XYZ

RLX355

CNC LATHE
GENERAL MANUAL

CE

ISO 9001

Manual NumberKKRDM4100 Date MAY 2019 REVKV4.0

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!!!

This machine is designed to cut common, metallic engineering materials (such as steel and aluminum). DO NOT use to cut special materials (such as composites) without agreement from XYZ Machine Tools. Any damage caused to the machine by processing such materials will not be covered by the warranty.

NOTE!!!

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

MACHINE SPECIFICATIONS

MODE	SPECIFICATIONS	RLX355
SWING AND DISTANCE	Swing over bed	360 mm / 8 3/4”
	Swing over cross slide	1000 mm / 40”
	Distance between centers	52 mm / 2 1/8”
SPINDLE	Spindle bored	52 mm / 2 1/8”
	Spindle nose type	D1-6 camlock
	Spindle taper	MT4 in bush
	Spindle motor	7.5 hp / 5.5 kw
SPINDLE SPEED	Low speed	35-1410 rpm
	High speed	100-4000 rpm
CROSS SLIDE	Cross slide travel	195 mm / 7 1/2”
BALLSCREW	X axis ballscrew diameter	0 20 mm
	Z axis ballscrew diameter	0 32 mm
TAILSTOCK	Tailstock Quill diameter	60 mm / 2 1/4”
	Tailstock Travel	150 mm / 6”
	Tailstock - taper	MT4
BED	Bed width	305 mm / 12”
	Bed length	1460 / 57 1/2”
MACHINE DIMENSION	Footprint (LxDxH)	2250 x 1450 x 2000 mm / 88.5” x 57” x 78.7
	Weight	2200 kg / 4850 lbs

**** To keep improvement and developing new functions, the Specifications is subject to change without future notice.

STANDARD ACCESSORIES

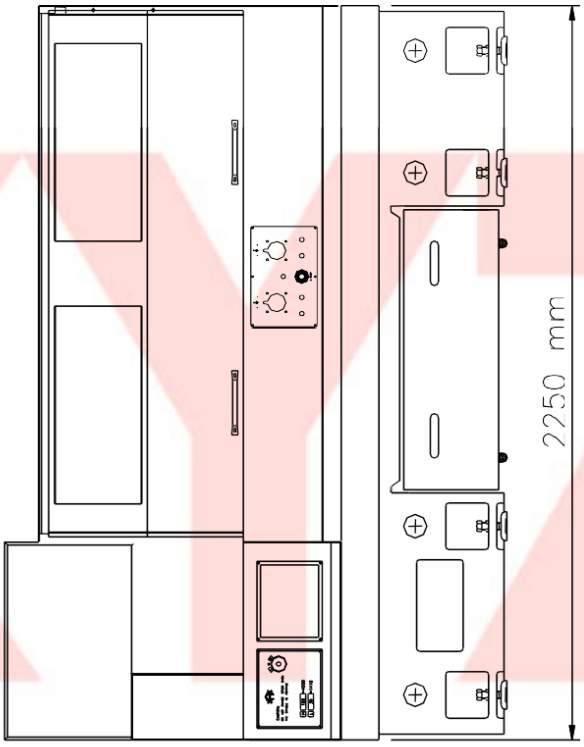
- ADJUST LEVELING
- AIR ASSISTED FLOATING TAILSTOCK SYSTEM
- AUTOMATIC LUBRICATION SYSTEM
- COOLANT SYSTEM
- ERGONOMICALLY MOUNTED OPERATOR CONTROL
- FULL MACHINE GURAD
- HIGH INTENSITY MACHINE LIGHT
- WORKING LIGHT
- MANUAL
- SPINDLE CENTER
- TAILSTOCK CENTER
- TOOL BOX
- X AXIS AC SERVO MOTOR
- X AXIS ELECTRONIC HANDWHEELS
- X AXIS PRECISION BALLSCREW
- Z AXIS AC SERVO MOTOR
- Z AXIS ELECTRONIC HANDWHEELS
- Z AXIS PRECISION BALLSCREW

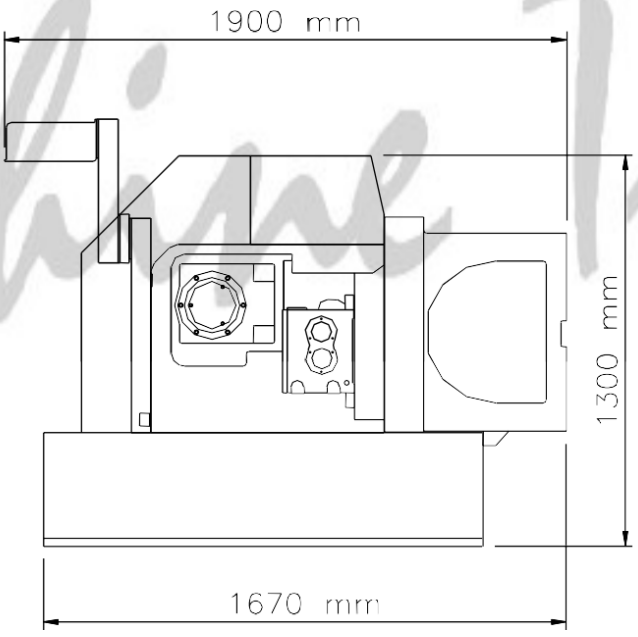
OPTIONAL ACCESSORIES

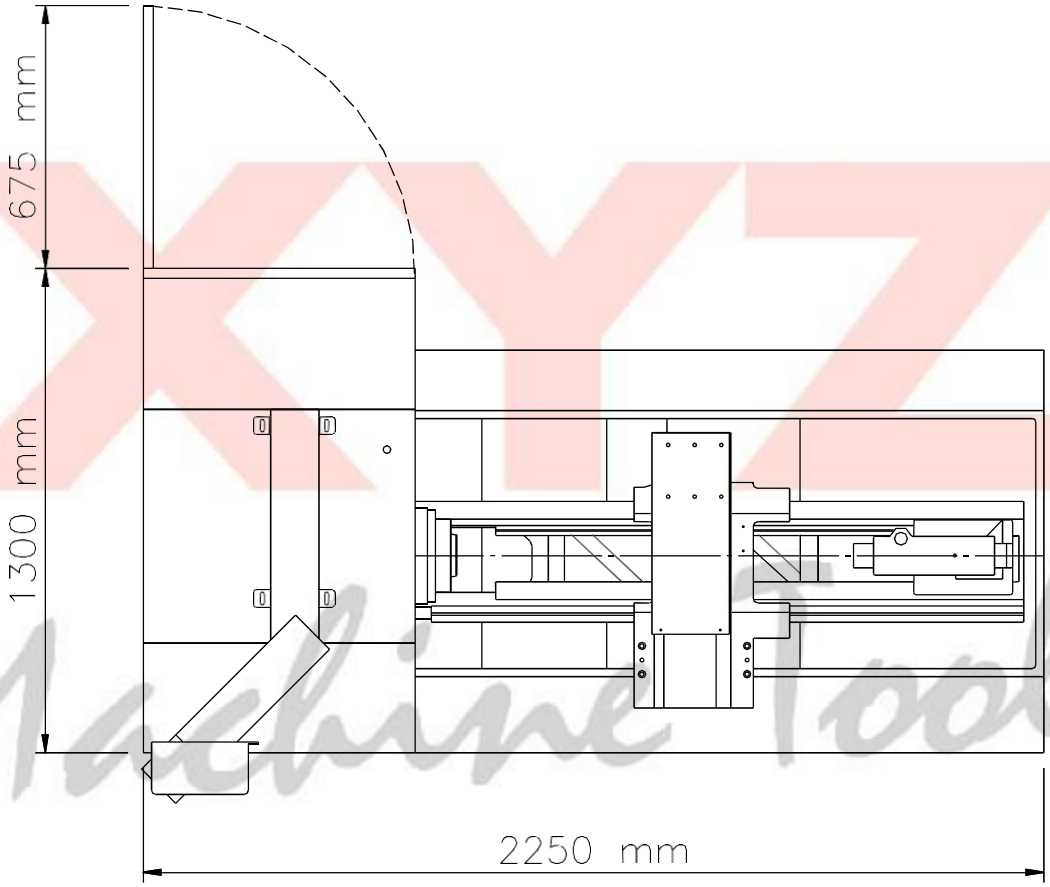
- POWER INDEX (4 TOOLS)
- STATIONARY STEADY ASSEMBLY
- TRAVELLING STEADY ASSEMBLY
- AUTOMATIC CHANGE SPINDLE SPEED SYSTEM

**** To keep improvement and developing new functions, the Specifications is subject to change without future 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 THIS THCHINE

1.1 OPERATOR SAFETY

This lathe is fast, powerful machines 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 understand 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 90dB(A). In real life, the noise level can be higher than 90dB(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 and without feed engagement.

WARNING !!!
Do not stay in the working area with an unpleasant noise level without wearing appropriate protective equipment, such as the earplug. Otherwise this might cause hearing pain or more serious problems.

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 K

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, however, 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 half-enclosed sheet metal guard and chuck guard. 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 warn 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 hands that could result in electric shock.

26. Do not touch the electric equipment and operating panel with wet hands, this 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 for 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 warningEnoticeEdanger. 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 K

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.

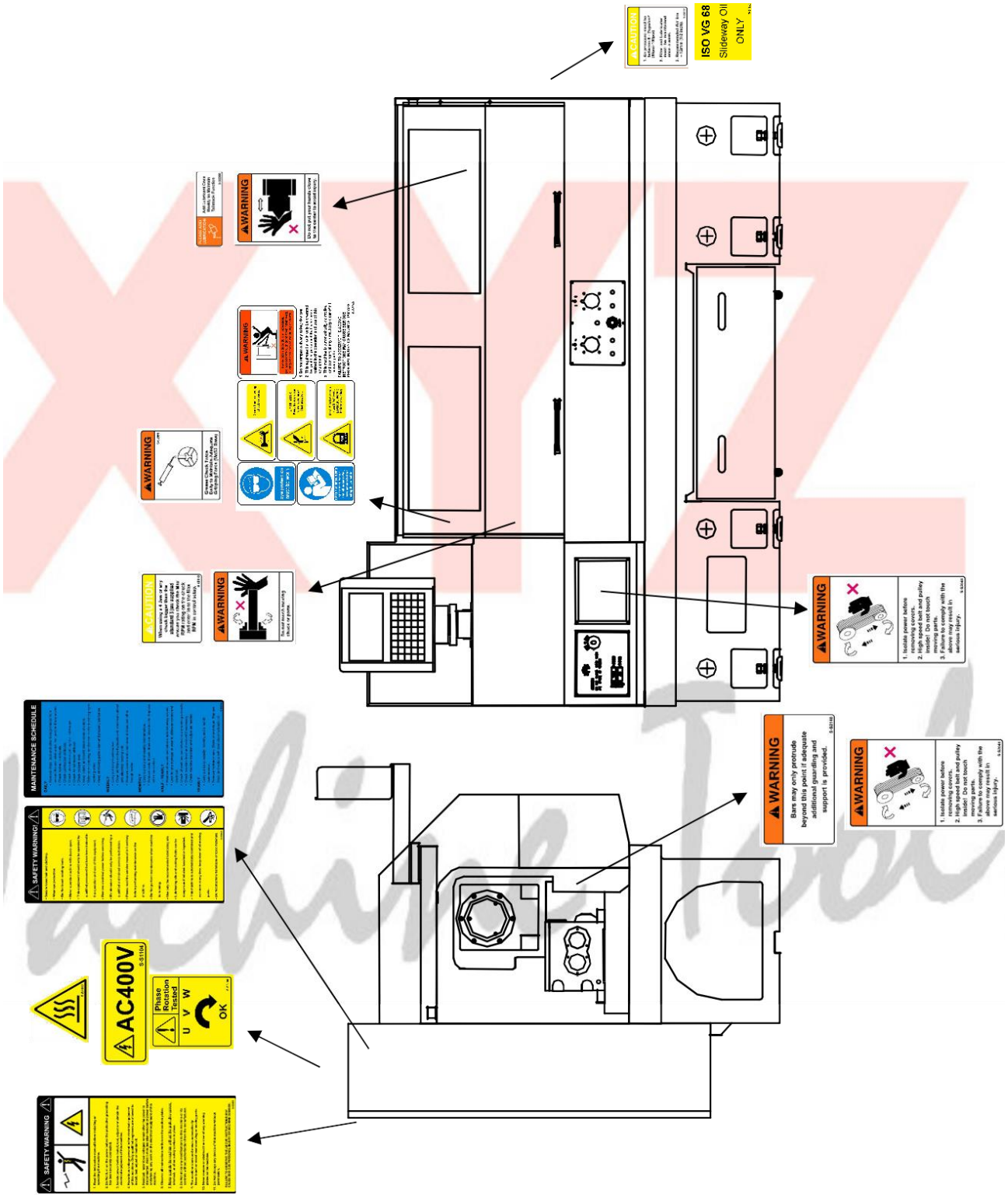
4. The actual gripping power being used for any given application is not known by the chuck manufacturer.

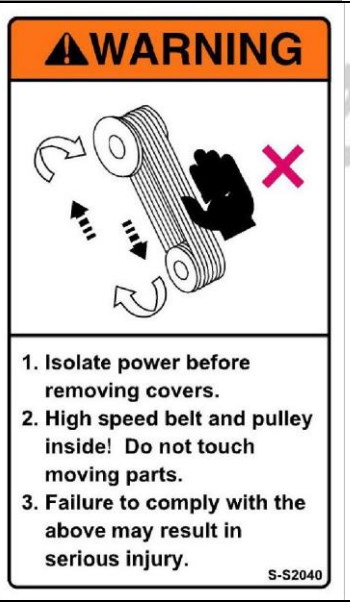
5. There is the possibility of the workpiece becoming insecurely gripped due to the influence of centrifugal force under certain conditions.

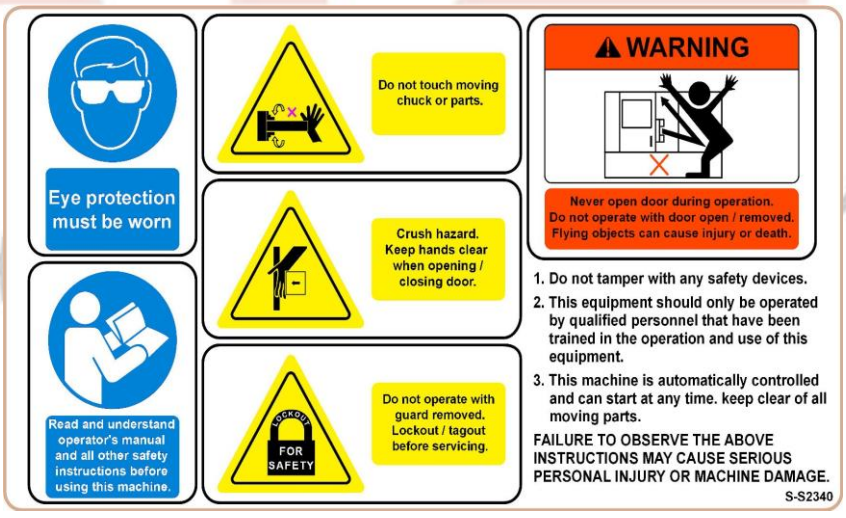
6. The factors involved include:
   (a) Too high a speed for a particular application.
   (b) Weight and type of gripping jaws if non-standard.
   (c) Radius at which gripping jaws are operating.
   (d) Condition of chuck- inadequate lubrication.
   (e) State of balance.
   (f) The gripping force applied to the workpiece in the static condition.
   (g) Magnitude of the cutting forces involved.
   (h) Whether the workpiece is gripping externally or internally.

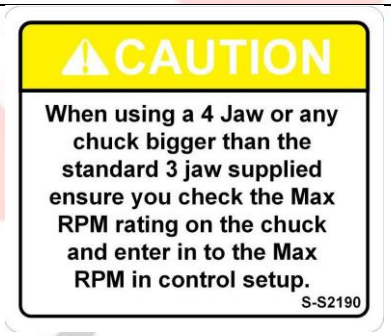
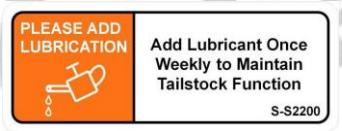
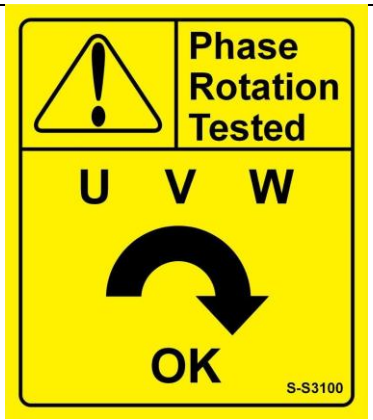
7. Careful attention must be paid to these factors. As they vary with each particular application, the manufacturer cannot provide specific figures for general use; the factors involved being outside his control.

1.11 SIGNS


CAUTION
ISO VG 68
Slideway Oil
ONLY
WARNING
WARNING
WARNING
WARNING
WARNING
WARNING
Bars may only protrude beyond this point if adequate additional guarding and support is provided.
MAINTENANCE SCHEDULE
SAFETY WARNING
SAFETY WARNING
AC400V
Phase Rotation Tested
U V W
OK

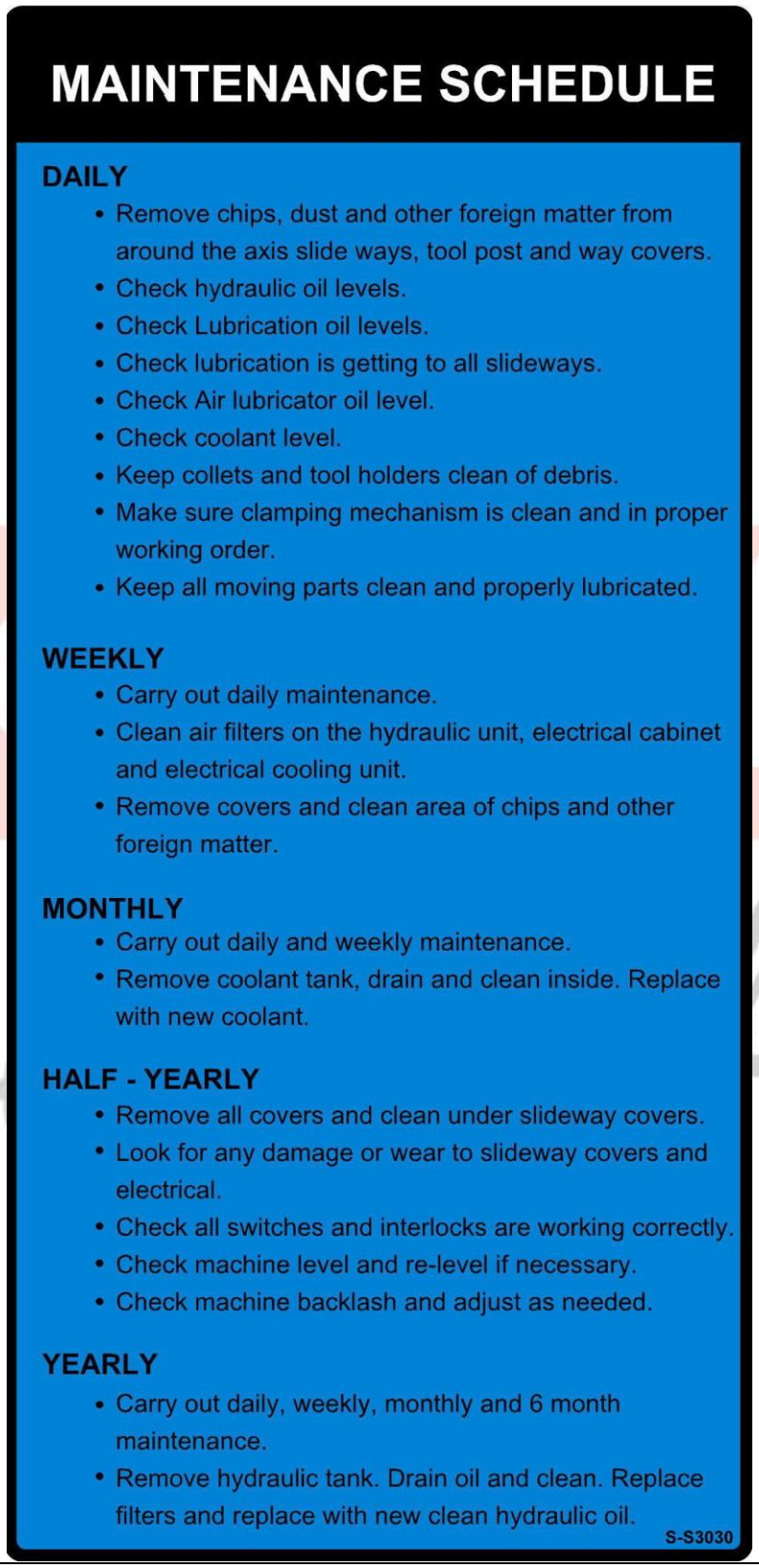
S-S1104 AC400V Yellow Sticker	
S-S1112 High Temperature Warning	
S-S1123 ISO 68 Slideway OIL	
S-S2030 Quill Out Warning	
S-S2040 Belt Warning	

S-S2050 Air Rotation Tested	
S-S2060 Spindle Running Warning	
S-S2340 RLX Safety F Warning	

S-S2091 Grease Maintain Warning	
S-S2140 Bar Warning	
S-S2190 Chuck Caution	
S-S2200 Lubricant To Tailstock	
S-S3100 Phase Rotation Tested	

S-S3030

Maintenance Schedule

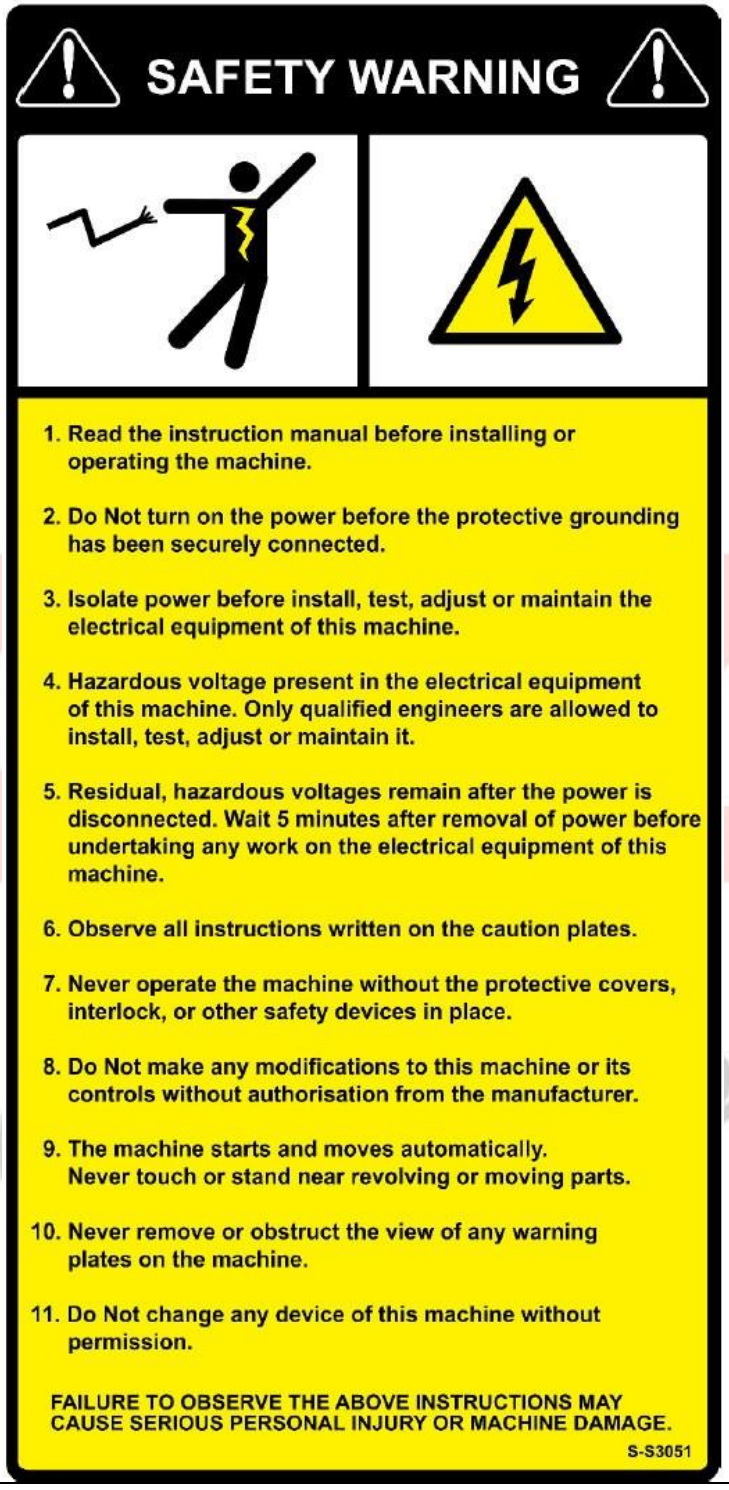


S-S3040

Safety Warning

S-S3051

Safety Precautions



S-S1160 Point Label	

NOTE!!!

On the RLX355 machine there are shipping brackets the hold the axes in place during shipping. These brackets must be removed before operating the machine. Do not discard the shipping brackets. The shipping brackets must be replaced if the machine is ever moved.

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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 5 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 5 tons at least. If can't make certain of the load capacity of the handling equipment, please contact with the manufacturn 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 7 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 balanced 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 is 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. Pervent sudden movement Of the machine, too quick and the macine could become unbalanced. This might result In a serious accident that causes the machine to drop.

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 latheK

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:

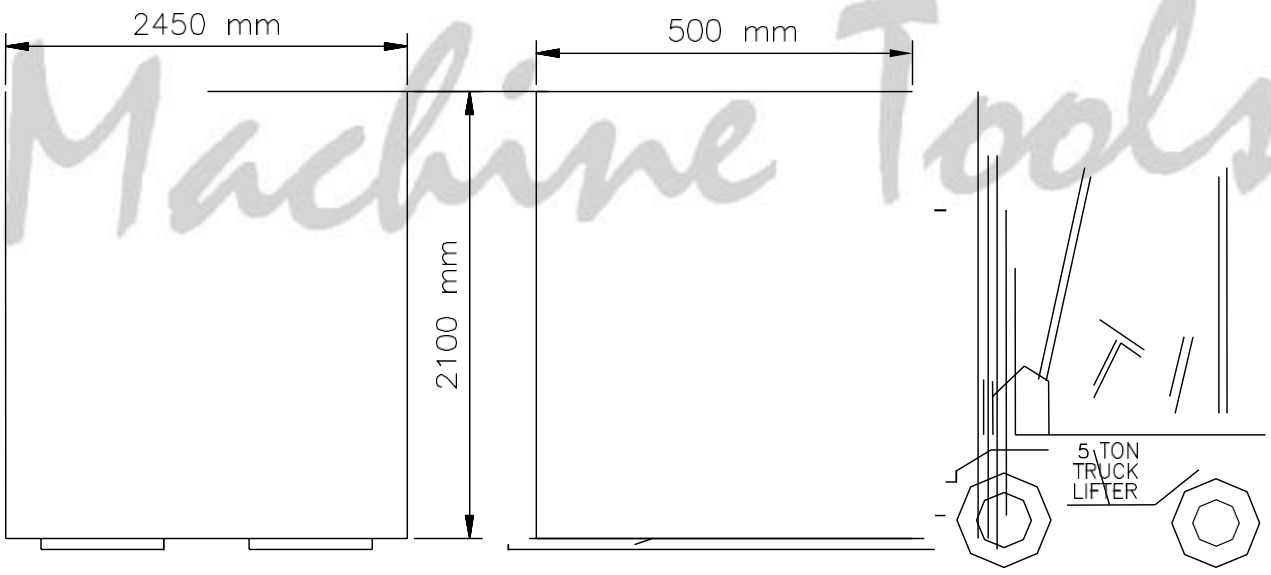
1. The loading capacity of the lifting equipment should be 5 tons at least.

2. Wire cables and chains of the lifting equipment should be able to bear a load of 5 tons at least.

3. The packed lathe is 2450 mm in length, 1500 mm in width and 2100 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 overturned because of an improper lifting height. This 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.

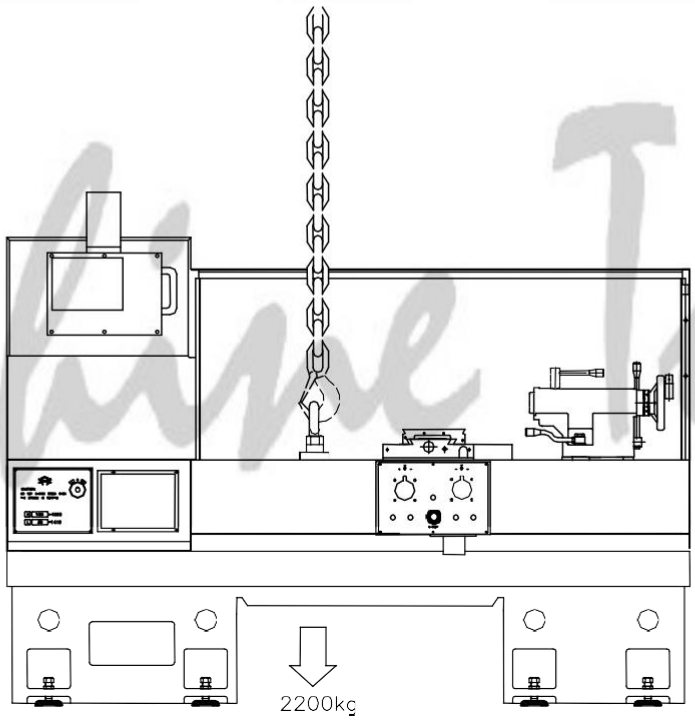
2. Wire cables and chains of the lifting equipment should be able to bear a load of 5 tons at least.

3. Use only the sling frame provided to lift the lathe. Other fixture or rope are prohibited.

4. The lathe is 2300 mm in length, 1250 mm in width and 1750 mm in height. Ensure nobody is in the way and the path is clear before commencing to move the lathe. Otherwise this might cause a collision with the lathe.

5. Beware that the lifting truck might overturn because of an improper lifting height. This might cause people injury and damage the lathe.

6. 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 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 an 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 moving, 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 this 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

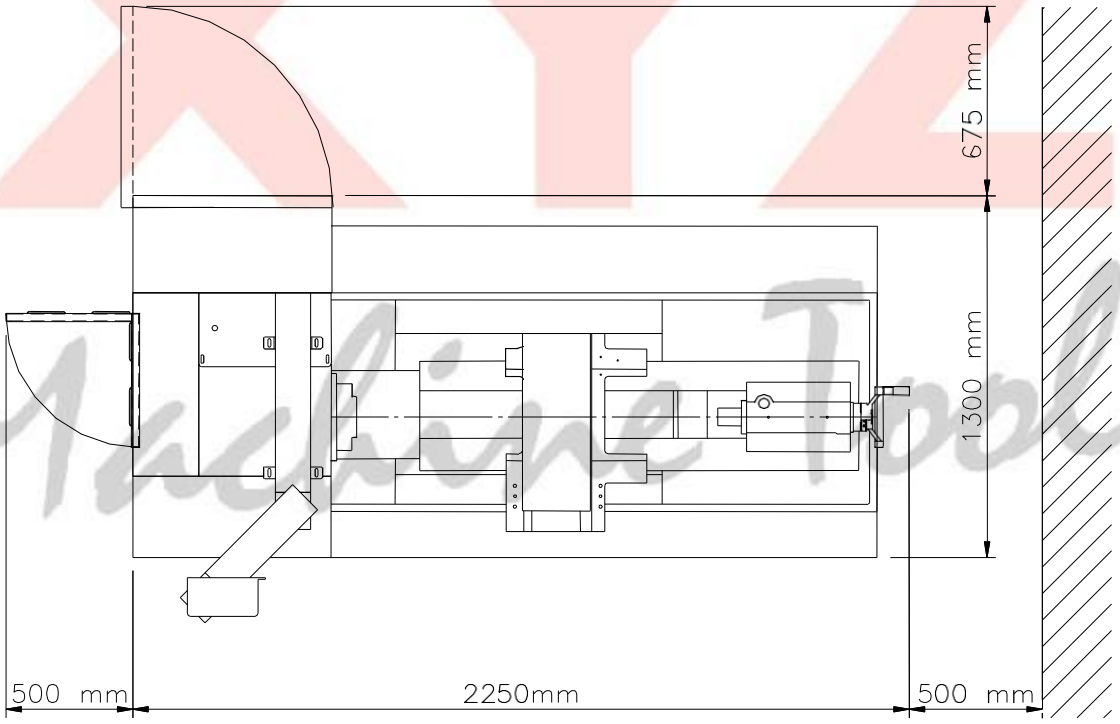
To upgrade the operation efficiency and accuracy of this CNC lathe, a proper foundation is required. Ensure the site space and the path width is large enough to install and transport the whole lathe at least 30 working days before the arrival of this lathe. If short of andard for space, replaced inform local agent or us as soon as possible, we will provide a 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 connect 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 locationK

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 followingK

1. Voltage: 85% to 110% of the rated voltage
2. Frequency: Rated frequency ± 2 Hz
3. TemperatureK 0℃ to 45℃ (32℉ to 113℉)
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 20 cm 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.

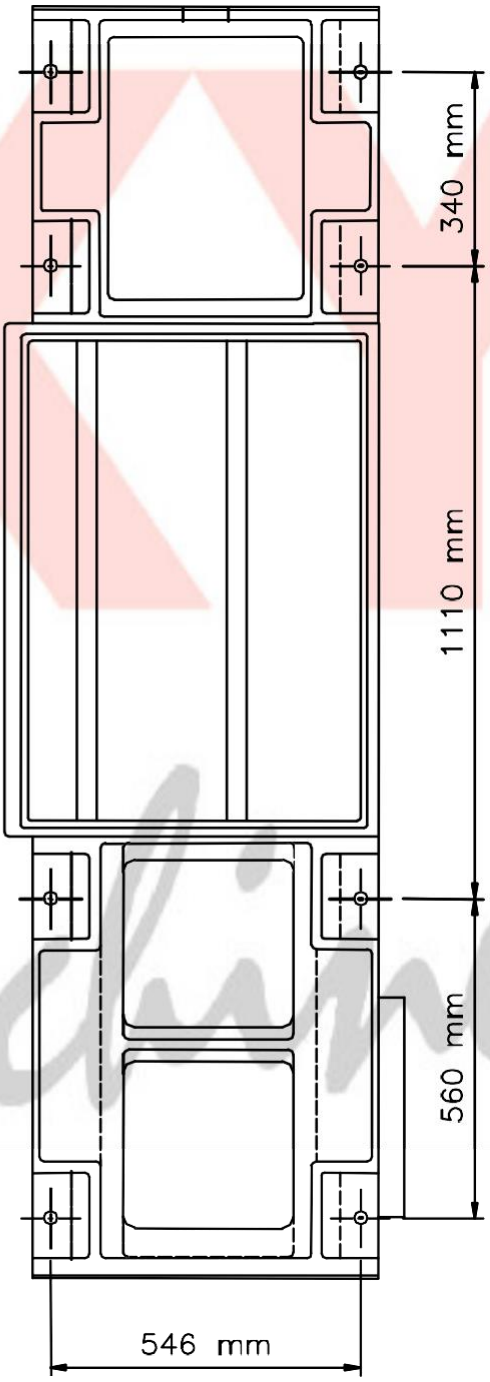
4. Place foundation pads on those reserved spaces, insert the L shape fixing stud through the foundation pad and foundation bolt, then fasten the fixing stud with the nut, as shown in the following figures.

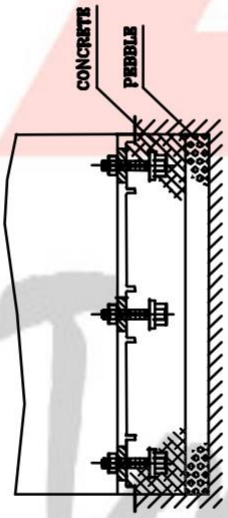
5. Adjust the L shape fixing studs based on dimensions shown in the following figures. Fill up those reserved spaces with concrete. Level the lathe after the concrete is dry and solid.

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 powerK

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. Failure 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 instructionsK

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.

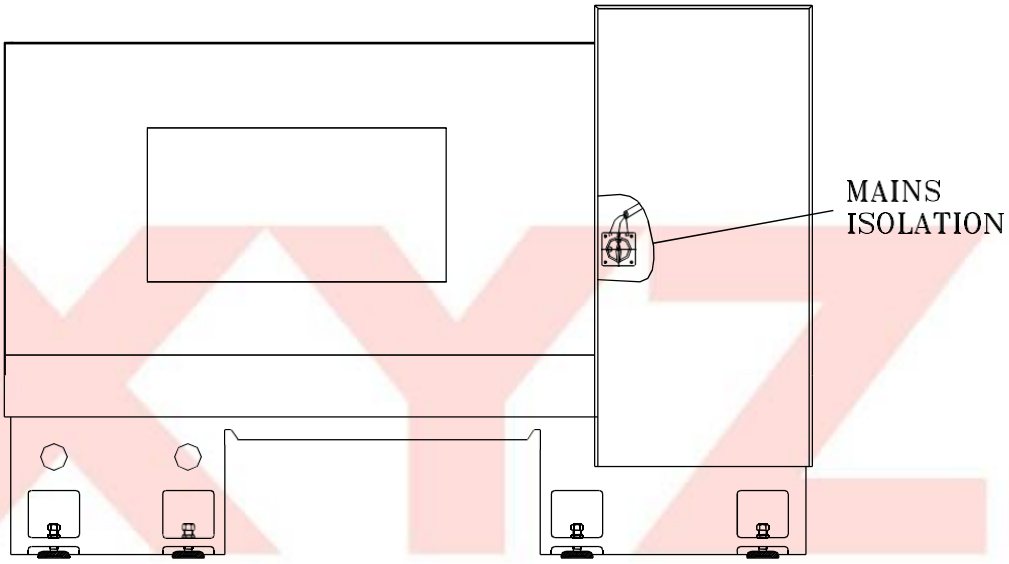
5. Always use an isolated grounding wire with a minimum length.

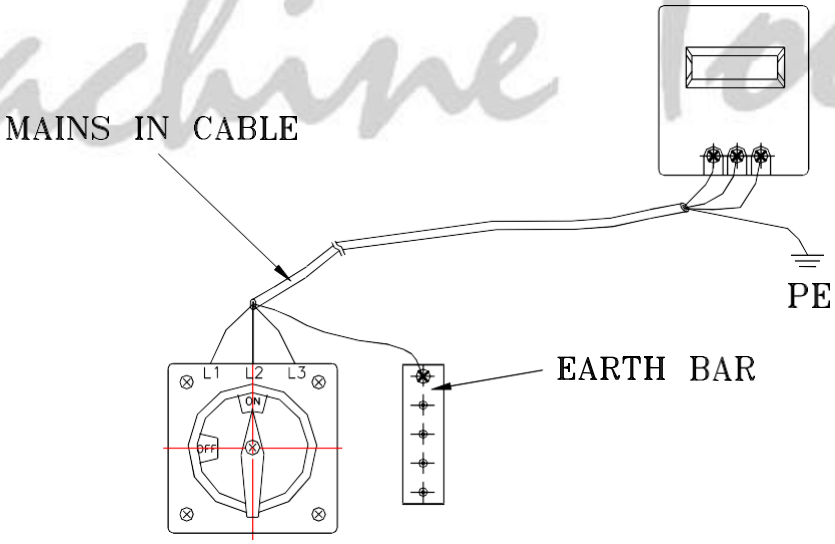
6. Be sure to measure the impedance to ground of the grounding device if only one equipment is connected, and the resistance should be less than 100 ohm.

WARNING !!!

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

3.4.4 ELECTRICAL CONNECTION





3.4.5 SPECIFICATION OF ELECTRICAL REQUIREMENT

CONTROL : FAGOR (STANDARD)

Total power capacity of the equipment : 10 KW				
No.	**Voltage**	**Rated Capacity**	**Wire**	**Current-fault breaker**
1	220V	35 A	Ђ14`ф	40A
2	380V	20 A	Ђ10`ф	30A
3	415V	19 A	Ђ 10`ф	30A

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.

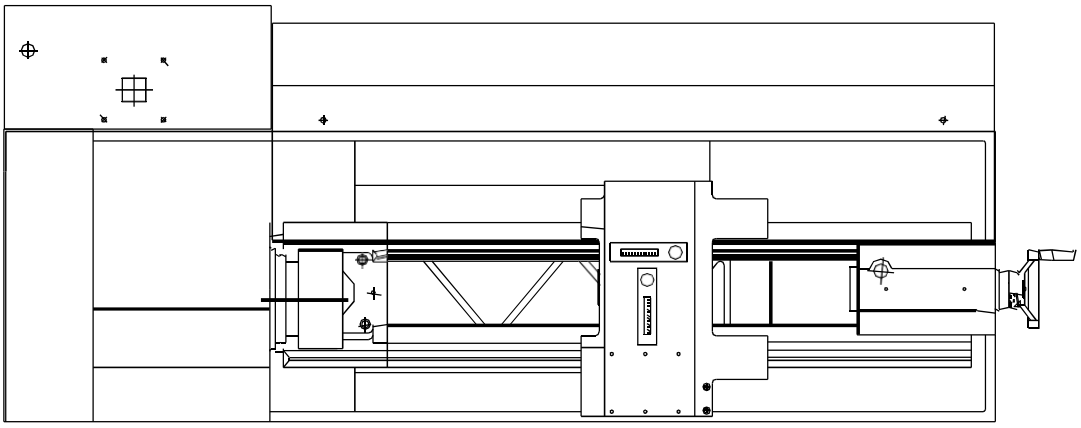
4. Place two horizontal levels on the cross slide orthogonally, level the lathe until differences between levels in both directions are within 0.05mm/m.

5. Fasten the setup nuts for the foundation pads and L shape-fixing studs.

6. Wait for about seven days until the concrete is dry and 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. Failure 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. Safty chuck 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 a long time. 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 Ⅲ switch "on" the circuit breaker of the machine's main power supply Ⅲ 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 (4000 rpm) 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 this might cause an 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 your 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 wear appropriate protective 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

The zero point returning should move toward the positive direction for X and Z axis. Along each of the two directions, ensure the starting point is at least 30mm away from the zero point in the negative direction for X and Z axis.

WARNING !!!

(a) Ensure to do the zero point returning after turning on the main power supply.

(b) Ensure to do zero point returning after running the programming codes with parts of the machine motions actually fixed.

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 CHANGE SPINDLE SPEED (MANUAL)

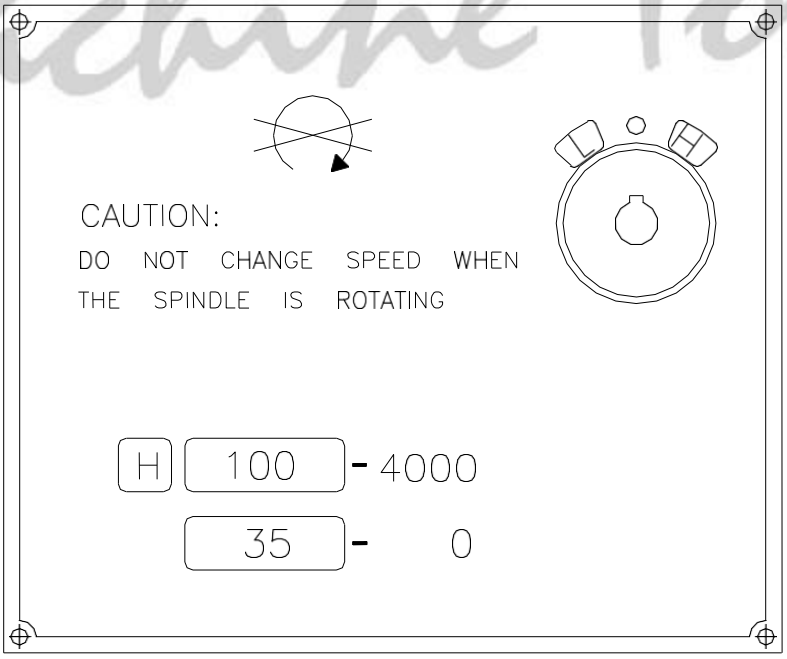
Spindle drive is from the main motor using an AC inverter variable speed drive and through a manually operated speed range selector lever. The spindle speed is first selected by means of the selector lever onto one of two positions.

LOW SPEED : 35 – 1410 RPM

HIGH SPEED : 100 – 4000 RPM

Spindle forward/reverse running control, start/stop control and variable speed control are controlled by CNC system.

WARNING !!!
Do not shift the speed range selector lever while the spindle is running.



4.10.2 CHANGE SPINDLE SPEED (AUTO)

If automatic gear change system (Optional) is supplied on this lathe, the spindle speed is selected automatically.

LOW SPEED : 35 – 1400 RPM

HIGH SPEED : 1401 – 4000 RPM

4.10.3 START OR STOP THE SPINDLE ROTATION

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

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.

4.10.4 SPINDLE SPEED CALCULATIONS

As a 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 x 1000 / Radius x D

D = diameter in min
S = cutting speed in metres/min
N = spindle speed rev/min

ExampleK

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 x 1000 / Radius x D where S = 400 m/min

Therefore N = 400 x 1000 / Radius x 100 = 1273 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.

4.10.5 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 of 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 K

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 emergency stop 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.

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CHAPTER 5

MECHANISM

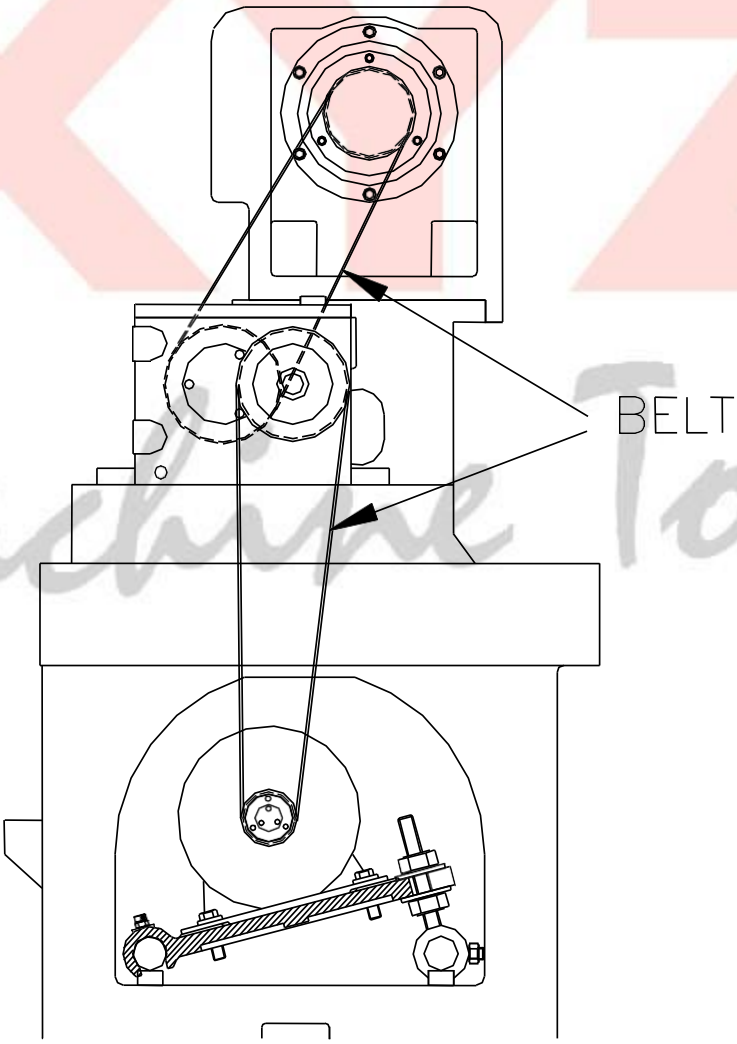
PLEASE READ CAREFULLY BEFORE

OF ADJUSTMENT THIS MACHINE

5.1 HEADSTOCK SYSTEM

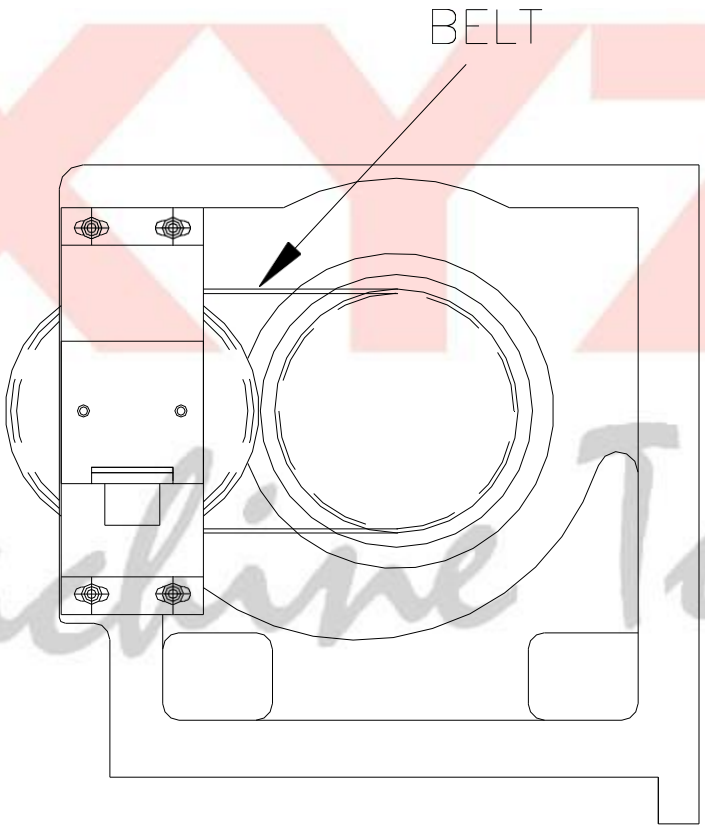
5.1.1 SPINDLE DRIVE MECHANISM

Spindle is driven by an AC servomotor or inverter variable speed motor through a timer belt. Spindle forward/reverse running control, start/stop control and speed control are controlled by CNC system. The spindle speed is first selected by means of the selector lever onto one of two 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.



5.1.3 CHUCKS AND 3-JAW CHUCK MOUNTING

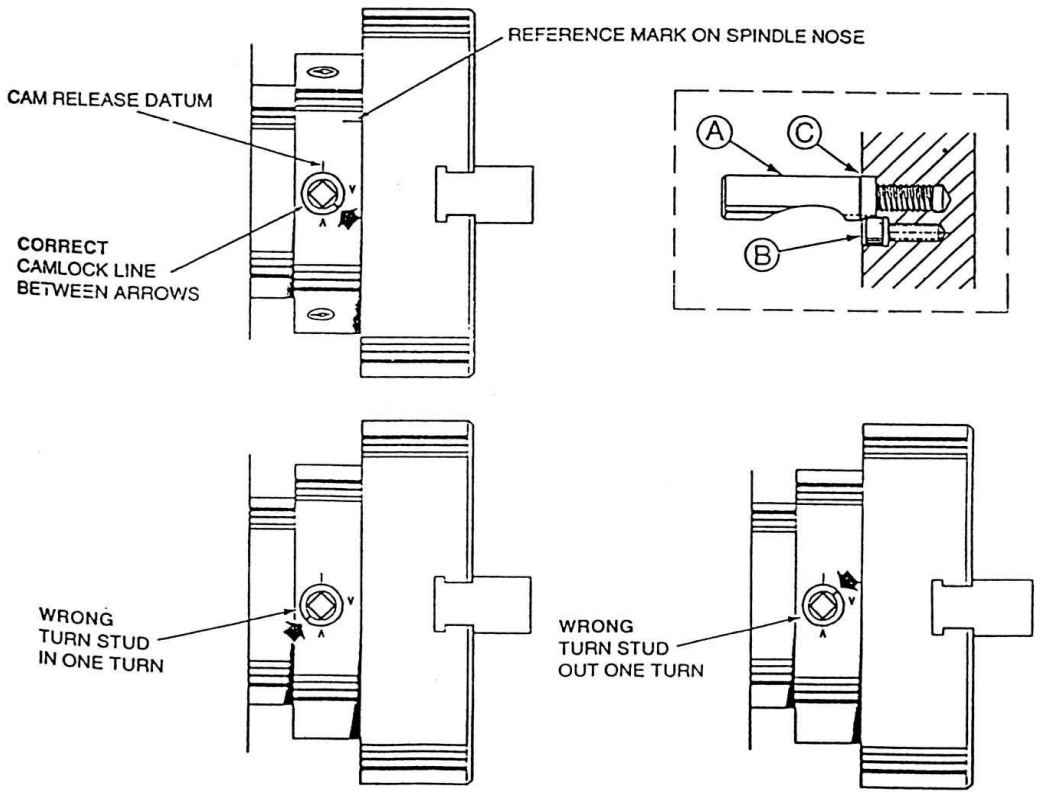
When fitting chucks or faceplates, first ensure that the spindle node and chuck tapers are clean; mount the chuck and ascertain that the cam locks in the correct position. When mounting a new chuck, it may be necessary to reset the camlock studs (A). To do this, remove the caphead lock screws (B) and set each stud so that the scribed ring (C) is flush with the rear face of the chuck and with the circular scallop in line with the lock screw hole (see inset).

Now remount the chuck or faceplate on the spindle nose and tighten the six cams between the two “V” marks on the spindle nose. If any of the cams do not tighten fully within these marks, remove the chuck or faceplate and re-adjust the stud as indicated in the diagram. Once a chuck has been correctly fitted, it may be stamped to align with the spindle reference mark for subsequent re-mounting in the same position.

Take careful note of special limitations when using faceplates.

WARNING !!!

Only high-speed chucks should be used with this machine.



5.1.4 CHUCK GUARDS

The lathe is supplied with a fully interlocked chuck guard, which is suitable only for use with standard chucks normally supplied with the machine. This chuck guard must be in the fully closed position before the spindle is permitted to run.

1. In the event of larger chucks being fitted to the machine, an alternative chuck guard must be used which is appropriate to the chuck diameter.

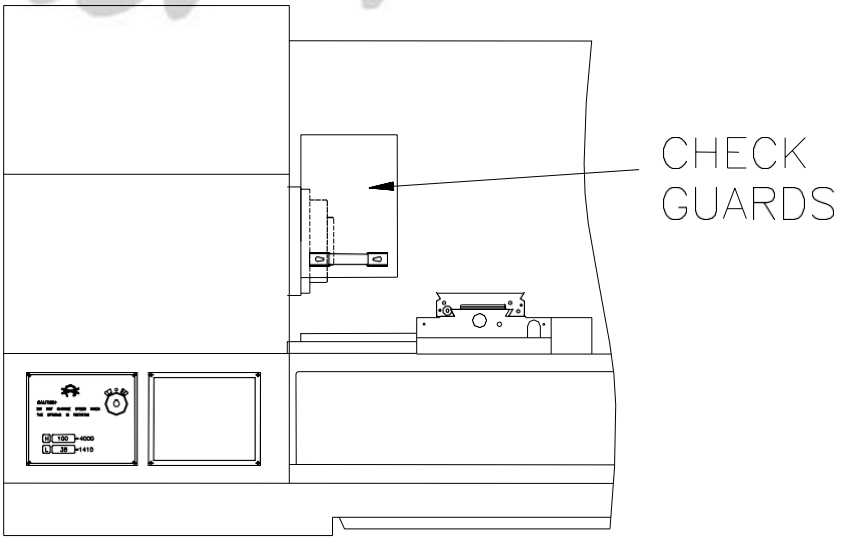
2. For safe operating practices, always ensure that chuck jaws do not extend beyond the outside diameter of the chuck.

3. In the event of a faceplate being used on the machine, the normal chuck guard must be removed from its mounting and if deemed necessary by the user, alternative safe guarding facilities provided which are appropriate to the particular situation.

4. This can only be determined on a case-by-case basis when using faceplates and is therefore the responsibility of the user.

NOTE !!!

It is not recommended that the chuck jaw extend beyond the outside diameter of the chuck as in these cases interference with the chuck guards may occur.



5.2 FEED-MOTION TRANSMISSION MECHANISM

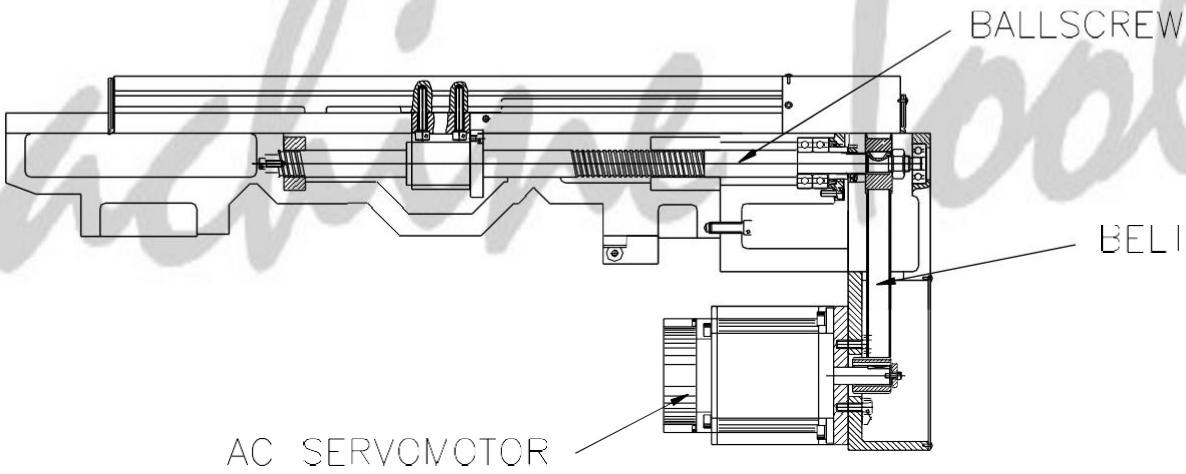
5.2.1 X AXIS TRANSMISSION MECHANISM

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.

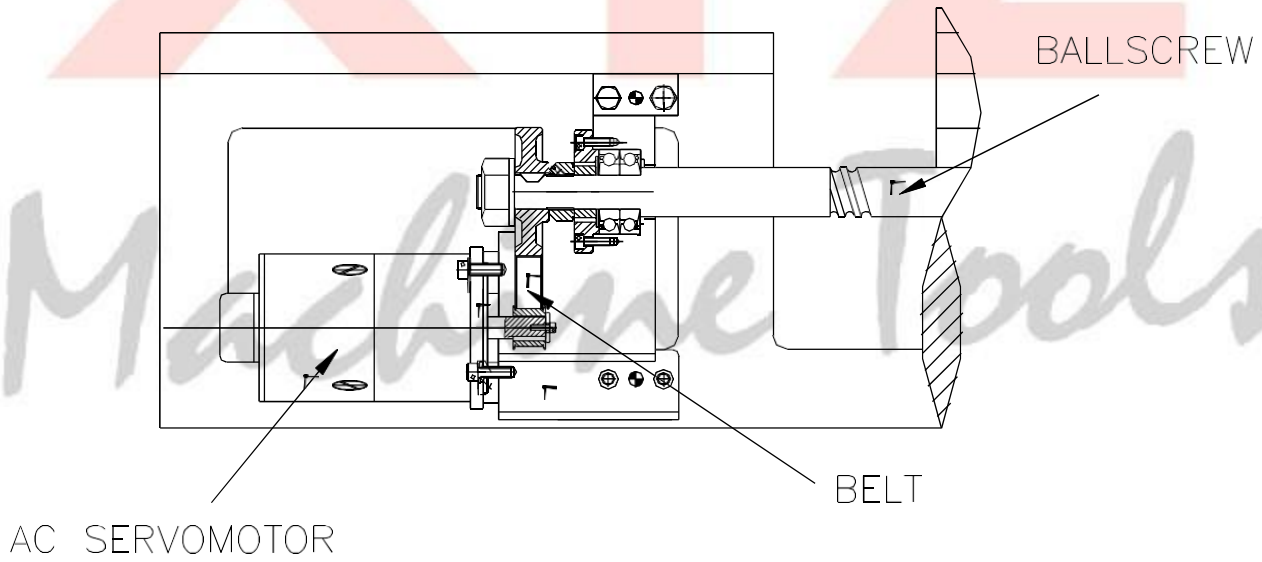


5.2.2 Z AXIS TRANSMISSION MECHANISM

1. The sadle is seated on guide rails of the bed and driven by the AC servo motor via the connection of a coupling and a ballscrew.

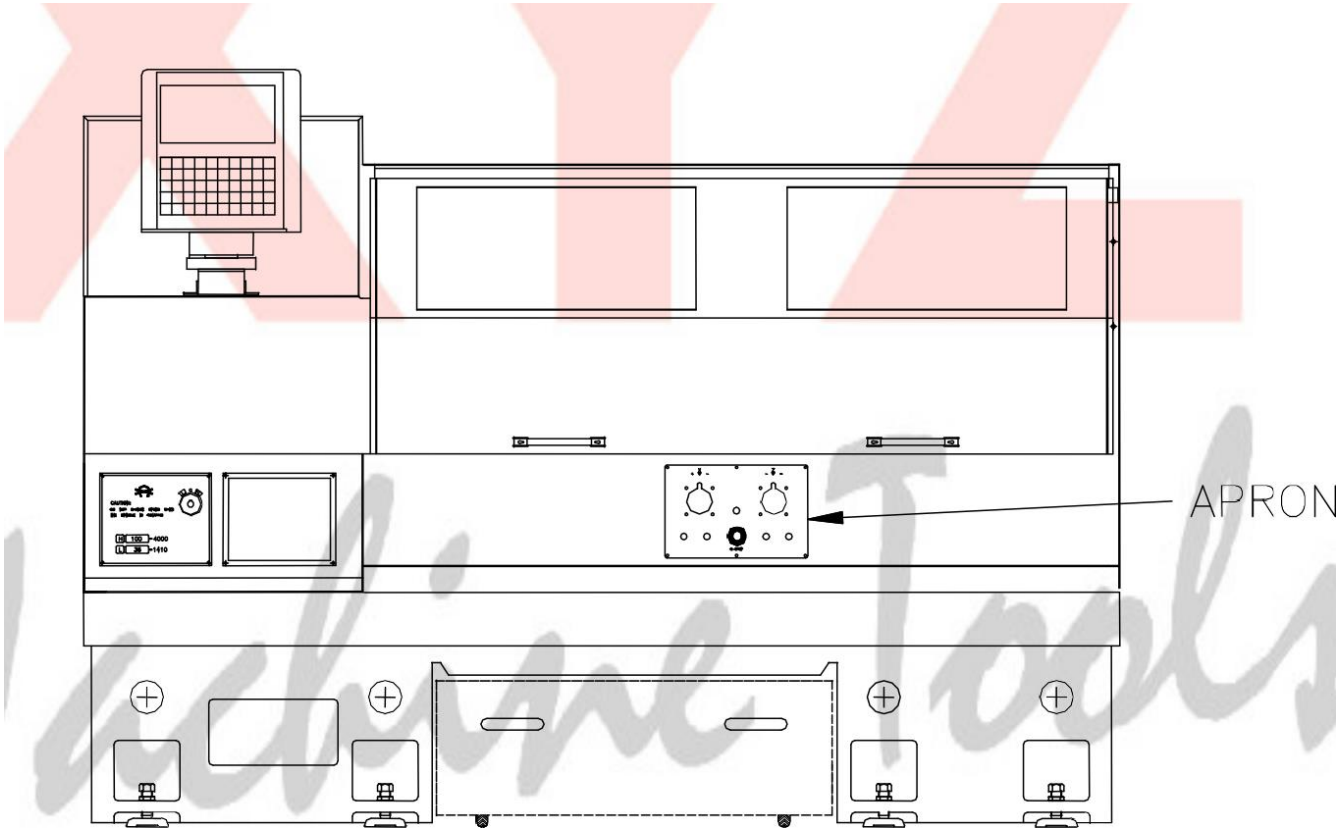
2. The AC servo motor is connected to the ballscrew through a belt.

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 APRON

The apron is fastened to the saddle and hangs on the front of the bed. It provides manual feed controls for X, Z-axes, spindle running direction, etc.



5.4 TOOLPOST MECHANISM

5.4.1 POWER INDEX (OPTIONAL)

1. The power index is driven by an electrical motor. The tool selection is accomplished by using the 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. A proximity switch is used with the electrical motor to control the magazine's positioning. When the selected tool traces the target location, the electrical motor stop immediately. The gear will lock the tool magazine to prevent the tool magazine from further traveling.

3. The rotation direction is only cw.

5.4.2 AUTOMATIC 8 STATION DISC TURRET (OPTIONAL)

1. The tool magazine is driven by an AC servo motor and the tool selection is accomplished by using the pneumatic 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. A proximity switch is used with the AC servo motor to control the magazine's positioning. When the selected tool traces the target location, the AC servo motor stop immediately. The oil pressure system will then lock the tool magazine to prevent the tool magazine from further traveling.

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.

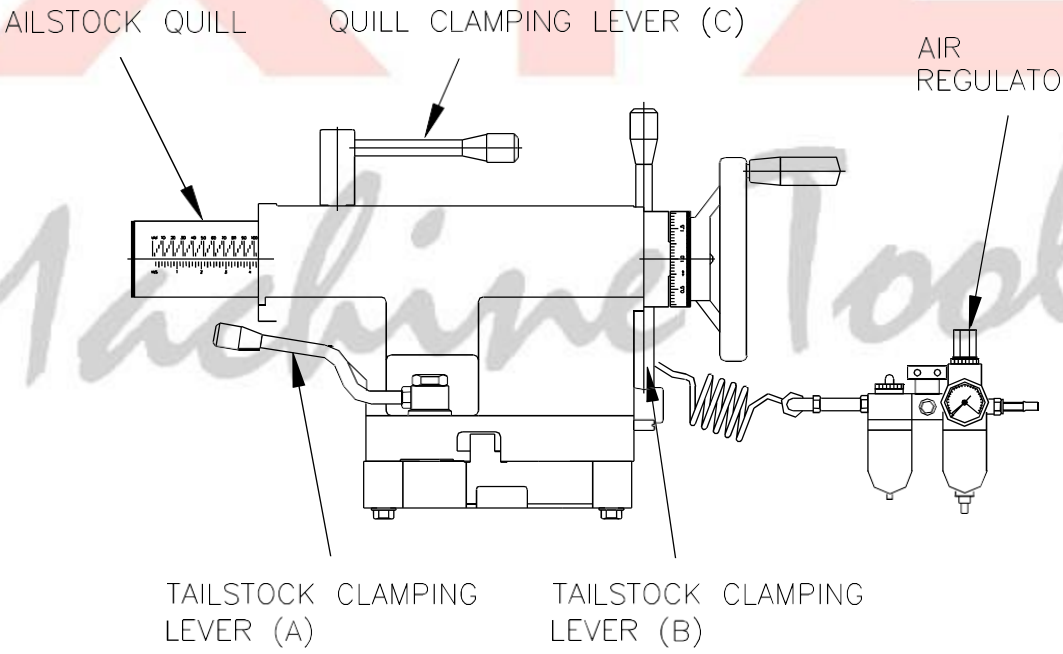
5.5 TAILSTOCK

1. The tailstock can be moved along the bed ways and clamped in position by clamping lever(A and B) .

2. To facilitate tailstock movement, the tailstock is equipped with an air floating system (Patent) for operator to move tailstock effortlessly. The pressure gauge is set at 4 kg/cm^2 by adjusting air regulator.

3. The tailstock quill moves in and out when the tailstock handwheel is turned.

4. The Tailstock quill is graduated in inch and metric dimensions. It is locked by means of a quill-clamping lever(C).

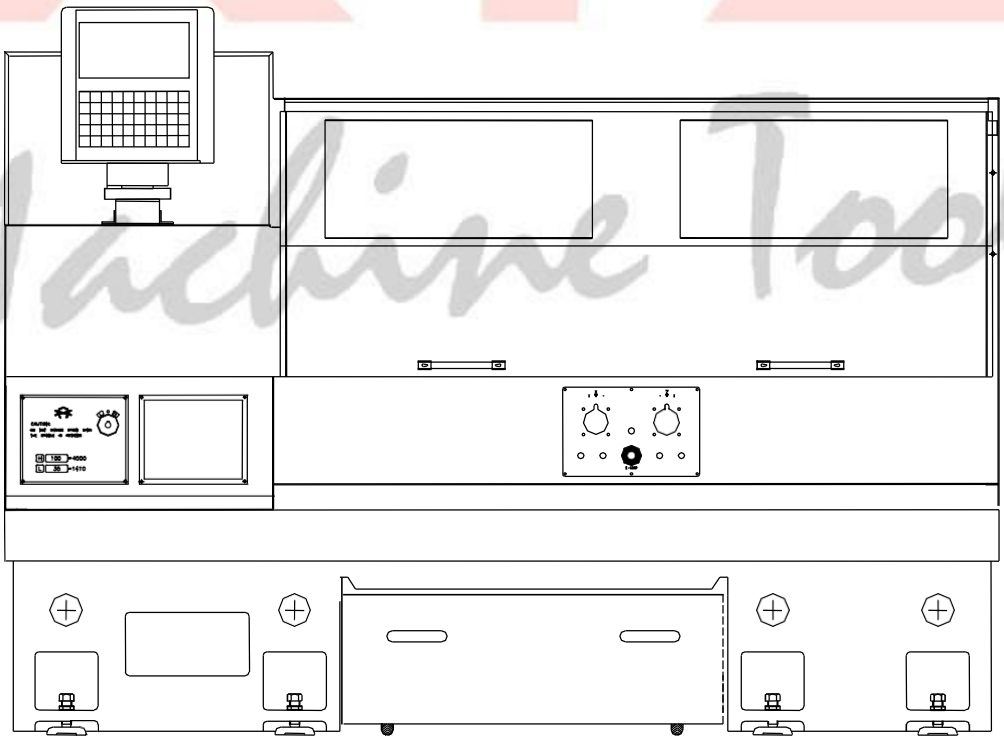


5.6 THE FULL-ENCLOSED (OPTION)

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-pieces 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-pieces 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.

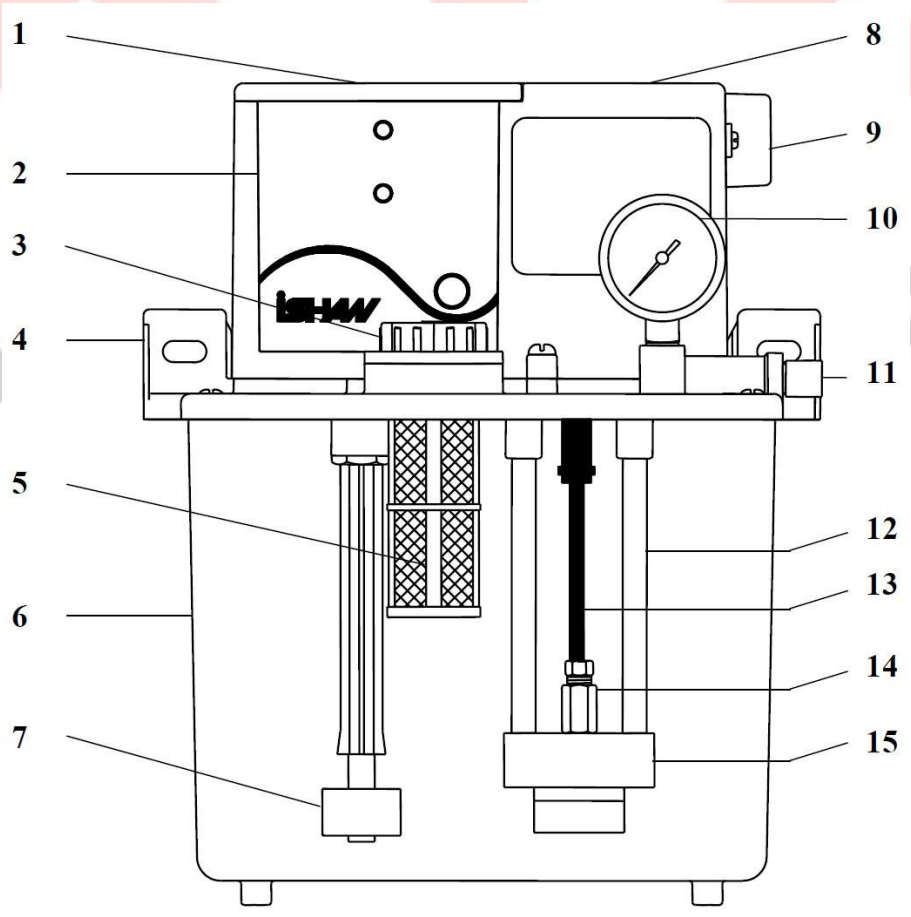


FULL ENCLOSED

5.7 LUBRICATOR

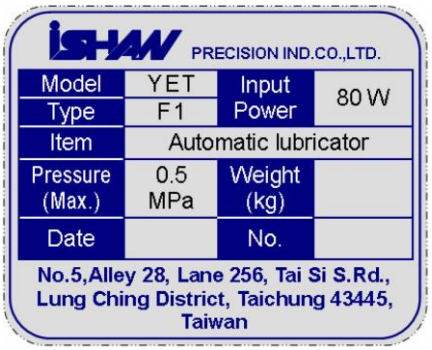
5.7.1 PARTS OF LUBRICATOR

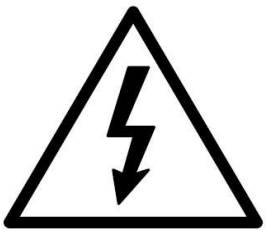
1. Electrical control box cover
2. YET-F control box
3. Oil tank cap
4. Upper lid
5. Inlet filter
6. Oil tank
7. Folat switch
8. Electrical control box housing
9. Beeper
10. Pressure gauge
11. One-way elbow adapter
12. Lifting rod
13. Shaft set
14. Pressure release valve
15. Gear Pump

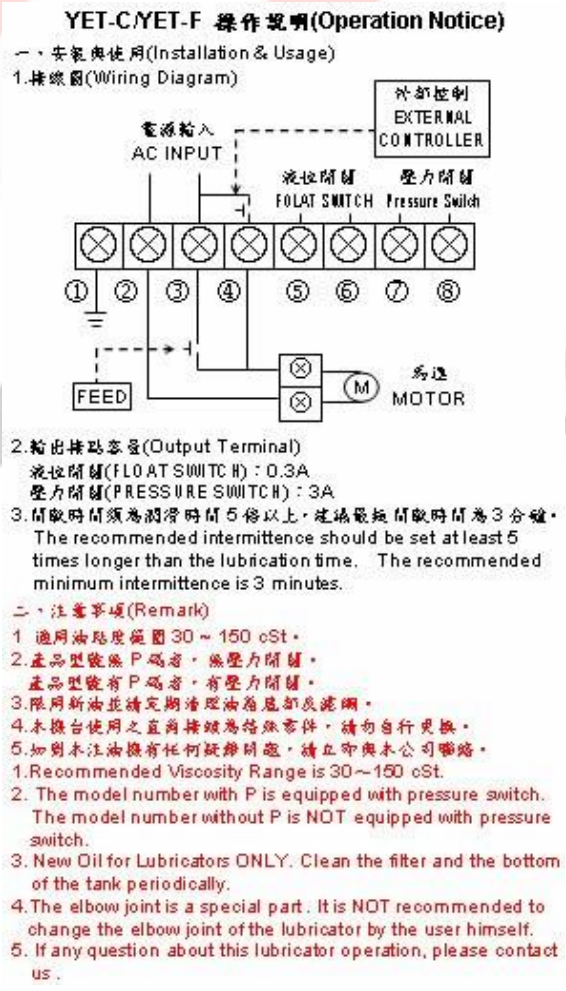


(Fig.1)

5.7.2 LABEL

<table>
<tr><td>Name Plate</td><td>Danger</td></tr>
<tr><td>


</td><td>

</td></tr>
<tr><td>Front side of the electrical control box</td><td>Outside of the electrical control box top cover</td></tr>
<tr><td>Wiring Diageam</td><td>Operation Notice</td></tr>
<tr><td>


</td><td>


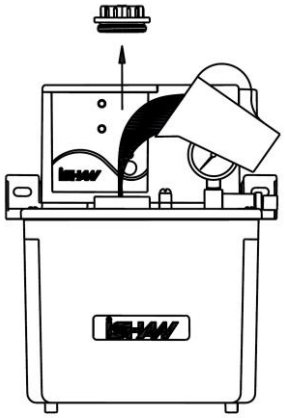
</td></tr>
<tr><td>Inside of the electrical control box</td><td></td></tr>
<tr><td>Notice</td><td></td></tr>
<tr><td>


</td><td></td></tr>
<tr><td>Top right corner of the front side of the oil tank</td><td>Left side of the oil tank</td></tr>
</table>

5.7.3 LUBRICANT FILLING

Remove the oil tank cap and fill the tank with clean lubricant at the level of 80% of the tank height (Fig. 3). Approved lubricant viscosity range is 30~150 cSt.

NOTE !!!
Viscosity higher than 150 cSt may result the burn down of the lubrication systems.

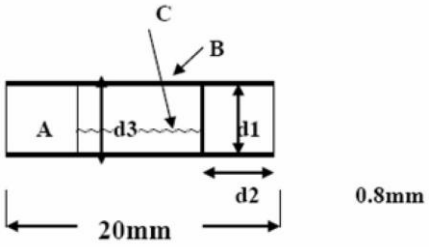


(Fig.3)

5.7.4 FUSE ON THE CONTROL BOARD

5.7.4.1 THE SPECIFICATION OF THE FUSE

1. TYPEK350204 glass tube fuse slow blow type 5.2*20.
2. Availabe rangeKFor protecting instruments, power supplies, computers, the related equipment of computers and telephone sets.
3. Shape & Size as following illustrationsK(UnitKmm)



(a) Structure & shape KAs shown in above figure.
Body size of fuse KDia 5.2 mm * L 20mm.
(b) Rated VoltageK250 V AC
(c) Rated CurrentlK2A

4. Characteristics of Electrical AppliancesK
   (a) Loading CapacityKLoading the 110% Listed Electrical Current (i.e. 2.2 A) for flowing,and it's available to let current keep on following without any melting.
   (b) TemperatureKProceed the preceding test for 1.5 hours, keep testing it with the original current every 10 minutes. Continuse to test it for 3 times. The temperature is not allowed to be higher. The main temperature rise is below 70K by way of Thermocouple Method, while it keeps below 50K by way of Thermocouple Method.
   (c) Fuse current characterK

Rated Current	1.35 In	1.5 In	2 In	
100mA-10A	MAX.	MAX.	MIN.	MAX.
	60 MINUTE	NON	3 S	120 S

5.7.4.2 FUSE REPLACEMENT

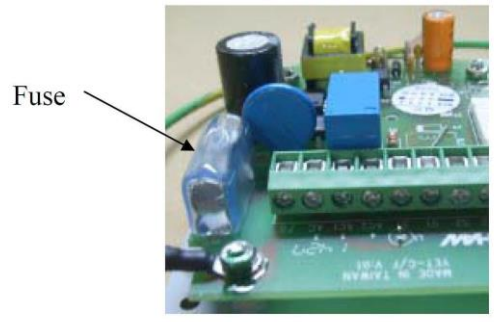
Make sure the power cable is disconnected before the fuse replacement. Remove the electrical control box cover and find the fuse (Fig. 7).

Remove the fuse protection cover (Fig. 8) and replace the fuse with the new one (Fig. 9). Fit-in the fuse cover and close the electrical control box cover.

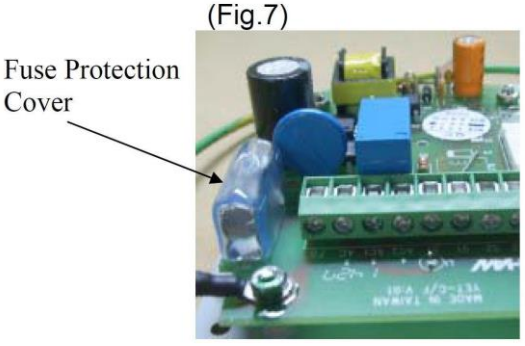
NOTE !!!

No contact with other components during the replacement.

The fuse should be of the original parts. Please refer to 5.7.4.1 The Specification of the Fuse.



(Fig.7)



(Fig.8)

(Fig.9)

5.7.4.3 EXTRA FUSE FOR SPARE PARTS

One extra fuse for spare parts is attached inside the electrical control box.

(Fig.10)

5.7.5 LUBRICATOR MAINTENANCE

iSHAN centralized lubrication systems are of low maintenance. However, related connection needs to be reviewed if properly fitted to secure the proper function of the system. Please clean periodically the oil tank of iSHAN centralized lubrications. If the user wants to clean the bottom of the tank, please TURN OFF the system first and remove the bolts on the tank to separate the tank for cleaning. After cleaning the tank, please fasten the bolts to fix the tank. Please follow below requirementsK

(a) ALWAYS Turn ON the power after more than 20 seconds of turning OFF to protect the lubricator.
(b) It is prohibited for changing to non-original set-up to avoid malfunction.
(c) The outlet of YET-F1 is a one-way adapter. It is prohibited to revise into other adapters.

CHAPTER 6

ADJUSTMENT

PLEASE READ CAREFULLY BEFORE ADJUSTMENT

OF 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 this 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 K

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

6.2.2 MOTOR TRANSMISSION'S BELT TENSION

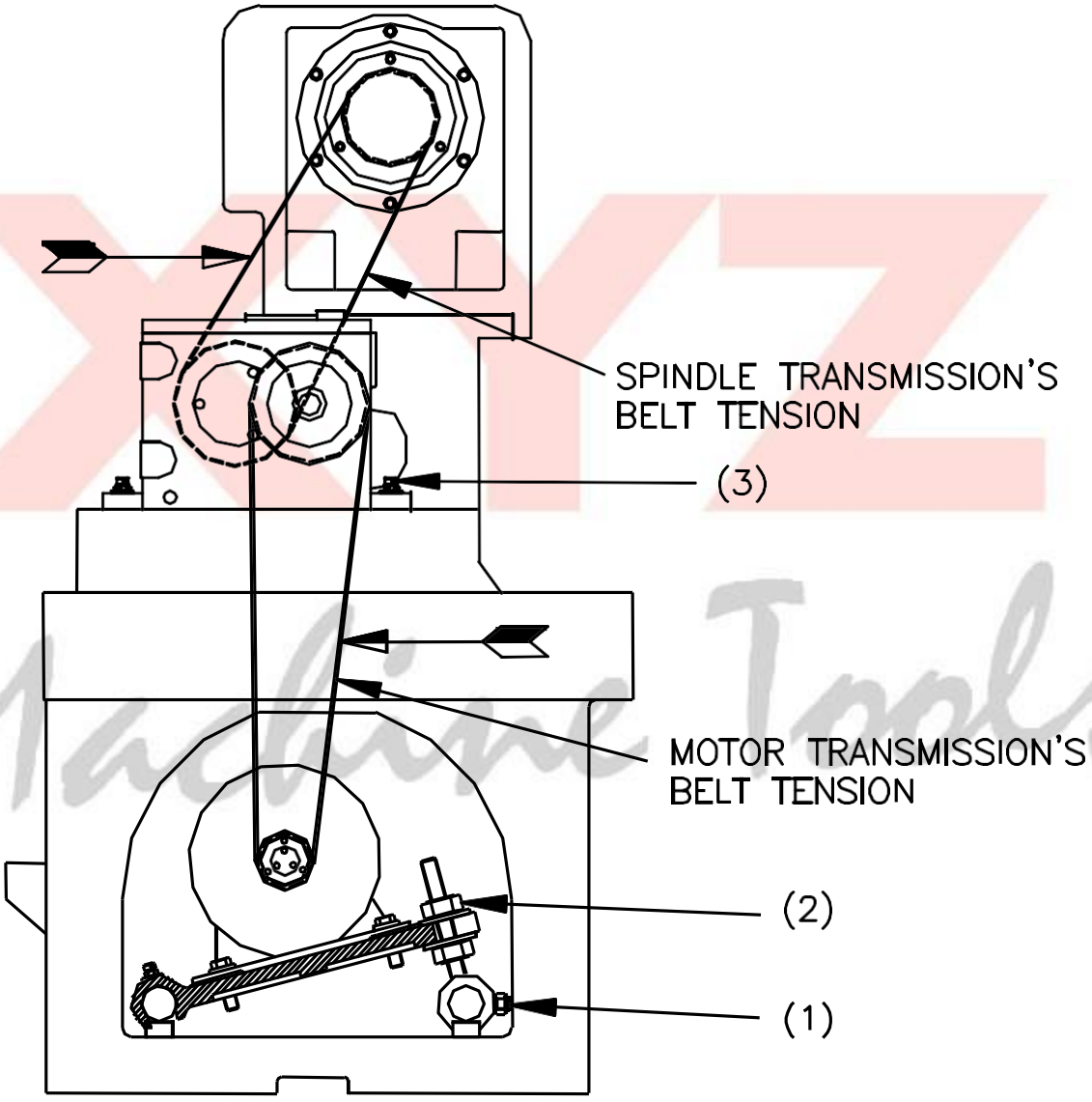
Follow steps below to adjust the belt tension:

1. Make sure the power source has been disconnected before adjusting the timing belt tension.
2. Loosen the fastening screws (1) on the motor stand and the nut of adjust bolt (2).
3. Adjust the belt tension properly by tightening the belt.
4. Tighten the nut of adjust bolt.
5. Tighten the fastening screws on the motor stand.

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.

6.2.3 SPINDLE TRANSMISSION'S BELT



6.2.4 SPINDLE POSITIONING BELT TENSION

Follow steps below to adjust the belt tensionK

1. Make sure the power source has been disconnected before adjusting the timing belt tension.

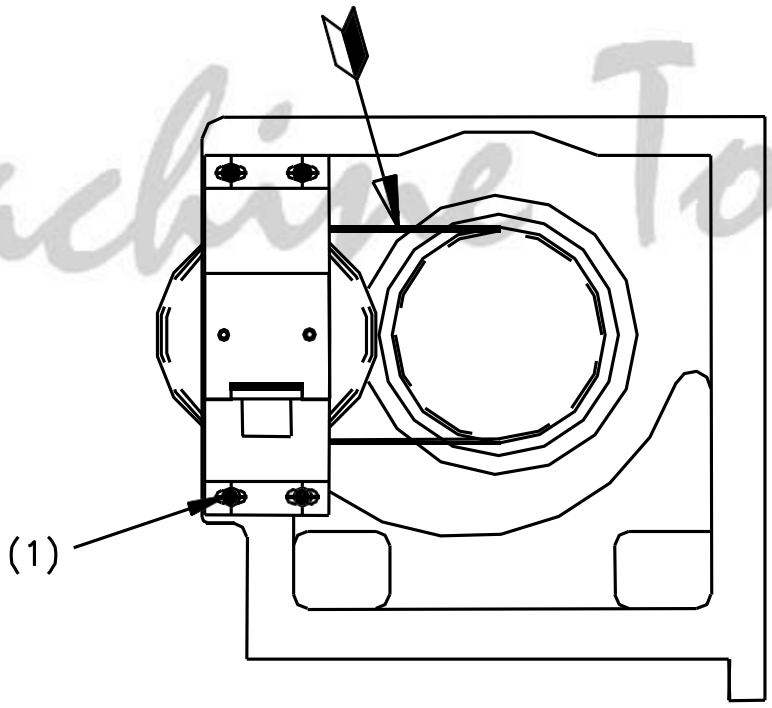
2. Loosen the 4 fastening screws (1).

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.



6.2.5 X AXIS TRANSMISSION'S BELT TENSION

1. Make sure the power source has been disconnected before adjusting the timing belt tension.

2. Remove the cover on the X-axis bracket.

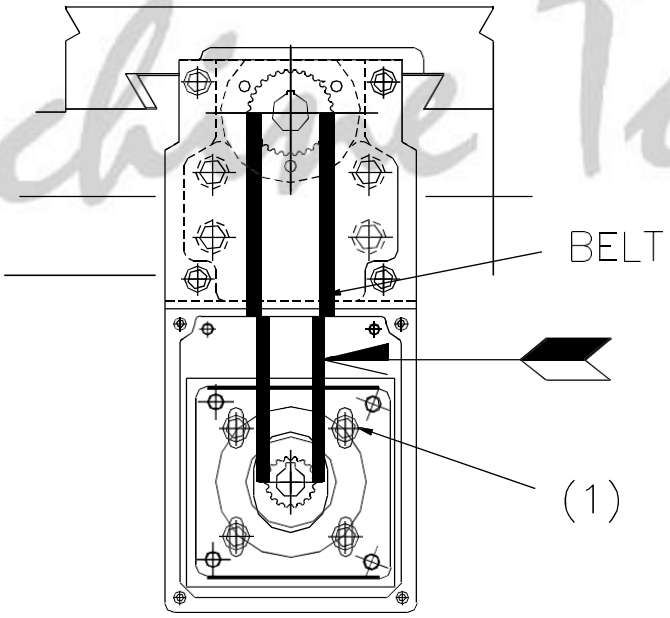
3. Loosen 4 fastening screw (1).

4. Adjust the belt tension properly by tightening the belt.

5. Tighten the fastening nut of adjust bolt.

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.



6.2.6 Z AXIS TRANSMISSION'S BELT TENSION

1. Make sure the power source has been disconnected before adjusting the timing belt tension.

2. Remove the cover for Z-axis AC servomotor.

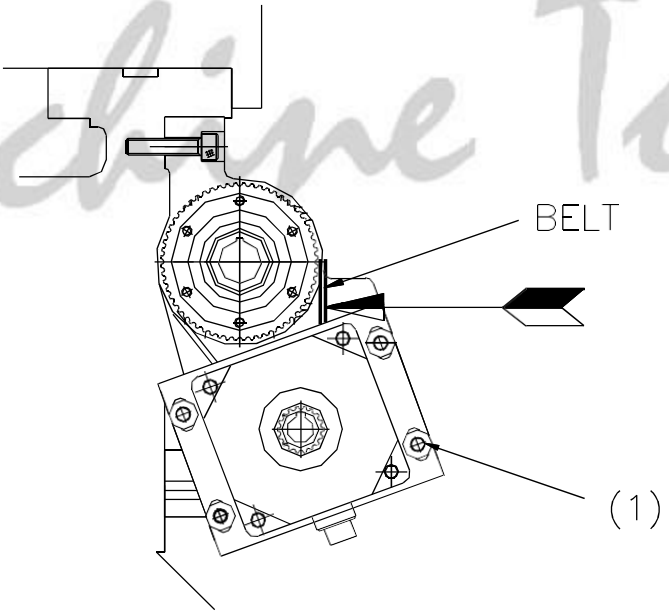
3. Loosen 4 fastening screw(1).

4. Adjust the belt tension properly by tightening the belt.

5. Tighten the fastening screw.

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 AXIS)

Make gib adjustment as per the following proceduresK

1. Loosen the gib setting screw (2).
2. Adjust the gib by turning the gib adjustment screw (1) using a flat head screwdriver, 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 (2) properly.

6.3.2 ADJUST CROSS SLIDE GIB (X AXIS)

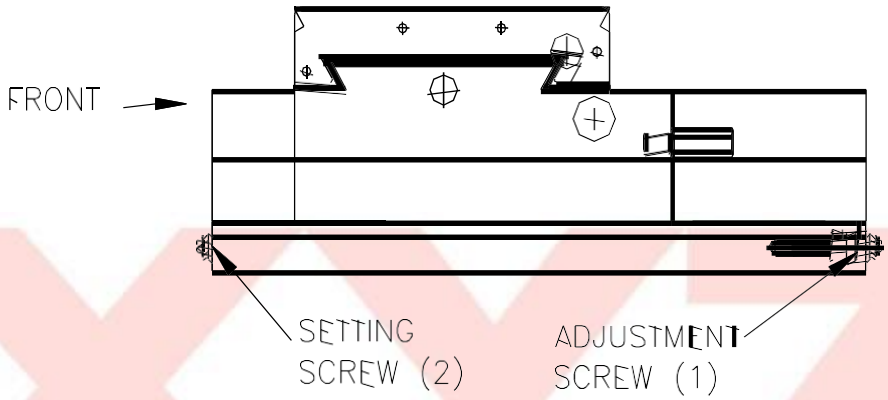
Make gib adjustment as per the following proceduresK

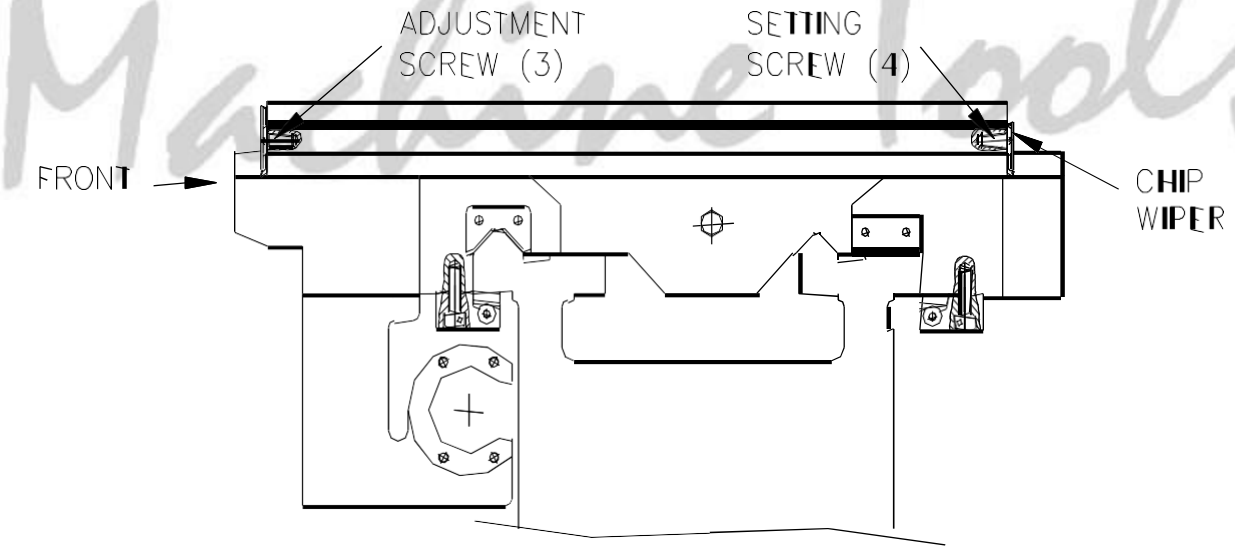
1. Remove the chip wiper on the cross slide to expose the gib adjustment screw and setting screw.
2. Loosen the gib setting screw (4).
3. Adjust the gib by turning the gib adjustment screw (3) using a flat head screwdriver, and try to feel if the cross slide moves smoothly.
4. Reverse the above procedures after gib adjustment has been made.
5. Tighten the setting screw (4) properly.

WARNING !!!

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

6.3.3 GIB ADJUSTMENT

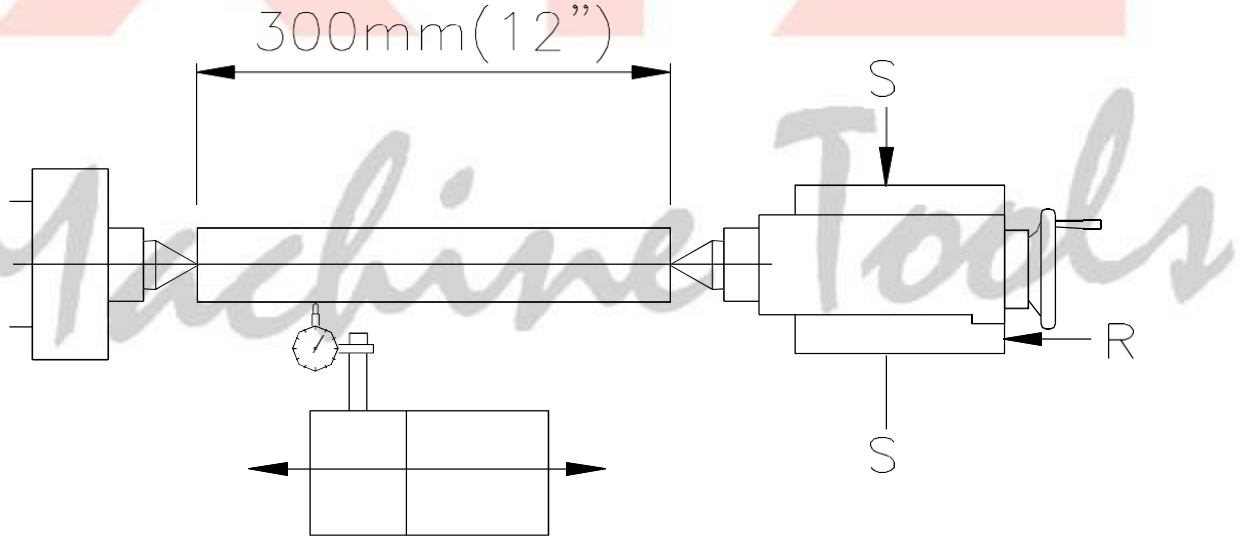




6.4 TAILSTOCK ADJUSTMENT

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 bodylaterally. Recheck alignment.



6.4.2 TAILSTOCK SET-OVER

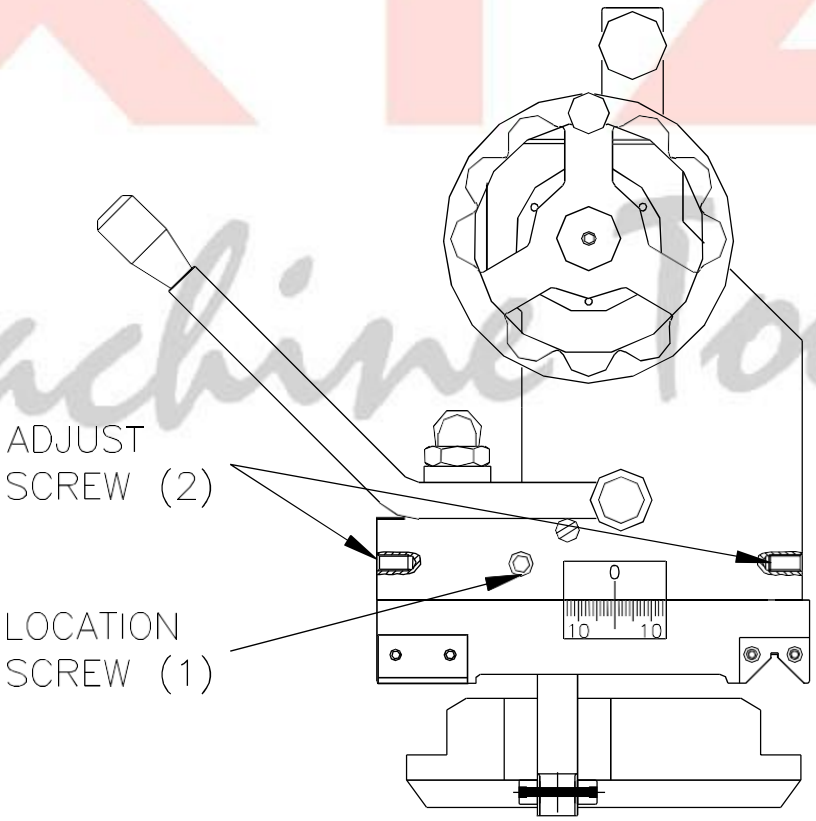
The tailstock can be set over for the production of shallow tapers or for re-alignment. Set over adjustment as per the following proceduresK

1. Unclamp all tailstock clamping lever.

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.

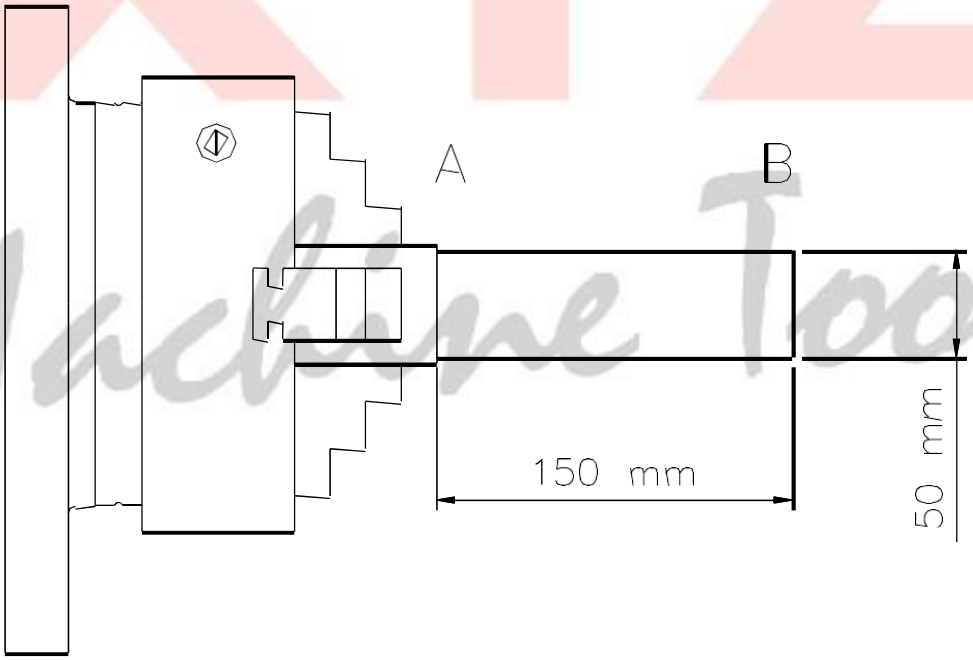
4. Re-tighten the rear location screw.



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

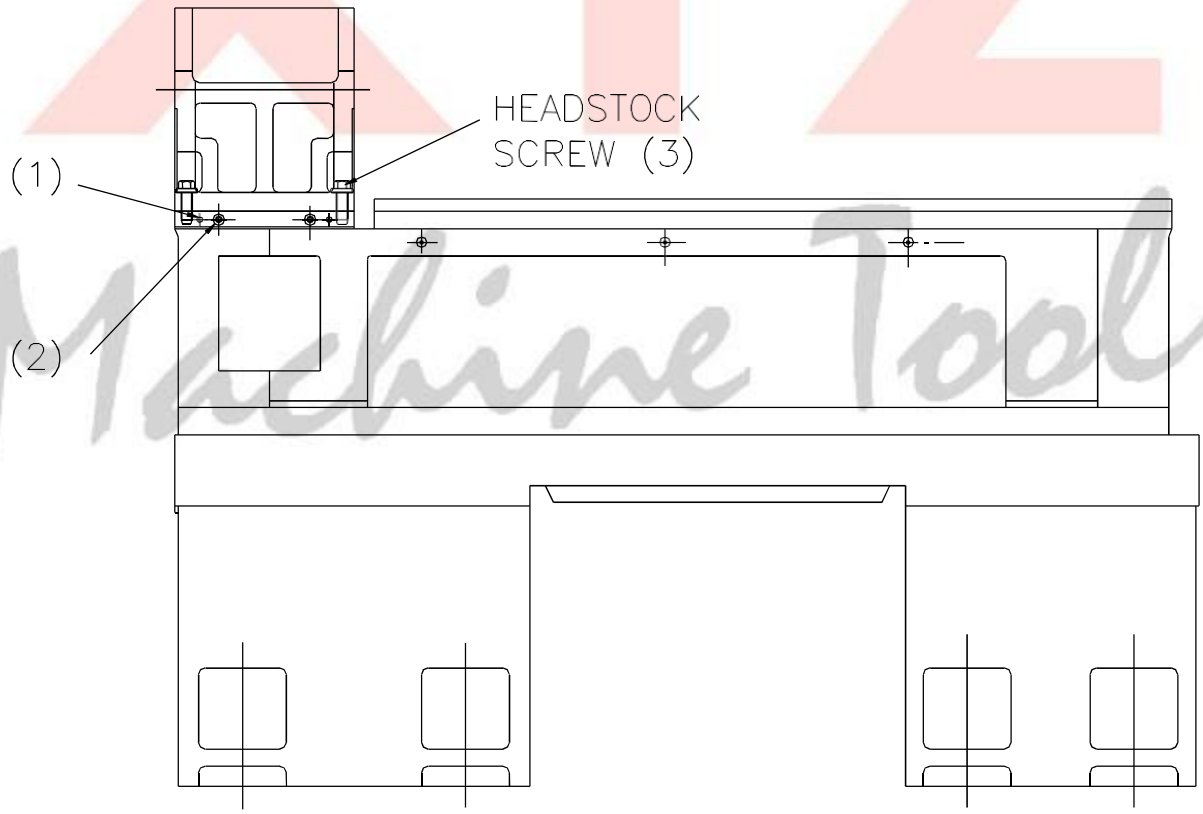
Align headstock as per the following procedures:

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).



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CHAPTER 7

MACHINE MAINTENANCE

PLEASE READ CAREFULLY BEFORE MAINTENANCE

ON THIS MACHINE

7.1 PREPARATION BEFORE 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 set 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 does not 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 does not 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 (V2.7)

7.3.4.1 OIL GUIDE TABLE A (For all machine type)

Lubricant Position	**Lubrication Tank** Slideway and Ballscrew	**Cutting Coolant**	
Lubricant Characteristic	∂Viscosity ISO VG68 ∂Anti-wear, Extreme-pressure	∂Good Heat conduction ∂Good lubricant performance	
Lubrication Method	Centralized Lub	Circulating Lub	
Replace& add Period	Daily As needed	As needed	
Tank Capacity	3 Liters	100 Liters ∋Depend on Model	
Recommended Grade of Oil	∂BP Macurrat D 68 ∂Mobil Vactra No.2 ∂Shell Tonna S2 M68 ∂BECHEM Staroil CGLP 68 MF	∂CPC Cutting Oil 31C ∂Shell Dromus B or Macron 32 ∂BECHEM AVANTIN	

****** This is recommended that use ISO68 grade of oil for Slideway and Ballscrew if this machine is located in a plant with ambient temperature of under 25 ° C.**

7.3.4.2 OIL GUIDE TABLE D (FOR LATHES)

Lubricant Position	**Gearbox Lubricat**	**Chuck Grease**	**Quill Lubricat**
Lubricant Characteristic	∂Viscosity ISO VG68 ∂Anti-rust, anti-oxidation ∂Good Stability	**∂NLGI #2** **∂Drop point >17>к** **∂Solid LubricantK MoS2**	∂Viscosity ISO VG32 ∂Anti-wear, Extreme -pressure
Lubrication Method	Circulating Lub	Centralized Lub	Centralized Lub
Replace& add Period	Half year(first time) One year	Twice Daily	Twice Daily
Tank Capacity	∋Depend on Model	---	---
Recommended Grade of Oil	∂BP Energol GR-XP 68 ∂Mobil Gear XMP 68 ∂Shell Omala 68 ∂Chevron Ultra Gear 68 ∂BECHEM Staroil G 68 ∂CPC HD68	∂BP Energrease L21M ∂Mobil XHP 322 special ∂Shell Gadus S3 V460D 2 ∂Chevron Molytex EP2 ∂BECHEM Highlub FA 40 MO	∂BP Energol NT32 ∂Mobil Vactra No.2 ∂Shell Tonna T32 ∂Chevron Way Lubricant ISO 32 ∂BECHEM Staroil CGLP 32 MF
Lubricant Position	**Hydraulic Tank**	**Tailstock Way**	**Air Assisted Tailstock**
Lubricant Characteristic	∂Viscosity ISO VG32 ∂Anti-rust, anti-oxidation ∂Good Stability	∂Viscosity ISO VG32 ∂Anti-wear, Extreme-pressure	∂Viscosity ISO VG32 ∂Anti-rust, anti-oxidation ∂Good Stability
Lubrication Method	Circulating Lub	Centralized Lub	Centralized Lub
Replace& add Period	Half year(first time) One year	As needed (Depend on status)	Once Weekly As needed
Tank Capacity	∋Depend on Model	---	---
Recommended Grade of Oil	∂BP Energol HLP 32 AW ∂Mobil DTE Light ∂Shell Tellus 32 ∂Chevron Hydraulic Oil AW32 ∂BECHEM Staroil NR 32	∂BP Energol NT32 ∂Mobil Vactra No.2 ∂Shell Tonna T32 ∂Chevron Way Lubricant ISO 32 ∂BECHEM Staroil CGLP 32 MF	∂B.P Energol HLP 32 AW ∂Mobil DTE Light ∂Shell Tellus 32 ∂Chevron Hydraulic Oil AW32 ∂BECHEM Staroil NR 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.
6. Clean or replace the filter screen for coolant pump.

7.5.4 HALF-YEARLY MAINTENANCE

1. Ensure the spindle run out and bearing clearance are within the specified precision's.
2. Ensure all the electrical parts, such as connectors, switches, cables, are in normal service conditions.
3. Check out all the insulation resistors. Ensure to keep a record.
4. 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.

10. Replace the filter of Headstock lubrication system.

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.

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CHAPTER 8

APPENDIX

8.1 TROUBLE SHOOTING

8.1.1 TABLE A

PROBLEM	PROBABLE CAUSES	CORRECTION
MACHINE START FAILURE	1. Fuse in control circuit burnt out 2. Incorrect power source 3. Overload thermal relay tripped	1. Replace 2. Correct it 3. Reset
INSUFFICIENT POWER OR MOTOR OVERHEATING	1. Less phase running 2. Overload cutting 3. Poor magnetic contractor	1. Correct 2. Reduce load 3. Replace
TOOL CHATTERING	1. Workpiece not clamped securely 2. Improper tool type or material	1. Clamp it securely 2. Use correct tool only
NO LUBRICANT DELIVERY	1. Lubrication pump failed 2. Lack of oil 3. Filter clogged	1. Check and correct it 2. Fill up oil 3. Clean it

8.1.2 TABLE B (FOR LUBRICATOR)

Problem	Diagnostics	Troubleshooting
Indication light does not work	Power cable is not connected	Check the power cable
	Indication light fails to work	The repair needs to be done by authorized personnel.
	Incorrect power connection to burn out the inside wiring.	Check if power cable is connected in mistake or incorrect power input.
	Impermissible lubricant to cause the motor burned-down.	Replace with a new motor and revise to the lubricant of suitable viscosity 30~150cSt.
	The broken control board	Replace a new control board. The repair needs to be done by authorized personnel.
Indication light is ON but no lubricant is discharged from the system	Insufficient lubricant	Refill the tank
	Float switch fails to work	Replace with a new float switch.The repair needs to be done by authorized personnel.
	Motor fails to work.	Replace with a new motor The repair needs to be done by authorized personnel.
	Incorrect input power at low voltage	Ensure the input power
	Oil suction set is blocked.	Clean the suction set
	Impermissible lubricant	Revised to the lubricant of suitable viscosity 30~150cSt.
Leaking at the connection of the pipe and the lubricator	Incorrect installation	The pipe must be inserted into the compression sleeve and at least 1mm over the end of the compression sleeve further into the adapter.
No lubricant discharging when pushing FEED button.	1. Incorrect wiring or input power	Check the wiring diagram and the input power.
	2. Insufficient lubricant (Abnormality Indication light become RED)	Refill the tank
	3. The fuse of the control board is broken(Indication light does not work when the power is connected).	Replace the fuse of the control board
	4. The control board is damaged(If all the checking shows normal, the control board could be broken)	Replace with a new motor. The repair needs to be done by authorized personnel.

Problem	Diagnostics	Troubleshooting
Motor runs but no lubricant is discharged at the lubrication points	Disassemble the pipe connecting with the output bore and check if the lubricant is discharged from the lubricator.	
	If YES, the lubricator is at normal condition.	The piping layout could be plugged or broken. Find out and replace the part of the pipe with problem.
	If NO, the problem is at the lubricator. The causes could be:	
	1. Air in the pipe	Please disassemble the pipe connecting with the output bore and keep the motor running for minutes to discharge the air in the pipe. Assemble again when the lubricant is discharging
	2. Jammed gear pump	The gear pump could be jammed because of dirty lubricant.The repair needs to be done by authorized personnel
	3. The motor runs but not in normal condition.	Replace with a new motor. The repair needs to be done by authorized personnel.

WARNING !!!

(a) Only original iSHAN centralized lubrication systems spare parts are used for iSHAN centralized lubrication systems. It is prohibited for changing to non-original spare parts.

(b) TURN OFF the power before any checking or maintenance Faults / Fault finding.

(c) If the lubricator is sent to repair, please ensure the lubricant is completely removed to protect the electronics from remainder of lubricant.

Working on products that have not been disconnected from the power supply can cause serious injury or death to persons. Installation, maintenance, and repair work may only be carried out by qualified experts on products that have been disconnected from the power supply. The supply voltage must be turned off before any product components are open.

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

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CHAPTER 9

PARTS LIST

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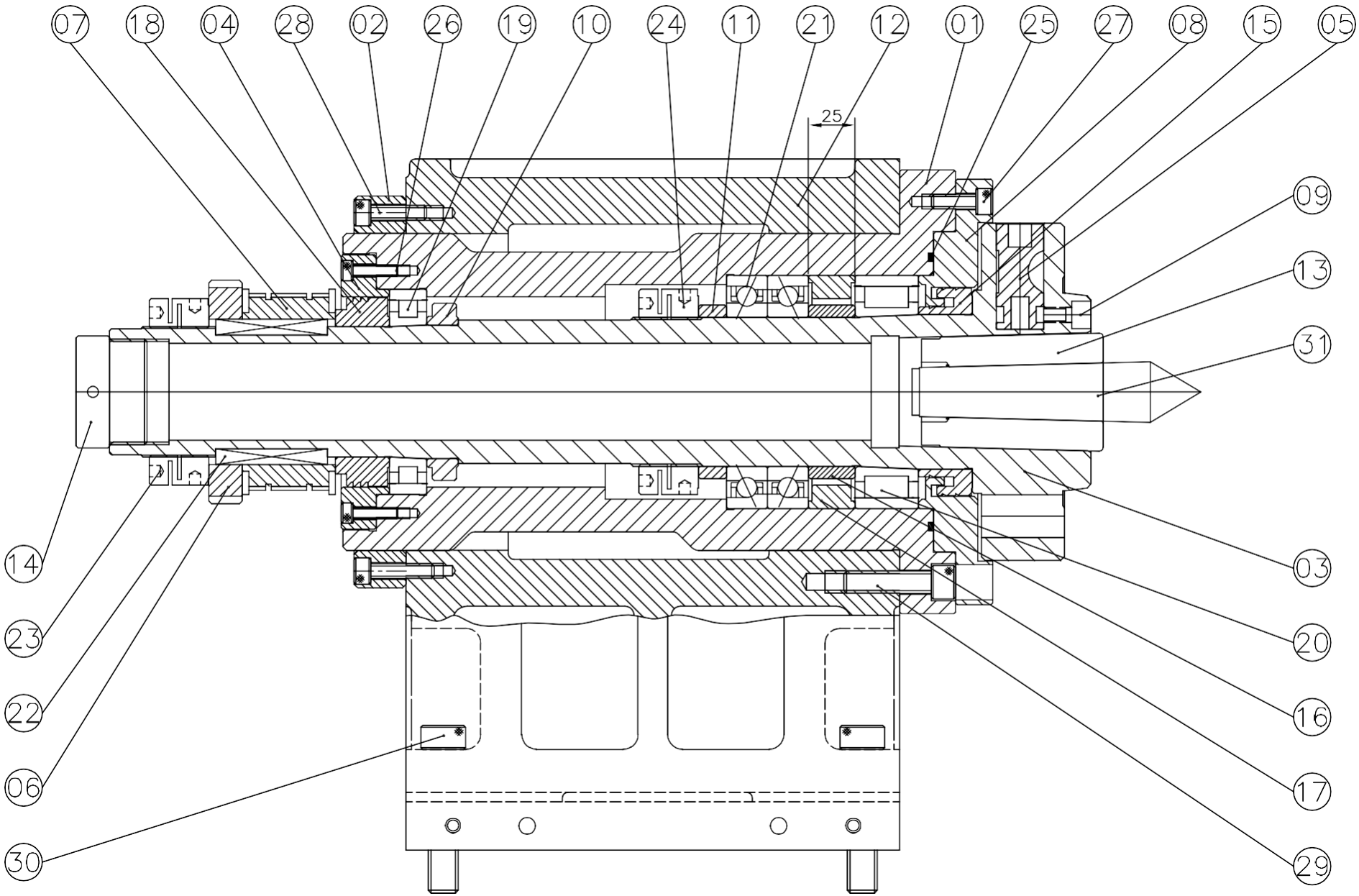

Spindle Drive Assembly

Spindle Drive Assembly

No.	Part Number	Description	Specification	XYZ Part No.
1	LS010010	SPINDLE HOUSING		
2	LS010021	REAR HOUSING COVER		
3	LS010030	SPINDLE		1349
4	LS010040	REAR BEARING COVER		
5	LS010050	CAMLOCK		15046
6	LS010090	BELT GEAR		17814
7	LS010140	SPINDLE DRIVE PULLEY		17815
8	LS010180	FRONT BEARING COVER		
9	LS010190	CAM SCREW		
10	LS010270	SPACER		
11	LS0102	SPACER		
12	LS010300	HEAD STOCK		
13	LS010470	CENTER SLEEVE		9358
14	LS010720	PLASTIC COVER-SPINDLE		11532
15	LS010840	SPACER		
16	LS010850	SPACER		
17	LS010860	SPACER		
18	LS010870	SPACER		
19	ABN01014R	BEARING	N1014	12085
20	ABNN3016R	BEARING	NN3016	17816
21	AB80BTR10S	BEARING	80BTR10S	17817
22	AK1208060	KEY	12x8x60 mm	
23	ANN520070	LOCK NUT	M70x2.0	
24	ANN520080	LOCK NUT	M80x2.0	
25	AOR351395	OIL RING	ϕ 139.5x3.5	
26	ASM606030	HEXAGON SOCKET CAP HD SCREW	M06x30	
27	ASM608025	HEXAGON SOCKET CAP HD SCREW	M08x25	
28	ASM608035	HEXAGON SOCKET CAP HD SCREW	M08x35	
29	ASM612035	HEXAGON SOCKET CAP HD SCREW	M12x35	
30	ASM614070	HEXAGON SOCKET CAP HD SCREW	M14x70	
31		SPINDLE CENTER		5202
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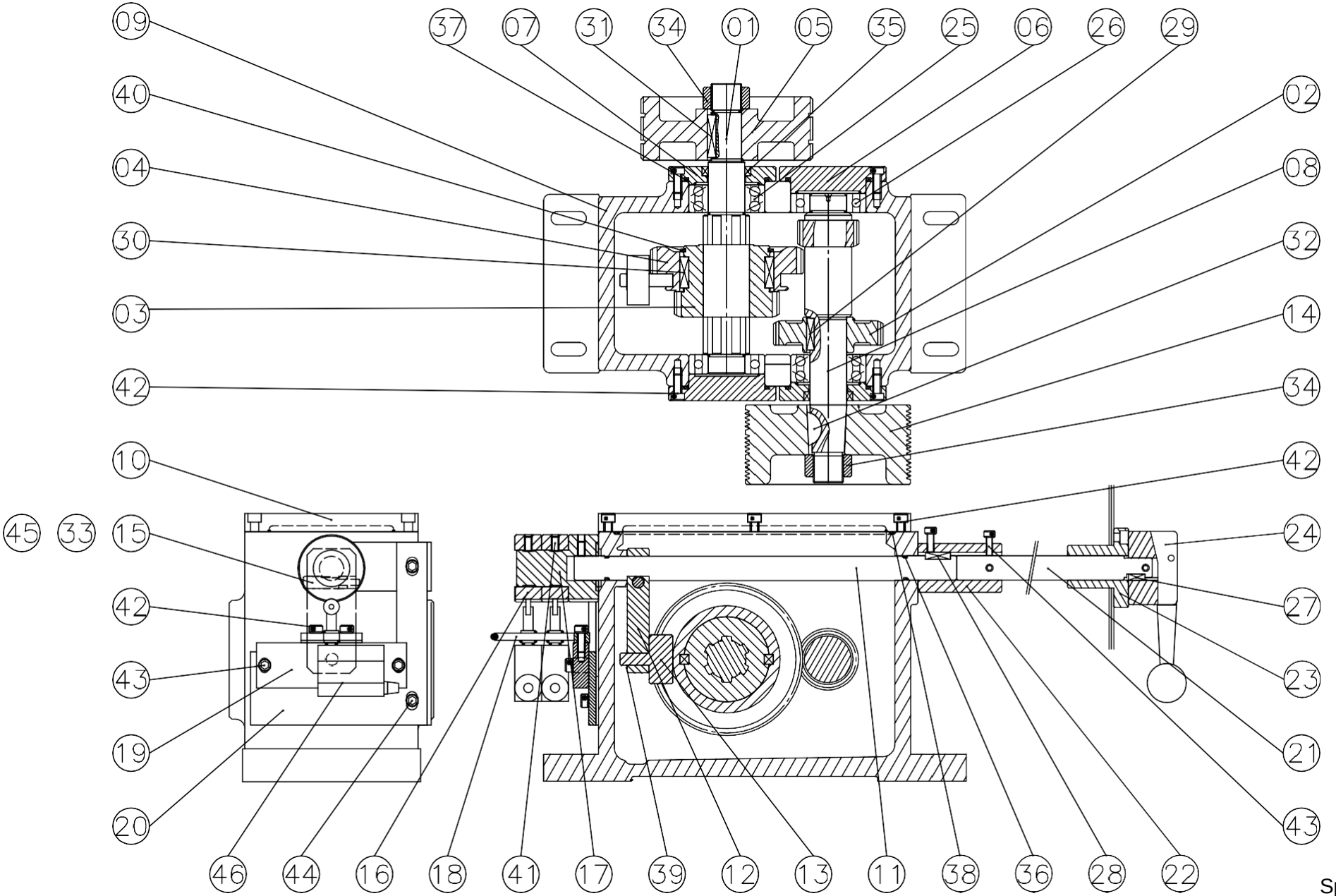

Selector Assembly

Speed

Speed Selector Assembly

No.	Part Number	Description	Specification	XYZ Part No.
1	LS010060	SLIDE SHAFT		14169 Set (1,3,4)
2	LS010100	GEAR		13468
3	LS010120	GEAR		14169 Set (1,3,4)
4	LS010130	GEAR		14169 Set (1,3,4)
5	LS010150	BELT GEAR		11841
6	LS010220	COVER		
7	LS010230	COVER		
8	LS010240	SHAFT DRIVE		13453
9	LS010250	GEAR BOX		6379
10	LS010260	GEAR BOX COVER		
11	LS010331	SHAFT		
12	LS010370	SWING ARM		
13	LS010380	CATCH BLOCK		
14	LS010400	SPINDLE BELT GEAR		12067
15	KR010450	FIXED PIN		4676
16	KR010800	CAM		
17	KR010810	SHAFT SLEEVE		
18	KR010820	BRACKET		
19	KR010830	BRACKET		
20	LS010900	SOLID FLOOR		
21	LS010910	SHAFT		
22	LS010920	PITMAN SHAFT		
23	LS010930	FIXED BUSH		
24	LS010940	SPEED SELECTOR LEVER		
25	AB520630N	BEARING	5206	4170
26	AB620600N	BEARING	6206	4167
27	AK0505015	KEY	5x5x15 mm	4858
28	AK0505020	KEY	5x5x20 mm	3893
29	AK060620	KEY	6x6x25 mm	
30	AK0807025	KEY	8x7x25 mm	4360
31	AK0807035	KEY	8x7x35 mm	11842
32	AKP104019	ROUND KEY	ϕ 19x4	12069
33	ANM110006	NUT	M6	6493
34	ANN515025	LOCKNUT	M25x1.5	4198
35	AOS304007	OIL SEAL	ϕ 30x ϕ 40x7	
36	AOP131020	OIL RING	ϕ 20x3.1	
37	AOP131062	OIL RING	ϕ 62x3.1	
38	AOL300660	OIL SEAL	ϕ 3.0x660 mm	

Speed Selector Assembly

No.	Part Number	Description	Specification	XYZ Part No.
39	ARS110010	RETAINING RING	ϕ 10	
40	ARS125070	RETAINING RING	ϕ 70	13325
41	ASM406012	HEADLESS SCREW	M6x12	
42	ASM606016	HEXAGON SOCKET CAP HEAD SCREW	M6x16	
43	ASM606020	HEXAGON SOCKET CAP HEAD SCREW	M6x20	
44	ASM608020	HEXAGON SOCKET CAP HEAD SCREW	M8x20	
45	AWMT01006	BRIGHT WASHER	M6	
46		LIMIT SWITCH		7923
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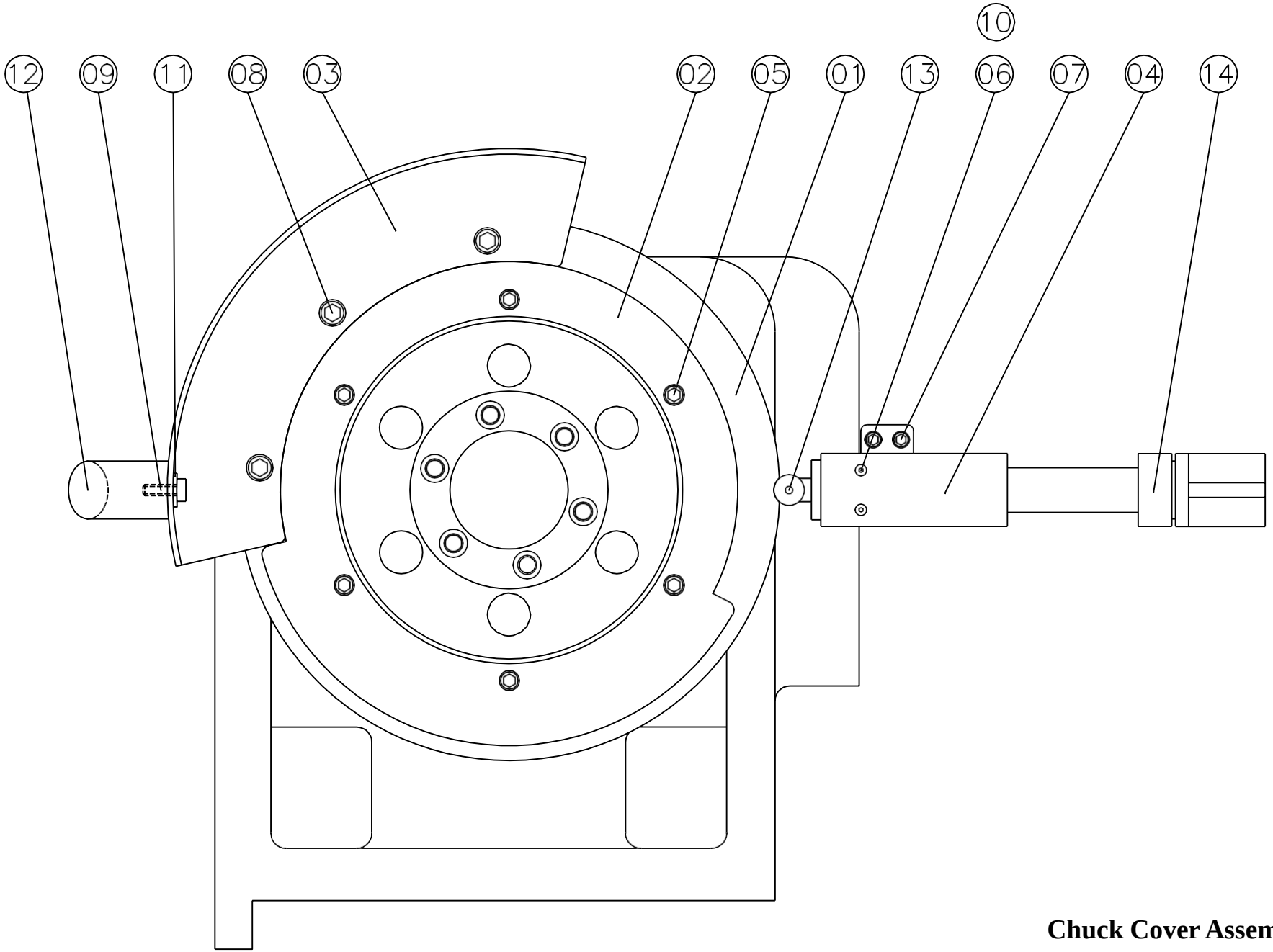
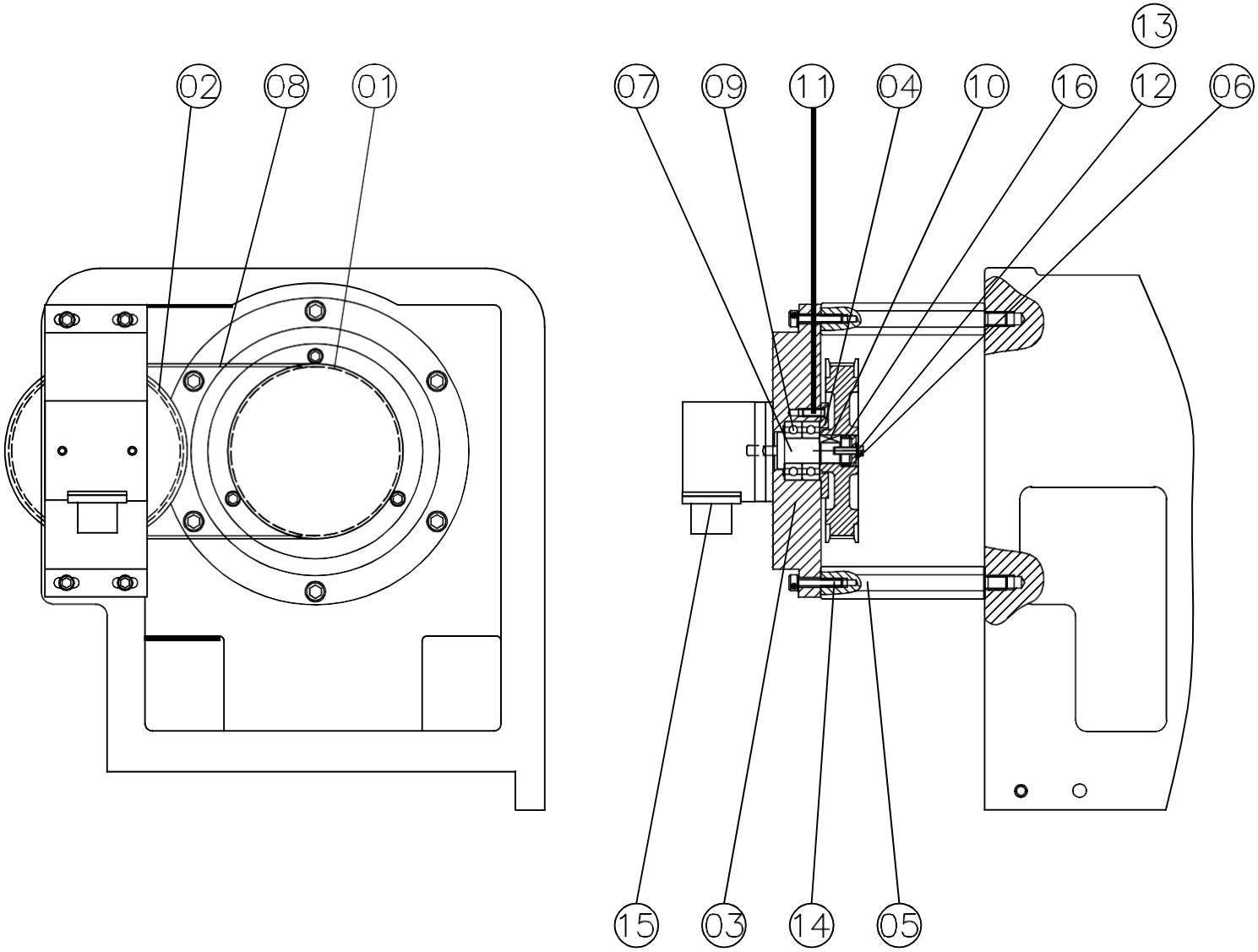


Chuck Cover Assembly

Chuck Cover Assembly

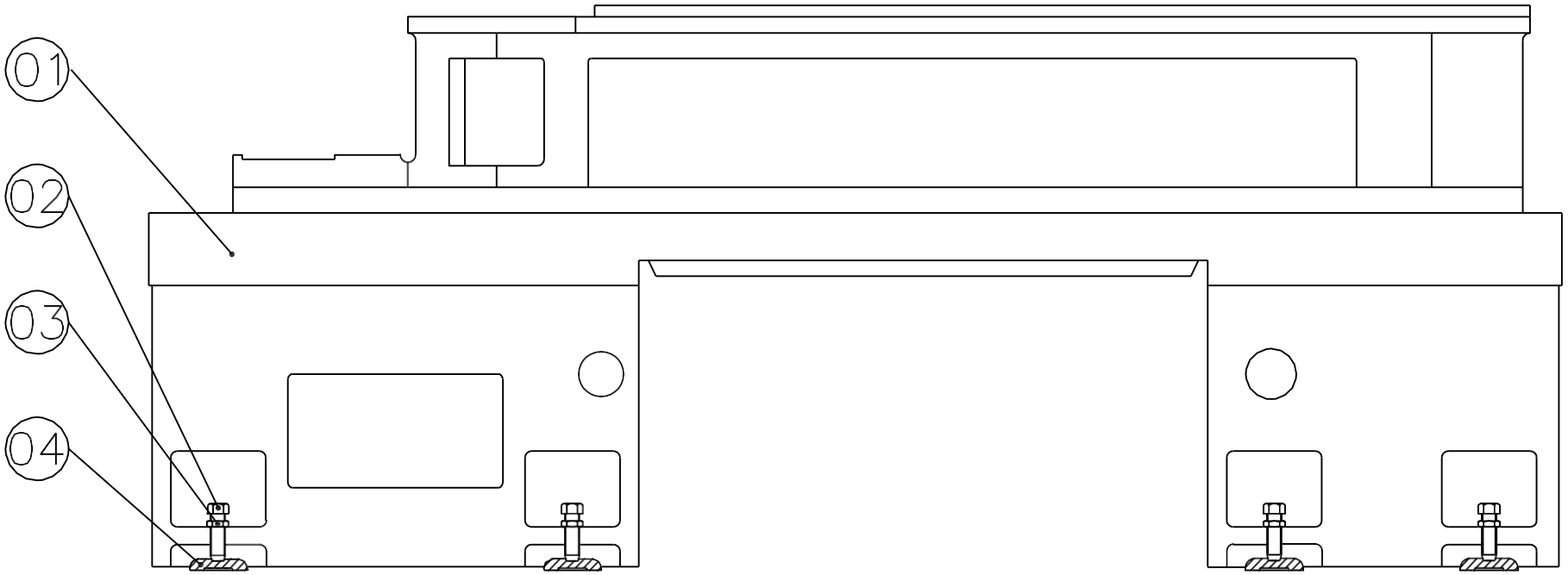
No.	Part Number	Description	Specification	XYZ Part No.
1	LS010510	CHUCK COVER		
2	LS010660	LIMIT COLLAR		
3	LS400590	COVER		8368
4	LS400600	LIMIT SWITCH BASE		
5	ASM106008	BUTTON HEAD CAP SCREW	M6x8	6512
6	ASM204030	CROSS RECESS HEAD SCREW	M4x30	12195
7	ASM605010	HEXAGON SOCKET CAP HEAD SCREW	M5x10	6532
8	ASM608012	HEXAGON SOCKET CAP HEAD SCREW	M8x12	
9	ASM608016	HEXAGON SOCKET CAP HEAD SCREW	M8x16	3670
10	AWMT01004	BRIGHT WASHER	M4	11780
11	AWMT01008	BRIGHT WASHER	M8	6635
12	KR570030	HANDLE		4810
13	KR570100	LIMIT SWITCH		3351
14	KR570180	PLASTIC ELLBOW		



Encoder Assembly

Encoder Assembly

No.	Part Number	Description	Specification	XYZ Part No.
1	LS010090	GEAR		17814
2	LS010551	BELT GEAR		12609
3	KR010571	BRACKET		
4	KR010580	COVER		
5	LS010590	CIRCULAR CYLINDER		
6	KR010601	SPACER		
7	KR010610	SHAFT		14282
8	LS010640	BELT	HTD-5M-680-15	12875
9	AB6203ZZ	BEARING	6203ZZ	3086
10	AK0505012	KEY	5x5x12mm	
11	ASM305012	FLAT HEAD SCREW	M5x12L	
12	ASM605016	HEXAGON SOCKET CAP HEAD SCREW	M5x16L	6533
13	AWML01005	SAW TEETH WASHER	M5	
14	ASM606030	HEXAGON SOCKET CAP HEAD SCREW	M6x30L	6542
15	KR570230	ENCODER		387
16	A-607-021	SHAFT LOCKING DEVIVCES	17x21x6.3t	



Bed Assembly

Bed Assembly

No.	Part Number	Description	Specification	XYZ Part No.
1	LS040010	BASE		
2	KR040120	ADJUSTABLE SCREW		11454
3	KR040130	HEXAGON NUT		11454
4	KR040140	BLOCK		11854
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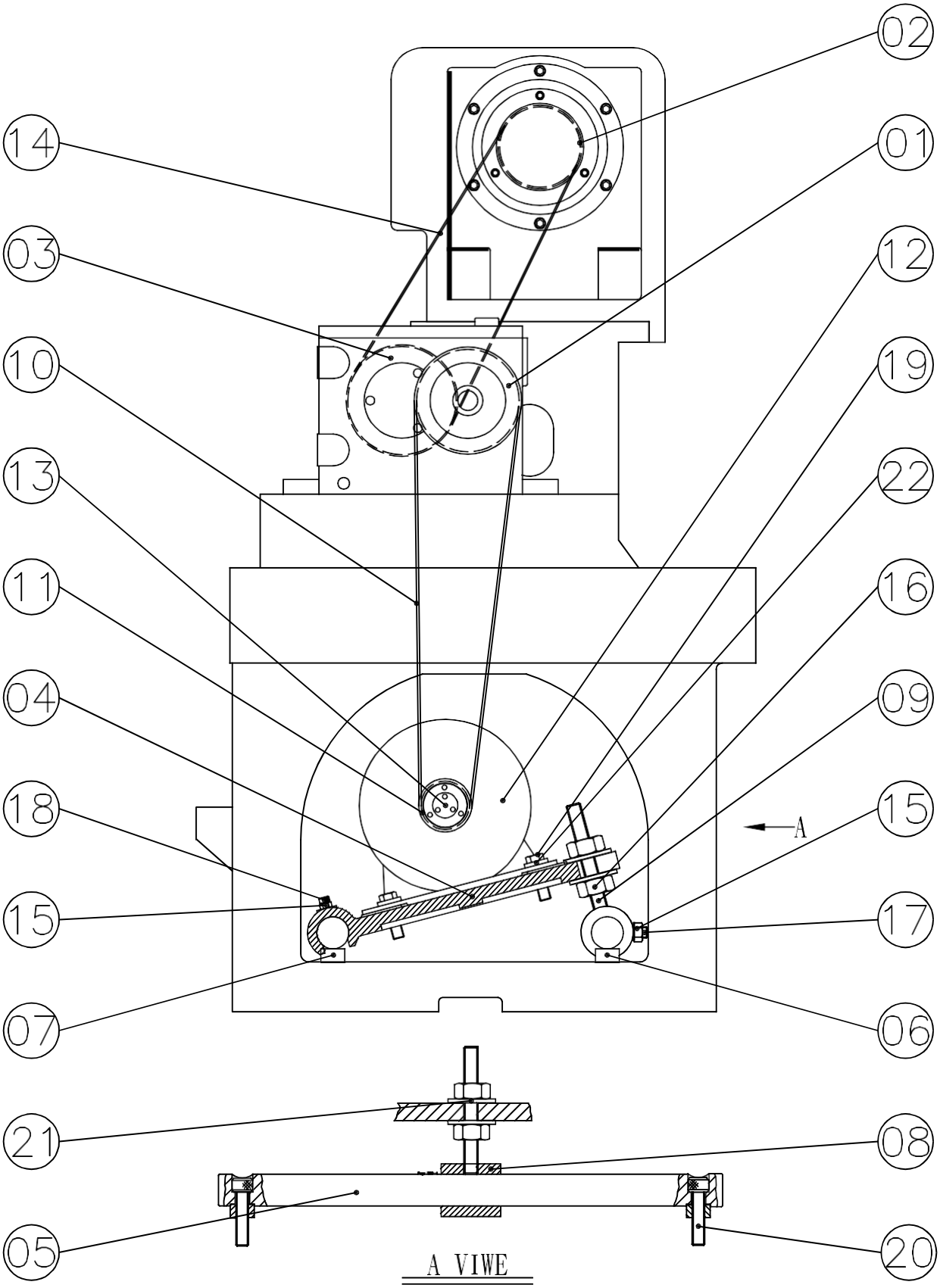

Spindle Motor Drive Assembly

Spindle Motor Driver Assembly

No.	Part Number	Description	Specification	XYZ Part No.
1	LS010400	SPINDLE PULLEY		12067
2	LS010140	BELT GEAR	7.5HP	17815
3	LS010150	GEAR BOX BELT GEAR		11841
4	LS040040	MOTOR MOUNTING		
5	KR040030	GUIDE BAR		
6	KR040050	SPACER		
7	KR040051	SPACER-MACHINING		
8	KR040060	PIVOT		
9	KR040070	ADJUSTABLE SCREW		
10	LS040080	BELT	5PK-1270	7865
11	LS040090	MOTOR PULLEY		12068
12	LS040100	SPINDLE MOTOR		7730
13	LS040110	MOTOR PULLY FIXED COVER		
14	LS040180	BELT	HTD-5M-1135-20	7802
15	ANM110008	NUT	M8	6494
16	ANM115020	NUT	M20	6499
17	ASM408020	HEADLESS SCREW	M8x20	
18	ASM408030	HEADLESS SCREW	M8x30	
19	ASM512035	HEXAGON HEAD SCREW	M12x35	
20	ASM616035	HEXAGON SOCKET CAP HEAD SCREW	M16x55	
21	AWMT01020	BRIGHT WASHER	M20	
22	AWMS01012	SPRING WASHER	M12	
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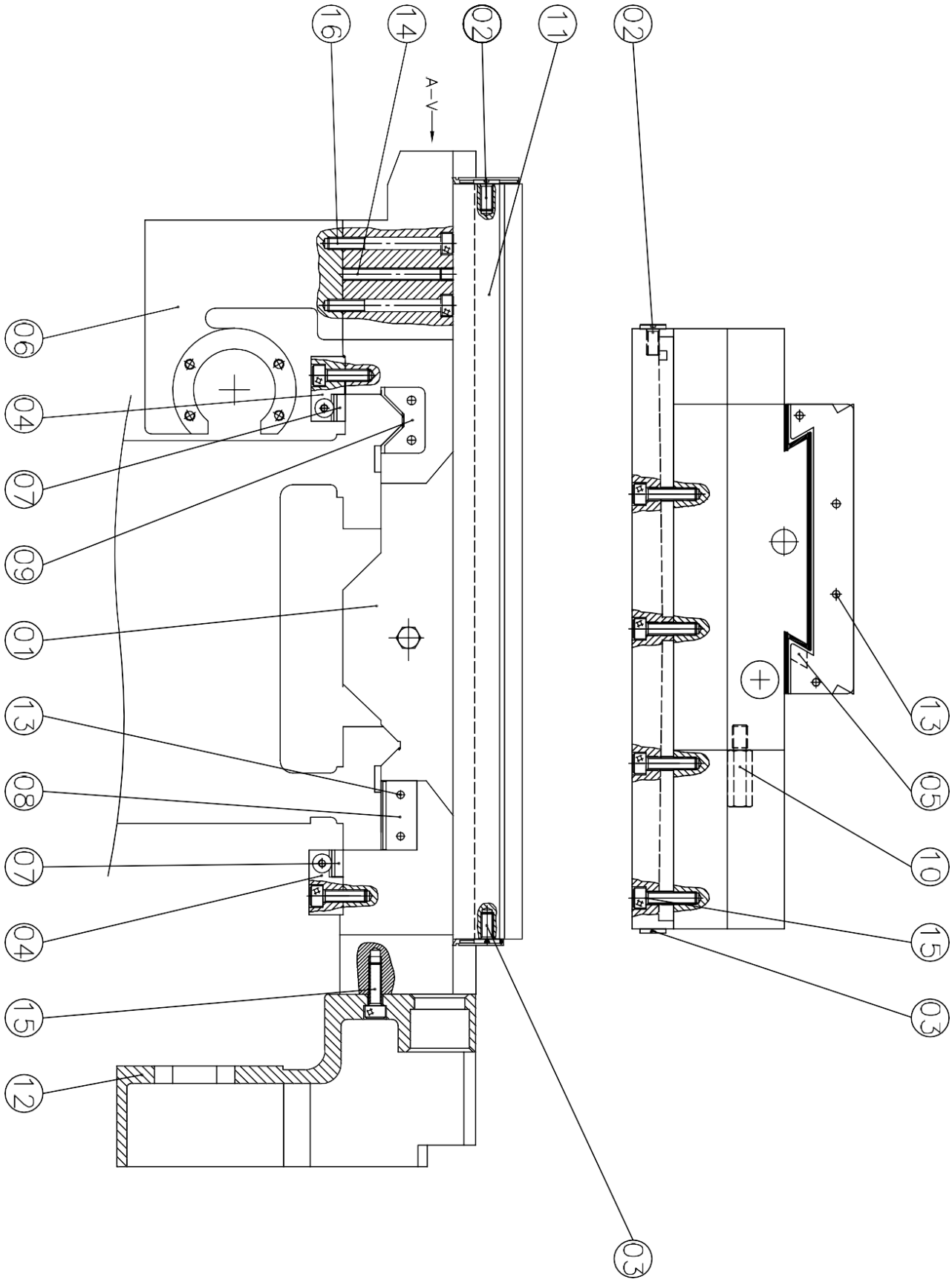

Saddle Assembly

Saddle Assembly

No.	Part Number	Description	Specification	XYZ Part No.
1	LS050010	SADDLE		
2	KR050020	ADJUSTABLE SCREW	39mm	5057
3	KR050030	ADJUSTABLE SCREW	29mm	5059
4	LS050060	GIB SEAT		
5	KR050070	GIB		5064
6	LS050080	APRON/BALL NUT BRACKET		
7	LS050110	GIB		16447
8	KR090280	SADDLE FLAT WIPER		5284
9	LS050150	SADDLE VEE WIPER		9794 Set
10	KR050160	BOLT		
11	LS060010	CROSS SLIDE		
12	LS110031	BRACKET		
13	ASM105010	BUTTON HEAD CAP SCREW	M5x10	
14	ASM405010	HEADLESS SCREW	M16x12	
15	ASM610035	HEXAGON SOCKET CAP HEAD SCREW	M10x35	
16	ASM610095	HEXAGON SOCKET CAP HEAD SCREW	M10x95	
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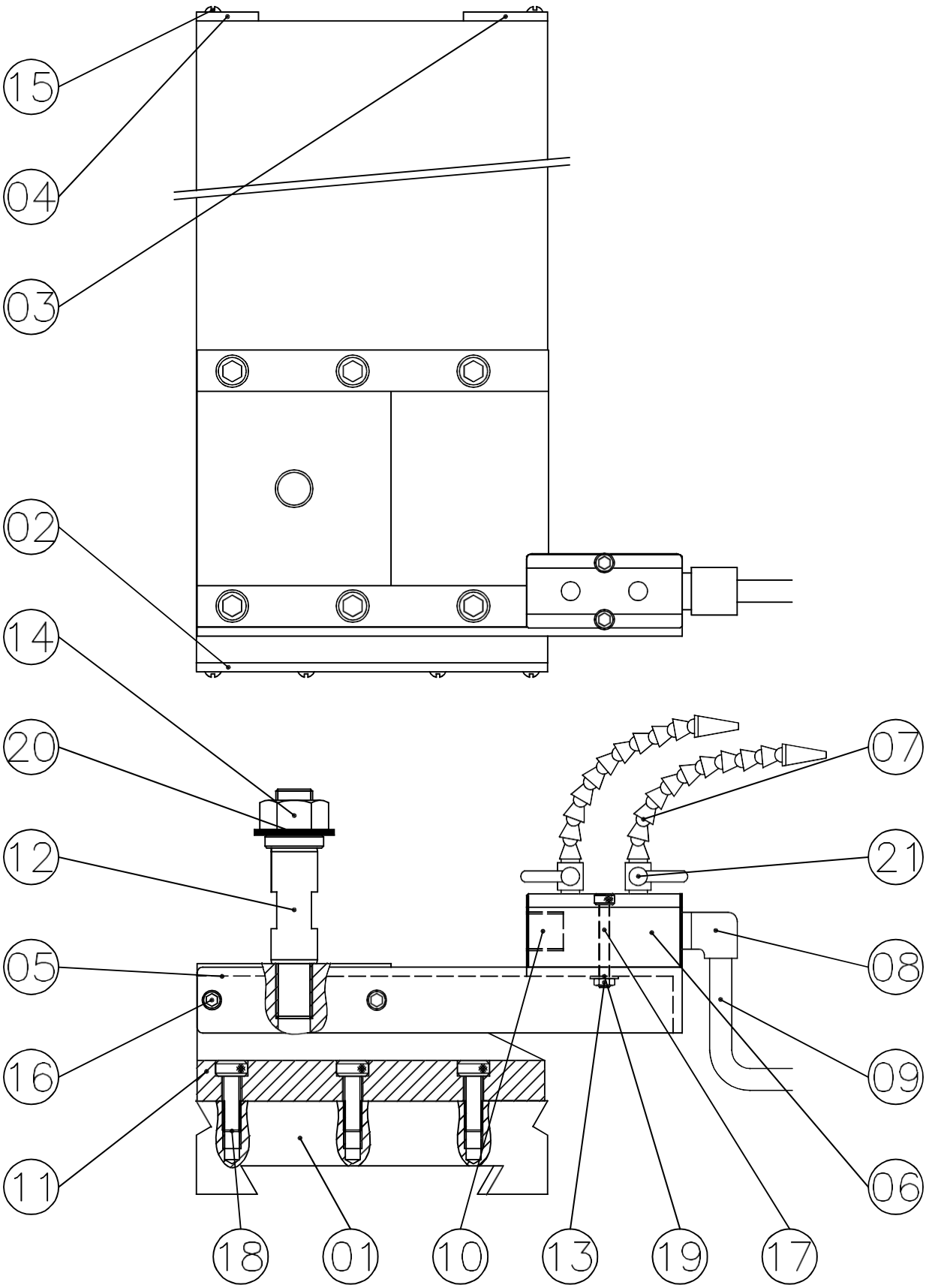

Cross Slide Assembly

Cross Slide Assembly

No.	Part Number	Description	Specification	XYZ Part No.
1	LS060010	CROSS SLIDE		
2	LS060020	CROSS SLIDE WIPER		9794 Set
3	LS060030	CROSS SLIDE WIPER	50mm	9794 Set
4	LS060040	CROSS SLIDE WIPER	38mm	9794 Set
5	LS060050	MOUNT PLANE		
6	KR060060	MOUNT BLOCK		12585 Assembled
7	KR060070	FLEXIBLE COOLANT NOZZLE		12585 Assembled
8	KR060080	ELBOW		12585 Assembled
9	KR060090	OIL PIPE		4729
10	KR060100	PLUG		
11	LS060110	SLOTTED TOOLPOST BASE		7354
12	LS060120	BOLT		9265
13	ANM10006	NUT	M6	9266
14	ANM215020	CHECK NUT	M20	
15	ASM105010	BUTTON HEAD CAP SCREW	M5x10	
16	ASM606012	HEXAGON SOCKET CAP HEAD SCREW	M6x12	
17	ASM606045	HEXAGON SOCKET CAP HEAD SCREW	M6x45	
18	ASM610030	HEXAGON SOCKET CAP HEAD SCREW	M10x30	
19	AWMT01006	BRIGHT WASHER	M6	
20	AWMT01020	BRIGHT WASHER	M20	
21		OIL VALVE		12585 assembled
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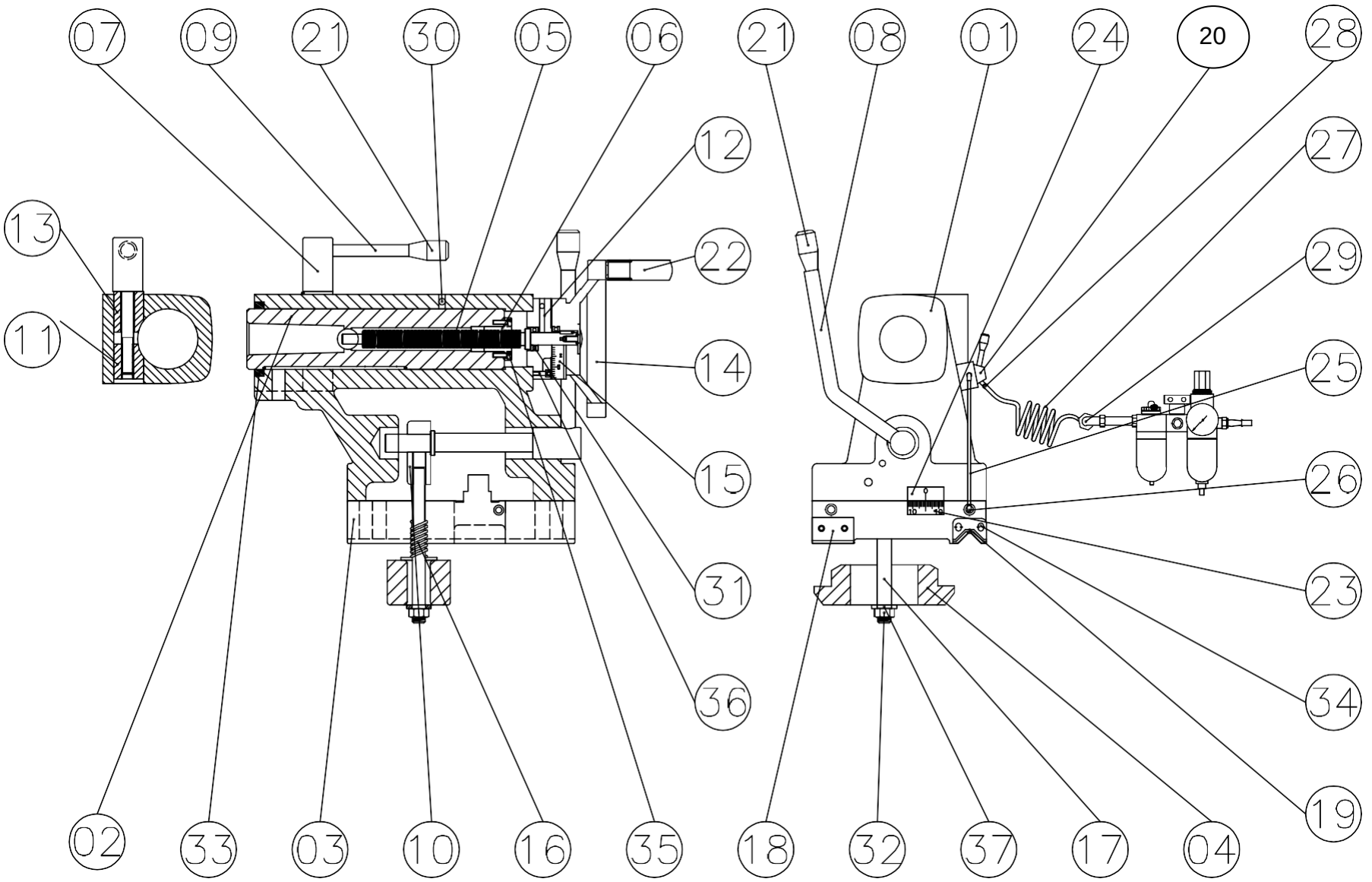
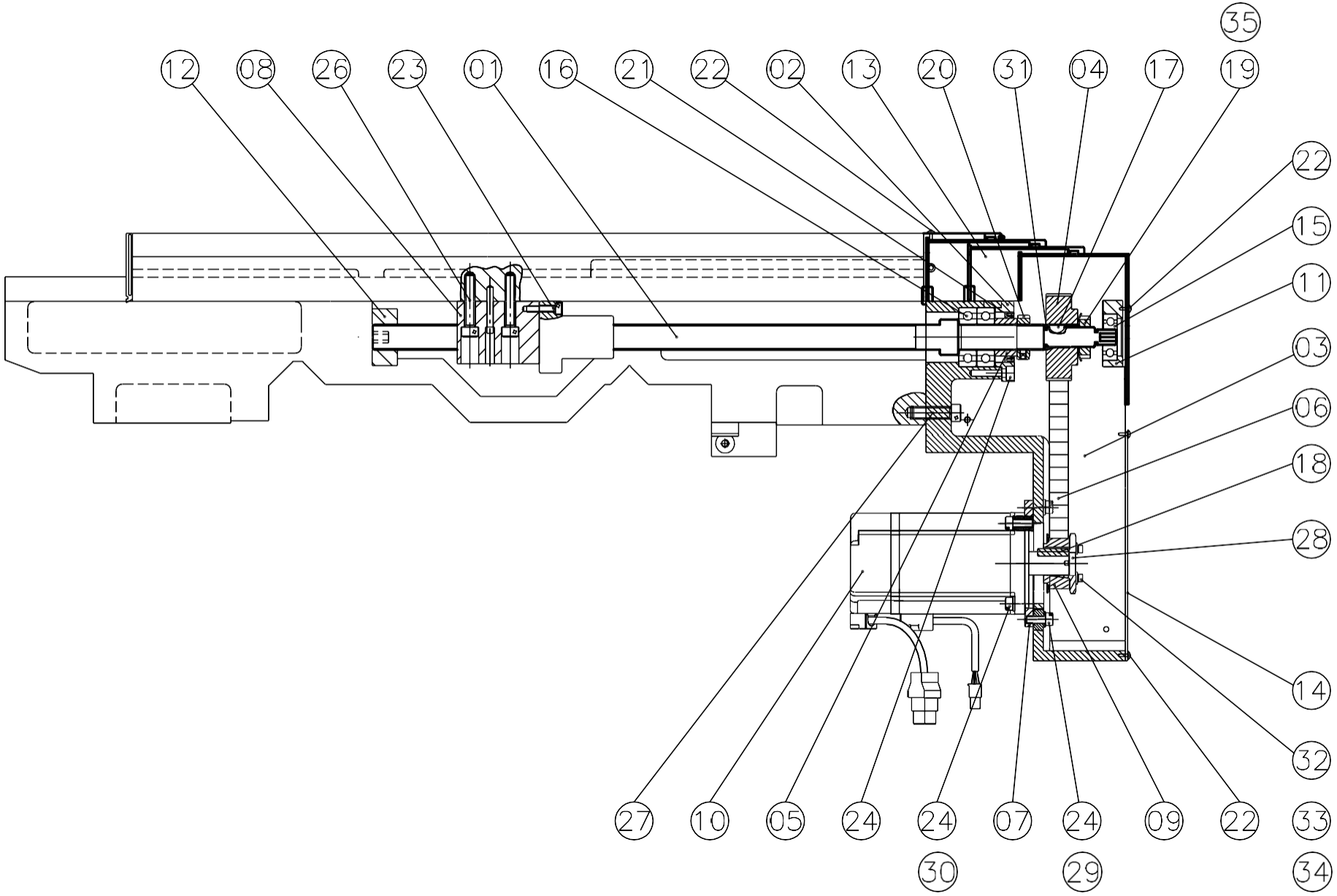


Tailstock Assembly

Tailstock Assembly

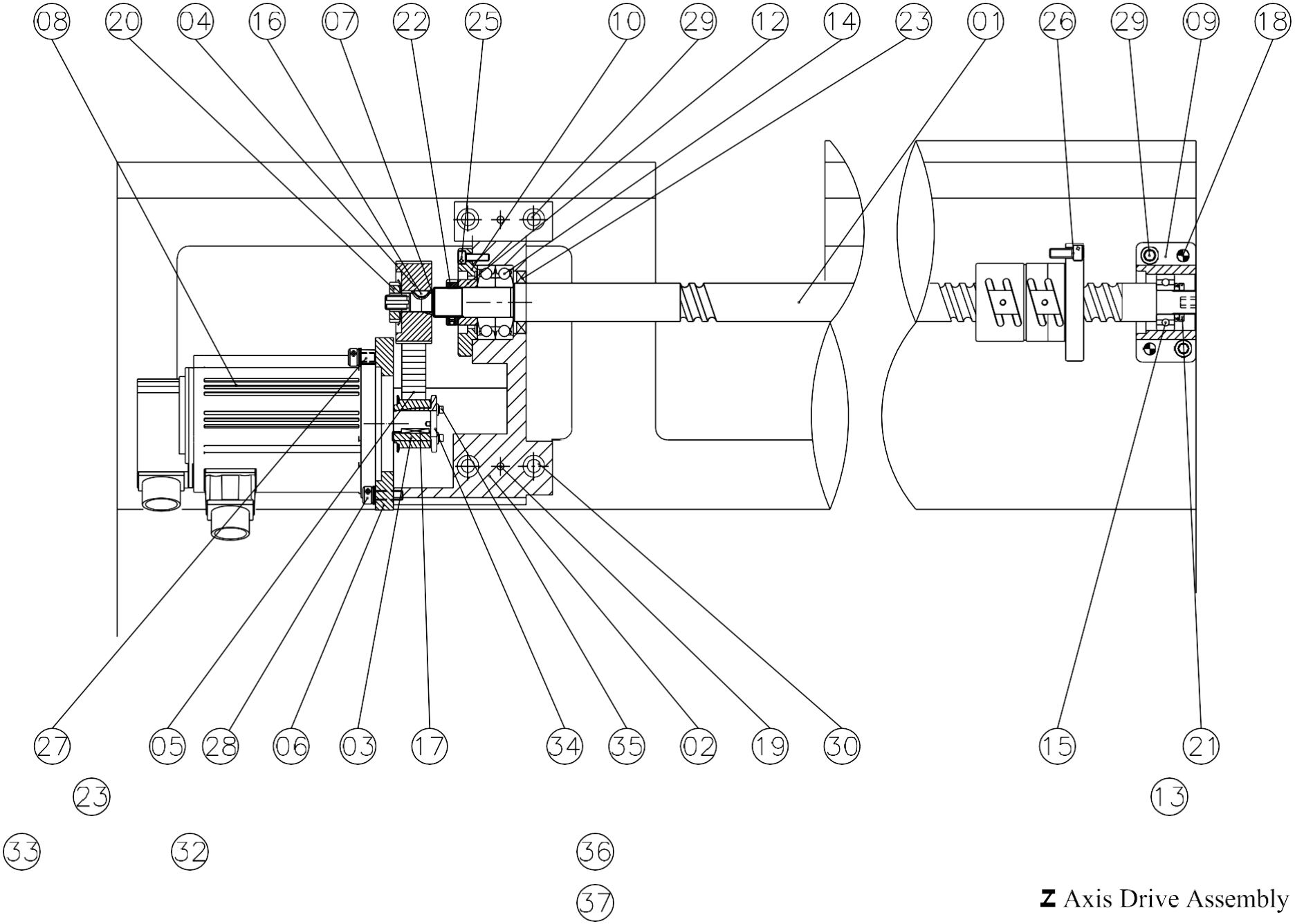
No.	Part Number	Description	Specification	XYZ Part No.
1	LS090010	TAILSTOCK BODY		14323
2	LS090020	TAILSTOCK QUILL		13319
3	LS090030	TAILSTOCK BASE		
4	LS090040	CLAMP PLATE		
5	LS090060	LEADSCREW		9128
6	LS090070	LEADSCREW NUT		9128
7	LS090080	QUILL CLAMP SHAFT		
8	LS090100	HAND LEVER		
9	LS090110	HAND LEVER		
10	LS090130	ADJUSTABLE BLOCK		
11	LS090140	QUILL CLAMP BLOCK		
12	LS090160	ROUND-INDEX RING		
13	LS090210	QUILL CLAMP BLOCK		
14	LS090220	HANDWHEEL		16713
15	LS090230	INDEX RING		14194
16	LS090240	SPRING		
17	LS090270	ADJUSTABLE SCREW		
18	LS090280	TAILSTOCK FLAT WIPER		
19	LS090290	TAILSTOCK VEE WIPER		9794 Set
20	KR090300	AIR SWITCH		2284
21	LS090320	PLASTIC HANDLE		
22	LS090330	PLASTIC HANDLE		
23	KR090340	SET OVER-INDICATOR SCALE PLATE		
24	KR090350	SET OVER-INDICATOR PLATE		
25	KR090360	AIR PIPE		17954
26	KR090370	ELBOW		14222
27	KR090380	AIR PIPE		2196
28	KR090390	ELBOW		14666
29	KR090400	ADAPTOR		11540
30	KR090410	BALL		5420
31	AB511040N	BEARING	51104	4398
32	ANM115020	NUT	M20	10377
33	AOS607508	OIL SEAL	ϕ 60x ϕ 75x08	16862
34	ASM105010	BUTTON HEAD CAP SCREW	M5x10	
35	ASM606020	HEXAGON SOCKET CAP HEAD SCREW	M6x20	
36	ASM606025	HEXAGON SOCKET CAP HEAD SCREW	M6x25	



X Axis Drive Assembly

X Axis Drive Assembly

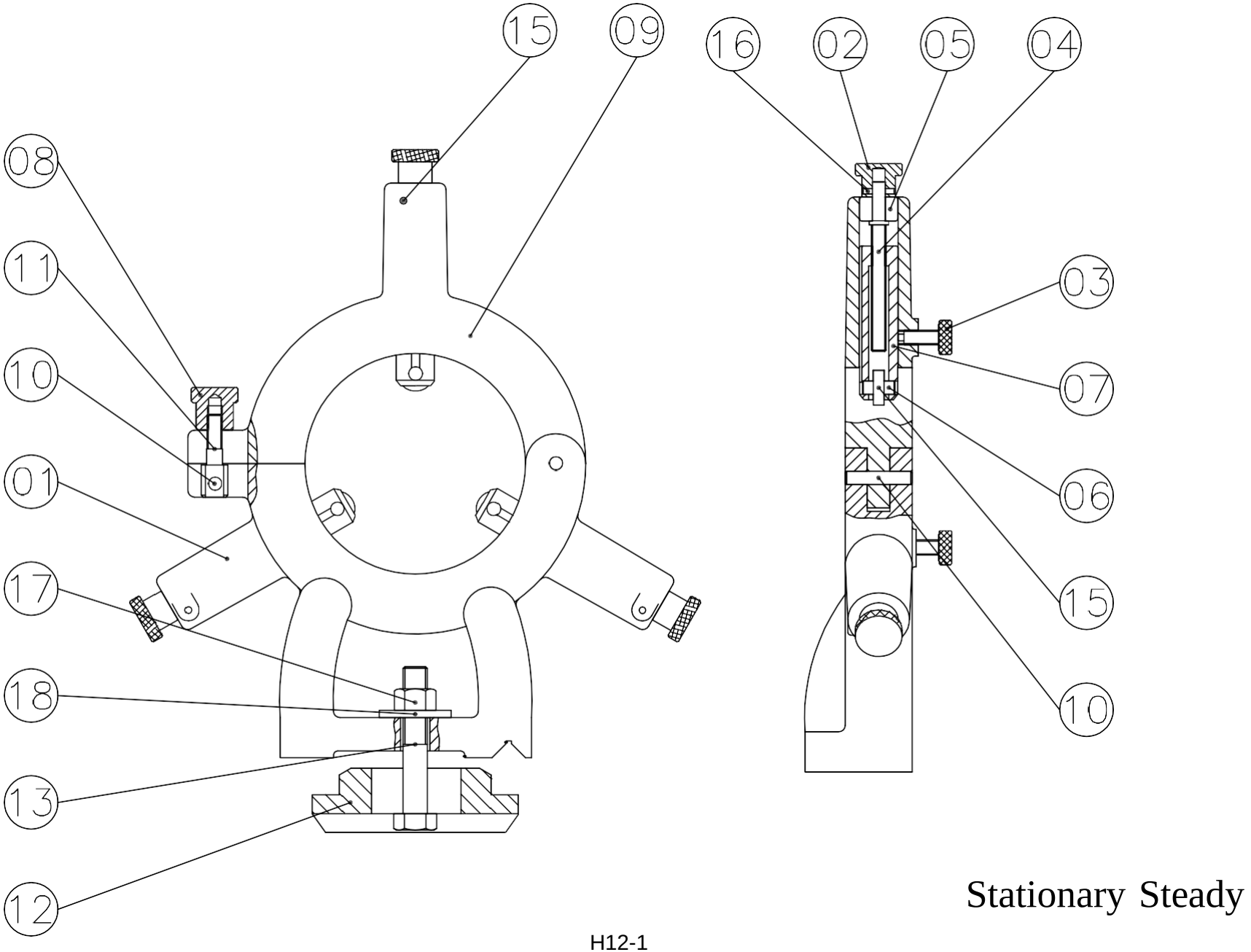
No.	Part Number	Description	Specification	XYZ Part No.
1	LS110010	BALL SCREW	X AXIS	10605
2	KR110020	BEARING COVER		11533
3	LS110031	BRACKET		
4		PULLEY	29136(SWI)	
5	KR110050	SPACER		
6		BELT	HTD-5M-535-15	778
7	KR110077	MOTOR ADJUSTABLE PLATE		
8	LS110080	APRON-BALL SCREW NUT		
9		MOTOR PULLEY	29430(SWI)	17172+17173
10		X AXIS SERVO MOTOR		13639
11	LS110110	BEARING BRACKET		
12	LS110150	RUBBER	50Ø20Ø20L	
13	LS400450	COVER-X AXIS		
14	LS400470	COVER PLATE-X AXIS BRACKET		
15	AB6301ZZN	BEARING	6301ZZ	5641
16	AB204760N	BEARING	20TAC47B	5533
17		KEY	12.7x3.175	
18		KEY	29433-1(SWI)	
19		NUT		
20	ANN510020	LOCKNUT (GROUND)	M20Ø1.0	
21	AOS304007	OIL RING	✕30x✕40x7 mm	
22	ASM105010	BUTTON HEAD CAP SCREW	M5x10	
23	ASM605030	HEXAGON SOCKET CAP HEAD SCREW	M5x30	
24	ASM606016	HEXAGON SOCKET CAP HEAD SCREW	M6x16	
25				
26	ASM608030	HEXAGON SOCKET CAP HEAD SCREW	M8x30	
27	ASM610035	HEXAGON SOCKET CAP HEAD SCREW	M10x35	
28		FERRULE	29431-1(SWI)	
29	AMMT01006	WASHER	M6	
30	AWMS01006	SPRING WASHER	M6	
31		FERRULE	16350(SWI)	
32		HEXAGON SOCKET CAP HEAD SCREW	No8-32UNC	
33		WASHER	No8-32UNC	
34		SPRING WASHER	No8-32UNC	
35		SPRING WASHER		
36				
37				



Z Axis Drive Assembly

Z Axis Drive Assembly

No.	Part Number	Description	Specification	XYZ Part No.
1	LS130010	BALL SCREW		12418
2	KR130023	BRACKET		
3		MOTOR PULLEY	29435(SWI)	17408
4		PULLEY	29880(SWI)	17411
5		BELT	HTD-5M-375-15	709
6	KR130079	MOTOR ADJUSTABLE PLATE		
7		FERRULE	16350(SWI)	315
8		Z AXIS SERVOMOTOR		17647
9	LS130100	REAR BRACKET		
10	KR130110	BEARING COVER		5652
11				
12	KR130130	SPACER		
13	KR130140	ADJUSTABLE PLATE		
14	AB256260N	BEARING	25TAC62B	5653
15	AB6204ZZN	BEARING	6204ZZ	13157
16		KEY	12.7x3.175	
17		KEY	29433-2(SWI)	
18	AKP106050	SPRING PIN	✕6x50 mm	
19	AKP106060	SPRING PIN	✕6x60 mm	
20		NUT		
21	ANN502010	LOCK NUT	M20x1.0	
22	ANN502515	LOCK NUT	M25x1.5	
23		SPRING WASHER		
24				
25	ASM606016	HEXAGON SOCKET CAP HEAD SCREW	M6x16	
26	ASM606020	HEXAGON SOCKET CAP HEAD SCREW	M6x20	
27	ASM608025	HEXAGON SOCKET CAP HEAD SCREW	M8x25	
28	ASM608030	HEXAGON SOCKET CAP HEAD SCREW	M8x30	
29	ASM610040	HEXAGON SOCKET CAP HEAD SCREW	M10x40	
30	ASM610045	HEXAGON SOCKET CAP HEAD SCREW	M10x45	
31				
32	AMMT01008	WASHER	M8	
33	AWMS01008	SPRING WASHER	M8	
34		TAPER LOCK	29431-3(SWI)	17409
35		HEXAGON SOCKET CAP HEAD SCREW	No8-32UNC	
36		WASHER	No8-32UNC	
37		SPRING WASHER	No8-32UNC	



Stationary Steady

Stationary Steady

No.	Part Number	Description	Specification	XYZ Part No.
1	LS220010	STATIONARY STEADY BASE		7024 Complete
2	KR220030	COLLAR		
3	KR220040	COLLAR-CLAMP SCREW		
4	KR220050	FINGER SCREW		
5	KR220060	RETAINING BUSH-FINGER		
6	KR220070	BEARING SHAFT		
7	KR220080	PAD TYPE FINGER		
8	KR220090	COLLAR-STEADY TOP CLAMP		
9	KR220100	STATIONARY STEADY TOP		
10	KR220110	PIVOT PIN		
11	KR220120	FIXED BOLT		
12	LS090050	BASE CLAMP PLATE		
13	KR090170	BOLT		
14	AB6000ZZN	BEARING	6000ZZ	11845
15	AKP104025	SPRING PIN	ϕ 4x25 mm	
16	AKP105045	SPRING PIN	ϕ 5x45 mm	
17	ANM102025	NUT	M20	
18	AWMT01020	HIGHT BRIGHT WASHER	M20	
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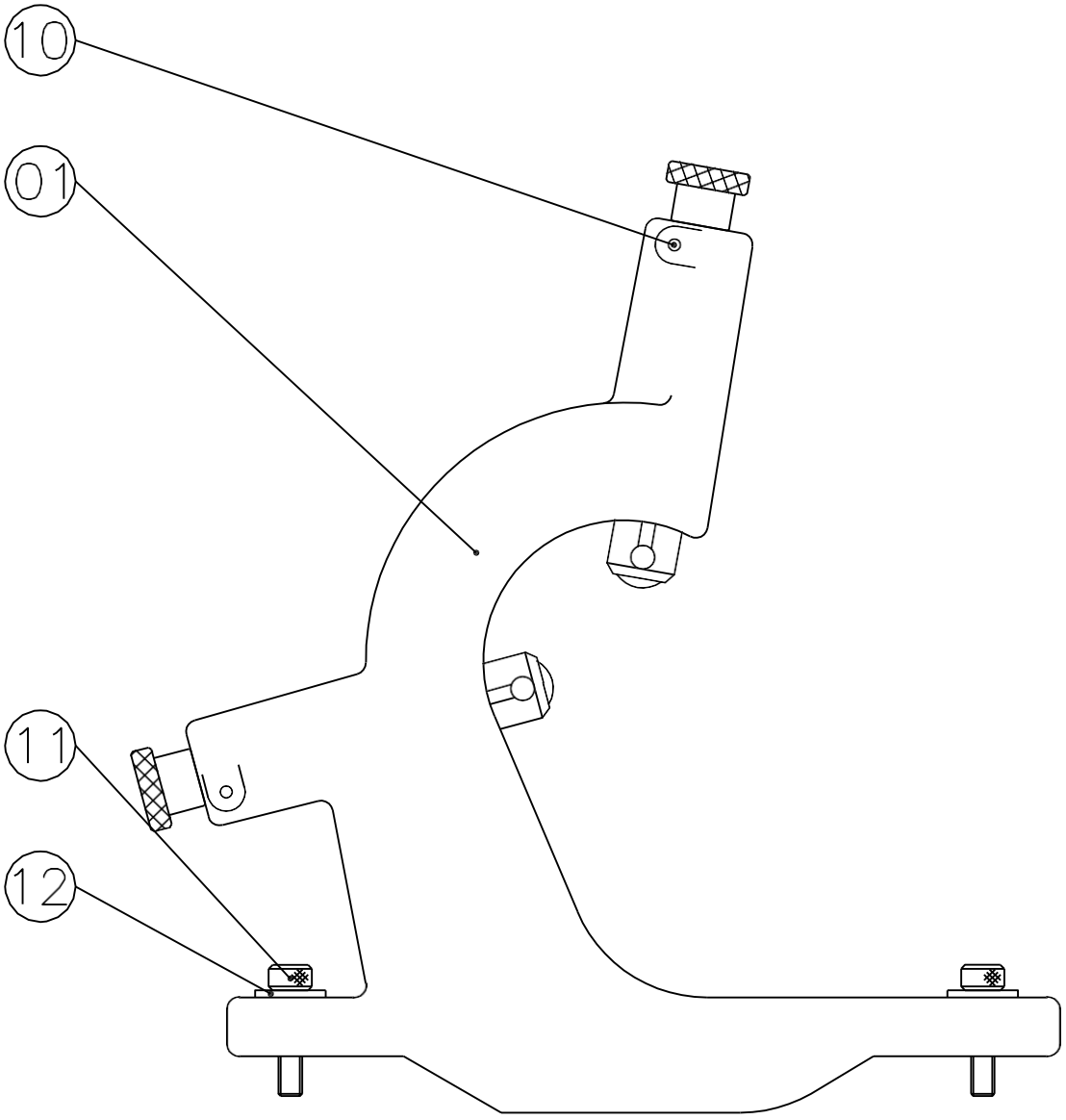

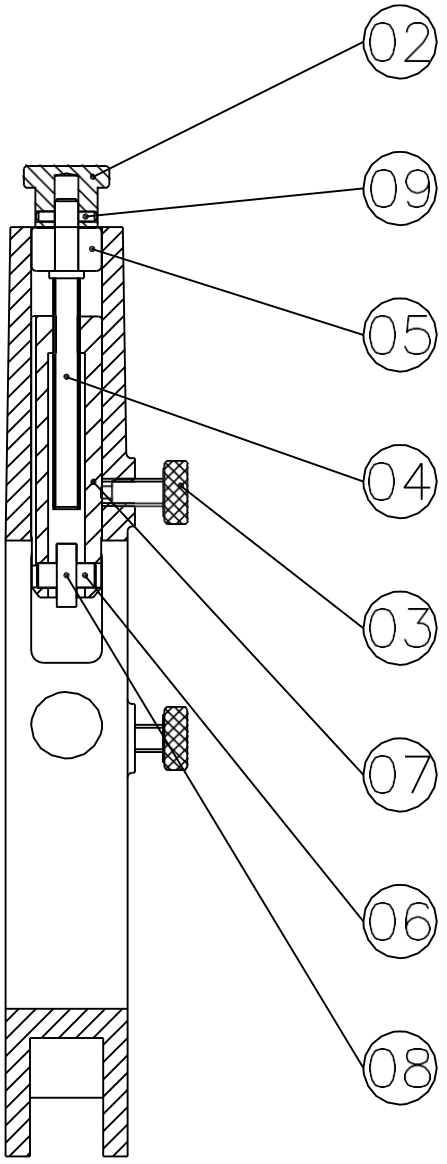

Travelling Steady

Travelling Steady

No.	Part Number	Description	Specification	XYZ Part No.
1	KR230010	TRAVELLING STEADY BASE		7039 Complete
2	KR220030	COLLAR		
3	KR220040	COLLAR-CLAMP SCREW		
4	KR220050	FINGER SCREW		
5	KR220060	RETAINING BUSH-FINGER		
6	KR220070	BEARING SHAFT		
7	KR220080	PAD TYPE FINGER		
8	AB6000ZZN	BEARING	6000ZZ	11845
9	AKP104025	SPRING DOWEL	ϕ 4x25 mm	
10	AKP105045	SPRING DOWEL	ϕ 5x45 mm	
11	ASM610045	HEXAGON SOCKET CAP HEAD SCREW	M10x45	
12	AWMT01020	BRIGHT WASHER	M10	
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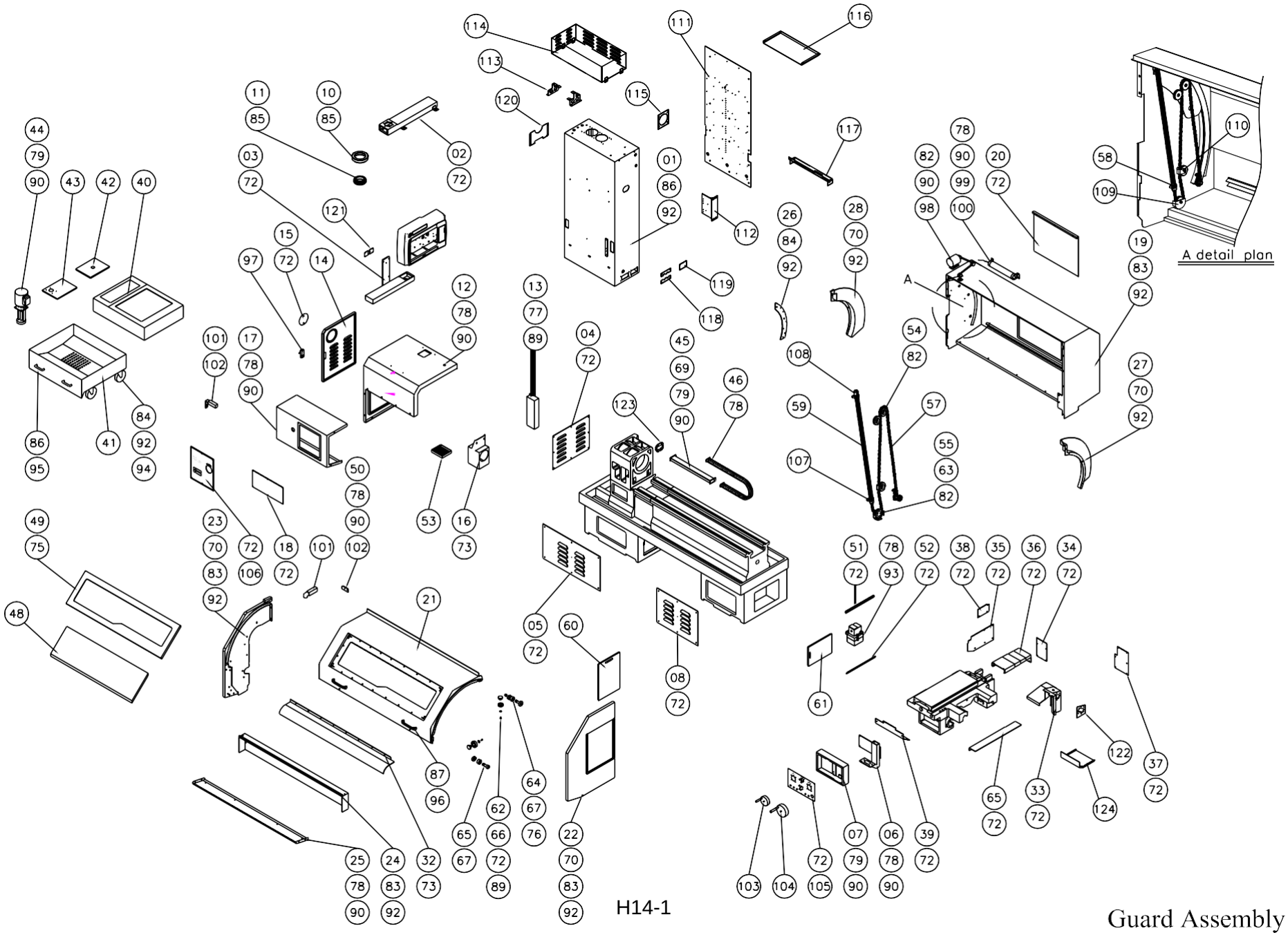

Guard Assembly

Guard Assembly

No.	Part Number	Description	Specification	XYZ Part No.
1		ELECTRICAL CABINET	29104-13(SWI)	
2	LU400030	BRACKET ARM		
3	LS400052	BRACKET ARM		
4	KR400060	COVER-SPINDLE MOTOR		
5	LS400070	COVER-HEAD END FRONT		
6	LS400090	BRACKET ARM-MPG CONTROL		
7	KR400100	BOX-MPG CONTROL		
8	LS400120	COVER-TAIL END FRONT		
9				
10	LW400170	SLEEVE-SWTVEL TABLE		
11	LW400180	CONTROL BOX SWIVEL TABLE		
12	LS400210	COVER-HEAD END		
13	KR400220	COVER-HEAD END INSIDE		
14	LS400230	DOOR-HEAD END		
15	LS400240	DOOR COVER		
16	LS400250	COOLANT COLLECTOR		
17	LS400260	COVER-HEAD END FRONT		
18	LS400270	COVER PLATE-HEAD END FRONT		
19	LS400280	GUARD-REAR		
20	LN410370	COVER PLATE-REAR		
21	LS400301	GUARD-FRONT DOOR		
22	LS400310	GUARD-RIGHT		
23	LS400320	GUARD-LEFT		
24	LS400330	GUARD-FRONT		
25	LS400340	GUARD-FRONT TRAY		
26	LS400350	FIXED PLATE		
27	LS400360	COVER-RIGHT TRACK		18248
28	LS400370	COVER -LEFT TRACK		18248
29				
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31				
32	LS400410	COVER -Z AXIS BALL SCREW		
33	LS400421	COVER -X AXIS MOTOR		
34	LS400430	COVER PLATE-X AXIS MOTOR		
35	LS400441	COVER PLATE-X AXIS MOTOR		
36	LS400450	COVER -X AXIS		
37	LS400460	COVER -X AXIS BRACKET		
38	LS400470	COVER PLATE-X AXIS BRACKET		

Guard Assembly

No.	Part Number	Description	Specification	XYZ Part No.
39	LS400480	COVER –SADDLE		
40	LS400490	COOLANT TANK		18249
41	LS400500	SWARF BIN		
42	LS400510	COVER-COOLANT TANK		18249
43	LS400520	FIXED COVER-COOLANT PUMP		
44	LS400530	COOLANT PUMP		1825
45	LS400540	SQUARE PROTECTION TUBE		
46	LS400550	FLEXIBLE CABLE CARRIER		17542
47				
48	LS400578	TEMPERED GLASS		15031
49	LS400581	VISION FRAME		
50	KR400610	LIMT SWITCH BASE		15396
51	LS400620	FIXED PLATE-LUBRICATTON COVER		
52	LS400630	FIXED PLATE-LUBRICATTON COVER		15345
53	LS400640	SWARF BIN		17120
54	KR400662	DOOR ROLLER	⌀50mm	5106
55	KR400661	DOOR ROLLER	⌀60mm	5438
56				
57	LS400680	CHAIN	1100mm	9963
58	KR400690	LASHING RING		
59	LS430560	SPRING		8347
60	LS400710	ACRYLIC PLATE-TAIL END		7765
61	LS400720	ACRYLIC PLATE –LUBRICATION		16711
62	KR400730	SLEEVE		5666
63	KR400740	SLEEVE		9827
64	KR400750	FIXED NUT		
65	KR400760	SPACER		
66	AB6000ZZN	BEARING	6000ZZ	
67	ABCF10-1N	BEARING	CF10-1	5668
68	ANM108005	NUT	M5	
69	ANM110006	NUT	M6	
70	ANM112008	NUT	M8	
71	ANM115010	NUT	M10	
72	ASM105008	BUTTON HEAD CAP SCREW	M5x8	
73	ASM106008	BUTTON HEAD CAP SCREW	M6x8	
74	ASM106012	BUTTON HEAD CAP SCREW	M6x12	
75	ASM106025	BUTTON HEAD CAP SCREW	M6x25	
76	ASM410010	HEADLESS SCREW	M10x10	

Guard Assembly

No.	Part Number	Description	Specification	XYZ Part No.
77	ASM605010	HEXAGON SOCKET CAP HEAD SCREW	M5x10	
78	ASM606012	HEXAGON SOCKET CAP HEAD SCREW	M6x12	
79	ASM606016	HEXAGON SOCKET CAP HEAD SCREW	M6x16	
80				
81				
82	ASM606040	HEXAGON SOCKET CAP HEAD SCREW	M6x40	
83	ASM608012	HEXAGON SOCKET CAP HEAD SCREW	M8x12	
84	ASM608016	HEXAGON SOCKET CAP HEAD SCREW	M8x16	
85	ASM608020	HEXAGON SOCKET CAP HEAD SCREW	M8x20	
86	ASM608025	HEXAGON SOCKET CAP HEAD SCREW	M8x25	
87	ASM608045	HEXAGON SOCKET CAP HEAD SCREW	M8x45	
88	ASM610035	HEXAGON SOCKET CAP HEAD SCREW	M10x35	
89	AWMT01005	BRIGHT WASHER	M5	
90	AWMT01006	BRIGHT WASHER	M6	
91	AWMT01010	BRIGHT WASHER	M10	
92	AWMH01008	HIGHT BRIGHT WASHER	M8	
93	KR570010	LUBRICATION PUMP		10637
94	KR570020	WHEEL		
95	KR570030	HANDLE		4810
96	KR570050	HANDLE		7549
97	KR570060	PLANE HANDLE		10556
98	KR570080	WORK LIGHT	24V/70W	15823
99	KR570090	LAMP	120V/36W	15823
100	KR570091	ELECTRICAL LAMP BALLAST		7469
101	KR570110	LIMIT SWITCH	XCK-P102	3219
102	KR570120	KEY LIMIT SWITCH	XCS-Z14	9670
103	KR570210	X AXIS ELECTRONIC HAND WHEEL		465
104	KR570220	Z AXIS ELECTRONIC HAND WHEEL		6932
105	KRPE0031	PANEL		
106	KRPE0042	PANEL		
107	LS430533	SCREW		
108	LS430543	SCREW		
109	LG410100	CHAIN FIXED PLATE		10116
110	LG410110	FIXED PLATE		10116
111		BASE PLATE	29105-13(SWI)	
112		POWER SWITCH BASE	29013-5(SWI)	
113		BRACKET	24067-12(SWI)	
114		BOX	29020-17(SWI)	

Guard Assembly

No.	Part Number	Description	Specification	XYZ Part No.
115		COVER	29104-6-3(SWI)	
116		COVER	29104-12-1(SWI)	
117		COVER	29104-12-2(SWI)	
118		COVER	28157-25(SWI)	
119		COVER	28157-28(SWI)	
120		COVER	29095-1(SWI)	
121	LU400030-A	COVER		
122	LS400421-A	COVER		
123	LS400540-A	COVER		
124	LS410240	COVER		
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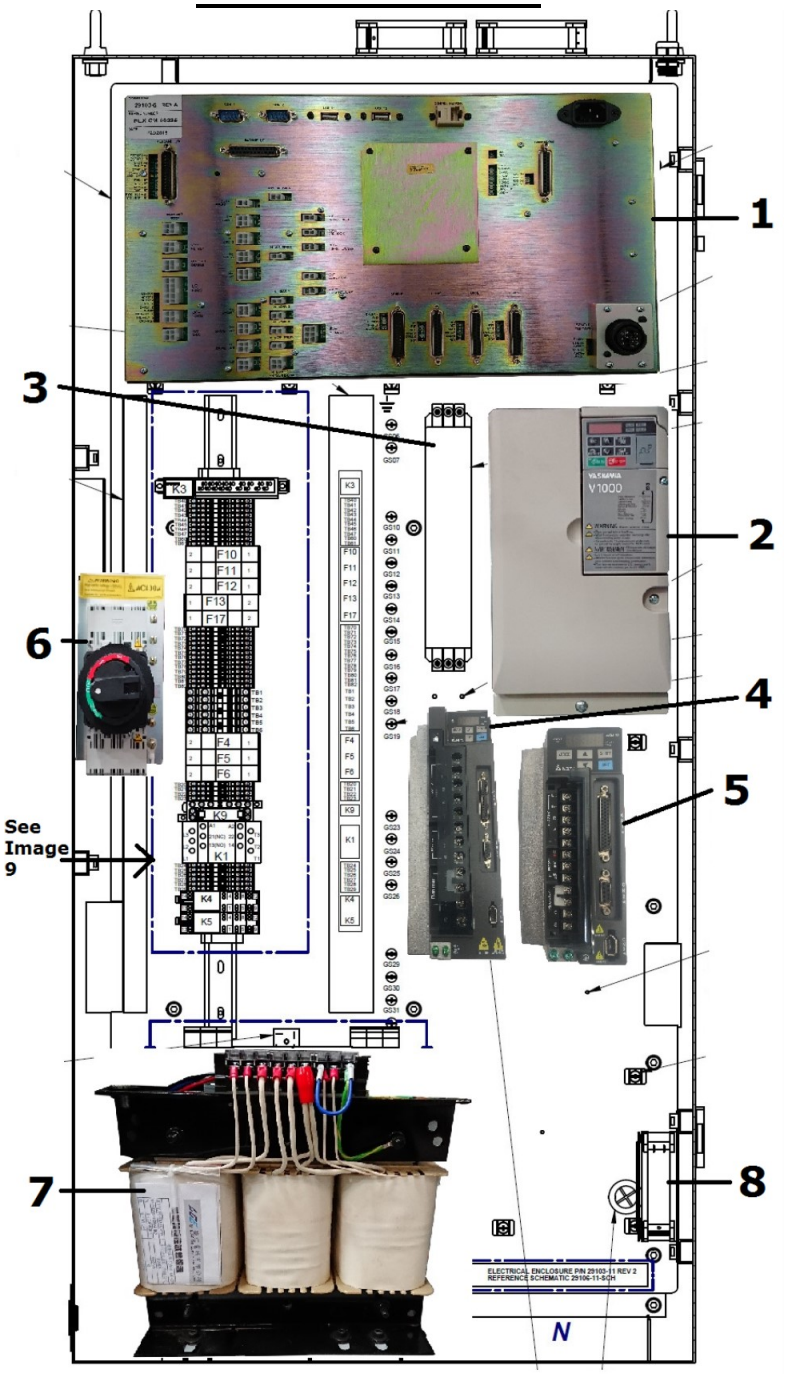
RLX 355

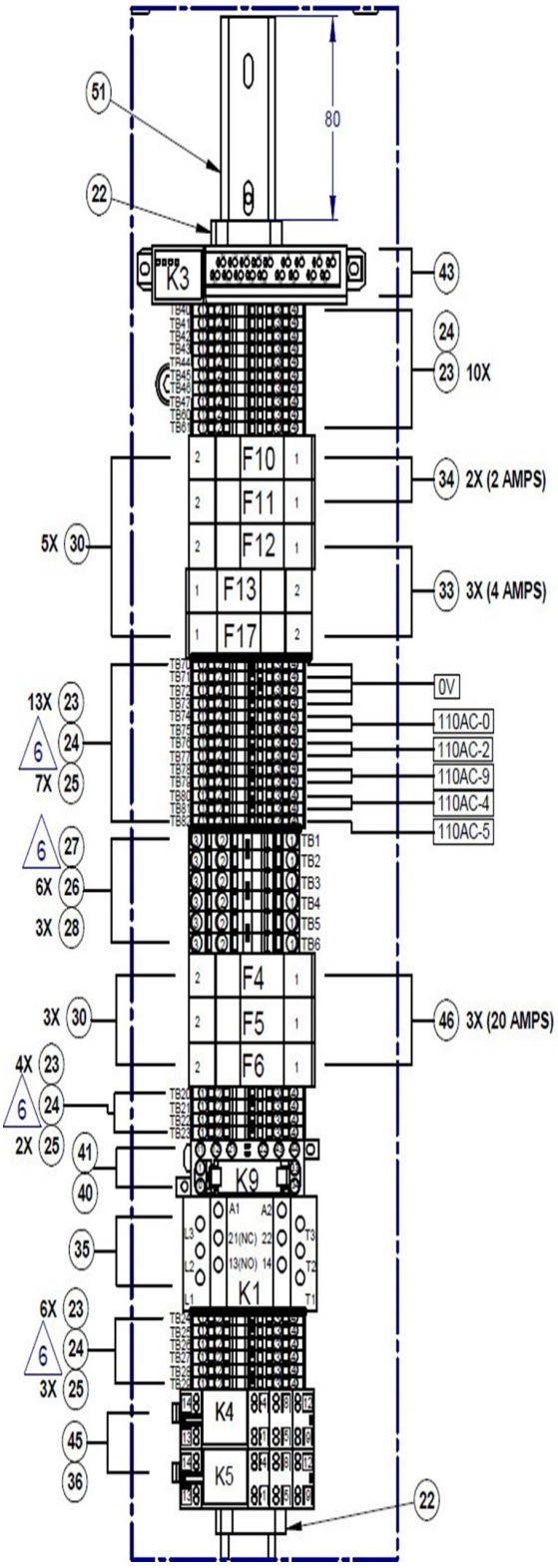
Parts Guide

Electrical Cabinet



Item	Description	XYZ Part
1	RLX Computer Module	17404
2	Inverter 5.5 KW	5870
3	Schaffner Line Filter	16782
4	Delta Servo Driver 750W	17609
5	Delta Servo Driver 2KW	17619
6	Door Isolator Switch 30A	14685
7	Transformer 3 Phase	17231
8	115V Fan	14128

Image 9



Item Number	Description	XYZ Part Number
22	Terminal Block End Cap	10376
23	Terminal Block Din Rail 20A	15168
24	Terminal Block Cover 20A	15167
25	Terminal Block Jumper 20A	15166
26	Terminal Block Din Rail 3 Pos 41A	17699
27	Terminal Block End Cover	17705
28	Terminal Block Jumper 41A	17260
29	Fuse 10 x 38mm 12 Amp	14088
30	Fuse Holder 32A	3750
32	Fuse 10 x 38mm 16 Amp	3147
33	Fuse 10 x 38mm 4 Amp	6622
34	Fuse 10 x 38mm 2 Amp	6616
35	Contactor Relay 24v DC	17337
36	Relay Socket 2 Pole Push Fit	16271
40	Omron Safety Relay	13767
41	Omron Socket Din Rail 4 Pole	13768
43	Omron Safety Relay 401 24V DC	15052
45	Omron Relay 2P 24VDC	16270
46	Fuse 10 x 38mm 20 Amp	6620
51	Din Rail	1655

Motor's, Cable's & Drives

Description	XYZ Part Number	
X Axis Motor	13639	
Z Axis Motor	17647	
X Axis Drive	17609	
Z Axis Drive	17619	
X Axis Motor Encoder Cable	17417	
X Axis Motor Power Cable	17416	
Z Axis Motor Encoder Cable	17186	
Z Axis Motor Power Cable	17418	

Motor's, Cable's & Drives

Description	XYZ Part Number	
Main Spindle Motor	7730	

Switches & Buttons

Description	XYZ Part Number	
E-Stop Button	3132	
Main Door / Belt In-spection Door Switch	3219	
Chuck Guard Switch	3351	
Limit Switch Fits Both X Or Z	16402	
Apron Cycle Start Button	15008	

Switches & Buttons

Description	XYZ Part Number	
Door Isolator Switch	14685	
Gear Selector Sensor Switches	7923	

Pump's

Description	XYZ Part Number	
Coolant Pump 110V 6" Pick Up	1825	
AutoLube Pump 110V YET-F1	10637	

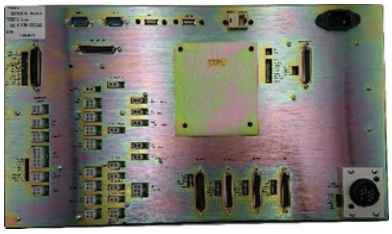
Handwheel's & Jog Stick

Description	XYZ Part Number	
Safety Jog Stick	15012	
X Axis Handwheel	465	

Handwheel's & Jog Stick

Description	XYZ Part Number	
Z Axis Handwheel	6932	

Pendant & Module

Description	XYZ Part Number	
RLX Pendant	17394	
Computer Module	17404	

Other Electrical Parts

Description	XYZ Part Number	
Inverter 5.5KW	5870	
Main Transformer	17231	

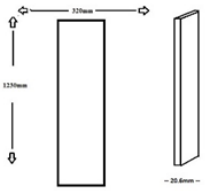
Other Electrical Parts

Description	XYZ Part Number	
Brake Resistor	5967	
Spindle Encoder	17253	
Work Lamp 24V	17367	
Work Light	15823	
Spindle Motor Fan	6439	
Electronic Handwheel & Apron Jog Stick Cable	460	

Pneumatic & Coolant

Description	XYZ Part Number	
Air Regulator Unit	4915	
Tailstock Assembly Air Pipe	2196	
Coolant Nozzle Assembly	12585	
Armoured Coolant Pipe 180"	4729	

Main Door &Window's

Description	XYZ Part Number	
Door Spring	8347	
Main Window 1230 x 320mm	15031	
Window Silicon	11661	

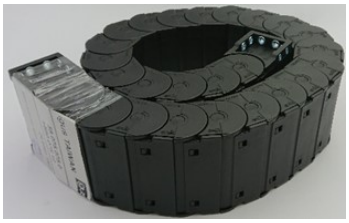
Pneumatic & Coolant

Description	XYZ Part Number	
Perspex Panel Tailstock End 470 x 332mm	7765	
Perspex Panel Auto Lube Pump	16711	

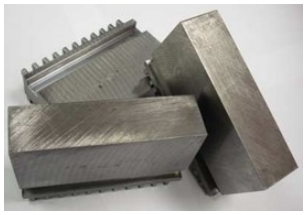
Belt's

Description	XYZ Part Number	
X Axis Belt	778	
Z Axis Belt	17116	
Spindle Encoder Belt	12875	
Spindle Belt Set	7865	
Spindle To Gear box Belt Set	7802	

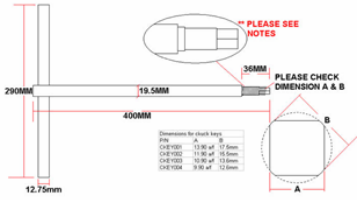
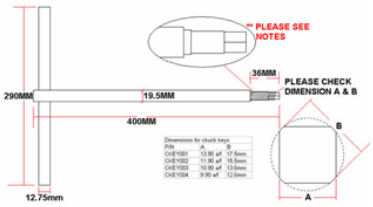
Drag Chain / Wiper's

Description	XYZ Part Number	
Z Axis Chain	17542	
Wiper Kit	9794	

Chuck's

Description	XYZ Part Number	
Standard 200mm Scroll 3 Jaw Chuck Supplied With The Machine	3867	
250mm Independent 4 Jaw Chuck Cast Iron	2662	
Chuck Guard To Suit 200mm Chuck	8368	
Chuck Guard To Suit 250mm Chuck	11904	
Soft Jaws For 200mm 3 Jaw Chuck	2645	

Chuck's

Description	XYZ Part Number	
Hard Inside Solid Jaws To Suit 200mm 3 Jaw	1344	
Hard Outside Solid Jaws To Suit 200mm 3 Jaw	538	
Soft Jaws For 250mm 4 Jaw Chuck	12458	
Extended Chuck Key For 200mm Chuck	6163	
Extended Chuck Key For 250mm Chuck	4462	

Steady Options

Description	XYZ Part Number	
Fixed Steady 20-155mm	7024	
Travelling Steady 15-70mm	7039	

Tool Post / Holders

Description	XYZ Part Number	
T2T Quick Change Tool Post Set	4929	
T2T Standard Holder	4938	
T2T Vee Holder	4939	
T2T Morse Holder	4940	
T2T Plain Bore 32mm Holder	4943	

Drilling Attachment's

Description	XYZ Part Number	
Drilling Attachment 40mm Bore	7725