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# XYZ

## RLX425

## RLX425 2M

### CNC LATHE

### GENERAL MANUAL



**CE**  
**ISO 9001**

Manual NumberKKRDM4200 DateKJUN, 2019 REVKV4.0

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## **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 aluminium). 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	RLX425	RLX425 2M
<b>SWING AND DISTANCE</b>	Swing over bed	532 mm / 20-7/8"	
	Swing in gap	700 mm / 27-9/16"	
	Swing over cross slide	257 mm / 10-1/8"	
	Distance between centers	1250 mm / 49-3/16"	2000 mm / 78-3/4"
<b>SPINDLE</b>	Spindle bored	80 mm / 4.09"	
	Spindle nose type	D1-8 camlock	
	Spindle taper	MT5 in bush	
	Spindle motor	10 hp / 7.5 kw 7.5hp / 5.5 kw (OPT.)	
<b>SPINDLE SPEED</b>	Low speed	15-300 rpm	
	Medium speed	301-850 rpm	
	High speed	851-2500 rpm	
<b>CROSS SLIDE</b>	Cross slide travel	205 mm / 8-1/16"	
<b>BALLSCREW</b>	X axis ballscrew diameter	Ø 25 mm	
	Z axis ballscrew diameter	Ø 36 mm	Ø 40 mm
<b>TAILSTOCK</b>	Tailstock Quill diameter	75 mm / 2-15/16"	
	Tailstock Travel	160 mm / 6-1/4"	
	Tailstock - taper	MT5	
<b>BED</b>	Bed width	370 mm / 14-1/2"	
<b>MACHINE DIMENSION</b>	Footprint (LxDxH)	2620 x 1380 x 1820 mm	3480 x 1380 x 1820 mm
	Weight	2850 kg / 6270 lbs	3800 kg / 8360 lbs

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

## STANDARD ACCESSORIES

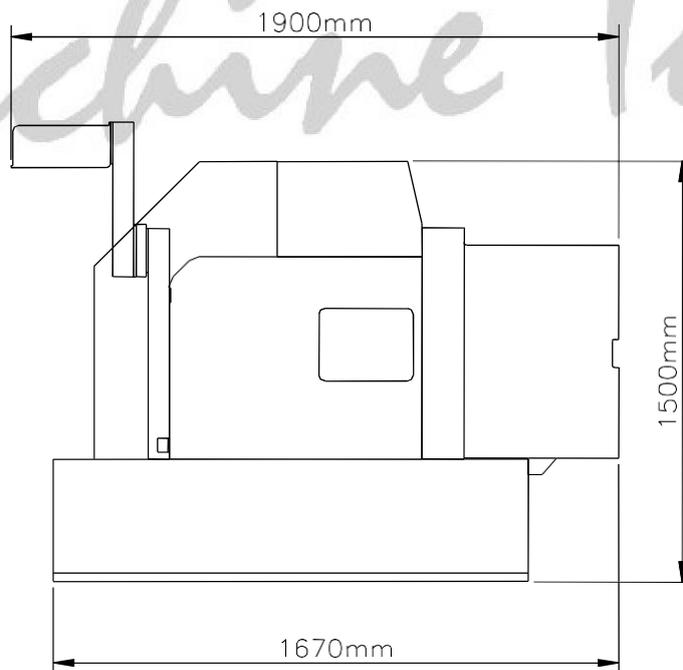
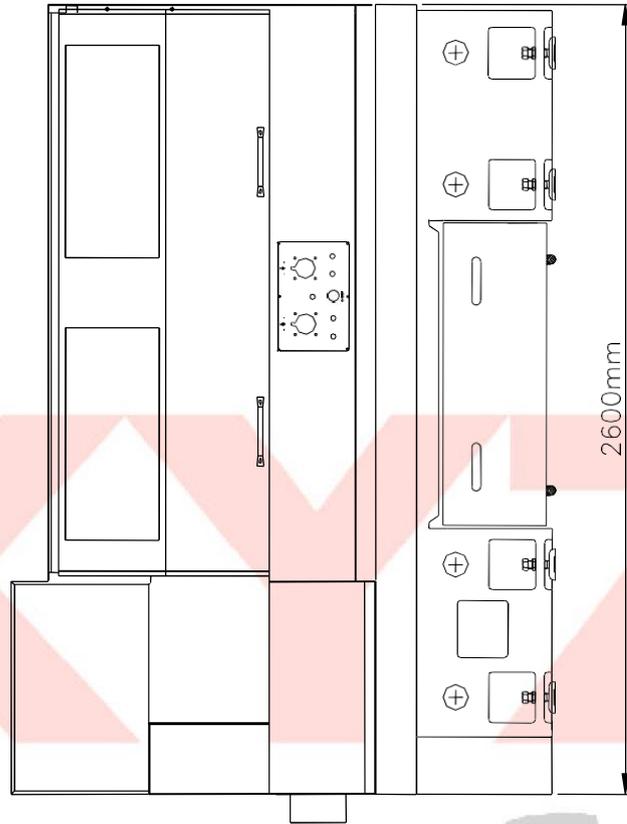
- ⌘ ADJUST LEVELING
- ⌘ AIR ASSISTED FLOATING TAILSTOCK SYSTEM
- ⌘ AUTOMATIC LUBRICATION SYSTEM
- ⌘ COOLANT SYSTEM
- ⌘ ELECTRONIC HANDWHEELS
- ⌘ ERGONOMICALLY MOUNTED OPERATOR CONTROL
- ⌘ HALF ENCLOSURE MACHINE GUARD
- ⌘ HIGH INTENSITY MACHINE LIGHT
- ⌘ WORKING LIGHT
- ⌘ MANUAL
- ⌘ SPINDLE CENTER
- ⌘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

## OPTIONAL ACCESSORIES

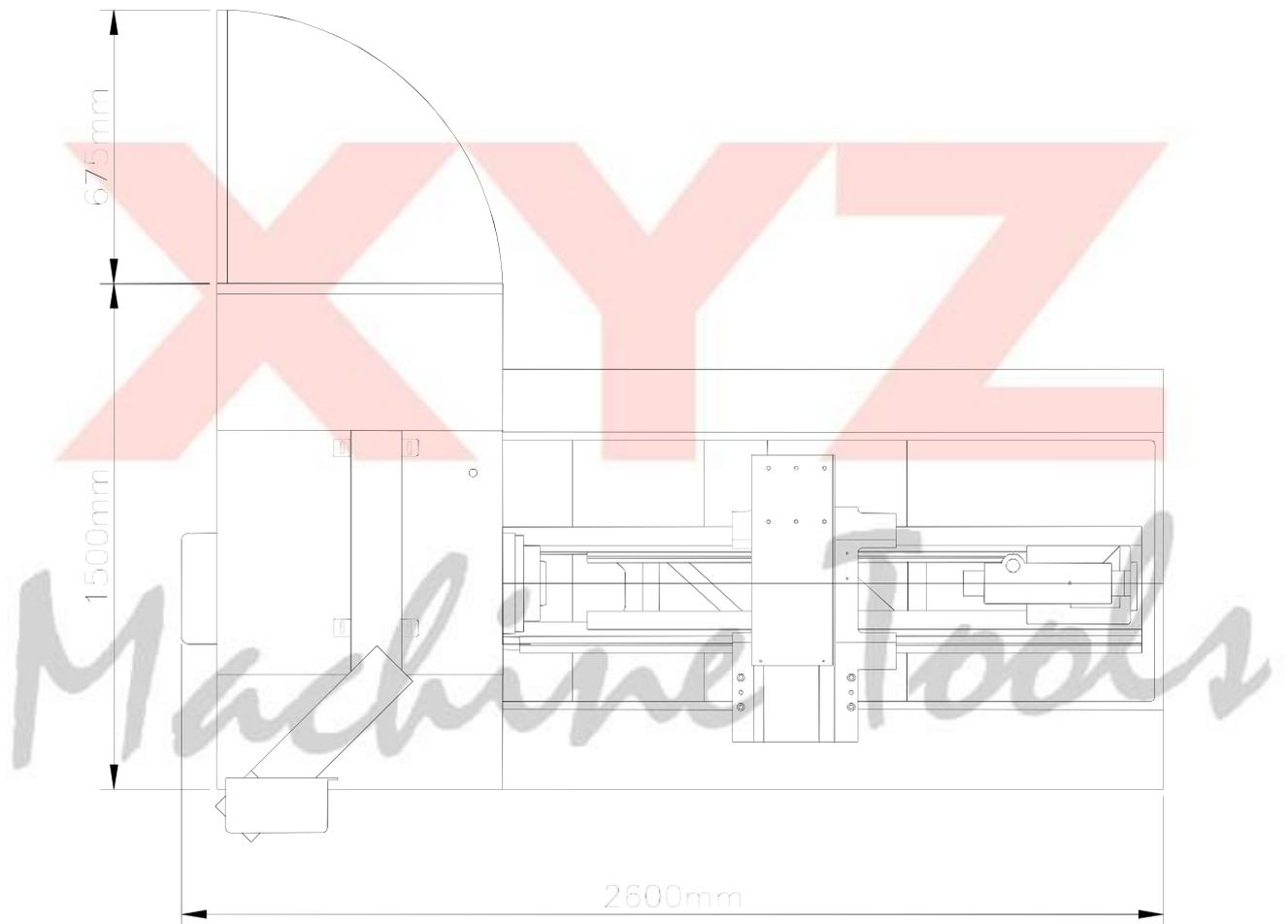
- ⌘ HYDRAULIC CHUCK
- ⌘ HYDRAULIC TAILSTOCK
- ⌘ 4 STATION INDEXING TOOLPOST
- ⌘ 8 STATION SERVO TURRET
- ⌘ OIL MIST COLLECTOR
- ⌘ OIL SKIMMER
- ⌘ FULL MACHINE GUARD
- ⌘ STATIONARY STEADY ASSEMBLY
- ⌘ TRAVELLING STEADY ASSEMBLY
- ⌘ AUTOMATIC CHANGE SPINDLE SPEED SYSTEM

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

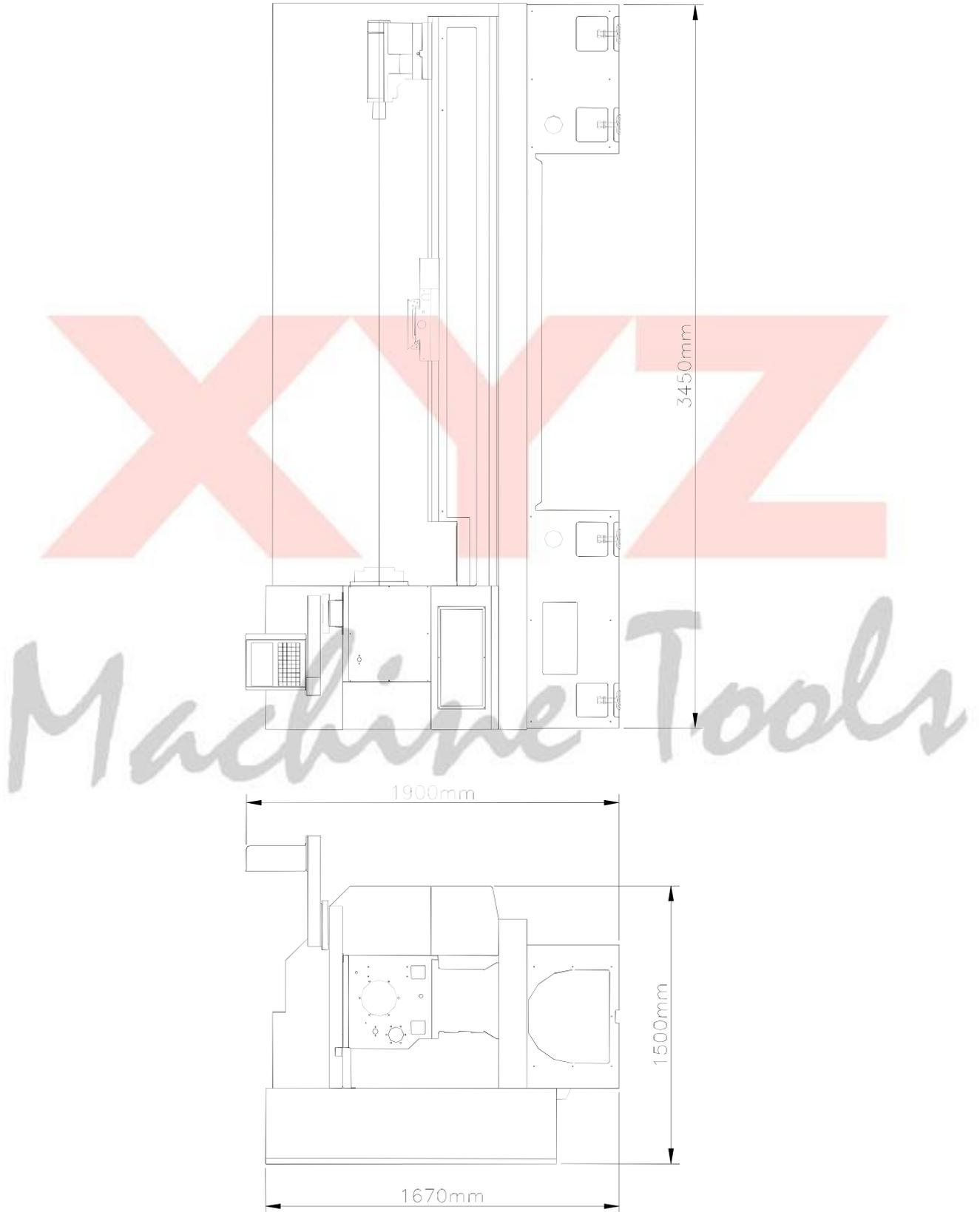
### RLX425 DIMENSION (STANDARD )

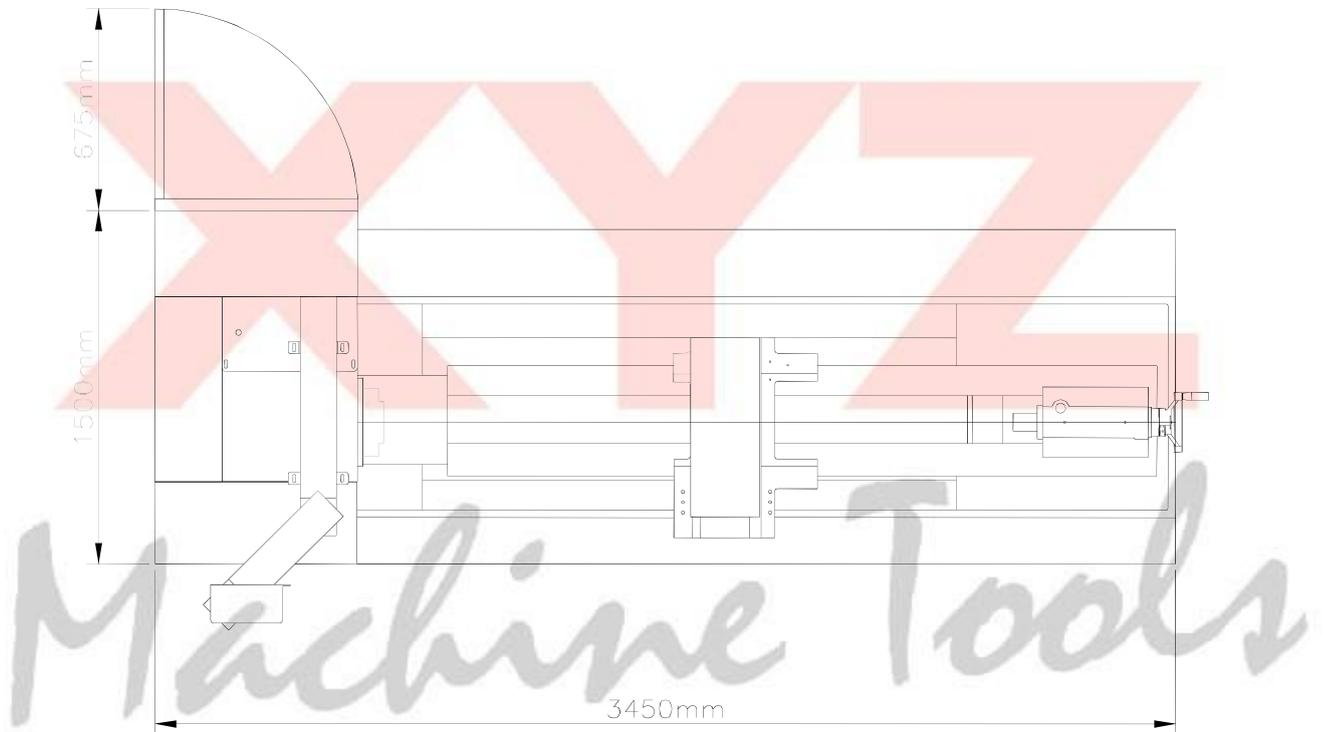


Machine Tools



### RLX425 2M 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.



# CONTENTS

## CHAPTER 1 HEALTH AND SAFETY

1.1	OPERATOR SAFETY .....	CH1-2
1.2	HEALTH AND SAFETY AT WORK .....	CH1-2
1.3	NOISE LEVEL.....	CH1-3
1.4	OPERATING HAZARDS.....	CH1-3
1.5	VARIABLE SPEED DRIVE .....	CH1-4
1.6	POTENTIAL DANGER AREAS .....	CH1-4
1.7	MACHINE SAFETY GUARD .....	CH1-4
1.8	OPERATING SAFETY PRECAUTIONS.....	CH1-5
1.9	GENERAL PRINCIPLES CONCERNING OPERATOR SAFETY FOR ALL TURNING MACHINES .....	CH1-6
1.10	SAFE OPERATION OF LATHE CHUCKS .....	CH1-11
1.11	SIGNS.....	CH1-12

## CHAPTER 2 SHIPPING AND HANDLING

2.1	SHIPPING AND HANDLING.....	CH2-2
2.2	LIFTING WITH THE MACHINE PACKED .....	CH2-4
2.3	TRANSPORTATION AND UNPACKING .....	CH2-7
2.4	STORAGE .....	CH2-8

## CHAPTER 3 INSTALLATION

3.1	PREPARATION .....	CH3-2
3.2	INSTALLATION LOCATION .....	CH3-4
3.3	FOUNDATION CONSTRUCTION PLAN .....	CH3-5
3.4	ELECTRICAL EQUIPMENT INSTALLATION .....	CH3-7
3.5	LEVELING THE MACHINE .....	CH3-12
3.6	INSPECTION .....	CH3-13

## CHAPTER 4 OPERATIONAL PROCEDURE

4.1	MACHINE .....	CH4-2
4.2	SAFETY EQUIPMENT .....	CH4-2
4.3	BEFORE START-UP .....	CH4-2
4.4	START AND STOP THE MACHINE .....	CH4-4
4.5	WARM-UP .....	CH4-5
4.6	PREPARATION .....	CH4-6
4.7	OPERATION .....	CH4-7
4.8	ZERO POINT RETURNING PROCEDURE .....	CH4-8
4.9	MANUAL OPERATION PROCEDURE .....	CH4-9
4.10	START OR STOP THE SPINDLE ROTATION .....	CH4-10
4.11	OPERATION .....	CH4-13
4.12	BREAK-UP .....	CH4-13
4.13	FINISH .....	CH4-13

4.14	INSPECTION AFTER FINISH .....	CH4-14
4.15	TURNED SURFACE FINISHES .....	CH4-15

## CHAPTER 5 MECHANISM AND ADJUSTMENT

5.1	HEADSTOCK SYSTEM.....	CH5-2
5.2	FEED-MOTION TRANSMISSION MECHANISM.....	CH5-6
5.3	APRON .....	CH5-8
5.4	TOOLPOST MECHANISM.....	CH5-9
5.5	TAILSTOCK.....	CH5-10
5.6	THE FULL-ENCLOSED (OPTION).....	CH5-11
5.7	LUBRICATOR.....	CH5-12

## CHAPTER 6

6.1	MECHANICAL ADJUSTMENT .....	CH6-2
6.2	TRANSMISSION'S BELT TENSION.....	CH6-3
6.3	GIB ADJUSTMENT.....	CH6-8
6.4	TAILSTOCK ADJUSTMENT .....	CH6-10
6.5	HEADSTOCK ADJUSTMENT.....	CH6-12
6.6	REMOVE/REFIT GAP PIECE.....	CH6-14

## **CHAPTER 7 MACHINE MAINTENANCE**

7.1	PREPARATION BEFORE MAINTENANCE .....	CH7-2
7.2	LUBRICATION SYSTEM .....	CH7-2
7.3	LUBRICATION .....	CH7-3
7.4	THE MACHINE MAINTENANCE .....	CH7-6
7.5	PREVENTIVE MAINTENANCE .....	CH7-8
7.6	HOW TO ORDER REPLACEMENT PARTS .....	CH7-10

## **CHAPTER 8 FUNCTION**

8.1	TROUBLE SHOOTING .....	CH8-2
8.2	ISO METRIC THREAD DATA .....	CH8-3

*Machine Tools*

## CHAPTER 9 PARTS LIST

9.1	SPINDLE DRIVE ASSEMBLY .....	H01-1
9.2	SPEED SELECTOR ASSEMBLY .....	H02-1
9.3	CHUCK COVER ASSEMBLY .....	H03-1
9.4	ENCODER ASSEMBLY .....	H04-1
9.5	HEAD LUBRICATION ASSEMBLY .....	H05-1
9.6	BED ASSEMBLY .....	H06-1
9.7	SPINDLE MOTOR DRIVE ASSEMBLY .....	H07-1
9.8	SADDLE ASSEMBLY .....	H08-1
9.9	CROSS SLIDE ASSEMBLY .....	H09-1
9.10	TAILSTOCK ASSEMBLY .....	H10-1
9.11	X AXIS DRIVE ASSEMBLY .....	H11-1
9.12	Z AXIS DRIVE ASSEMBLY .....	H12-1
9.13	STATIONARY STEADY .....	H13-1
9.14	TRAVELLING STEADY .....	H14-1
9.15	GUARD ASSEMBLY .....	H15-1

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# **CHAPTER 1**

## **HEALTH AND SAFETY**

PLEASE READ CAREFULLY BEFORE  
OPERATION OF THIS MACHINE

## 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 worn by the operator and all exposed persons operating this machine. Do not rely on the door guard for ultimate protection.
14. Beware to reset the coordinates after you take over the machine unless it is not necessary due to common coordinates when several people share the machine operation.
15. Isolate machine when leaving it unattended.

## 1.9 GENERAL PRINCIPLES CONCERNING OPERATOR SAFETY FOR ALL TURNING MACHINES

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

18. Beware of material flying from the lathes.
19. Do not wear rings, watches, ties or loose sleeved clothing.
20. Always use the recommended or equivalent hydraulic oil, lubricant oil and grease.
21. The working table adjacent to the machine should be secured to prevent the workpiece room falling onto the machine.
22. Ensure the machine is stopped and the power is off before replacing the fuse.
23. Always use the fuse with the same specification for replacement.
24. Do not use other workholding devices without checking for compatibility with this lathe.
25. Do not touch the switch with wet 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.

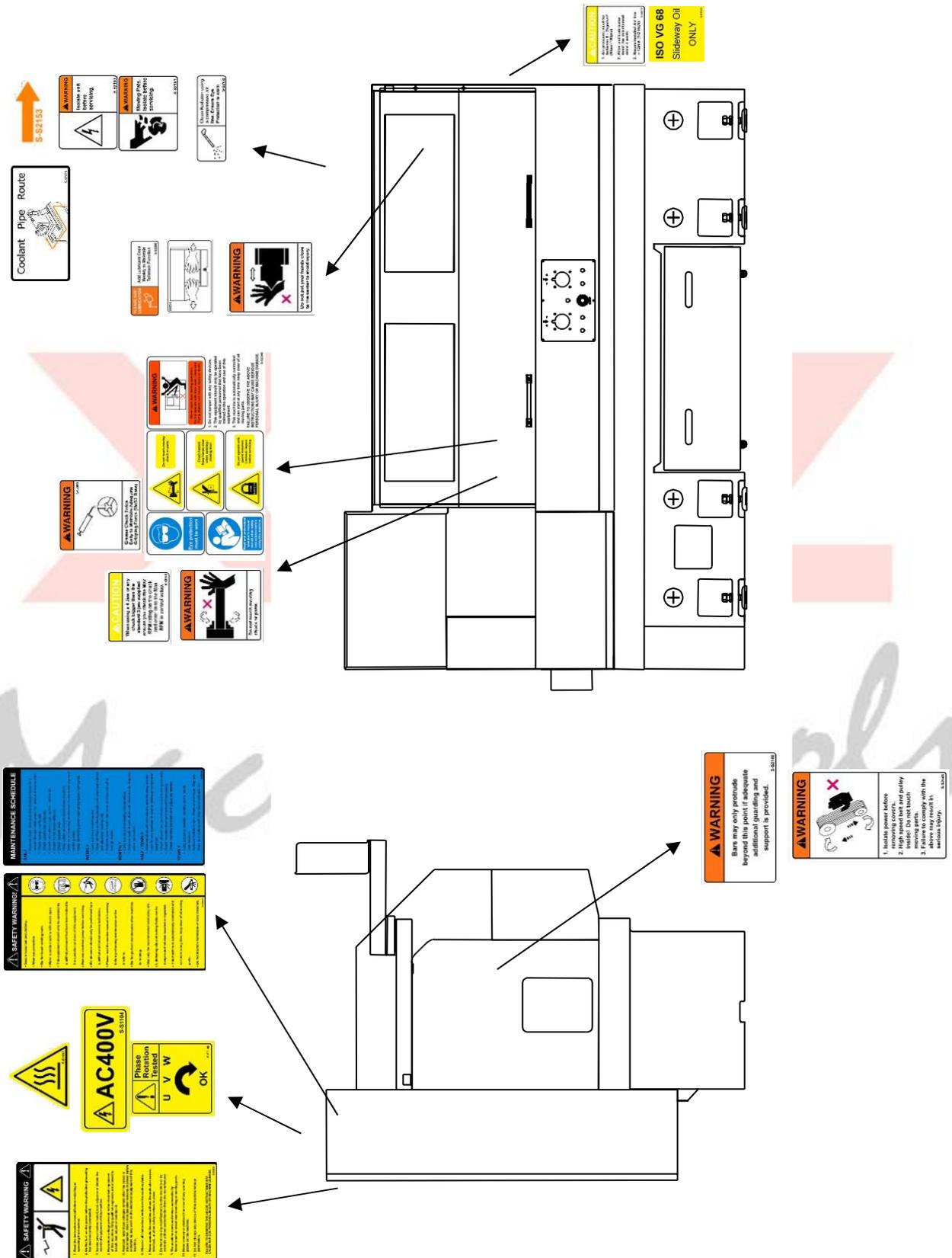
73. Never use excessive forces in polishing, filing.
74. Always use the proper hand tool to remove swarf.
  - (a) Never hurry to remove swarf.
  - (b) Beware of swarf wrapped around the spindle or workpiece.
75. Beware of tools/lathe parts falling on controls.
76. Do not change the original setting parameters 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 warning. 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.

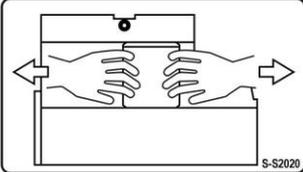
## 1.10 SAFE OPERATION OF LATHE CHUCKS

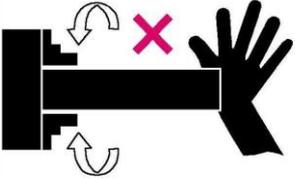
Where details of operating speeds and of maximum recommended operating speeds are supplied these are intended only as a guide. Such details must be regarded as for general guidance only for the following reasons K

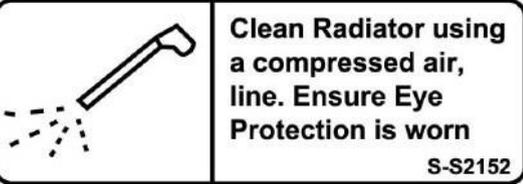
1. They apply only to chucks in sound condition.
2. If a chuck has sustained damage, high speeds may be dangerous. This applies particularly to chucks with gray cast iron bodies wherein fractures may occur.
3. The gripping power required for any given application is not known in advance.
4. The actual 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.

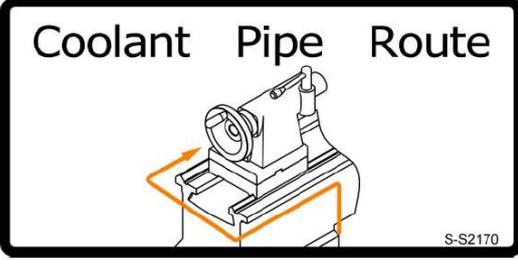
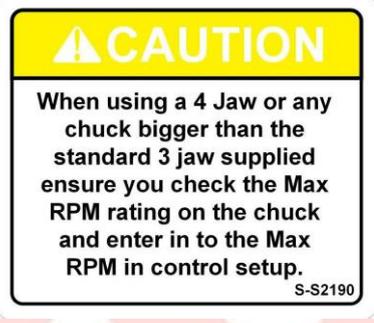
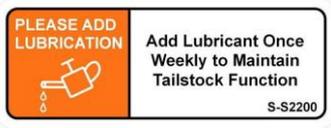
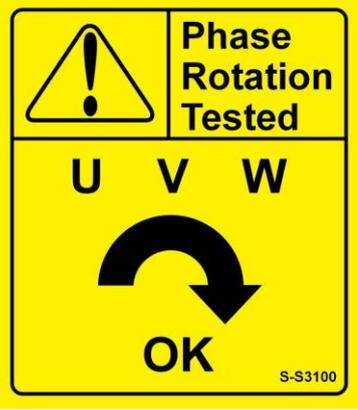
# 1.11 SIGNS



<p><b>S-S1104</b> AC400V Yellow Sticker</p>	
<p><b>S-S1112</b> High Temperature Warning</p>	
<p><b>S-S1123</b> ISO 68 Slideway OIL</p>	
<p><b>S-S2020</b> Tailstock Moving Sticker</p>	
<p><b>S-S2030</b> Quill Out Warning</p>	
<p><b>S-S2040</b> Belt Warning</p>	

<p><b>S-S2050</b></p> <p>Air Rotation Tested</p>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>▲ CAUTION</b></p> <ol style="list-style-type: none"> <li>1. Air pressure must be between 6 - 7kgs/cm<sup>2</sup> (85psi-100psi).</li> <li>2. Filter and Lubricator must be maintained once a week.</li> <li>3. Recommended Air line - 12mm (1/2 inch).</li> </ol> <p style="text-align: right; font-size: small;">S-S2050</p> </div>
<p><b>S-S2060</b></p> <p>Spindle Running Warning</p>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;"><b>▲ WARNING</b></p>  <p style="text-align: center;">Do not touch moving chuck or parts.</p> </div>
<p><b>S-S2340</b></p> <p>RLX Safety F Warning</p>	<div style="border: 1px solid black; padding: 10px;"> <div style="display: flex; flex-wrap: wrap;"> <div style="width: 33%; border: 1px solid black; padding: 5px; margin: 5px;">  <p style="text-align: center; font-size: small;">Eye protection must be worn</p> </div> <div style="width: 33%; border: 1px solid black; padding: 5px; margin: 5px;">  <p style="text-align: center; font-size: x-small;">Do not touch moving chuck or parts.</p> </div> <div style="width: 33%; border: 1px solid black; padding: 5px; margin: 5px;">  <p style="text-align: center; font-size: x-small;">Never open door during operation. Do not operate with door open / removed. Flying objects can cause injury or death.</p> </div> <div style="width: 33%; border: 1px solid black; padding: 5px; margin: 5px;">  <p style="text-align: center; font-size: x-small;">Read and understand operator's manual and all other safety instructions before using this machine.</p> </div> <div style="width: 33%; border: 1px solid black; padding: 5px; margin: 5px;">  <p style="text-align: center; font-size: x-small;">Crush hazard. Keep hands clear when opening / closing door.</p> </div> <div style="width: 33%; border: 1px solid black; padding: 5px; margin: 5px;">  <p style="text-align: center; font-size: x-small;">Do not operate with guard removed. Lockout / tagout before servicing.</p> </div> </div> <div style="margin-top: 10px;"> <ol style="list-style-type: none"> <li>1. Do not tamper with any safety devices.</li> <li>2. This equipment should only be operated by qualified personnel that have been trained in the operation and use of this equipment.</li> <li>3. This machine is automatically controlled and can start at any time. Keep clear of all moving parts.</li> </ol> <p style="font-size: x-small; margin-top: 5px;"><b>FAILURE TO OBSERVE THE ABOVE INSTRUCTIONS MAY CAUSE SERIOUS PERSONAL INJURY OR MACHINE DAMAGE.</b></p> <p style="text-align: right; font-size: x-small;">S-S2340</p> </div> </div>

<p><b>S-S2091</b></p> <p>Grease Maintain Warning</p>	
<p><b>S-S2140</b></p> <p>Bar Warning</p>	
<p><b>S-S2150</b></p> <p>Radiator Sticker A</p>	
<p><b>S-S2151</b></p> <p>Radiator Sticker B</p>	
<p><b>S-S2152</b></p> <p>Radiator Sticker C</p>	
<p><b>S-S2153</b></p> <p>Radiator Sticker D</p>	

<p><b>S-S2170</b></p> <p>Coolant Pipe Route</p>	
<p><b>S-S2190</b></p> <p>Chuck Caution</p>	
<p><b>S-S2200</b></p> <p>Lubricant To Tailstock</p>	
<p><b>S-S3100</b></p> <p>Phase Rotation Tested</p>	

**S-S3030**

## Maintenance Schedule

**MAINTENANCE SCHEDULE****DAILY**

- Remove chips, dust and other foreign matter from around the axis slide ways, tool post and way covers.
- Check hydraulic oil levels.
- Check Lubrication oil levels.
- Check lubrication is getting to all slideways.
- Check Air lubricator oil level.
- Check coolant level.
- Keep collets and tool holders clean of debris.
- Make sure clamping mechanism is clean and in proper working order.
- Keep all moving parts clean and properly lubricated.

**WEEKLY**

- Carry out daily maintenance.
- Clean air filters on the hydraulic unit, electrical cabinet and electrical cooling unit.
- Remove covers and clean area of chips and other foreign matter.

**MONTHLY**

- Carry out daily and weekly maintenance.
- Remove coolant tank, drain and clean inside. Replace with new coolant.

**HALF - YEARLY**

- Remove all covers and clean under slideway covers.
- Look for any damage or wear to slideway covers and electrical.
- Check all switches and interlocks are working correctly.
- Check machine level and re-level if necessary.
- Check machine backlash and adjust as needed.

**YEARLY**

- Carry out daily, weekly, monthly and 6 month maintenance.
- Remove hydraulic tank. Drain oil and clean. Replace filters and replace with new clean hydraulic oil.

S-S3030

**S-S3040**

Safety Warning


SAFETY WARNING!


- Secure loose hair and clothing.
- Wear eye protection.
- Do Not touch rotating tools.
- Never operate machine with doors open.
- This equipment should only be operated by qualified personnel that have been trained in the operation and use of this equipment.
- Remove electrical power before servicing.
- Maintenance should only be performed by a qualified and trained service technician.
- Please read the service manual in it entirety before performing maintenance on the machine.
- Do Not perform maintenance when machine is running.
- Use only the recommended lubricating oils.
- Lubricating oils and cutting fluids can be dangerous if inhaled, touched or ingested.
- This machine is automatically controlled and can start at any time. keep clear of all moving parts.
- Do Not machine flammable or toxic materials.





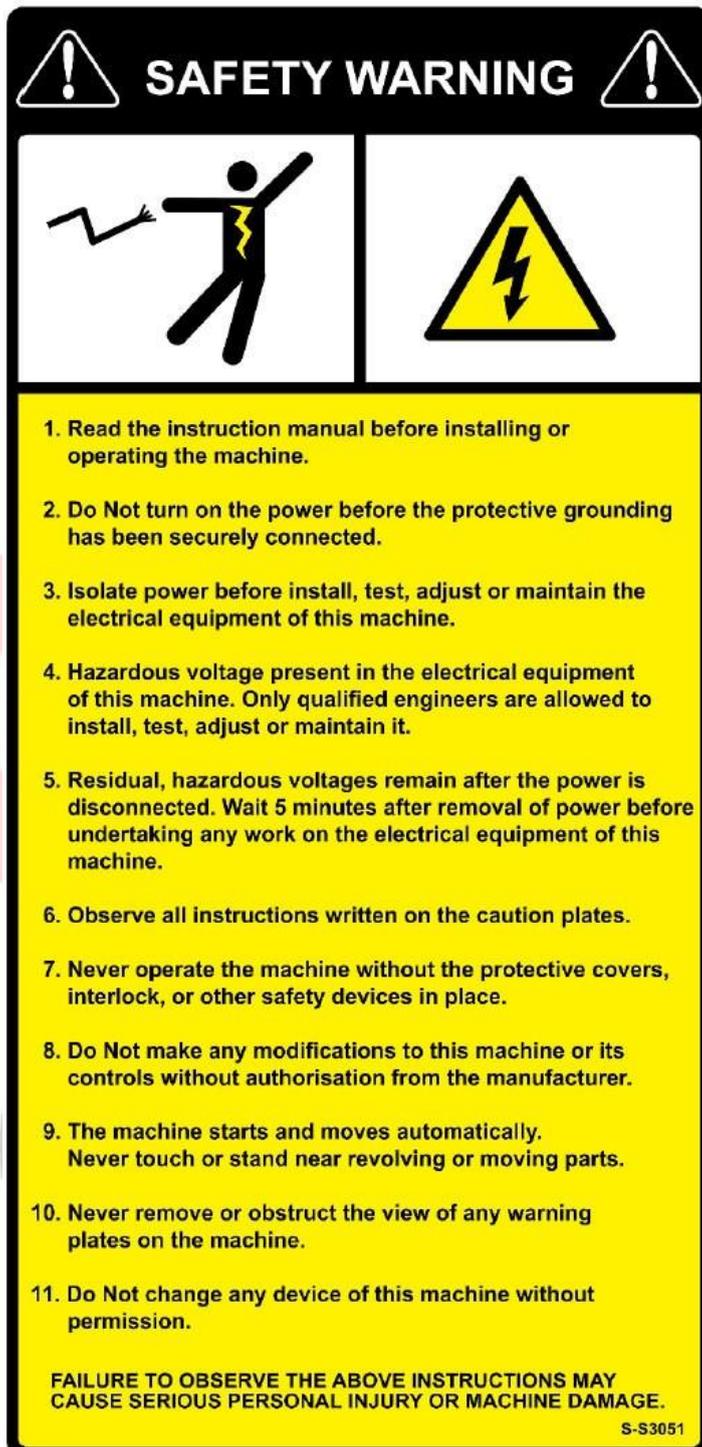




S-S3040

**S-S3051**

## Safety Precautions



The sign features a black border and a yellow background. At the top, the words "SAFETY WARNING" are written in bold black letters, flanked by two white exclamation marks inside black triangles. Below this, there are two white rectangular boxes. The left box contains a black silhouette of a person being struck by a lightning bolt, with a jagged line representing the bolt. The right box contains a yellow triangle with a black lightning bolt symbol. Below these boxes, there is a list of 11 numbered safety instructions in black text. At the bottom of the sign, there is a warning statement in bold black text, and the code "S-S3051" is printed in the bottom right corner.

**SAFETY WARNING**

1. Read the instruction manual before installing or operating the machine.
2. Do Not turn on the power before the protective grounding has been securely connected.
3. Isolate power before install, test, adjust or maintain the electrical equipment of this machine.
4. Hazardous voltage present in the electrical equipment of this machine. Only qualified engineers are allowed to install, test, adjust or maintain it.
5. Residual, hazardous voltages remain after the power is disconnected. Wait 5 minutes after removal of power before undertaking any work on the electrical equipment of this machine.
6. Observe all instructions written on the caution plates.
7. Never operate the machine without the protective covers, interlock, or other safety devices in place.
8. Do Not make any modifications to this machine or its controls without authorisation from the manufacturer.
9. The machine starts and moves automatically. Never touch or stand near revolving or moving parts.
10. Never remove or obstruct the view of any warning plates on the machine.
11. Do Not change any device of this machine without permission.

**FAILURE TO OBSERVE THE ABOVE INSTRUCTIONS MAY CAUSE SERIOUS PERSONAL INJURY OR MACHINE DAMAGE.**

S-S3051



**NOTE!!!**

On the RLX425/RLX425 2M 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.



# **CHAPTER 2**

## **SHIPPING AND HANDLING**

PLEASE READ CAREFULLY BEFORE SHIPPING  
AND HANDLING OF THIS LATHE

## 2.1 SHIPPING AND HANDLING

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

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

### 2.1.1 DANGERS

Ensure the shipping and handling equipment can handle a gross weight of 7 tons at least. If can't make certain of the load capacity of the handling equipment, please contact with the 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.**

XYZ  
Machine Tools

## 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

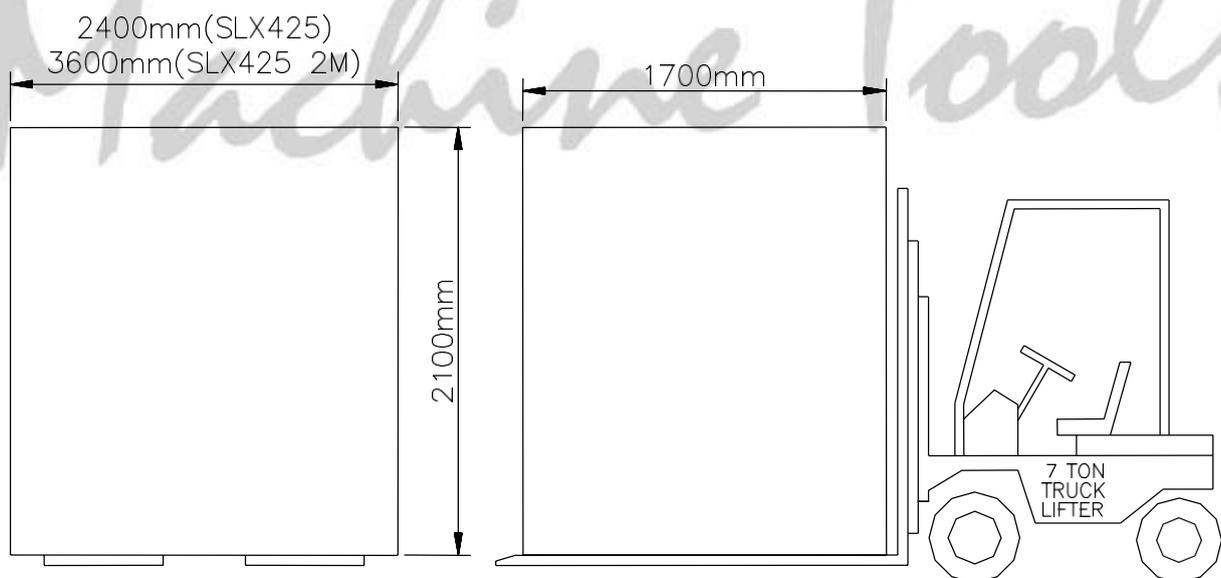
1. Use a forklift of sufficient capacity to raise or move the lathe.
2. Pay special attention to lathe balance while lifting.
3. Have another person to help guide the way while lifting the lathe.
4. Make sure the forks of the forklift protrude past the far edge of the lathe bottom.
5. Do not raise the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

Machine Tools

## 2.2.2 USING FORK-LIFTING TRUCK

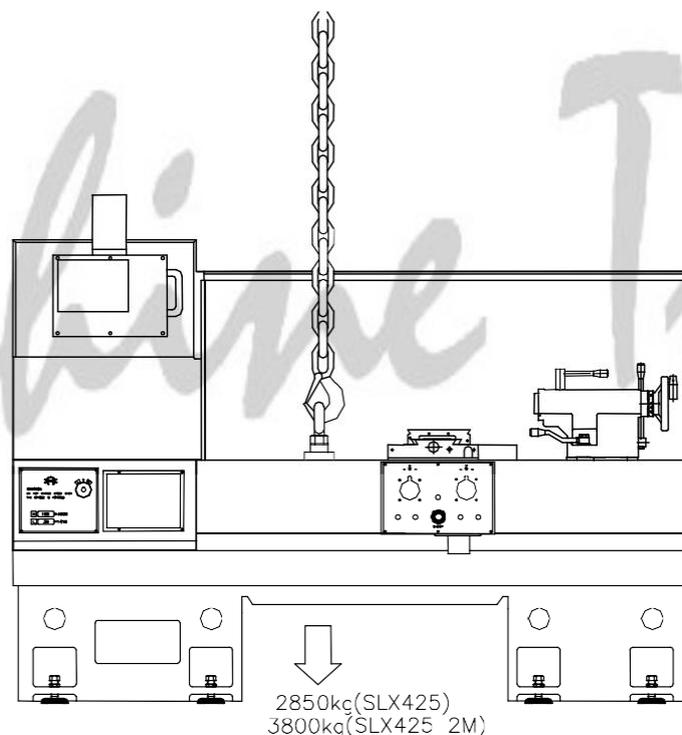
The lathe should be lifted and moved by a forklift. Attention should be paid to the machine balance during lifting and moving. This lathe should be lifted under the followingK

1. The loading capacity of the lifting equipment should be 7 tons at least.
2. Wire cables and chains of the lifting equipment should be able to bear a load of 7 tons at least.
3. The packed RLX425 lathe is 2400 mm in length, 1700 mm in width and 2100 mm in height. The packed RLX425 2M lathe is 3600 mm in length, 1700 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 overturn 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 7 tons at least. The loading capacity below 7 tons is prohibited.
2. Wire cables and chains of the lifting equipment should be able to bear a load of 7 tons at least.
3. Use only the sling frame provided to lift the lathe. Other fixture or rope are prohibited.
4. The RLX425 lathe is 2620 mm in length, 1380 mm in width and 1820 mm in height and RLX425 2M lathe is 3480 mm in length, 1380 mm in width and 1820 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.

Machine Tools

## 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

*Machine Tools*

### 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 standard 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.

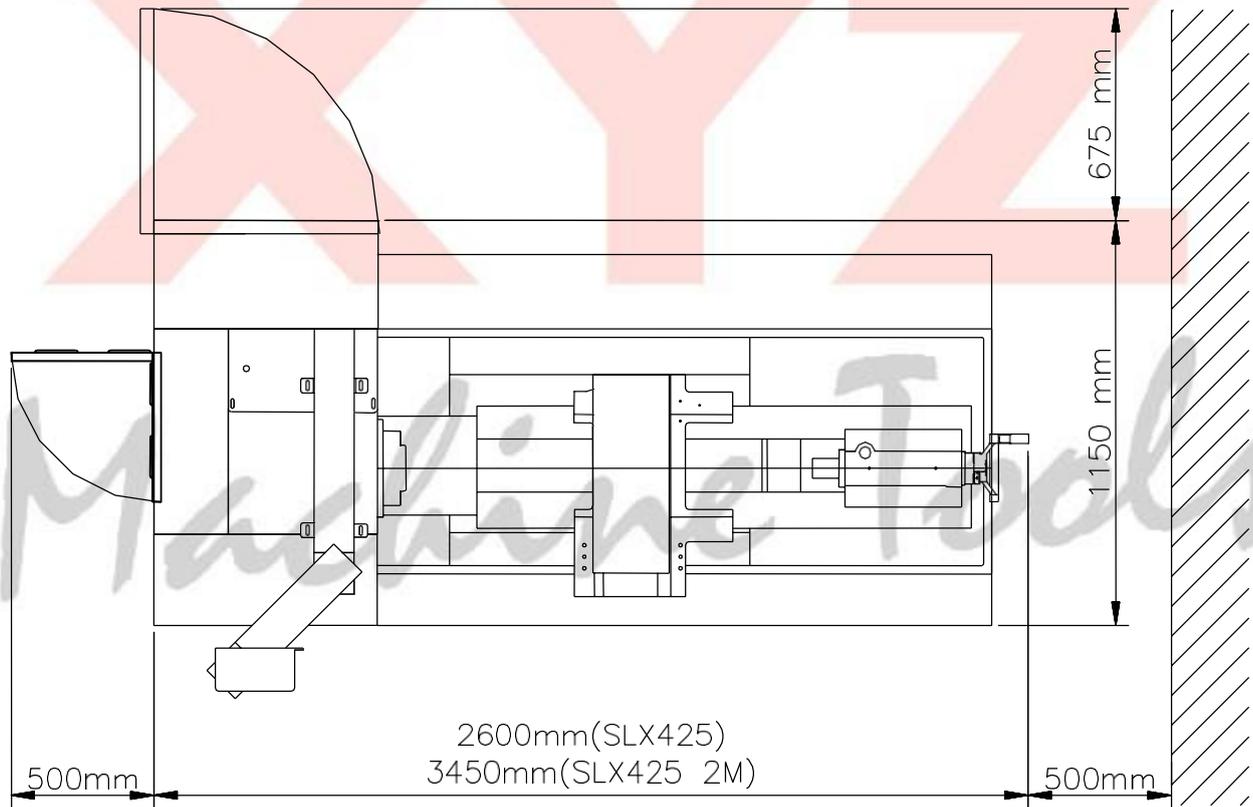
**WARNING !!!**

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

XYZ  
Machine Tools

### 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<sup>2</sup> Hz
3. TemperatureK 0°C to 45°C (32F to 113F)
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.

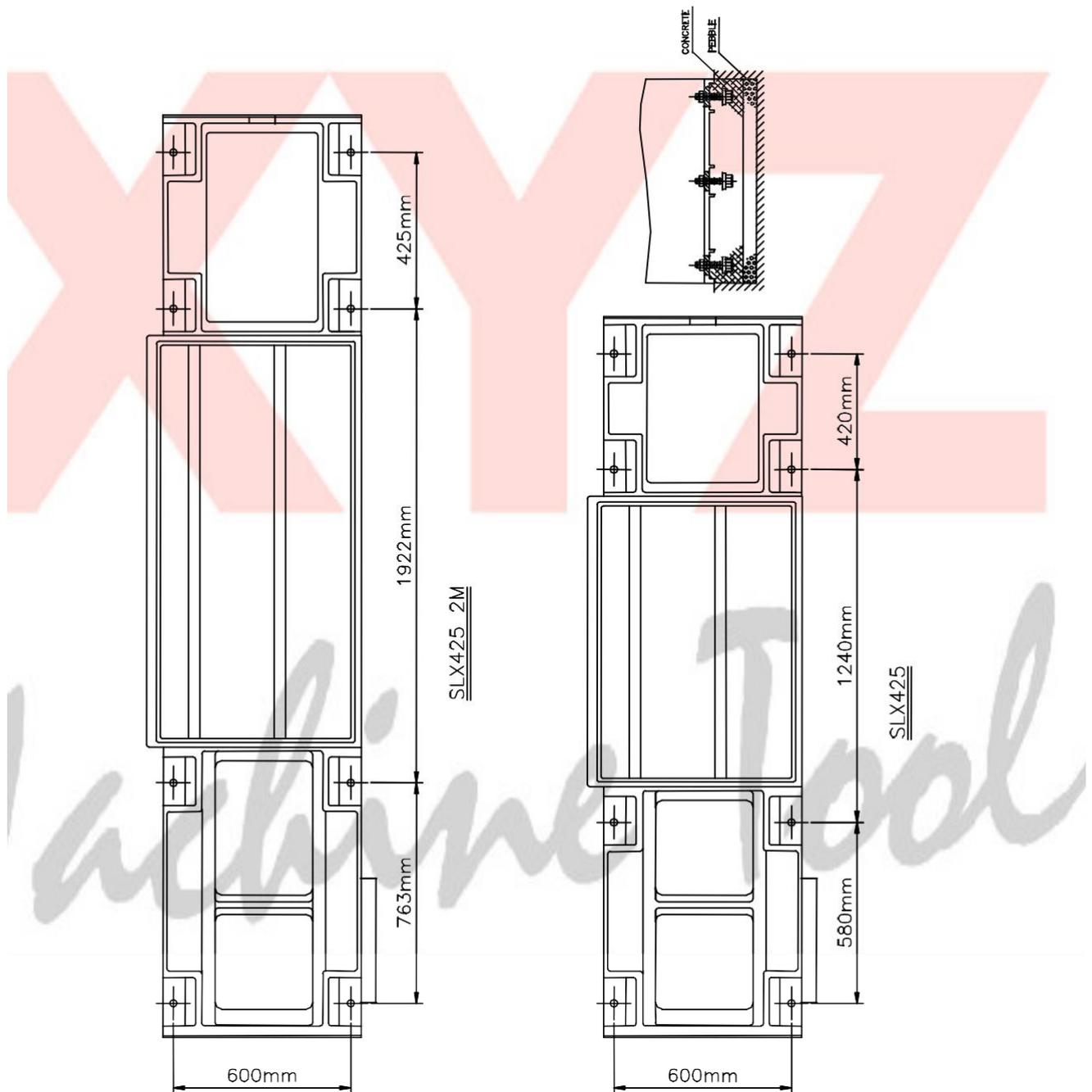
#### 3.3.1 FOUNDATION CONSTRUCTION PLAN ONE

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  $\pm 2$  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.

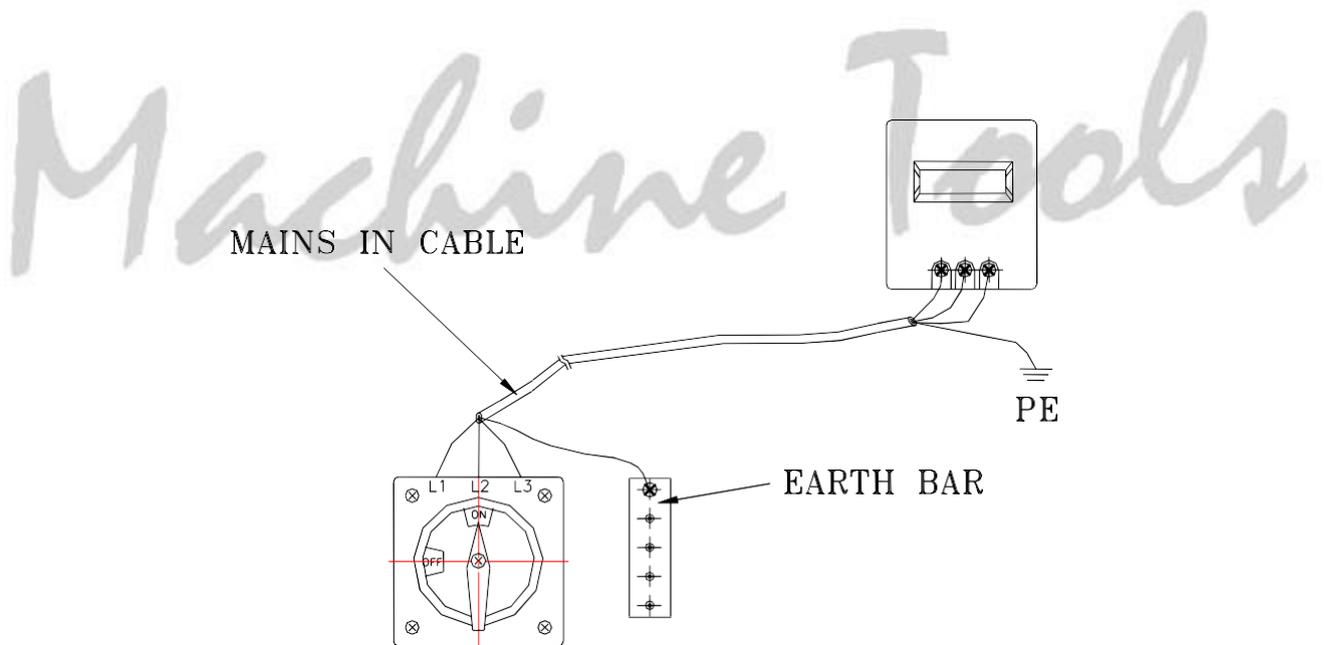
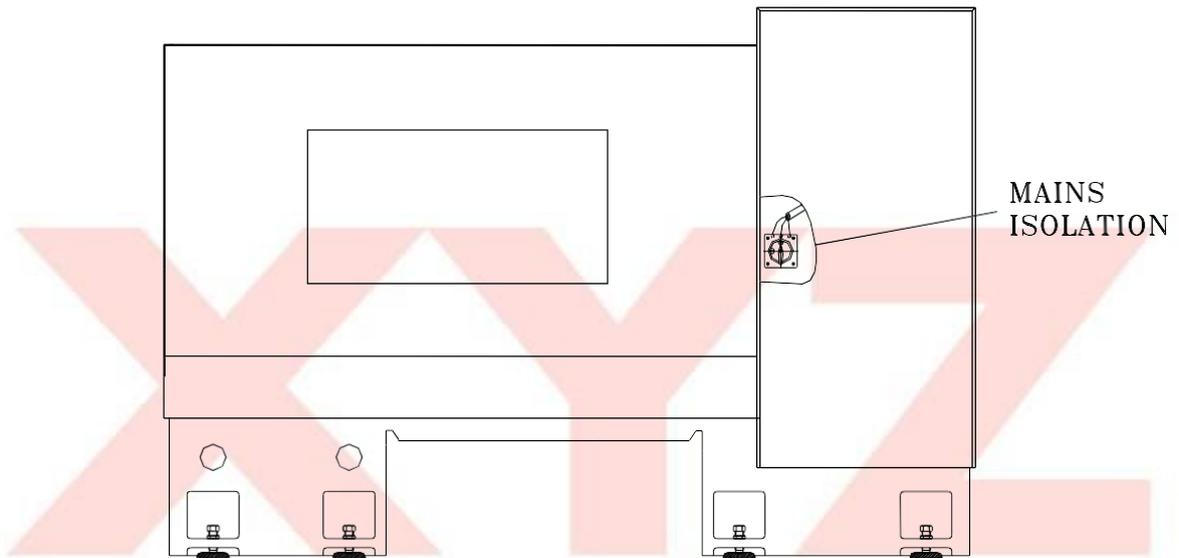
The minimum cross section area of the grounding wire lead used is 14 mm<sup>2</sup>. The impedance of the grounding wire should be less than 100 ohm. Dimensions of this wire should be larger than A W G No.5 and S W G No.6 . (Ensure this NC lathe is grounded to a individual grounding rod.) If this kind 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

EXK

$KVA = K(11KW + 1.3KW + 2.1 KW + 2.6KW) / 0.746 = 22.788 KVA = 22788 VA$   
 $220VK[(22788 VA / 220V)/1.732] \times 1.2 = 72 A$   
 $380VK[(19035 VA / 380V)/1.732] \times 1.2 = 42 A$   
 $415VK[(19035 VA / 415V)/1.732] \times 1.2 = 38 A$

#### CONTROL : FANUC (STANDARD)

Total power capacity of the equipment : 12 KW				
No.	Voltage	Rated Capacity	Wire	Current-fault breaker
1	220V	47 A	Н22`φ	60A
2	380V	30 A	Н10`φ	40A
3	415V	27 A	Н 10`φ	40A

#### CONTROL : FAGOR (STANDARD)

Total power capacity of the equipment : 10 KW				
No.	Voltage	Rated Capacity	Wire	Current-fault breaker
1	220V	35 A	Н14`φ	40A
2	380V	20 A	Н10`φ	30A
3	415V	19 A	Н 10`φ	30A

#### CONTROL : SIEMENS 802D (STANDARD)

Total power capacity of the equipment : 15 KW				
No.	Voltage	Rated Capacity	Wire	Current-fault breaker
1	220V	52 A	Н22`φ	60A
2	380V	30A	Н10`φ	40A
3	415V	28 A	Н 10`φ	40A

#### WARNING !!!

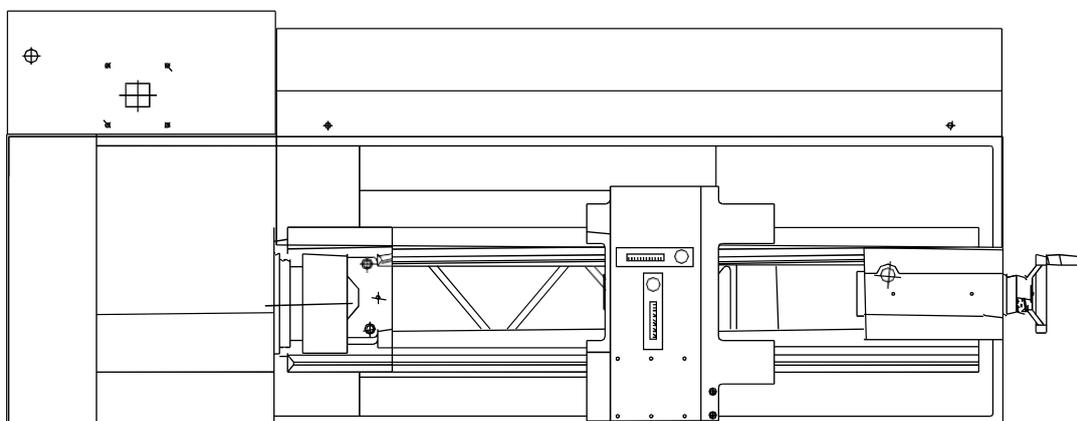
Ensure the electrical cables have the same or better power rating as prescribed in the electrical document.

## 3.5 LEVELING THE MACHINE

### 3.5.1 ADJUST THE MACHINE

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

1. Place the temporary foundation pads or leveling blocks on the foundation.
2. In the first case, insert the L-shape fixing stud through the pad and foundation bolt, then fasten the fixing stud with the nut.
3. Adjust foundation bolts until the space between the base bed and foundation pad is 5mm (approx.) long.
4. Place two horizontal levels on the cross slide orthogonally, level the lathe until differences between levels in both directions are within 0.05mm/m.
5. Fasten the setup nuts for the foundation pads and L shape-fixing studs.
6. 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 (1000 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.

Machine Tools

## 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.

XYZ  
Machine Tools

## 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)

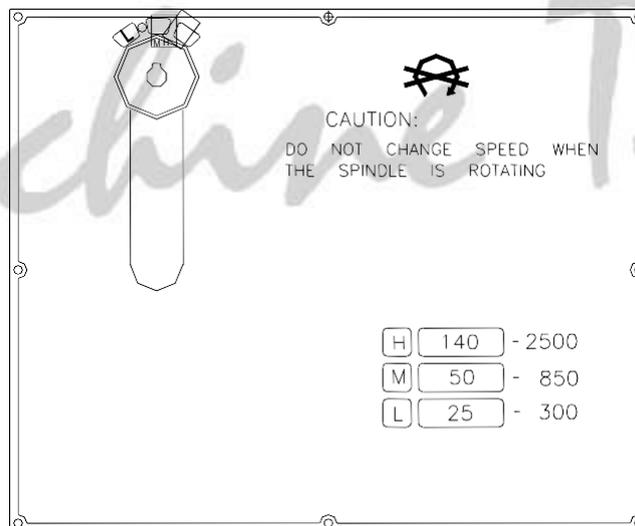
Spindle drive is from the main motor using an AC inverter variable speed drive and through a manually operated speed range selector lever. The spindle speed is first selected by means of the selector lever onto one of two positions.

**LOW SPEED :** 25 – 300 RPM

**MEDIUM SPEED :** 50 – 850 RPM

**HIGH SPEED :** 140 – 2500 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.**

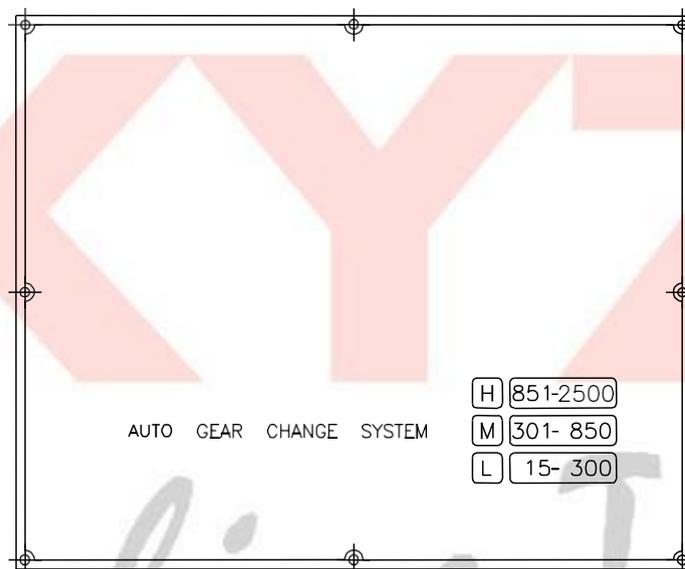
## 4.10.2 CHANGE SPINDLE SPEED (AUTO)

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

**LOW SPEED :** 15 – 300 RPM

**MEDIUM SPEED :** 301 – 850 RPM

**HIGH SPEED :** 851 – 2500 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  $N = S \times 1000 / \text{Radius} \times D$

D = diameter in mm

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

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

#### 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 or speed range will provide a sufficient increase in power availability to meet the proposed demand.

## 4.11 OPERATION

### 4.11.1 PREPARATION

Please follow steps below to prepare for the process 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.

**XYZ**

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*Machine Tools*

# **CHAPTER 5**

## **MECHANISM**

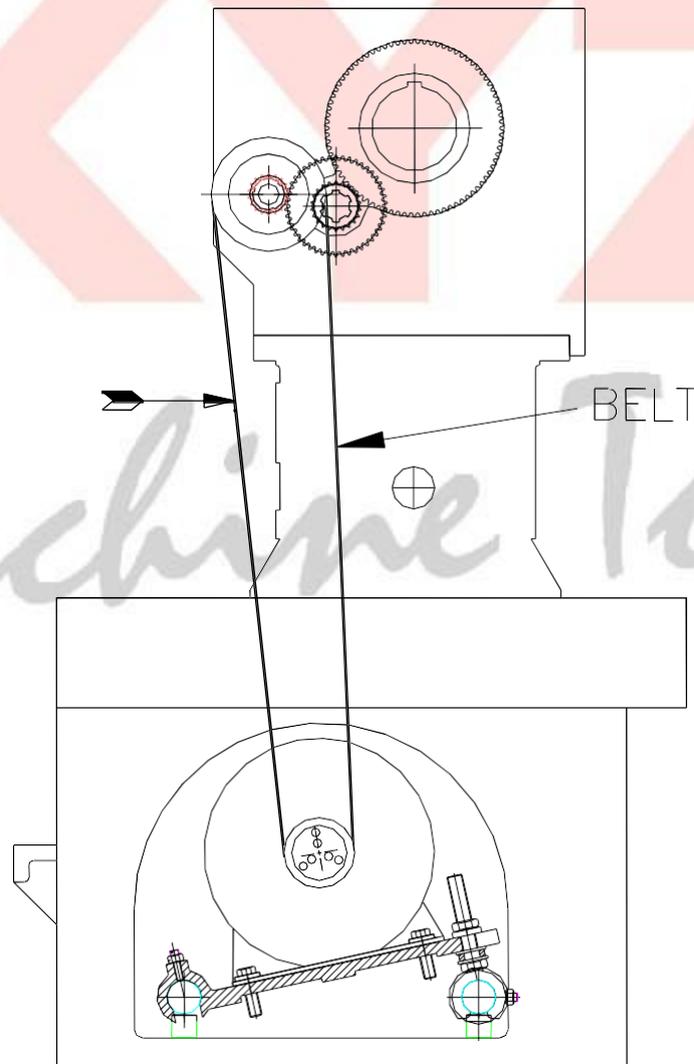
PLEASE READ CAREFULLY BEFORE  
OF ADJUSTMENT THIS MACHINE

*Machine Tools*

## 5.1 HEADSTOCK SYSTEM

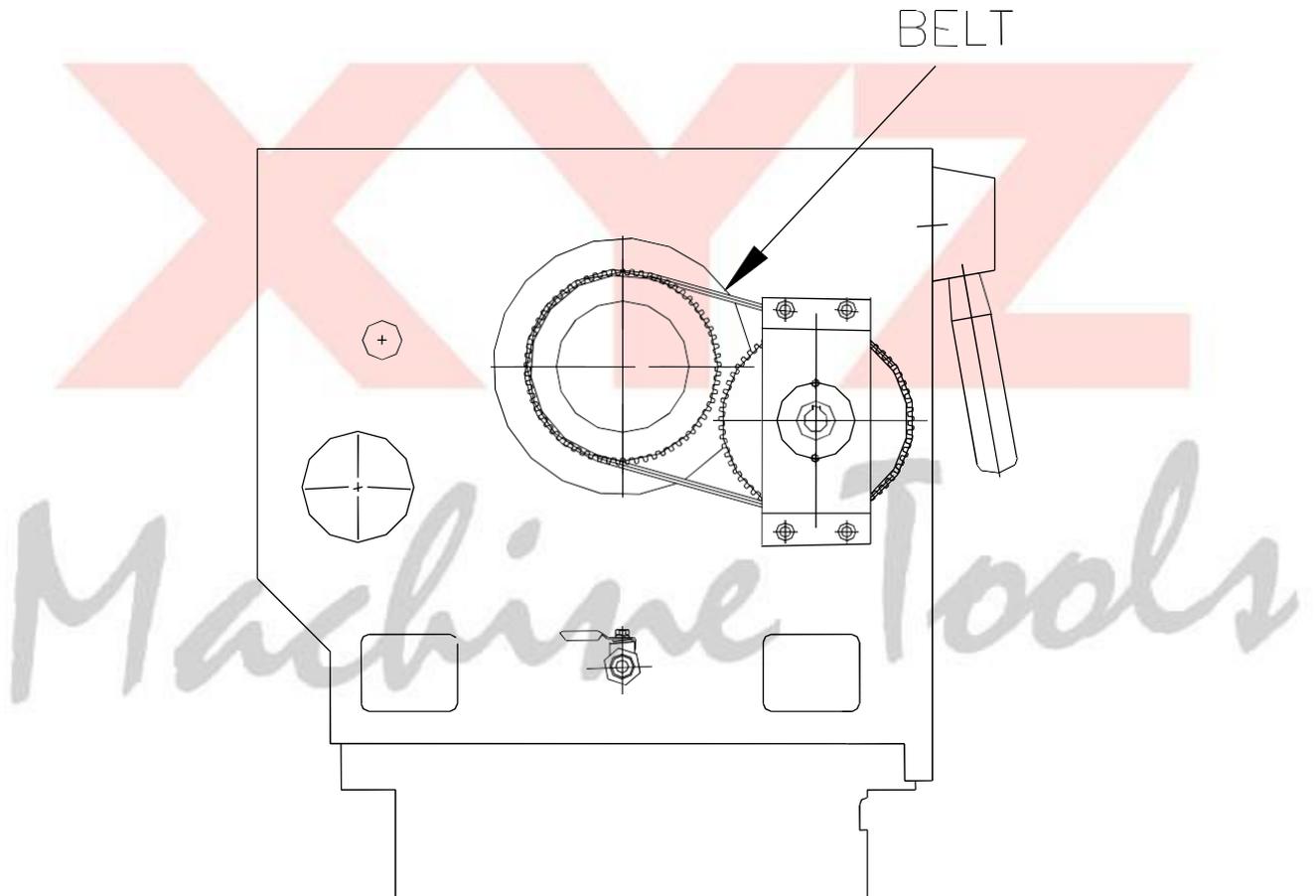
### 5.1.1 SPINDLE DRIVE MECHANISM

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.



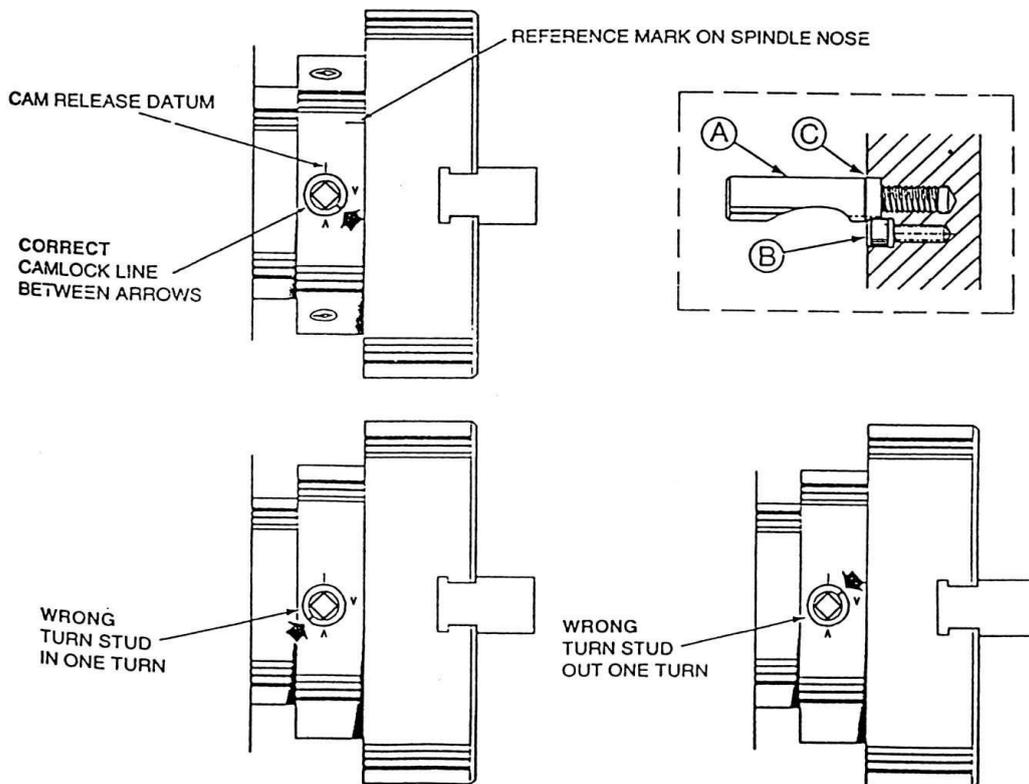
### 5.1.3 CHUCKS AND 3-JAW CHUCK MOUNTING

When fitting chucks or faceplates, first ensure that the spindle nose 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.**



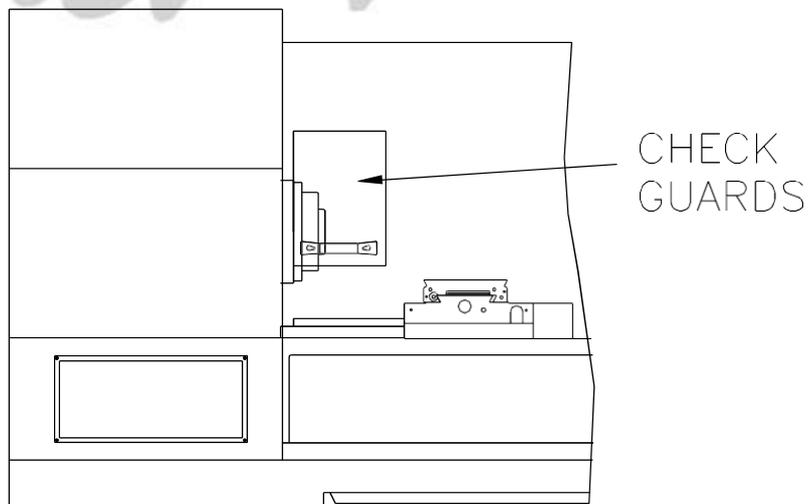
## 5.1.4 CHUCK GUARDS

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 !!!

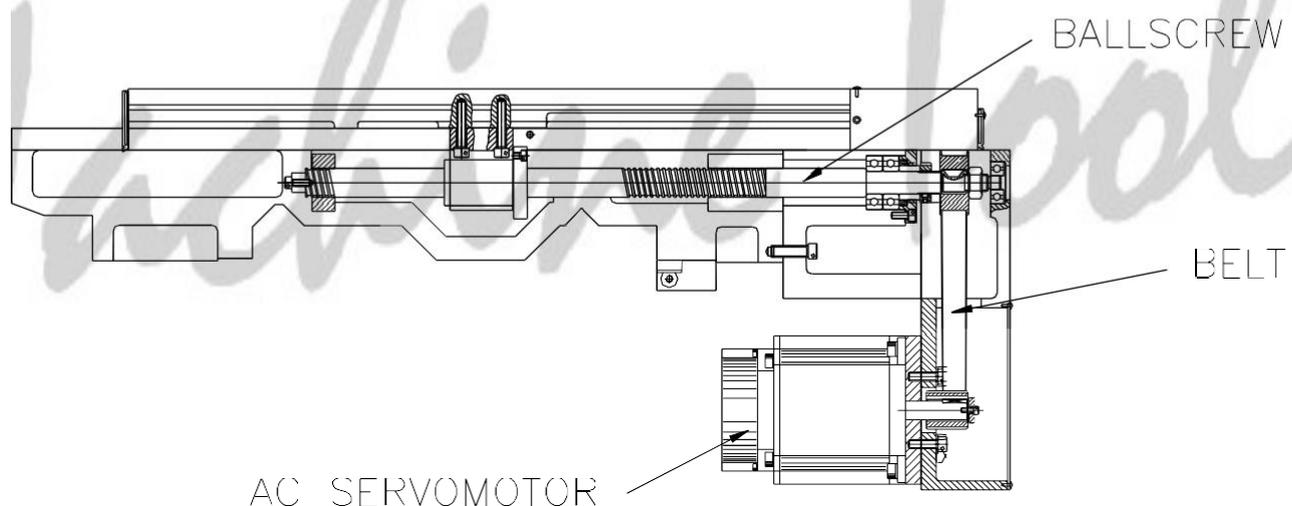
It is not recommended that the chuck jaw extend beyond the outside diameter of the chuck as in these cases interference with the chuck guards may occur.



## 5.2 FEED-MOTION TRANSMISSION MECHANISM

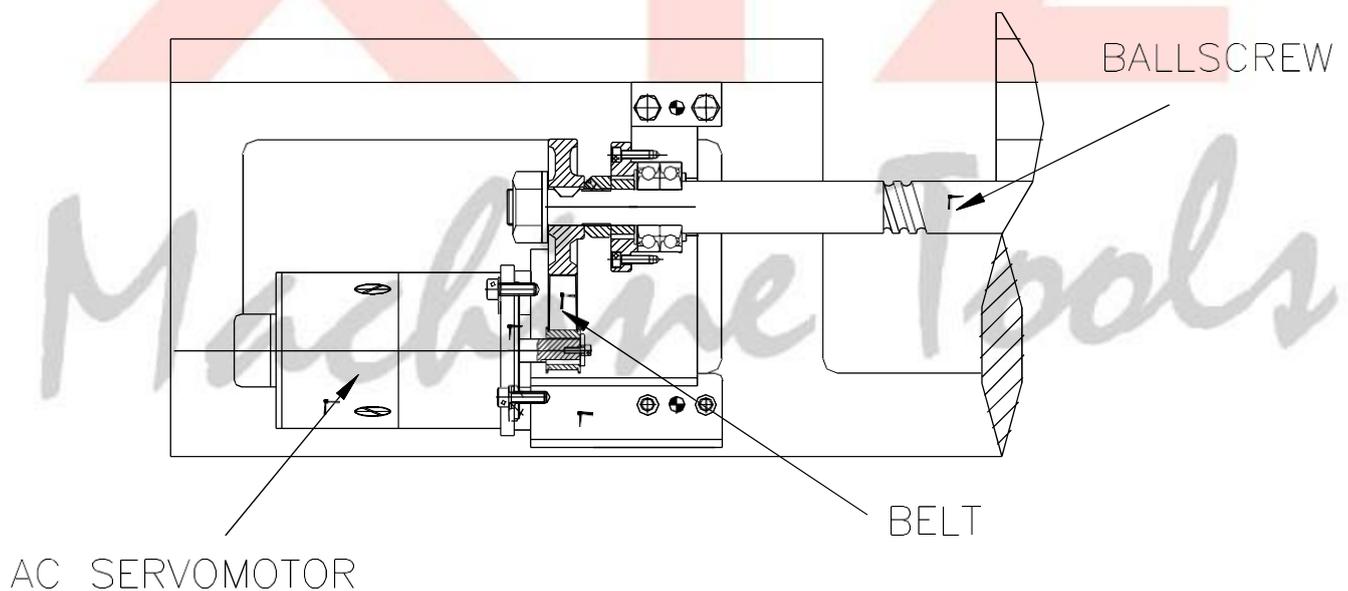
### 5.2.1 X AXIS TRANSMISSION MECHANISM

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.



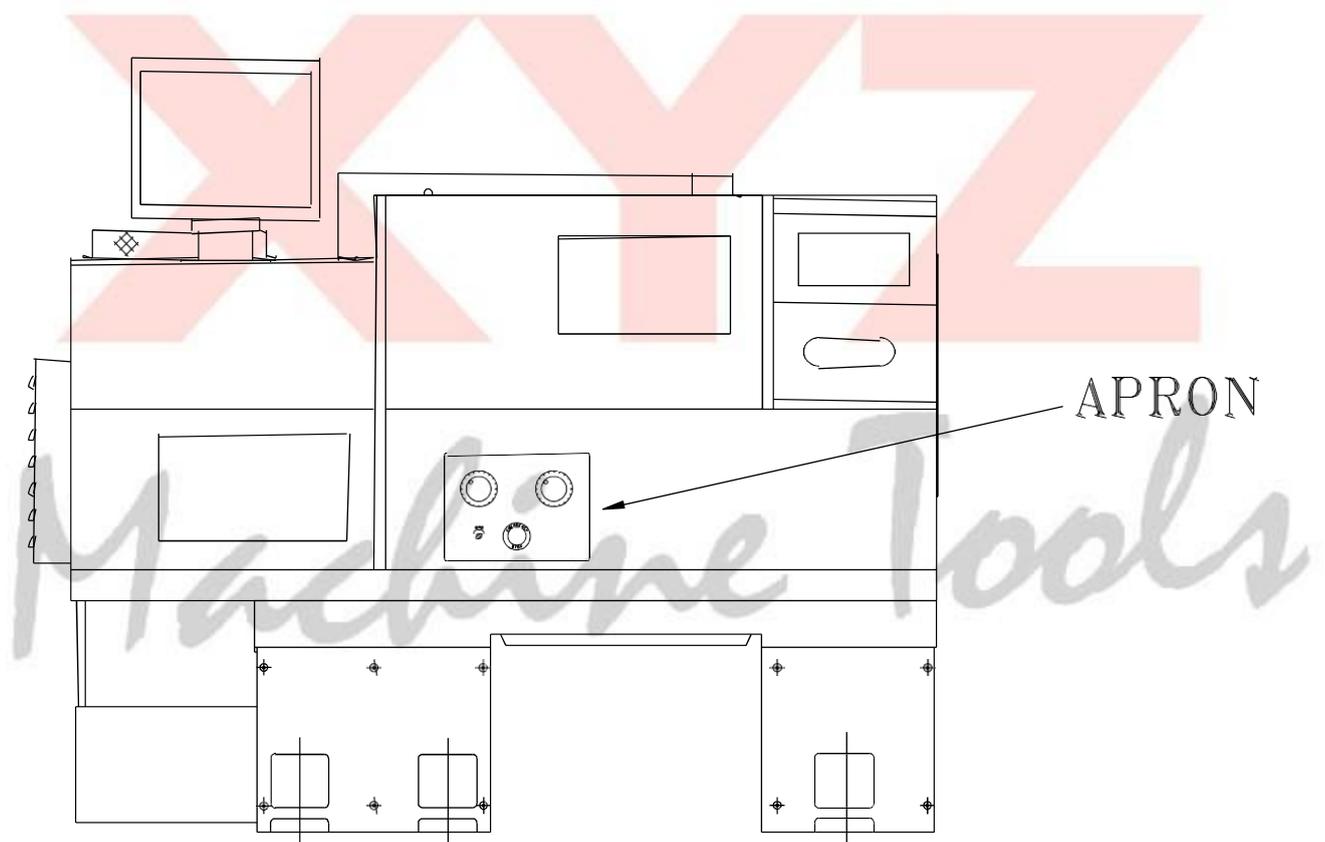
## 5.2.2 Z AXIS TRANSMISSION MECHANISM

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



## 5.3 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)

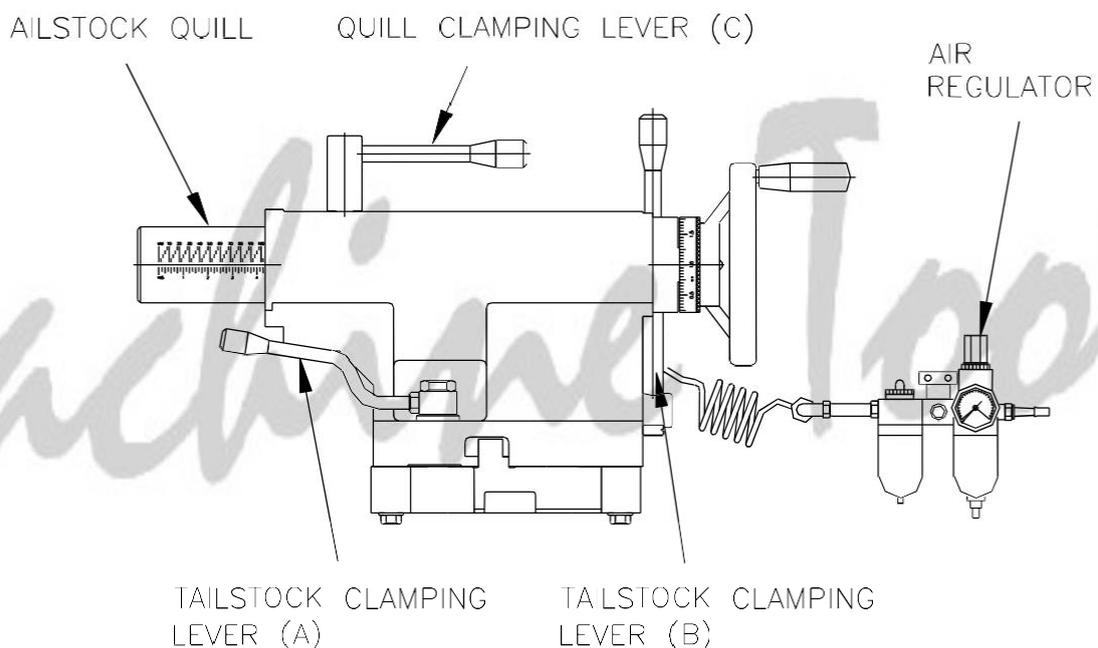
1. The power index is driven by an electrical motor. The tool selection is accomplished by using the proximity switch.
2. As the tool exchange command is issued, the swivel disk will be rotated to the selected tool position according to NC or manual commands. A proximity switch is used with the electrical 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<sup>2</sup> 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).

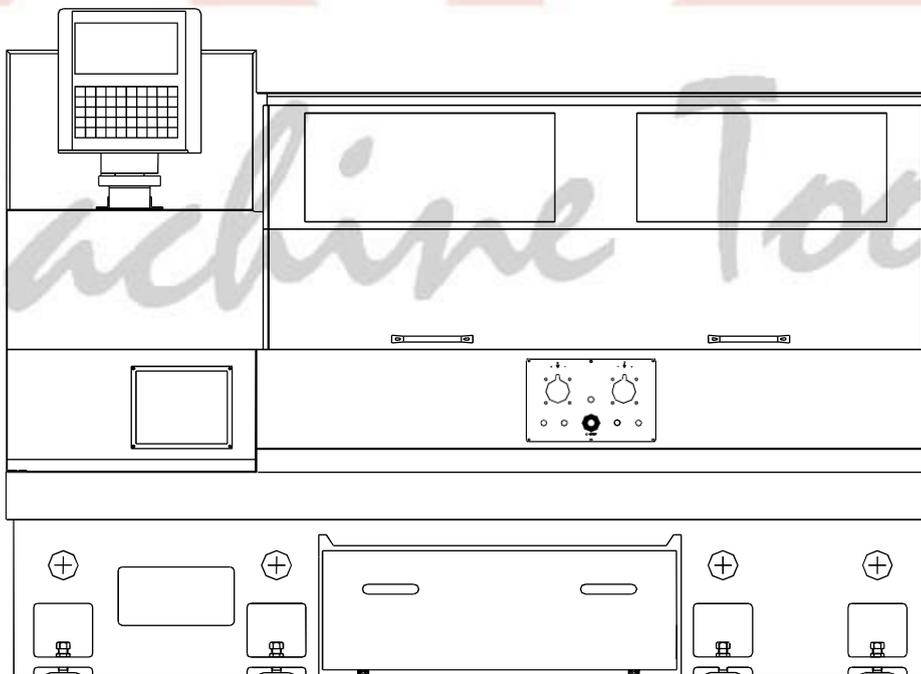


## 5.6 THE FULL-ENCLOSED (OPTION)

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-piece front door so that you can inspect the machine or install the workpiece easily. For the sake of safety, the operator should open and close the front safety guard with both hands.

### **WARNING !!!**

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

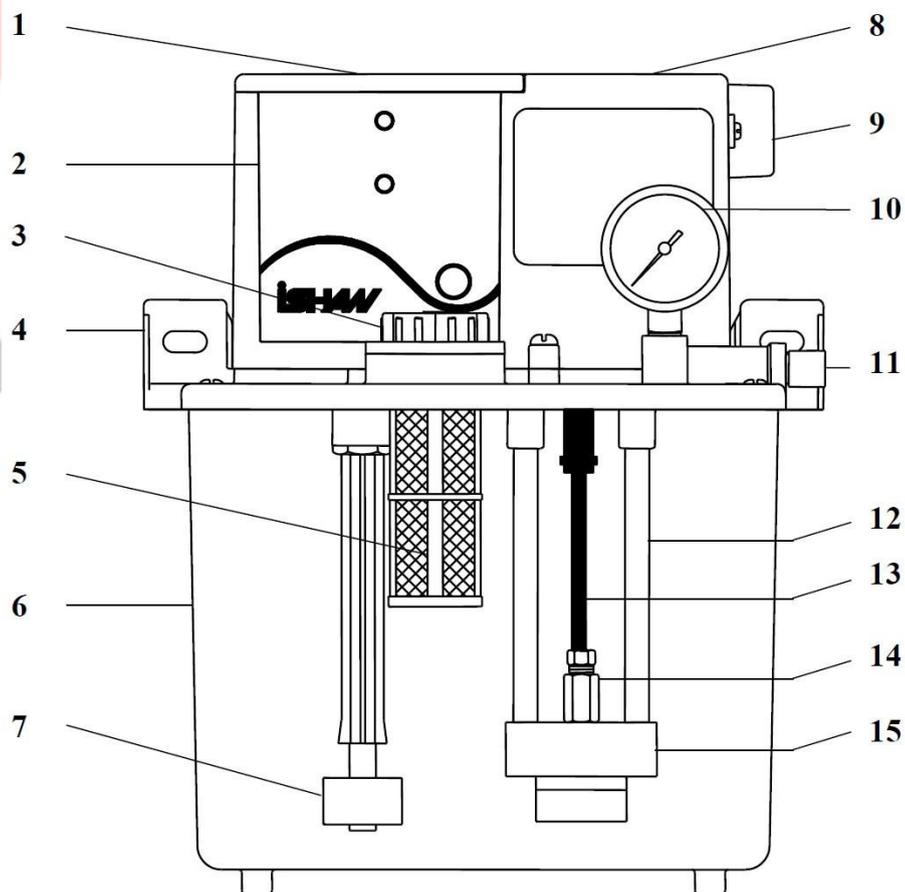


FULL ENCLOSED

## 5.7 LUBRICATOR

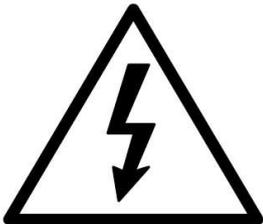
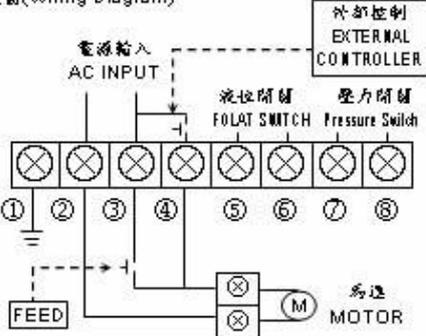
### 5.7.1 PARTS OF LUBRICATOR

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



(Fig.1)

5.7.2 LABEL

<p style="text-align: center;">Name Plate</p>	<p style="text-align: center;">Danger</p>
	
<p style="text-align: center;">Front side of the electrical control box</p>	<p style="text-align: center;">Outside of the electrical control box top cover</p>
<p style="text-align: center;">Wiring Diagram</p>	<p style="text-align: center;">Operation Notice</p>
	<p style="text-align: center;"><b>YET-C/YET-F 操作說明(Operation Notice)</b></p> <p>一、安裝與使用(Installation &amp; Usage)</p> <p>1. 接線圖(Wiring Diagram)</p>  <p>2. 輸出接點容量(Output Terminal)          液位開關(FLOAT SWITCH): 0.3A          壓力開關(PRESSURE SWITCH): 3A</p> <p>3. 開關時間須為潤滑時間 5 倍以上。建議電機開關時間為 3 分鐘。          The recommended intermittence should be set at least 5 times longer than the lubrication time. The recommended minimum intermittence is 3 minutes.</p> <p>二、注意事項(Remark)</p> <p>1. 適用油粘度範圍 30 ~ 150 cSt。          2. 產品型號無 P 碼者，無壓力開關。          產品型號有 P 碼者，有壓力開關。          3. 限用新油並請定期清理油路及濾網。          4. 本機台使用之直筒接頭為特殊零件，請勿自行更換。          5. 如對本注油機有任何疑難問題，請立即與本公司聯絡。</p> <p>1. Recommended Viscosity Range is 30 ~ 150 cSt.          2. The model number with P is equipped with pressure switch. The model number without P is NOT equipped with pressure switch.          3. New Oil for Lubricators ONLY. Clean the filter and the bottom of the tank periodically.          4. The elbow joint is a special part. It is NOT recommended to change the elbow joint of the lubricator by the user himself.          5. If any question about this lubricator operation, please contact us.</p>
<p style="text-align: center;">Inside of the electrical control box</p>	
<p style="text-align: center;">Notice</p>	
	
<p style="text-align: center;">Top right corner of the front side of the oil tank</p>	<p style="text-align: center;">Left side of the oil tank</p>

### 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.

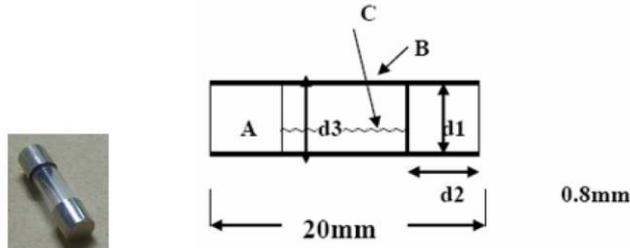


(Fig.3)

### 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. Continue 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

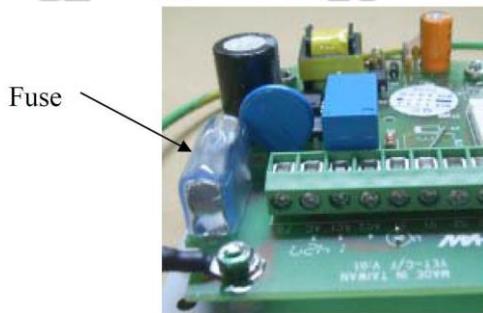
### 5.7.4.2 FUSE REPLACEMENT

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

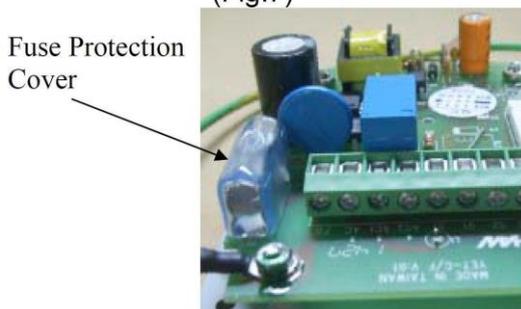
Remove the fuse protection cover (Fig. 8) and replace the fuse with the new one (Fig. 9). Fit-in the fuse cover and close the electrical control box cover.

**NOTE !!!**

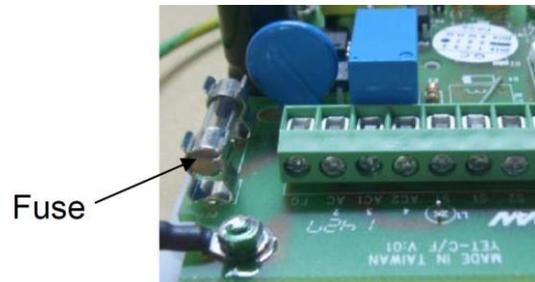
**No contact with other components during the replacement.  
The fuse should be of the original parts. Please refer to 5.7.4.1 The Specification of the Fuse.**



(Fig.7)



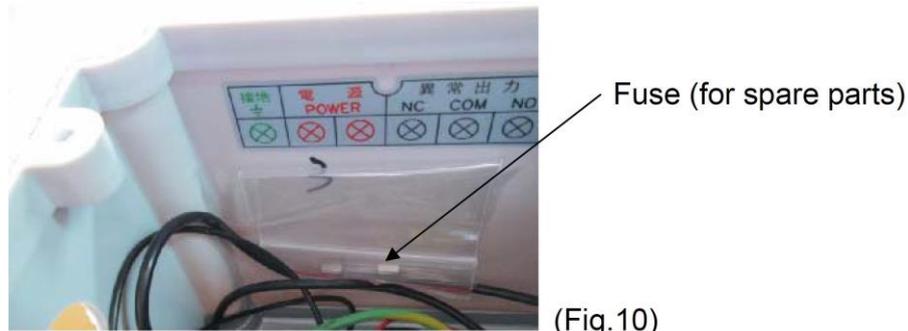
(Fig.8)



(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

*Machine Tools*

## 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.

Machine Tools

## 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

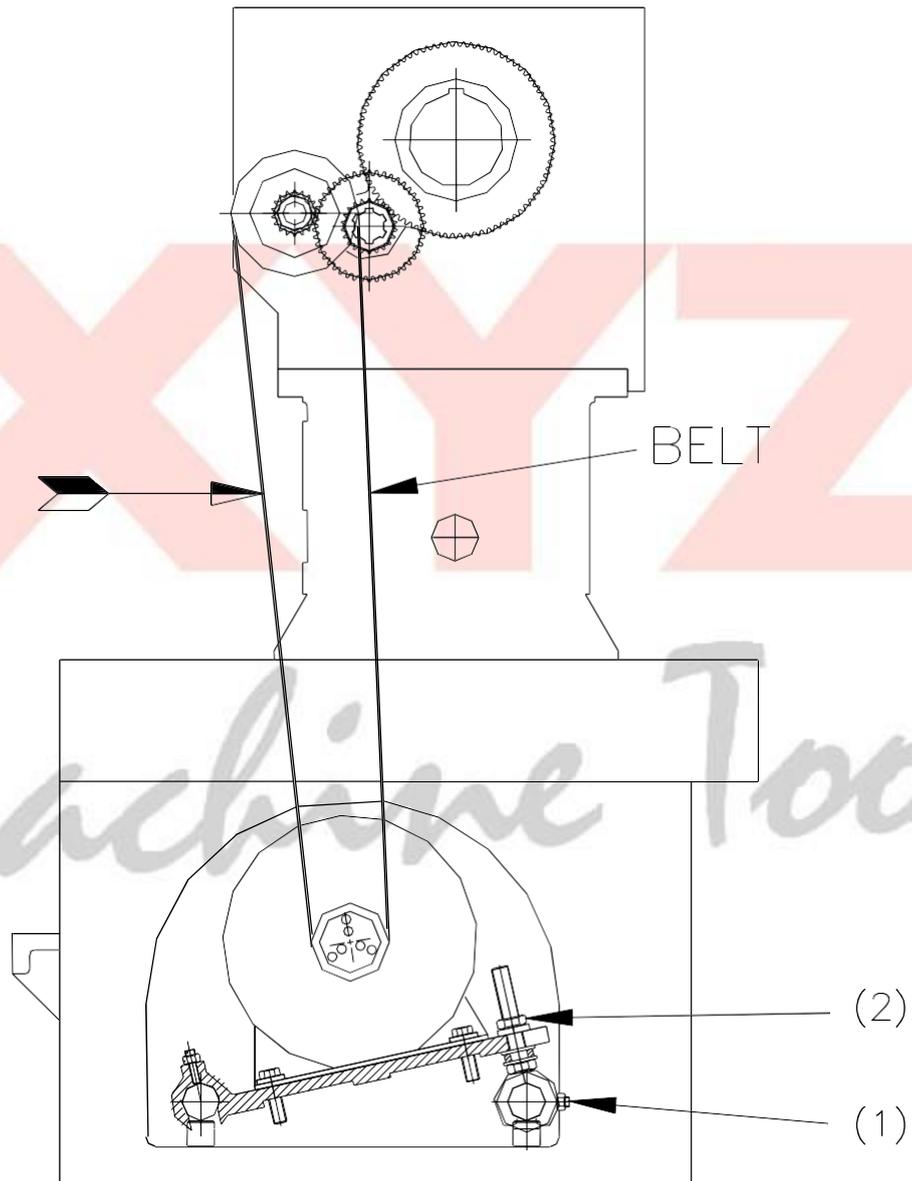
Follow steps below to adjust the belt tension:

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



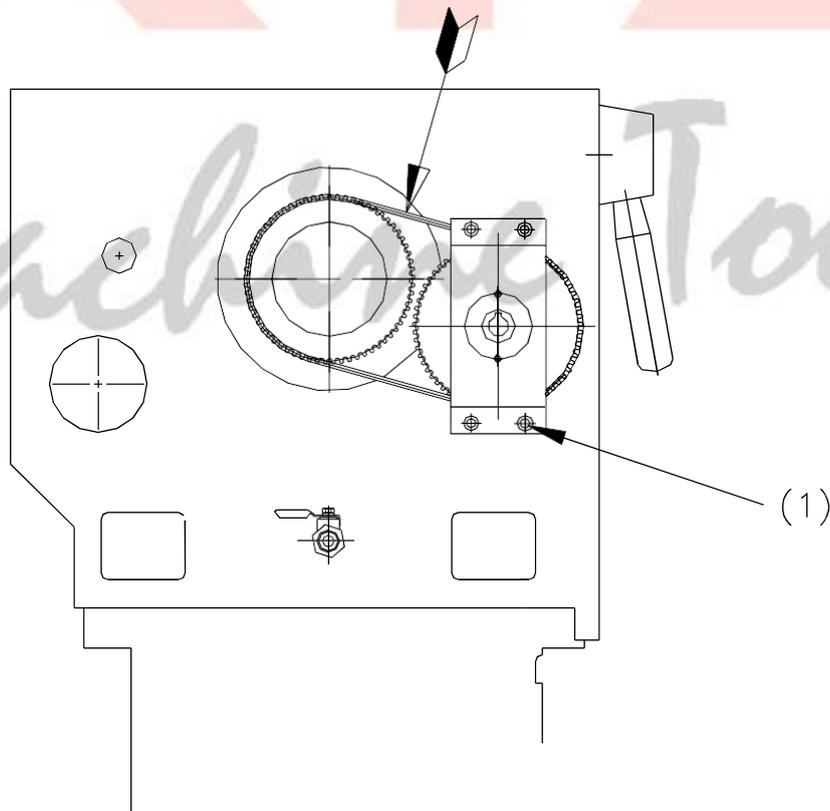
## 6.2.4 SPINDLE POSITIONING BELT TENSION

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.

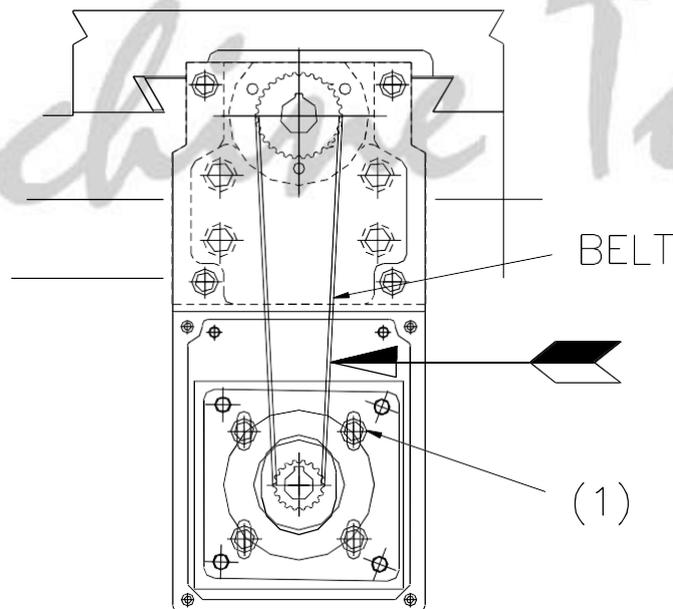


## 6.2.5 X AXIS TRANSMISSION'S BELT TENSION

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.

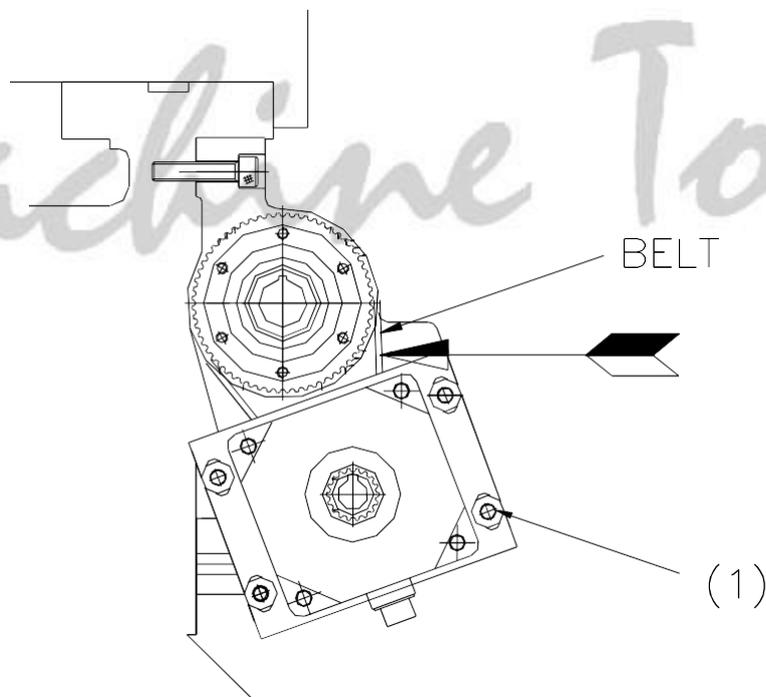


## 6.2.6 Z AXIS TRANSMISSION'S BELT TENSION

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 )

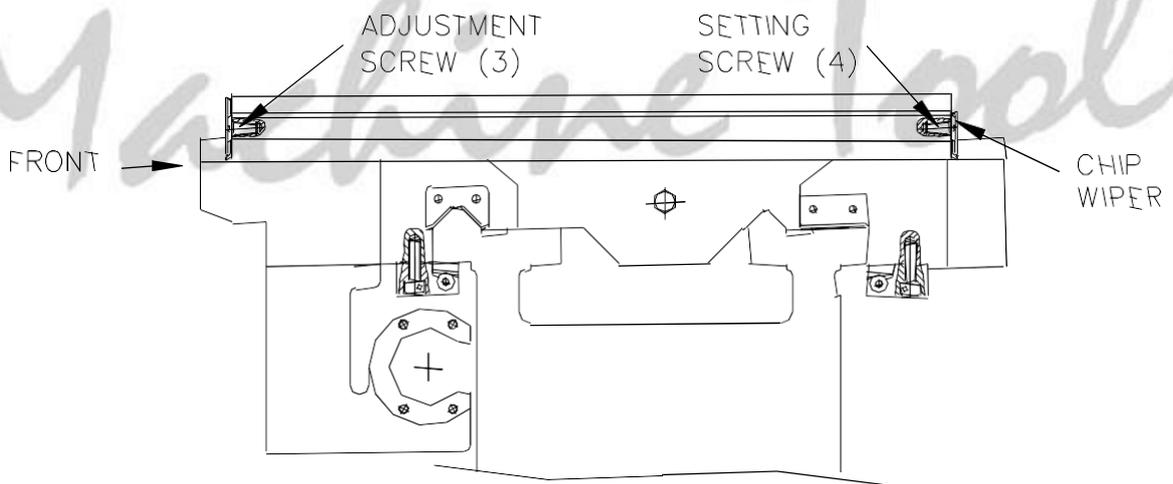
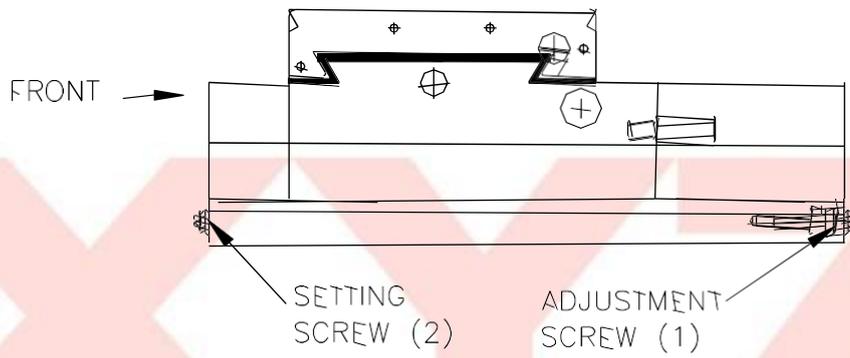
Make gib adjustment as per the following proceduresK

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.**

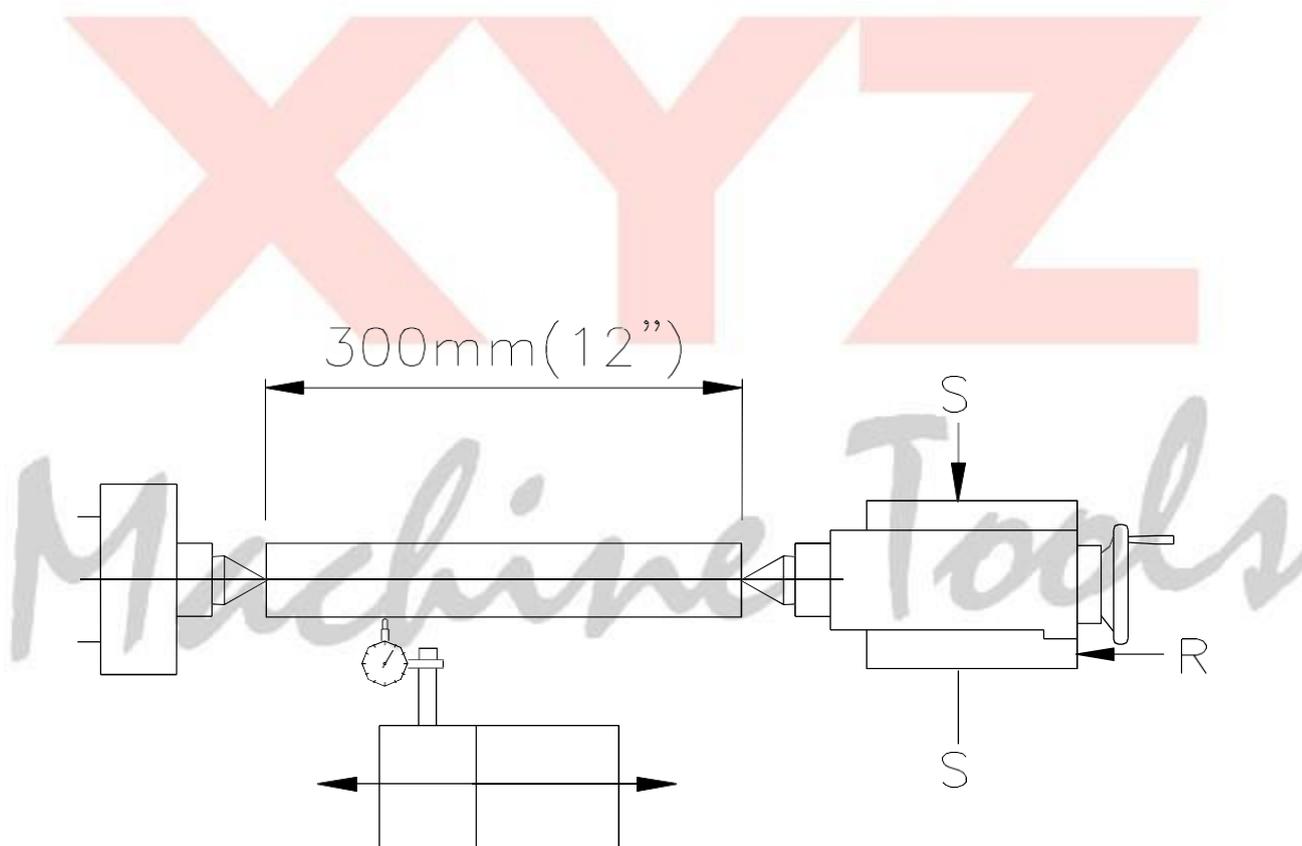
### 6.3.3 GIB ADJUSTMENT



## 6.4 TAILSTOCK ADJUSTMENT

### 6.4.1 TAILSTOCK CHECK

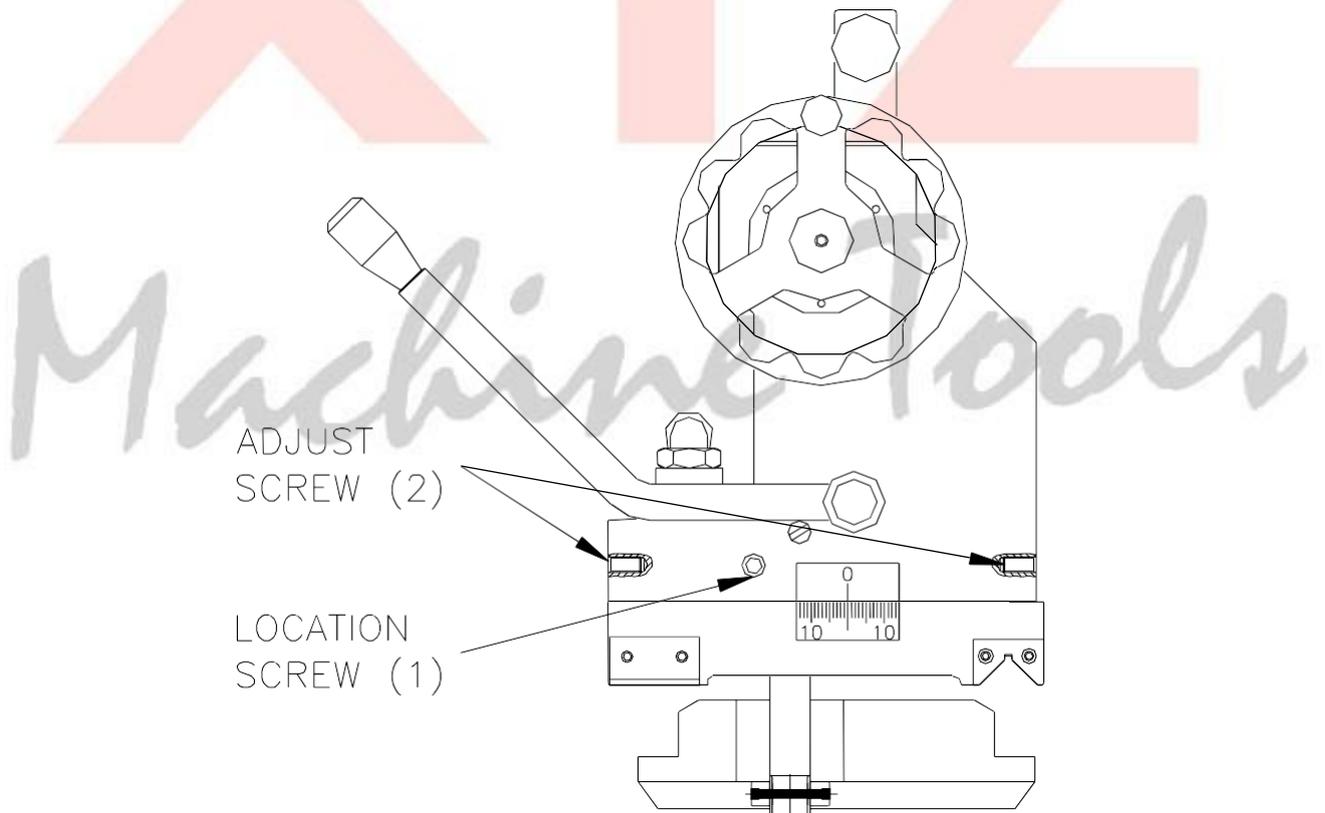
Using a 300mm (12") long ground steel bar mounted between center, check the alignment by traversing a dial test indicator along the centerline of the bar. To correct any error first release the tailstock clamp levers, slacken the rear locating screw (1) and then adjust the screws (2) on each side of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



## 6.4.2 TAILSTOCK SET-OVER

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

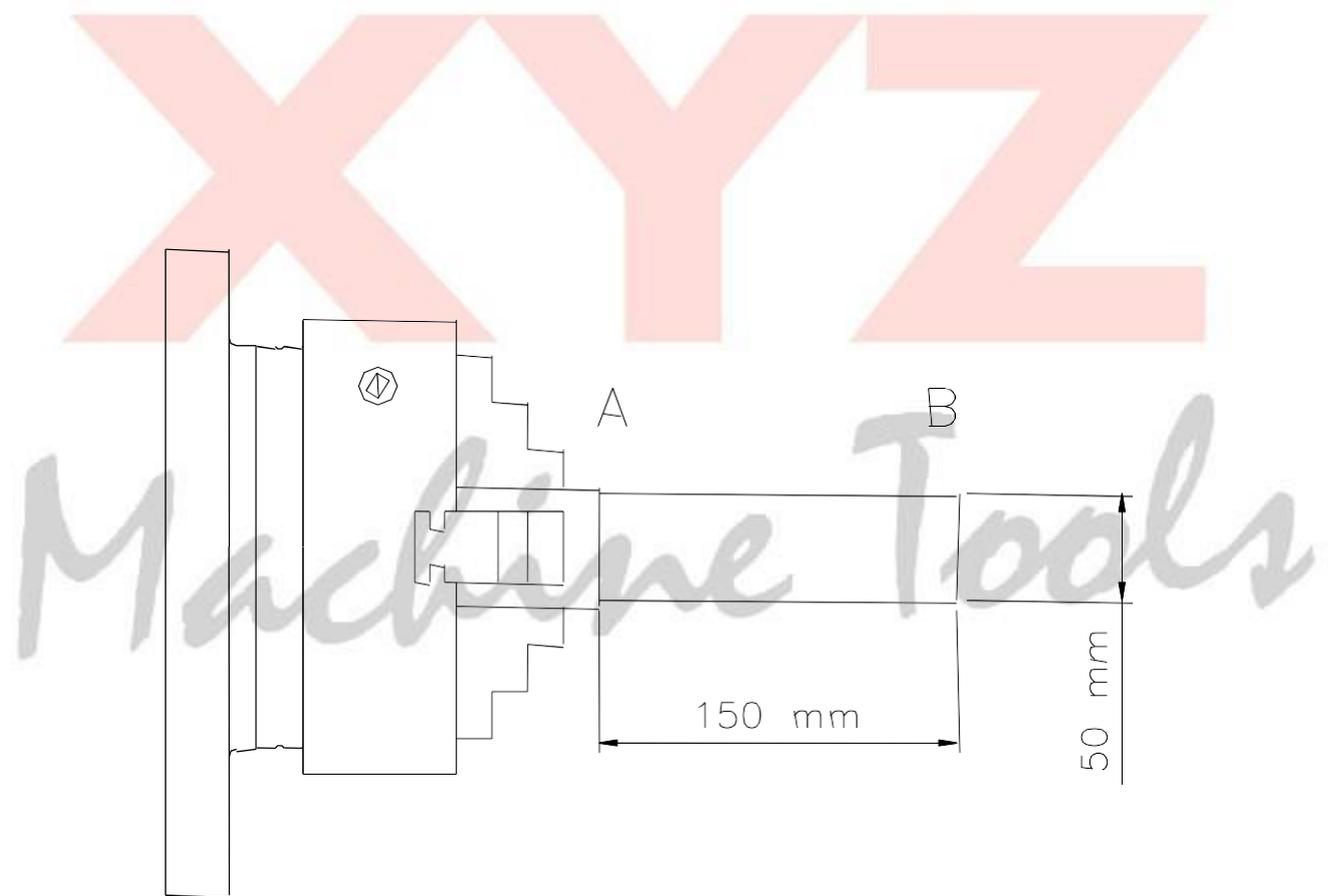
1. Unclamp all tailstock clamping lever.
2. Loosen rear location screw (1) one turn.
3. Adjust screw (2) at each side of base by loosening one and tightening the other to laterally move the tailstock across the base.
4. Re-tighten the rear location screw.



## 6.5 HEADSTOCK ADJUSTMENT

### 6.5.1 HEADSTOCK ALIGNMENT CHECKS

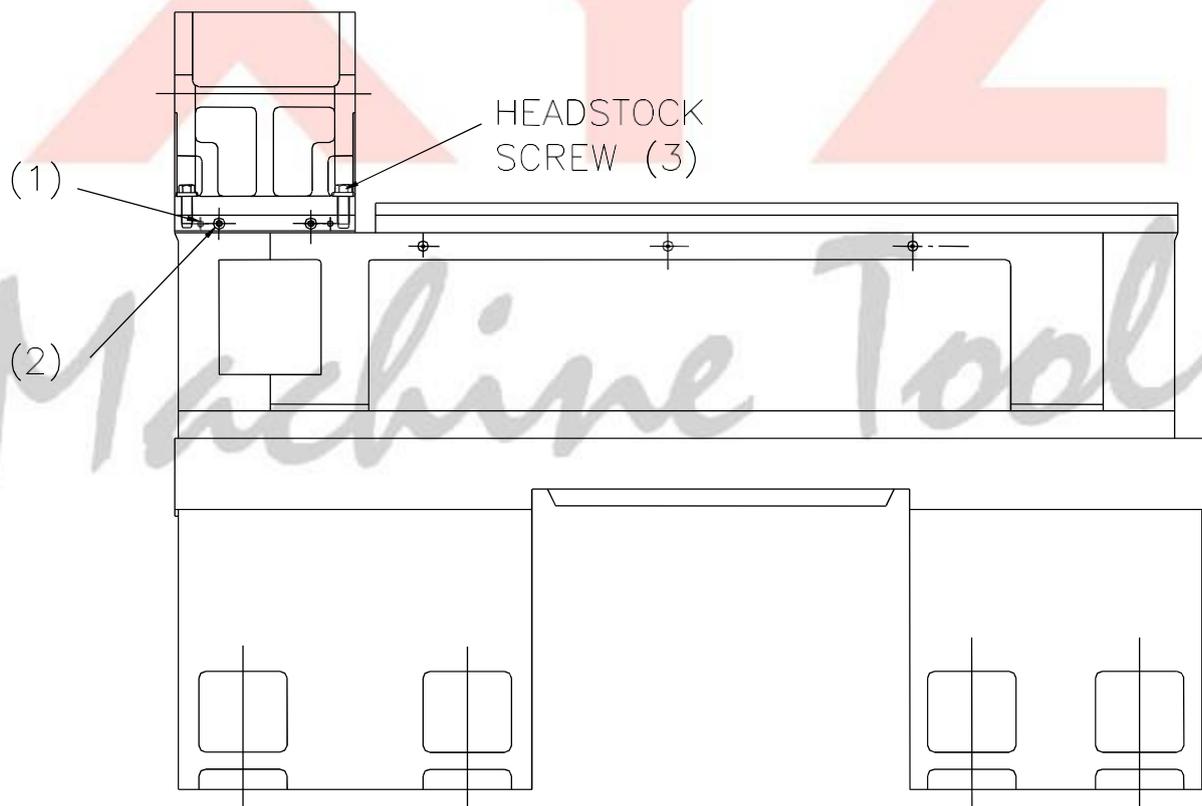
Take a light over a 150mm (6") length of 50mm(2") diameter steel bar held in a chuck (but not supported at free end). Micrometer readings at each end of the turned bar A and B should be within 0.02 mm(0.0008").



## 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).



## 6.6 REMOVE/REFIT GAP PIECE

### 6.6.1 REMOVE GAP PIECE

Remove the gap piece as per the following procedures:

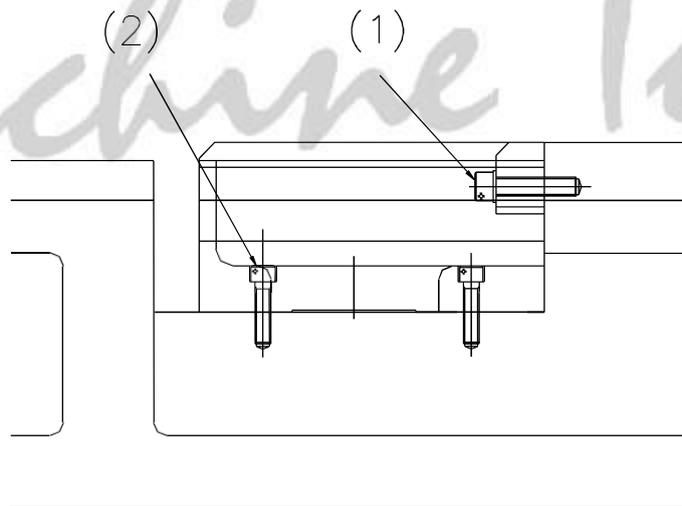
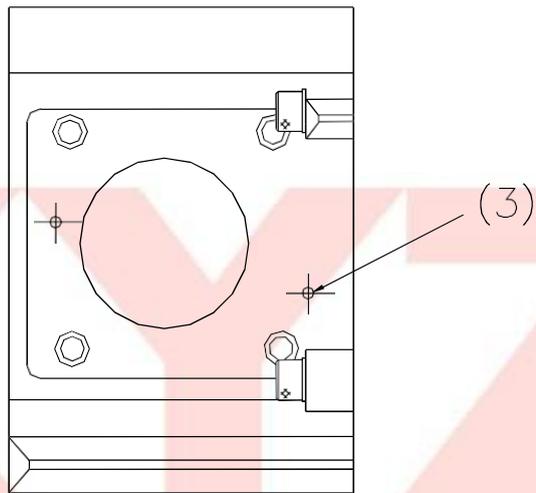
1. Clean area around gap.
2. Remove check or any work holding.
3. Release 6 fastening screws (1) and (2).
4. Carefully remove the gap piece avoiding damaging the ballscrew and gap piece mating surfaces.

### 6.6.2 REFIT GAP PIECE

Refit the gap piece as per the following procedures:

1. Clean area around gap.
2. Ensure machine is level and all mating surfaces are clean.
3. Carefully slide gap piece back into position and lightly put fastening screws back.
4. Align the ways by hand and lightly tap the gap with a hide hammer.
5. Finally, position the gap by fitting back 2 position pin (3).
6. Tighten 6 fastening screws (1) and (2)

### 6.6.3 REMOVE/REFIT GAP PIECE



Machine Tools

**XYZ**

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*Machine Tools*

# CHAPTER 7

XYZ

## MACHINE MAINTENANCE

PLEASE READ CAREFULLY BEFORE MAINTENANCE

ON THIS MACHINE

*Machine Tools*

## 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	<ul style="list-style-type: none"> <li>∅Viscosity ISO VG68</li> <li>∅Anti-wear, Extreme-pressure</li> </ul>	<ul style="list-style-type: none"> <li>∅Good Heat conduction</li> <li>∅Good lubricant performance</li> </ul>	
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	<ul style="list-style-type: none"> <li>∅BP Macurrat D 68</li> <li>∅Mobil Vactra No.2</li> <li>∅Shell Tonna S2 M68</li> <li>∅BECHEM Staroil CGLP 68 MF</li> </ul>	<ul style="list-style-type: none"> <li>∅CPC Cutting Oil 31C</li> <li>∅Shell Dromus B or Macron 32</li> <li>∅BECHEM AVANTIN</li> </ul>	

\*\*\*\* 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	<b>Gearbox Lubricat</b>	<b>Chuck Grease</b>	<b>Quill Lubricat</b>
Lubricant Characteristic	<ul style="list-style-type: none"> <li>∅Viscosity ISO VG68</li> <li>∅Anti-rust, anti-oxidation</li> <li>∅Good Stability</li> </ul>	<ul style="list-style-type: none"> <li>∅NLGI #2</li> <li>∅Drop point &gt;17&gt;κ</li> <li>∅Solid LubricantK MoS2</li> </ul>	<ul style="list-style-type: none"> <li>∅Viscosity ISO VG32</li> <li>∅Anti-wear, Extreme -pressure</li> </ul>
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	<ul style="list-style-type: none"> <li>∅BP Energol GR-XP 68</li> <li>∅Mobil Gear XMP 68</li> <li>∅Shell Omala 68</li> <li>∅Chevron Ultra Gear 68</li> <li>∅BECHEM Staroil G 68</li> <li>∅CPC HD68</li> </ul>	<ul style="list-style-type: none"> <li>∅BP Energrease L21 M</li> <li>∅Mobil XHP 322 special</li> <li>∅Shell Gadus S3 V460D 2</li> <li>∅Chevron Molytex EP2</li> <li>∅BECHEM Highlub FA 40 MO</li> </ul>	<ul style="list-style-type: none"> <li>∅BP Energol NT32</li> <li>∅Mobil Vactra No.2</li> <li>∅Shell Tonna T32</li> <li>∅Chevron Way Lubricant ISO 32</li> <li>∅BECHEM Staroil CGLP 32 MF</li> </ul>
Lubricant Position	<b>Hydraulic Tank</b>	<b>Tailstock Way</b>	<b>Air Assisted Tailstock</b>
Lubricant Characteristic	<ul style="list-style-type: none"> <li>∅Viscosity ISO VG32</li> <li>∅Anti-rust, anti-oxidation</li> <li>∅Good Stability</li> </ul>	<ul style="list-style-type: none"> <li>∅Viscosity ISO VG32</li> <li>∅Anti-wear, Extreme-pressure</li> </ul>	<ul style="list-style-type: none"> <li>∅Viscosity ISO VG32</li> <li>∅Anti-rust, anti-oxidation</li> <li>∅Good Stability</li> </ul>
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	<ul style="list-style-type: none"> <li>∅BP Macurrat D68</li> <li>∅Mobil Vactra No.2</li> <li>∅Shell Tonna S2 M68</li> <li>∅BECHEM Staroil CGLP 68 MF</li> </ul>	<ul style="list-style-type: none"> <li>∅BP Energol NT32</li> <li>∅Mobil Vactra No.2</li> <li>∅Shell Tonna T32</li> <li>∅Chevron Way Lubricant ISO 32</li> <li>∅BECHEM Staroil CGLP 32 MF</li> </ul>	<ul style="list-style-type: none"> <li>∅B.P Energol HLP 32 AW</li> <li>∅Mobil DTE Light</li> <li>∅Shell Tellus 32</li> <li>∅Chevron Hydraulic Oil AW32</li> <li>∅BECHEM Staroil NR 32</li> </ul>

**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

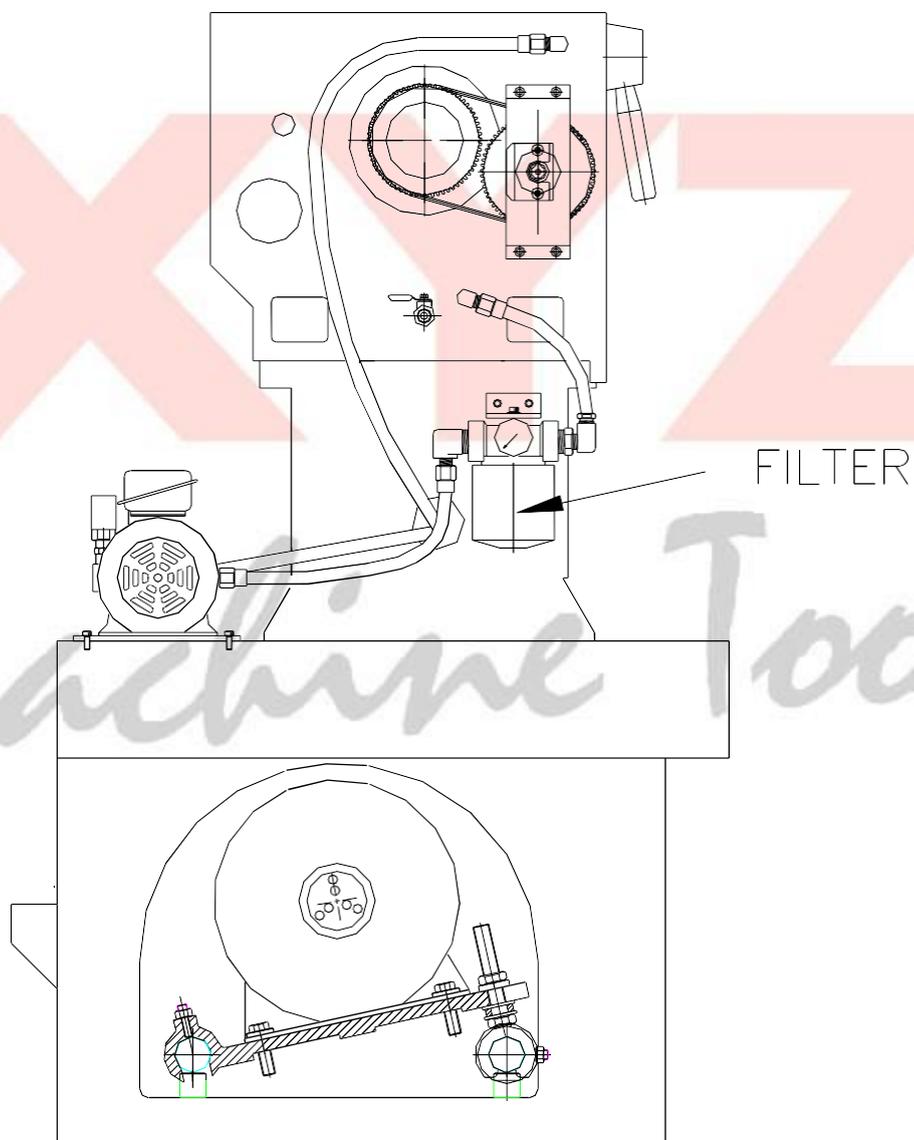
1. Only qualified engineers are allowed to maintain or install the electrical equipment.
2. Do not remove or alter any over-traveling limit switch and related mechanical parts without permission.
3. Always use ladders when working in the high place.
4. Ensure all the appliances, such as fuse, cable,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

### 7.4.3 FILTER OF HEADSTOCK LUBRICATION SYSTEM

There is a filter within the headstock lubrication system. The headstock lubrication system will be failed if it is dirty. It is necessary to be changed when it is dirty. It is recommended that the filter element should be replaced when it is dirty or every year at least.



## 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.

# **CHAPTER 8**



## **APPENDIX**

# *Machine Tools*

## 8.1 TROUBLE SHOOTING

### 8.1.1 TABLE A

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

Machine Tools

## 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	K
	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 to change 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

Machine Tools

XYZ

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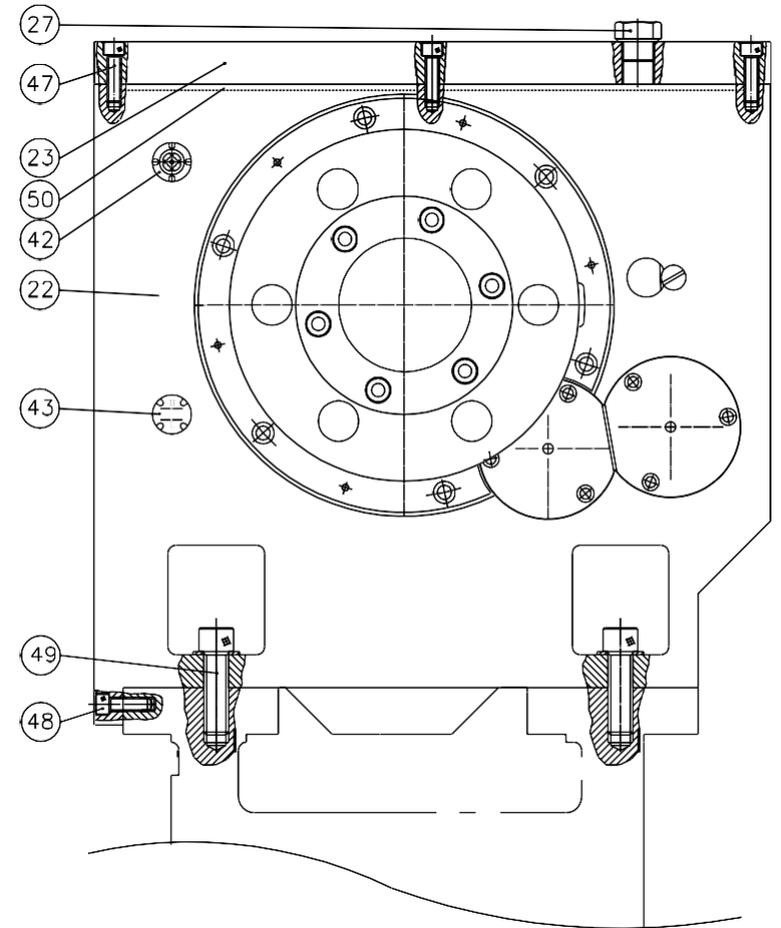
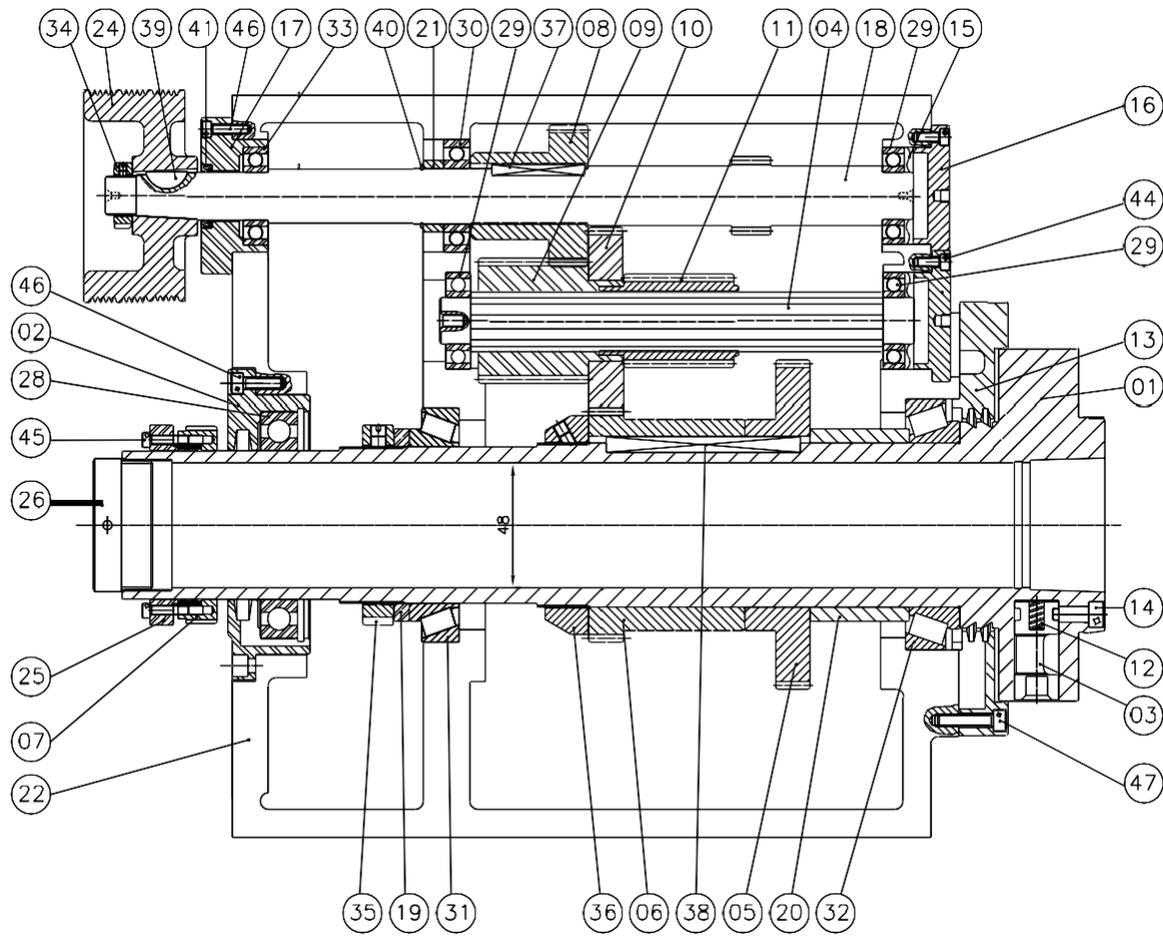
Machine Tools

# **CHAPTER 9**



## **PARTS LIST**

*Machine Tools*



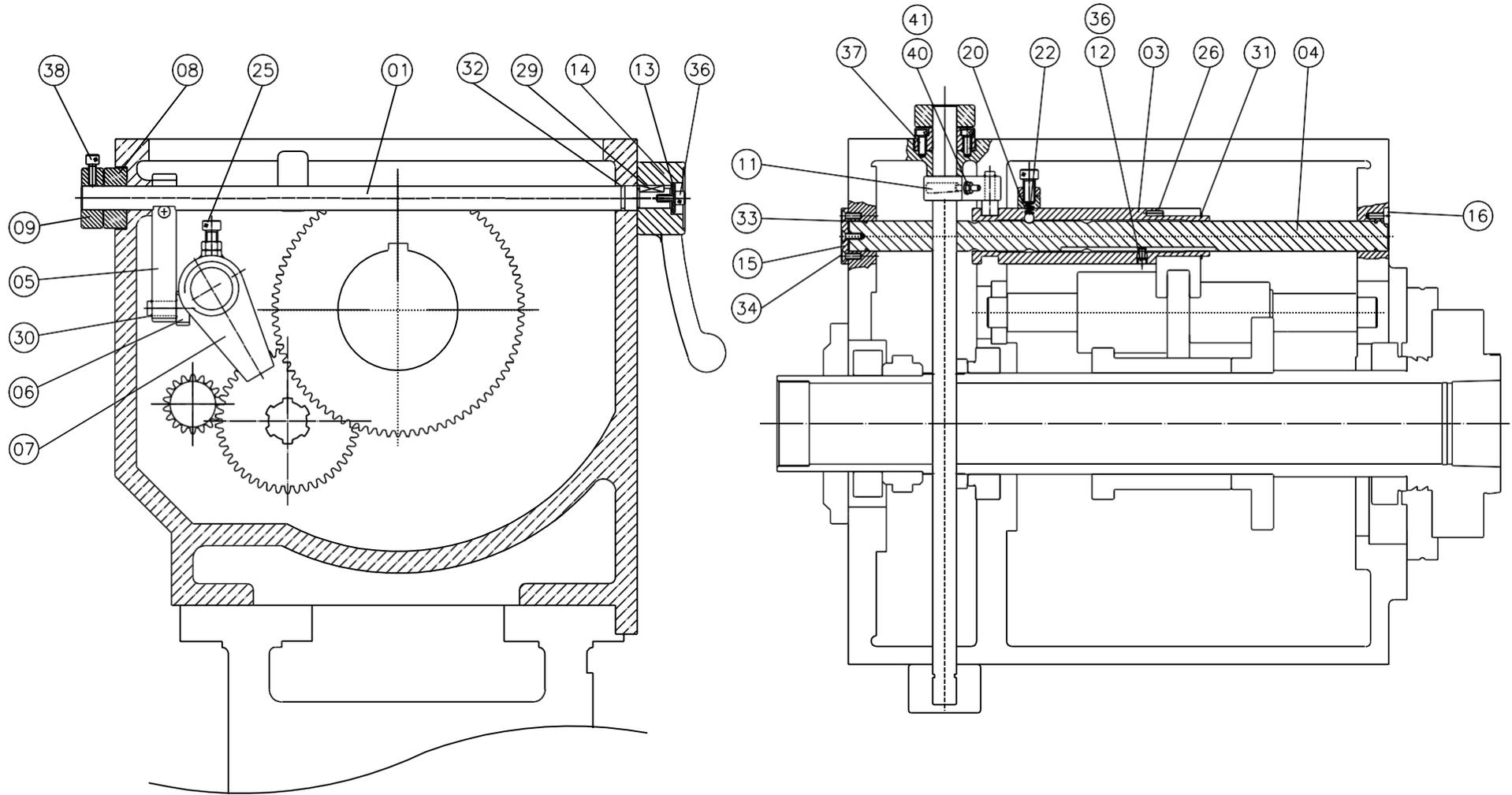
Spindle Drive Assembly

**Spindle Drive Assembly**

<b>No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Specification</b>	<b>XYZ P/N</b>
1	KR010031	SPINDLE		<b>3956</b>
2	KR010040	REAR COVER		<b>3957</b>
3	KR010050	CAMLOCK		<b>Part of 5737</b>
4	KR010060	SLIDE SHAFT		<b>Part of 5677</b>
5	KR010070	GEAR		<b>3897</b>
6	KR010081	GEAR		<b>3898</b>
7	KR010091	BELT GEAR		<b>4875</b>
8	KR010100	GEAR		<b>3892</b>
9	KR010110	GEAR		<b>Part of 5677</b>
10	KR010120	GEAR		<b>Part of 5677</b>
11	KR010130	GEAR		<b>Part of 5677</b>
12	KR010170	SPRING		<b>Part of 5737</b>
13	KR010180	FRONT COVER		<b>2266</b>
14	KR010190	CAM SCREW		<b>4164</b>
15	KR010200	ELASTIC WASHER		<b>11988</b>
16	KR010220	COVER		<b>11989</b>
17	KR010230	COVER		
18	KR010241	SHAFT DRIVE		<b>3891</b>
19	KR010270	SPACER		
20	KR010280	SPACER		
21	KR010290	SPACER		<b>3895</b>
22	KR010300	HEAD		
23	KR010310	HEAD COVER		
24	KR010400	SPINDLE DRIVE PULLEY		<b>4165</b>
25	KR010561	TAPER LOCK COLLAR		<b>5042</b>
26	KR010720	PLASTIC COVER-SPINDLE		<b>11531</b>
27	KR010740	PLASTIC COVER-HEAD COVER		
28	KR500040	BEARING	6019	<b>4166</b>
29	KR500070	BEARING	6206	<b>4167</b>
30	KR500080	BEARING	6207	<b>4168</b>
31	KR500100	BEARING	32020X	<b>4443</b>
32	KR500110	BEARING	32021X	<b>4446</b>
33	KR500140	BEARING	5206	<b>4170</b>
34	KR510020	LOCKNUT	YSFM 25x1.5	<b>4198</b>
35	KR510040	LOCKNUT (GROUND)	YSFM 100x2.0	<b>4199</b>
36	KR510050	LOCKNUT	YSAM 105x2.0	<b>3903</b>
37	KR520020	KEY	8x7x60mm	<b>3893</b>
38	KR520050	KEY	125x16x10mm	<b>3902</b>

**Spindle Drive Assembly**

<b>No.</b>	<b>Part Number</b>	<b>Description</b>	<b>Specification</b>	<b>XYZ P/N</b>
39	KR520060	ROUND KEY	019x4x7.5	<b>4200</b>
40	KR520080	RETAINING RING	S35	<b>4203</b>
41	KR530030	OIL RING	30x40x7 mm	<b>4202</b>
42	KR530070	OIL SCALE	VO-29	<b>4204</b>
43	KR530080	OIL SCALE	VH-29	<b>4205</b>
44	KR540310	HEXAGON SOCKET CAP HEAD SCREW	M6x16	
45	KR540330	HEXAGON SOCKET CAP HEAD SCREW	M6x25	
46	KR540420	HEXAGON SOCKET CAP HEAD SCREW	M8x20	
47	KR540440	HEXAGON SOCKET CAP HEAD SCREW	M8x30	
48	KR540510	HEXAGON SOCKET CAP HEAD SCREW	M10x25	
49	KR540630	HEXAGON SOCKET CAP HEAD SCREW	M16x55	
50	KR570130	RUBBER PAD		

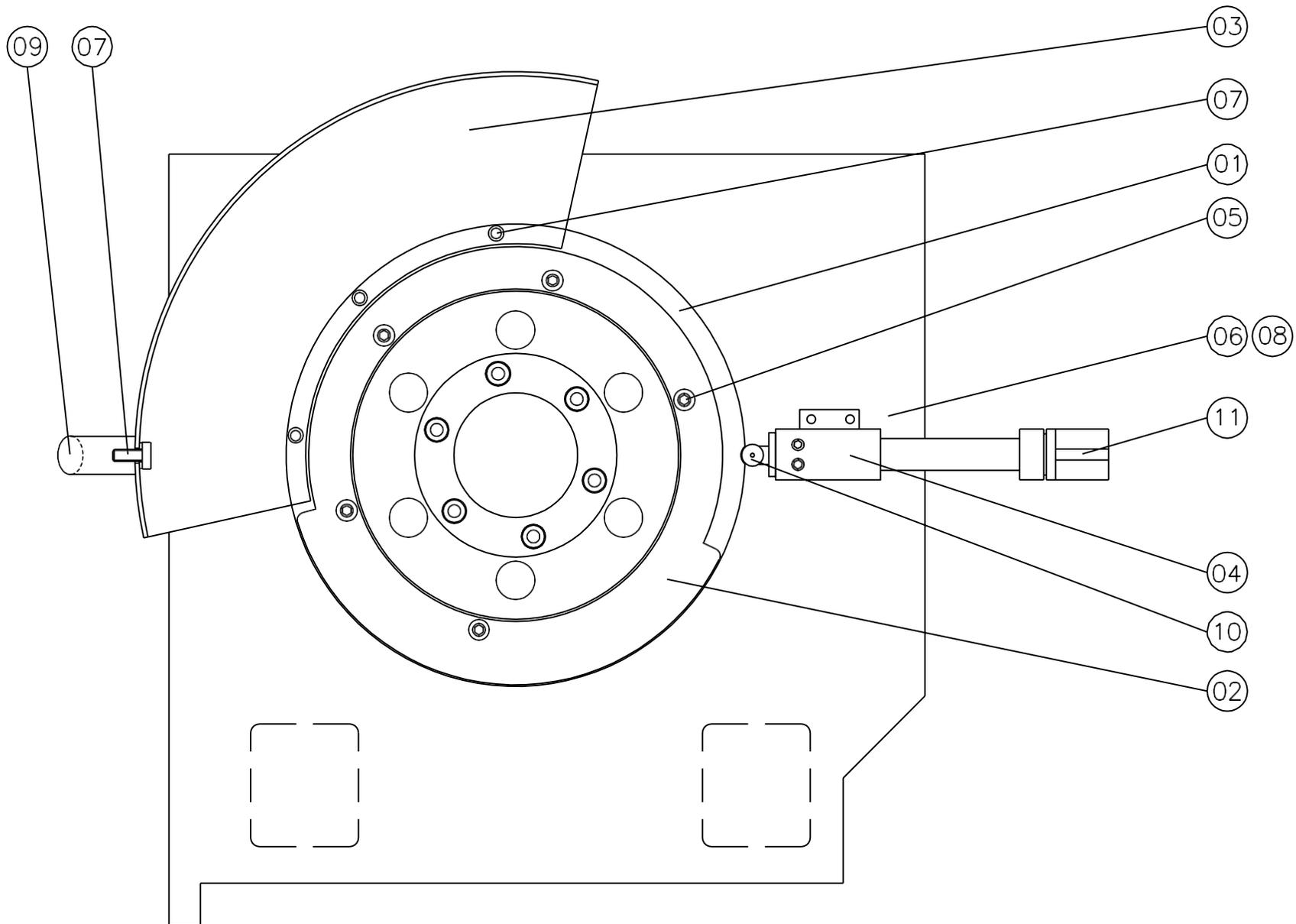


Speed Selector Assembly

**Speed Selector Assembly**

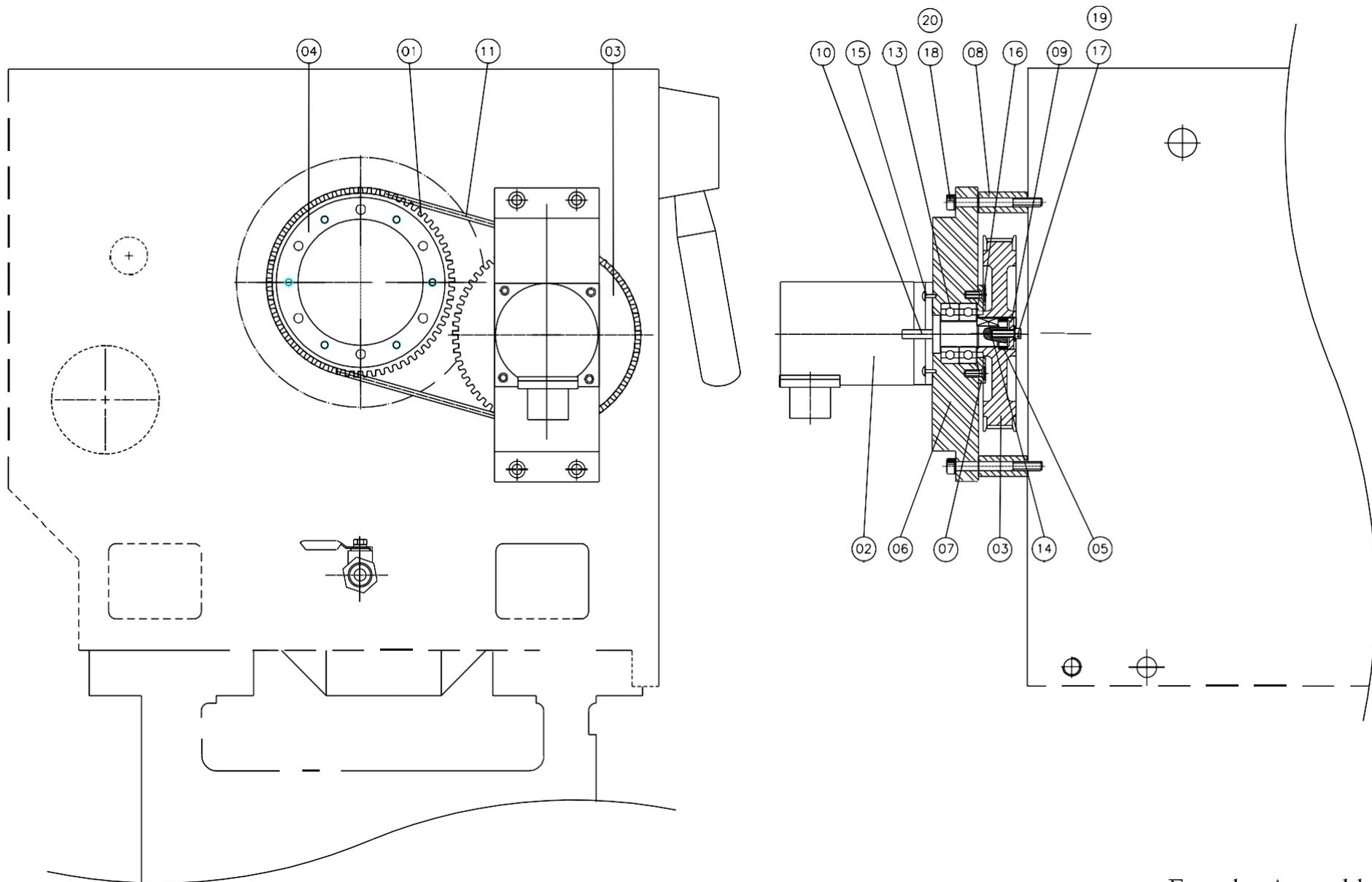
No.	Part Number	Description	Specification	XYZ P/N
1	KR010330	SHAFT		<b>4656</b>
2				
3	KR010340	SLIDE SHAFT		<b>4670</b>
4	KR010350	SHAFT		<b>4671</b>
5	KR010370	SWING ARM		<b>3905</b>
6	KR010380	CATCH BLOCK		<b>4672</b>
7	KR010390	SWING ARM		<b>3904</b>
8	KR010420	SHAFT COLLAR		<b>4673</b>
9	KR010430	STOP COLLAR		<b>4674</b>
10	KR010440	ADJUSTING SCREW		<b>4675</b>
11	KR010450	FIXED PIN		<b>4676</b>
12	KR010460	DOG SCREW	M10x10	<b>5740</b>
13	KR010480	SPACER		<b>4677</b>
14	KR010500	SPEED SELECTOR LEVER		<b>4678</b>
15	KR010620	REAR COVER		<b>4679</b>
16				
17				
18				
19				
20	KR010730	SPRING		<b>4680</b>
21				
22	KR010750	BALL		<b>4681</b>
23				
24	KR010760	LIMIT COLLAR		<b>4682</b>
25	KR010770	ADJUSTING SCREW		<b>4683</b>
26	KR010780	FIXED PIN	5x15 mm	<b>4684</b>
27				
28				
29	KR520020	KEY	20x5x5 mm	<b>3893</b>
30	KR520070	RETAINING RING	S12	<b>4685</b>
31	KR520080	RETAINER RING	S35	<b>4203</b>
32	KR530010	OIL RING	20x15 mm	<b>4686</b>
33	KR530020	OIL RING	31x24 mm	<b>4687</b>
34	KR540100	FLAT HEAD SCREW	M6x20	
35				
36	KR540160	HEADLESS SCREW	M10x10	
37	KR540310	HEXAGON SOCKET CAP HEAD SCREW	M6x16	
38	KR540320	HEXAGON SOCKET CAP HEAD SCREW	M6x20	





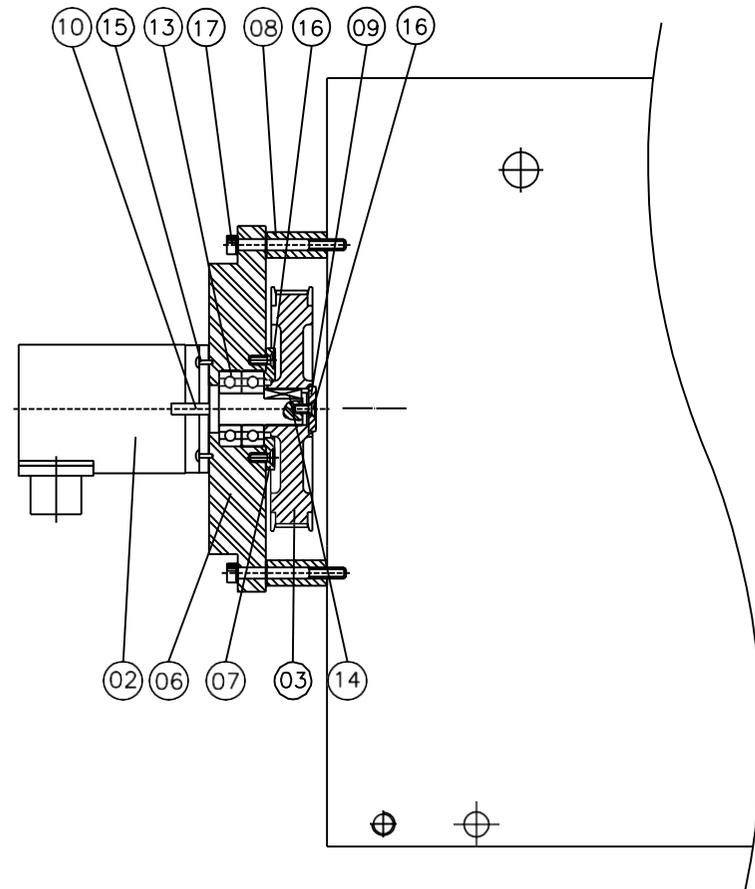
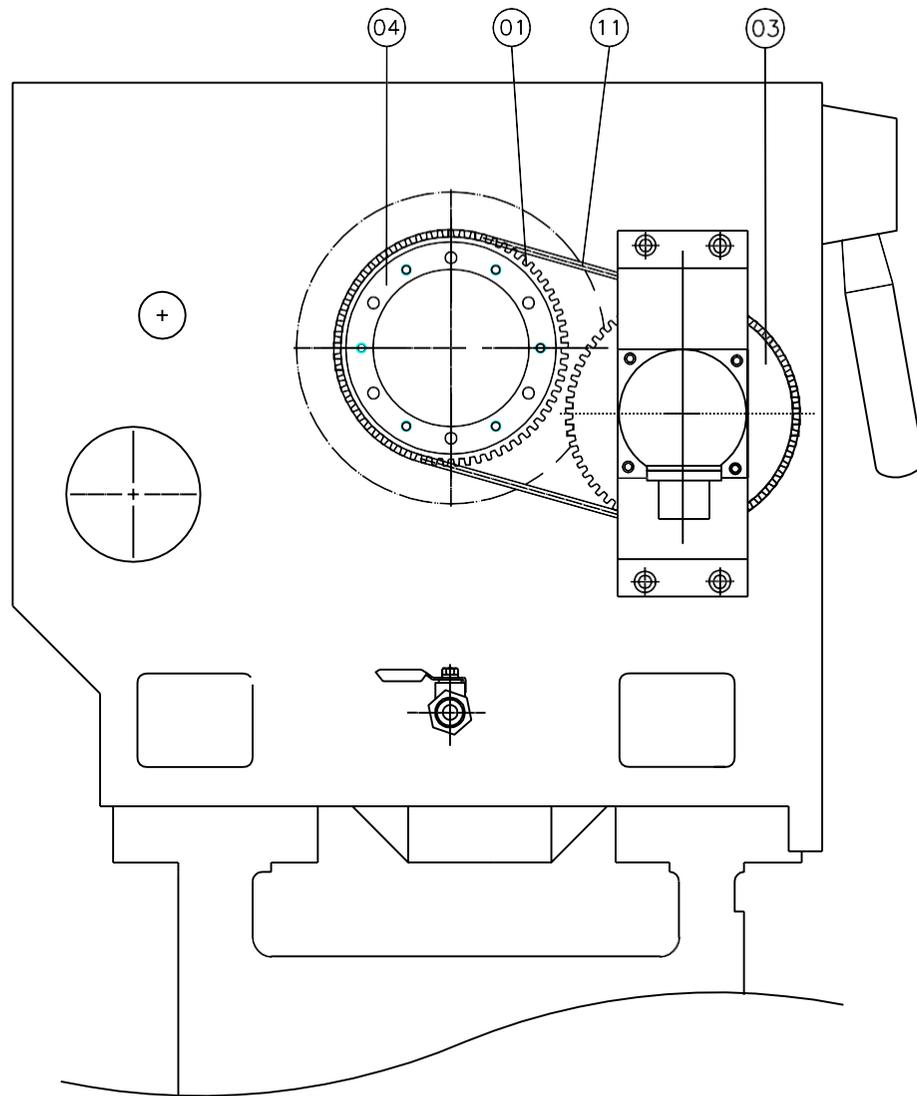
Chuck Cover Assembly





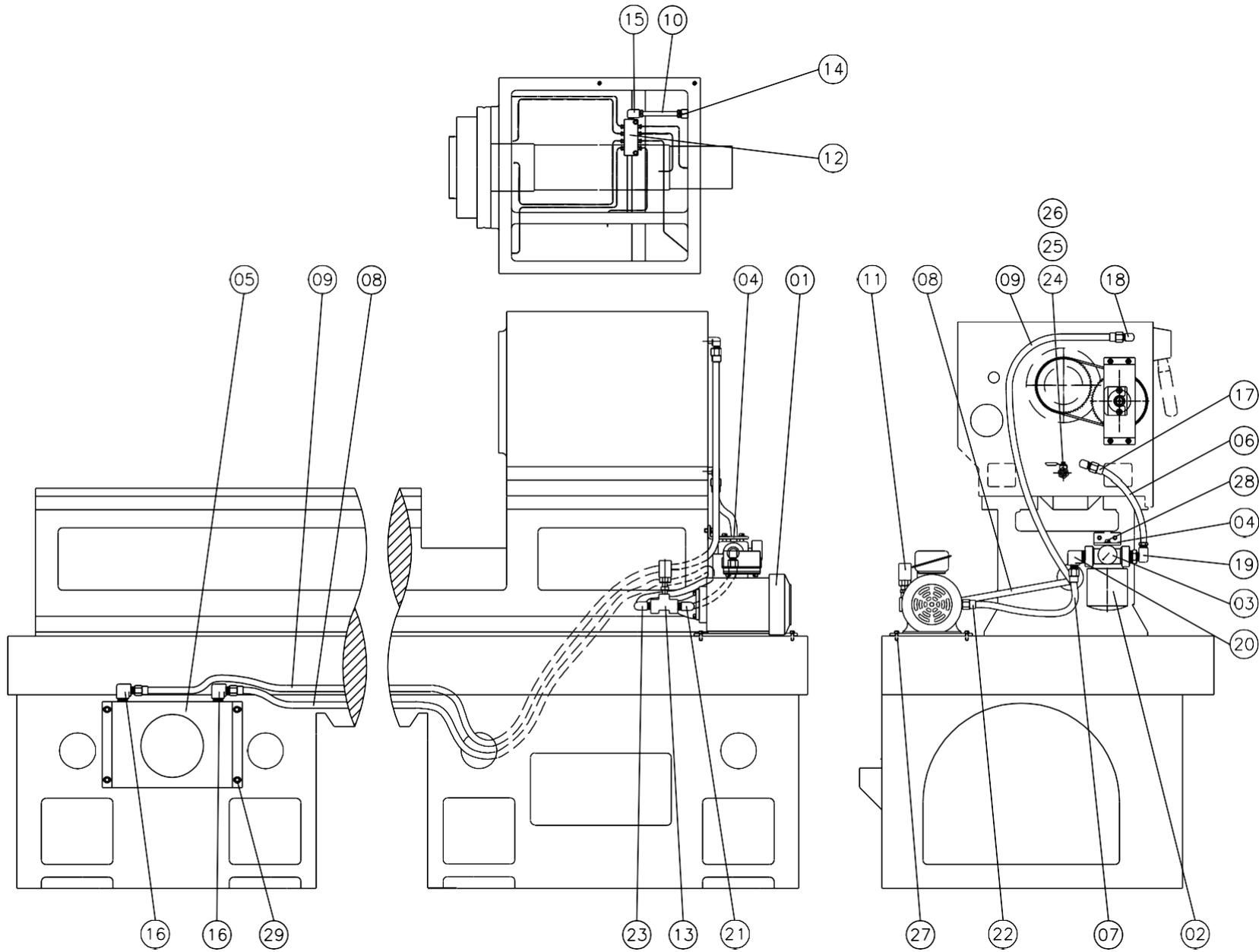
Encoder Assembly





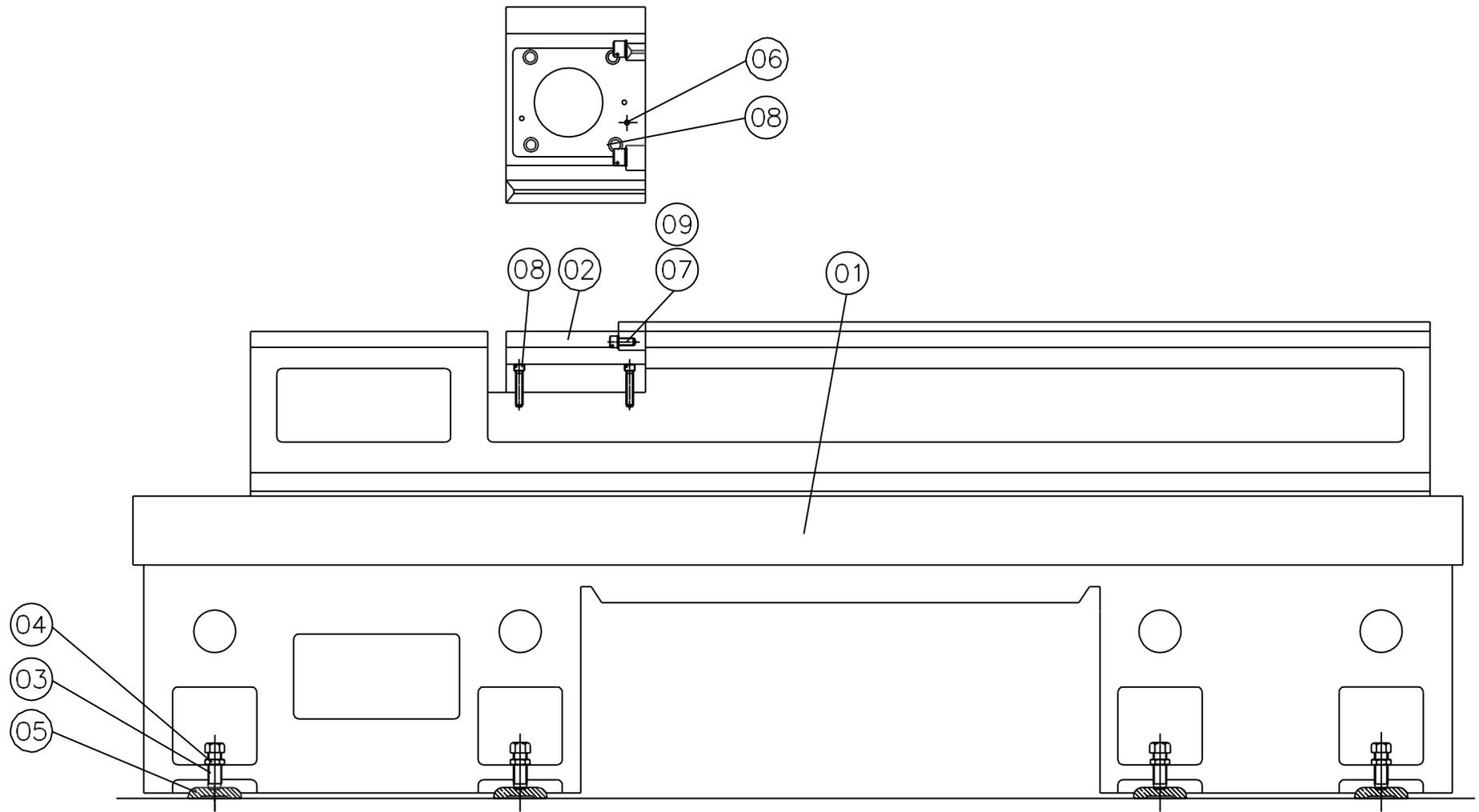
# Encoder Assembly





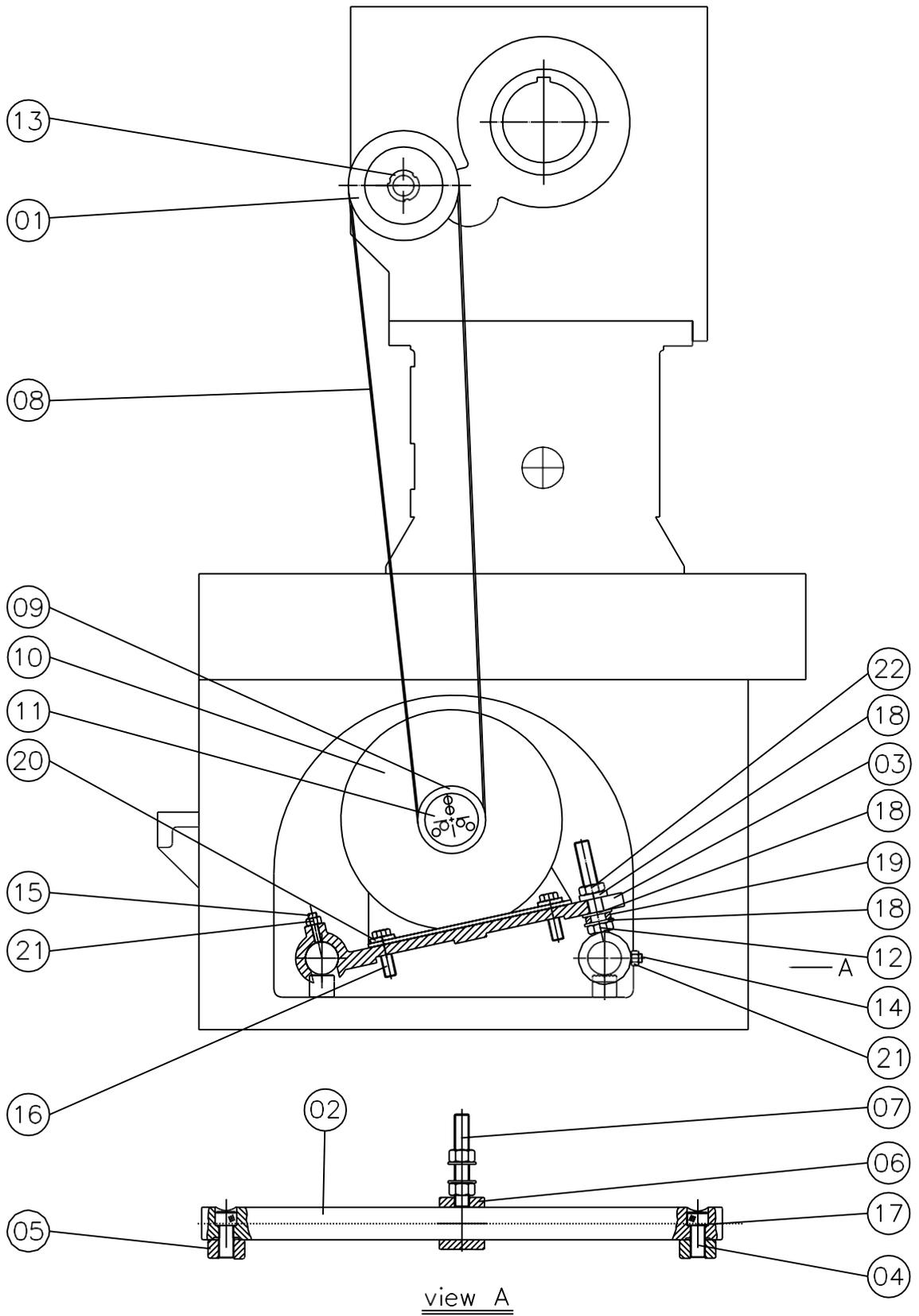
Head Lubrication Assembly





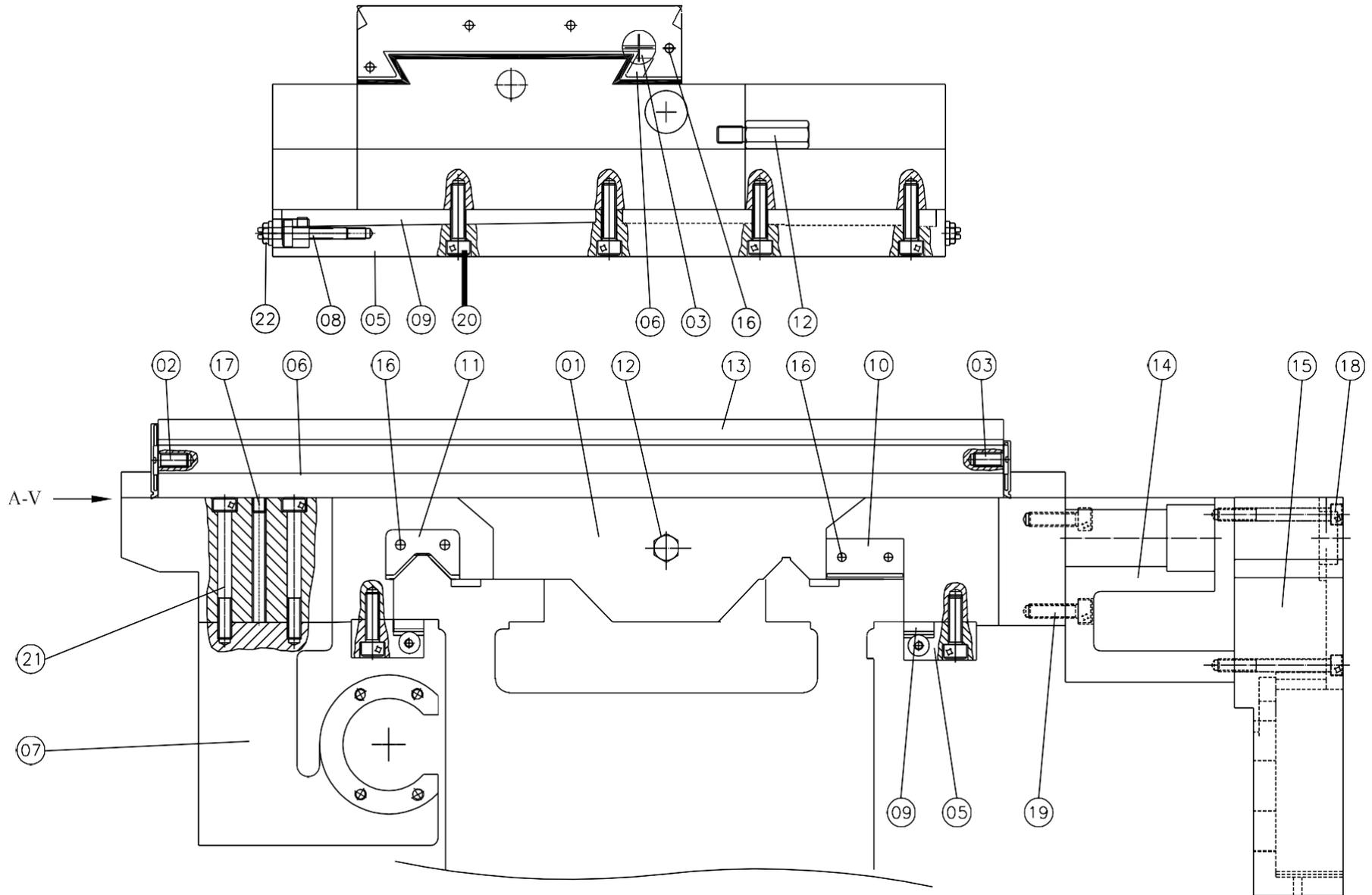
Bed Assembly





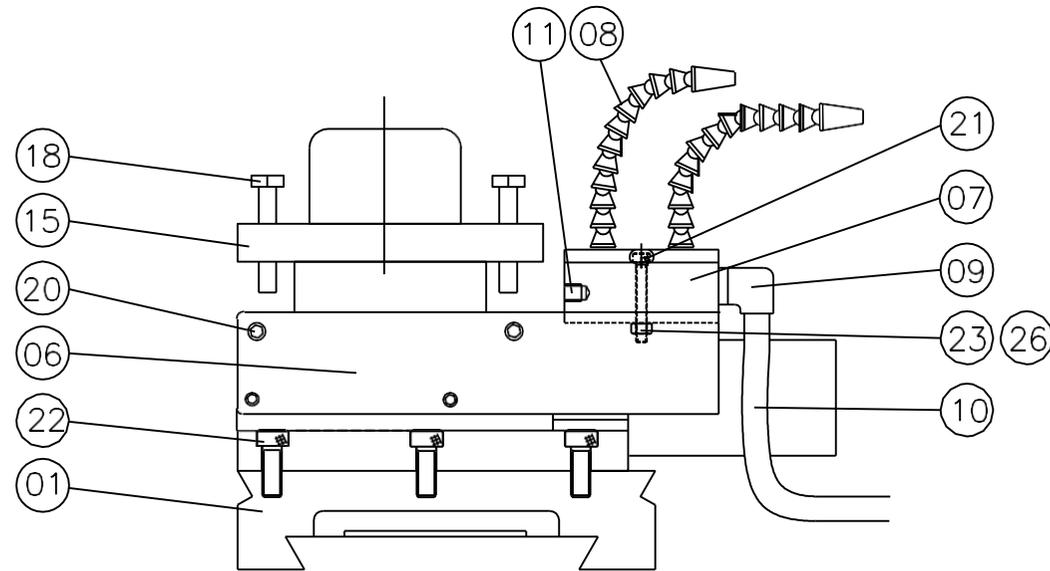
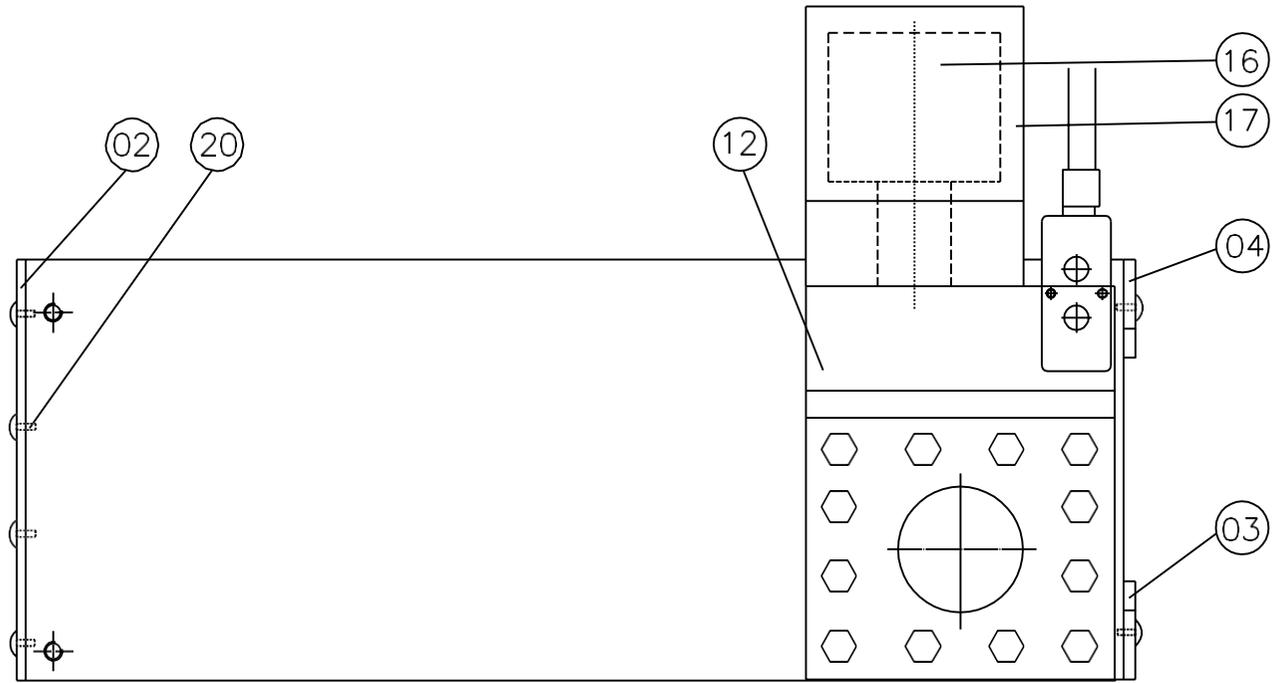
# Motor Drive Assembly





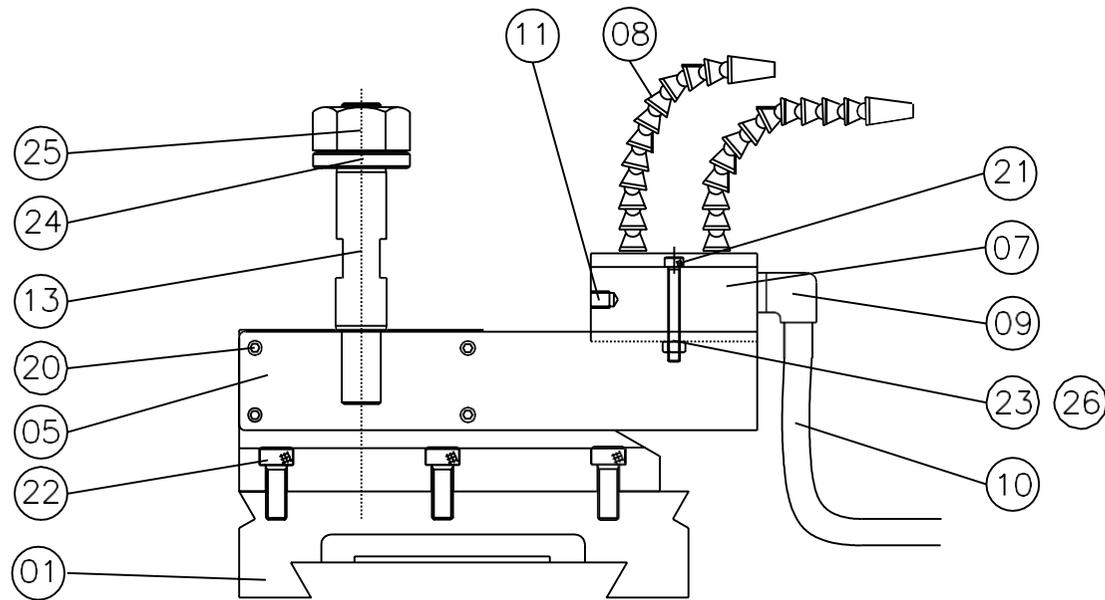
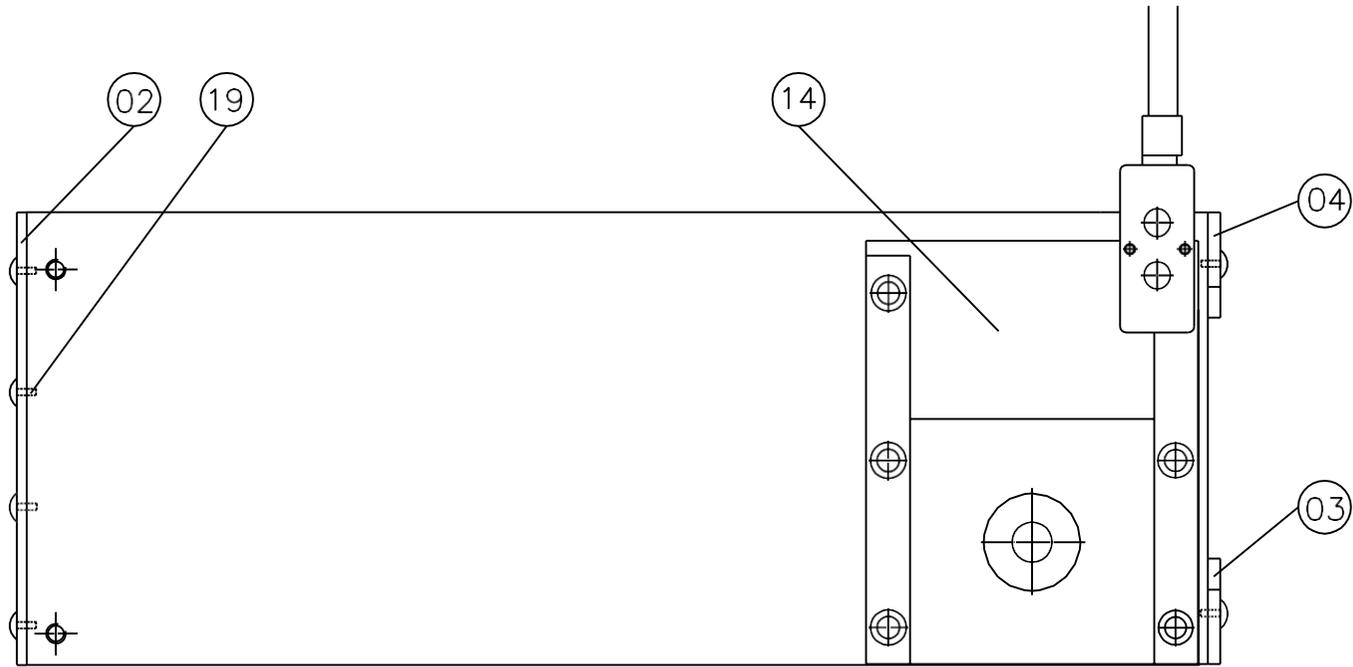
Saddle Assembly





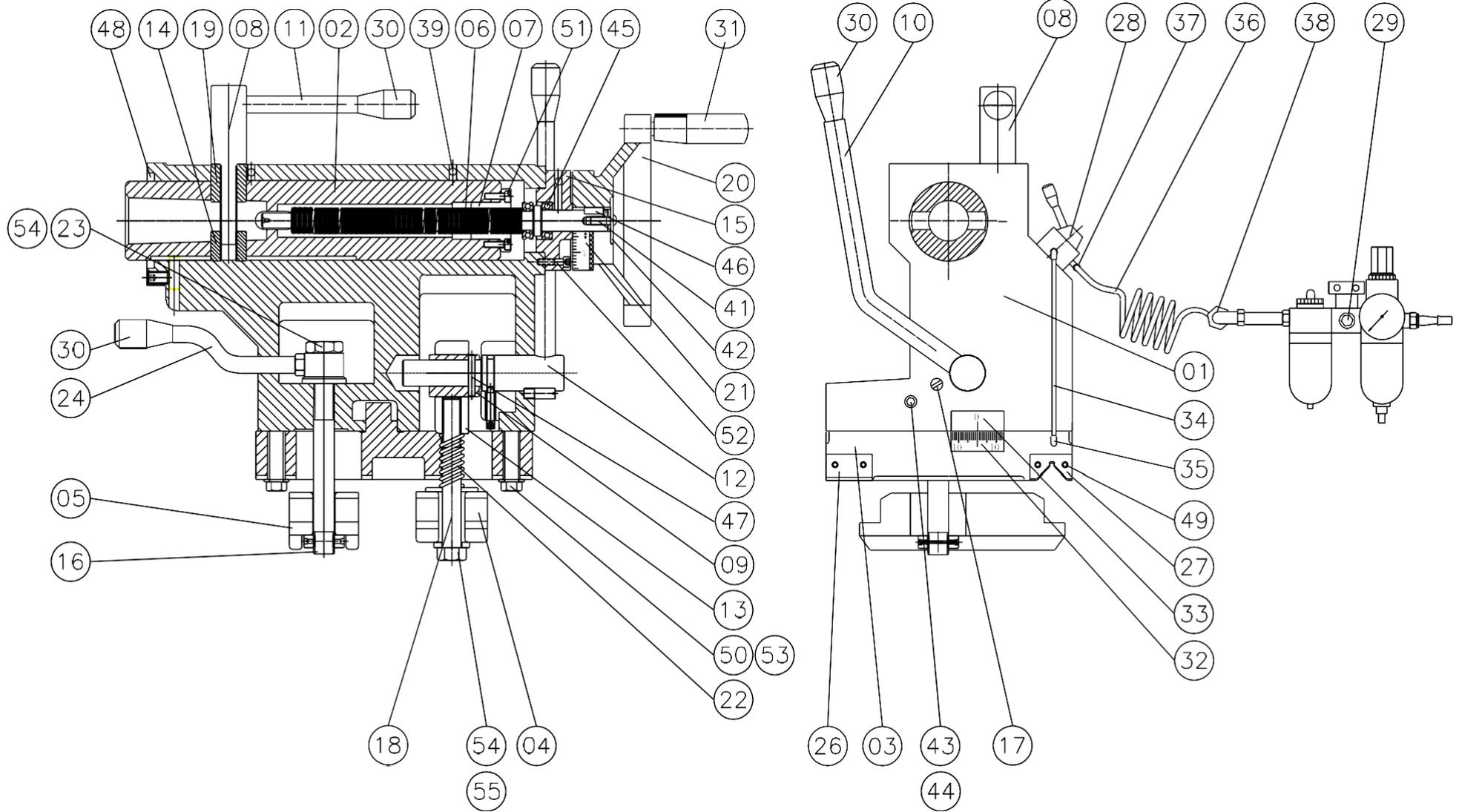
Cross Slide Assembly





Cross Slide Assembly



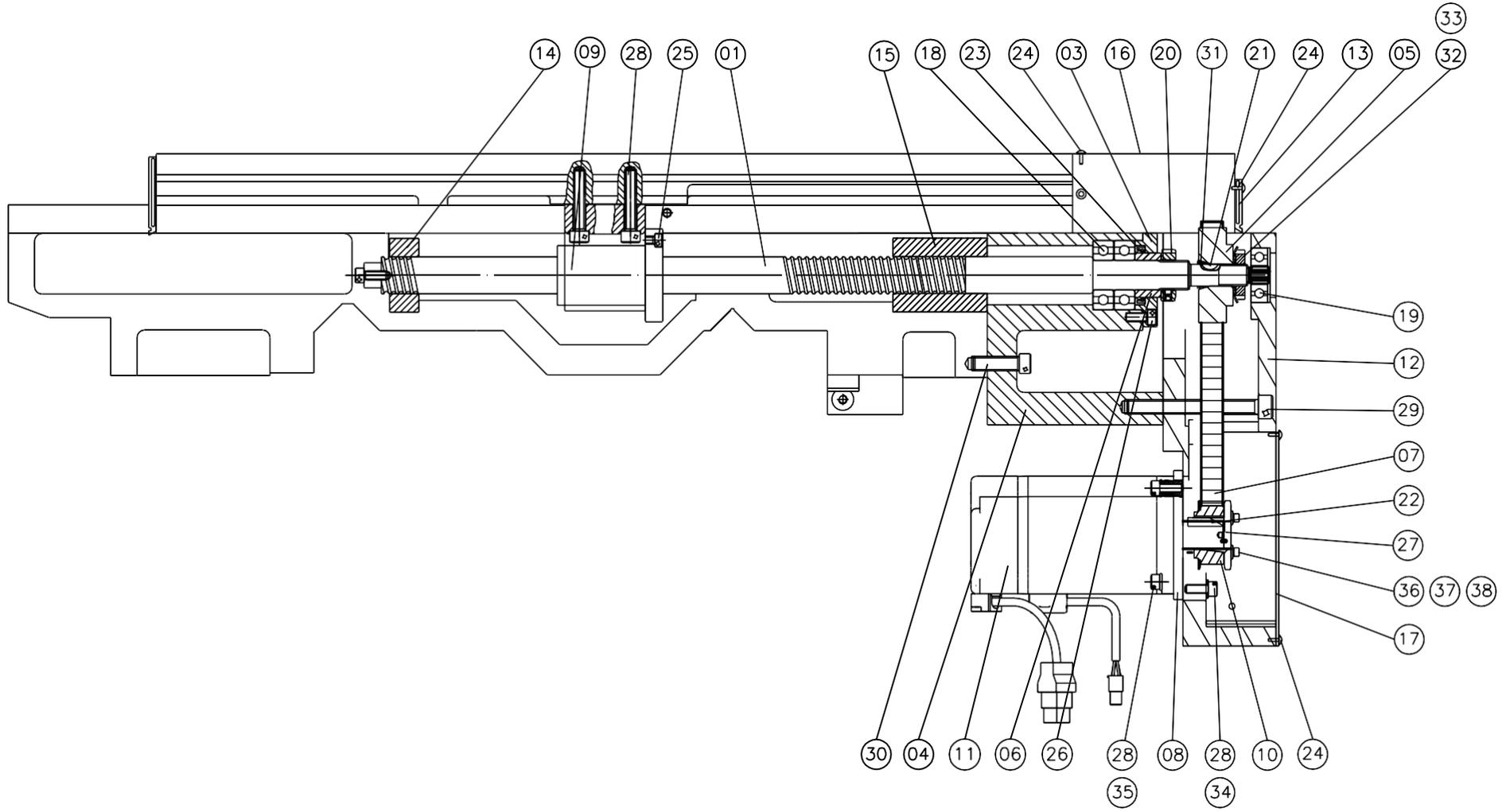


Tailstock Assembly

**Tailstock Assembly**

No.	Part Number	Description	Specification	XYZ P/N
1	KR090010	TAILSTOCK BODY	Complete for 1m version	17333
			Complete for 2m version	14513
2	KR090020	TAILSTOCK QUILL		9483
3	KR090030	TAILSTOCK BASE		11500
4	KR090040	CLAMP PLATE		
5	KR090050	CLAMP PLATE		17778
6	KR090060	LEADSCREW	For 1m ver	Part of 5283
			For 2m ver	Part of 12848
7	KR090070	LEADSCREW NUT	For 1m ver	Part of 5283
			For 2m ver	Part of 12848
8	KR090080	QUILL CLAMP SHAFT		17953
9	KR090090	SLEEVE		
10	KR090100	HAND LEVER		
11	KR090110	HAND LEVER		18312
12	KR090120	BUTTON HEAD CAP SCREW		
13	KR090130	ADJUSTABLE BLOCK		
14	KR090140	QUILL CLAMP BLOCK		18313
15	KR090160	ROUND-INDEX RING		18314
16	KR090170	BOLT		2195
17	KR090190	SET SCREW		
18	KR090200	BOLT		
19	KR090210	QUILL CLAMP BLOCK		4897
20	KR090220	HANDWHEEL		1486
21	KR090230	INDEX RING		18315
22	KR090240	SPRING		
23	KR090250	LOCK NUT		
24	KR090260	HAND LEVER		2193
25	KR090270	ADJUSTABLE SCREW	165mm	
26	KR090280	TAILSTOCK FLAT WIPER		Part of 9797
27	KR090290	TAILSTOCK VEE WIPER		Part of 9797
28	KR090300	AIR SWITCH		2284
29	KR090310	AIR FILTER		
30	KR090320	PLASTIC HANDLE		5294
31	KR090330	PLASTIC HANDLE		5384
32	KR090340	SET OVER-INDICATOR SCALE PLATE		
33	KR090350	SET OVER-INDICATOR PLATE		
34	KR090360	AIR PIPE		17954
35	KR090370	ELBOW		18316
36	KR090380	AIR PIPE		2196
	KR090381	AIR PIPE FOR KR-BL480		10217
37	KR090390	ELBOW		18317

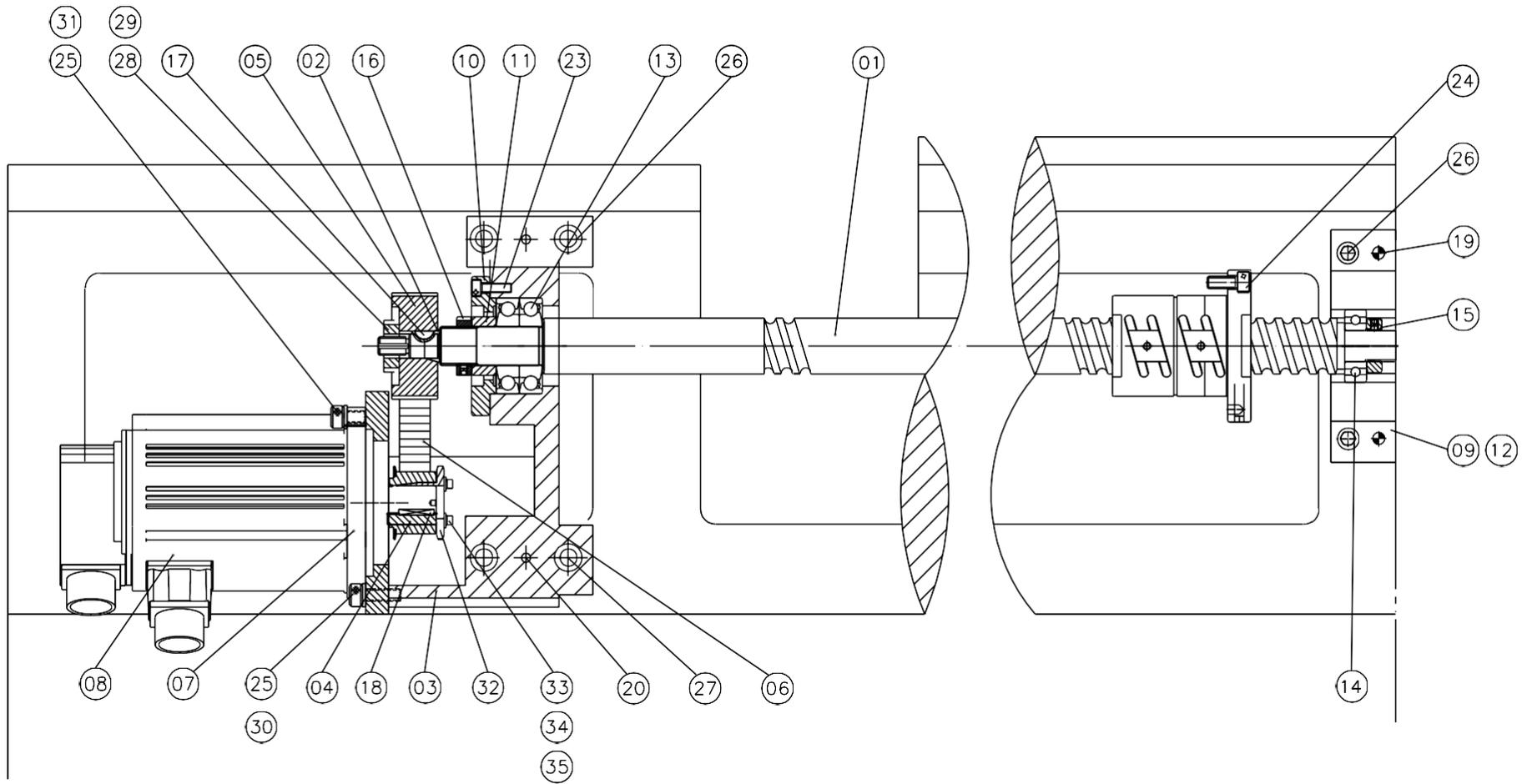




X Axis Drive Assembly

**X Axis Drive Assembly**

No.	Part Number	Description	Specification	XYZ P/N
1	KR110012	X AXIS BALL SCREW		<b>5430</b>
2				
3	KR110020	BEARING COVER		<b>1153</b>
4	KR110031	BRACKET		<b>8299</b>
5		PULLEY	29136(SWI)	<b>5864</b>
6	KR110050	SPACER		
7		BELT	HTD-5M-535-15	<b>778</b>
8	KR110077	MOTOR ADJUSTABLE PLATE		
9	KR110080	APRON-BALL SCREW NUT		<b>17029</b>
10		MOTOR PULLEY	29430(SWI)	<b>17173</b>
11		X AXIS SERVO MOTOR		<b>13639</b>
12	KR110115	BRACKET-X AXIS MOTOR		
13	KR110140	CROSS SLIDE WIPER	125x30mm	<b>Part of 9797</b>
14	KR110150	RUBBER	50x25x20L	<b>17033</b>
15	KR110160	RUBBER	50x25x65L	
16	KR400450	COVER-X AXIS		<b>17034</b>
17	KR400470	COVER PLATE-X AXIS BRACKET		
18	KR500010	BEARING	2047	<b>5533</b>
19	KR500090	BEARING	6301ZZ	<b>5641</b>
20	KR510010	LOCKNUT (GROUND)	YSFM 20x1.0	<b>5654</b>
21		KEY	12.7x3.175	
22		KEY	29433-1(SWI)	
23	KR530030	OIL RING	✕30x✕40x7 mm	
24	KR540040	BUTTON HEAD CAP SCREW	M5x10	
25	KR540240	HEXAGON SOCKET CAP HEAD SCREW	M5x30	
26	KR540300	HEXAGON SOCKET CAP HEAD SCREW	M6x16	
27		FERRULE	29431-1(SWI)	
28		HEXAGON SOCKET CAP HEAD SCREW	M6x16	
29	KR540490	HEXAGON SOCKET CAP HEAD SCREW	M8x80	
30	KR540520	HEXAGON SOCKET CAP HEAD SCREW	M10x35	
31		FERRULE	16350(SWI)	
32		SPRING WASHER		
33		NUT		
34	AMMT01006	WASHER	M6	
35	AWMS01006	SPRING WASHER	M6	
36		HEXAGON SOCKET CAP HEAD SCREW	No8-32UNC	
37		WASHER	No8-32UNC	
38		SPRING WASHER	No8-32UNC	

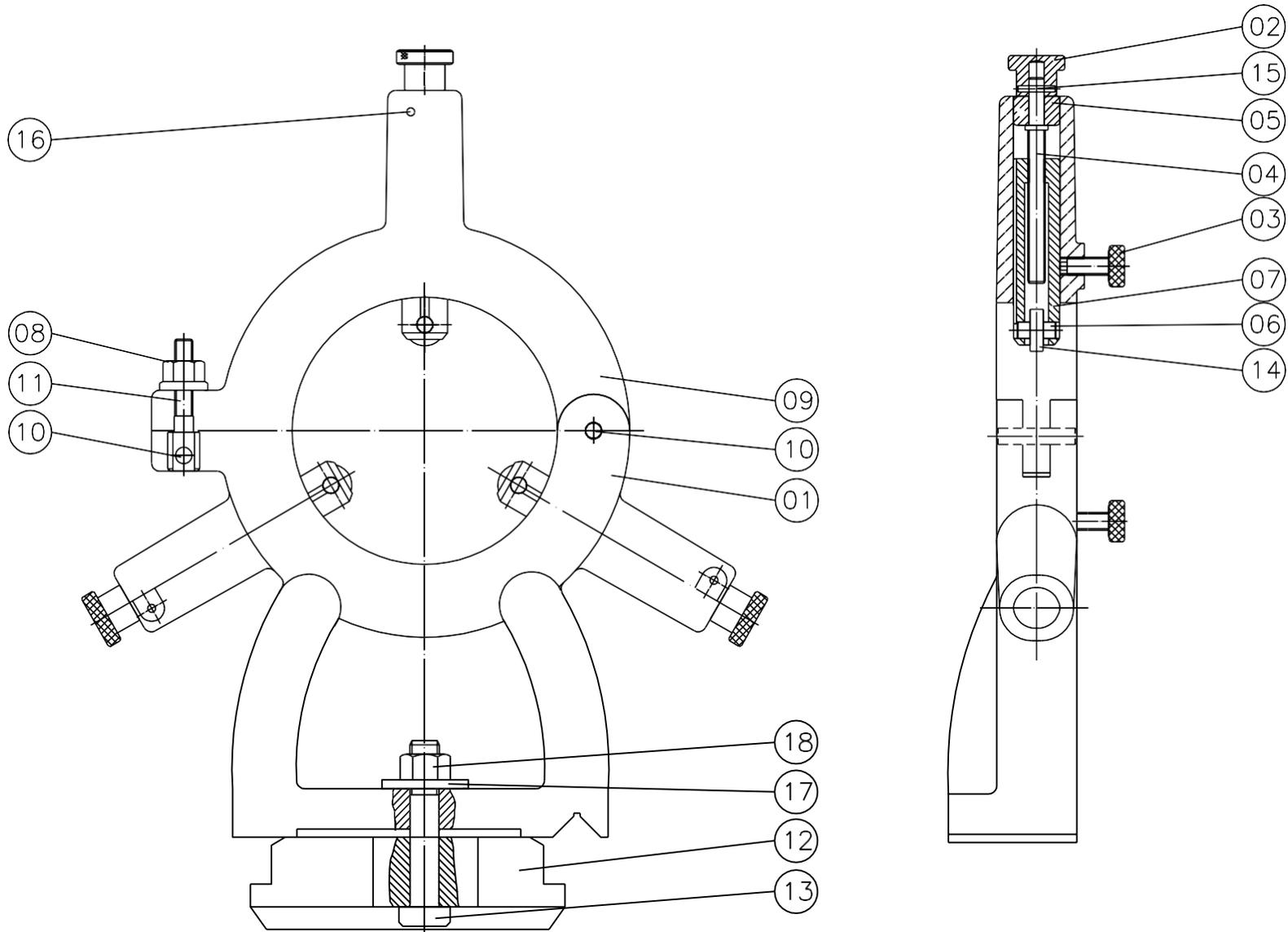


Z Axis Drive Assembly

## Z Axis Drive Assembly

No.	Part Number	Description	Specification	XYZ P/N
1	KR130011	BALL SCREW	Z AXIS	<b>5650</b>
	KR130015	BALL SCREW FOR KR-BL480	Z AXIS	<b>8064</b>
2		FERRULE	16350(SWI)	<b>315</b>
3	KR130023	BRACKET		
4		MOTOR PULLEY	29435(SWI)	<b>17408</b>
5		PULLEY	29880(SWI)	
		PULLEY FOR KR-BL480	29882(SWI)	<b>17422</b>
6		BELT	HTD-5M-375-15	<b>17116</b>
		BELT FOR KR-BL480	HTD-5M-435-15	<b>17421</b>
7	KR130079	MOTOR ADJUSTABLE PLATE		
	LG130070	MOTOR ADJUSTABLE PLATE FOR KR-BL480		
	LG130071	MOTOR ADJUSTABLE PLATE FOR KR-BL480		
8		Z AXIS SERVOMOTOR		
		Z AXIS SERVOMOTOR FOR KR-BL480		
9	LS130100	REAR BRACKET		
	KR130101	REAR BRACKET FOR KR-BL480		
10	KR130110	BEARING COVER		<b>5652</b>
11	KR130050	SPACER		
	KR130130	SPACER FOR KR-BL480		
12	KR130141	ADJUSTABLE PLATE		
13	KR500020	BEARING	25BS62DH	<b>5653</b>
	KR500021	BEARING FOR KR-BL480	30BS62DH	<b>10604</b>
14		BEARING	6204ZZ	<b>13157</b>
		BEARING FOR KR-BL480	6205ZZ	<b>4455</b>
15		LOCKNUT (GROUND)	M20x1.0	
		LOCKNUT (GROUND) FOR KR-BL480	M25x1.5	
16		LOCKNUT (GROUND)	M25x1.5	
		LOCKNUT (GROUND) FOR KR-BL480	M30x1.5	
17		KEY	12.7x3.175	
18		KEY	29433-2(SWI)	
19	KR520140	SPRING DOWEL	\$6x50mm	
20	KR520150	SPRING DOWEL	\$6x60mm	
21				
22				
23		HEXAGON SOCKET CAP HEAD SCREW	M6x16	
24		HEXAGON SOCKET CAP HEAD SCREW	M8x25	
25		HEXAGON SOCKET CAP HEAD SCREW	M8x30	
26		HEXAGON SOCKET CAP HEAD SCREW	M10x40	



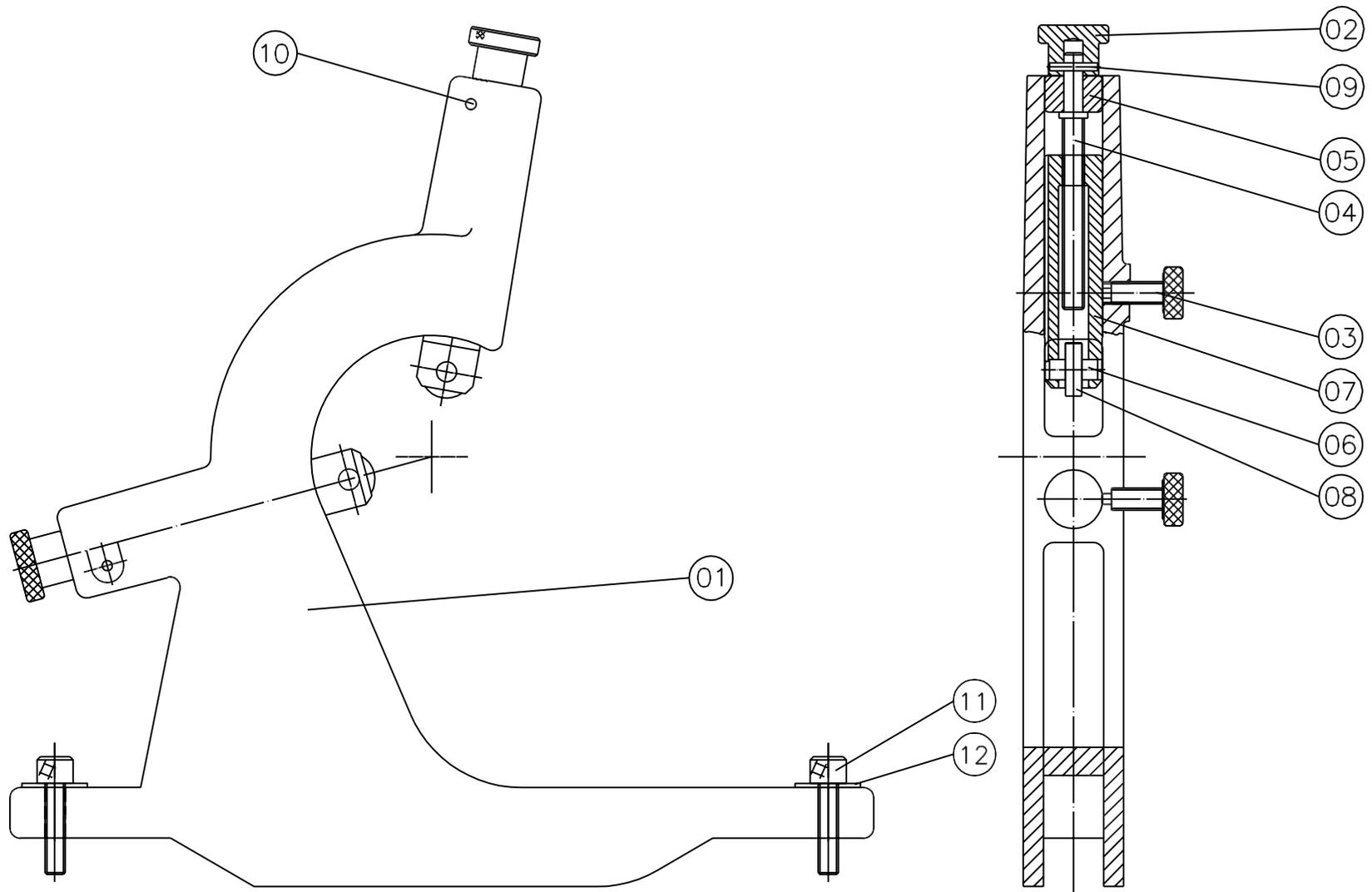


Stationary Steady



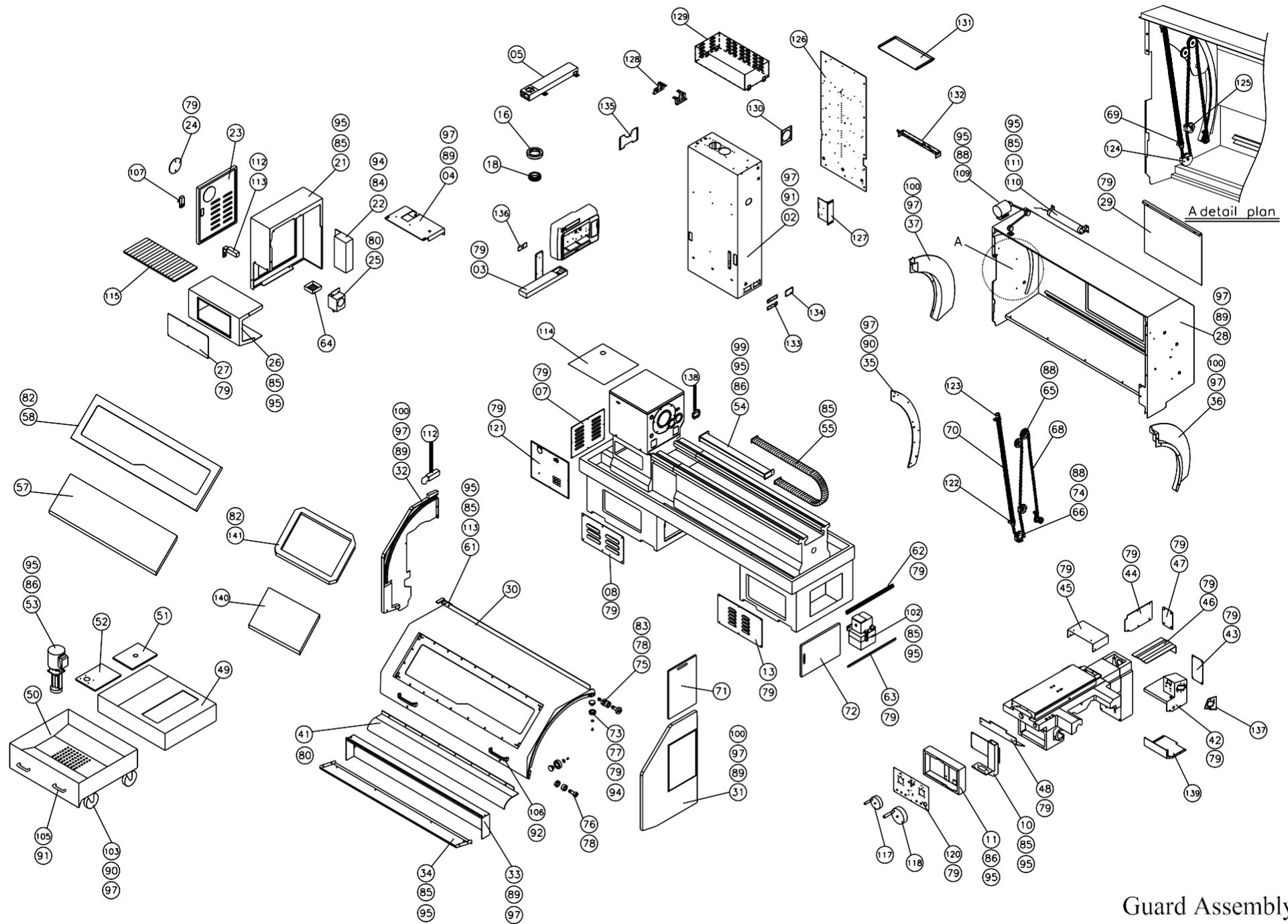
**Stationary Steady**

No.	Part Number	Description	Specification	XYZ P/N
	<b>Steady option</b>	<b>Fixed Steady Roller Type 20mm - 150mm 425 Lathe</b>		<b>4548</b>
	<b>Steady option</b>	<b>Fixed Steady Roller Type 15mm - 190mm 425 Lathe</b>		<b>4550</b>
	<b>Steady option</b>	<b>Rock Fixed Steady to Suit SLX 425 Range 15-280mm</b>		<b>14931</b>
1	KR220020	STATIONARY STEADY BASE		
	KR220021	STATIONARY STEADY BASE		
2	KR220030	COLLAR		
	KR220031	COLLAR		<b>Part of 17137</b>
3	KR220040	COLLAR-CLAMP SCREW		<b>14910</b>
	KR220041	COLLAR-CLAMP SCREW		
4	KR220050	FINGER SCREW		
	KR220051	FINGER SCREW		<b>Part of 17137</b>
5	KR220060	RETAINING BUSH-FINGER		
	KR220061	RETAINING BUSH-FINGER		<b>Part of 17137</b>
6	KR220070	BEARING SHAFT		<b>5660</b>
	KR220071	BEARING SHAFT		
7	KR220080	PAD TYPE FINGER		
	KR220081	PAD TYPE FINGER		
8	KR220090	COLLAR-STEADY TOP CLAMP		
9	KR220100	STATIONARY STEADY TOP		
	KR220101	STATIONARY STEADY TOP		
10	KR220110	PIVOT PIN		<b>12931</b>
	KR220111	PIVOT PIN		
11	KR220120	FIXED BOLT		<b>12932</b>
	KR220121	FIXED BOLT		
12	KR090050	BASE CLAMP PLATE		
13	KR090170	BOLT		
14	KR500030	BEARING	6000ZZ	<b>5661</b>
	KR500031	BEARING		
15	KR520110	SPRING DOWEL	4x25mm	
	KR520111	SPRING DOWEL		
16	KR520120	SPRING DOWEL	5x45mm	
17	KR550090	HIGH BRIGHT WASHER	M20	
18	KR560090	NUT	M20	



Travelling Steady





# Guard Assembly

## Guard Assembly

No.	Part Number	Description	Specification	XYZ P/N
1				
2		ELECTRICAL CABINET	29104-13(SWI)	
3	LU400030	BRACKET ARM		
4	KR400043	COVER-HEAD END REAR		
5	KR400051	BRACKET ARM		
6				
7	KR400060	COVER-SPINDLE MOTOR	KR560420	
8	KR400074	COVER-HEAD END FRONT	KR560801	
	KR400072	COVER-HEAD END FRONT FOR KR-BL480		
9				
10	KR400090	BRACKET ARM-MPG CONTROL		
11	KR400100	BOX-MPG CONTROL	KR560592	
12				
13	KR400123	COVER -TAIL END FRONT		<b>14536</b>
	KR400121	COVER -TAIL END FRONT FOR KR-BL480		
14				
15				
16	LW400170	SLEEVE-SWIVEL TABLE		
17				
18	LW400180	CONTROL BOX SWIVEL TABLE		
19				
20	KR400200	FIXED BRACKET		
21	KR400210	COVER-HEAD END	KR560030	<b>11468</b>
22	KR400220	COVER-HEAD END INSIDE		
23	KR400230	DOOR-HEAD END	KR560010	<b>2909</b>
24	KR400240	DOOR COVER		
25	KR400250	COOLANT COLLECTOR	KR560690	<b>2888</b>
26	KR400260	COVER-HEAD END FRONT	KR560020	
27	KR400270	COVER PLATE-HEAD END FRONT	KR560040	
28	KR400280	GUARD-REAR	KR560050	<b>Part of 16192</b>
	KR400281	GUARD-REAR FOR KR-BL480		
29	LN410370	COVER PLATE-REAR	KR560060	
30	KR400300	GUARD-FRONT DOOR	KR560070	<b>Part of 16192</b>
	KR400301	GUARD-FRONT DOOR FOR KR-BL480		
31	KR400310	GUARD-RIGHT	KR560750	<b>Part of 16192</b>
32	KR400320	GUARD-LEFT	KR560760	<b>Part of 16192</b>
33	KR400330	GUARD-FRONT	KR560550	<b>9817</b>
	KR400331	GUARD-FRONT FOR KR-BL480		

**Guard Assembly**

No.	Part Number	Description	Specification	XYZ P/N
34	KR400340	GUARD-FRONT TRAY	KR560730	<b>Part of 8027</b>
	KR400341	GUARD-FRONT TRAY FOR KR-BL480		<b>Part of 8028</b>
35	KR400350	FIXED PLATE		<b>Part of 8027 / 8</b>
36	KR400360	COVER-RIGHT TRACK	KR560080	<b>Part of 8027 / 8</b>
37	KR400370	COVER-LEFT TRACK	KR560090	<b>Part of 8027 / 8</b>
38				
39				
40				
41	KR400410	COVER-Z AXIS BALL SCREW		
	KR400411	COVER-Z AXIS BALL SCREW FOR KR-BL480		
42	KR400423	COVER-X AXIS MOTOR		
43	KR400432	COVER PLATE-X AXIS MOTOR		
44	KR400442	COVER PLATE-X AXIS MOTOR		
45	KR400450	COVER-X AXIS		<b>17304</b>
46	KR400460	COVER-X AXIS BRACKET		<b>7610</b>
47	KR400470	COVER PLATE-X AXIS BRACKET		
48	KR400480	COVER-SADDLE		
49	KR400490	COOLANT TANK		<b>17768</b>
50	KR400500	SWARF BIN		
51	KR400510	COVER-COOLANT TANK		
52	KR400520	FIXED COVER-COOLANT PUMP		
53	KR400530	COOLANT PUMP		<b>1825</b>
54	KR400540	SQUARE PROTECTION TUBE		
55	KR400550	FLEXIBLE CABLE CARRIER		<b>17543</b>
	KR400551	FLEXIBLE CABLE CARRIER FOR KR-BL480		<b>17544</b>
56				
57	KR400578	TEMPERED GLASS for 1m bed	<b>320 x 1504 x 20.6mm</b>	<b>15032</b>
		TEMPERED GLASS for 2m bed LHS	<b>320 x 1504 x 20.6mm</b>	<b>15032</b>
		TEMPERED GLASS for 1m bed RHS	<b>280 x 603 x 20.6mm Right</b>	<b>15033</b>
58	KR400580	VISION FRAME	KR560890	
59				
60				
61	KR400610	LIMIT SWITCH BASE		<b>15396</b>
62	KR400620	FIXED PLATE-LUBRICATION COVER		
63	KR400630	FIXED PLATE-LUBRICATION COVER		
64	KR400640	SWARF BIN		<b>5664</b>
65	KR400662	DOOR ROLLER	≈50mm	<b>5106</b>
66	KR400661	DOOR ROLLER	≈60mm	<b>5438</b>
67				
68	KR400680	CHAIN	1225mm	<b>9963</b>

## Guard Assembly

No.	Part Number	Description	Specification	XYZ P/N
69	KR400690	LASHING RING		
70	KR430562	SPRING	1m ver x2	8346
	KR430563	SPRING FOR KR-BL480	2m ver x2	8345
71	KR400710	ACRYLIC PLATE-TAIL END	330x470mm	7766
72	KR400720	ACRYLIC PLATE-LUBRICATION	340x390mm	16711
73	KR400730	SLEEVE		5666
74	KR400740	SLEEVE		9827
75	KR400750	FIXED NUT		5667
76	KR400760	SPACER		9828
77	KR500030	BEARING	6000ZZ	5661
78	KR500120	BEARING	CF10-1	5668
79	KR540030	BUTTON HEAD CAP SCREW	M5x8	
80	KR540050	BUTTON HEAD CAP SCREW	M6x8	
81	KR540060	BUTTON HEAD CAP SCREW	M6x12	
82	KR540070	BUTTON HEAD CAP SCREW	M6x25	
83	KR540160	HEADLESS SCREW	M10x10	
84	KR540230	HEXAGON SOCKET CAP HEAD SCREW	M5x10	
85	KR540300	HEXAGON SOCKET CAP HEAD SCREW	M6x12	
86	KR540310	HEXAGON SOCKET CAP HEAD SCREW	M6x16	
87				
88	KR540360	HEXAGON SOCKET CAP HEAD SCREW	M6x40	
89	KR540400	HEXAGON SOCKET CAP HEAD SCREW	M8x12	
90	KR540410	HEXAGON SOCKET CAP HEAD SCREW	M8x16	
91	KR540430	HEXAGON SOCKET CAP HEAD SCREW	M8x25	
92	KR540470	HEXAGON SOCKET CAP HEAD SCREW	M8x45	
93	KR540530	HEXAGON SOCKET CAP HEAD SCREW	M10x35	
94	KR550020	BRIGHT WASHER	M5	
95	KR550030	BRIGHT WASHER	M6	
96	KR550040	BRIGHT WASHER	M10	
97	KR550080	HIGH BRIGHT WASHER	M8	
98	KR560030	NUT	M5	
99	KR560040	NUT	M6	
100	KR560050	NUT	M8	
101	KR560060	NUT	M10	
102	KR570010	LUBRICATION PUMP		10637
103	KR570020	WHEEL		
104				
105				

## Guard Assembly

No.	Part Number	Description	Specification	XYZ P/N
106	KR570050	HANDLE	390mm	<b>7549</b>
107				
108				
109	KR570080	WORKING LIGHT	24V/70W	<b>17367</b>
110	KR570090	LIGHT	120V/36W	<b>15823</b>
111	KR570091	BALLAST RESISTER-LIGHT		
112	KR570110	LIMIT SWITCH	XCK-P102	<b>5670</b>
113	KR570120	KEY-LIMIT SWITCH	XCS-Z14	<b>9670</b>
114	KR570130	RUBBER PAD		
115	KR570140	RUBBER PAD-STRIPED	3x673x273mm	<b>16678</b>
116				
117	KR570210	X AXIS ELECTRONIC HANDWHEEL		<b>464</b>
118	KR570220	Z AXIS ELECTRONIC HANDWHEEL		<b>6254</b>
119				
120	KRPE0031	PANEL		
121	KRPE0040	PANEL		
122	KR430533	SCREW		
	KR430534	SCREW FOR KR-BL480		
123	KR430543	SCREW		
	KR430544	SCREW FOR KR-BL480		
124	LG410100	CHAIN FIXED PLATE		
125	LG410110	FIXED PLATE		
126		BASE PLATE	29105-13(SWI)	
127		POWER SWITCH BASE	29013-5(SWI)	
128		BRACKET	24067-12(SWI)	
129		BOX	29020-17(SWI)	
130		COVER	29104-6-3(SWI)	
131		COVER	29104-12-1(SWI)	
132		COVER	29104-12-2(SWI)	
133		COVER	28157-25(SWI)	
134		COVER	28157-28(SWI)	
135		COVER	29095-1(SWI)	
136	LU400030-A	COVER		
137	KR400423-A	COVER		
138	KR400540-A	COVER		
139	KR410240	COVER		
140	KR400579	TEMPERED GLASS for 2m bed RHS	<b>280 x 603 x 20.6mm Right</b>	<b>15033</b>
141	KR400581	VISION FRAME FOR KR-BL480		
142				

**XYZ**

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*Machine Tools*

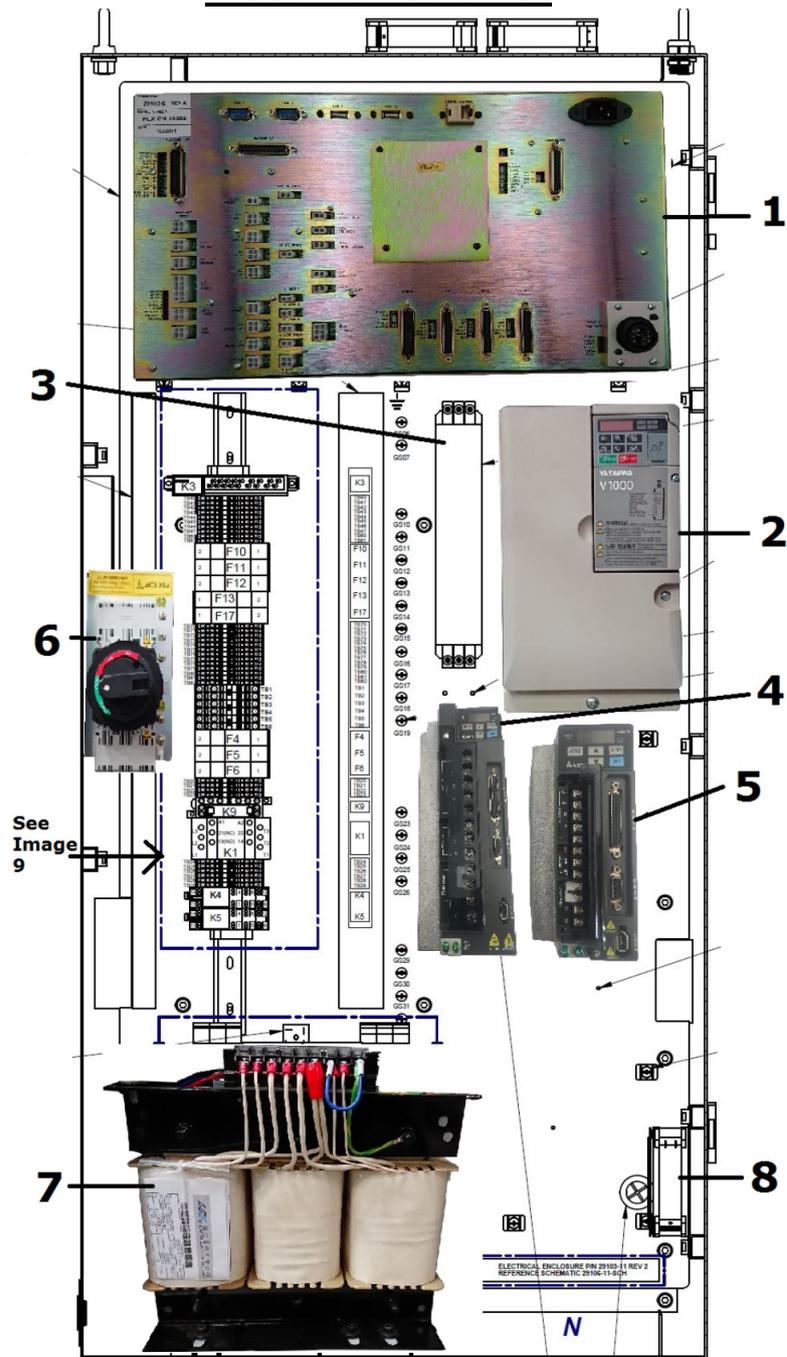
# RLX 425

## Parts Guide



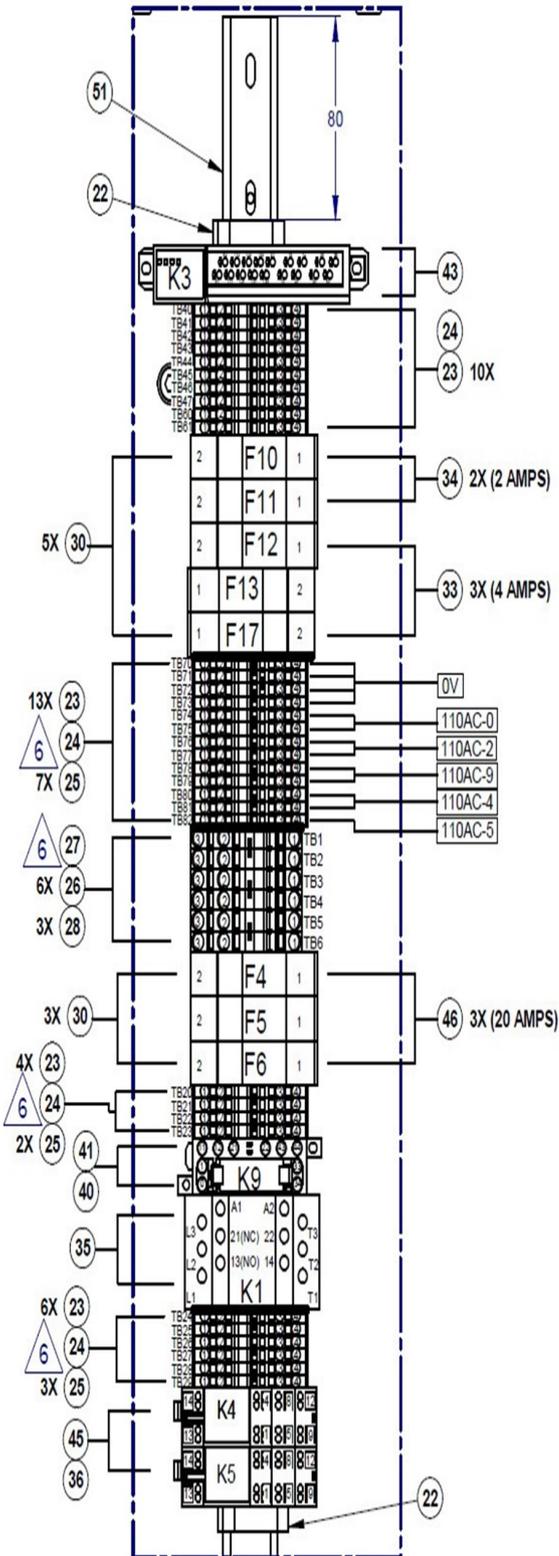
<b><u>Category</u></b>	<b><u>Page Number</u></b>
<b>Electrical Cabinet</b>	2-3
<b>Motor's, Cable's &amp; Drives</b>	4-5
<b>Switches &amp; Buttons</b>	5-6
<b>Handwheel &amp; Jog Stick</b>	6-7
<b>Pendant &amp; Module</b>	7
<b>Pumps</b>	6
<b>Other Electrical Parts</b>	7-8
<b>Pneumatic &amp; Coolant</b>	9
<b>Main Door &amp; Windows</b>	9-10
<b>Belt's</b>	10
<b>Drag Chain &amp; Wipers</b>	11
<b>Tooling Inc Chucks/Toolpost/ Steady &amp; Drilling Attachment</b>	11-13

## Electrical Cabinet



<u>Item Number</u>	<u>Description</u>	<u>XYZ Part Number</u>
1	RLX Computer Module	17404
2	Inverter 7.5 KW	5871
3	Schaffner Line Filter	16782
4	Delta Servo Driver 750W	17611 for 1m or 17621 for 2m
5	Delta Servo Driver 2KW	17612 for 1m or 17622 for 2m
6	Door Isolator Switch 30A	14685
7	Transformer 3 Phase	17231
8	115V Fan	14128

Image 9



<u>Item Number</u>	<u>Description</u>	<u>XYZ Part Number</u>
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

<u>Description</u>	<u>XYZ Part Number</u>	
X Axis Motor	13639	
Z Axis Motor	17647 for 1m 17661 for 2m	
X Axis Drive	17611 for 1m 17612 for 2m	
Z Axis Drive	17621 for 1m 17622 for 2m	
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

<u>Description</u>	<u>XYZ Part Number</u>	
Main Spindle Motor	4059	

## Switches & Buttons

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

## Switches & Buttons

<u>Description</u>	<u>XYZ Part Number</u>	
Door Isolator Switch	14685	
Gear Selector Sensor Switches	7923	

## Pump's

<u>Description</u>	<u>XYZ Part Number</u>	
Coolant Pump 110V 6" Pick Up	1825	
AutoLube Pump 110V YET-F1	10637	
Ishan Headstock Circulation Pump & Motor	3879	

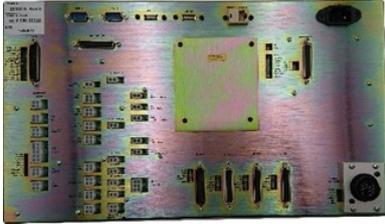
## Handwheel's & Jog Stick

<u>Description</u>	<u>XYZ Part Number</u>	
Safety Jog Stick	15012	
X Axis Handwheel	465	

**Handwheel's & Jog Stick**

<u>Description</u>	<u>XYZ Part Number</u>	
Z Axis Handwheel	6932	

**Pendant & Module**

<u>Description</u>	<u>XYZ Part Number</u>	
RLX Pendant	17394	
Computer Module	17404	

**Other Electrical Parts**

<u>Description</u>	<u>XYZ Part Number</u>	
Inverter 7.5KW	5871	
Main Transformer	17231	

## Other Electrical Parts

<u>Description</u>	<u>XYZ Part Number</u>	
Brake Resistor	5967 x 3	
Spindle Encoder	17253	
Work Lamp 24V	17367	
Work Light	15823	
Spindle Motor Fan	6439	
Electronic Handwheel & Apron Jog Stick Cable	460 for 1m 570 for 2m	

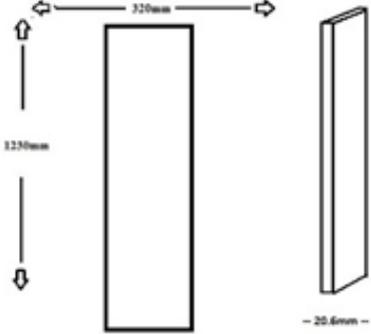
## Filters

<u>Description</u>	<u>XYZ Part Number</u>	
Oil Filter	830	
Door Filter	7920	

## Pneumatic & Coolant

<u>Description</u>	<u>XYZ Part Number</u>	
Air Regulator Unit	4915	
Tailstock Assembly Air Pipe	2196 for 1m 10217 for 2m	
Coolant Nozzle Assembly	12585	
Armoured Coolant Pipe 180" for 1m 220" for 2m	4729 for 1 m 8652 for 2m	

## Main Door & Window's

<u>Description</u>	<u>XYZ Part Number</u>	
Door Spring	8346 x 2 for 1m 8345 x 2 for 2m	
Main Window 1504 x 320mm for 1m 2m would be as above & small R.H.S window 603x 280mm	15032 for 1m 15032 for 2m Left hand side 15033 for 2m Right hand side	
Window Silicon	11661	

## Pneumatic & Coolant

<u>Description</u>	<u>XYZ Part Number</u>	
Perspex Panel Tailstock End 470 x 375mm	7766	
Perspex Panel Auto Lube Pump	16711	

## Belt's

<u>Description</u>	<u>XYZ Part Number</u>	
X Axis Belt	778	
Z Axis Belt	17116 for 1m 17421 for 2m	
Spindle Encoder Belt	1897	
Spindle Belt Set	1367	

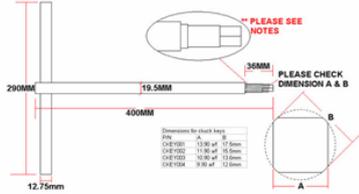
## Drag Chain / Wiper's

<u>Description</u>	<u>XYZ Part Number</u>	
Z Axis Chain	17543 for 1m 17544 for 2m	
Wiper Kit	9795	

## Chuck's

<u>Description</u>	<u>XYZ Part Number</u>	
Standard 250mm Scroll 3 Jaw Chuck Supplied With The Machine	13081	
315mm Independent 4 Jaw Chuck Cast Iron	2611	
Chuck Guard To Suit 250mm Chuck	4807	
Chuck Guard To Suit 315mm Chuck	7311	
Soft Jaws For 250mm 3 Jaw Chuck	2697	

## Chuck's

<u>Description</u>	<u>XYZ Part Number</u>																					
Hard Inside Solid Jaws To Suit 250mm 3 Jaw	3058																					
Hard Outside Solid Jaws To Suit 250mm 3 Jaw	3062																					
Soft Jaws For 315mm 4 Jaw Chuck	15841																					
Extended Chuck Key 250 and 315 mm Chuck	4462	 <p>PLEASE SEE NOTES</p> <p>PLEASE CHECK DIMENSION A &amp; B</p> <table border="1"> <thead> <tr> <th colspan="2">Dimensions for chuck keys</th> </tr> </thead> <tbody> <tr> <td>250mm</td> <td>12.75mm</td> </tr> <tr> <td>315mm</td> <td>12.75mm</td> </tr> <tr> <td>400mm</td> <td>12.75mm</td> </tr> <tr> <td>500mm</td> <td>12.75mm</td> </tr> <tr> <td>600mm</td> <td>12.75mm</td> </tr> <tr> <td>700mm</td> <td>12.75mm</td> </tr> <tr> <td>800mm</td> <td>12.75mm</td> </tr> <tr> <td>900mm</td> <td>12.75mm</td> </tr> <tr> <td>1000mm</td> <td>12.75mm</td> </tr> </tbody> </table>	Dimensions for chuck keys		250mm	12.75mm	315mm	12.75mm	400mm	12.75mm	500mm	12.75mm	600mm	12.75mm	700mm	12.75mm	800mm	12.75mm	900mm	12.75mm	1000mm	12.75mm
Dimensions for chuck keys																						
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600mm	12.75mm																					
700mm	12.75mm																					
800mm	12.75mm																					
900mm	12.75mm																					
1000mm	12.75mm																					

## Steady Options

<u>Description</u>	<u>XYZ Part Number</u>	
Fixed Steady 20-150mm	4548	
Fixed Steady 15-190mm	4550	
Rock Fixed Steady 15-280mm	14931	

<u>Description</u>	<u>XYZ Part Number</u>	
Travelling Steady 15-70mm	7039	

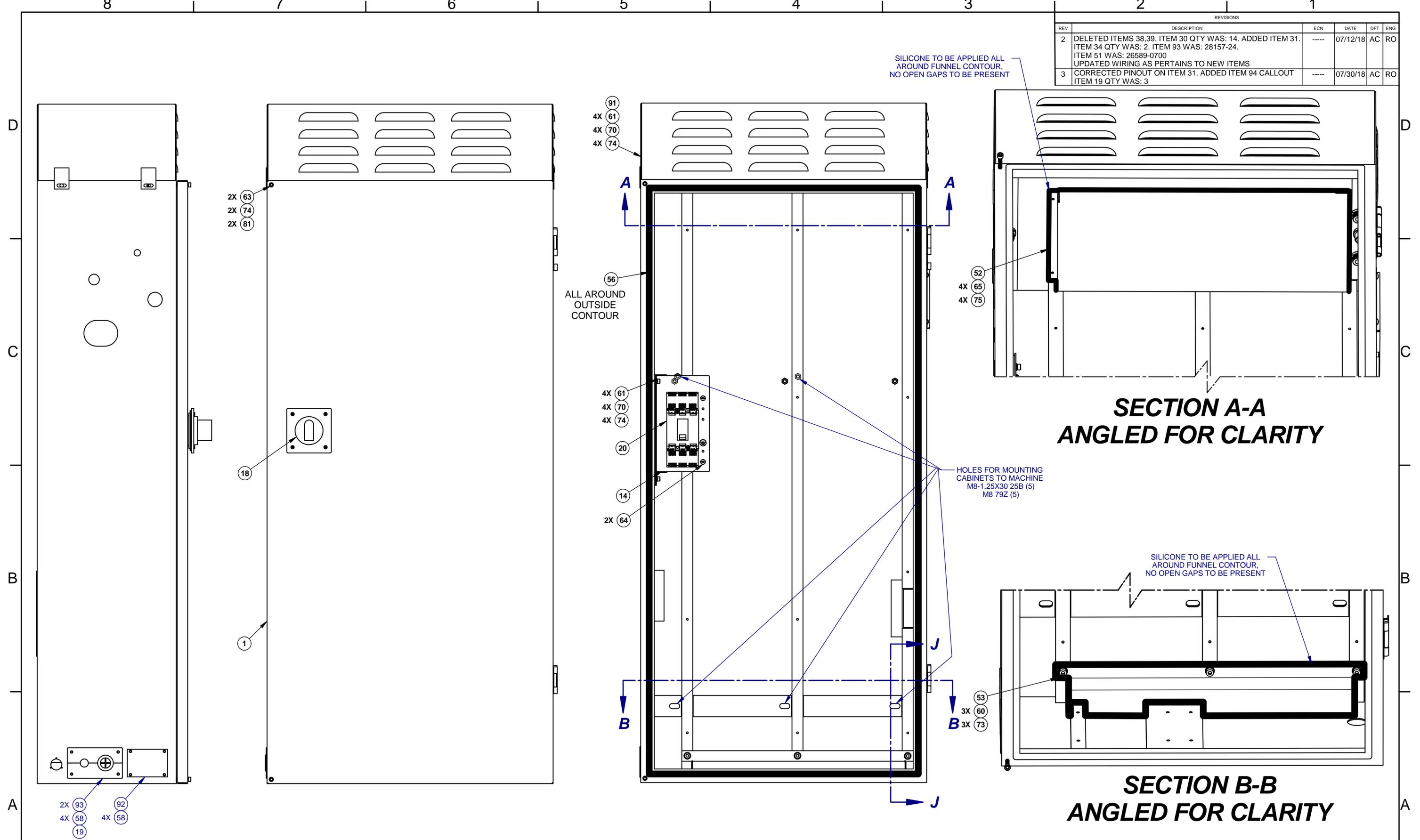
### Tool Post / Holders

<u>Description</u>	<u>XYZ Part Number</u>	
T3 Quick Change Tool Post Set	4928	
T3 Standard Holder	4930	
T3 Vee Holder	4931	
T3 Morse Holder	4932	
T3 Plain Bore 40mm Holder	3870	

### Drilling Attachment's

<u>Description</u>	<u>XYZ Part Number</u>	
Drilling Attachment 40mm Bore	7724	

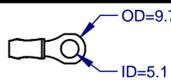
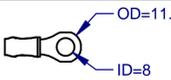
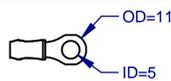
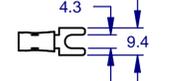
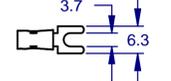
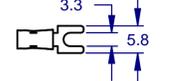
REVISIONS					
REV	DESCRIPTION	ECN	DATE	DFT	ENG
2	DELETED ITEMS 38,39. ITEM 30 QTY WAS: 14. ADDED ITEM 31. ITEM 34 QTY WAS: 2. ITEM 93 WAS: 28157-24. ITEM 51 WAS: 26589-0700 UPDATED WIRING AS PERTAINS TO NEW ITEMS	----	07/12/18	AC	RO
3	CORRECTED PINOUT ON ITEM 31. ADDED ITEM 94 CALLOUT ITEM 19 QTY WAS: 3	----	07/30/18	AC	RO



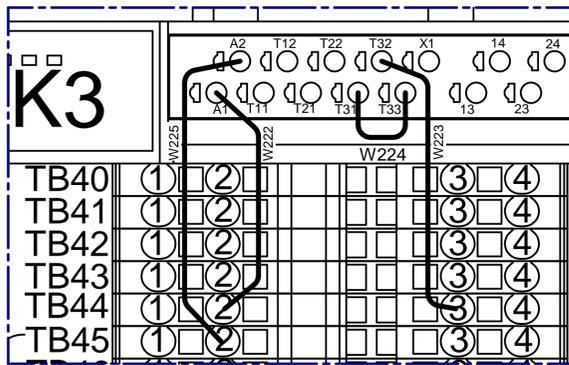
DIMENSIONS ARE IN MILLIMETERS 1-4 ±0.020, 4-16 ±0.025 16-63 ±0.050, 63-250 ±0.070, 250-1000 ±0.100, 1000-1500 ±0.200 REMOVE ALL SHARP EDGES MASK ALL TAPPED HOLES DIMENSIONS PER ASME Y14.5		APPROVALS	DATE		
MATERIAL	FINISH	DRAWN BY Chris	6/15/15	TITLE ELECTRICAL CABINET ASSY-LATHE-425	
		ENGINEER RO		SIZE D	CODE IDENT. NO. 06238
		ENGINEER		THIRD ANGLE PROJECTION	DWG NO. 29103-12
				SCALE: -	REV 3
					SHEET 1 OF 9

NOTICE: THIS DESIGN WAS ORIGINATED BY AND EMBODIES A CONFIDENTIAL PROPRIETARY DESIGN OWNED BY SOUTHWESTERN INDUSTRIES. IT IS DISCLOSED IN CONFIDENCE FOR A SPECIFIC PURPOSE AND THE RECIPIENT HEREOF AGREES NOT TO MAKE ANY REPRODUCTION, DISCLOSURE OR OTHER USE OF THIS INFORMATION WITHOUT THE WRITTEN CONSENT OF SOUTHWESTERN INDUSTRIES.



SWI P/N EQUIVALENT	TERMINAL REQUIREMENTS		
	TERMINAL 	GAUGE	DIMENSIONS
29131-10-10	RING 1	14-10 AWG (2.0-5.5mm <sup>2</sup> )	
29131-08-14	RING 2	8 AWG (8mm <sup>2</sup> )	
29131-08-10	RING 3	14 AWG (2mm <sup>2</sup> )	
29132-01-12	FORK 1	12-10 AWG (3.5-5.5mm <sup>2</sup> )	
29132-02-14	FORK 2	14 AWG (2mm <sup>2</sup> )	
29132-03-14	FORK 3	14 AWG (2mm <sup>2</sup> )	
29132-06-06	RING 4	6 AWG (13.5mm <sup>2</sup> )	

WIRE	ITEM NUMBER	WIRE FROM	TYPE OF TERMINAL FROM	WIRE LABEL	WIRE GAGE mm <sup>2</sup> 	WIRE LENGTH	COLOR	WIRE TO	TYPE OF TERMINAL TO
W201		SWI-T1	RING 2	L1-1	8	450	BLACK	FL1-LINE-L1	FERRULE
W202		SWI-T2	RING 2	L2-1	8	450	BLACK	FL1-LINE-L2	FERRULE
W203		SWI-T3	RING 2	L3-1	8	450	BLACK	FL1-LINE-L3	FERRULE
W204		GS05	RING 4	GND	10	400	GREEN/YELLOW	FL1-LINE-GND	RING 4
W205		FL1-LOAD-GND	RING 3	GND	8	100	GREEN/YELLOW	GS18	RING 3
W206		GS19	RING 1	GND	5.5	250	GREEN/YELLOW	SPD-GND-1	RING 1
W208		FL1-LOAD-L1	FERRULE	L1-2	8	350	BLACK	TB1-1	FERRULE
W209		FL1-LOAD-L2	FERRULE	L2-2	8	350	BLACK	TB3-1	FERRULE
W210		FL1-LOAD-L3	FERRULE	L3-2	8	350	BLACK	TB5-1	FERRULE
W211		TB2-3	FERRULE	L1-2	5.5	250	BLACK	F4-1	FERRULE
W212		TB4-3	FERRULE	L2-2	5.5	250	BLACK	F5-1	FERRULE
W213		TB6-3	FERRULE	L3-2	5.5	250	BLACK	F6-1	FERRULE
W214		F17-2	FERRULE	24AC-1	0.75		BLACK	K9-22	FERRULE
W215		K9-21	FERRULE	24AC-2	0.75		BLACK	REC1-AC1	FAST-ON
W216		TB70-3	FERRULE	0V	2		BLUE	REC1-AC2	FAST-ON
W217		TB80-4	FERRULE	110AC-4	2		RED	F10-1	FERRULE
W218		F10-2	FERRULE	110AC-2	2		RED	TB76-1	FERRULE
W219		F12-2	FERRULE	110AC-5	2		RED	TB82-1	FERRULE
W220		TB75-1	FERRULE	110AC-0	2		RED	F13-1	FERRULE
W221		TB81-4	FERRULE	110AC-4	2		RED	F12-1	FERRULE
W222		K3-A1	FERRULE	24DC-F47	0.5		BROWN	TB44-2	FERRULE
W223		K3-T32	FERRULE	24DC-F47	0.5		BROWN	TB44-3	FERRULE
W224		K3-T31	FERRULE	RESET	0.5		BROWN	K3-T33	FERRULE
W225		K3-A2	FERRULE	ODC	0.5		GREEN	TB45-2	FERRULE
W226		K1-54	FERRULE	L1-8	2		BLACK	F20-1	FERRULE
W227		K1-74	FERRULE	L2-8	2		BLACK	F21-1	FERRULE
W228		K1-84	FERRULE	L3-8	2		BLACK	F22-1	FERRULE
W229		TB2-1	FERRULE	L1-2	2	330	BLACK	K1-53	FERRULE
W230		TB4-1	FERRULE	L2-2	2	330	BLACK	K1-73	FERRULE
W231		TB6-1	FERRULE	L3-2	2	330	BLACK	K1-83	FERRULE



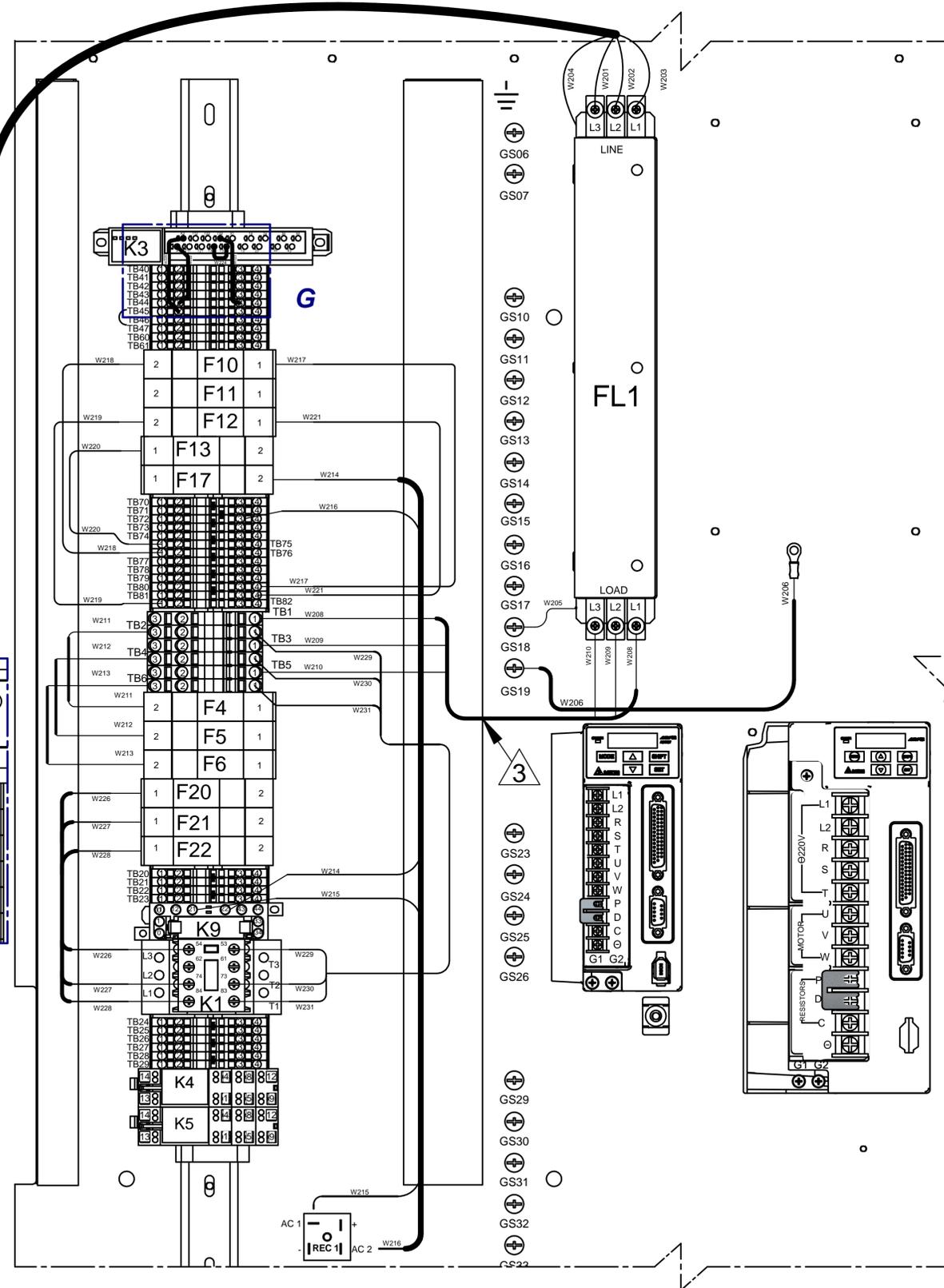
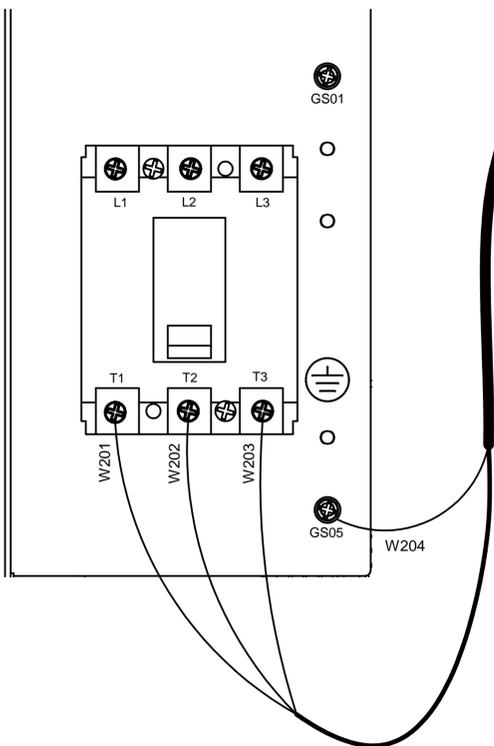
DETAIL G



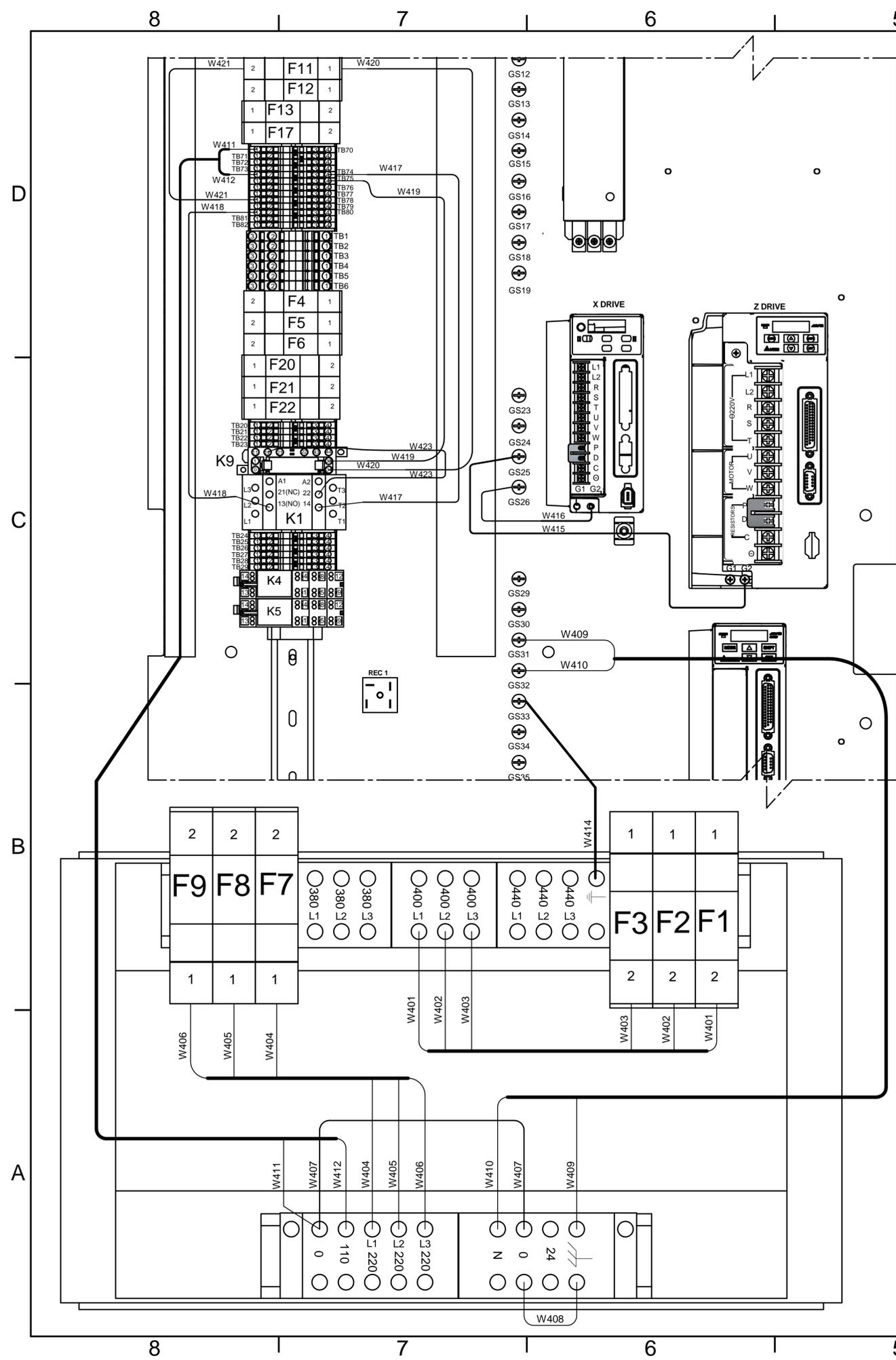
NOTES: (UNLESS OTHERWISE SPECIFIED).

-  PLACE INSULATION WIRE SLEEVE ON ALL CRIMP PORTION OF EACH RING AND TERMINAL (3D7).
-  EQUIVALENT GAGE WIRE MAY BE USED (EXAMPLE: 5.5mm<sup>2</sup>=10AWG). ALL WIRES TO BE RATED AT 600V AND 85°C OR HIGHER RATED. (3C6, 4D2, 5 D2, 6B1, 7B2, 8B1)
-  BREAK RIB IN WIRE WAY (ITEM 2) WHEN ROUTING THESE WIRES AS SHOWN IN PICTURE. (3B5, 4B6, 4C6)

(NOTE 3 REPEATED ON SHEET 4)

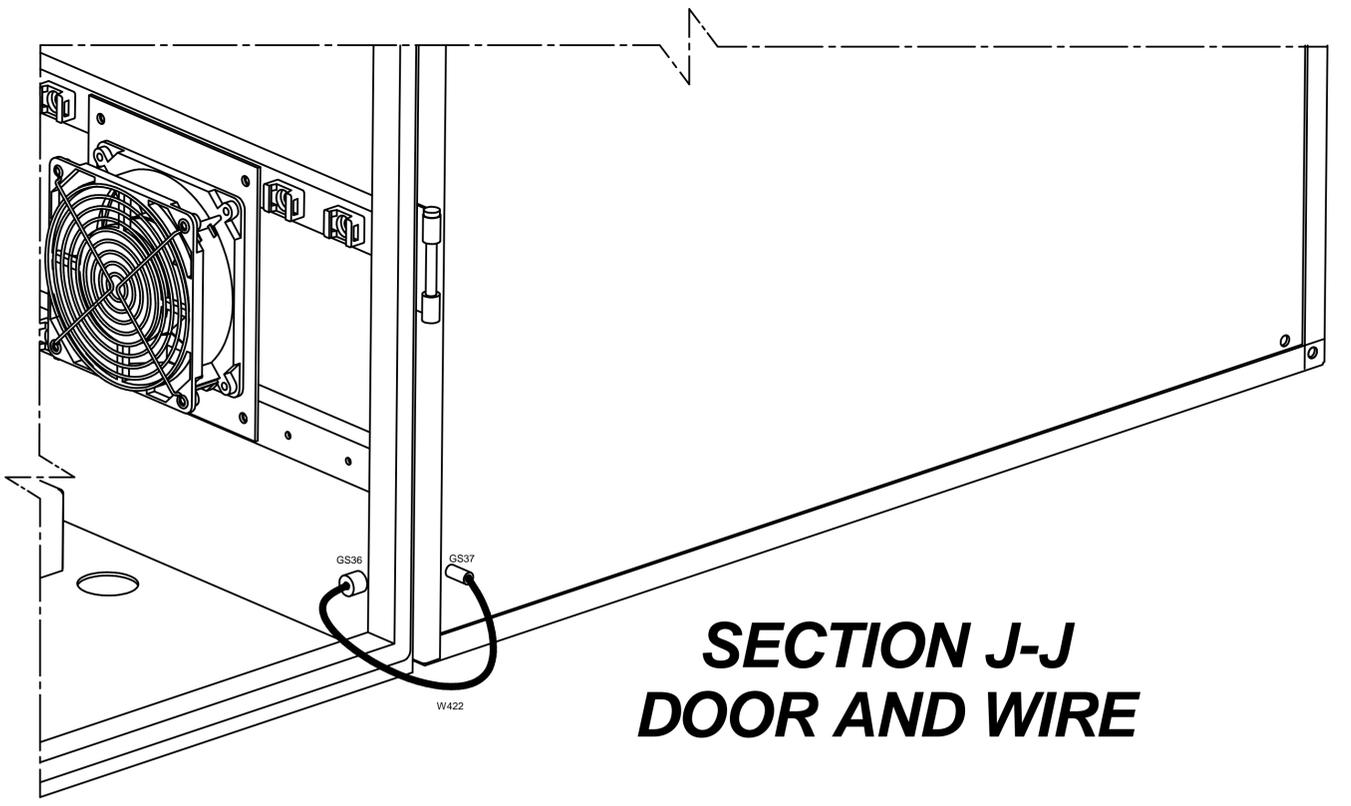


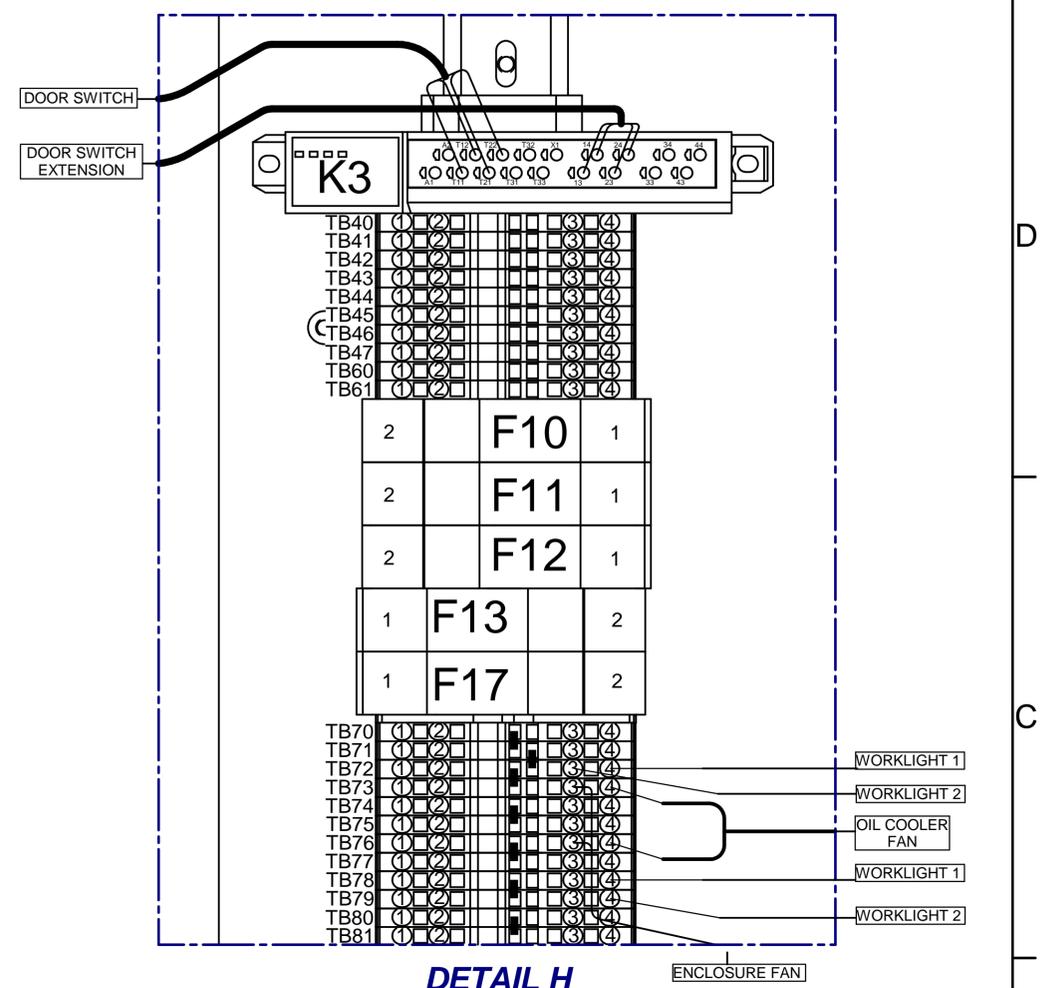
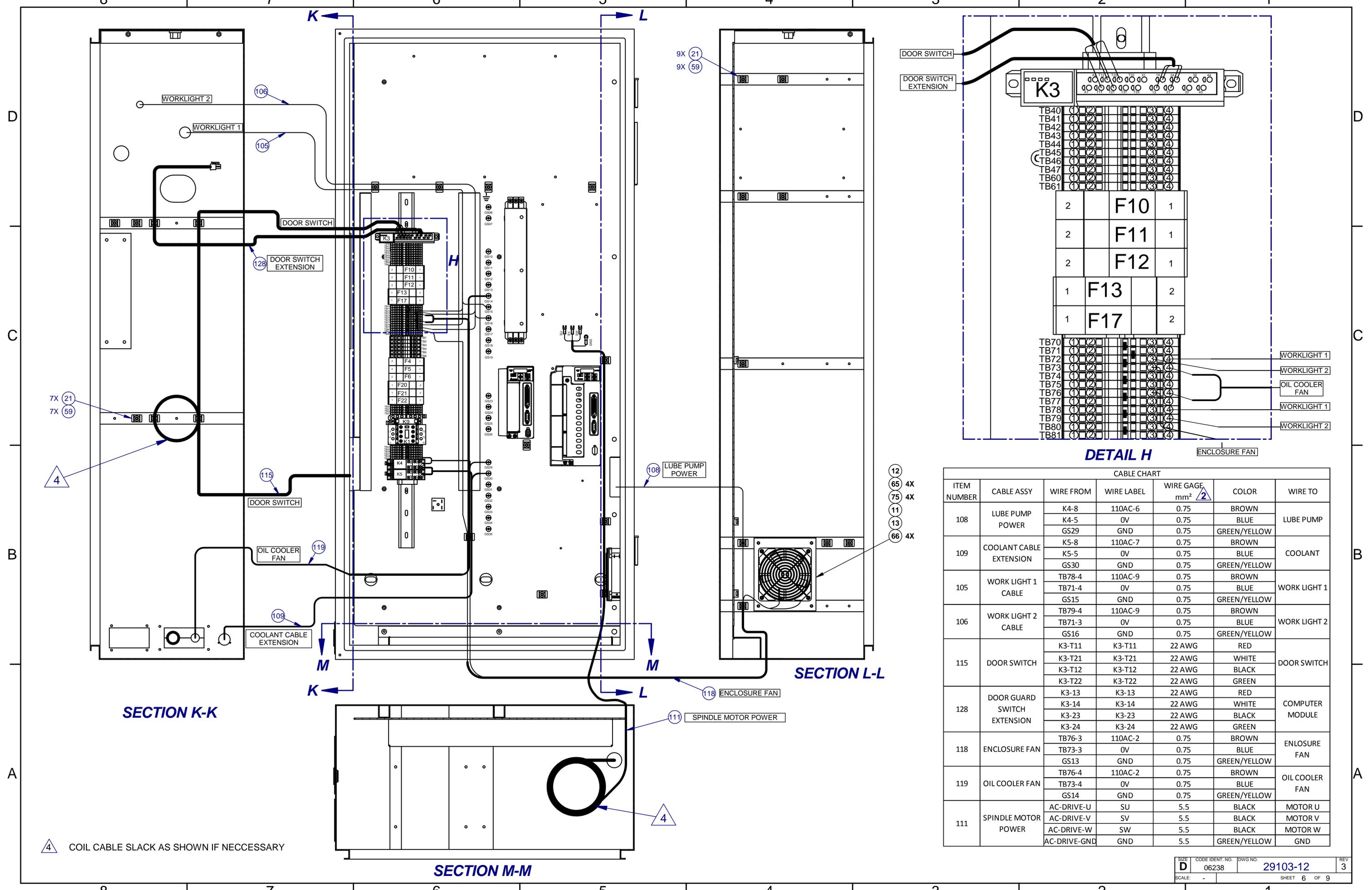




**WIRE CHART**

WIRE	ITEM NUMBER	WIRE FROM	TYPE OF TERMINAL FROM	WIRE LABEL	WIRE GAGE mm <sup>2</sup> $\Delta$	WIRE LENGTH	COLOR	WIRE TO	TYPE OF TERMINAL TO
W401		F1-2	FERRULE	L1-3	2	170	BLACK	TRX-400-L1	FORK 2
W402		F2-2	FERRULE	L2-3	2	190	BLACK	TRX-400-L2	FORK 2
W403		F3-2	FERRULE	L3-3	2	210	BLACK	TRX-400-L3	FORK 2
W404		TRX-220-L1	FORK 2	L1-5	2	200	BLACK	F7-1	FERRULE
W405		TRX-220-L2	FORK 2	L2-5	2	200	BLACK	F8-1	FERRULE
W406		TRX-220-L3	FORK 2	L3-5	2	200	BLACK	F9-1	FERRULE
W407		TRX-110-0V	FORK 2	0V	2	100	BLUE	TRX-24-0V	FORK 2
W408		TRX-24-0V	FORK 2	0V	2	100	BLUE	TRX-GND	FORK 2
W409		TRX-GND	FORK 2	GND	5.5	350	GREEN/YELLOW	GS31	RING 1
W410		TRX-N	FORK 2	GND	5.5	350	GREEN/YELLOW	GS32	RING 1
W411		TRX-110-0V	FORK 2	0V	2	850	BLUE	TB70-1	FERRULE
W412		TRX-110	FORK 2	110AC-0	2	800	RED	TB74-1	FERRULE
W413		TRX-24	FORK 2	24AC-0	2	940	BLACK	F17-1	FERRULE
W414		TRX-GND	FORK 2	GND	5.5	350	GREEN/YELLOW	GS33	RING 1
W415		GS25	RING 1	GND	2		GREEN/YELLOW	Z-DRIVE-G2	RING 1
W416		GS26	RING 1	GND	2		GREEN/YELLOW	X-DRIVE-G1	RING 1
W417		TB74-4	FERRULE	110AC-0	2		RED	K1-14	FORK 2
W418		K1-13	FORK 2	110AC-4	2		RED	TB80-1	FERRULE
W419		TB75-4	FERRULE	110AC-0	0.75		RED	K9-33	FERRULE
W420		K9-34	FERRULE	110AC-8	0.75		RED	F11-1	FERRULE
W421		F11-2	FERRULE	110AC-9	0.75		RED	TB78-1	FERRULE
W422		GS36	RING 1	GND	5.5		GREEN	GS37	RING 1
W423		K9-12	ERRULE	24DC-RB10	0.5		BROWN	K1-22	FERRULE

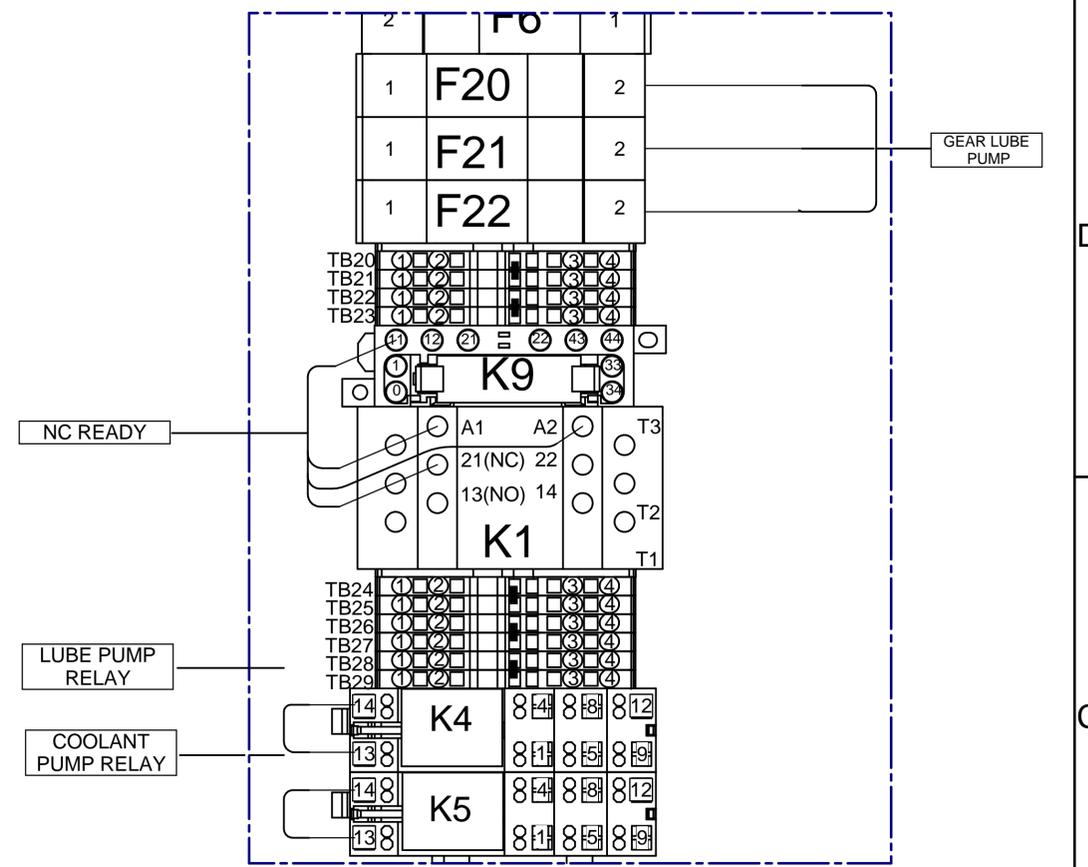
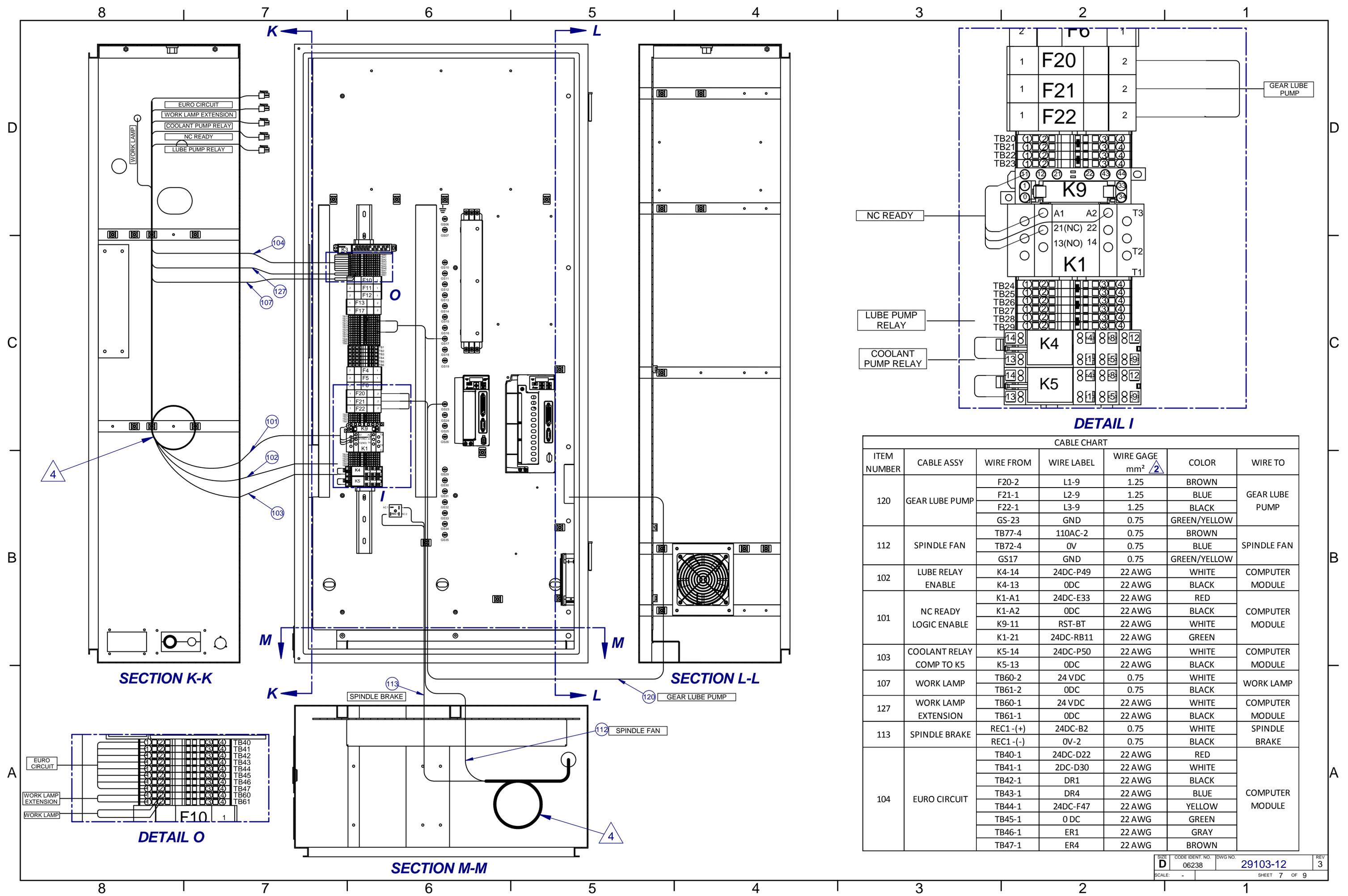




**CABLE CHART**

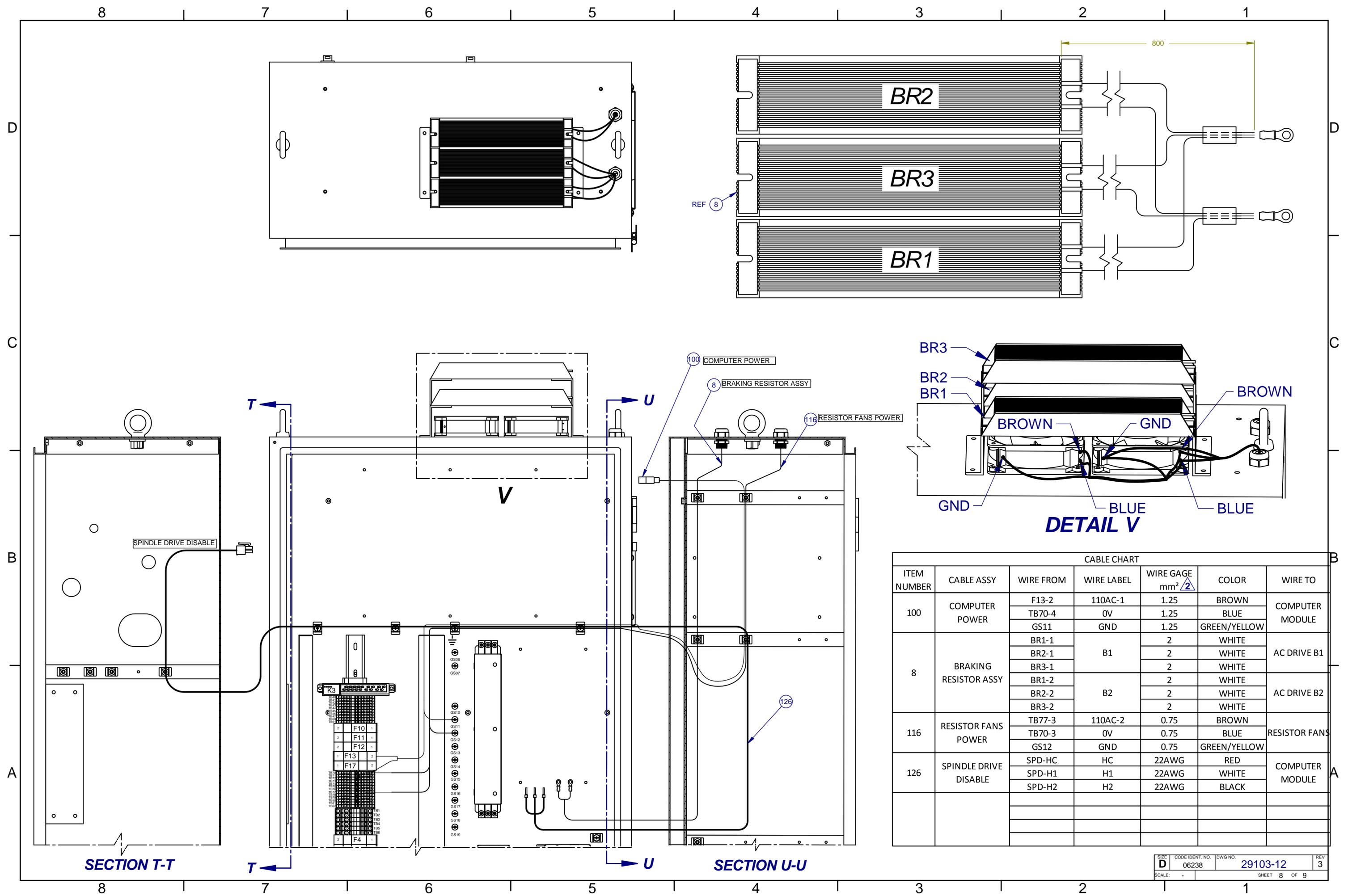
ITEM NUMBER	CABLE ASSY	WIRE FROM	WIRE LABEL	WIRE GAGE, mm <sup>2</sup>	COLOR	WIRE TO
108	LUBE PUMP POWER	K4-8	110AC-6	0.75	BROWN	LUBE PUMP
		K4-5	0V	0.75	BLUE	
		GS29	GND	0.75	GREEN/YELLOW	
109	COOLANT CABLE EXTENSION	K5-8	110AC-7	0.75	BROWN	COOLANT
		K5-5	0V	0.75	BLUE	
105	WORK LIGHT 1 CABLE	TB78-4	110AC-9	0.75	BROWN	WORK LIGHT 1
		TB71-4	0V	0.75	BLUE	
106	WORK LIGHT 2 CABLE	GS15	GND	0.75	GREEN/YELLOW	WORK LIGHT 2
		TB79-4	110AC-9	0.75	BROWN	
115	DOOR SWITCH	K3-T11	K3-T11	22 AWG	RED	DOOR SWITCH
		K3-T21	K3-T21	22 AWG	WHITE	
128	DOOR GUARD SWITCH EXTENSION	K3-T12	K3-T12	22 AWG	BLACK	COMPUTER MODULE
		K3-T22	K3-T22	22 AWG	GREEN	
		K3-13	K3-13	22 AWG	RED	
		K3-14	K3-14	22 AWG	WHITE	
118	ENCLOSURE FAN	K3-23	K3-23	22 AWG	BLACK	ENCLOSURE FAN
		K3-24	K3-24	22 AWG	GREEN	
		TB76-3	110AC-2	0.75	BROWN	
119	OIL COOLER FAN	GS13	GND	0.75	GREEN/YELLOW	OIL COOLER FAN
		TB76-4	110AC-2	0.75	BROWN	
		TB73-4	0V	0.75	BLUE	
111	SPINDLE MOTOR POWER	GS14	GND	0.75	GREEN/YELLOW	GND
		AC-DRIVE-U	SU	5.5	BLACK	
		AC-DRIVE-V	SV	5.5	BLACK	
		AC-DRIVE-W	SW	5.5	BLACK	
		AC-DRIVE-GND	GND	5.5	GREEN/YELLOW	

4 COIL CABLE SLACK AS SHOWN IF NECESSARY



**DETAIL I**

CABLE CHART						
ITEM NUMBER	CABLE ASSY	WIRE FROM	WIRE LABEL	WIRE GAGE mm <sup>2</sup> $\Delta$	COLOR	WIRE TO
120	GEAR LUBE PUMP	F20-2	L1-9	1.25	BROWN	GEAR LUBE PUMP
		F21-1	L2-9	1.25	BLUE	
		F22-1	L3-9	1.25	BLACK	
		GS-23	GND	0.75	GREEN/YELLOW	
112	SPINDLE FAN	TB77-4	110AC-2	0.75	BROWN	SPINDLE FAN
		TB72-4	0V	0.75	BLUE	
		GS17	GND	0.75	GREEN/YELLOW	
102	LUBE RELAY ENABLE	K4-14	24DC-P49	22 AWG	WHITE	COMPUTER MODULE
		K4-13	ODC	22 AWG	BLACK	
101	NC READY LOGIC ENABLE	K1-A1	24DC-E33	22 AWG	RED	COMPUTER MODULE
		K1-A2	ODC	22 AWG	BLACK	
		K9-11	RST-BT	22 AWG	WHITE	
103	COOLANT RELAY COMP TO K5	K5-14	24DC-P50	22 AWG	WHITE	COMPUTER MODULE
		K5-13	ODC	22 AWG	BLACK	
107	WORK LAMP	TB60-2	24 VDC	0.75	WHITE	WORK LAMP
		TB61-2	ODC	0.75	BLACK	
127	WORK LAMP EXTENSION	TB60-1	24 VDC	22 AWG	WHITE	COMPUTER MODULE
		TB61-1	ODC	22 AWG	BLACK	
113	SPINDLE BRAKE	REC1 -(+)	24DC-B2	0.75	WHITE	SPINDLE BRAKE
		REC1 -(-)	0V-2	0.75	BLACK	
104	EURO CIRCUIT	TB40-1	24DC-D22	22 AWG	RED	COMPUTER MODULE
		TB41-1	2DC-D30	22 AWG	WHITE	
		TB42-1	DR1	22 AWG	BLACK	
		TB43-1	DR4	22 AWG	BLUE	
		TB44-1	24DC-F47	22 AWG	YELLOW	
		TB45-1	0 DC	22 AWG	GREEN	
		TB46-1	ER1	22 AWG	GRAY	
		TB47-1	ER4	22 AWG	BROWN	

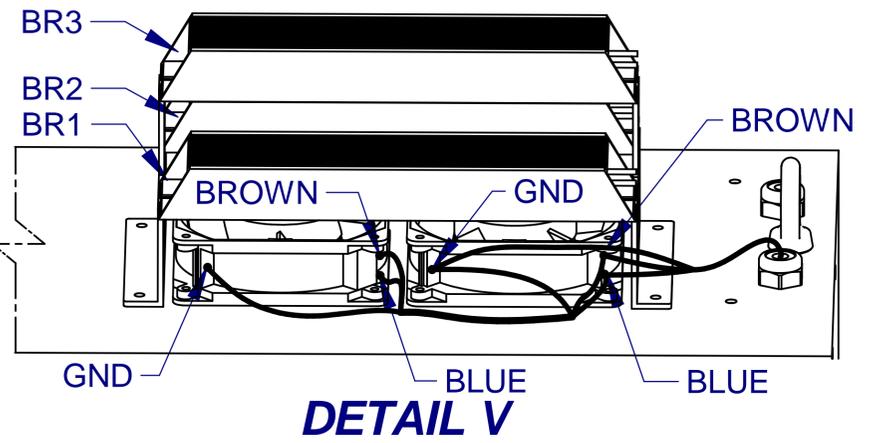


SPINDLE DRIVE DISABLE

REF 8

800

100 COMPUTER POWER  
 8 BRAKING RESISTOR ASSY  
 116 RESISTOR FANS POWER

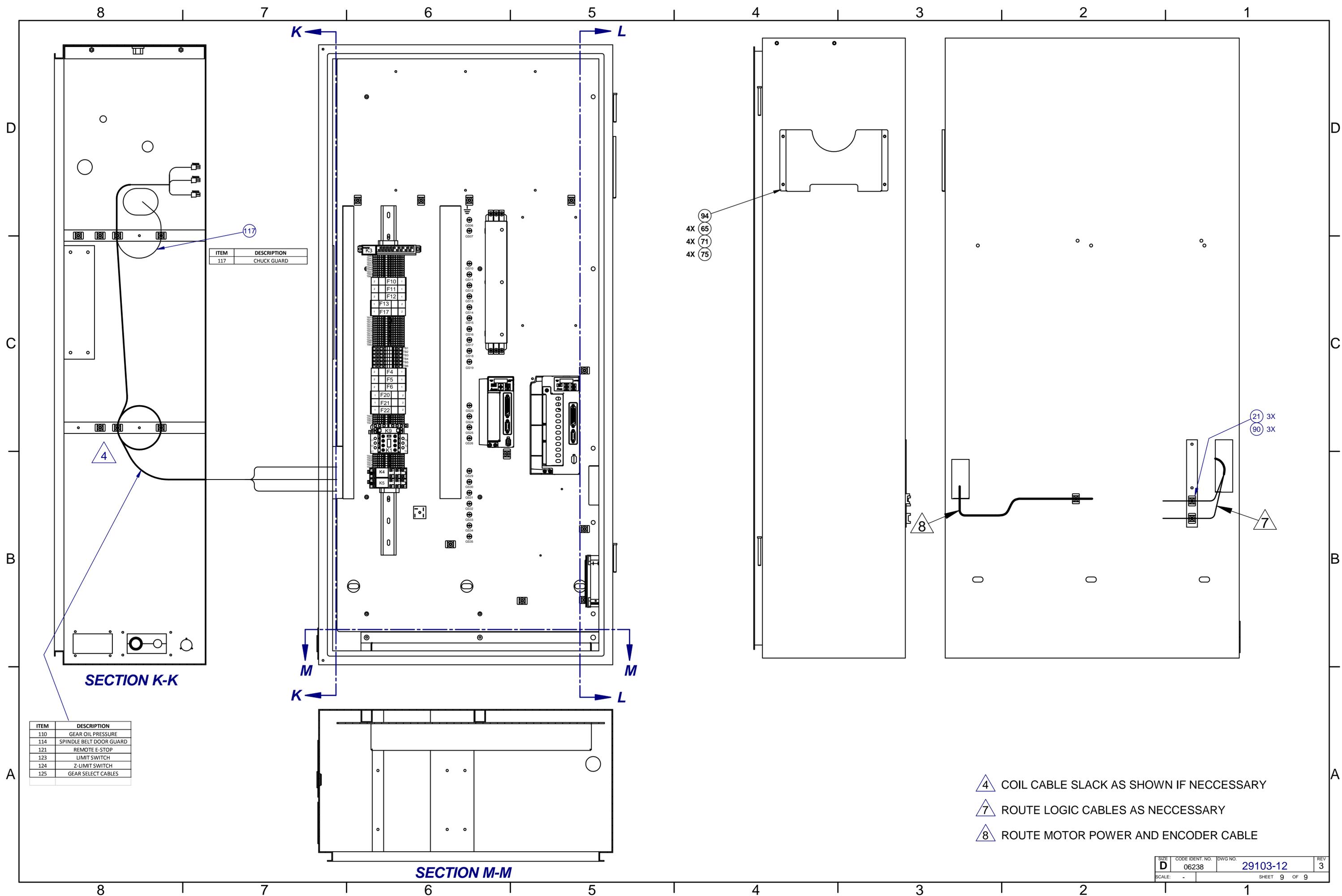


**DETAIL V**

CABLE CHART						
ITEM NUMBER	CABLE ASSY	WIRE FROM	WIRE LABEL	WIRE GAGE mm <sup>2</sup> $\Delta$	COLOR	WIRE TO
100	COMPUTER POWER	F13-2	110AC-1	1.25	BROWN	COMPUTER MODULE
		TB70-4	0V	1.25	BLUE	
		GS11	GND	1.25	GREEN/YELLOW	
8	BRAKING RESISTOR ASSY	BR1-1	B1	2	WHITE	AC DRIVE B1
		BR2-1		2	WHITE	
		BR3-1		2	WHITE	
		BR1-2	B2	2	WHITE	AC DRIVE B2
		BR2-2		2	WHITE	
		BR3-2		2	WHITE	
116	RESISTOR FANS POWER	TB77-3	110AC-2	0.75	BROWN	RESISTOR FANS
		TB70-3	0V	0.75	BLUE	
		GS12	GND	0.75	GREEN/YELLOW	
126	SPINDLE DRIVE DISABLE	SPD-HC	HC	22AWG	RED	COMPUTER MODULE
		SPD-H1	H1	22AWG	WHITE	
		SPD-H2	H2	22AWG	BLACK	

**SECTION T-T**

**SECTION U-U**



ITEM	DESCRIPTION
117	CHUCK GUARD

ITEM	DESCRIPTION
110	GEAR OIL PRESSURE
114	SPINDLE BELT DOOR GUARD
121	REMOTE E-STOP
123	LIMIT SWITCH
124	Z-LIMIT SWITCH
125	GEAR SELECT CABLES

- 4X (94)
- 4X (65)
- 4X (71)
- 4X (75)

- △ 4 COIL CABLE SLACK AS SHOWN IF NECESSARY
- △ 7 ROUTE LOGIC CABLES AS NECESSARY
- △ 8 ROUTE MOTOR POWER AND ENCODER CABLE

Parts List for Assembly P/N: 29103-12

Printed 7/31/2018

29103-12

ELECTRICAL CABINET ASSY-LATHE-425

Type	PL	Dwg Size	D
Revision	3	Product	
Status	U	Engineer	RO
Date	8/31/2015	Planner Code	
By	Rogelio	Comm Code	

Item	P/N	Title	Detail	Reference(t	Qty	UseAs	Rev	Stat	Type	Mfr	Mfr P/N
1	29104-12	ENCLOSURE-ELECT-355/425-PT10			1	EA	3	U	PS		
2	29105-12	SHEET METAL-BACK PANEL-355/425-PT10			1	EA	5	U	DWG		
3	24067-12	BRACKET-RESISTOR MOUNT			2	EA	A	R	DWG		
5	22794-3	TRANSFORMER-3PHASE-6.8KVA-EURO			1	EA	2	U	DWG	SUENN LIANG ELECTRIC CO., LTD	
8	27175-8	RESISTOR ASSY-100 OHMS-500W-X3			1	EA	2	U	PL		
9	28162	SERVO DRIVE-750W-DELTA-NOT PROG			1	EA	B	R	DWG		
10	28162-2	SERVO DRIVE-2kW-DELTA-NOT PROGRAMMED	ASD-B2-2023-B		1	EA	1	U	DWG		
11	26564-2	FAN-220VAC-120 x 120mm			3	EA	A	R	DWG	BISONIC	4C-230HB
12	29104-6-3	SHEET METAL-BRACKET-FAN			1	EA	1	U	DWG		
13	26708-1	FAN GUARD-120 mm			3	EA	-	R	DWG		
14	29013-5	SHEET METAL-ELEC CABINET-SWITCH MOUNT			1	EA	1	U	DWG		
15	26691-3	BRACKET-CABLE WAY-RIGHT-2OP M11			3	EA	A	R	DWG		
16	26691-4	BRACKET-CABLE WAY-LEFT-2OP M11			3	EA	A	R	DWG		
17	26687-2	FOAM-CABLE WAY			3	EA	B	R	DWG		
18	22653	HANDLE OPERATING MECHANISM			1	EA	C	R	DWG	FUJI	BW9BTAA-L 3W
19	26779-5	GROMMET-28mm HOLE			4	EA	A	R	DWG		
20	22654-40	BREAKER-220V	40 AMP		1	EA	D	R	DWG	FUJI	BW50EAG-3 P040
21	23262-3	CABLE TIE HOLDER	1/4-20		28	EA	A	R	DWG		

Item	P/N	Title	Detail	Reference(t)	Qty	UseAs	Rev	Stat	Type	Mfr	Mfr P/N
22	23095-1	TERMINAL BLOCK-RAIL END STOP			4	EA	-	R	DWG		
23	22557-10	TERMINAL BLOCK-DIN RAIL-4POS-20 AMPS		TB20-TB82	33	EA	A	R	DWG	PHOENIX CONTACT	3209578
24	22557-9-C1	TERMINAL BLOCK-COVER-4 POS			4	EA	-	R	DWG	PHOENIX CONTACT	3030514
25	22557-9-J1	TERMINAL BLOCK- JUMPER			12	EA	-	R	DWG	PHOENIX CONTACT	3030161
26	22557-12	TERMINAL BLOCK-DIN RAIL-3 POS-41 AMPS	3038150	TB1-TB6	6	EA	A	R	DWG	PHOENIX CONTACT	3038150
27	22557-12-C1	TERMINAL BLOCK-COVER-END-3 POS			1	EA	A	R	DWG	PHOENIX CONTACT	3038202
28	22557-12-J1	TERMINAL BLOCK-JUMPER			3	EA	A	R	DWG	PHOENIX CONTACT	3030284
29	23152-12	FUSE-TIME DELAY-500 V-10mm x 38mm L	12 AMPS	F1-F3	3	EA	C	R	DWG		
30	23036-1	FUSE HOLDER-32 AMP-690V		F1-F13,F17 ,F20-F22	17	EA	B	R	DWG	BUSSMAN	BS-CHM1DU
32	23152-16	FUSE-TIME DELAY-500 V-10mm x 38mm L	16 AMPS	F7-F9	3	EA	C	R	DWG	DF ELECTRIC	420016
33	23152-4	FUSE-TIME DELAY-500 V-10mm x 38mm L	4 AMPS	F12,F13,F17	3	EA	C	R	DWG	DF ELECTRIC	420004
34	23152-2	FUSE-TIME DELAY-500 V-10mm x 38mm L	2 AMPS	F10,F11	5	EA	C	R	DWG		
35	29028	CONTACTOR-RELAY-3PHASE-24VDC-25A	LC1D18BL	K1	1	EA	1	U	PS	SCHNEIDER ELECTRIC	LC1D186BL
36	23434-4	RELAY-SOCKET-2POLE-SPRING TERMINAL	PYF08S	K4,K5	2	EA	1	U	DWG	OMRON	PYF-08-PU
37	23822-1	CONTACTOR-AUXILIARY CONTACTS-3NO/1NC		K1	1	EA	1	U	DWG	SCHNEIDER ELECTRIC	LADN31
40	29120-3	RELAY-FORCE GUIDED-4PST-24VDC-6A		K9	1	EA	A	R	DWG	OMRON	G7SA-2A2B-DC24
41	23434-5	RELAY-SOCKET-4POLE		K9	1	EA	1	U	PS	OMRON	P7SA-10F-N D-DC24
42	23037	DIODE-BRIDGE RECTIFIER-HIGH CURRENT-25 WATT	25 WATT	REC1	1	EA	-	R	DWG		

Item	P/N	Title	Detail	Reference(t)	Qty	UseAs	Rev	Stat	Type	Mfr	Mfr P/N
43	22891-4	RELAY-SAFETY MODULE		K3	1	EA	1	U	PS	OMRON	G9SE-401 DC24
44	24394-4	FILTER-EMC/RFI-42A-3PHASE	FN3258-42-33	FL1	1	EA	1	U	PS	SHAFFNER	FN3258-42-3 3
45	23435-3	RELAY-DPDT-24VDC-3A	MY2-GS-DC24	K4,K5	2	EA	1	U	DWG	OMRON	MY2-GS-24V DC
46	23152-25	FUSE-TIME DELAY-500 V-10mm x 38mm L	25 AMPS	F4-F6	3	EA	C	R	DWG		
47	27153-0670	WIREWY-GRAY-5mm SLOT-45mm x 63mm	670mm		1	EA	1	U	PS		
48	27154-0670	WIREWY-COVER-GRAY-48mm x 330mm	670mm		1	EA	1	U	PS		
49	27155-0670	WIREWY-GRAY-5mm SLOT-22mm x 63mm	670mm		1	EA	A	R	DWG		
50	27156-0670	WIREWY-COVER-GRAY-25mm x 8mm	670mm		1	EA	A	R	DWG		
51	26589-0800	DIN RAIL-SLOTTED	800mm		1	EA	A	R	DWG		SRD2001
52	29104-12-1	SHEET METAL-ELEC ENCL CABINET-TOP FUNNEL	425		1	EA	1	U	DWG		
53	29104-12-2	SHEET METAL-ELEC ENCL CABINET-BOTTOM FUNNEL	425		1	EA	1	U	DWG		
54	23166-1	FITTING - LIQUID TIGHT STRAIGHT STRAIN RELIEF M20X1.5			2	EA	-	R	DWG		
56	27669-1	GASKET-BEZEL-ROLL			3484	MM	-	R	DWG		
57	27645-1	EYEBOLT M12 X 1.75			2	EA	A	R	PS		
58	M5-0.8X6 27Z	SCREW-BHCS-STL-BO			(8)	EA	1	U	PS		
59	M5-0.8X10 27Z	SCREW-BHCS-STL-ZINC	NON STOCKABLE		28	EA	-	R	PS		
60	M8-1.25X20 25B	SCREW-SHCS-STL-BO			14	EA	A	R	PS		
61	M6-1.0X16 25B	SCREW-SHCS-STL-BO			8	EA	-	R	PS		
62	M5-0.8X20 25B	SCREW-SHCS-STL-BO	NON STOCKABLE		3	EA	-	R	PS		
63	M6-1.0X30 25B	SCREW-SHCS-STL-BO			2	EA	A	R	PS		
64	M5-0.8X12 22Z	SCREW-TH-PHIL-STL-ZINC	NON STOCKABLE		52	EA	-	R	PS		

Item	P/N	Title	Detail	Reference(t)	Qty	UseAs	Rev	Stat	Type	Mfr	Mfr P/N
65	M5-0.8X10 25B	SCREW-SHCS-STL-BO			49	EA	-	R	PS		
66	M4-0.7X50 10Z	SCREW-PH-PHIL-STL-ZINC	NON STOCKABLE		12	EA	-	R	PS		
67	M4-0.7X20 25B	SCREW-SHCS-STL-BO			6	EA		R	PS		
68	M5-0.8X16 25B	SCREW-SHCS-STL-BO			1	EA	A	R	PS		
69	24009-1	WASHER-BELLEVILLE SPRING LK-SERRATED	.331 ID x .512 OD x .028 THK-5/16 or M8		14	EA	D	R	DWG		
70	24009-3	WASHER-BELLEVILLE SPRING LK-SERRATED	.264 ID x .374 OD x .024 THK-1/4 or M6		8	EA	D	R	DWG		
71	24009-4	WASHER-BELLEVILLE SPRING LK-SERRATED	.209 ID x .354 OD x .0212 THK-10 or M5		49	EA	D	R	DWG		
72	24009-5	WASHER-BELLEVILLE SPRING LK-SERRATED	.169 ID x .276 OD x .0173 THK-8 or M4		6	EA	D	R	DWG		
73	M8 70B	WASHER-FLAT USS-STL-BO			14	EA		R	PS		
74	M6 70B	WASHER-FLAT USS-STL-BO			10	EA	-	R	PS		
75	M5 70B	WASHER-FLAT USS-STL-BO			49	EA	-	R	PS		
76	M4 70B	WASHER-FLAT-STL-BO			6	EA	-	R	PS		
81	M6-1.0 50B	NUT-HEX-STL-BO			4	EA		R	PS		
82	M4-0.7 50Z	NUT-HEX-STL-ZINC			4	EA	-	R	PS		
89	29103-12-LB1	LABEL-TEXT-RLX-425			1	EA	2	U	DWG		
90	29103-12-LB2	LABEL-TEXT-RLX-425			1	EA	1	U	PS		
91	29020-17	SHEET METAL-HOUSING-RESISTORS-425			1	EA	1	U	PS		
92	28157-28	SHEET METAL-COVER-CABLE ENTRY-GRAY			1	EA	1	U	DWG		
93	28157-25	SHEET METAL-CABLE ENTRY-EURO LATHE			2	EA	2	U	DWG		

Item	P/N	Title	Detail	Reference(t)	Qty	UseAs	Rev	Stat	Type	Mfr	Mfr P/N
94	29095-1	SHEET METAL-POCKET-ENCLOSURE			1	EA	1	U	DWG		
100	26592-3	CABLE ASSY-3 COND-COMP MODULE PWR	EURO		1	EA	3	U	PL		
101	29032-7	CABLE ASSY-4 COND-NC READY TO K1	EURO		1	EA	7	U	PL		
102	27635-30	CABLE ASSY-2 COND-LUBE PUMP-COMP TO K4			1	EA	A	R	PL		
103	27635-28	CABLE ASSY-2 COND-COOLANT PUMP RELAY-COMP TO K5			1	EA	A	R	PL		
104	26681-3	CABLE ASSY-8 COND-EURO I/O	EURO		1	EA	1	U	PL		
105	29679-4	WORK LIGHT ASSY-1 -W/CABLE-110VAC	EURO		1	EA	1	U	PL		
106	29679-5	WORK LIGHT ASSY-2 -W/CABLE-110VAC	EURO		(1)	EA	1	U	PL		
107	29066-1	WORK LAMP ASSY-24VDC-220mm	EURO		(1)	EA	3	U	PL		
108	27176-40	CABLE ASSY-3 COND-LUBE PUMP-POWER	EURO		(1)	EA	1	U	PL		
109	27176-34	CABLE ASSY-3 COND-COOLANT EXTENSION	EURO		1	EA	1	U	PL		
110	27635-46	CABLE ASSY-2 COND-HEAD OIL PRESSURE	EURO		(1)	EA	1	U	PL		
111	26671-7	CABLE ASSY-4 COND-SPINDLE MOTOR PWR	EURO		(1)	EA	1	U	PL		
112	27176-20	CABLE ASSY-3 COND-SPINDLE FAN	EURO		(1)	EA	1	U	PL		
113	27635-45	CABLE ASSY-2 COND-SPINDLE BRAKE	EURO		(1)	EA	1	U	PL		
114	29032-16	CABLE ASSY-4 COND-SPINDLE DOOR SWITCH	EURO		(1)	EA	1	U	PL		
115	29032-14	CABLE ASSY-4 COND-DOOR SWITCH	EURO		(1)	EA	1	U	PL		
116	27176-14	CABLE ASSY-3 COND-FAN POWER-RESISTORS			1	EA	A	U	PL		
117	29032-15	CABLE ASSY-4 COND-CHUCK GUARD	EURO		(1)	EA	1	U	PL		
118	27176-28	CABLE ASSY-3 COND-ENCL FAN POWER	EURO		1	EA	1	U	PL		
119	27176-36	CABLE ASSY-3 COND-OIL COOLER FAN	EURO		(1)	EA	1	U	PL		

Item	P/N	Title	Detail	Reference(t)	Qty	UseAs	Rev	Stat	Type	Mfr	Mfr P/N
120	26684-6	CABLE ASSY-4 COND-POWER-GEAR LUBE PUMP	EURO		(1)	EA	2	U	PL		
121	29032-33	CABLE ASSY-4 COND-REMOTE E-STOP	EURO		(1)	EA	1	U	PL		
122	27635-43	CABLE ASSY-2 COND-RSG EXTENSION	EURO		(1)	EA	1	U	PL		
123	29032-12	CABLE ASSY-4 COND-LIMIT SWITCH-AXIS	EURO		(2)	EA	1	U	PL		
125	27635-44	CABLE ASSY-2 COND-GEAR SELECT SWITCH	EURO		(3)	EA	1	U	PL		
126	29032-8	CABLE ASSY-4 COND-SPINDLE DISABLE			1	EA	1	U	PL	WEY YII	
127	27635-48	CABLE ASSY-WORK LAMP EXTENSION			1	EA	1	U	PL		
128	29032-24	CABLE ASSY-4 COND-GUARD EXTENSION			1	EA	2	U	PL		