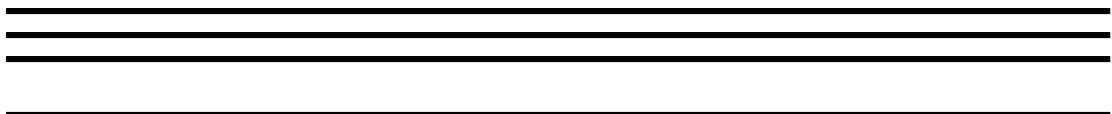

XYZ

COMPACT TURN

**CNC TURNING CENTER
GENERAL MANUAL**

CE

ISO 9001



The following documentations are provided by us.

- (1) Introduction manual
- (2) Parts list
- (3) Electrical document
- (4) Other document provided by OEM partners

WARNING !!!

Please read these documentations thoroughly before using the machine. An adequate training by the manufacturer or by OEM partner is required before starting to use these machines.

WARNING !!!

It is the customers responsibility to ensure the machine is installed in a safe operating position with all service pipes and cables clear of the operation area so as not to cause a hazard. Access must be allowed for safe maintenance, swarf and oil disposal including safe stacking of machine and unmachined components.

WARNING !!!

The machine is equipped with safety devices. Do not change any safety devices on the machines. If changes to these safety devices are made, the manufacturer and OEM partner will not be responsible for any ensuing issues of product liability. This action will also invalidate any remaining warranty entitlement.”

NOTE !!!

The recipient hereof agrees not to copy or distribute this document without the written consent.

MACHINE SPECIFICATIONS

VDI - TURRET

STROKE LIMIT	MAX. Swing	400 mm
	Max. turned dimmer	200 mm
	Power check diameter	6" / 8"
TRAVEL	X Axis	115 mm
	Z Axis	290mm
SPINDLE	Spindle nose	A2-5 / A2-6
	Bearing diameter	100 mm
	Spindle speed	5000 / 4500 rpm
	Spindle bore	61
	Bar capacity	52
FEED RATE	Cutting feed rate(X,Z)	10 m/min
	Rapid traverse rate (X,Z)	20 m/min
TURRET	no. of tool dis diameter	280mm
	Type	VDI30 / BLOCK TYPE
	No. of tool station	12 / 10
TAIL STOCK	Diameter	60
	Travel	90mm
COOLANT TANK		80L
GENERAL SPECIFICATION	Overall dimensions (LxWxH)	1698 x1241X1715mm
	Gross weight (approx.)	2520 Kg

STANDARD ACCESSORIES

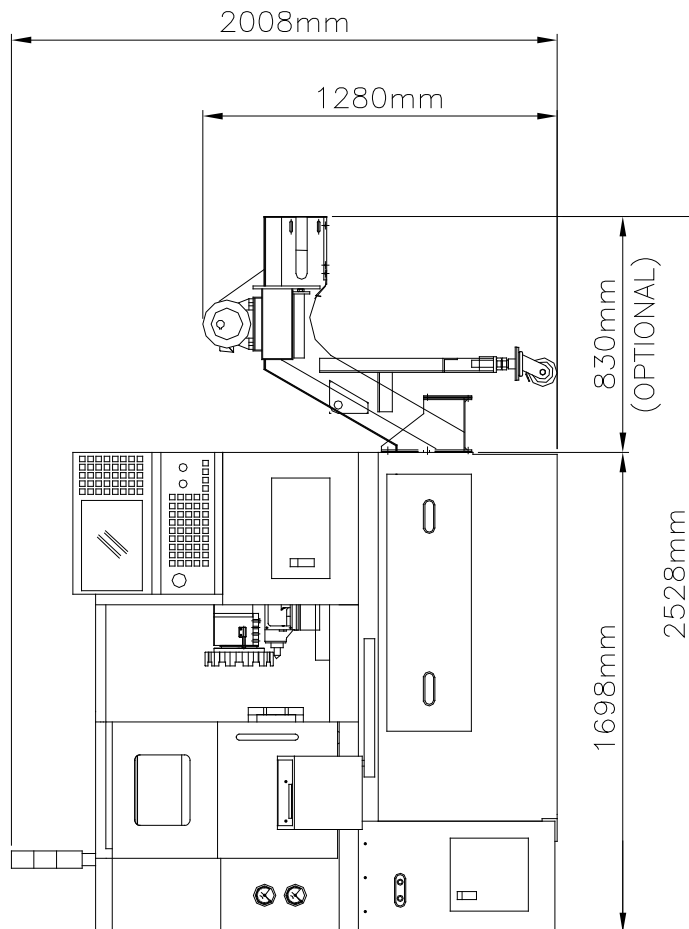
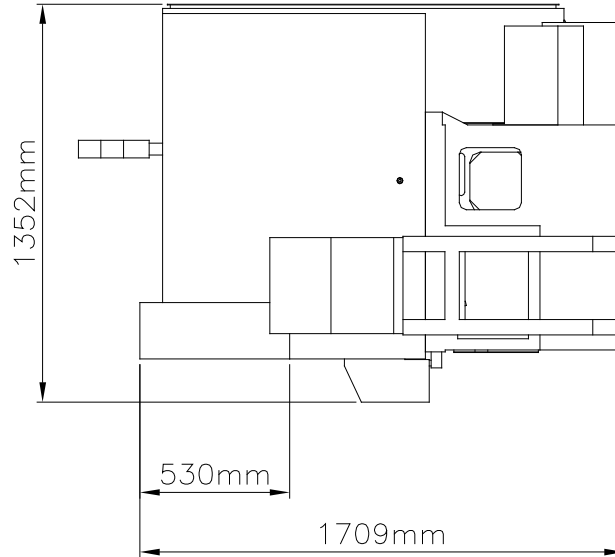
- ⊙ ADJUST LEVELING
- ⊙ AUTOMATIC LUBRICATION SYSTEM
- ⊙ COOLANT SYSTEM
- ⊙ FULL MACHINE GUARD
- ⊙ HIGH INTENSITY MACHINE LIGHT
- ⊙ MANUAL
- ⊙ SPINDLE CENTER
- ⊙ TAILSTOCK CENTER
- ⊙ TOOL BOX
- ⊙ X AXIS AC SERVO MOTOR
- ⊙ X AXIS PRECISION BALLSCREW
- ⊙ Z AXIS AC SERVO MOTOR
- ⊙ Z AXIS PRECISION BALLSCREW
- ⊙ ELECTRONIC HANDWHEELS

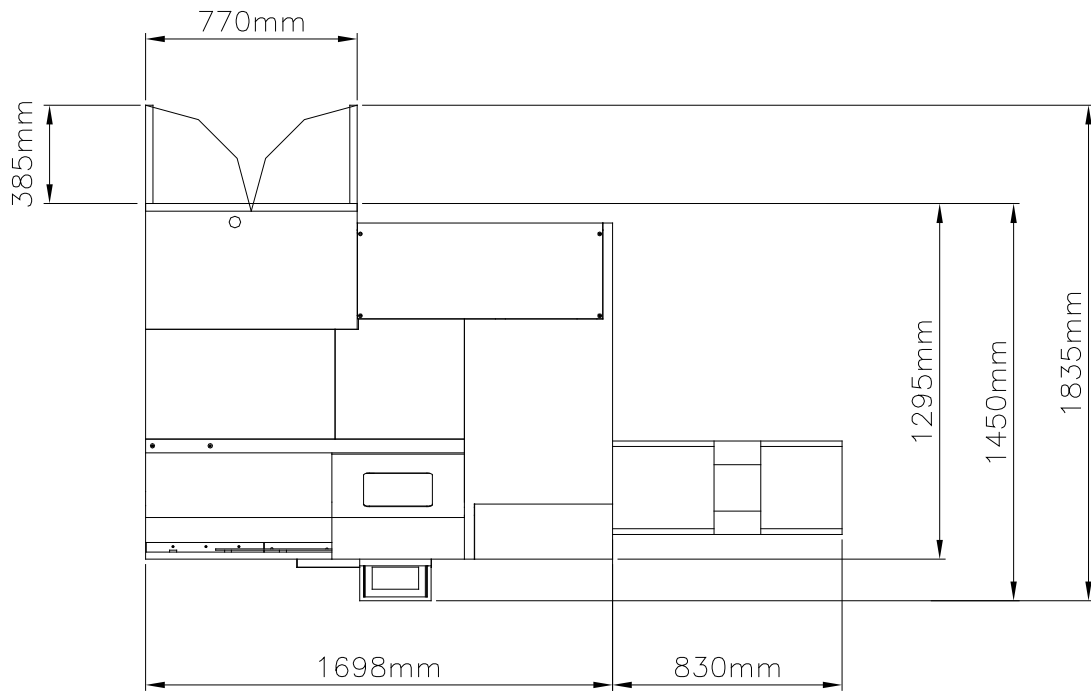
OPTIONAL ACCESSORIES

- ⊙ TAILSTOCK
- ⊙ PARTS CATCHER
- ⊙ TOOL SETTING PROBE
- ⊙ CHIP CONVEORY

**** Specifications is subject to change without prior notice.

DIMENSION (STANDARD)





INTRODUCTION

This lathe is made up of bed base, headstock, saddle, cross slide, operation panel, hydraulic, lubrication system, chip collecting equipment, safety guards, CNC controllers, etc. This lathe is designed to machine those workpieces that do not generate power chip, corrosion or flammable substances, such as magnesium alloy. Please contact our local dealer or us if in doubt.

Because this machine can machine the workpiece in an automatic mode, the safety and efficiency of the working process could be increased tremendously. Nevertheless, read all the manuals we provided thoroughly. Do not try to use this lathe unless you understand how to operate and stop the machine and all the safety matters concerned. Details about how to operate this lathe are followed.

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CHAPTER 1

HEALTH AND SAFETY

PLEASE READ CAREFULLY BEFORE

OPERATION OF THE LATHE

1.1 OPERATOR SAFETY

This lathe is fast, powerful machines that can be dangerous if used under improper circumstances.

Read the following Health and Safety Guidance Notes and observe before and during the use of the lathe.

Please read the following health and safety guidance notes and understands how to operate the machine before using the machine.

WARNING !!!

The machine is equipped with safety devices. Do not change any safety devices on this machine. If changes to these safety devices are made, the manufacturer and our OEM partner will not be responsible for any ensuing issues of product liability. This action will also invalidate any remaining warranty entitlement.”

1.2 HEALTH AND SAFETY AT WORK

In accordance with the requirements of the Health and Safety at work, this manual contains the necessary information to ensure that the machine tool can be operated properly and with safety. It is assumed that the operator has been properly trained, has the requisite skill and is authorized to operate the machine, or, if undergoing training, is under the close supervision of a skilled and authorized person.

Attentions are drawn to the importance of compliance with the various statutory regulations, which may be applicable, such as "The Protection of Eyes Regulations. It is further stressed that good established workshop practice is essential.

Adequate information is also provided to enable the machine to be properly serviced and maintained by persons with the necessary skills and authority.

1.3 NOISE LEVEL

The noise level of this machine is within 85dB(A). In real life, the noise level can be higher than 85dB(A) because actual working conditions might be different.

The conditions of measurement are with the spindle running at top speed, with a standard chuck fitted, without feed engagement.

WARNING !!!

Do not stay in the working area with unpleasant noise level without wearing appropriate protect equipment, such as the earplug. Otherwise might cause hearing hurt or more serious.

1.4 OPERATING HAZARDS

When using the machine be fully aware of the following operating hazards.

1.4.1 METAL CUTTING FLUIDS

Cancer of the skin may result from continuous contact with oil; Particularly with straight cutting oils, but also with soluble oils. The following precautions should be taken:

1. Avoid unnecessary contact with oil.
2. Wear protective clothing.
3. Use protective shields and guards.
4. Do not wear oil soaked or contaminated clothing.
5. After work, thoroughly wash all parts of the body that have come into contact with oils.
6. Avoid mixing different types of oils.
7. Change oils regularly.
8. Dispose of oils correctly.

1.5 VARIABLE SPEED DRIVE

Note that these machines are designed to allow fast and easy change of the spindle speed. Take care to ensure that the workpiece is secure and the maximum safe speed for any operation are not exceeded.

1.6 POTENTIAL DANGER AREAS

Keep away from those areas having moving or rotating machine parts. Do not touch or reach over moving or rotating objects. Although the moving or rotating parts are designed to be shielded by guarding doors or covers, if possible, they still might cause a serious accident if not used properly. Fully understand all the safety procedures before starting to use the machine. Beware of potential dangerous area and warning and dangerous awareness to avoid any injury and accident.

1.7 MACHINE SAFETY GUARD

The machine is equipped with full-enclosed sheet metal enclosure guards. These guards are interlocked through the machine logic in such a way that the machine conforms to all Health and Safety requirements necessary for CE marking.

WARNING !!!

The machine is equipped with safety devices. Do not change any safety devices on this machine. If changes to these safety devices are made, the manufacturer and our OEM partner will not be responsible for any ensuing issues of product liability. This action will also invalidate any remaining warranty entitlement.”

1.8 OPERATING SAFETY PRECAUTIONS

1. Never use the machine without adequate lighting or if the machine light is broken.
2. The floor could become slippery because of the spilt water or oil and cause accident. Ensure the floor is clean, dry and orderly.
3. Keep the machine and work area neat, clean and orderly.
4. Always provide an ample working space.
5. Keep all guards and cover plates in place and all machine cabinet doors closed.
6. Never lay anything on the working surfaces of the machine, where it may be fouled with rotating or moving parts.
7. Do not touch or reach over moving or rotating machine parts.
8. Do not touch any switch without care.
9. Ensure you know the function of the switch and how to use it before using it.
10. Do not operate the machine in excess of its rated capacity.
11. Stop the machine immediately if anything unexpected happens.
12. Ensure that you know how to stop the machine before starting it.
13. Eye protection must be worn by the operator and all exposed persons operating this machine. Do not rely on the door guard for ultimate protection.
14. Beware to reset the coordinates after you take over the machine unless it is not necessary due to common coordinates when several people share the machine operation.
15. Isolate machine when leaving it unattended.

1.9 GENERAL PRINCIPLES CONCERNING OPERATOR SAFETY FOR ALL TURNING MACHINES

1. Do not allow turning or hand tools to be caught in the chuck or other holding device.
2. Always support the workpiece as necessary- using chucks, steadies and centers.
3. Correctly locate tool in socket heads and screw slots.
4. Beware of obstructions that prevent complete tightening of screws- ensure screw is tight.
5. Do not move guards while the lathe is under power.
6. Beware of accidentally moving levers, clutches (where applicable) or turning the power on.
7. Never place hand on chuck or workpiece to stop rotation of the spindle.
8. On machines with a clutch drive, make sure clutch is completely disengaged on stopping, and kept properly adjusted.
9. Allow chuck to stop before operating it.
10. Always check chuck area for chuck keys and loose items.
11. Never start spindle with chuck key in the chuck.
12. Do not allow distractions to interfere with lathe operations. Do not operate lathe whilst talking.
13. Always attend to filing and deburring operations.
14. Always pay attention to file and deburring tools close to the chuck. File and deburring tools may catch on chuck.
15. Beware of clutch (where applicable) position when jogging the spindle to different positions for gauging.
16. Beware of hands resting on clutch levers.
17. Be sure lathe is in neutral position when placing gauges on components gripped in the chuck.

18. Beware of material flying from the lathes.
19. Do not wear rings, watches, ties or loose sleeved clothing.
20. Always use the recommended or equivalent hydraulic oil, lubricant oil and grease.
21. The working table adjacent to the machine should be secured to prevent the workpiece room falling onto the machine.
22. Ensure the machine is stopped and the power is off before replacing the fuse.
23. Always use the fuse with the same specification for replacement.
24. Do not use other workholding devices without checking for compatibility with this lathe.
25. Do not touch the switch with wet hand that could result in electric shock.
26. Do not touch the electric equipment and operating panel with wet hand, which could result in electric shock.
27. Do not grip a component with grease or oil on it.
 - (a) Grip all components firmly.
 - (b) Do not attempt to hold components that are too awkward or too difficult to hold.
 - (c) Do not hold components that are too heavy for the machine.
 - (d) Know how to hold components properly when lifting.
28. Be sure to clean oil or grease from hand tools, levers and handles.
29. Be sure there is enough texture on the surface of the hand tool or lever handle for proper safe hand contact.
30. Grip hand tools and lever handles firmly.
 - (a) Always choose the proper hand tool and appropriate grip position on the lever handle.
 - (b) Do not use hand tools or lever handles in an awkward position.
 - (c) Do not apply excessive force.
31. Always use the recommended gripping position to grasp hand tools and lever handles.
32. Do not use broken, chipped or defective tools.
33. Be sure that the workpiece is immobile in vice or other holding device.
34. Beware of irregular shaped workpieces.

35. Beware of large burrs on workpieces.
36. Always select the correct tool for the job.
37. Do not run the lathe unattended.
38. Do not use tools without handles.
39. Always support the workpiece as necessary-using vice.
40. Do not rush work.
41. Never substitute the wrong size tools if the correct sized tool is not available or cannot be located in the shop.
42. Do not move guards while the lathe is under power.
43. Do not place hand or body in path of moving objects.
 - (a) Beware of moving machine parts that can fall.
 - (b) Be aware of where you are moving your hand or body in relationship to the lathe.
 - (c) Be aware of hands or other parts of the body that may be in position to be hit by a spindle or workpiece.
44. Know the function of each and every control.
45. Never place hand on spindle or workpiece.
46. Make sure power has been turned off when lathe is unused for some time.
47. Never start spindle with tool key in the tool.
48. Do not allow distractions to interfere with the lathe operations.
49. Do not operate the lathe while talking.
50. Beware of lathe dangers when attending to other aspects of lathe operation. E.g., while operating tailstock.
51. Beware of loose clothing near the rotating parts of the lathe.
52. Beware of loose hair near the rotating parts of the lathe.
53. Beware of performing another operation while in close proximity to the rotating parts of the lathe.

54. Be sure spindle is not running when using gauges on the lathe.
55. Always wear protection before operating the lathe.
 - (a) Never remove protection for even a short time when operating the lathe.
 - (b) Wear protective devices correctly.
 - (c) Know the correct way to wear protective devices.
56. Beware of material and tool flying from the lathe.
57. Beware of where you leave tools during set up.
58. Keep protective guards at the point of operation.
 - (a) Know how to set or attach protective guards properly.
 - (b) Never use the wrong protective guard.
 - (c) Know how to select the proper guards.
59. When the spindle and workpiece are in motion, never reach over under or around a workpiece to make an adjustment.
60. Never reach over, under or around a workpiece to retrieve anything.
61. Never reach over, under or around the workpiece to tighten a machine part.
62. Never reach over, under or around a workpiece to move hand tool to another position.
63. Never reach over, under or around a workpiece to remove swarf.
64. Know the proper procedure for applying loads. Never apply force from an awkward position.
65. Never mount a workpiece too large for the lathe.
66. Never mount a workpiece too large for the operator to handle.
67. Use the equipment necessary for handling workpieces.
68. Never apply undue force on the accessory or control lever.
69. Secure all workpieces.
70. Secure all jaws, nuts, bolts and blocks.
71. Always use the correct equipment.

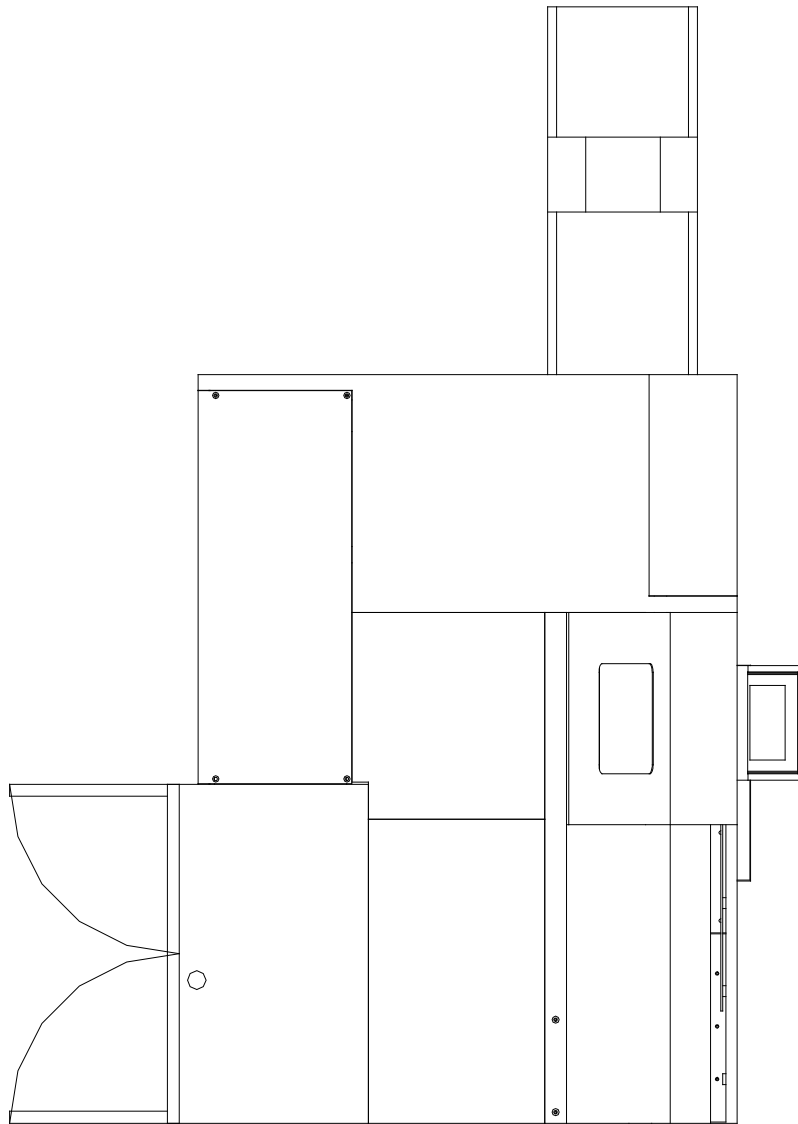
72. Never take cuts beyond the lathe's capability.
73. Never use excessive forces in polishing, filing.
74. Always use the proper hand tool to remove swarf.
 - (a) Never hurry to remove swarf.
 - (b) Beware of swarf wrapped around the spindle or workpiece.
75. Beware of tools/lathe parts falling on controls.
76. Do not change the original setting parameters unless it is necessary. Always keep records of the original setting values before change.
77. Do not blur, block or take away any however according to set-back afterward plate and sign for warning · notice · danger. Please contact us or our local dealer or distributor to purchase a new plates or signs.
78. Disconnect the circuit breaker of the main power immediately if the power supply is short or unsteady.
79. Never change gears by moving them with your hands.
80. When the chuck and workpiece are in motion, never reach over under or around a workpiece to make an adjustment.
 - (a) Never reach over, under or around a workpiece to retrieve anything.
 - (b) Beware of where you leave tools during set up.
 - (c) Never reach over, under or around a workpiece to move hand tool/lathe to another position.
 - (d) Never reach over, under or around the workpiece to tighten a lathe part.
 - (e) Never reach over, under or around a workpiece to remove swarf.

1.10 SAFE OPERATION OF LATHE CHUCKS

Where details of operating speeds and of maximum recommended operating speeds are supplied these are intended only as a guide. Such details must be regarded as for general guidance only for the following reasons:

1. They apply only to chucks in sound condition.
2. If a chuck has sustained damage, high speeds may be dangerous. This applies particularly to chucks with gray cast iron bodies wherein fractures may occur.
3. The gripping power required for any given application is not known in advance.
4. The actual gripping power being used for any given application is not known by the chuck manufacturer.
5. There is the possibility of the workpiece becoming insecurely gripped due to the influence of centrifugal force under certain conditions.
6. The factors involved include:
 - (a) Too high a speed for a particular application.
 - (b) Weight and type of gripping jaws if non-standard.
 - (c) Radius at which gripping jaws are operating.
 - (d) Condition of chuck- inadequate lubrication.
 - (e) State of balance.
 - (f) The gripping force applied to the workpiece in the static condition.
 - (g) Magnitude of the cutting forces involved.
 - (h) Whether the workpiece is gripping externally or internally.
7. Careful attention must be paid to these factors. As they vary with each particular application, a manufacturer cannot provide specific figures for general use; the factors involved being outside his control.

1.11 SIGNS



	DANGER
<p>1. Interlocking safety system is the the safety system which is designed to prevent the machine from starting to run when the door is open or when the door is not properly closed. 2. Always lock off the power before working on the electrical equipment of the machine and disconnect the power. 3. Do not perform any actions of the machine while the door is open.</p>	

CHAPTER 2

SHIPPING AND HANDLING

PLEASE READ CAREFULLY BEFORE SHIPPING AND
HANDLING OF THIS LATHE

2.1 SHIPPING AND HANDLING

This lathe is composed of bed base, headstock, saddle, cross slide, operation panel, hydraulic, lubrication system, chip collecting equipment, safety guards, CNC controllers, etc. Those components are connected with electrical cables and or pneumatic piping circuit.

During transportation, the lathe body and coolant tank are packed together. The shipping and handling equipment used should be able to lift a gross weight of 7 tons at least. Due to sizes of the lathe, it is recommended to lift this lathe with crane and use only the sling frame provided by us. Read the following section carefully before handling the package.

2.1.1 DANGERS

Ensure the shipping and handling equipment can handle a gross weight of 7 tons at least. If can't make certain of the load capacity of the handling equipment, please contact with the manufactory which provide the handling equipment, be ensure the load capacity. **Don't try to do handling under unknown the load capacity of the handling equipment otherwise might happen accident that damaged handling equipment and machine, even person injury.**

Use only the sling frame provided by us to lift this lathe. Uses of any other sling frame are prohibited because might happen accident that damaged handling equipment and machine even person injury. Ensure the wire ropes can withstand at least a gross weight of 5 tons if they are used with the lifting equipment to lift the machinery package.

2.1.2 WARNINGS

1. Ensure the lifted machinery package is in balance before starting to move it.
2. Abrupt changes in lifting & lowering speed might cause unexpected damage on the machinery package and are therefore prohibited.
3. No people or vehicle is allowed to stay under the lifted package.
4. Make sure nobody stay around the working area before starting to lift the package. Clinging onto the sling frame or wire ropes by any person is very dangerous and is definitely prohibited.

2.1.3 NOTICES

1. Check if there is any people or blockage around the working area before starting to lift the package. Blockage should be removed and people be told to leave before proceed.
2. Do not stop the lifting motions suddenly during the process. Prevent moment of lathe too quick become to unbalance might result in a serious accident that drops down the lathe.
3. Only qualified people are allowed to operate the lifting equipment to handle this machinery package so that prevent accident happen.

NOTE!!!

The packing is subject to change without prior notice.

2.2 LIFTING WITH THE MACHINE PACKED

2.2.1 SAFETY RULES FOR MACHINE LIFTING

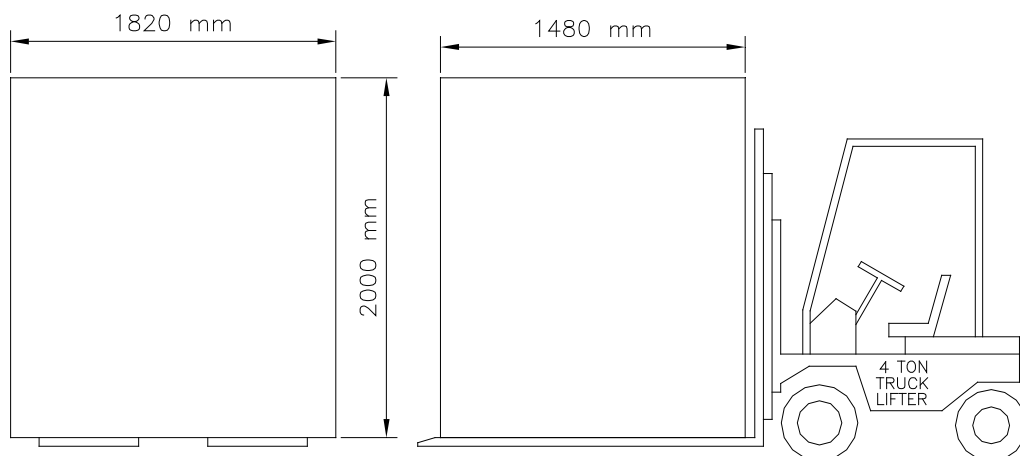
The following safety rules must be absolutely followed when lifting and/or moving the lathe:

1. Use a forklift of sufficient capacity to raise or move the lathe.
2. Pay special attention to lathe balance while lifting.
3. Have another person to help guide the way while lifting the lathe.
4. Make sure the forks of the forklift protrude past the far edge of the lathe bottom.
5. Do not raise the lathe too high as this may cause a loss of stability.
6. The forklift should be driven by experience personnel.

2.2.2 USING FORK-LIFTING TRUCK

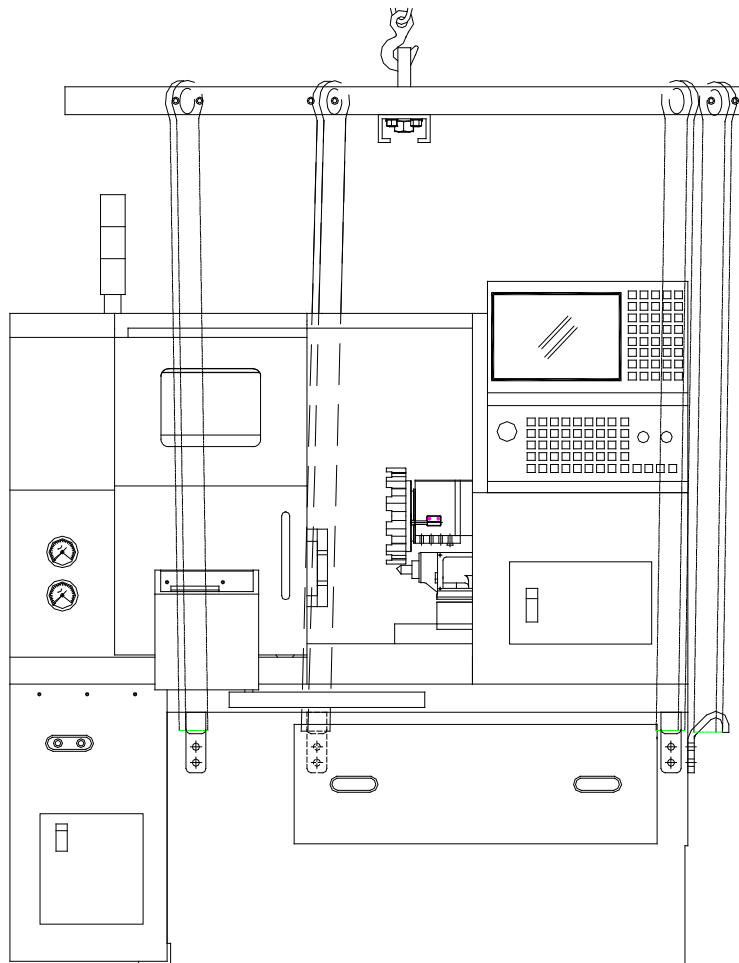
The lathe should be lifted and moved by a forklift. Attention should be paid to the machine balance during lifting and moving. This lathe should be lifted under the following:

1. The loading capacity of the lifting equipment should be 4 tons at least.
2. Wire cables and chains of the lifting equipment should be able to bear a load of 4 tons at least.
3. The packed lathe is 1820 mm in length, 1480 mm in width and 2000 mm in height. Ensure nobody is in the way and the path is not blocked before moving the packed lathe. It could prevent the lathe from collision.
4. Beware that the lifting truck might be overturned because of an improper lifting height. Otherwise might cause people injury and damage the lathe.
5. Always assign a person to guide the way to ensure safety.



2.2.3 SING CRANE OR OTHER LIFTING EQUIPMENT

1. The loading capacity of the lifting equipment should be 5 tons at least. The loading capacity below 5 tons is prohibited.
2. This machine is 1698mm in length, 1241mm in width and 1715mm in height. Ensure nobody is in the way and the path is clear before commencing to move the machine. Otherwise might cause collision on the machine.
3. Pay special attention to machine balance while lifting. Please adjust the machine like the figure.
4. Beware that the machine might be overturned because of an improper lifting height. Otherwise might cause people injury and damage the machine.
5. Always assign a person to guide the way to ensure safety.



2.3 TRANSPORTATION AND UNPACKING

2.3.1 TRANSPORTATION

1. Ensure to fasten all the loose parts and firmly during transportation.
2. Ensure to fix the lathe firmly inside the crate to prevent the lathe move from falling.
3. Ensure to enclose the lathe with a waterproof cover to keep this lathe from moisture or corrosive substance. It prevents the mechanical and electrical parts from damage.

2.3.2 UNPACKING AND CHECKING THE MACHINE

This CNC lathe is packed on one wooden plate. When receiving the machine, carefully disassemble the wooden plate and remove all parts. Do not damage the machine while unpacking it. Examine all parts to make sure that no breakage has occurred during shipping. If any parts damage has occurred, contact your local distributor or the machinery manufacturer.

2.4 STORAGE

2.4.1 STORAGE WITH THE MACHINE PACKED

1. Ensure to put anti-moisture substance inside the crate.
2. Do not place the whole packing directly under the sunlight or near any other heat source.
3. Keep away from any corrosive substance or any equipment causing abnormal vibration.
4. The ambient temperature and moisture should be moderate and kept as constant and smooth as possible.

2.4.2 STORAGE OF THE BARE MACHINE

1. Ensure to fasten all the loose parts and have an anti-rust treatment of the lathe.
2. Ensure to fasten all the sliding guards and doors to prevent from move, even falling.
3. Ensure to enclose the lathe with a waterproof cover to keep this lathe from moisture or corrosive substance. Otherwise might cause the mechanical and electrical parts damage.
4. Ensure to put anti-moisture substance inside the electric cabinet, operating panel, and any other enclosure of this lathe.
5. Do not place the lathe directly under the sunlight or any other heat source. Keep away from any corrosive substance or any equipment causing abnormal vibration. The ambient temperature and moisture should be moderate and kept as constant and smooth as possible. Otherwise might cause the mechanical and electrical and electrical parts damage.
6. Ensure all the power supplies are off and the main power supply cables are taken off before putting the pack in store.

CHAPTER 3

INSTALLATION

PLEASE READ CAREFULLY BEFORE

INSTALLATION THIS LATHE

3.1 PREPARATION

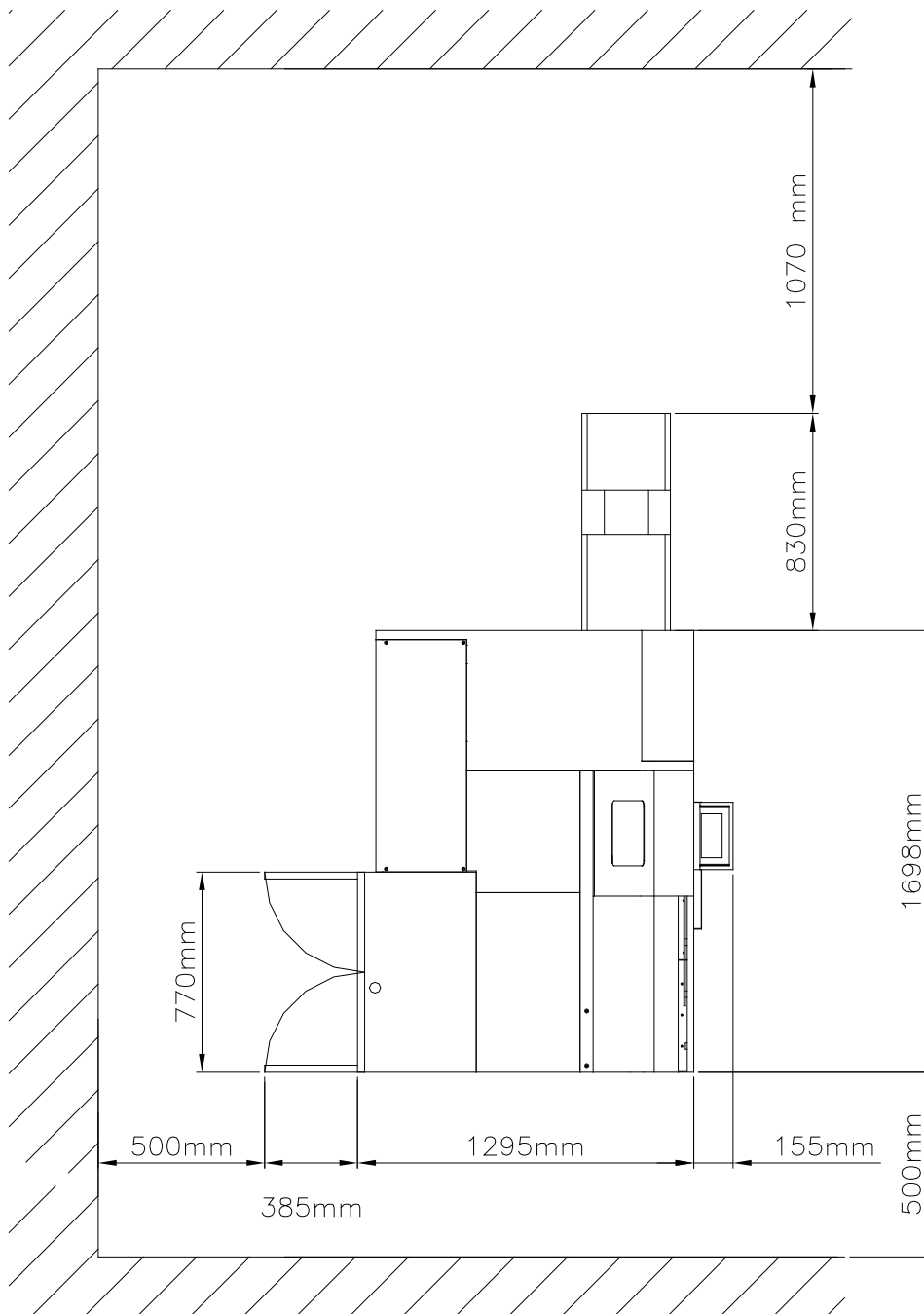
To upgrade the operation efficiency and accuracy of this CNC lathe, a proper foundation is required. Ensure the site space and the path width is large enough to install and transport the whole lathe at least 30 working days before the arrival of this lathe. If under-standard for space, be inform local agent or us as soon as possible, we will provide the suggestion and information service for you. Please clear the space in advance for the lathe to move in and install.

WARNING !!!

Ensure to reserve space for optional equipment. Please contact local agent or us if you have any problem in installing this lathe.

3.1.1 SPACE REQUIREMENT

A distance of at least 500mm is required from machine to wall end objects or between machines to ensure easy repair, cleaning and maintenance of machine. Recommended site space for the lathe with standard equipment:



3.2 INSTALLATION LOCATION

To upgrade the operation efficiency and accuracy of this CNC lathe, a proper foundation is required.

It is recommended that this CNC lathe should be located in a plant with ambient temperature of around 20°C and without the influence of dampness, chemical gas or trembling. This lathe should be installed under the following location:

1. Do not install the lathe in a location near vibration sources, such as air compressor, punch press, etc. Otherwise poor machining accuracy may result.
2. Do not expose this CNC lathe to direct sunlight, moisture, etc.
3. Keep this lathe away from flying powder, corrosion substances, etc.

3.2.1 ENVIRONMENTAL REQUIREMENT

This lathe should be installed under the right environments as following:

1. Voltage: 85% to 110% of the rated voltage
2. Frequency: Rated frequency ± 2 Hz
3. Temperature : 0°C to 45°C (32°F to 113°F)
4. Relative humidity – less than 90%, the moisture condense to water drop due to temperature alternation is unacceptable.
5. Keep the lathe away from excessive dust and corrosion substances nearby.
6. Do not expose the lathe directly under sunlight or heat source, which might result in considerable environmental temperature changes.
7. Do not place the lathe near any abnormal vibrations.
8. Do not place this lathe near the magnetic and static electric fields.
9. Do not place this lathe near the air compressor and presser.
10. Do not place this lathe near any equipment causing electronic noise.

3.3 FOUNDATION CONSTRUCTION PLAN

This lathe should be placed upon a solid foundation to maintain the lathe accuracy for a long run. Dig the planning site to about 100cm underground. Pave the bottom with a layer of pebble of 20cm thick, then fill the site with concrete. The foundation surface should be level and flat. Ensure to reserve spaces for the foundation-fixing studs. Please refer to the section of foundation construction plan for details.

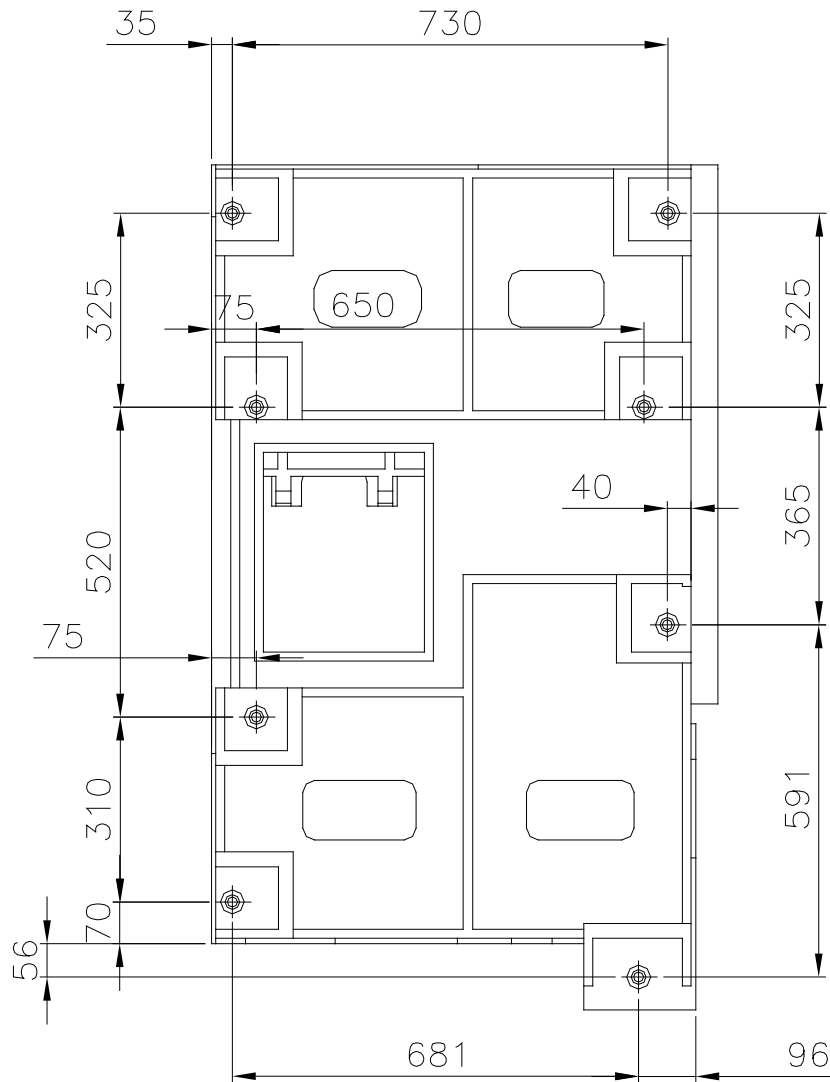
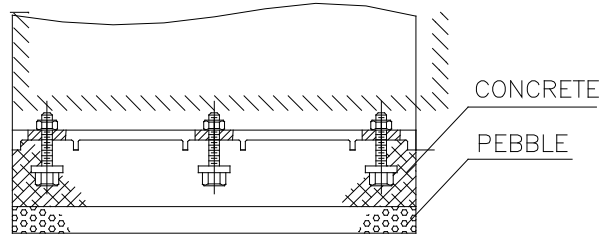
3.3.1 FOUNDATION CONSTRUCTION PLAN ONE

1. Ensure the foundation construction work is finished at least 12 days prior to the arrival of the lathe. Refer to the following foundation construction diagrams for details. The construction procedures are listed as follows: Dig the foundation site. Pave the site bottom with a layer of pebble stone.
2. Ensure to reserve 8 spaces for installing the L shape fixing studs and foundation pads before filling up the foundation site with concrete. Ensure those 8 surfaces are level and flat.
3. After the concrete is dry and solid, place temporary foundation pads on those 8 reserved spaces, then place the lathe above the foundation pads. Ensure to leave a space of 50mm between the lathe base bed and ground to install the L shape fixing stud.
4. Place foundation pads on those reserved spaces, insert the L shape fixing stud through the foundation pad and foundation bolt, then fasten the fixing stud with the nut, as shown in the following figures.
5. Adjust the L shape fixing studs based on dimensions shown in the following figures. Fill up those reserved spaces with concrete. Level the lathe after the concrete is dry and solid.

3.3.2 FOUNDATION CONSTRUCTION PLAN TWO

Ensure the ground is rigid enough to place the lathe. Place the leveling blocks on the ground, then place the lathe upon the leveling blocks. Level the lathe accordingly. (see 3.3.3)

3.3.3 FOUNDATION CONSTRUCTION



3.4 ELECTRICAL EQUIPMENT INSTALLATION

This lathe should be installed under the right electrical environments.

WARNING!!!

Before connecting the power wires, make sure the voltage is the same for both the machine and the plant power.

3.4.1 POWER SUPPLY REQUIREMENT

1. Voltage: the voltage must be between 85% to 110% of the local voltage
2. Frequency: the frequency must be between ± 2 Hz of rated frequency
3. Ensure to install a adequate current-fault breaker(see 3.4.5) prior to the power supply switch or transformer of this lathe.
4. Ensure all the associated connections and wiring are appropriate, that is, connections and wiring should conform with the local safety rules at least.
5. Thread the power supply cable through the cable inlet positioned at the lower right side of the lathe, rest the cable upon the electric cabinet frame, then connect the cable to the main power supply switch of this lathe.

3.4.2 POWER WIRING

Follow the instructions below to wire power.

1. Ensure the electrical cables have the same or better power rating as prescribed in the electrical document.
2. Only qualified engineers are allowed to connect the power cable of this lathe.
3. Do not connect any power cable that might generate signal noises on the power panel of the lathe.
4. Do not connect the power cable of the lathe to any power source or power panel that might cause an abrupt voltage drop.
5. Remove all the anti-moisture substances placed inside the cabinets or panels.
6. Ensure to turn off all the power supplies and place “Under Installation High Voltage Equipment. Do not turn on the Power” warning signs in front of the main power supply switch before connecting the power supply.

WARNING!!!

Only qualified engineers are allowed to install or maintain the electrical equipment of the lathe. Fail to do so will result in serious accident.

3.4.3 GROUNDING

Connect the connector marked with “PE” inside the electric cabinet to the external grounding conductor. If it is no “PE” wiring on the external power supply system, please prepare one ground wire and set a grounding copper rod under the ground, then connect the “PE” connector on the electric cabinet and the ground rod with the ground wire.

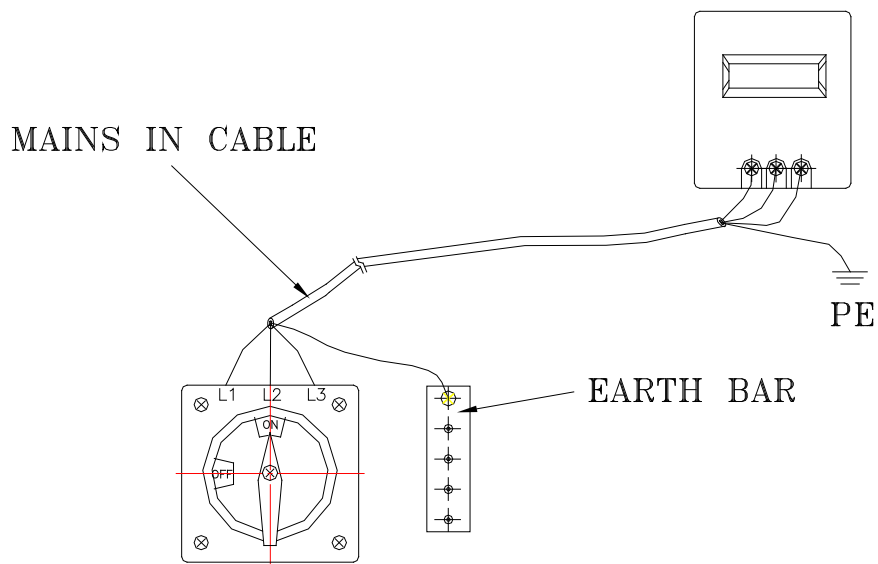
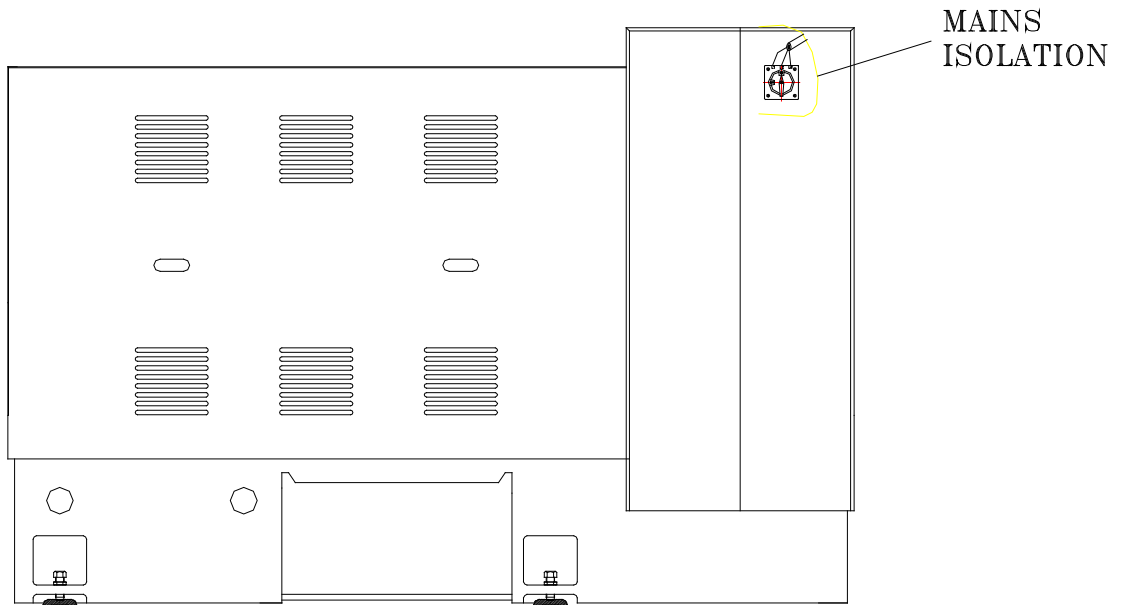
The minimum cross section area of the grounding wire lead used is 14 mm². The impedance of the grounding wire should be less than 100 ohm. Dimensions of this wire should be larger than A W G No.5 and S W G No.6 . (Ensure this NC lathe is grounded to a individual grounding rod.) If this kind of arrangement is not possible, please grounded the lathe based on the following instructions:

1. The grounding wire of the lathe should be connected to its own grounding terminal individually. This kind of arrangement could prevent external grounding current overflow into this lathe. This overflow current might result in a serious damage on this lathe and is prohibited.
2. The reinforced concrete steel rod is usually used as a grounding terminal because of its low resistance to ground (less than 5 ohm). In doing so, please make connections according to the following instructions. These instructions are also valid when connecting ground wires to other types of grounding terminal.
3. Do not share the grounding terminal of this lathe with other equipment, such as welding equipment and high frequency induction lathes.
4. Ensure the power rating of the grounding terminal is compatible to the power rating of this lathe.
5. Always use an isolated grounding wire with a minimum length.
6. Be sure to measure the impedance to ground of the grounding device if only one equipment is connected, and the resistance should be less than 100 ohm.

WARNING!!!

Do not connect the grounding cable of this machine in series with that of other machine. Otherwise might result in serious accident.

3.4.4 ELECTRICAL CONNECTION



3.4.5 SPECIFICATION OF ELECTRICAL REQUIREMENT

1. CONTROL : FANUC

$$\text{KVA} : (11 \text{ KW} + 1.3\text{KW} \times 0.6 + 1.8\text{KW} \times 0.7 + 2.5\text{KW}) / 0.746 = 20.831 \text{ KVA} = 20831 \text{ VA}$$

$$220\text{V} : [(20831 \text{ VA} / 220\text{V}) / 1.732] \times 1.2 = 66 \text{ A}$$

$$380\text{V} : [(20831 \text{ VA} / 380\text{V}) / 1.732] \times 1.2 = 38 \text{ A}$$

$$415\text{V} : [(20831 \text{ VA} / 415\text{V}) / 1.732] \times 1.2 = 35 \text{ A}$$

Total power capacity of the equipment : 15.54KW				
No.	Voltage	Rated Capacity	Wire	Current-fault breaker
1	220V	66 A	$\geq 22 \text{ m m}^2$	75A
2	380V	38A	$\geq 14 \text{ m m}^2$	50A
3	415V	35A	$\geq 14 \text{ m m}^2$	40A

2. CONTROL : SIEMENS

$$\text{KVA} : (11 \text{ KW} + 2.1\text{KW} \times 0.6 + 2.1\text{KW} \times 0.7 + 2.5\text{KW}) / 0.746 = 21.756 \text{ KVA} = 21756 \text{ VA}$$

$$220\text{V} : [(21756 \text{ VA} / 220\text{V}) / 1.732] \times 1.2 = 69 \text{ A}$$

$$380\text{V} : [(21756 \text{ VA} / 380\text{V}) / 1.732] \times 1.2 = 40 \text{ A}$$

$$415\text{V} : [(21756 \text{ VA} / 415\text{V}) / 1.732] \times 1.2 = 36 \text{ A}$$

Total power capacity of the equipment : 16.23KW				
No.	Voltage	Rated Capacity	Wire	Current-fault breaker
1	220V	69 A	$\geq 22 \text{ m m}^2$	75A
2	380V	40A	$\geq 14 \text{ m m}^2$	50A
3	415V	36A	$\geq 14 \text{ m m}^2$	40A

WARNING !!!

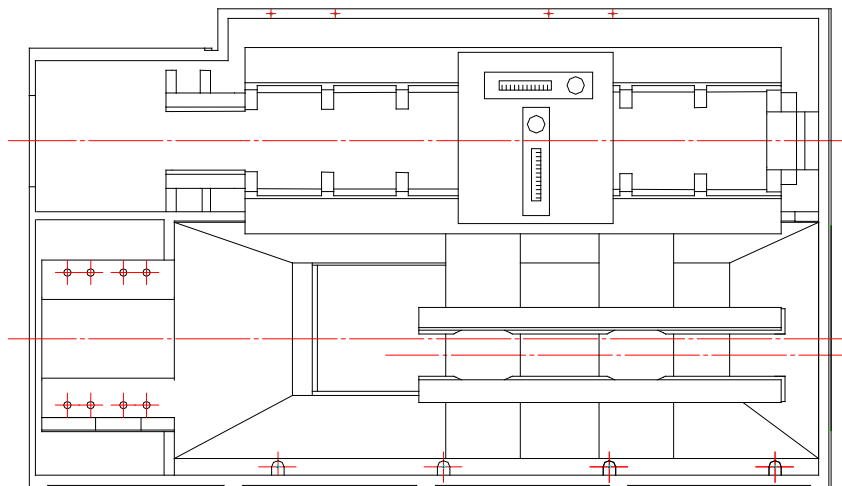
Ensure the electrical cables have the same or better power rating as prescribed in the electrical document

3.5 LEVELING THE MACHINE

3.5.1 ADJUST THE MACHINE

If the CNC lathe is not installed properly, its bed may become twisted. Even a slight amount of twist will move centers out of alignment, and result in inaccurate work. Adjust the machine leveling under the following procedures:

1. Place the temporary foundation pads or leveling blocks on the foundation.
2. In the first case, insert the L-shape fixing stud through the pad and foundation bolt, then fasten the fixing stud with the nut.
3. Adjust foundation bolts until the space between the base bed and foundation pad is 5mm (approx.) long.
4. Place two horizontal levels on the cross slide orthogonally, level the lathe until differences between levels in both directions are within 0.05mm/m.
5. Fasten the setup nuts for the foundation pads and L shape-fixing studs.
6. Fill up the foundation with concrete and wait for seven days until the concrete is solid.
7. Place two 200mm long horizontal levels on the cross slide orthogonally, level the lathe until difference between levels in both directions is within 0.02mm/m.
8. After the leveling has been accomplished, tighten the nuts on the leveling screws.



3.6 INSPECTION

3.6.1 BEFORE POWER START-UP

1. Ensure the power supply specification is correct.
2. Ensure electric cables and connectors are appropriated based on the local safety regulations.
3. Ensure connections between the lathe and grounding terminals are correct.
4. Ensure the current-fault breaker required by the local safety regulations is installed on the power supply side.
5. Ensure all the temporary fastening equipment used during the transportation process is removed.
6. Ensure there is no loose part on the working table.
7. Ensure there is no loose part on the folding guard.
8. Ensure all the fixing studs are fastened properly.
9. Secure nuts, bolts, locks, and other parts needed to be secured.
10. Ensure the hydraulic, pneumatic, and cutting coolant systems are connected properly.
11. Ensure safety-guarding shields and doors are in a good condition.
12. Ensure the hydraulic oil, lubricant, and cutting coolant are filled up to the required level.
13. Ensure all the over-travel limit switch are working.
14. Ensure tension of the spindle driver's belt is appropriate.
15. Ensure there is no unexpected person or substance around the lathe before starting up the lathe.
16. Read manuals carefully and ensure you understand all the safety instructions and operating procedures before starting up the lathe.

3.6.2 AFTER POWER START-UP

Make sure the power source wires are connected to the right connection points. Follow the instructions below to check the power wiring.

1. Ensure functions of the power supply switches are normal.
2. Ensure the hydraulic pump and cutting coolant pump work normally. Stop the lathe immediately if the pressure indication is abnormal. Check the power supply wiring connection if necessary.
3. Start chuck running. If the chuck runs in the correct direction, the power wires are connected to the correct points. Otherwise, If the chuck runs in the wrong direction, change any two of the three power wires until correct running direction of chuck is obtained.
4. Ensure the emergency stop switch.
5. Ensure the lubrication pump work and all the lathe parts are lubricated properly.
6. Ensure the cooling system works normally.
7. Ensure the stroke-limiting functions specified by the NC programming codes and over-travel limit switch work.
8. Run the test program to ensure the lathe is in a normal condition.
9. A time interval of more than 30 seconds is required between power switch off and on at the mains isolator to allow the machine interval self checking circuits to fully reset.

WARNING!!!

Only qualified engineers are allowed to install or maintain the electrical equipment of the lathe. Fail to do so will result in serious accident.

CHAPTER 4

OPERATIONAL PROCEDURE

PLEASE READ CAREFULLY BEFORE
STARTING TO OPERATE THIS MACHINE

4.1 MACHINE

This machine could be operated under manual or automatic mode. The information about how to operate this machine is given below. Please read carefully before starting to operate this machine.

4.2 SAFETY EQUIPMENT

1. Full-enclosed splash guard.
2. Over-traveling limit switches for moving in the X and Z directions.
3. Emergency stop push button.
4. NC programming codes written to limit the traveling distance.
5. Interlock relationships specified by the NC software codes to prevent wrong operating this machine.

4.3 BEFORE START-UP

Ensure all the wires and cables are insulated properly before starting up this machine, otherwise might happen electric leakage and shock.

4.3.1 INSPECTION BEFORE TURNING ON THE POWER

1. Ensure there is no loose wiring or connector.
2. Ensure the electrical cabinet, doors of NC controller and other safety guarding doors are closed.
3. Ensure all the machine parts are secured and fixed properly.
4. Ensure all the oil levels are normal.

4.3.2 WARNINGS

1. Ensure you know how to use this machine before starting it.
2. Always wear the correct protection outfit, such as safety goggles, oil-proof safety shoes, safety uniform, etc. before starting the machine.
3. Ensure all the doors and shields of the machine, the operating panel and the main power supply panel are closed before starting up the machine.

4.3.3 NOTICES

1. Ensure the power supply of this machine is enough to run all the units of this machine easily before starting up the machine.
2. All the cable should be protected from contacting with chips, which might result in an electric short.
3. Always clean and lubricate all the sliding surfaces before starting up the machine if the machine is just unpacked or has not been used for longtime. Ensure to run the lubrication system for a while until all the sliding parts are lubricated adequately before starting up this machine.
4. Always use the proper type of lubrication oil as indicated in the nameplate or the manual.
5. Check all the switches, push buttons and operating levers to make sure they could be operated smoothly.
6. To turn on the main power, the procedures below must be following:
Turn on the factory's main power supply → switch "on" the circuit breaker of the machine's main power supply → press on the push button on the operating panel to turn on the CRT and controllers.
7. Check the oil level of the oil tank regularly. Fill it up if necessary.
8. Check the coolant level of the cutting water tank regularly. Fill it up if necessary.
9. Ensure the standby signal light is luminous after switching on the main power supply.

4.4 START AND STOP THE MACHINE

4.4.1 START PROCEDURE

1. Connect the power supply.
2. Turn on the main power supply switch.

WARNING !!!

Ensure the load capacity is correct before turning on the power supply.

4.4.2 EMERGENCY STOP PROCEDURE

If any emergency conditions are happened, push down the emergency stop button on the main operation panel to stop the machine immediately. Pull upward to release the emergency stop button.

4.4.3 NORMAL STOP PROCEDURE

1. Push the power "OFF" button of NC equipment.
2. Turn off the main power supply switch.

4.5 WARM-UP

Based on our experience, the sudden thermal expansion of the casting parts might damage the contact surfaces of the sliding parts and result in a serious oil leakage and loss precision. Ensure to warm up the machine before starting to machine the workpieces if the machine has not been run for sometime.

4.5.1 NOTICES

1. Ensure all the sliding parts have been returned to the zeroing position slowly before warming up the machine under automatic mode. Make sure the program command is correct in order to prevent the machine from damage.
2. Ensure to warm up the machine under automatic mode for 10 to 20 minutes with an appropriate spindle speed (1000rpm) and feed rate (1000mm/min).
3. Ensure each and every movement of the machine is normal while warming up the machine under the automatic mode.

4.6 PREPARATION

4.6.1 WARNINGS

1. Always use the recommended cutting tools. Otherwise might cause accident.
2. Do not use broken or defective cutting tools.
3. Ensure to have a sound lighting facility around the working area.
4. Tools and equipment surrounding the machine should be kept in place. Keep the machine and working area clean and orderly.
5. Do not lay anything upon the working surfaces, including the guideways, saddle, safety guards, etc.

4.6.2 NOTICES

1. Check the oil level of the oil tank regularly. Please use the recommended oil as described in the oil guide table of the maintenance manual.
2. Use the standard cutting tools and tool length.
3. Always try a light-load machining before doing a heavy-load machining.

WARNING !!!

- (a) **Ensure the load capacity is correct before turning on the power supply.**
- (b) **Ensure all the alarm messages of the alarm message indicator are off before proceed.**

4.7 OPERATION

4.7.1 WARNINGS

1. Beware of loose or long hair near the working area to avoid unnecessary accident from happening.
2. Do not wear gloves when operating the machine, otherwise it will cause dangers.
3. Always handle large workpieces with appropriate manpower.
4. Only qualified people are allowed to operate the forklift truck, crane, lifting equipment and other materials handling equipment.
5. Never open the guarding doors while machining.
6. Ensure the workpiece has been clamped firmly and properly on the holding device before machining the workpiece.
7. Stop the machine before adjusting the coolant nozzles.
8. Do not touch or reach over rotating or moving objects
9. Do not remove any safety equipment.
10. Always use the proper tools, instead of using hand, to remove the chip from the cutting tool.
11. Do not install or remove the cutting tool and other tool holding equipment unless the machine is fully stopped.
12. Always to wear appropriate protect equipment while working in a dusty environment.
13. Ensure to open the dust collecting equipment and wear a safety mask while machining the workpiece made with graphite or any other materials might generate powder chip.
14. Always use the appropriate lifting equipment to handle the loads, and beware of the surroundings while operating the lifting equipment to prevent crashing and damaging.
15. Ensure the chips do not pile up so that might cause fire while doing a heavy-load machining.

4.8 ZERO POINT RETURNING PROCEDURE

This machine install with absolute servomotor. It do not return to zero after turn on the power.

4.9 MANUAL OPERATION PROCEDURE

4.9.1 MANUAL OPERATION MODE

Select switch to JOG mode to enable this mode. Please note that turn the JOG mode select switch to manual mode will interrupt the automatic operation process. On the other hand, the manual operation will stop if any mode other than manual mode has been selected.

4.9.2 MANUAL FEED MOTION

1. Select switch to JOG mode to enable this mode.
2. Select a proper feedrate by adjusting the switch, then start the feed motion by pressing the button.
3. The feed motion continues with the button being pressed on. The feed movement will slow down and stop once the button is released.

4.9.3 MANUAL RAPID TRAVERSE FEED

1. Select switch to JOG mode to enable this mode.
2. Press the rapid traverse speed button and the motion direction. The feed movement will slow down and stop once the button is released.

4.9.4 MPG FEED MOTION

1. Select switch at MPG or JOG mode (depend on different control system).
2. Select a proper speed by using the MPG scale select and select the motion direction.
3. You can control the feed motion by manipulating the hand wheel.

4.10 START OR STOP SPINDLE ROTATION

4.10.1 START OR STOP THE SPINDLE ROTATION

Refer to the following steps to start or stop the spindle rotation:

1. Select switch at the JOG mode.
2. Press the clockwise (CW) or counter clockwise (CCW) switch to rotate the spindle.
3. Select a proper spindle speed by adjusting the spindle speed adjusting switch.
4. Push the spindle stop button to stop the spindle rotation if necessary.
5. The spindle motion could also be started or stopped under the MDI mode by using the miscellaneous M functions. Please refer to the related information for details.

4.10.2 SPINDLE SPEED CALCULATIONS

As a two-range variable speed drive is available to the spindle, it is possible to machine a particular material at its optimum surface speed, hence spindle speed in rev/min and at the optimum power available.

The optimum spindle speed is calculated from the formulae shown below.

Using $N = S \times 1000 / \text{Radius} \times D$

D = diameter in mm

S = cutting speed in metres/min

N = spindle speed rev/min

Example:

It is required to rough turn a diameter of 100mm in mild steels.

What spindle is required, and in what speed range should it be used?

Using $N = S \times 1000 / \text{Radius} \times D$ where $S = 400 \text{ m/min}$

Therefore $N = 400 \times 1000 / \text{Radius} \times 100 = 1273 \text{ rev/min}$

This speed is obtainable in both the low and high spindle speed ranges, but in the low-speed range, it is more powerful than in the high-speed range, so the low-range should be used.

4.10.3 CUTTING FORCES AND POWER CONSUMPTION

If a calculated requirement is in excess of availability, then the proposed depth of cut or feed rate should be reduced proportionately.

Note that in certain circumstances reference to the power curves may show that a change of spindle RPM or speed range will provide a sufficient increase in power availability to meet the proposed demand.

4.11 OPERATION

4.11.1 PREPARATION

Please follow steps below to prepare for the process:

1. Select the proper way of machining, jig mounting and fixture equipment.
2. Design the machining sequence.
3. Select the proper machine tools and arrange the tool sequence.
4. Select proper cutting conditions. Ensure those conditions meet specifications of the machine.

4.12 BREAK-UP

Ensure to turn off the main power switch on the operating panel and the circuit breaker of the main power whenever the machining job is done and the machine is left unattended.

4.13 FINISH

1. Turn off the power
2. Turn off the NC controller power.
3. Turn off the main power supply switch located on the electrical cabinet wall.

4.14 INSPECTION AFTER FINISH

1. Ensure all the machine parts are in good conditions.
2. Check the centralized lubrication system. Fill up or refill the oil if necessary.
3. Ensure there is no leakage occurred in the pipe lines.
4. Ensure all screws are secured properly.
5. Ensure all the gauges and indication meters are in normal conditions.
6. Clean up the cutting chips. Keep the machine and working area clean and orderly.

4.14.1 NOTICES

1. Ensure to turn off the power supply of the machine and put “Under Maintenance. Do not turn on the power supply” warning signs on visible spots before cleaning the machine or accessories. Ensure the machine is fully stopped before. Maintaining the machine.
2. Ensure to clean the machine and its surroundings and put everything in order after the machining job is done. Ensure to put anti-rust oil on the machine bed and all the moving parts to keep them from rust and dirt.
3. The entire machine moving parts should be returned to the original zeroing position.
4. Check and replace the broken wipers.
5. Check and replace the lubricant or hydraulic oil if they are dirty or emulsify.
6. Check and replace the coolant if they are dirty.
7. Check and refill the lubricant, hydraulic oil and coolant if necessary.
8. Clean the filters of the lubrication, hydraulic, and cutting cooling systems.
9. Turn off all the power switches and main power circuit breakers when leaving the machine unattended.

4.15 TURNED SURFACE FINISHES

Many factors effect the surface finish achieved when turning. The following table assumes that good turning practices are followed and that the best possible conditions are available. I.e., machine and equipment are in good condition with tools and components held effectively with optimum rigidity.

The graph shows the effect of toolnose radius combined with feedrate on surface theoretical finish available.

1. Cutting speed

Generally, a low cutting speed leads to a lower shear angle, greater cutting forces and a longer contact time between tool and workpiece. This encourages edge build up, which can lead to tearing and galling rather than cutting. Therefore and increased cutting speed can improve surface finish.

2. Rake angle

Particularly when cutting ductile materials a greater rake angle may improve the surface finish. This is achieved due to the increased shear angle and thus the decrease in cutting forces, giving less tendency for the workpiece material to adhere to the cutting edge.

3. Dulled tools

When a tool becomes dull, the flank wear land contact area is increased. This in turn increases the cutting force and heat generation, and may lead to larger flank wear land ripping out fragments of the workpiece. Keep tools sharp, and index them regularly.

4. Coolant

This may improve the surface finish, as it will reduce the tendency of workpiece material adhering to the tool due to the reduced temperature at the tool-chip interface. However, coolant residue may contaminate the contact surface between tool and workpiece interfering with the metallurgical reactions which cause the tool to perform erratically.

CHAPTER 5

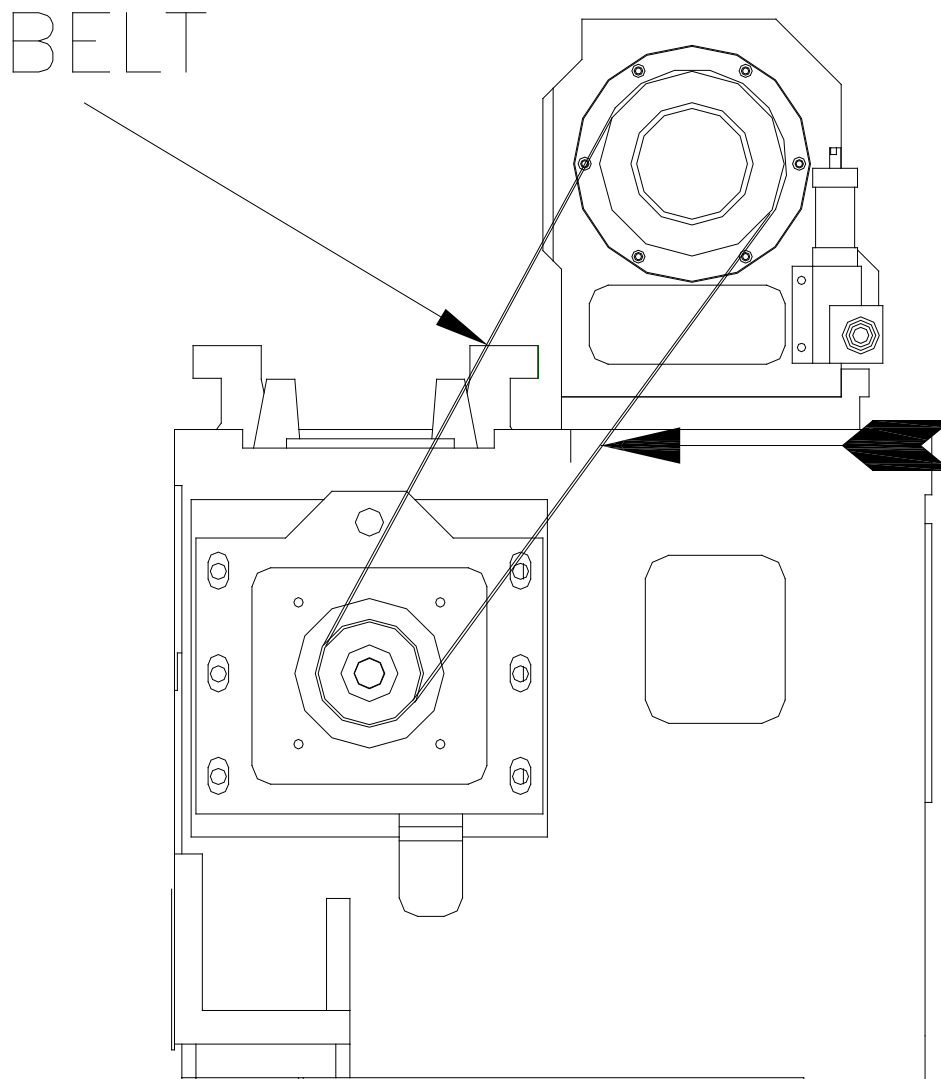
MECHANISM

PLEASE READ CAREFULLY BEFORE
ADJUSTMENT THIS MACHINE

5.1 HEADSTOCK SYSTEM

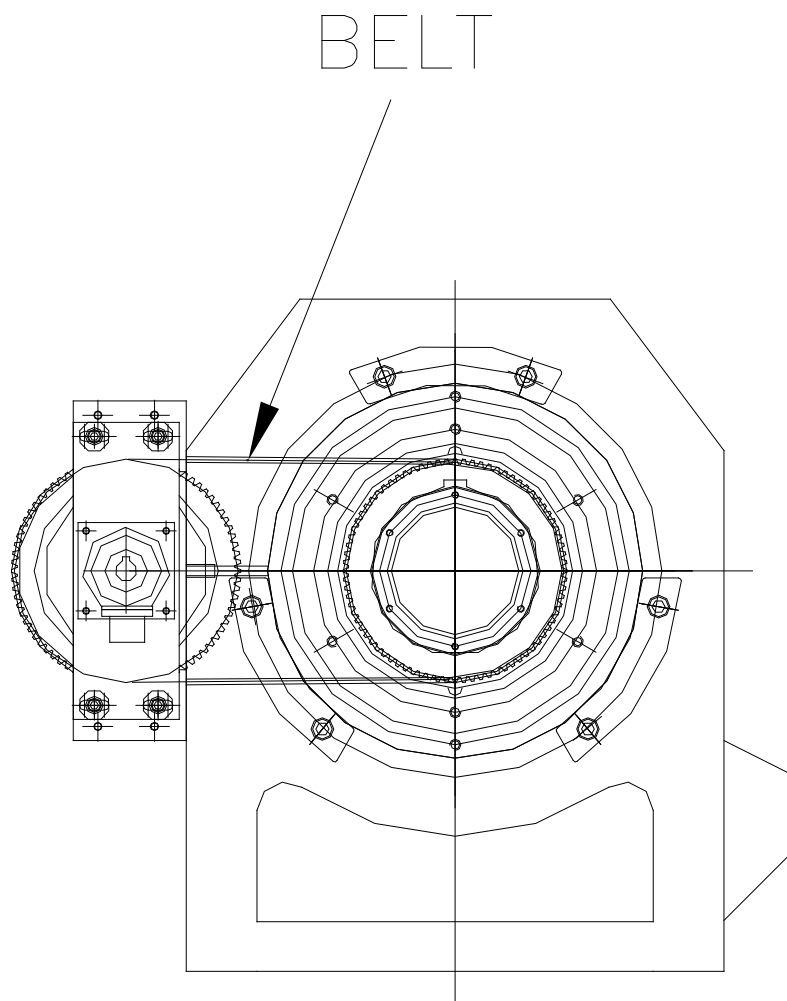
5.1.1 SPINDLE DRIVE MECHANISM

Spindle drive is from the main motor using an AC inverter variable speed drive and through a manually operated speed range selector lever. The spindle speed is first selected by means of the selector lever onto one of three positions.



5.1.2 SPINDLE POSITIONING MECHANISM

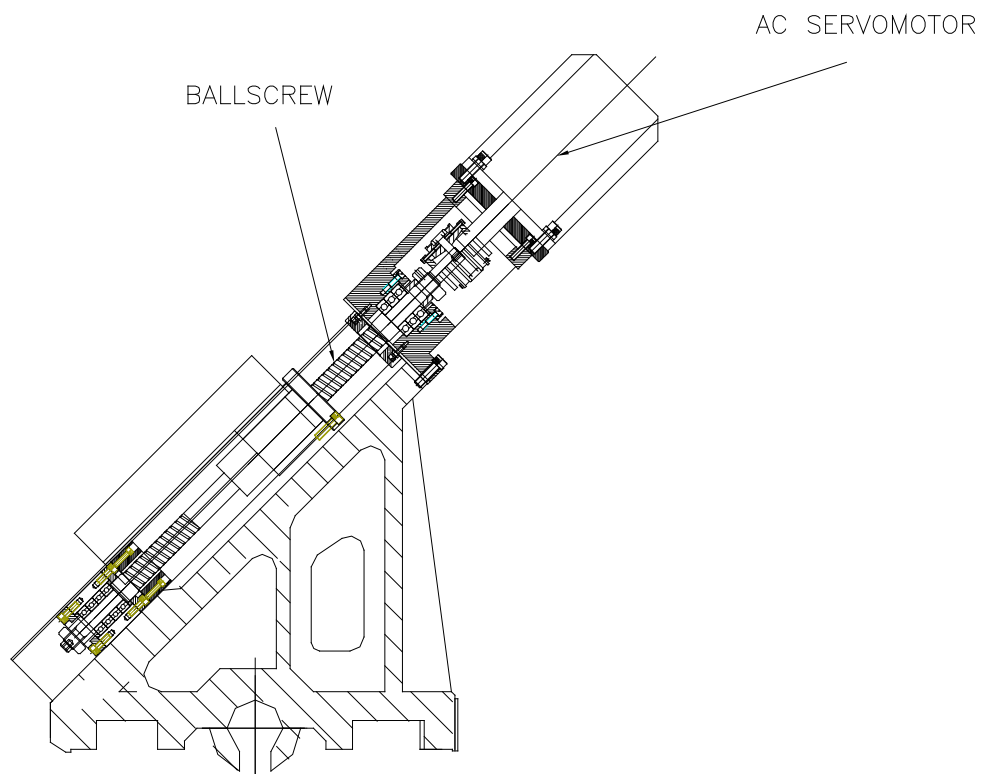
The sensor tracks the spindle rotation motion and feeds the positioning signal to the spindle drive motor's controller to control the spindle position precisely.



5.2 FEED-MOTION TRANSMISSION MECHANISM

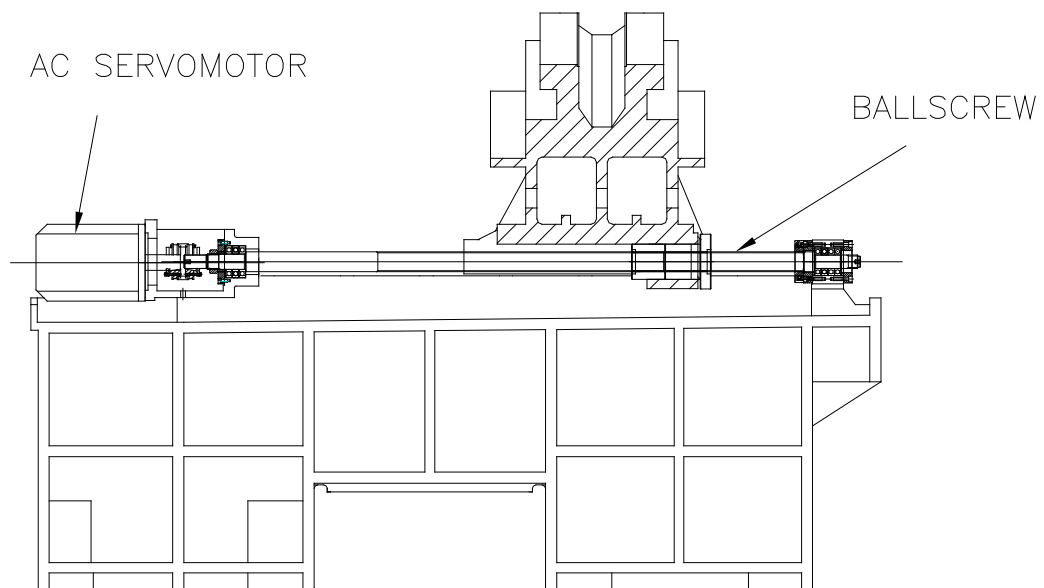
5.2.1 X AXIS TRANSMISSION MECHANISM

1. The working table is seated on guide rails of the saddle and driven by the AC servo motor via the connection of a coupling and a ballscrew.
2. The AC servo motor is connected to the ballscrew through a belt.
3. The encoder equipped with the AC servo motor is used to track down the feed motion positioning. This is only a semi-closed control loop. Otherwise can selections the linear scales (optional part) which is a closed control loop.
4. The maximum traveling range in the X direction is 195mm. A safety mechanism is used to prevent the saddle from over-traveling as described below. When the working table travels over the limit, the positioning blocks will touch the limit switch on the saddle. The limit switch transmits the over-limit signal to the AC servo motor's controller to stop the feed motion.



5.2.2 Z AXIS TRANSMISSION MECHANISM

1. The saddle is seated on guide rails of the bed and driven by the AC servo motor via the connection of a coupling and a ballscrew.
2. The AC servo motor is connected to the ballscrew through a belt.
3. The encoder equipped with the AC servo motor is used to track down the feed motion positioning. This is only a semi-closed control loop. Otherwise can selections the linear scales (optional part) which is a closed control loop.



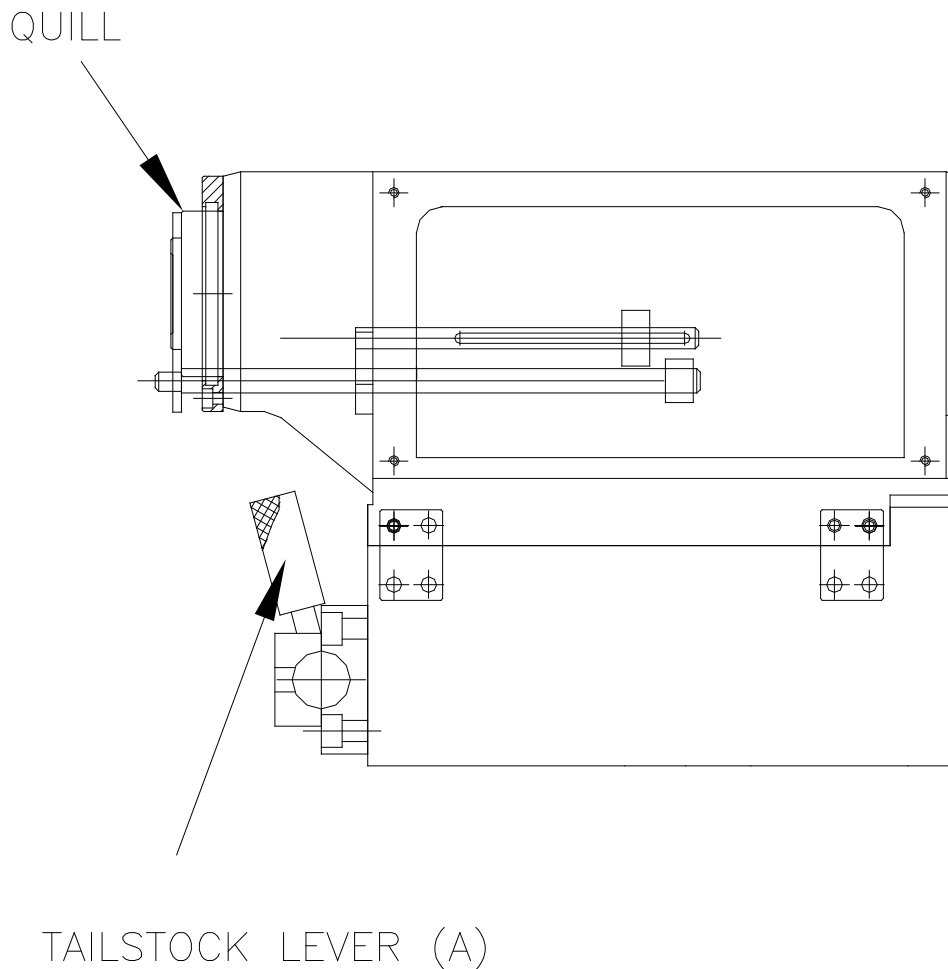
5.3 TURRET MECHANISM

5.3.1 AUTOMATIC TURRET

1. The tool magazine is driven by an AC servo motor or hydraulic motor. The tool selection is accomplished by using the hydraulic system and proximity switch.
2. As the tool exchange command is issued, the swivel disk will be rotated to the selected tool position according to NC or manual commands. When the selected tool traces the target location, the AC servo motor or hydraulic motor stop immediately. The oil pressure system will then lock the tool magazine to prevent the tool magazine from further traveling. Two proximity switches are used for checking the magazine's clamping and unclamping.
3. The rotation direction could be either cw or ccw.
4. The tool is selected randomly based on the shortest path to minimize the tool selection time.

5.4 TAILSTOCK

1. The tailstock can be moved along the bed ways and clamped in position by clamping hydraulic.
2. To facilitate tailstock movement, the tailstock is equipped with a pushing level (A) for operator to move tailstock effortlessly. Move level (A) to connect to Z axis if you want to move tailstock.** (Optional equipment)
3. The tailstock quill moves in or out when push the quill in or out button on the panel.

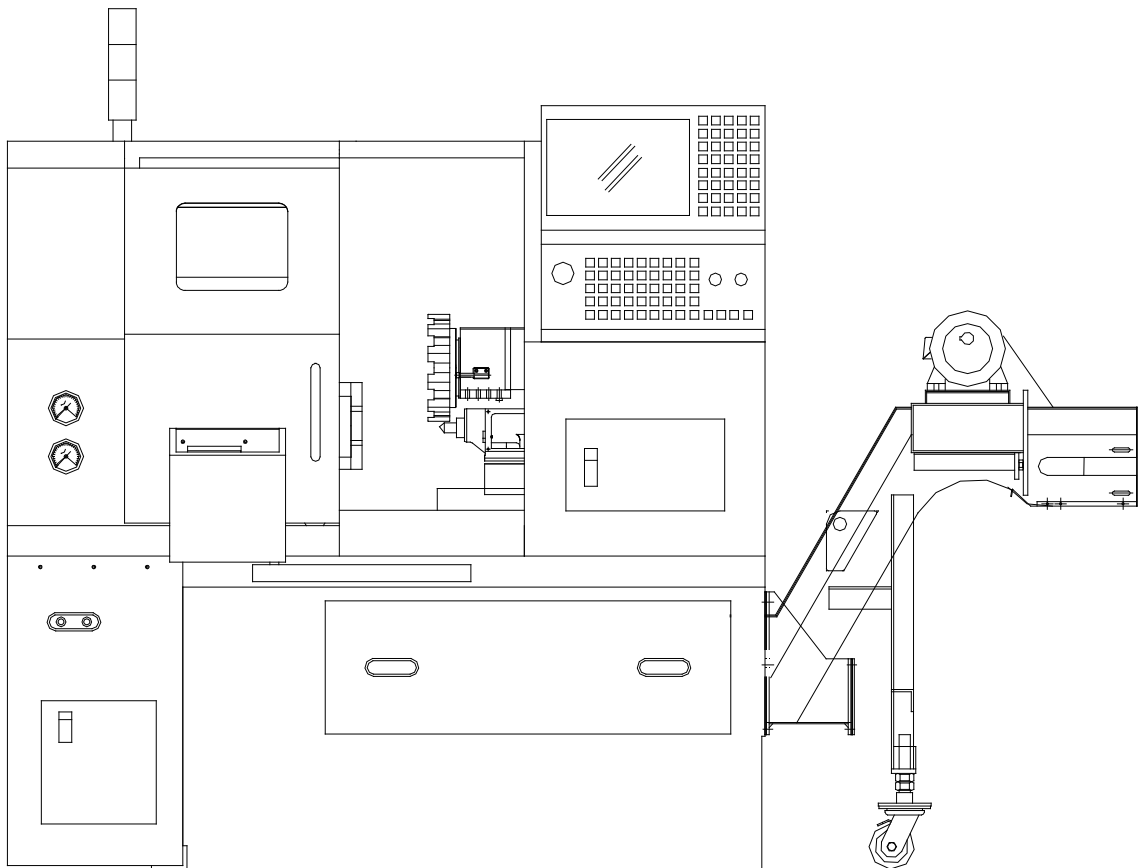


5.5 THE FULL-ENCLOSED

A full-enclosed sheet metal enclosure is designed to isolate the running machine and the cutting coolant and flying chips it generates from the operator. Chips are conveyed to the chip-collecting bucket through the chip conveying tunnel. The circulating cutting coolant is pumped through the coolant filters to the coolant distributors. The sheet metal enclosure is designed to have a one-piece front door so that you can inspect the machine or install the workpiece easily. For the sake of safety, the operator should open and close the front safety guard with both hands.

WARNING !!!

Ensure to close the one-piece front door before starting up the machine. The running machine will be stopped if the front door is opened in order to protect the operator from flying chips, spraying cutting coolant and running machine. Nevertheless, make sure the machine is full stopped before opening the door.



CHAPTER 6

ADJUSTMENT

PLEASE READ CAREFULLY BEFORE ADJUSTMENT

THIS MACHINE

6.1 MECHANICAL ADJUSTMENT

Ensure to turn off the main power supply and put warning signs on visible spots before inspecting the belt tension. Do not touch or reach over the pulleys and the belts if the power is still on. Otherwise might result in squeeze to wounded and disabled.

6.1.1 NOTICES

1. Check the pressure readings regularly to make sure all the system pressures setting are normal.
2. Observe regularly if there is any abnormal noise arising inside the rotating motors and other moving or rotating parts.
3. Moving or rotating parts are lubricated properly.
4. Ensure all the safety guards and safety equipment are installed properly.
5. Adjust the belt tension based on the tension value given in local agent.

6.2 TRANSMISSION'S BELT TENSION

After the machine has been operated for a long period, the spindle drive-timing belt may gradually become loose. Check the main drive belt tension frequently.

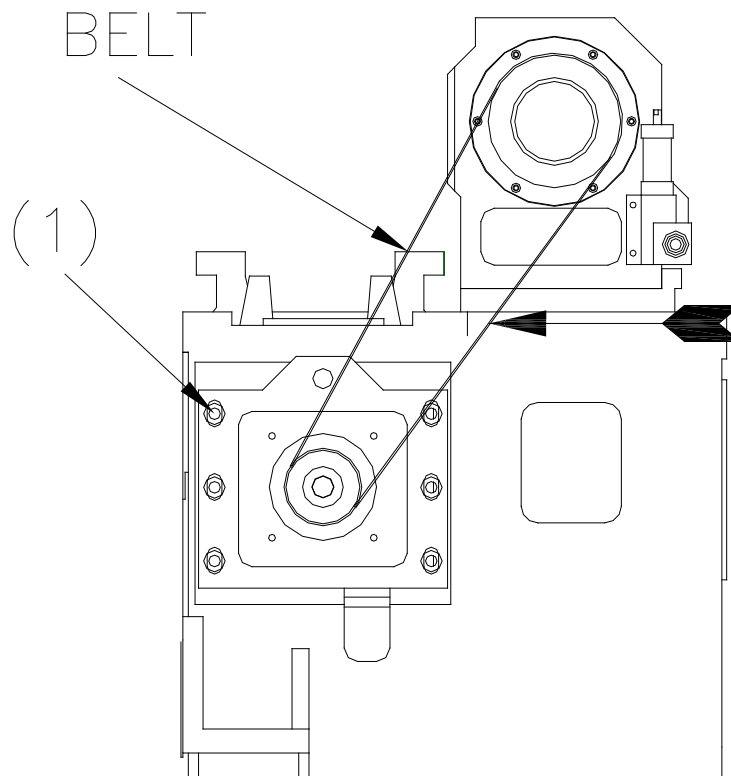
6.2.1 SPINDLE TRANSMISSION'S BELT TENSION

Follow steps below to adjust the belt tension:

1. Make sure the power source has been disconnected before adjusting the timing belt tension.
2. Loosen the 6 fastening screws (1) on the gearbox.
3. Adjust the belt tension properly by moving motor bracket.
4. Tighten the 6 fastening screws.

WARNING !!!

Ensure to have a proper tension value for the spindle transmission belt. If you can not ensure the proper tension value, please do not adjust the belt tension.



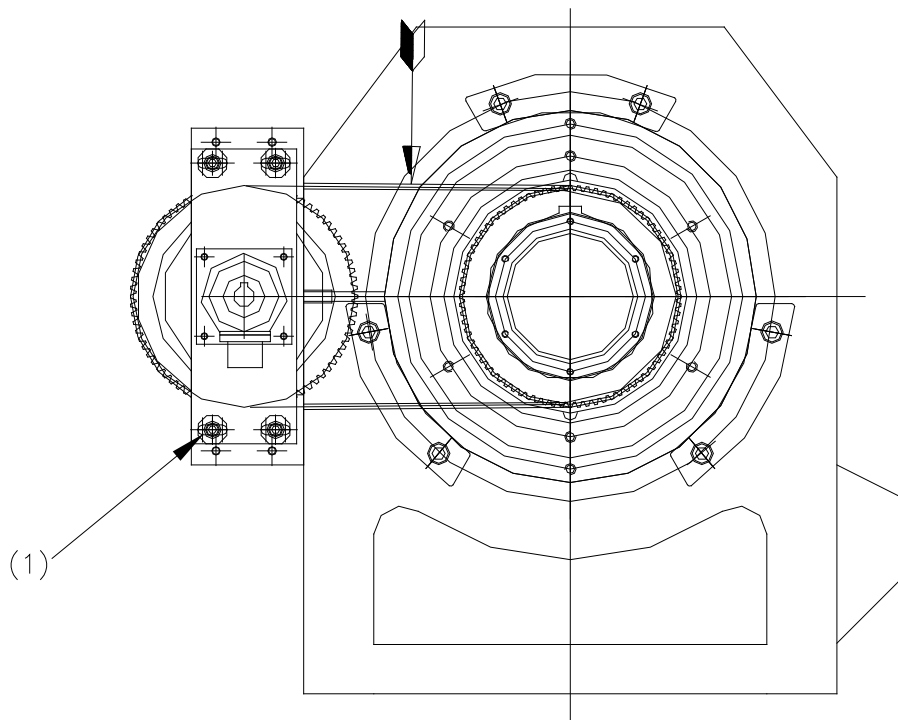
6.2.2 SPINDLE POSITIONING BELT TENSION

Follow steps below to adjust the belt tension:

1. Make sure the power source has been disconnected before adjusting the timing belt tension.
2. Loosen the 4 fastening screws (1).
3. Adjust the belt tension properly by tightening the belt.
4. Tighten the fastening screws.

WARNING !!!

Ensure to have a proper tension value for the spindle transmission belt. If you can not ensure the proper tension value, please do not adjust the belt tension.



6.3 GIB ADJUSTMENT

Because of long-term friction between the bed and carriage, wear may occur. Proper gib adjustment is necessary after the machine has been operated for a long time.

6.3.1 ADJUST SADDLE GIB (Z AND X AXIS)

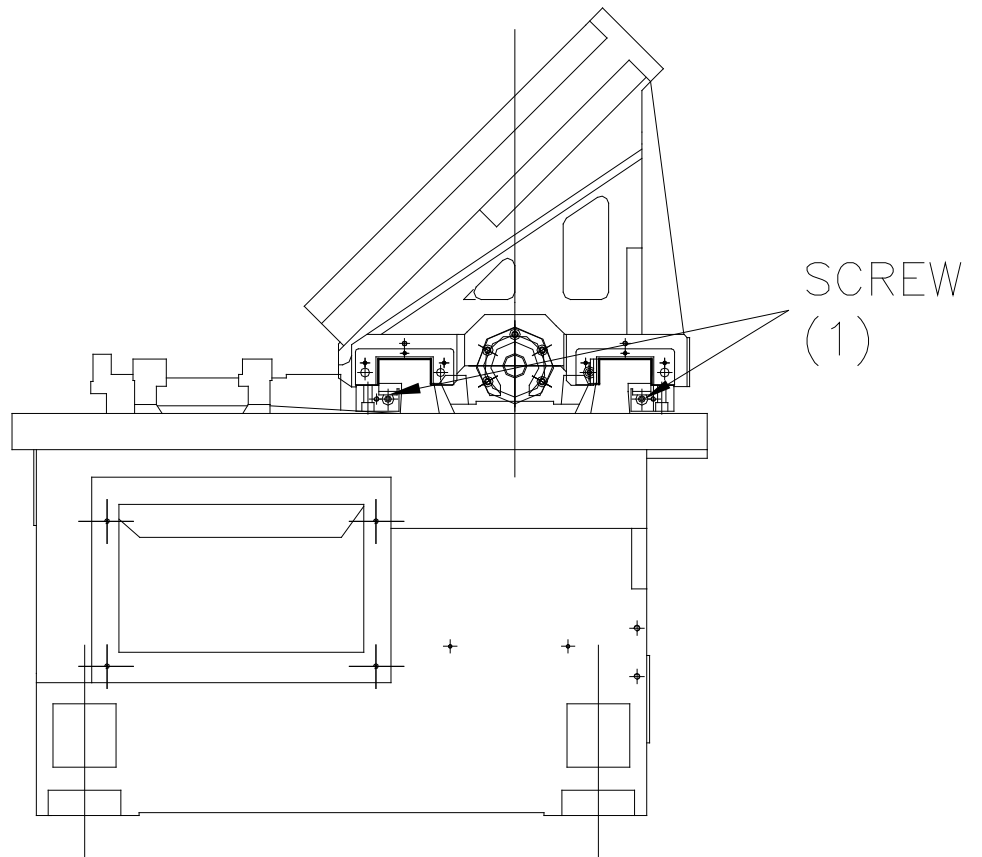
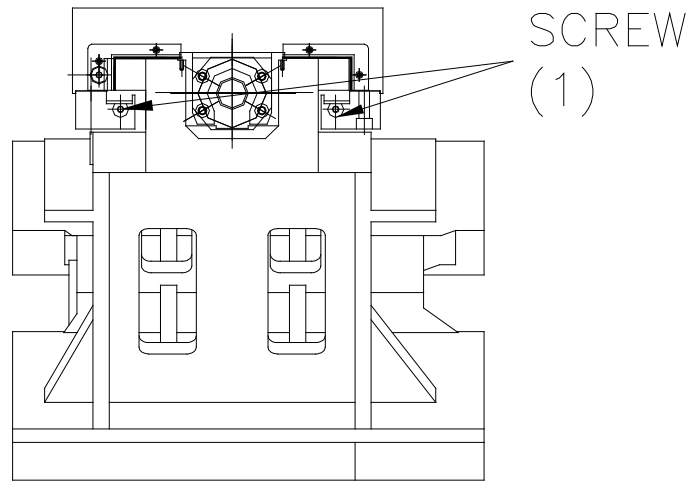
Make gib adjustment as per the following procedures:

1. Loosen the setting screw (1).
2. Adjust the gib by turning the gib adjustment screw which on the other side, and try to feel if the carriage moves smoothly.
3. Reverse the above procedures after gib adjustment has been made.
4. Tighten the setting screw (1) properly.

WARNING !!!

Ensure to adjust gib frequently and properly. Otherwise might result the machine out of accuracy.

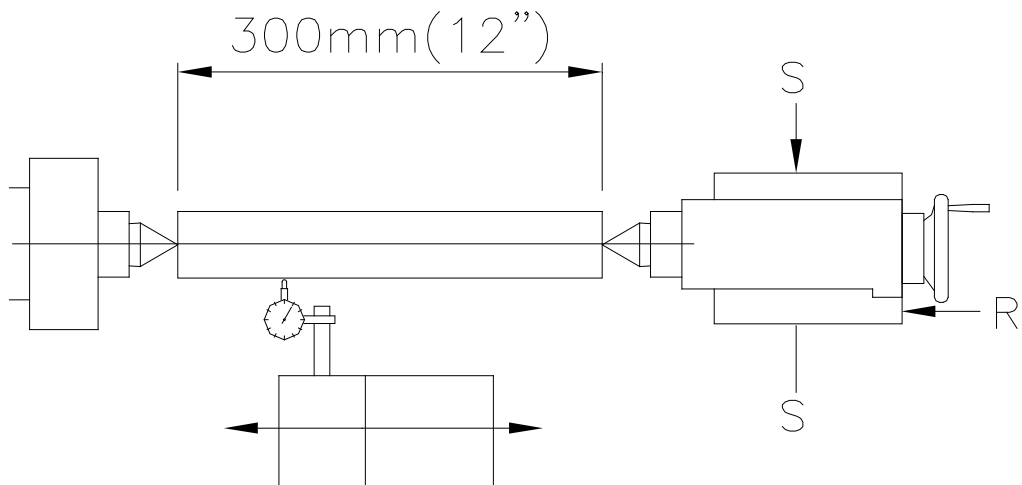
6.3.2 GIB ADJUSTMENT



6.4 TAILSTOCK ADJUSTMENT

6.4.1 TAILSTOCK CHECK

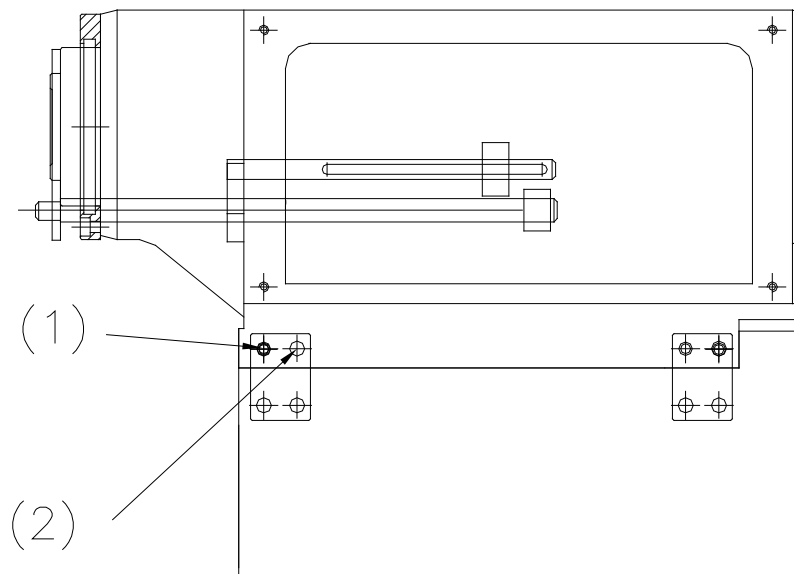
Using a 300mm (12") long ground steel bar mounted between center, check the alignment by traversing a dial test indicator along the centerline of the bar. To correct any error first release the tailstock clamp levers, slacken the rear locating screw (1) and then adjust the screws (2) on each side of the tailstock body laterally. Recheck alignment.



6.4.2 TAILSTOCK SET-OVER

The tailstock can be set over for the production of shallow tapers or for re-alignment. Set over adjustment as per the following procedures:

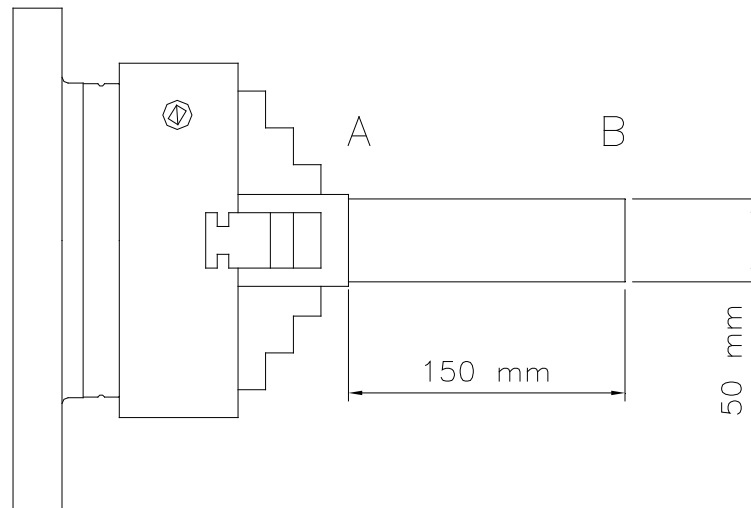
1. Unclamp tailstock.
2. Loosen rear location screw (1) one turn.
3. Adjust screw (2) at each side of base by loosening one and tightening the other to laterally move the tailstock across the base.
4. Re-tighten the rear location screw.



6.5 HEADSTOCK ADJUSTMENT

6.5.1 HEADSTOCK ALIGNMENT CHECKS

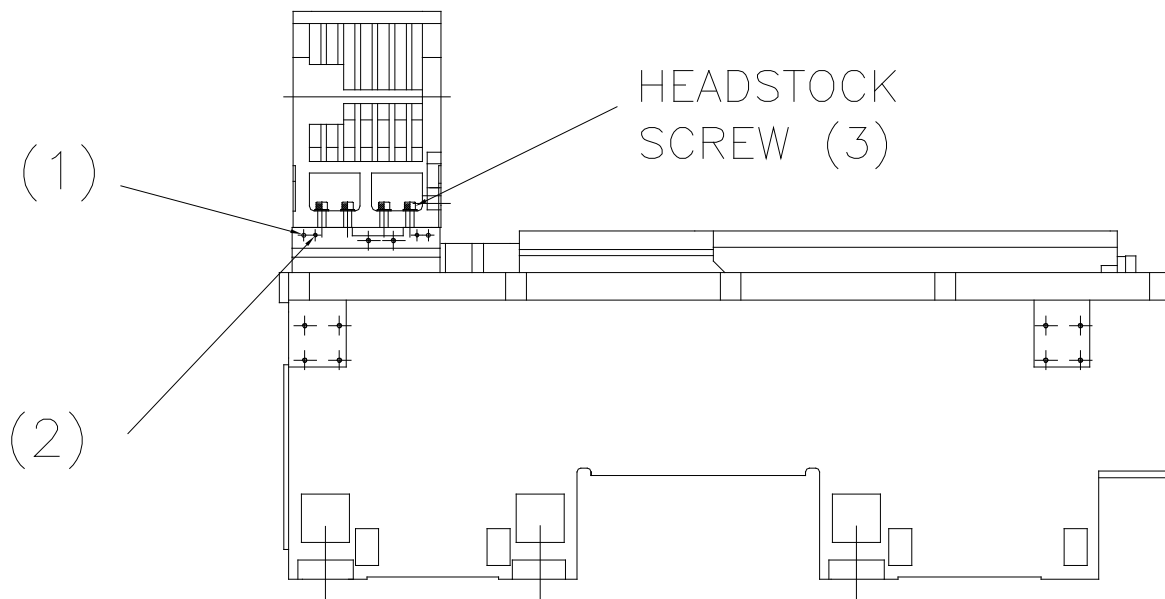
Take a light over a 150mm (6") length of 50mm(2") diameter steel bar held in a chuck (but not supported at free end). Micrometer readings at each end of the turned bar A and B should be within 0.02 mm(0.0008").



6.5.2 HEADSTOCK ALIGNMENT CHECKS

Align headstock as per the following procedures:

1. Loosen 4 fastening headstock screw (3) and fastening screw (1).
2. Adjust screw (2) at each side of base by loosening one and tightening the other to laterally move the headstock within tolerance.
3. Re-tighten the fastening screw (1).
4. Re-tighten the 4 fastening headstock screw (3).



CHAPTER 7

MACHINE MAINTENANCE

PLEASE READ CAREFULLY BEFORE MAINTENANCE

THIS MACHINE

7.1 PREPARATION BEFORE THE MAINTENANCE

1. Fully Understand all the safety instructions illustrated in the manual.
2. Always maintain the machine under the foreman's instruction.
3. Prepare all the necessary spare parts, such as washer, O ring, seal, etc., in advance.
4. Fully understand all the maintenance procedures written in the maintenance manual.
5. Follow the maintenance procedures and be sure to establish the maintenance records after work.

7.2 LUBRICATION SYSTEM

Running conditions of this machine depend heavily on the lubrication management. Ensure to check the lubrication system frequently to keep this machine in a good service condition. The followings describe how to lubricate various machine parts properly. Recommended lubrication oil used in the pneumatic system, lubrication grease and cutting coolant are listed in the oil guide table.

7.2.1 WARNING SYSTEM FOR THE CENTRALIZED LUBRICATION SYSTEM

A warning system is designed to notify users of checking and filling up the slideway lubrication system. The lubrication frequency has been setting by factory. Please make sure it is better for machine if you change the lubrication frequency.

Please fill the oil tank with oil immediately when the warning alarm message is shown on the control. The warning alarm will be continuing if the warning status is not released even though the power is turned off / on. Ensure to check the centralized lubrication system weekly at least, and fill up the tank if necessary. Recommended lubrication oil is listed in the oil guide table.

WARNING!!!

If there is a lack of oil, please fill the oil tank with oil immediately.

7.3 LUBRICATION

7.3.1 LUBRICATION FOR THE X AND Z AXIS BEARINGS

Grease is used to lubricate bearings of X-axis and Z-axis. The recommended grease (Nbu 15) could be used in high working temperature conditions. It has a good abrasive property and do not be changed.

7.3.2 LUBRICATION FOR THE X AND Z AXIS BALLSCREWS

The cross-saddle, saddle are traveled along the X and Z directions respectively. Either the X-axis or Z-axis movement is driven by an AC servo motor via the connection of a coupling and a ballscrew. All the ballscrews are pre-tensioned and lubricated with proper oil to avoid positioning error resulting from thermal deformation.

7.3.3 LUBRICATION FOR THE SPINDLE SYSTEM

1. Grease is used to lubricate spindle bearings. The recommended grease (Nbu 15) could be used in high working temperature conditions. It has a good abrasive property, and do not be changed.
2. Ensure to maintain an adequate lubrication cooling oil in the cooling system. Fill it up if necessary.
3. The spindle cooler (optional equipment) used to cool the spindle bearing to prevent the spindle system from thermal deformation.

7.3.4 THE OIL GUIDE TABLE

Lubricant Position	Slideway and Ballscrew	Cutting Coolant	Pressure Cylinder
Lubricant Characteristic	<ul style="list-style-type: none"> ⊙ Viscosity ISO VG68 ⊙ Anti-wear, Anti-pressure 	<ul style="list-style-type: none"> ⊙ Good Heat conduction ⊙ Good lubricant performance 	<ul style="list-style-type: none"> ⊙ Viscosity ISO VG32 ⊙ Anti-rust, anti-oxidation ⊙ Good Stability
Lubrication Method	Centralized Lub	Circulating Lub	
Oil Change Period	As needed	As needed	Every year
Tank Capacity	3 Liters	100 Liters	
Recommended Grade of Oil	<ul style="list-style-type: none"> ⊙ B.P Energol NT68 ⊙ Mobil Vactra No.2 ⊙ Esso Febis K68 ⊙ Shell Tonna T68 ⊙ Chevron Way Lubrica NT68 	<ul style="list-style-type: none"> ⊙ CPC Cutting Oil 31C ⊙ Mobile Esultran ⊙ Esso Pennex 44 or Kulwell 30 or Dortan 32 ⊙ Shell Dromus B or Macron 32 	<ul style="list-style-type: none"> ⊙ B.P Energol HLP 32 AW ⊙ Mobil DTE 13 ⊙ Esso Auto A32 ⊙ Shell Tellus 32 ⊙ Chevron Ed Hydraulic 32

WARNING!!!

Ensure to use the recommended fluids as listed in the oil guide table.

7.4 THE MACHINE MAINTENANCE

Ensure to turn off the main power switch, the power switch of the machine panel and main power circuit breaker and put “**Under maintenance, Do not touch any power switch**” warning signs on visible spots before starting the maintenance work.

7.4.1 NOTICES

1. Only qualified engineers are allowed to maintain or install the electrical equipment.
2. Do not remove or alter any over-traveling limit switch and related mechanical parts without permission.
3. Always use ladders when working in the high place.
4. Ensure all the appliances, such as fuse, cable, etc., are reliable.

7.4.2 CLEANING RULE

1. Ensure to clean up the anti-rust treatment with the kerosene or the diesel on the contact surfaces of the moving machine parts. Don't clean up the anti-rust solvent on other places than where mentioned above.
2. Do not clean the machine with organic solvent.
3. Do not use compressed air to remove the dust on the machine, which might damage surfaces among sliding parts.
4. Remove all the anti-moisture substances placed inside the enclosures.
5. Always clean up the working area and machine after the maintenance job is done. Keep the machine and work area neat, clean, dry and orderly.
6. Remove all the garbage and leftover after the maintenance work is done.
7. Always keep the maintenance records and inspection results.
8. Report to our local dealer or us if any abnormal condition was found during maintenance. Do not disassemble the machine by yourself.

7.5 PREVENTIVE MAINTENANCE

To keep the machine in good service conditions, please follow the procedures below to maintain the machine.

7.5.1 DAILY MAINTENANCE

1. Check to see if the oil quantity in the automatic lubricator is sufficient.
2. Check to see if the cutting fluid quantity in the fluid tank is sufficient.
3. Clean up the machine and working area after finishing the work. Ensure to put a layer of rust-prevent oil on those exposed sliding surfaces.
4. Turn the power source switch off when you finish the work.
5. Release the water accumulated in the air filter cap.
6. Remove chips from the machine every day after job is finished.
7. Check the spindle taper bore after finishing the machining. Clean up the spindle taper bore with the spindle taper bore cleaner, as illustrated in the following chapter.
8. Stop the machine immediately and find out sources of the problems if any part of the machine is overheated.
9. Stop the machine immediately and fix the problems before resuming the machine if any electrical part, such as the connector, switch, electrical socket and electrical wire, is out of order.
10. Ensure there is no abnormal noise occurs when the machine is running.

7.5.2 WEEKLY MAINTENANCE

1. Ensure all the pumps work well.
2. Ensure the automatic station disc turret could be operated smoothly.

7.5.3 MONTHLY MAINTENANCE

1. Check gibs on the bed and cross slide. If necessary, adjust gibs according to the instructions in “GIB ADJUSTMENT” .
2. Clean the cutting fluid pipes and lubrication oil pipes.
3. Clean the cutting fluid tank.
4. Check ball screws and clean them.
5. Ensure any nuts and screws are locked.

7.5.4 HALF-YEARLY MAINTENANCE

1. Ensure the spindle run out and bearing clearance are within the specified precision's.
2. Clean or replace the filter screen for coolant pump.
3. Ensure all the electrical parts, such as connectors, switches, cables, are in normal service conditions.
4. Check out all the insulation resistors. Ensure to keep a record.
5. Check the precision of automatic station disc turret.

7.5.5 YEARLY MAINTENANCE

1. Ensure the push buttons and switches on the control panels work properly.
2. Remove all the carbon deposited on the electrical relay points, then clean all the electrical relay points with alcohol liquid.
4. Clean up the cutting oil tank, then fill up the tank with recommended oil.
5. Clean up the hydraulic system, including the oil tank, and refill the oil tank. Ensure all the setting pressure are normal.
6. Check the machine leveling and adjust if necessary.
7. Replace the lubrication oil in the headstock.
8. Check the alignment accuracy between the spindle center and tailstock center.
9. Check all electric wire connections for looseness.

7.6 HOW TO ORDER REPLACEMENT PARTS

1. Quote components part number and description, against each part's illustration for all component parts required.
2. Some parts are standard items, which can generally be purchased locally- e.g. nuts, bolts, screws, washers, etc.
3. Always quote the machine serial number in all parts orders or technical inquiries. This number can be found at the nameplate at the machine bed.

CHAPTER 8

APPENDIX

8.1 TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSES	CORRECTION
MACHINE START FAILURE	<ol style="list-style-type: none"> 1. Fuse in control circuit burnt out 2. Incorrect power source 3. Overload thermal relay tripped 	<ol style="list-style-type: none"> 1. Replace 2. Correct it 3. Reset
INSUFFICIENT POWER OR MOTOR OVERHEATING	<ol style="list-style-type: none"> 1. Less phase running 2. Overload cutting 3. Poor magnetic contractor 	<ol style="list-style-type: none"> 1. Correct 2. Reduce load 3. Replace
TOOL CHATTERING	<ol style="list-style-type: none"> 1. Workpiece not clamped securely 2. Improper tool type or material 	<ol style="list-style-type: none"> 1. Clamp it securely 2. Use correct tool only
NO LUBRICANT DELIVERY	<ol style="list-style-type: none"> 1. Lubrication pump failed 2. Lack of oil 3. Filter clogged 	<ol style="list-style-type: none"> 1. Check and correct it 2. Fill up oil 3. Clean it

8.2 ISO METRIC THREAD DATA

O. Dia.	Core Dia.	Pitch	Depth	Flat	Effective	Tapping	Clear
3.0	2.3866	0.5	0.3067	0.0625	2.675	2.5	3.1
4.0	3.1412	0.7	0.4294	0.0875	3.545	3.3	4.1
5.0	4.0184	0.8	0.4908	0.1	4.48	4.2	5.1
6.0	4.7732	1.0	0.6134	0.125	5.35	5.0	6.1
8.0	6.4664	1.25	0.7668	0.15625	7.188	6.8	8.2
10.0	8.1596	1.5	0.9202	0.1875	9.026	8.5	10.2
12.0	9.8530	1.75	1.0735	0.21856	10.836	10.2	12.2
16.0	13.5462	2.0	1.2269	0.25	14.701	14.0	16.25
20.0	16.9328	2.5	1.5336	0.3125	18.376	17.5	20.25
22.0	18.9328	2.5	1.5336	0.3125	20.376	19.5	22.25
24.0	20.3194	3.0	1.8403	0.375	22.051	21.0	24.25
30.0	25.7060	3.5	2.147	0.4375	27.727	26.5	30.5