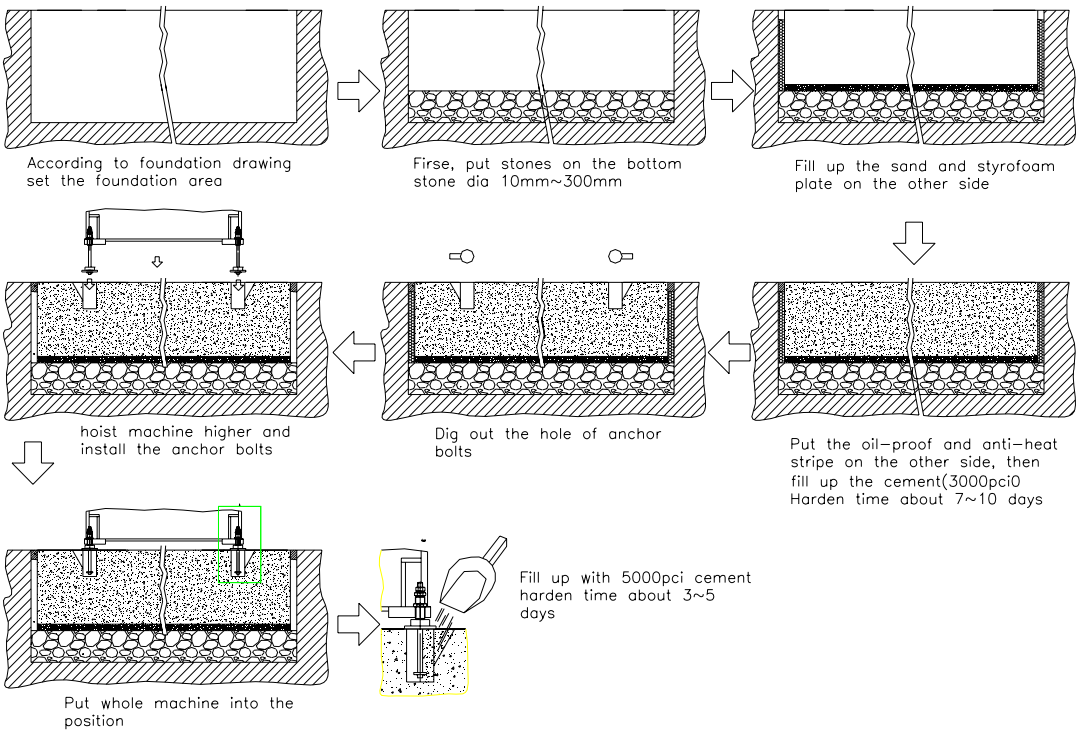
7> The machine must not be subject to chips scattered from other machine or airborne dust.

3-4 Process of setting



1> Concrete 5000pci
2> concrete 3000pci
3> Anti-oil/heat branze
4> Anti-vibration polyfoam
5> Anti-vibration sand
6> Round-shaps ston Dia 150~300

3-5 Setting step



3-6 Leveling adjust

Using leveling gage to check the level of machine. The gage reading must be with 0.01mm/M. The leveling situation is very important to the accuracy of this machine. We must do the following steps.

Step by step

1> Move table to the center of travel.

2> Put the level gauge on the middle of table and adjust the foundation bolts within table legion. Adjust bolt to the standard value or scale on the level gauge.

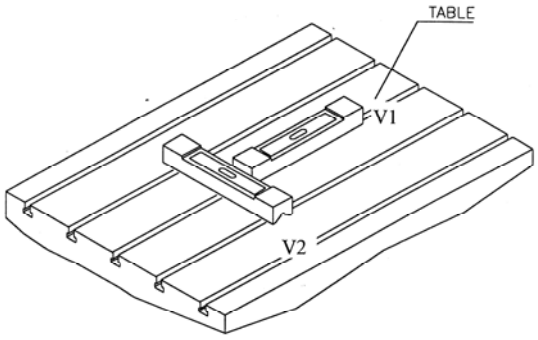
3> Move the table backward about 1000mm, then repeat step2, till all bolts adjusted to the end of travel.

4> Move table to the center of travel again.

5> Move table forward to 1000mm, then repeat step2 and adjust all foundation bolts still the end of travel.

6> Move table form forward to backward about 500mm, then repeat step2 and adjust all foundation bolts still the end of travel.

7> Lock tight every bolts, nut one after another.



3-7 Ground connection

ATTENTION!

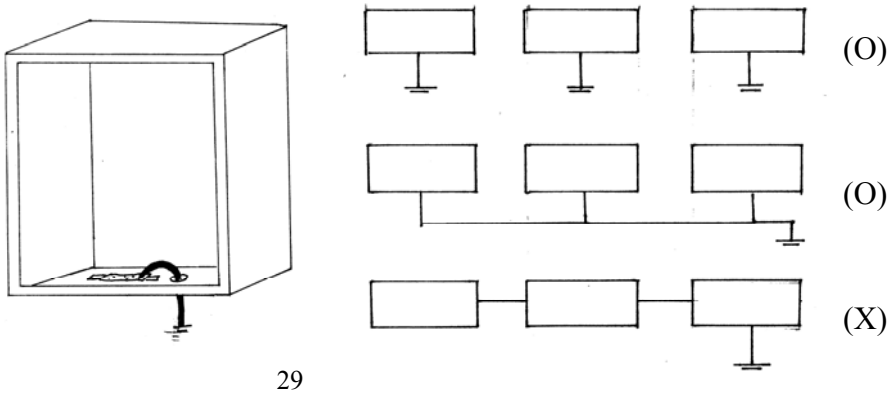
1> Don't Cascade parallel connected with other machine in grounding.

2> Parallel connection in grounding is OK.

3> Voltage need correct by name plate on side of machine.

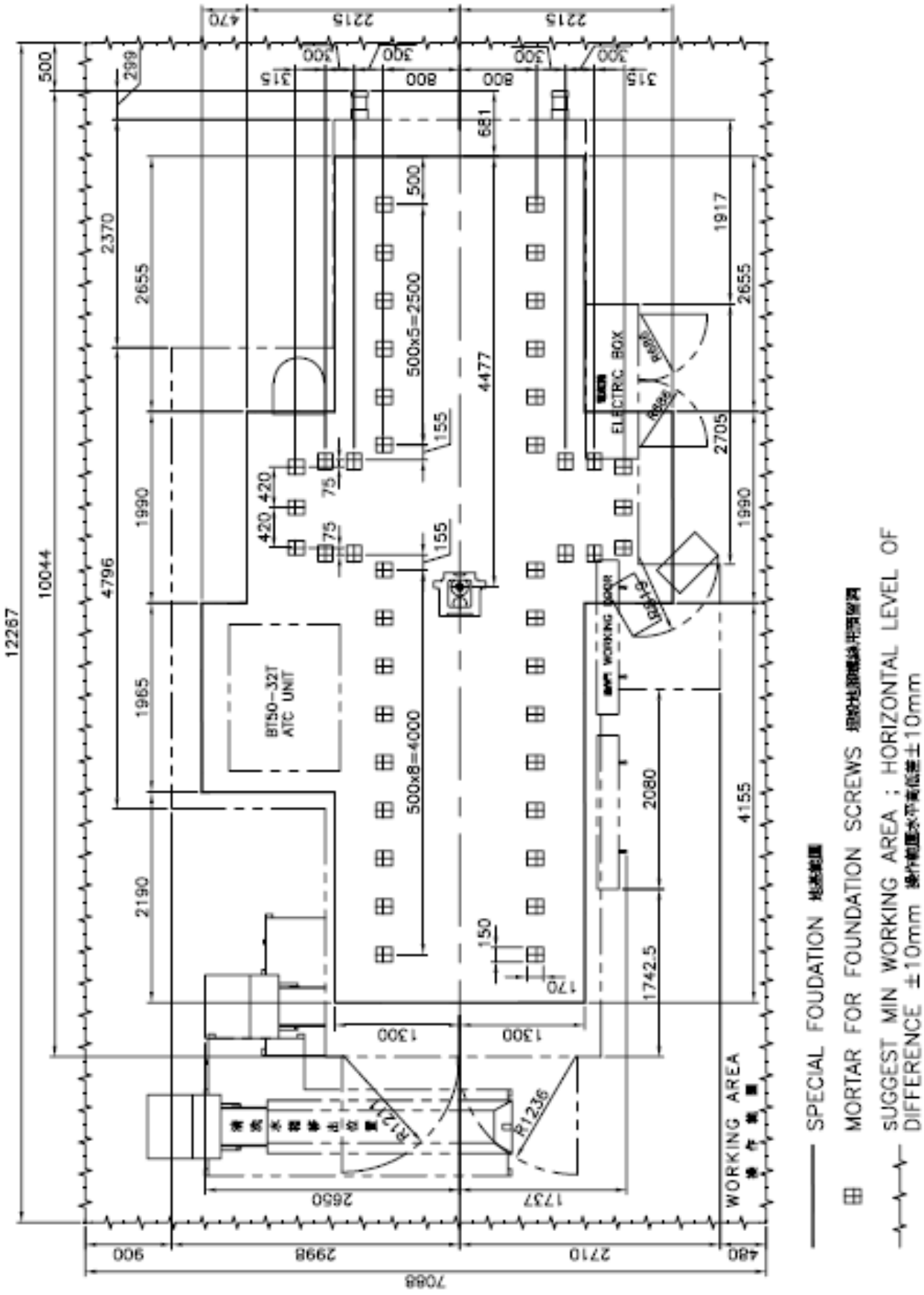
4> Size of electrical wire § 14 mm^2 diameter(ground wire).

5> Ground resistance below 100Ω.

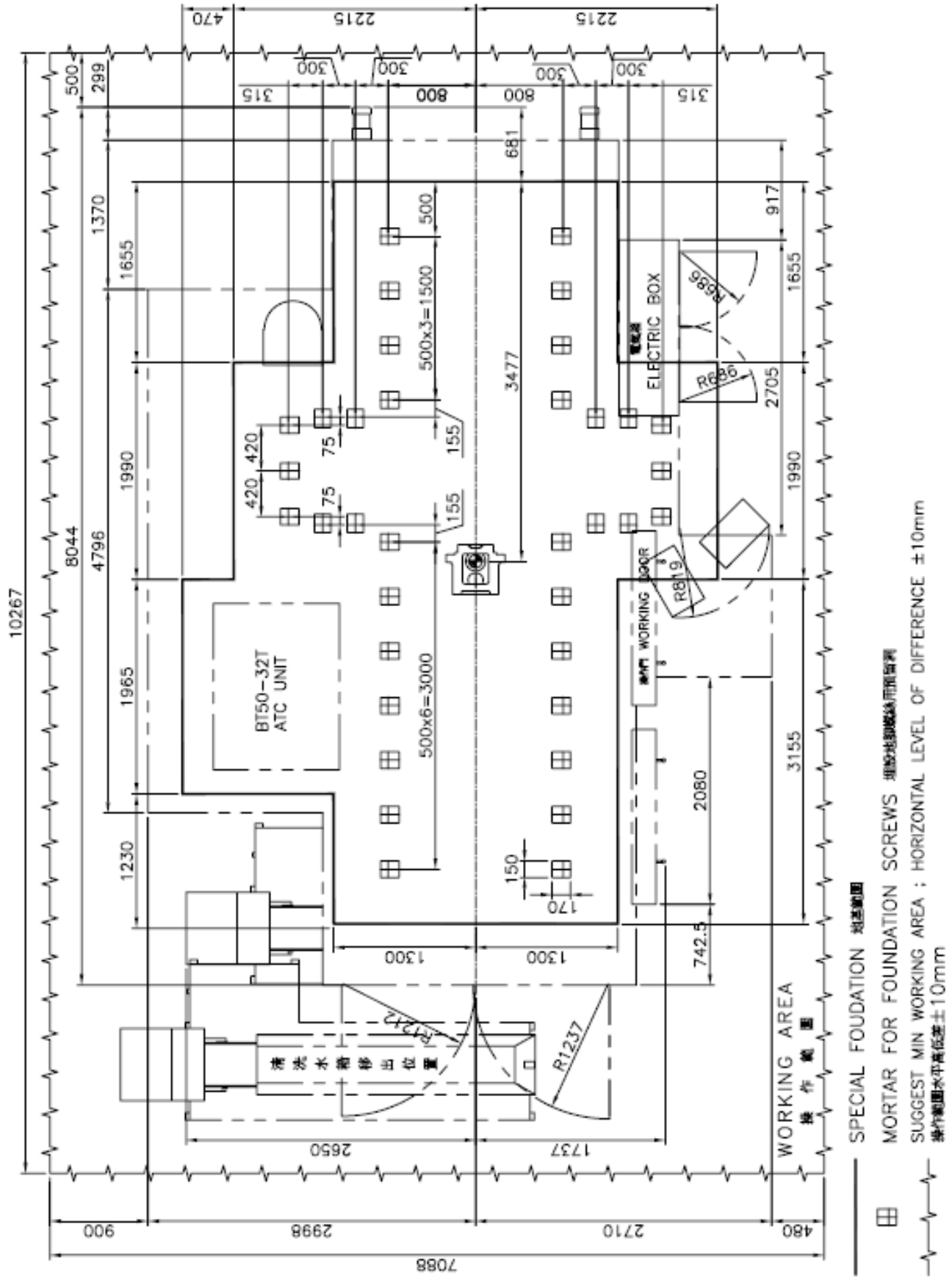


3-8 Foundation anchor set up drawing

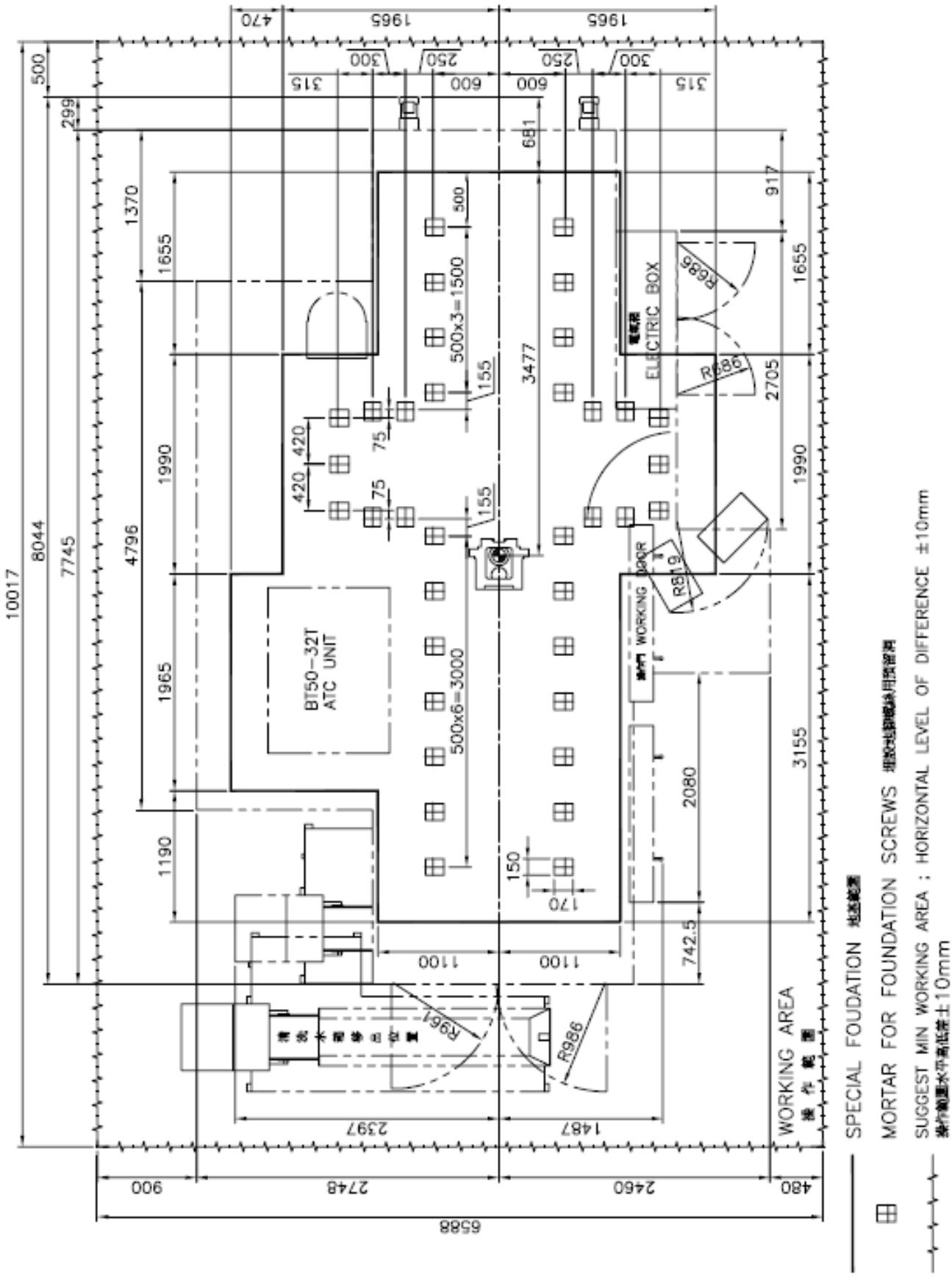
3-8-1 LX4225-8150134



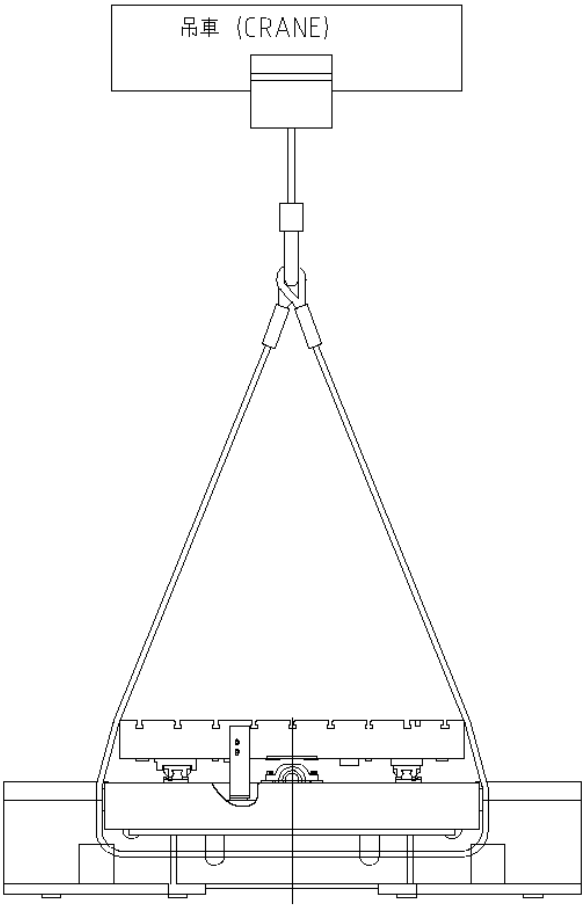
3-8-2 LX3225-8150218

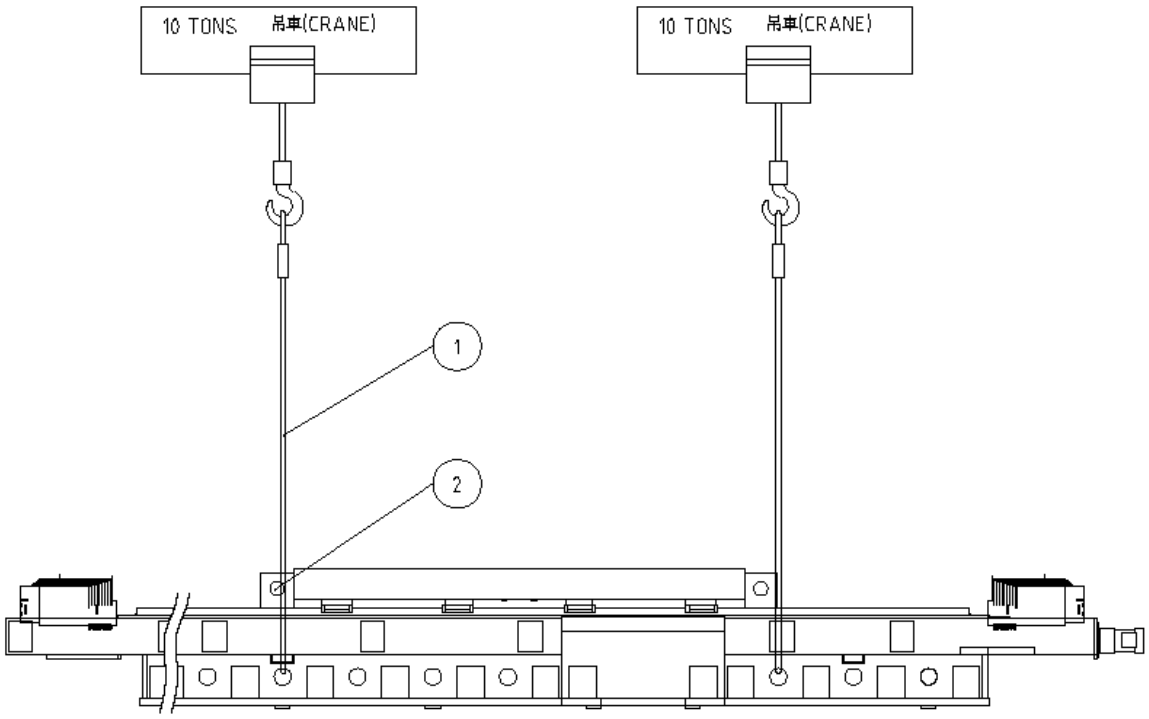


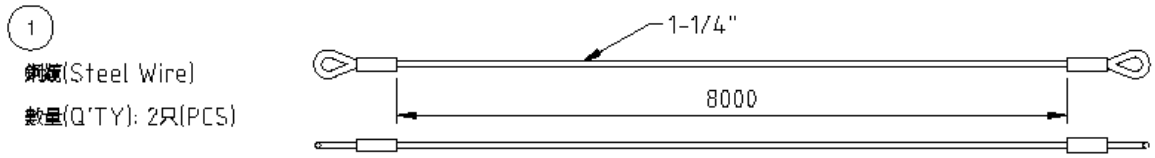
3-8-3 LX3220-8150208



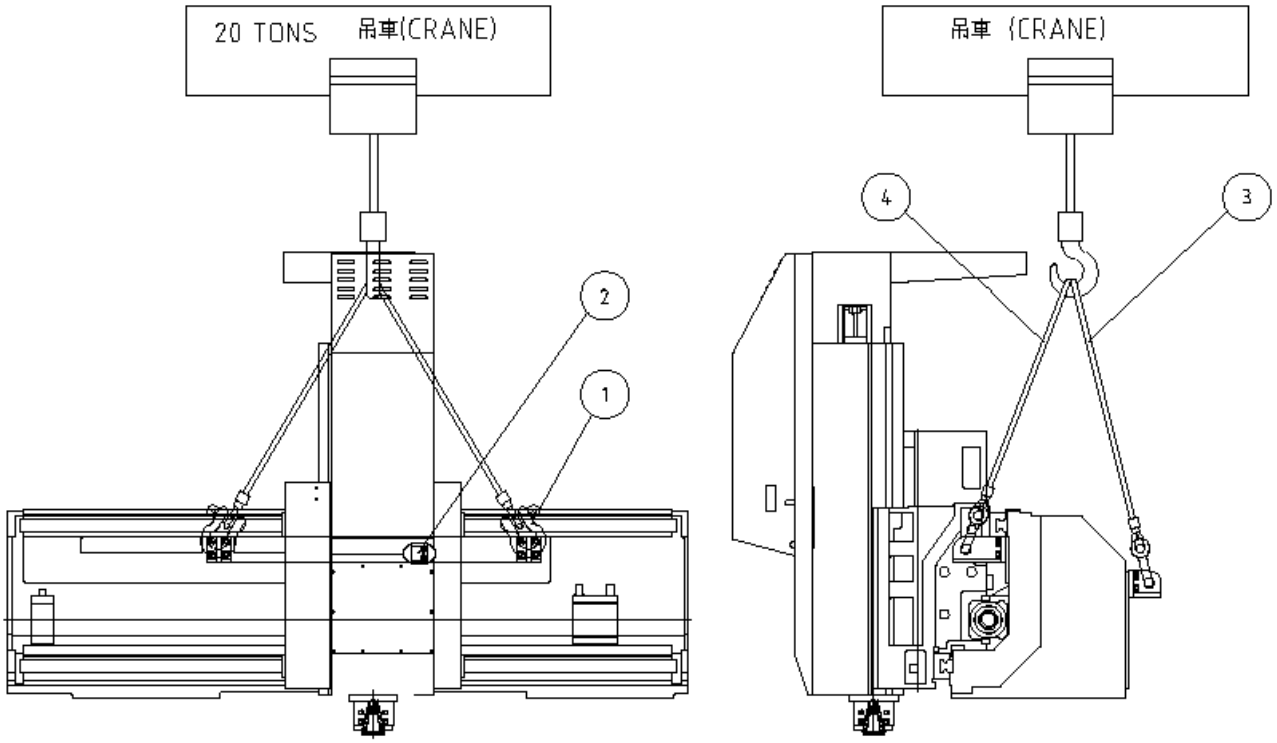
3-9 Hoisting drawing

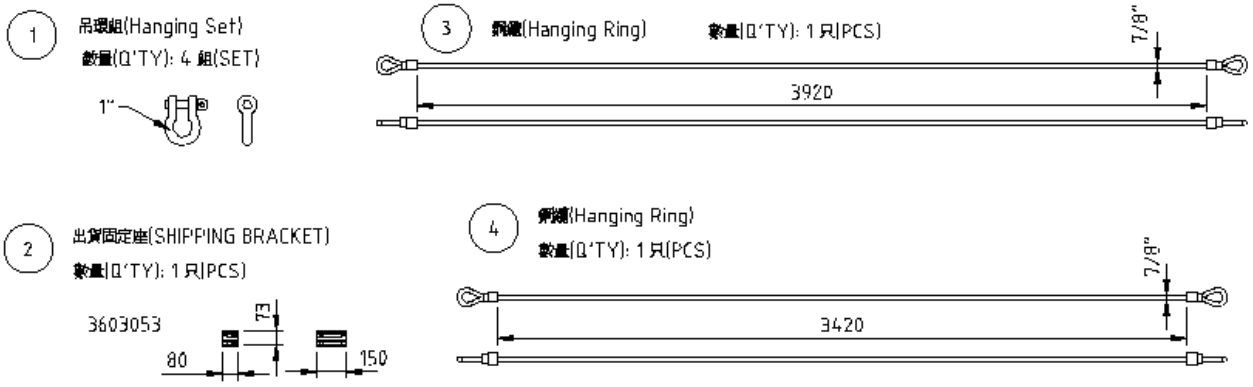


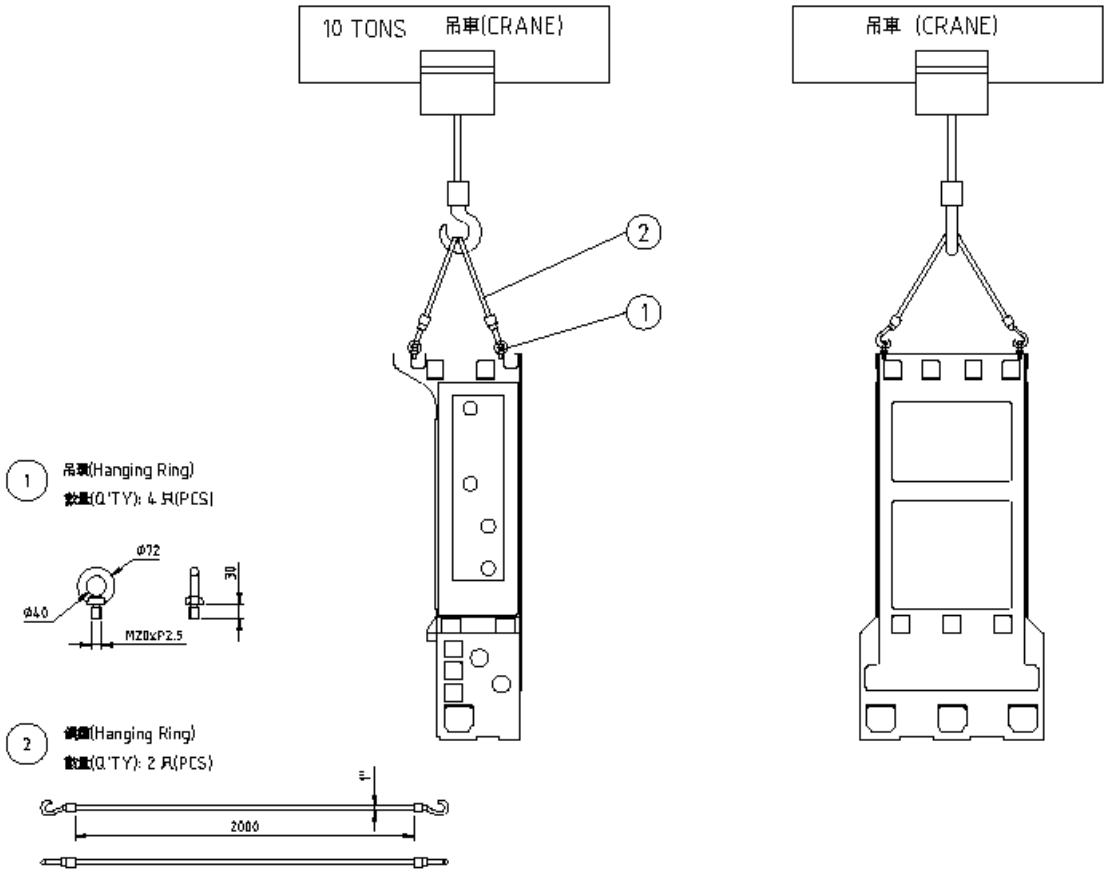



1
鋼纜(Steel Wire)
數量(Q'TY): 2只(PCS)
1-1/4"
8000


2
出貨固定座(SHIPPING BRACKET)
數量(Q'TY): 2只(PCS)
380
100
220
3603131


20 TONS 吊車(CRANE)
吊車 (CRANE)
1
2
3
4


1
吊環組(Hanging Set)
數量(Q'TY): 4 組(SET)
1"
3
鋼纜(Hanging Ring)
數量(Q'TY): 1 只(PCS)
7/8"
3920
2
出貨固定座(SHIPPING BRACKET)
數量(Q'TY): 1 只(PCS)
3603053
73
80
150
4
鋼纜(Hanging Ring)
數量(Q'TY): 1 只(PCS)
7/8"
3420


10 TONS 吊車(CRANE)
吊車 (CRANE)
2
1
1
吊環(Hanging Ring)
數量(Q'TY): 4 只(PCS)
φ72
φ40
30
M20xP2.5
2
鋼纜(Hanging Ring)
數量(Q'TY): 2 只(PCS)
1"
2000

4 Spindle unit

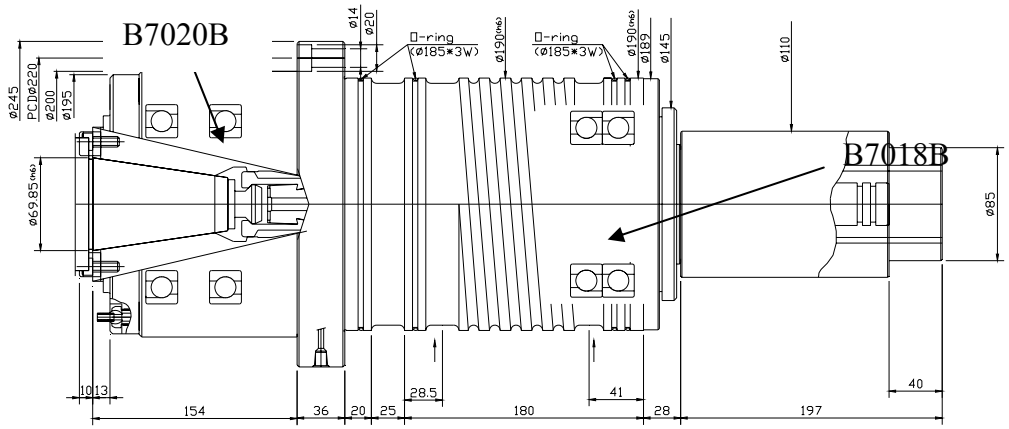
We use high precision class of angular ball bearing. They have high rigidity on both axial and radial directions can stand for high speed running. Can be applied in high and low speed, heavy and light cutting and still maintain high accuracy, The spindle is using quill type cooling circulation system, combined with 1000 kcal/hr oil-temp control system, So it can reach the best cutting performance.

During the interval of tool changing, the chips blowing system in the spindle will clean the chips,

The spindle inside and tool holder will remain in clean condition.

The clamping system is a combination of disc spring and pull rod with pull stud. This type of clamping system is safe, even if the hydraulic failure, because it is a mechanical system.

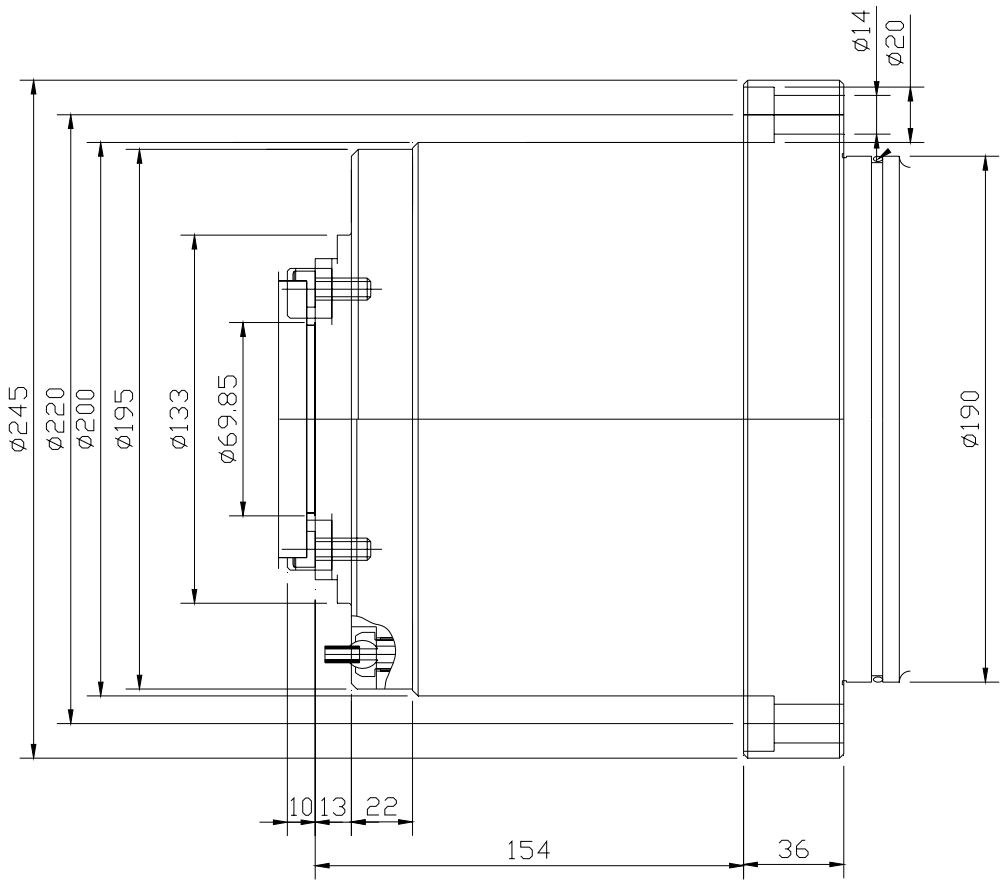
4-1 Spindle outline

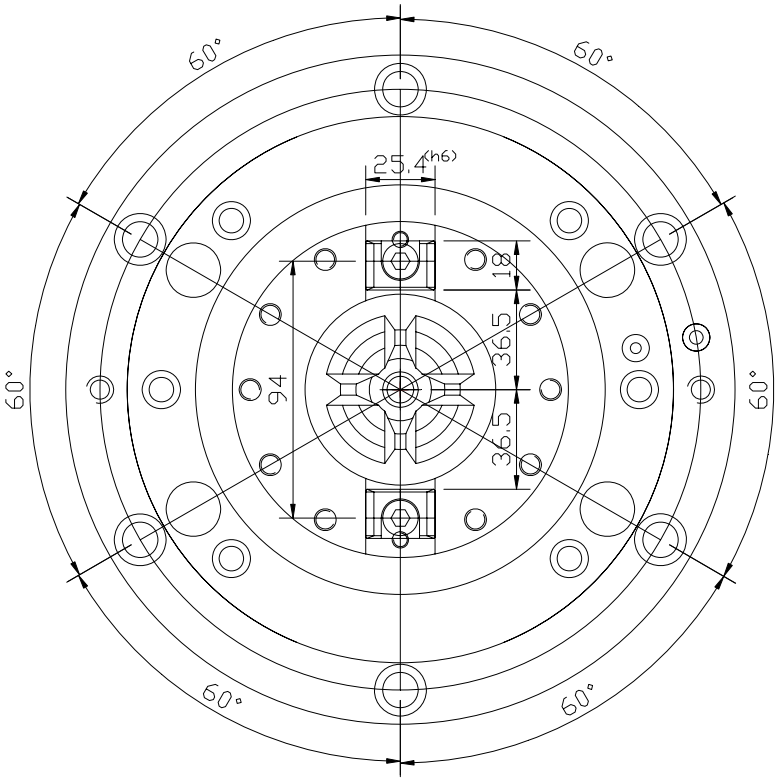


4-2Spindle data

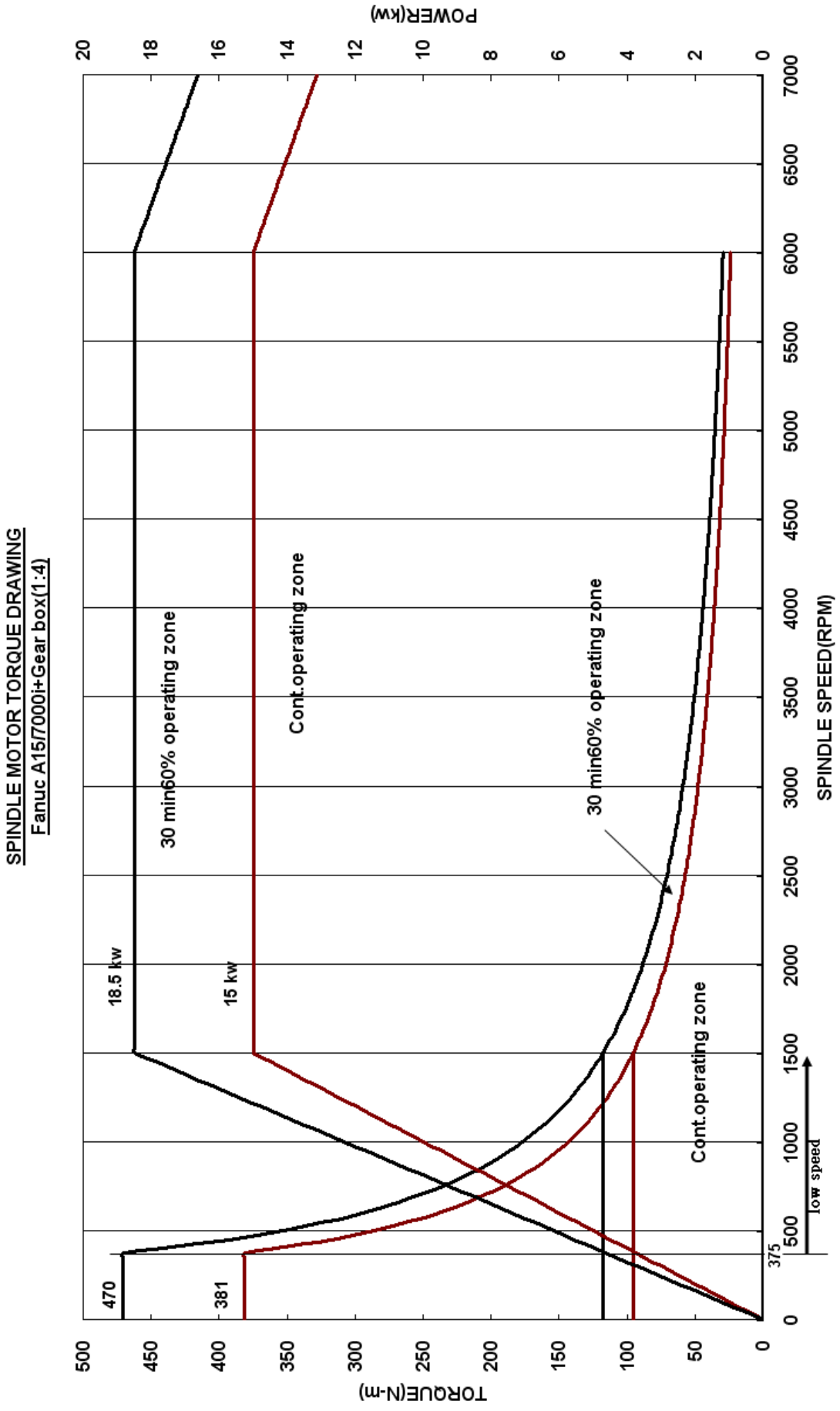
	RPM	Bearing	Preload	Lubrication	Pull-force(N)	Belt	Tool-standard	
TYPE	6,000	B7020E B7018E	Rigid	Grease	20,000	——	BT or ISO CAT SK	

4-3 Spindle nose dimension





4-4 Torque diagram



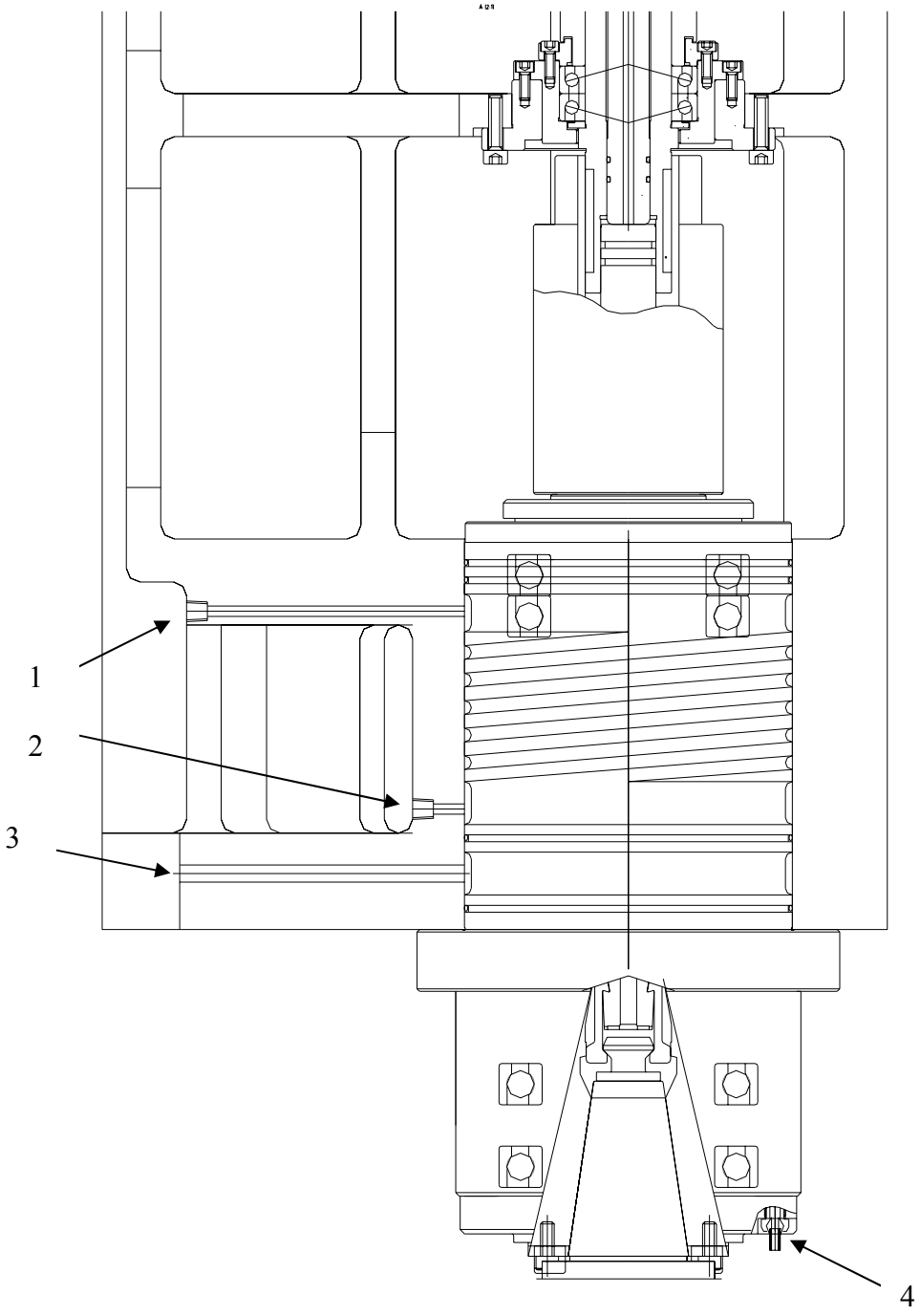
4-5 Maintenance

This is designed with high precision, a kind of automatic CNC machine center. For the spindle life, please before operating, follow up the table statements of spindle warming up :

CONDITION	SPINDLE REVOLUTION(rpm%)	TIME	CHECKING ITEM
Daily work	20% of Max. rev.	10 min.	4. Temperature raising must be less than 20 ℃ 5. Vibration 6. Noise level
Spindle stop rotating over 72 hrs and up	3. 25% of Max. rev. 4. 50% or 1/3 of Max. rev.	10 min. 10 min.	1. Temperature raising must be less than 20 ℃ 2. Vibration 3. Noise level
Spindle stop rotating over 2 weeks and up	6. 20% 7. 40% 8. 60% 9. 80% 10. full speed	15 min 15 min. ***30*** min. ***30*** min. ***40*** min.	5. Temperature raising must be less than 20 ℃ 6. Vibration 7. Noise level **8.** Each ***Time*** should wait till steady temperature then run the next step.

1. Do not rotate spindle unless the tool holder loaded into spindle already.
2. If the temperature raise over 20℃, please slow down the revolution of spindle to 800 rpm then wait about 5℃ higher than room temperature to operate following up the table instructions above.

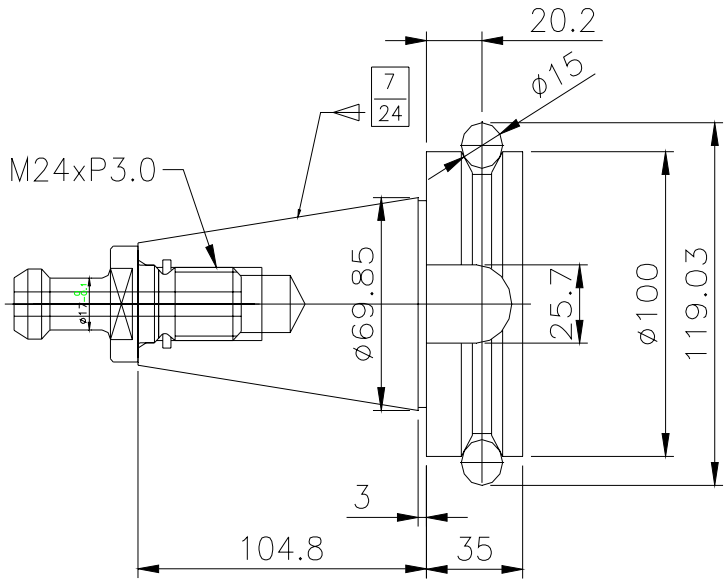
4-6 Spindle head stock

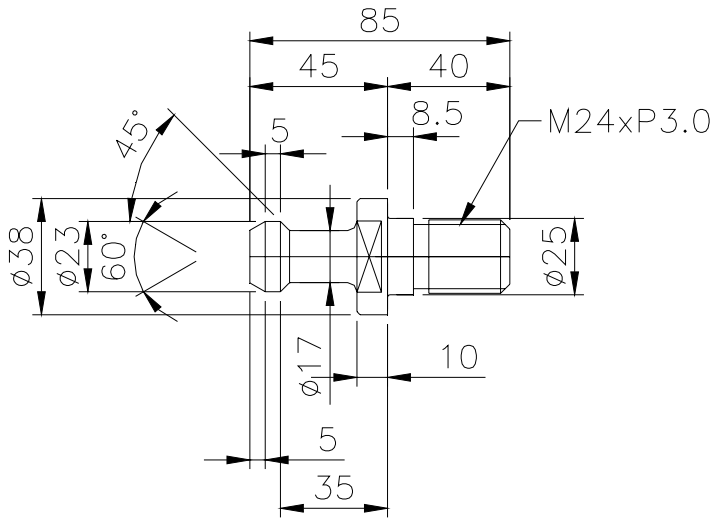


1> Spindle oil cooler outlet
2> Spindle oil coolant inlet
3> Nozzle coolant inlet
4> Nozzle coolant outlet

5 Tool system

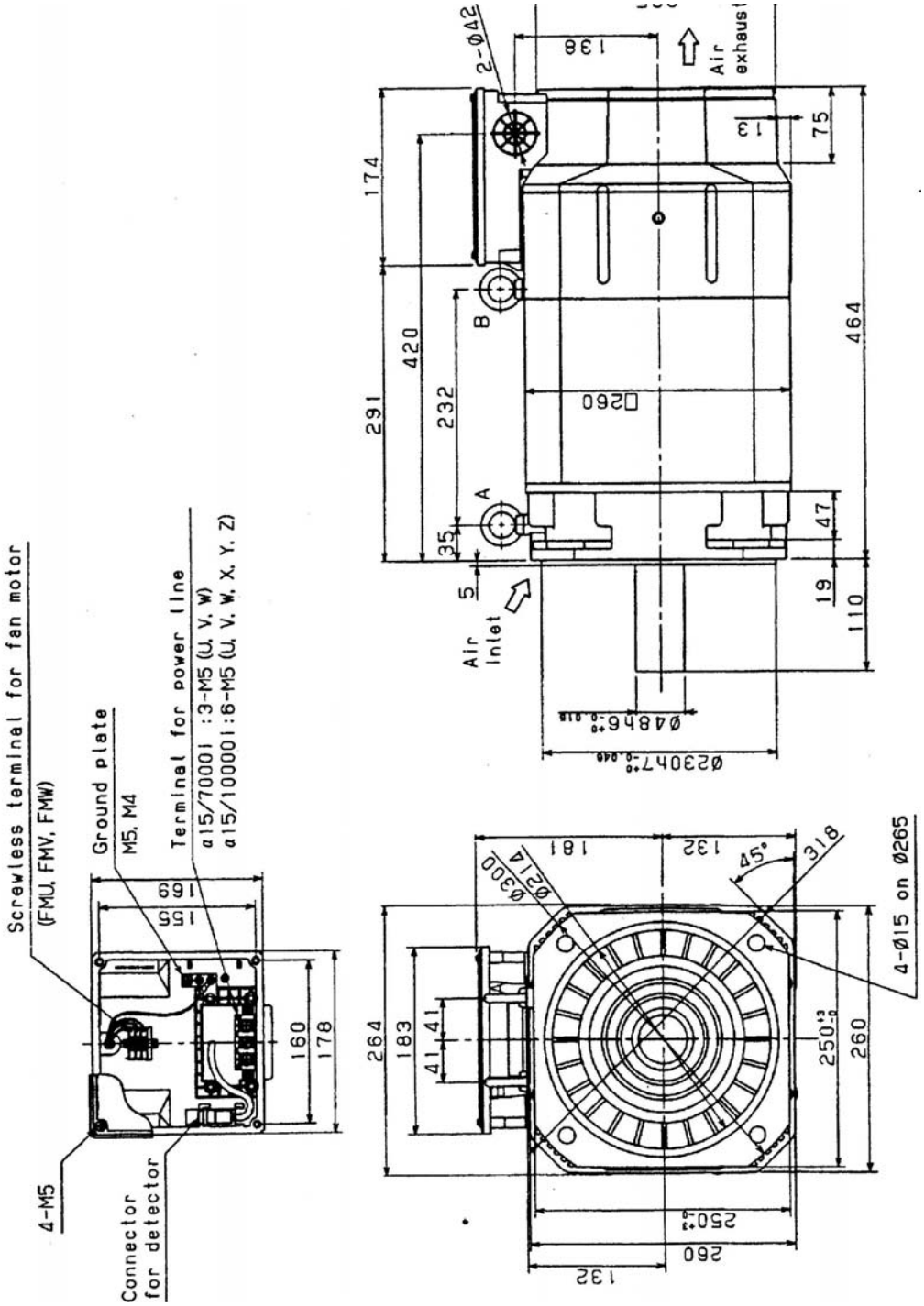
5-1 Tool holder and pull stud (BT 50)





6 Fanuc AC Spindle motor and servo motor

6-1 Outside Appearance



6-2 Specification

Item	unit	Specification
Type		α 15/7000i
Cont. rate	kw/hp	15/20
30min rate	kw/hp	18.5/25
S3 60%	kw	18.5/25
Base speed	min^{-1}	1500
Max. speed	min^{-1}	7000
Output torque	N.m	95.4
Rotor inertia	$Kg.m^2$	0.09
Weight	kgf	110
Vibration		V5
Noise	dB	75
Cooling fan	W	56
Insulation		Class H
Ambient temperature	˚C	0 to 40
Sensor		Mi sensor or MZi sensor
Resolution of MZi sensor	/rev	4096
Number of detected gear teeth per rotation	λ /rev	256
Bearing lubrication		grease
Maximum output during acceleration	KW	22.2
Applicable spindle amplifier module		SPM-22i

6-3 Servo motor

Item	unit	Specification		
		X	Y	Z
Type		α 40/3000i	α 40/3000i	α 40/3000i
Output	kw/HP	6/8	6/8	4/5.4
Rating rotating speed	min^{-1}	2000	2000	3000
Maximum rotation speed	min^{-1}	3000	3000	3000
Rated torque at stall	Nm	38	38	22
Rotor inertia	$Kg.m^2$	0.022	0.022	0.012
Torque constant	Nm/A	1.18	1.18	1.2
Static friction	N.m	1.8	1.8	1.2
Mass	kgf	51	51	29

7 Two-speed Gearbox System

7-1 Application

Machine tools are designed to be universal so that they can process different materials. This requires both high cutting speeds for soft materials as well as high cutting forces for hard material requirements which a two-speed gearbox can fulfill since it can either retain high motor speed (i=1:1) or multiply the motor torque (1.g ratio i = 4) and reduce the speeds, both by the same factor, The cutting power is therefore constant and remains available across a wide speed range.

This provides high torque at low speeds on the one hand and high power at high speed on the other, allowing the cutting power of modern tools to fully utilized.

7-2Maintenance:

Daily work	1. Check the oil level of oil cup
Weekly work	1. Check the oil level and fill it of oil cup
Monthly work	1. Check oil pipe and connectors to see is there any leak or loose. 2. Clean the system.
Yearly work	1. Change the oil

7-3 Trouble shootings

Trouble	Possible reason	Solution
Big noise in gearbox and some noise of clash	● Release the speed inductor of motor, may be the wrong parameter of motor caused the problem. ● May be the pitch off sensor break down so can not transfer the correct signal.	● Check the speed sensor connector, if necessary replace. ● Check the parameter and the system.
Strange noise of gear box and noise during.	Long time running at high speed of 1:1 ratio and gear shift to 1:4.	Gearbox will not damage try many times shifting gear will

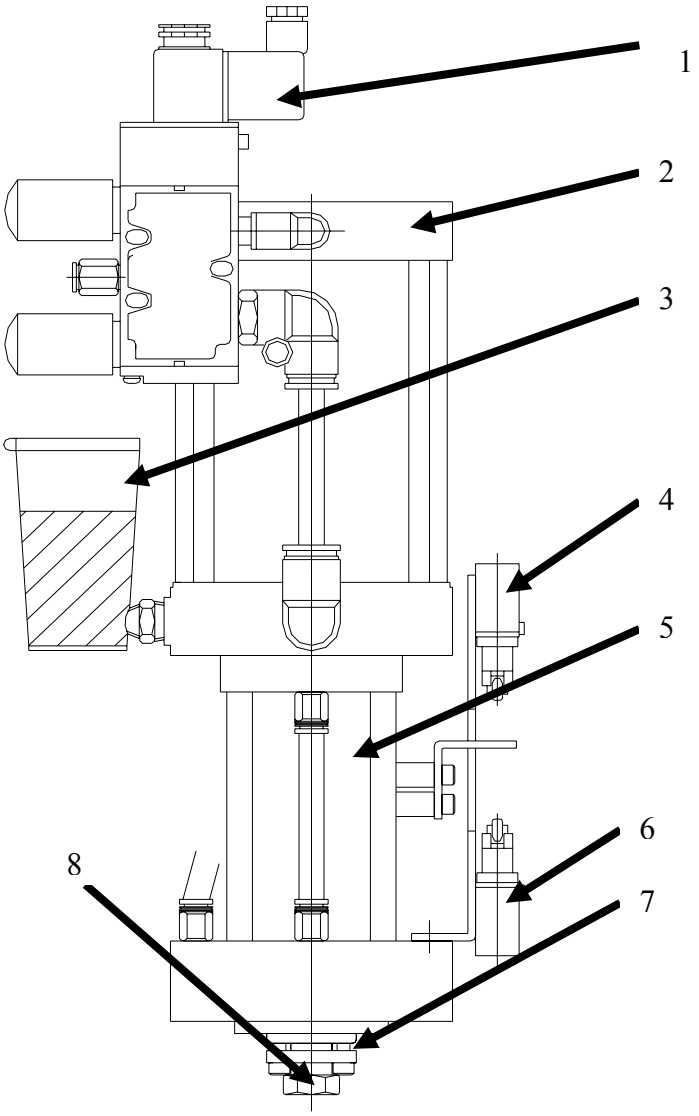
	Axis bearing problem in	improve.
In coolant tank the oil level is in unusually dismissing situation.	May be the connector loose or leak.	Checking the piping and connectors, should be replace or tighten if the problem found.
Flow rate switch can not transfer the signal, and the alarm sign is on	● Flow fate switch is broken.	● Replace the flow rate switch.
Circulating oil temp. too high.	● Circulating pipe is blocked. ● Cooler is not started	● Check the piping system. ● Check the oil cooler.

8 Unclamping Cylinder(Booster cylinder)

8-1 Application

By using big area pneumatic cylinder and its system the air power pressure is 5-6 kg/cm^2 to push the hydraulic cylinder which is smaller size cylinder and create a multiple power pressure to reach the high output push-out tool mechanism.

8-2 Outside Appearance



NO	Name	Qty	Mode	Note
1	Solenoid valve	1	MVSC-300-4E1	Mindman
2	Pneumatic cylinder	1		
3	Oil cup	1		ISO VG32
4	Micro switch	1	SL1-A(clamping)	YAMATAKE
5	Hydraulic cylinder	1		
6	Micro switch	1	SL1-A(unclamping)	YAMATAKE
7	Fix nut	1		
8	Adjust screw	1		

8-3 Specification

Applied pneumatic pressure: 5-6 kg/cm^2
Output pressure: 4000 kg/cm^2
Cylinder stock: 17 mm
Pneumatic capacity: 2.95L/min
Hydraulic capacity: 70 cc
The specification of hydraulic: ISO VG32

8-4 Maintenance:

Daily work	1. Check the oil level of oil cup
Weekly work	2. Check the oil level and fill it of oil cup
Monthly work	3. Check oil pipe and connectors to see is there any leak or loose. 4. Clean the system.
Yearly work	1. Change the hydraulic oil


Caution

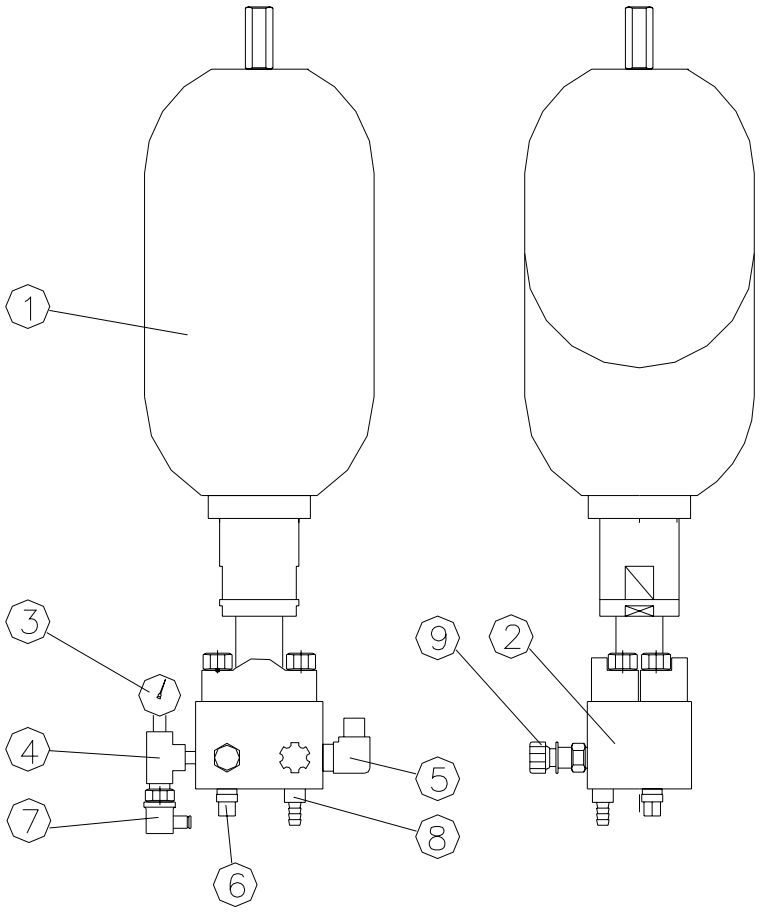
When change hydraulic oil or re-fill the oil, please pay attention to the oil level which is allowed in 60~70% range.

9 Nitrogen bottle type counter weight system

9-1 Application

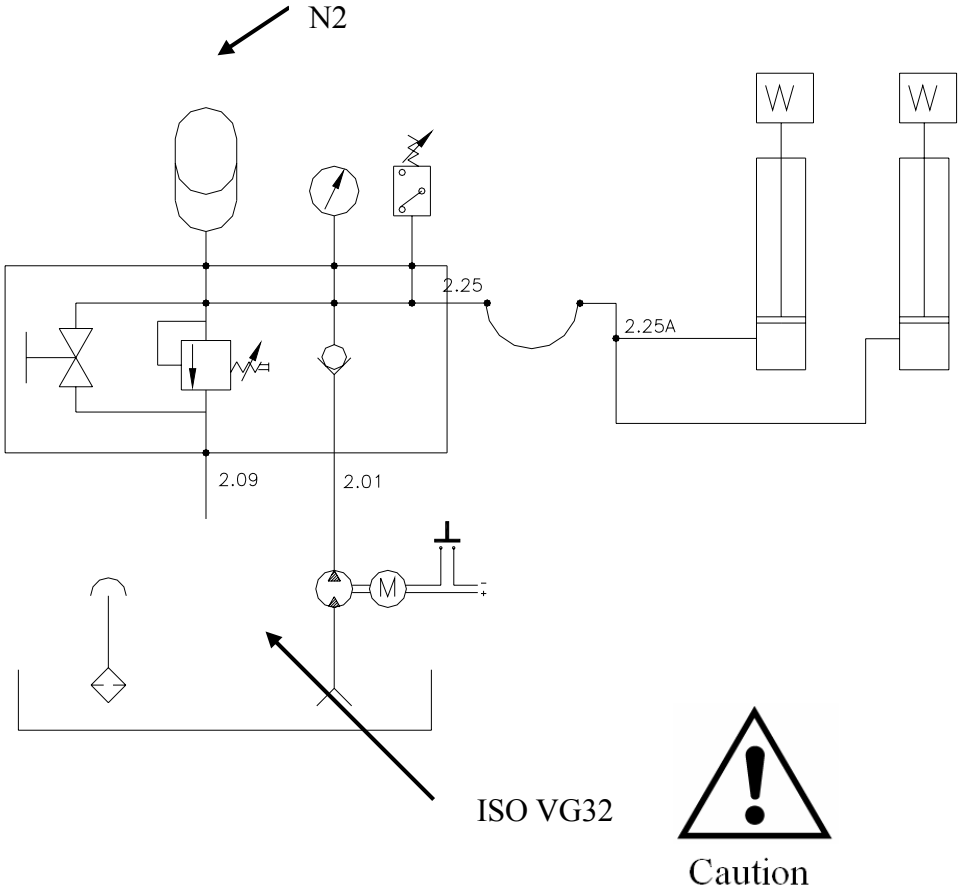
The Nitrogen bottle is a special design with inside smaller steal bottle, the filling of Nitrogen gas to certain gas pressure then fill the hydraulic oil to the outside layer of thin smaller inside bottle and by the change of volume, which will create pressure and introduce this pressure to hydraulic cylinder and then producer a trust to balance the Z axis up and down motion.

9-2 Outside Appearance



ITEM	(NAME)	(DESCRIPTION)	Q'TY
9	PRESSURE MODULATOR		1
8	PLUGGED CONNECTOR	1/2PT*1/2PLUG	1
7	PRESSURE SWITCH	PUM-20A-14K	1
6	PRESSSURE CONNECTOR	1/4PT*1/2H	1
5	PRESSURE CONNECTOR	3/4PT*1/2H-L type	2
4	T TYPE CONNECTOR	1/4"PT INNER THREADED T type	1
3	PRESSURE GAUGE	AT1/4*63*100kg	1
2	BALANCE MODULE	FLANGED(MIT)	1
1	PRESSURE CONTAINER	AL150-10L-OP-	1

9-3 The sketch of nitrogen counter weight



9-4 Maintenance:

Daily work	1. Check the Hydraulic pressure
Weekly work	3. Re-fill the pressure (push the button)
Monthly work	5. Check oil pipe and connectors to see is there any leak or loose. 6. Clean the system.
Yearly work	1. Change the oil (Oil type: ISO VG32)

9-5 Trouble shootings

Trouble	Possible reason	Solution
Overload of Z axis motor	● Lose pressure due to Nitrogen leak ● Hydraulic system pressures not enough.	● Re-fill Nitrogen ● Push up the hydraulic pressure ● Check any leak in system.
Alarm signal by pressure switch	● Hydraulic system pressure not enough	● Check pipe system, circuit and connector ● Check leakage ● Raise the pressure
Counter weight hydraulic cylinder leak	● Oil seals broken	● Replace oil seal or cylinder

Danger

Caution

1. Re-fill Nitrogen need attention
   Nitrogen is a high pressure gas, unless it is necessary, please do not re-fill the N2, otherwise, should be done by authorized personal or qualified person and follow the instruction of operation manual.
2. During the re-filling process, need to clean the hydraulic oil first and release the hydraulic-pressure.
3. Repairing Z axis associated system must release the pressure of hydraulic pressure of this Nitrogen system.
4. If re-assembly the Nitrogen balancing system, before connecting the piping system and install the connectors and start the hydraulic pressure, please loose the terminals of pipe and connector and release the release gas.

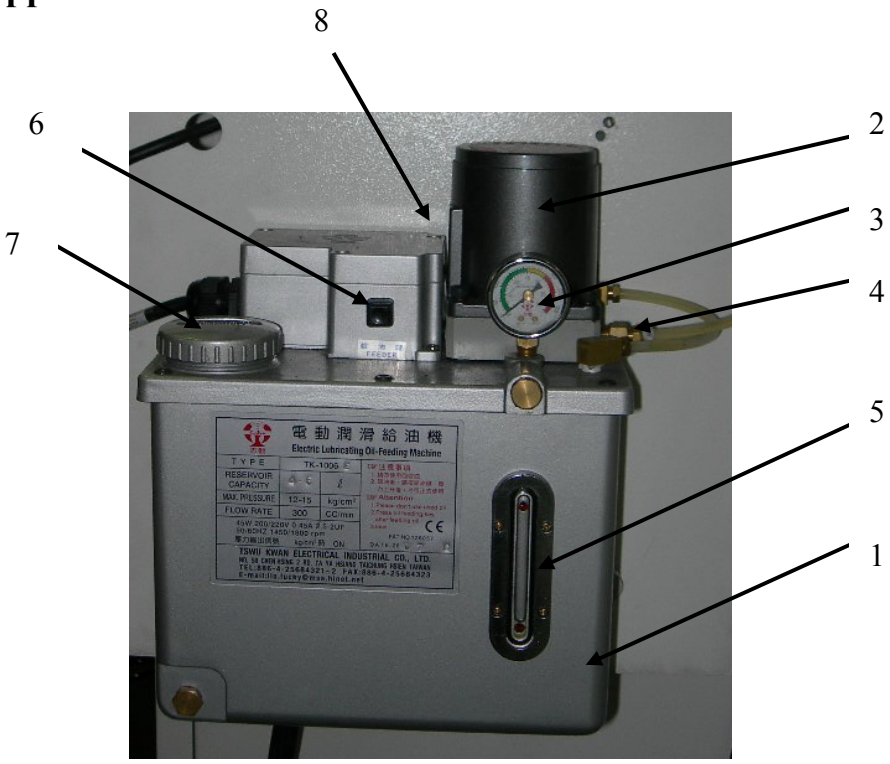
10 Lubrication unit

10-1 Application

The slide way and liner way of machine are in headstock (Z axis) and table (x axis), saddle (Y axis) and the X,Y, Z axis ball screw, those areas need to be lubricated and all supplied by the lubricating pump located at the rear side of this machine.

When we turn on the machine power the auto lube will be started automatically and it will pump the lubricant to the areas mentioned above every 15 minutes. Every shot of oil will last 30 seconds. It can be adjusted if necessary, please refer to the operation manual.

10-2 Outside Appearance



NO	Name	Mode	Note
1	Oil tank	4.5 little	ISO VG68
2	Pump		
3	Pressure gauge		
4	Oil outlet		
5	Oil level gauge		
6	Push button		
7	Oil inlet		
8	Adjust screw		

10-3 Specification

Item	Specification
Max flow	300cc/min
Pressure	12-15kg/cm2
Float switch	Yes
Oil tank capacity	4.6 little
Pressure protection device	yes
Voltage	50/60 Hz/ Single phase
Consumption power	45W

10-4 Maintenance:

Daily work	1. Check the pressure(push the button)
Weekly work	4. Re-fill the lubrication
Monthly work	7. Check oil pipe and connectors to see is there any leak or loose. 8. Clean the system.

When we have the following situation please hold on the push button for 30 seconds, this action should repeat 3 times, because for a long time no operation, the lubrication is very little.

When

1. The machine is first time set up
2. Long time no operation.
3. Everyday before operation.

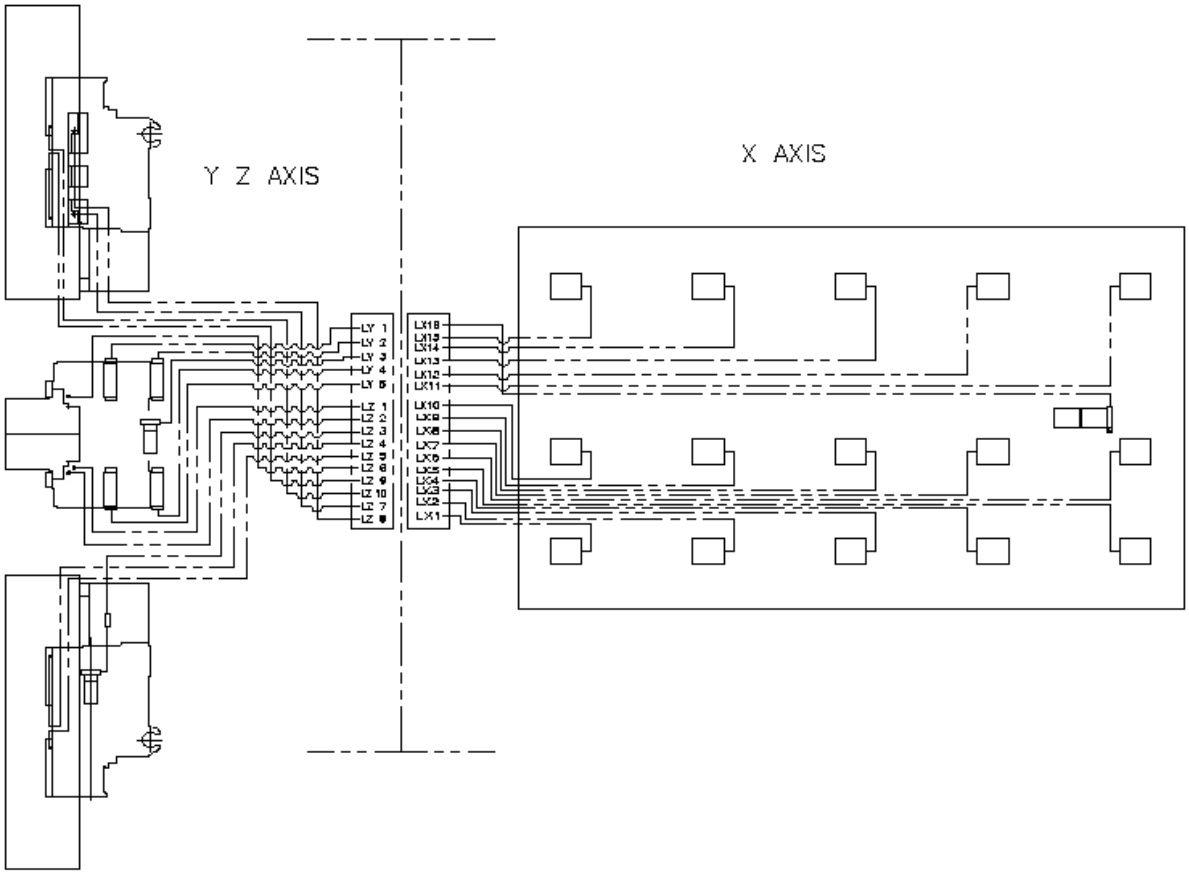
We should do this lubricating operation, go around and begin again 3 times when hand off the pump will stop automatically.

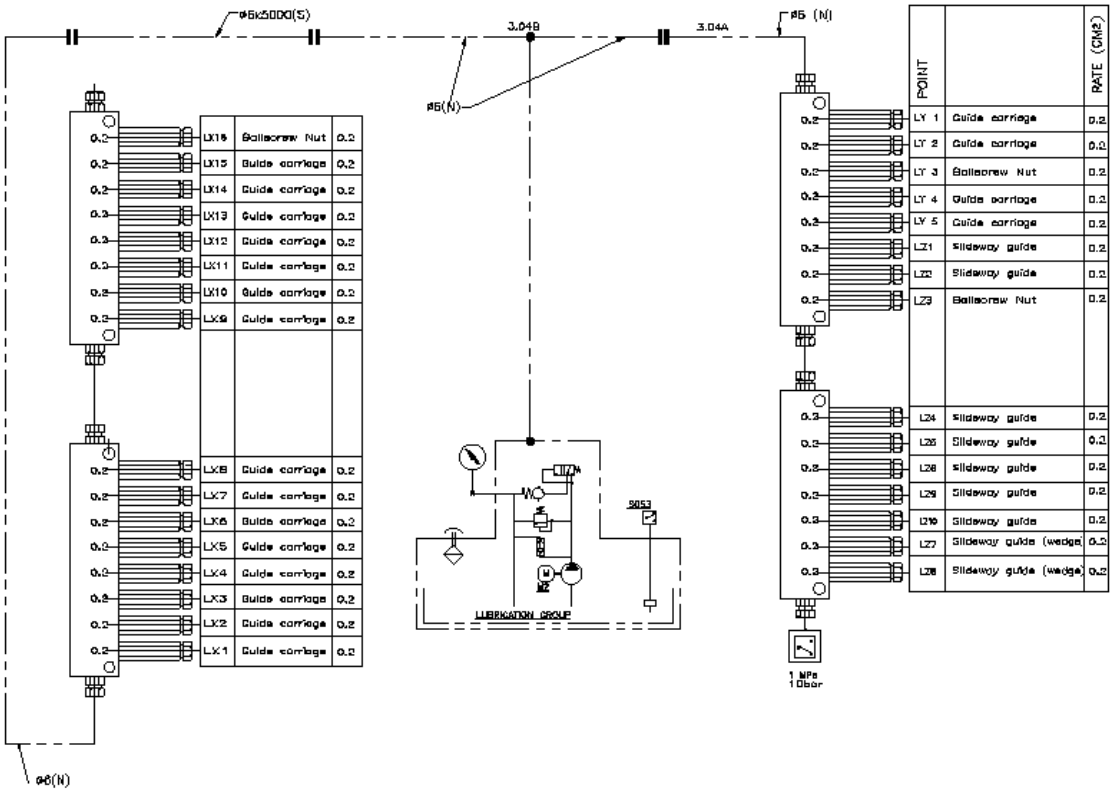
The total capacity of lubricant is 4.5 liters, we should re-fill from the oil inlet every 2 weeks. When the oil level goes down to 1/4.

The operation panel will show “LUBE ALUMN” Which is very dangerous.

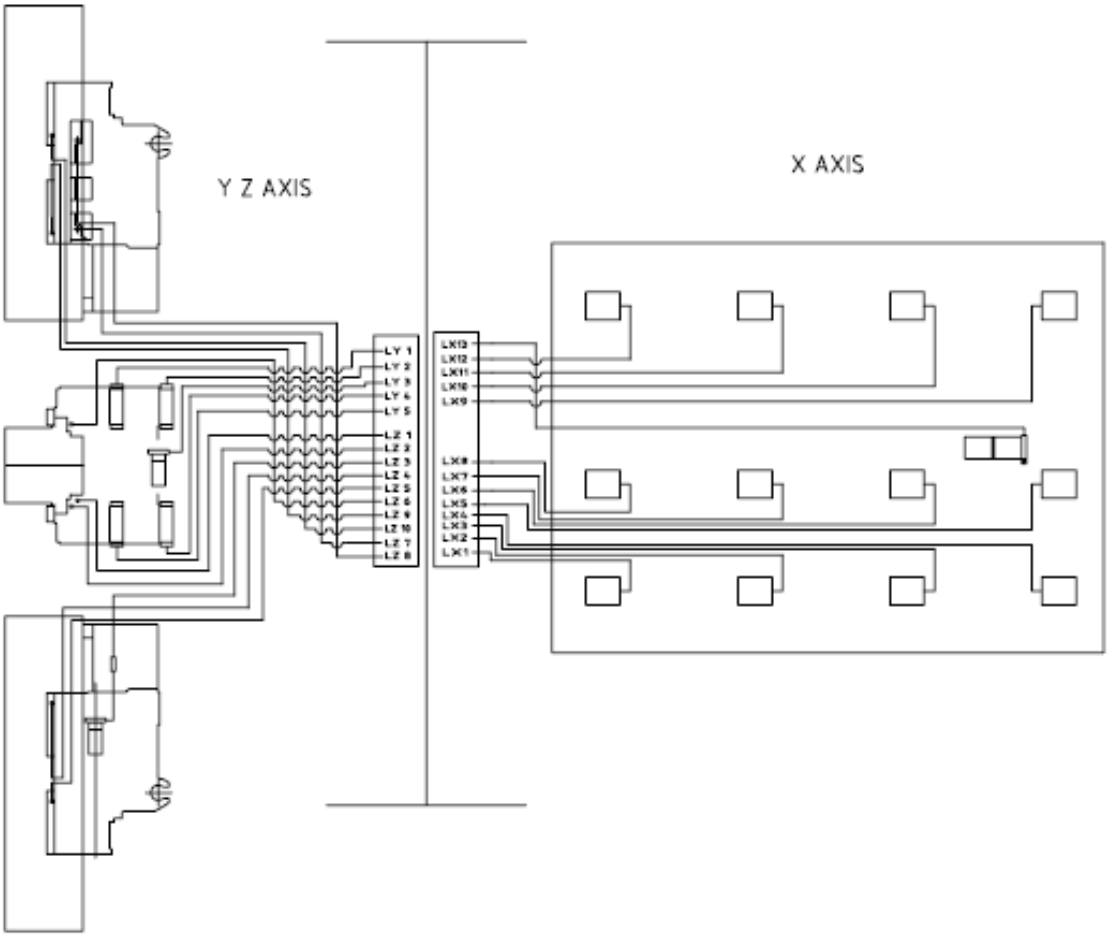
10-5 The sketch of Lubrication

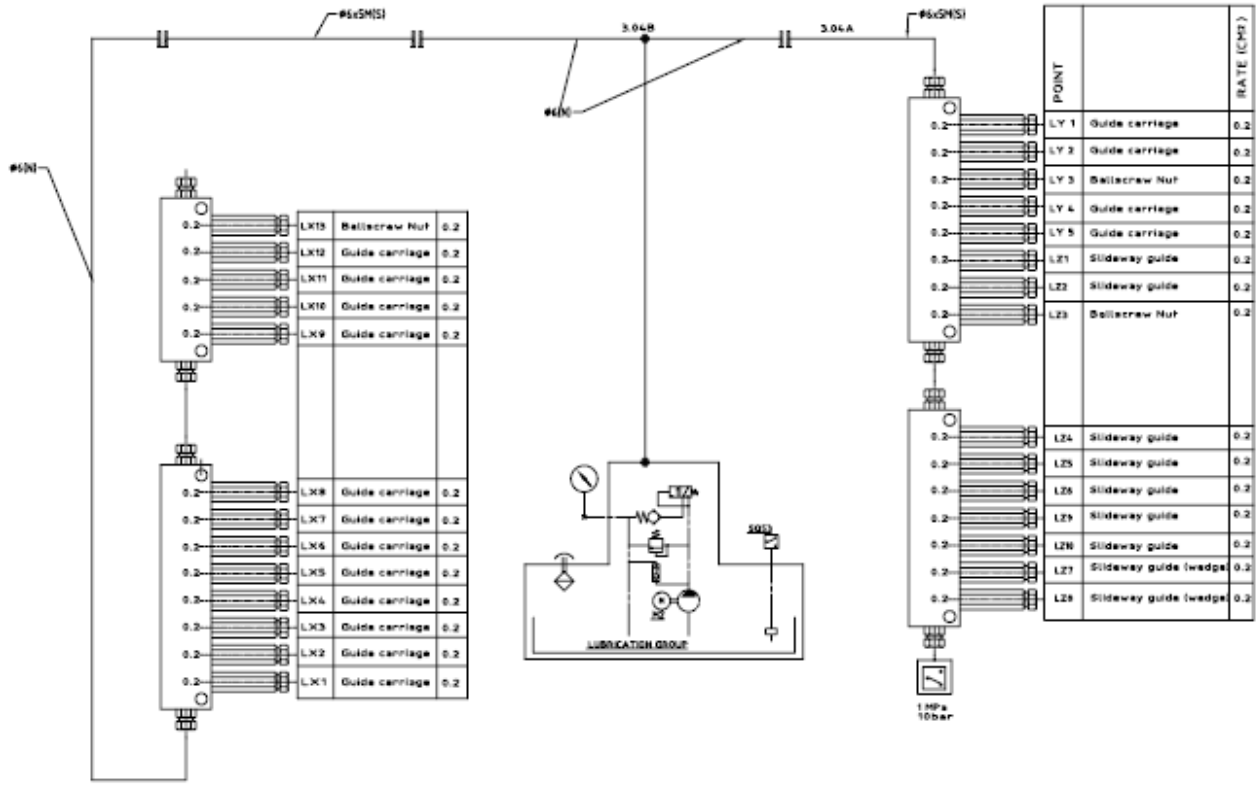
10-5-1 LX4225-8150136



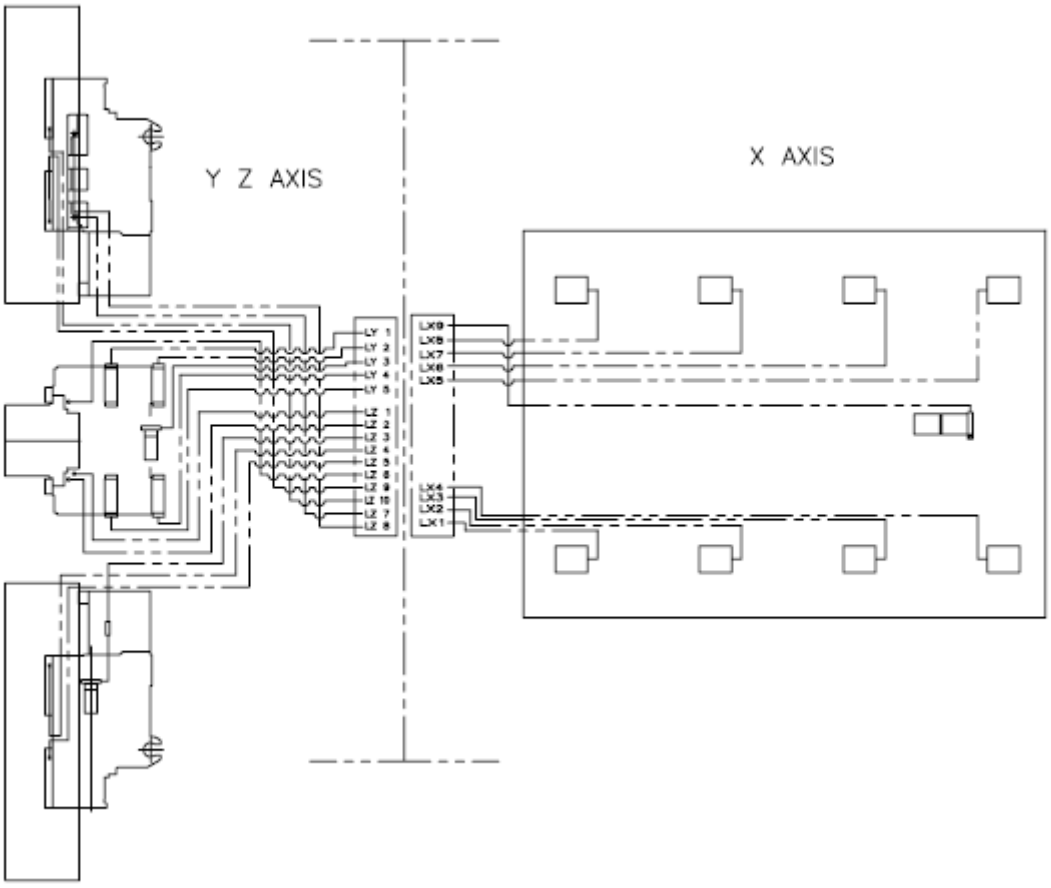


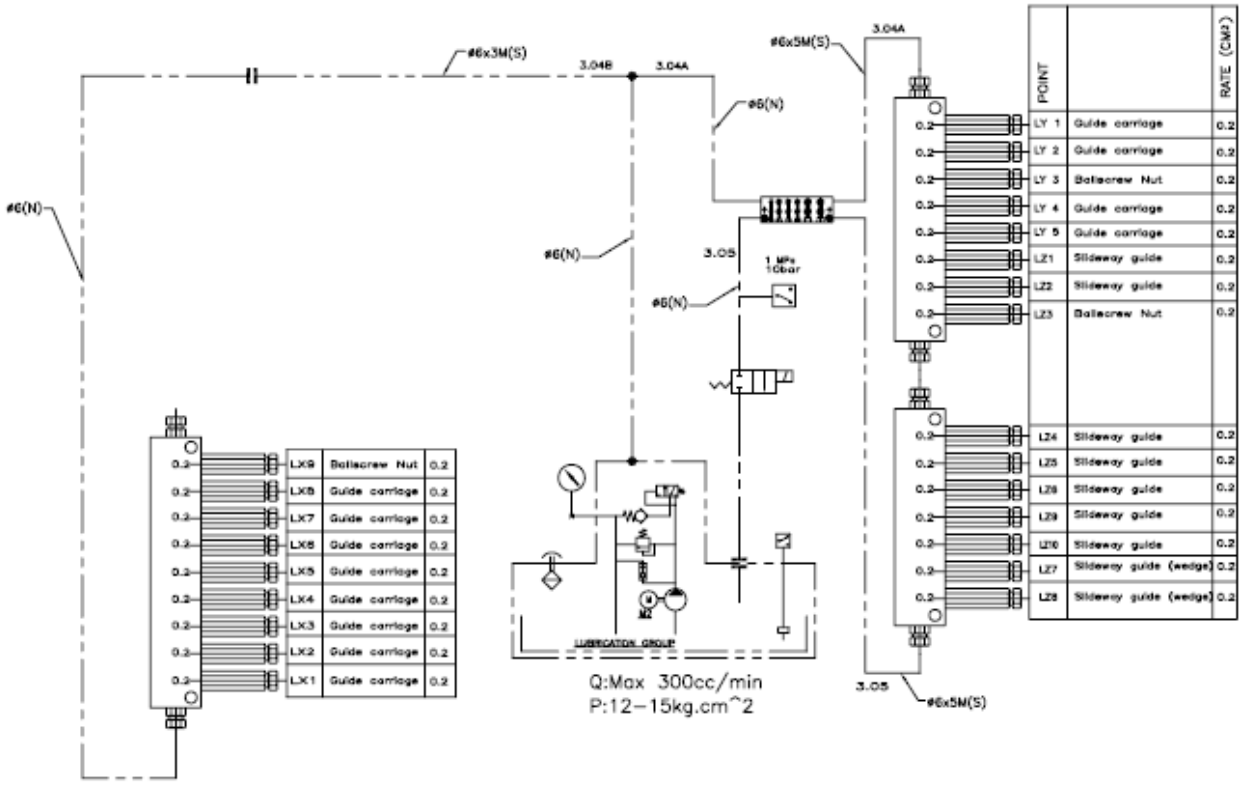
10-5-2 LX3225-8150145





10-5-3 LX3220-8150146





10-6 Trouble shootings

Trouble	Possible reason	Solution
Pump can not work	1. The thermal relay of pump is working 2. There is some foreign particles in 3. The viscosity of oil either too high or too low.	1. Disassemble the pump and take away the foreign particle 2. use suitable viscosity oil 3. Replace the damage switch or connect.

The control lubricator system is always has strong influence to the machine accuracy and life of operation, so please take good can of operation and maintenance.

The normal working condition is in the temperature of surrounding at 5-60° please do not over it or below it and please do not let the sun shine impinge on the machine directly.

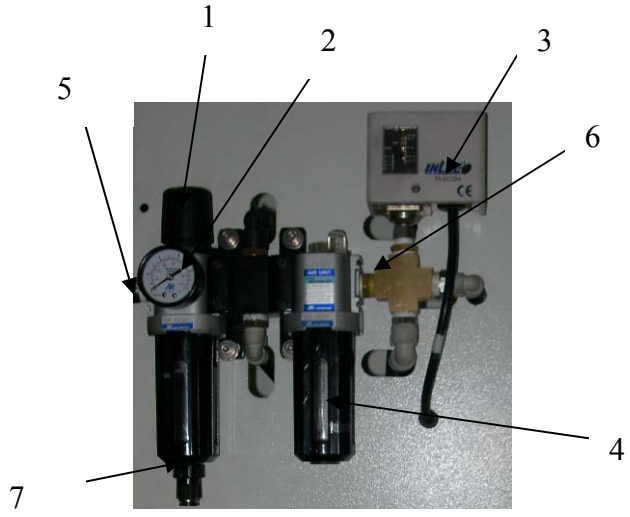
Max. operating pressure should not over 12 kgf/cm^2 (170 PSI).

11 Pneumatic system

11-1 Description

F.R.L unit

1> Adjusting knob
2> Pressure gauge
3> Switch
4> Oil cap
5> Air inlet
6> Air outlet
7> Filter



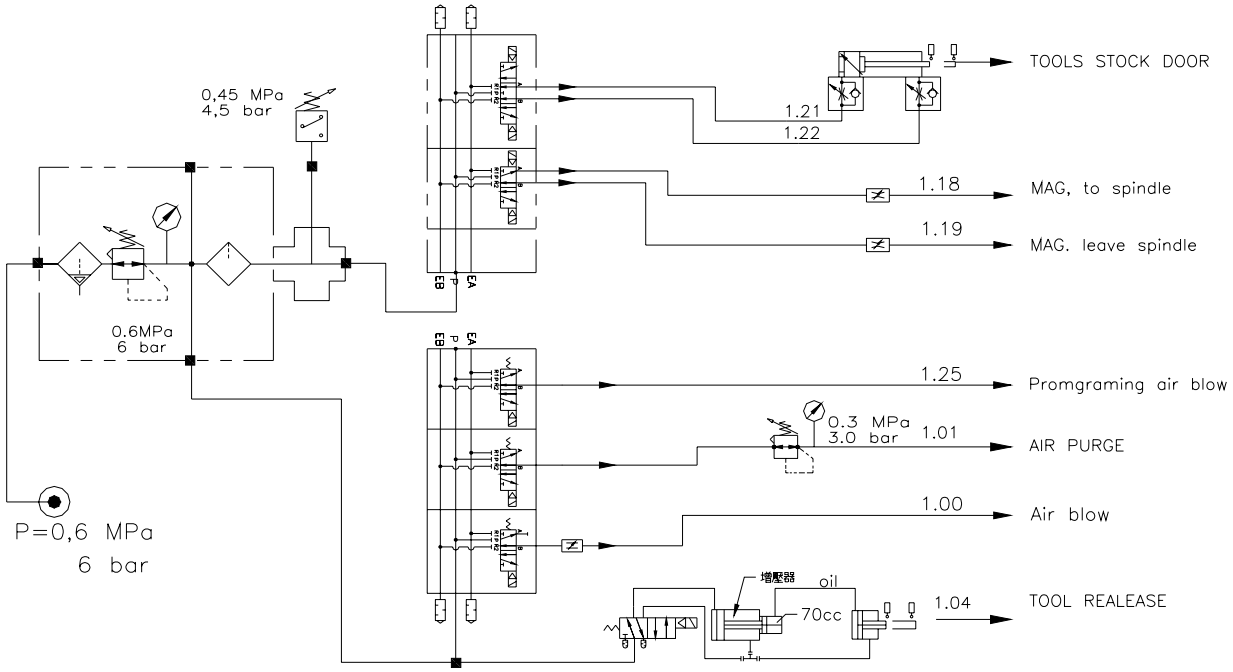
11-2 Specification:

ITEM	F.R.L. UNIT MODEL MACP-300-10A
Components code	MAFR300-10A-MADV300/MAL-300-10A
Bore size	PT 3/8
Operating pressure	0～9.9 kgf /c ㎡ (0～0.99MPa)
Proof pressure	15 kgf /c ㎡ (1.5MPa)
Regulation pressure range	0.5～8.5 kgf /c ㎡ (0.05～0.85MPa)
Effective orifice	35 m ㎡
Ambient temperature	5～60℃
Filter accuracy	5 μ m
Lubricant capacity	55cc
Flow rate for oil drip	60 *l*/min
Recommended lubricant	TURBINE OIL ISO-VG32 or relevance
Weight	720 g
Attachment	Pressure gauge, T-type bracket

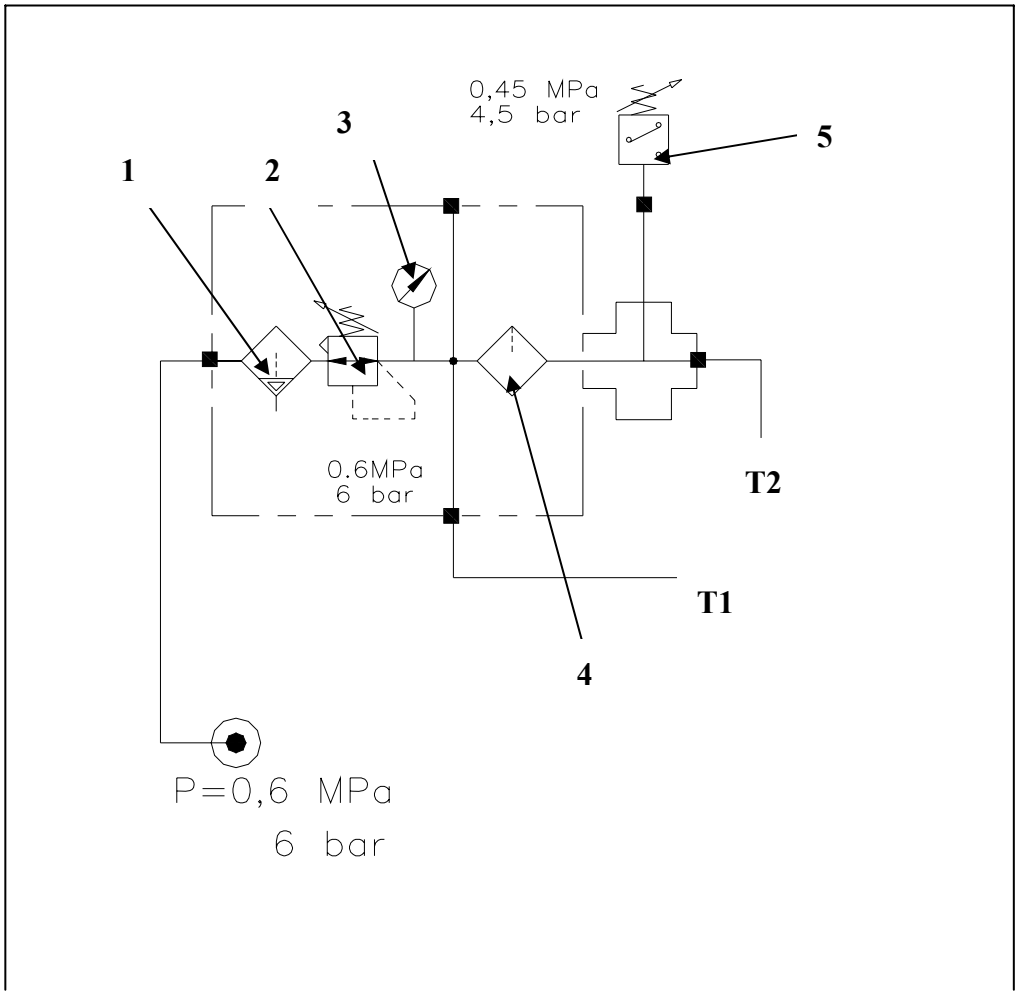
The following functions are controlled and actuated by pneumatic system

1> Spindle air blow
2> Tool release
3> Cutting air blow
4> Spindle air purge
5> Automatic tool change door open/close
6> ATC MAG. Moving

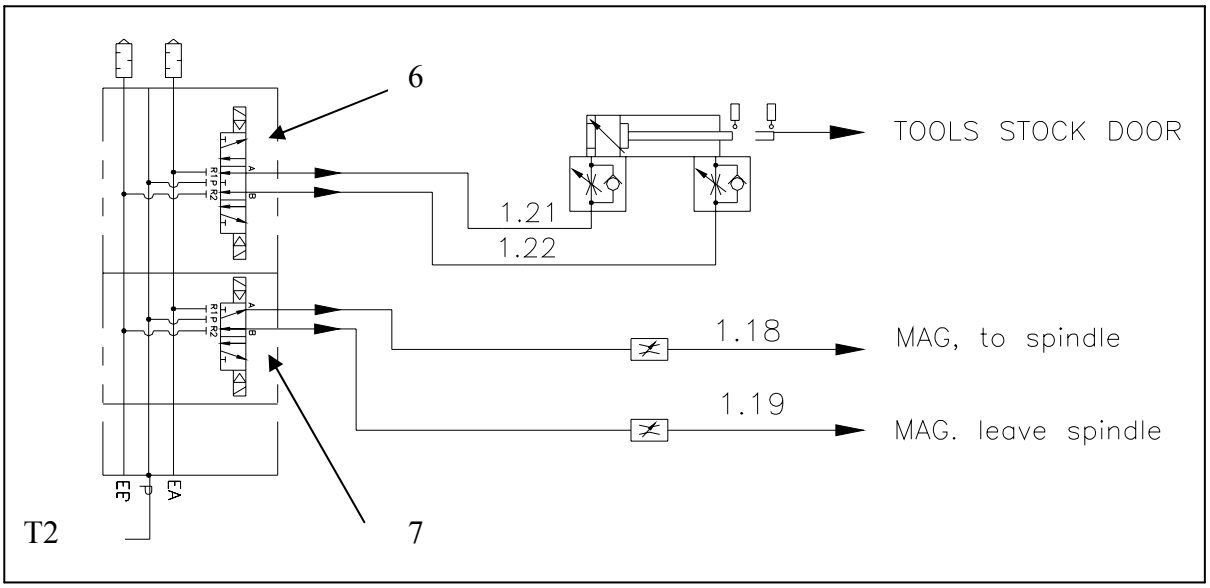
11-3 The sketch of pneumatic system



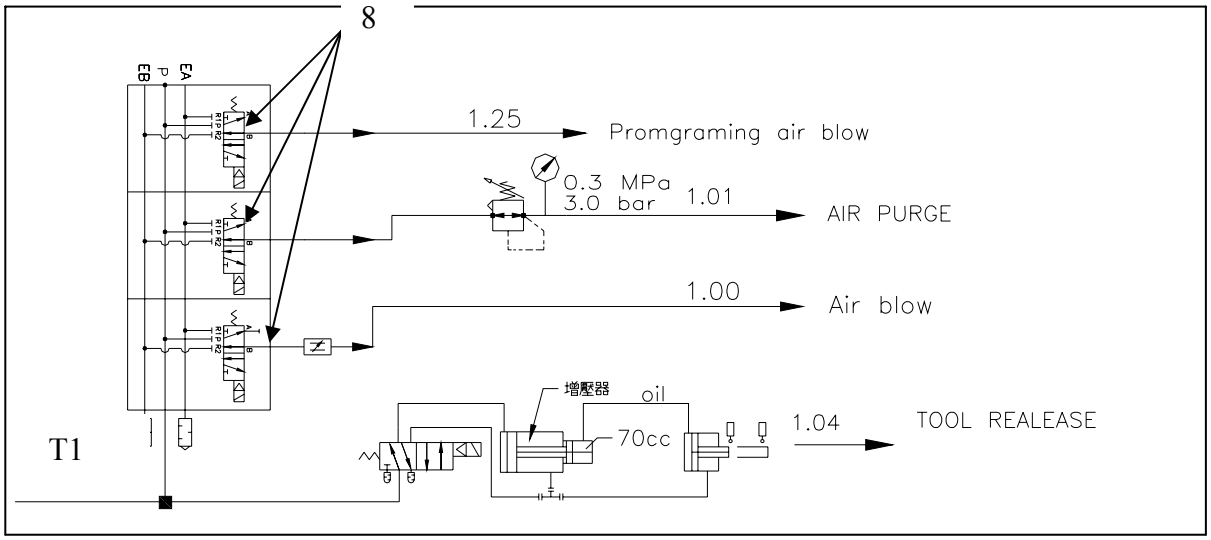
F.R.L unit



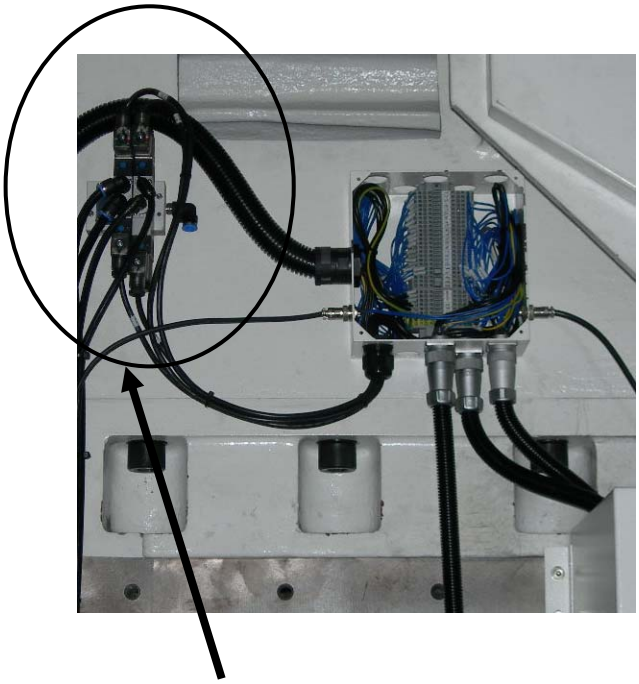
MAG. door and MAG. moving unit.



11-4 Head stock area pneumatic loop



11-5 Head stock area pneumatic loop



MAG. door and MAG. moving unit

11-6 Maintenance

1> Pneumatic pressure setting at 5 kg/cm^2 (71 psi).

2> Air source can not less than 5~7 kg/cm^2(78 psi).

3> Air filter will improve the quality of air, should not contain dust and moisture.

4> The filter accuracy should have the capacity of 5u.

5> Each 8 hours check the F.R.L unit oil cup and fill it up.

11-7 Note

1> Polycarbonate bowls may be damaged and possibly fail if exposed to synthetic oils, thinner solvents, trichloroethylene, kerosene, or other aromatic hydrocarbons. When used in above atmosphere, please use a metal bowl.

2> Unsuitable for flow is below 400 l/min.

3> The drain line should be 8 mm or more and overall line should be less then 5000mm.

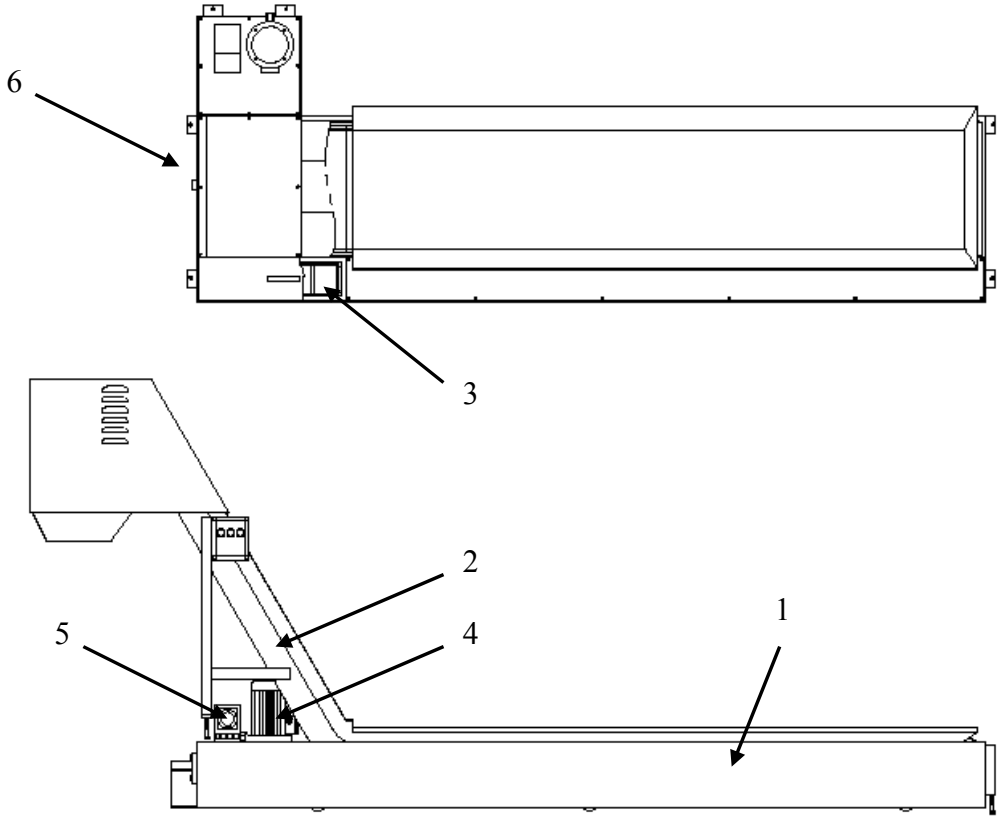
12 Coolant system

12-1 Application

This system will provide cooling condition and function to the tools and work piece during operation of machine.

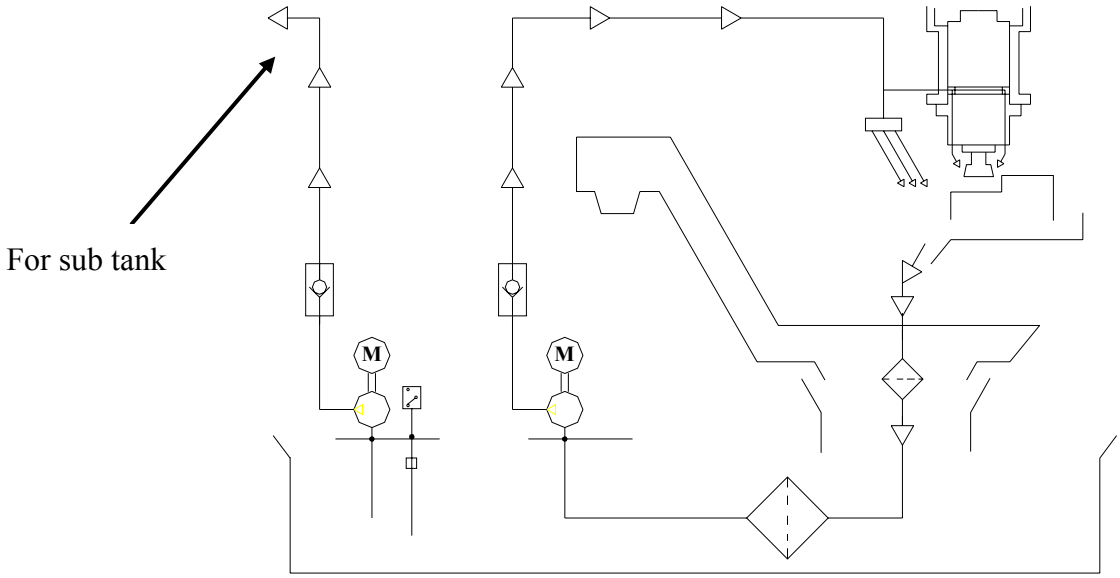
The coolant system will supply and cycle return and filing the cooling water. During the cutting process also will offer the lubrication to work piece and washout the chips.

12-2 Outside Appearance



NO	Name	Qty	Mode	Note
1	Coolant tank	1		
2	Chip conveyor	1		
3	Chip filter	1		
4	Coolant pump	1		
5	Oil separator	1		
6	Level gauge	1		
		1		

12-3 The route sketch of coolant system



12-4 Specification

Item	unit	Specification
Tank capacity	Liter	650
Pump type: Power: Outlet pressure Outlet flow:	 W Kg/cm2 m^3/h	TPHK5T4-3 720 2~3 2.3
Liquid temperature range:	˚C	0˚C ~ 90˚C
Max. ambient temperature:	˚C	50˚C

12-5 Maintenance:

Daily work	1. Check water lever of coolant tank. 2. Check pump function 3. Clean filter net 4. Clean chip bucket
Weekly work	5. Check water level of coolant tank and re-fill to its normal condition 6. Check any leak from piping circuit.
Monthly work	9. Check any unusual situation of coolant. 10. To determine any change or replacement of the coolant. 11. Clean the coolant system. 12. Lubricate all rotating area of the system.

Caution

1> All water used in this machine need to add same type of solvent, please follow the instruction to select proper brand and quantity to mix with water.
Our recommendation as follows:
Mobilcut 222-concentration 7% max.

2> Coolant will deteriorate due to the frequency and working condition, please judge whether should replace or change.

3> The duality of coolant will affect the result of working performance. So always be careful in coolant quality and it mix ratio.

4> The deteriorated coolant will pollute the environment, So please arrange the qualified personal and with license company to handle this waste.

12-6 Trouble Shooting

Trouble	Possible reason	Solution
Nozzle can not blow off coolant	4. Pump is defective 5. Inlet hole of pump had blocked 6. Piping has foreign particle. 7. Water level too low. 8. Filter blocked	4. Repair or replace pump. 5. Clean it also clean the water tank. 6. Clean the block. 7. Re-fill coolant. 8. Clean the filter.
Pump runs at reduced capacity	1. Wrong direction of rotation. 2. Pump is blocked by impurities 3. Check valve is partly blocked	1. Check the electric connection. 2. Clean the block. 3. Clean check valve.
Chip conveyor jam in and can not move	1. Too much chip block the moving parts. 2. No lubrication on the moving parts of the chip conveyor. 3. Motor damage.	1. Stop the chip conveyor clean the chips and stand again. 2. Do the lubrication and start again. 3. Replace the motor.
Pump stops during operation.	1. Thermal overload switch in motor or external motor protection cut out 2. Control circuit has cut out.	1. Check the overload switch. 2> Replace Control circuit.

Caution

1> Cooling liquid and chip are harm to human physical body so please handle it with care for example please wear hand glove during work with it.

2> Please make sure the power is turn off when repair the chip conveyor. The chain or chip may be harm to your hands, So during maintenance of chip conveyor we suggest to wear gloves.

3> It is recommend that clean the chips when the conveyor is moving in operation we do not suggest that clean the chip after stop the conveyor this situation will damage the conveyor become of overload.

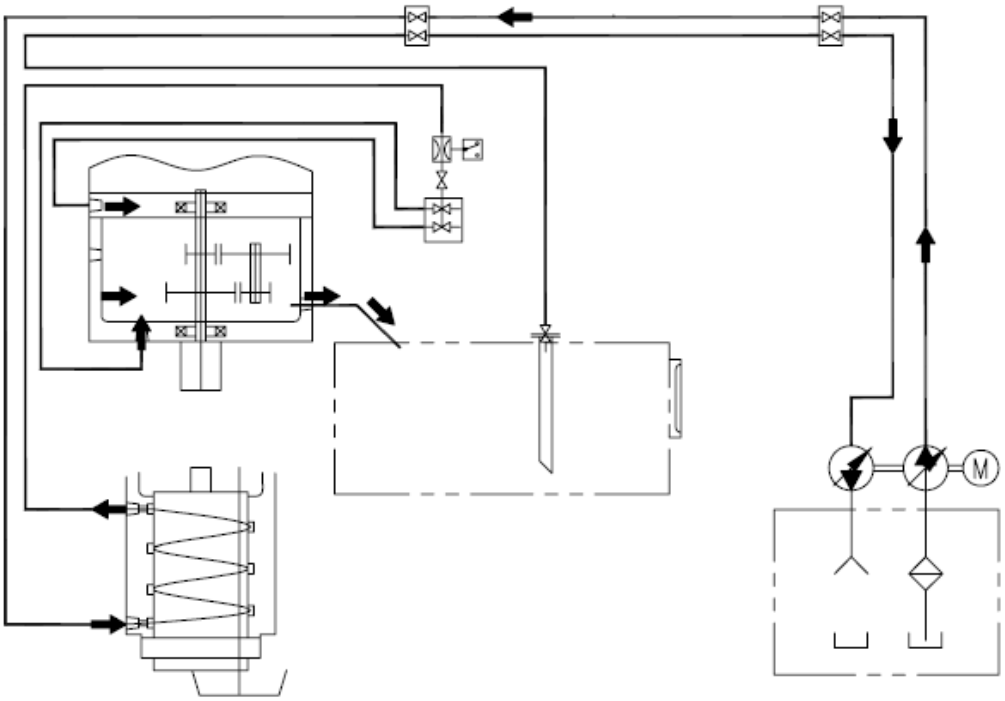
13 Cooler system

13-1 Specification:

ITEM		
Cooling capacity BTU/hr		12000　3000 KCAL/Hr
Power source	V	AC 220V/380V 3 φ　50/60 Hz
Oil pump power	Hp	0.25/0.19KW
Total current	A	3.8
Inlet and outlet bore size	in	1/2”x1/2”
Oil pump flow rate	L/min	P1：10，P2：20
Refrigerant		R-134a
Oil tank capacity	Litter	35L
Refrigerant Oil		ISO VG32

This system is incorporated with oil-temp controller , will make the coolant oil including in the collar of spindle smooth and will reach the cooling condition effectively.

13-2 The sketch of spindle oil cooling rote

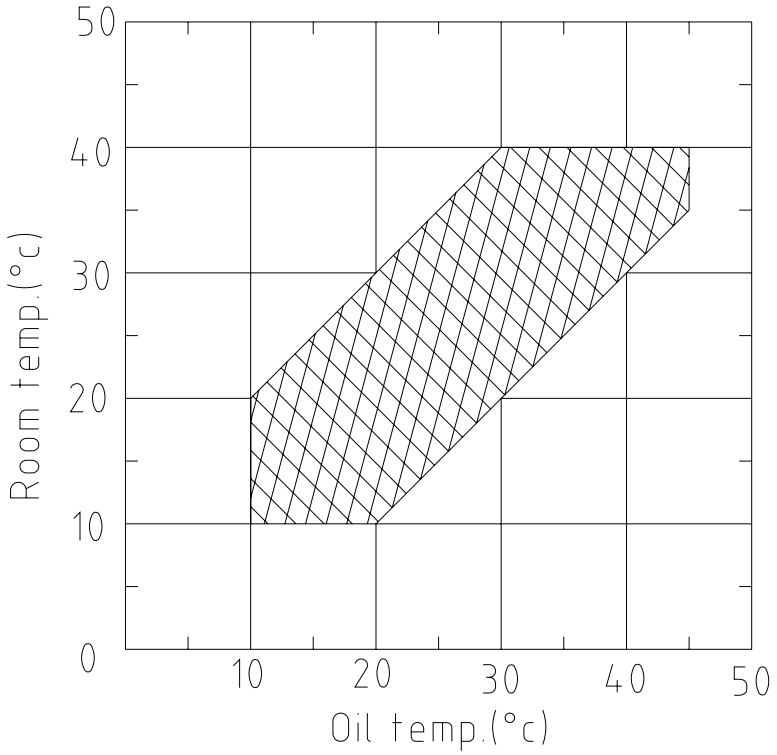


13-3 Regular checking before operation

1> Make sure the power is switched on and the indicated lamp light up.
2> Check the oil level if it is on full position.
3> Make sure the inlet or outlet joint is locked tightly.
4> Check the pressure of oil pump is at 3.5Kg/㎡.
5> Check the direction of pump motor is correct as the mark indicated.
6> If operator wants to switch on the power again after turning down the power must take 2-3 minutes break to re-start the oil cooler.
7> The net mesh of inlet must be in 10mm-15mm to avoid reducing flow rate and performance.
8> The filter shall be washed once a week with soapy water at least.

13-4 The temperature range that can be applied

It is because of the limit of cooling efficiency , the oil temperature controller can used only in this range which show in the following drawing.



Oil temperature should be within ±10℃ of room temperature

ATTENTION!

1> When oil temperature is over 45˚C , please stop the system and check.
2> Do not fall it flat and strike it as moving and put it on a level and solid floor.
3> Clean the inlet hole and outlet hole of air always.
4> Do not fall it flat and strike it as moving and put it on a level and solid floor.
5> Locate the oil cooler at well ventilation place where is free from fir hazard and from direct sunlight or heat.
6> Be sure the installation place of oil cooler unit where exhausting and air suction can be well performed.
7> Before remove the air filter must wait for more 10 monutes after turning off switch.
8> When the refrigerator once stops, wait for more 3 minutes. If not necessary, do not ON-OFF of the refrigerator.

13-5 Maintenance

Daily work

1> Check the oil level.
2> Check the temperature gauge.
3> Clean the suction strainer at the suction end of the oil cooler, oil pipes.

Weekly work

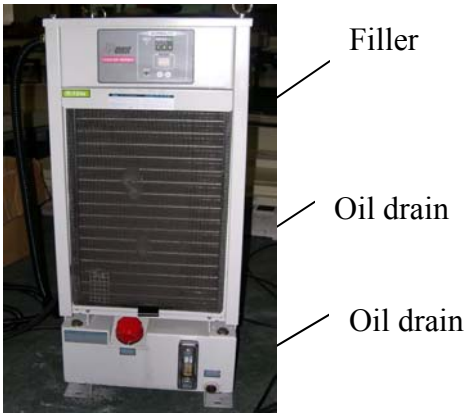
1> Clean the filter by brush or compressed air.
2> Check oil pipe and connectors to see is there any leak or loose.

Monthly work

1> Wash the filter
2> Clean up the dirt on radiator of oil cooler with compressive air.

Yearly work

1> Change the oil.



13-6 Trouble shooting

SITUATION	CAUSE	REMEDY
Main power turned on, but the indicate lamp is not lit.	Negative phase relay is triggered. Control circuit protector is blown.	Reconnect the wiring. Replace the fuse.
Pump runs but no oil flow and lower oil circulation rate of air.	Joint of oil piping is loosened from suction side.	Check the joint of oil pipe at suction side and tighten the loose joint.
	Suction strainer clogged.	Clean the suction strainer. Change the oil of oil tank if the oil is contaminated.
	The oil level in tank is too low.	Trace and refill up oil.
	Undue pressure loss in oil pipe cause actuation of relief valve.	Enlarge the oil pipe diameter or trim shortly the piping.
	Oil viscosity too high.	Choose the appropriate oil.
Pump runs but the refrigerator does not work.	Thermostat is OFF.	Shift the thermostat setting to the lower side until the refrigerator starts.
Both pump and refrigerator stop.	Control circuit protector failed. Power failure.	Replace the fuse. Check the power source.
Buzzer comes out while refrigerator runs.	Air filter clogged. Obstacle block the suction or exhausting port.	Clean the air filter. Remove the obstacle.
High pressure switch actuated. Thermostat is OFF.	Ambient temperature is too high.	Move the machine to the lower temperature or far from heat source.
Compressor motor overload relay actuated.	Compressor out of order.	Replace the compressor.

NOTE :

1> If alarm does not display, motor still runs but oil is not cool, please record the situation and ask technical service or local agent right away.

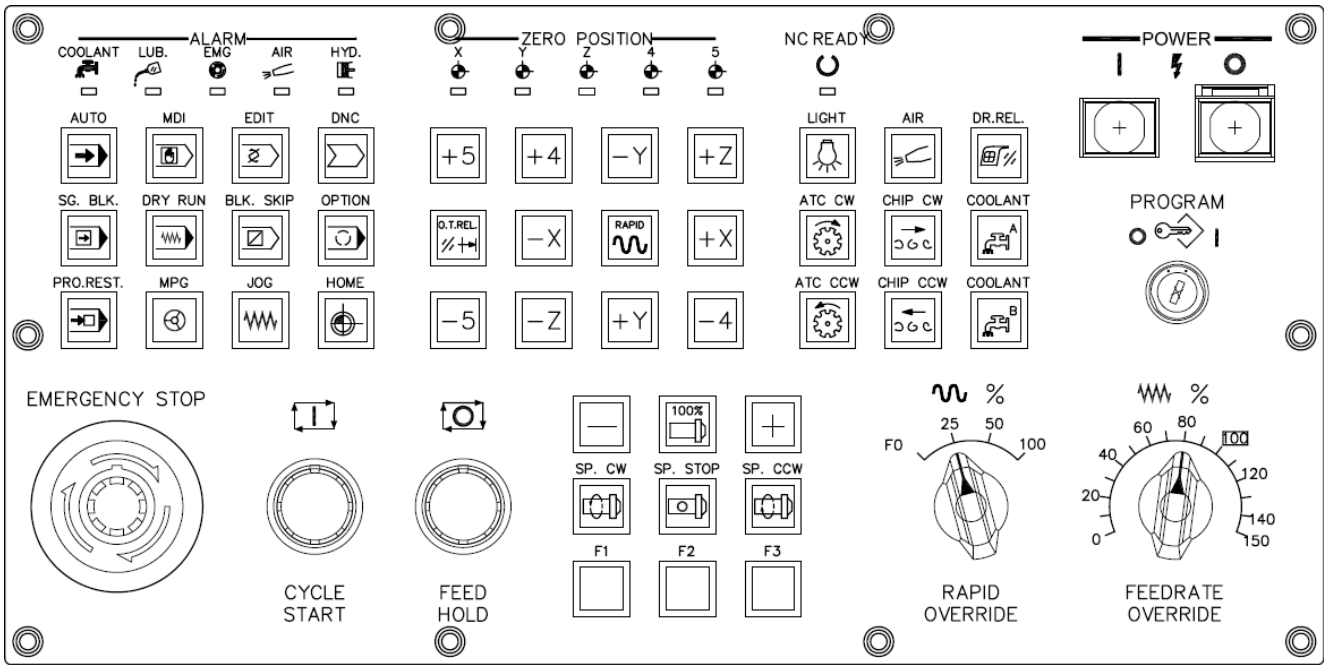
2> Damage from cleaning air filter irregularly is not included guarantee period.

3> Be sure to turn off the main power switch when the oil cooler is checked or maintained.

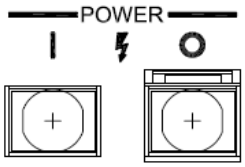
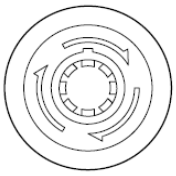
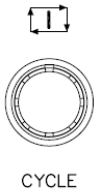
4> Do not brush or use polishing powder, acid , solvent, benzene and hot water to clean the surface of case. It is necessary, clean with dry cloths and neutral detergent.

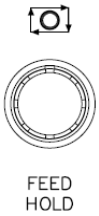
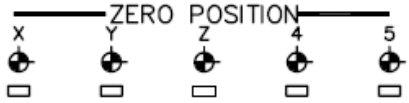
B01 MACHINE OPERATION PANEL

B01-1 MACHINE OPERATION PANEL



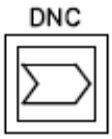
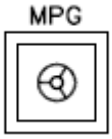
B01-2 DESCRIPTION OF FUNCTIONAL BUTTONS

	CRT power on and off, ON will display green light as well as OFF will be red light while button be pressed.
	The key switch uses for protecting NC's program. When the key turned to "I" position, operator can edit program or it will be locked up on can not edit program on "O" position.
	Use for emergency situation occurring to stop machine operating right away.
	Start automatic operation or cycle command.

	Temporarily stop feeding in automatic operation started by the CYCLE START button.
	The indicated lamps will light on while operator commands G28 for X, Y, Z fourth or the fifth axis and each one of axes reach to the position of original reference point.
	**Coolant Alarm :** The warning lamp will light on while there is something wrong with coolant delivery and the screen will show the alarm message. **Lubricant Alarm :** The warning lamp will light on while there is something wrong with the lubrication system's delivery and the screen will show the alarm message. **Emergency Alarm :** The warning lamp will light on while there is emergency situation happened during machining and the screen will display the alarm message. **Pneumatic Alarm :** The warning lamp will light on while the pneumatic system's delivery in trouble and the screen will display the alarm message. **Hydraulic Alarm :** The warning lamp will light on while the hydraulic system's delivery in trouble and the screen will display the alarm message.

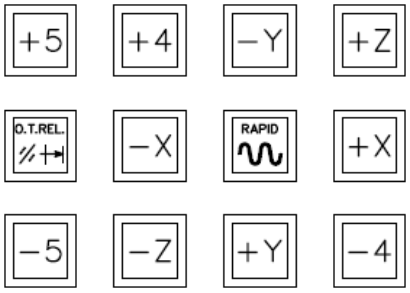
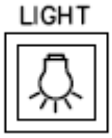
B01-3 MODE SELECTGION

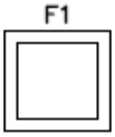
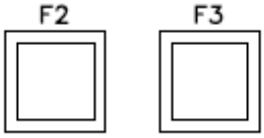
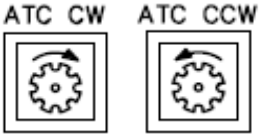
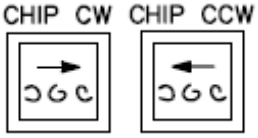
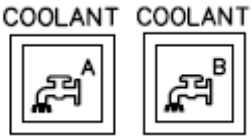
	This mode is selected to execute the program automatically.
	The mode used for inputting data, modifying parameters and executing by manual.

	This mode is selected to edit registered program.
	The mode used to execute the program from external computer transmitted.
	The mode selected to move axes manually with the direction of axes and speed on the handle wheel.
	The mode is used to move three axes by jog trot or rapid speed.
	The mode selected axis to return to the reference original position or with CYCLE START button to return to home position for three axes at the same time.

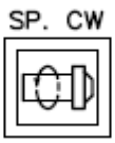
B01-4 FUNCTIONAL BUTTONS

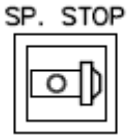
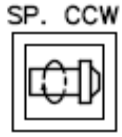
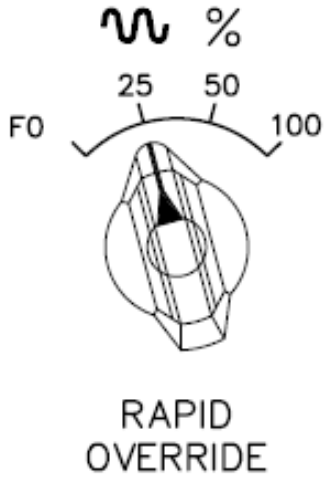
	Under AUTO, MDI and DNC mode, as soon as the button is pressed will stop the machine after executing one block of program.
	If this button is pressed during the cycle operation of DNC, MDI or AUTO mode, the command specified on NC memory will be ignored and the feed rate will be at jog speed (G01) or controlled speed by turning the knob of FEEDRATE OVERRIDE.
	The button for deleting the command of single block which is added the “/” mark before the block command.

	This button made to stop block commands with M01 code under DNC, MDI or AUTO mode. Press “CYCLE START” can execute the program continuously.
	The function of this button is not available.
	The either one of axes movement and the direction buttons while they are pressed. “-X”, “+Y” and “+Z” can return to home position only individually under JOG mode.
	The button made for rapid moving axes by pressing this button and moving axis together with the knob of FEEDRATE OVERRIDE to control the speed of movement.
	The button made to release each one of the axes, which are over traverse and eliminate the alarm message.
	Press this button one time, the working lamp will light on and press it again the lamp will extinguish. The button made for bringing light during machining by pressing the button one time to turn on the light. Twice pressing will extinguish.
	The air blast button made for air supply during machining by press the button one time will be on and twice will be off. On the other hand, during executed program through M47/M48 can be done.

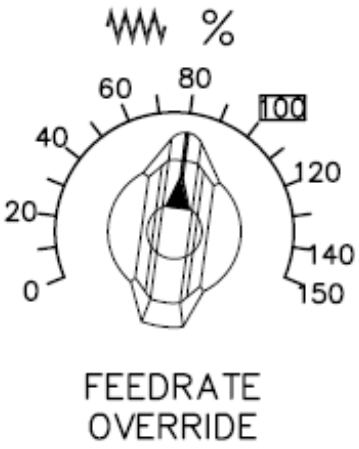
	This button made to release the door interlock of CE type only for the safety sake. Normal situation the door is closed.
	Air blow by manu.
	These buttons made for spare function not available now.
	Under the manual mode, press the buttons for turning the tool magazine with CW or CCW direction.
	The buttons are pressed for turning the coil type chip conveyor with CW or CCW direction.
	The buttons made for supplying coolant A type (beneath the spindle) or coolant B type (beneath the enclosure guard). Coolant A type can use commands of M08/M09 to turn on and turn off.

B01-5 SPINDLE OVERRIDE

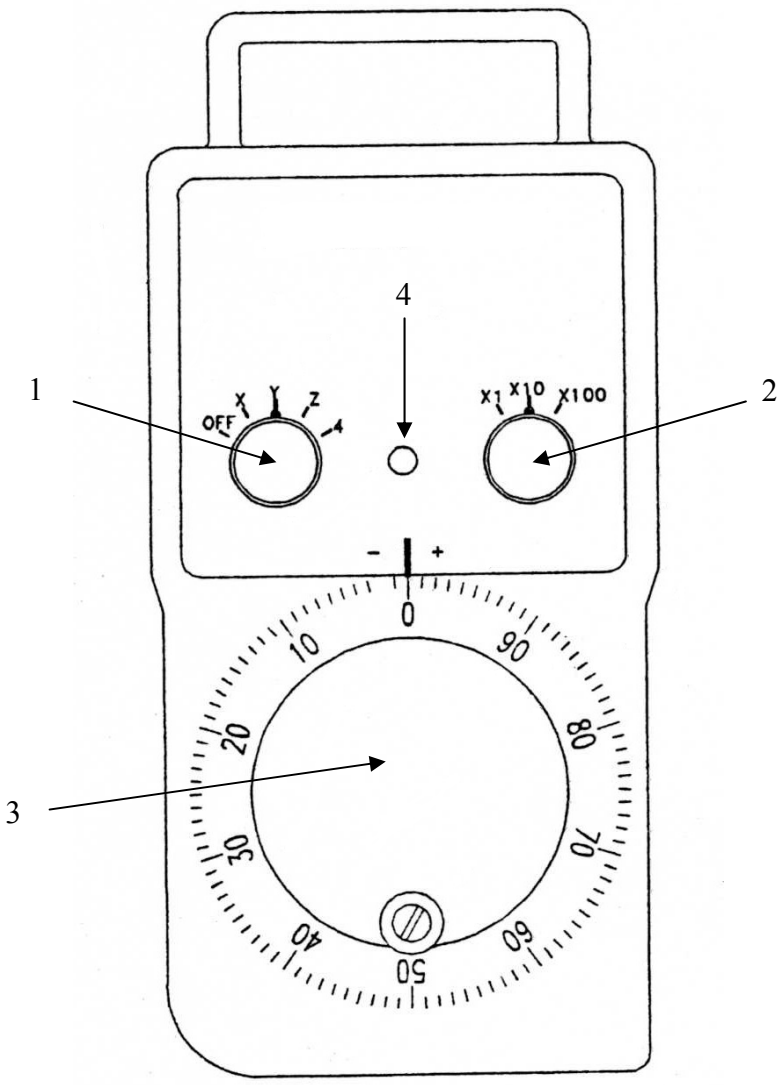
	Press the "+" or "-" buttons can change the spindle speed within 50% to 120%. Press the "100%" button then machine will restore the original speed.
	The button pressed after the spindle speed command has input under MDI or AUTO mode, it will turned with CW direction under manual mode.

	Under the manual mode, press this button, then the spindle will stop turning right away.
	The button pressed after the spindle speed command has input under MDI or AUTO mode, it will turned with CCW direction under manual mode.
	The knob selected to deliver the feed rate of rapid traverse for three axes.

B01-6 FEEDRATE OVERRIDE

	The outside circle of knob is for modifying slower feed rate of axes within the range from 0% to 150%. The inner circle of knob is for choosing rapid feed rate within the range of 0%, 25%, 50% and 100%.

B01-7 OPERATOIN OF MPG



1. Axes selection knob：Select certain axis which is operated by operator.

2. Movement selection knob：Select the proper movement of axis with in 0.001, 0.01 or 0.1 mm.

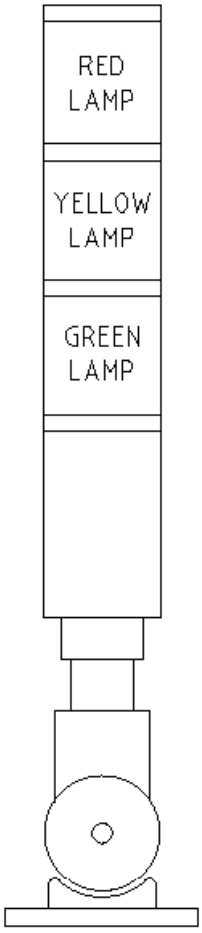
3. MPG Lever：Turn the lever to move certain axis.

4. Indicated lamp：Indicated lamp light on for showing normal use.

B01-8 PEDAL SWITCH

Tool release pedal located near side of operation door. Under “MPG” mode,
press “Tool release” button first, then step the pedal one time to release tool from spindle,
step two times to clamp tool. Press “Tool release” button again to close the tool release pedal function.

B01-9 THREE LAYER WARNING LAMP



Red lamp：The lamp will flash while the alarm happened.

Yellow lamp：The lamp will flash while program finished.

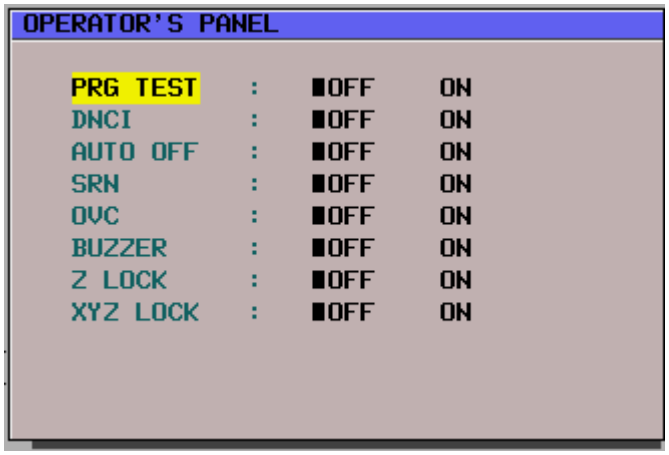
Green lamp：The lamp will light on when machine executed program normally.

B02 THE DESCRIPTION OF OPERATION PANEL FUNCTION

B02-1 DISPLAY SCREEN POWER ON

OFSET SETTING → ▶ → OPR → PAGE ↓ → PAGE ↑

DISPLAY SCREEN SHOWN：



B02-2 DESCRIPTION OF FUNCTIONAL BUTTONS

PRG TEST：Set to “ON”, means testing program executed.

DNCI：Set to “ON”, means “DNC” connecting start.

AUTO OFF：Set to “ON”, means the function of auto power off was starting.

SRN：Set to “ON”, start the function of programming start.

OVC：Set to “ON”, fixed Feed rate function started.

BUZZER：Set to “ON”, the function of “BUZZER” started.

Z LOCK：Set to “ON”, means Z axis movement was locked.

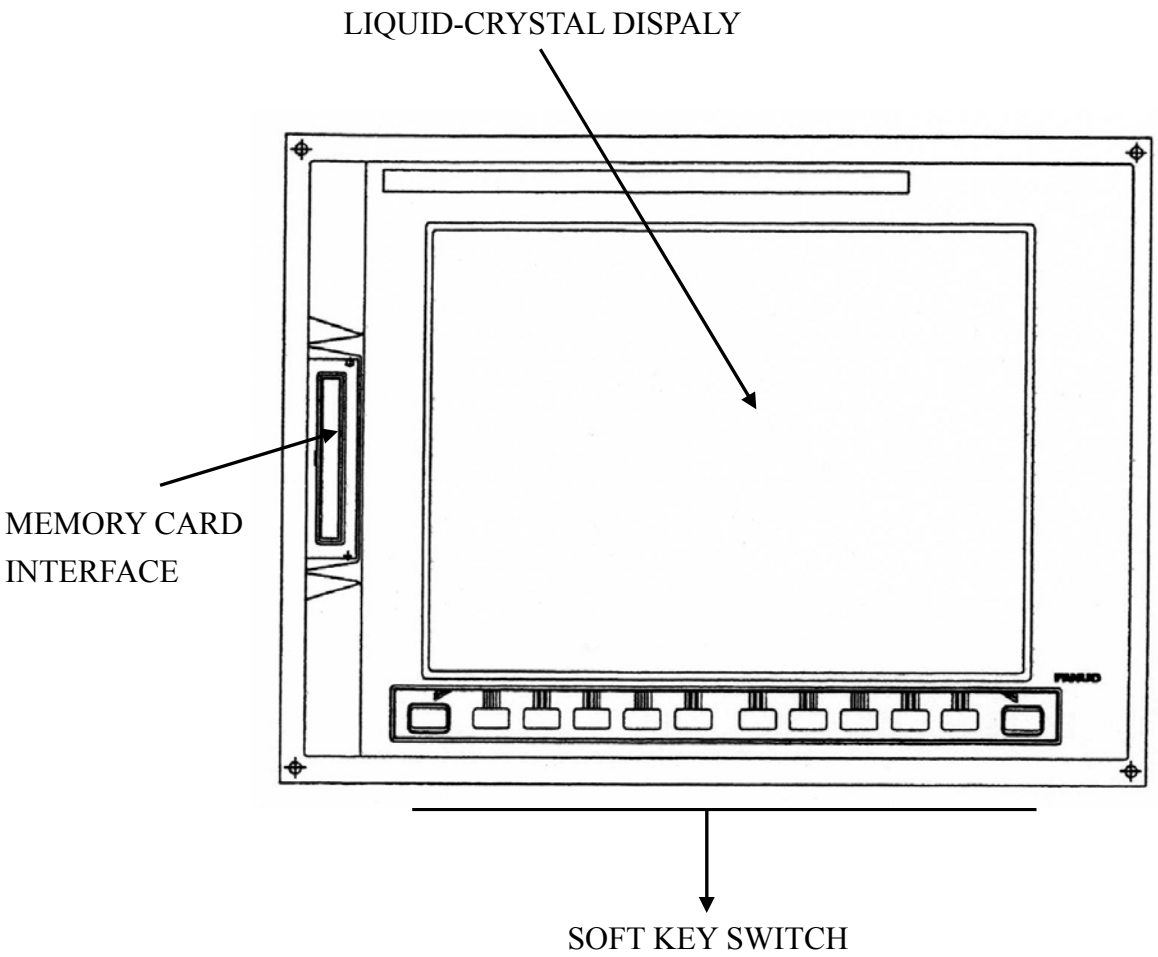
X Y Z LOCK：Set to “ON”, means three axis movement were locked.

Above functional buttons used by cursor for setting “ON” or “OFF” to execute it.

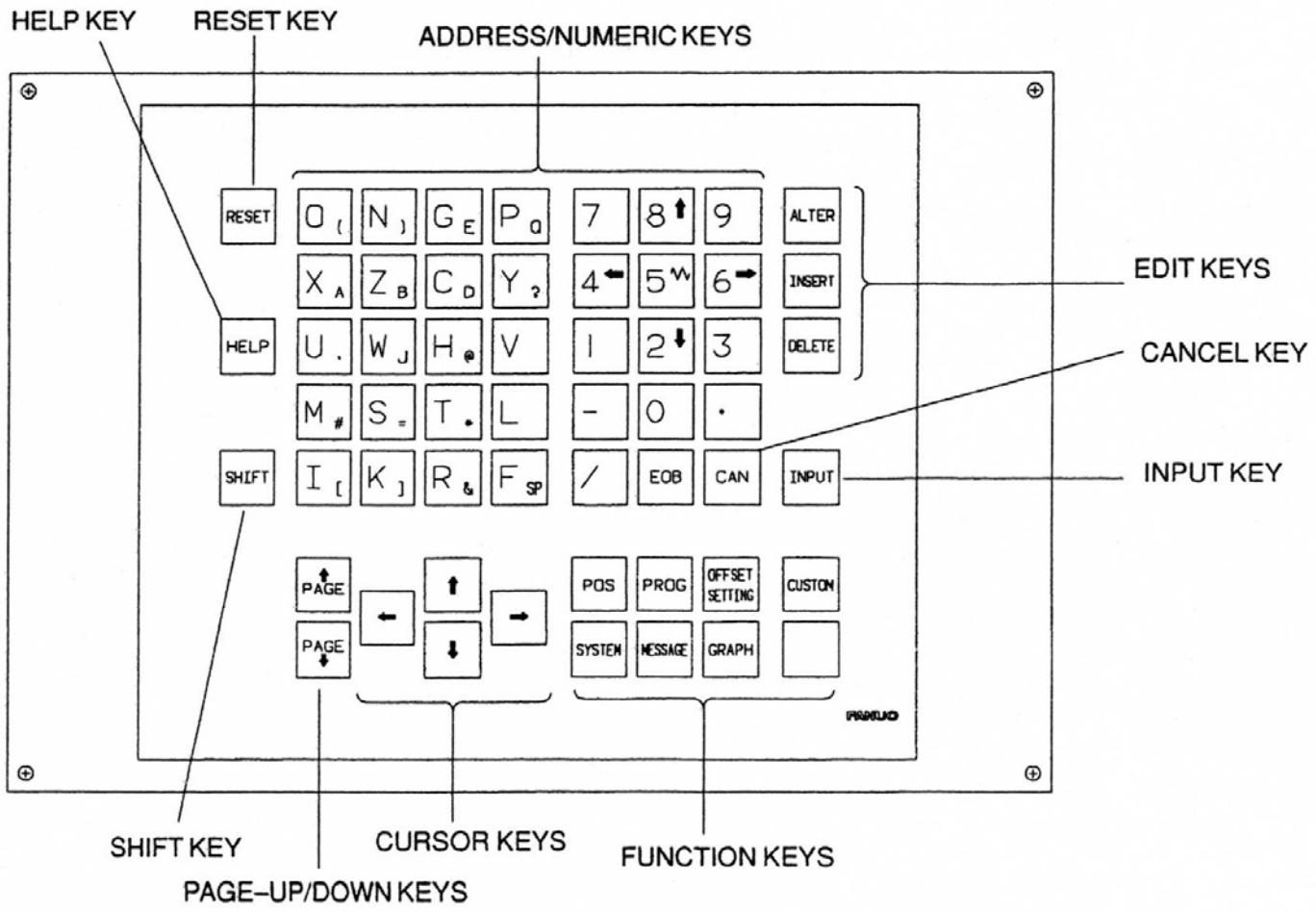
B03 SETTING AND DISPLAY UNIT

B03-1 CNC CONTROL & STANDARD MDI UNIT

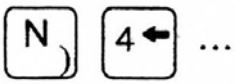
B03-1-1CNC CONTROL UNIT

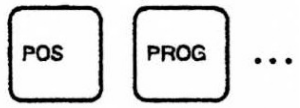
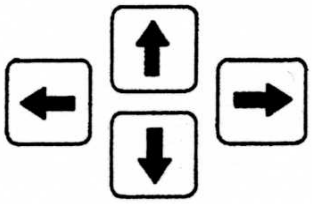


B03-1-2 STANDARD MDI UNIT



B03-2 EXPLANATION OF THE KEYBOARD

Reset key 	Used to reset the CNC to release an alarm or other similar state.
Help key 	Used to get help with operations such as for the MDI keys, when the operator does not know what do next. For the 160i/180i/210i/160is/180is/210is,the Esc key on the personal computer takes the place of this key.
Soft keys	The soft keys are assigned different functions depending on the application. The functions currently assigned to the soft keys are displayed on the lowermost line of the screen.
Address/numeric keys 	Used to enter letters and numbers.
Shift key 	Some of the address keys have two different letters. When the shift key is pressed first before pressing one of these address keys, the lower-right letter is input. When the shift key is pressed, ^ is displayed in the key input buffer indicating that the lower-right letter will be input.
Input key 	Data input by pressing an address or numeric key is stored in the key input buffer, then displayed. When data input to the key input buffer needs to be written to the offset register, press the <INPUT> key. This key is equivalent to soft key〔INPUT〕. Either key may be used.
Cancel key 	Used to delete letters or numbers input to the key input buffer. Example: When N001X100Z is displayed on the key input buffer, pressing the cancel key deletes the letter Z, and N001X100 is displayed.
Edit keys 	Used to edit programs.  : Alter  : Insert  : Delete

Function keys 	Used to switch screens for each function. For the 160i/180i/210i/160is/180is/210is, the Alt key on the personal computer takes the place of  and the Ctrl key takes the place of  .
Cursor keys 	Four cursor keys are provided.  : Moves the cursor to the right or forwards in small units.  : Moves the cursor to left or backwards in small units.  : Moves the cursor downward or forwards in large units.  : Moves the cursor upward or backwards in large units.
Page-up/down keys 	Page-up and page-down keys are provided.  : Used to display the next page.  : Used to display the previous page.

B03-3 EXPLANATION OF THE FUNCTION KEYS

The function keys select what is displayed. Each function is divided into sub-functions, and the sub-junctions by soft keys.

There are six function keys: POS, PROG, OFFSET SETTING, SYSTEM, MESSAGE, and GRAPH.

POS : Display the current position.

PROG : Display and edits a program stored in memory.

OFFSET SETTING : Display and offset value, offset from the workpiece zero point, custom macro variable, and tool life management data. Allows data to be input these items.

SYSTEM : Displays and sets a parameter and pitch error compensation value, and displays self diagnostic data.

MESSAGE : Displays an alarm message, external operator message, external alarm message, and alarm history.

GRAPH : Displays graphic data.

CUSTOM : Press this key to display the custom screen (conversational macro screen).
In case of 160i/180i/210i/160is/180is/210is, this key is assigned to "Ctrl" key of the personal computer.
To display the custom screen with the CNC screen display function, press SHIFT + POS.

: In case of 160i/180i/210i/160is/180is/210is, this key is assigned to "Alt" Key of the personal computer.

B04 LOADING / UNLOADING TOOL BY MANUAL

B04-1 TOOL UNLOADING

1. MDI → PROG → G200 → EOB → INPUT → CYCLE START
   Under MDI mode, press " PROG " button on the CRT panel, then key in " G200 " of sub program. Press" EOB " and " INPUT " buttons on the CRT panel, then press "CYCLE START " button. Meanwhile the Y and Z axis will move automatically to the position of tool Unloading.

2. Press " MPG " button on the operation panel to change mode, then press " TOOL RELEASE " button.

3. Take away the tool within the spindle by hands which wear gloves and step the pedal switch at the same time.

4. Step pedal switch again, then press the button of " TOOL RELEASE ".

※ MPG → F1

" F1" button is made for blowing air from spindle center to remove extra coolant solution after executing CTS function. This button is made for the option function of CTS only and to avoided operator getting wet from extra coolant solution.

B04-2 TOOL LOADING

1. MDI → PROG → G200 → EOB → INPUT → CYCLE START
   Under " MDI " mode, press " PROG " button on the CRT panel, then key in " G200 " of sub program. Press " EOB " and " INPUT " buttons on the CRT panel, then press "CYCLE START " button. Meanwhile the Y and Z axis will move automatically to the position of tool loading.

2. Press " TOOL RELEASE " button on the operation panel, under " MPG " mode, then step the pedal switch.

3. Put the tool into the spindle by hands which wear gloves, then step pedal switch again.

4. Press the " TOOL RELEASE " button to shut off the function of pedal switch.

B04-3 TOOL MAGAZINE CW / CCW BY MANUAL

NOTE：This is for safety sake and affective under tool magazine door opening.

1. MDI → PROG → M21
   EOB → INPUT → CYCLE START
   Under " MDI " mode, press " PROG " button and key in " M21 ", then press " EOB ", " INPUT " and " CYCLE START " buttons. Meanwhile the tool magazine door will open.

2. MPG → CW or CCW
   Press " MPG " button to change mode, then press " CW " or " CCW " button to turn the tool Magazine along with the direction of " CW " or " CCW ".

3. MDI → PROG → M22 → EOB → INPUT → CYCLE START
   Press " MDI " button to change mode, then press " PROG " button and key in "M22", then press " EOB", " INPUT " and "CYCLE START" buttons. Meanwhile the tool magazine door will close.