



**CW80 SERIES      HORIZONTAL LATHES**  
**CW110 SERIES    HORIZONTAL LATHES**  
**CW100Q SERIES   HORIZONTAL LATHES**

# **INSTRUCTION BOOK**

**(For Mechanical Unit   CE)**

**SHENYANG No.1 LATHE WORKS**  
**SHENYANG MACHINE TOOL CO., LTD**  
**THE PEOPLE'S REPUBLIC OF CHINA**

THE CHINESE VERSION OF THIS TECHNICAL DOCUMENT IN ENGLISH IS REGARDED AS FINAL.

IT IS NECESSARY FOR YOU TO READ THIS BOOK CAREFULLY AND THOROUGHLY BEFORE OPERATING THE MACHINE.

**MATTERS NEEDING ATTENTION TO OPERATION**

- 1) It is necessary for you to read this Instruction Book carefully and thoroughly and be acquainted with all details of the Instruction Book before operating the machine, only for this doing can make the machine completely run safely.
- 2) Before operating the machine, all covers, safe guards that were dismounted for transport should be well re-installed, otherwise, some troubles may occur to make the machine not be normally started, and the personnel injury may also result in.
- 3) This Instruction Book is compiled according to the present modules. Later, if there is any new module added, we shall revise this Instruction Book at any time. If you need to change a new one due to that the Instruction Book is damaged or lost, pay attention to the points mentioned above, please.
- 4) Although this Instruction Book has been checked carefully, something not to be understood by user is also hard to avoid. If you find there are still a few questionable points, incorrect explanation or omission in it, please make contact with the Marketing Department of our factory (for the contact information of our factory, please refer to the back cover).
- 5) The models of the products mentioned in the Instruction Book are as follows:  
CW80 Series: CW6180B, CW6280B, CW6180C, CW6280C;  
CW110 Series: CW61110B, CW62110B, CW61110C, CW62110C;  
CW100Q Series: CW61100Q, CW62100Q;  
While using the machine, the users shall pay attention to distinguishing them one from another.

## MATTERS NEEDING ATTENTION TO INSTALLATION

In order to insure the machine running normally, care must be greatly taken to following items during installation of the machine:

### 1 Wiring

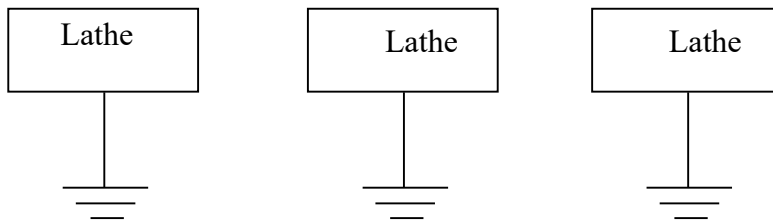
- 1.1 The performance values of wire used for connecting the electrical parts should be equal to or more than the specified values in this Book.
- 1.2 Never use the common terminal block with the equipments like welding machine or high frequency quencher, etc. which can make noise.
- 1.3 Power cable should be connected by skilled electrician.

### 2 Grounding

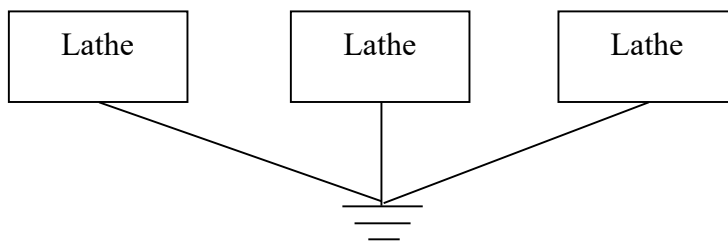
Cross section and grounding resistance as well as matters needing attention to grounding, the grounding wire used for the machine must be in accordance with the standard GB5226.1-2002.

Grounding wire should be connected as shown by figures given below.

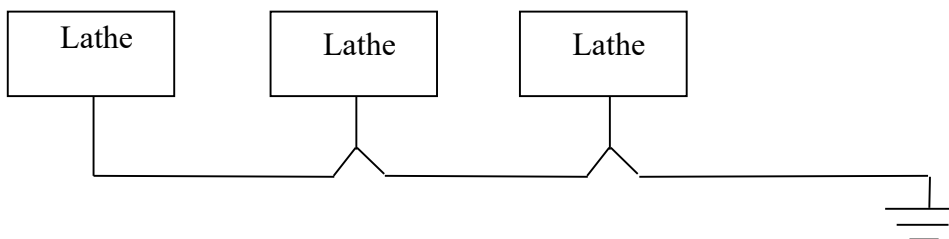
Independent grounding wire:



Common grounding wire:



Never connect to one grounding rod for some equipment like the figure given below:



**NOTICE TO ENVIRONMENTAL PROTECTION**

The following stipulations have to be followed when the machine is finally scrapped:

1. It is necessary to deliver some harmful or non-degradable wastes, including used batteries, electrical elements, rubber components, etc., which cannot be recovered or re-utilized to designated local recovering unit.
2. For any waste liquid, such as lubricating oil, coolant, etc., which cannot be recovered or re-utilized and lead to polluting environment, they have to be drained off at designated place in the locality.

## CONTENTS

<b>INSTRUCTION BOOK</b> .....	1
1 SAFETY WARN.....	1
1.1 Notice to Operator and Maintainer .....	1
1.2 Requirements for Basic Operation .....	1
1.3 Requirements before Switching on the Power Supply .....	2
1.4 Requirements after Switching-on the Power Supply .....	3
1.5 Routine Inspection .....	3
1.6 Preparation before Operating the Machine .....	3
1.7 Operation .....	4
1.8 Interruption of Machining .....	5
1.9 After Machining .....	6
1.10 Safety Equipment .....	6
1.11 Maintenance .....	6
1.12 Prohibition .....	7
2 General description .....	8
2.1 Application Scope .....	8
2.2 Identification Marking of Model .....	8
2.3 Application and Turning Range of the Machine .....	8
2.3.1 Application of the Machine .....	8
2.3.2 Turning Range of the Machine .....	9
2.4 Accuracy of the Machine .....	9
2.5 Noise of the Machine .....	9
2.6 Illumination of the Machine .....	9
2.7 Requirements of Environment to the Machine .....	9
2.8 Affection of the Machine to Environment .....	10
3 TRANSPORTATION, HANDLING and INSTALLATION .....	11
3.1 Transport of the Machine .....	11
3.2 Handling of the Machine .....	11
3.3 Overall Dimensions, Center gravity and Weight of the Machine .....	12
3.4 Installation of the Machine .....	14
3.4.1 Preparation Work before Installation .....	14
3.4.2 Power Interface .....	14
3.4.3 General Power Supply .....	14
3.4.4 Installation of the Machine .....	15
3.4.5 Foundation of the Machine .....	15
3.4.6 Installation Steps .....	15
3.4.7 Connection of Inner Devices of the Machine .....	16
3.4.8 Trial-run .....	16
3.5 Part Drawing for Wedge Irons .....	18
3.6 Appearance View of the Machine .....	19
3.7 Foundation Plan .....	20
3.7.1 Foundation Plan for the Machine of 1500 mm .....	20

3.7.2	Foundation Plan for the Machine of 3000 mm	21
3.7.3	Foundation Plan for the Machine of 4000 mm	22
3.7.4	Foundation Plan for the Machine of 5000 mm	23
3.7.5	Foundation Plan for the Machine of 6000 mm, for intergrated bed lathe of 6000mm(Accessory 1)	24
3.7.6	Foundation Plan for the Machine of 8000 mm, for intergrated bed lathe of 8000mm(Accessory 2)	25
3.7.7	Foundation Plan for the Machine of 8000 mm(The gap-bed type lathe)	26
3.7.8	Foundation Plan for the Machine of 11000 mm	27
3.7.9	Foundation Plan for the Machine of 14000 mm(The gap-bed type lathe)	28
3.7.10	Foundation Plan for the Machine of 14000 mm	29
4	SPECIFICATIONS OF THE MACHINE	30
4.1	Explanation for Main Specifications	30
4.2	Table for Main Specifications	30
4.3	Accessories for the Machine	34
4.3.1	Accessories for the Machines of CW80 Series	34
4.3.2	Accessories for the Machines of CW110 Series	34
4.3.3	Accessories for the Machines of CW100Q Series	34
5	hydraulic system	36
5.1	Gear Pump	36
5.2	Rotary Valve for Special-purpose:	36
5.3	Solenoid Valve	36
5.4	Oil Filter	37
5.5	Oil Reservoir	37
5.6	Hydraulic Principle Diagram	37
5.6.1	Hydraulic Principle Diagram of the Machine of 1.5 m-3m	38
5.6.2	Hydraulic Principle Diagram of the Machine of 4m and More than 4m	39
6	driving System and arrangement of Bearing sizes	40
6.1	Driving System Diagram for CW80B, CW110B and CW100Q	40
6.2	List of Gears, Wormwheels, Leadscrews and Nuts for CW80B, CW110B and CW100Q	41
6.3	Arrangement of Bearings of CW80B, CW110B and CW100Q	44
6.4	Driving System Diagram for CW80C, CW110C	45
6.5	List of Gears, Wormwheels, Leadscrews and Nuts for CW80C and CW110C	46
6.6	Arrangement of Bearings of CW80C and CW110C	49
7	control System of the machine	50
7.1	Arrangement Diagram of Control Levers for the Machine of Center Distance of 1.5m and 3m	50
7.2	Arrangement Diagram of Control Levers for the Machine of Center Distance of 4m and More than 4m	52
7.3	Definition of Operating Directions of Handles and Handwheel of the Machine	54
7.4	Operating Procedures of the Machine	55
7.4.1	Preparing Procedures	55
7.4.2	Requirements of Loading and Clamping Workpiece	55

7.4.3	Requirements from the Machine for Tool .....	56
7.4.4	Manual Feed .....	56
7.4.5	Automatic Feed .....	57
7.4.6	Threads Cutting .....	57
7.4.7	Operation of Spindle Stop .....	58
7.4.8	Operation of Machine Stop .....	59
7.5	Re-start after Power-off and Emergency Stop of the Machine .....	59
7.6	Rescue in Emergency Status .....	59
7.7	Cleaning of Chips .....	59
8	Setting up of the Machine .....	60
8.1	Characteristic Table for Power Vs Torque of Spindle for CW80 Series .....	60
8.1.1	Characteristic Table for Power Vs Torque of Spindle for CW110 Series and CW100Q Series .....	61
8.2	Table of Feed Amount and Threads for CW80 Series, CW110 Series and CW100Q Series Machines of Metric System .....	62
8.3	Table of Feed Amount and Threads for CW80 Series, CW110 Series and CW100Q Series Machines of Inch System .....	63
8.4	Setting Up of Feed System for the Machines of Metric System of CW80 Series .....	64
8.4.1	Ordering of Change Gears .....	64
8.4.2	Normal Setting Formulas for Various Threads .....	64
8.4.3	For Cutting Special Threads by Means of Change Gears .....	65
8.4.4	For Cutting Inch Threads of 19 t.p.i. ....	65
8.4.5	Realization of Fine Feeds .....	65
8.4.6	For Broaching Oil Groove or Keyways with Carriage .....	65
8.5	Setting Up of Feed System for the Machines of Inch System of CW80 Series .....	66
8.5.1	Ordering of Change Gears .....	66
8.5.2	For Cutting Inch Threads of 11.5 t.p.i. ....	66
8.5.3	For Cutting Inch Threads of 19 t.p.i. ....	66
8.5.4	For Cutting Inch Threads of 27 t.p.i. ....	67
8.5.5	Realization of Fine Feed .....	67
8.6	Setting Up of Feed System for the Machines of Metric System of CW110 Series .....	67
8.6.1	Ordering of Change Gears .....	67
8.6.2	Setting Formulas for Various Threads .....	68
8.6.3	For Cutting Special Threads by Means of Change Gears .....	68
8.6.4	For Cutting Inch Threads of 19 t.p.i. ....	68
8.6.5	Realization of Fine Feeds .....	68
8.6.6	For Broaching Oil Groove or Keyways with Carriage .....	68
8.7	Setting Up of Feed System for the Machines of Inch System of CW110 Series .....	68
8.7.1	Ordering of Change Gears .....	68
8.7.2	For Cutting Inch Threads of 11.5 t.p.i. ....	69
8.7.3	For Cutting Inch Threads of 19 t.p.i. ....	69
8.7.4	For Cutting Inch Threads of 27 t.p.i. ....	70



8.8 Setting Up of Feed System for the Machines of Metric System of CW100Q Series	70
8.8.1 Ordering of Change Gears	70
8.8.2 Setting Formulas for Various Threads	71
8.8.3 For Cutting Special Threads by Means of Change Gears	71
8.8.4 For Cutting Inch Threads of 19 t.p.i	71
8.8.5 Realization of Fine Feeds	71
8.8.6 For Broaching Oil Groove or Keyways with Carriage	71
8.9 Turning Tapers	71
9 Adjustment of the Machine	73
9.1 Adjustment of the Spindle Bearings	73
9.2 Adjustment of Safety Device in the Apron.	74
9.3 Adjustment of the Backlash Between the Cross Slide Leadscrew and Nut	74
9.4 Adjustment for Taper Attachment	75
10 Maintenance and Lubricating of the Machine	76
10.1 Maintenance of the Machine	76
10.2 Lubrication of the Machine	76
10.3 Lubrication of the Machine	77
11 USE AND CLEANING OF CUTTING FLUID	78
11.1 Preparation before Pouring Cutting Fluid	78
11.2 Pouring of Cutting Fluid	78
11.3 Usage of Cutting Fluid	78
11.3.1 Application of Cutting Fluid	78
11.3.2 Using Method of Cutting Fluid	78
11.3.3 Selection and Technical Specifications of Cutting Fluid	78
11.4 Adding, Changing, Changing Cycle and Method of Cutting Fluid	80
11.4.1 Adding of Cutting Fluid	80
11.4.2 Changing of Cutting Fluid	80
11.4.3 Changing Cycle of Cutting Fluid	80
11.4.4 Changing Methods of Cutting Fluid	81
11.5 Cleaning Method and Matters Needing Attention to Cooling System	81
12 INSPECTION AND MAINTENANCE OF THE MACHINE	83
12.1 Routine Inspection	83
12.2 Periodic Inspection	84
12.3 Overhauling of the Machine	85
13 COMMON troubles and trouble-shooting	86
14 wearing Parts	88
14.1 Table of Wearing Parts	88
15 PROTECTION MEASURES OF SAFETY OF THE MACHINE	112
15.1 Disposition of Necessary Safety Warning Labels	112

## 1 SAFETY WARN

The machine is provided with some safety devices to prevent operator from injury and the equipment from damage, but the operator should understand and be acquainted with the stipulations given by various safety labels and following stipulations thoroughly before operating the machine.

### 1.1 Notice to Operator and Maintainer

- Operator when intends to operate the machine should be trained and have skill of operating the machine. And it is necessary for him/her to read the INSTRUCTION BOOK thoroughly and be completely acquainted with the content given by the INSTRUCTION BOOK as well as only possessing the skill of operating the machine before operating the machine he/she can be allowed to operate this machine.
- Before operating the machine, operator should well wear working overalls and safety shoes, put on protecting glasses and long hair should be put in the cap. And also put on mask if workpiece made from cast or aluminum material is to be turned.
- Maintenance shall be performed by qualified maintainer or person specially trained to avoid unexpected accident.

### 1.2 Requirements for Basic Operation

#### **DANGER**

- Never touch the transformer, motors and any terminals etc. with high voltage with hand to avoid serious shock.
- Never touch any switch with wet hand, otherwise, also resulting in shock.

#### **WARN**

- Before you touch any switch, it is necessary to confirm whether it is the one that you need, never mistaken.

#### **NOTICE**

- There must be adequate working space to avoid unexpected accident.
- Separate ground of the machine should be adopted and it is better that its length is as short as possible.
- The operator shall be well acquainted with the location of the E-stop button, so that the button can be pressed without hesitation when it is needed.
- You should at first press the emergency stop button as soon as any trouble occurs with the machine or the machine is under hazardous status, then the general switch of power supply. No switching on the power supply before the trouble is remedied.

- The general switch of power supply should be at once switched off when power-off.
- Water and oil may cause working floor slipping, resulting in danger, in order avoid unexpected accident, working floor should be kept clean and dry.
- Do not dirty, nick or make down any warning tablets. Please order new one from our factory if some words on the tablet become not clear or it has been lost. While it is necessary for you to order a new tablet, please confirm the content of the tablet and the location of it on the machine.
- Do not touch any switch at will.
- Recommended lubricating oil and grease or approved oil possessing equivalent performance should be adopted.
- Check the using condition of the hydraulic oil and lubricating oil, and be sure that is under sufficient and qualified hydraulic oil and lubricating oil. Guarantee that the requirements for the normal lubricating and control of the machine can be met. Attention must be paid to adding and changing hydraulic oil and lubricating oil in time.

### 1.3 Requirements before Switching on the Power Supply

#### **DANGER**

- All cables, wires or patch cord whose insulating covers are damaged will cause current leakage or shock, so check them carefully before switching on the power supply.

#### **NOTICE**

- Cross section of the cables used from electrifying switch to main circuit switch fitted for the machine shall be in accordance with the across section specified in the Electric Circuit Diagrams to meet the needs of power requirements.
- Ensure that the protection connecting wire which is not less than the cross section of the phase wire is firmly connected to the PE terminal of the machine.
- Check carefully if the electrical system is correct before connecting power supply and pay attention whether the motor is moisture.
- The oil tank of the machine should be filled to the oil level and check it, refill it when necessary.
- For lubricating point, the kind of oil and relative oil position, please refer to Lubrication Chart
- Every switch and operating lever should be nimble, smooth and their actions should be checked.
- Electrician should wear insulating shoes of oil-proof, working overalls and put on other articles for safety protection.

#### 1.4 Requirements after Switching-on the Power Supply

##### NOTICE

- For operating the machine at the first time after unpacking or re-operating the machine under stop status for a long time, it is necessary to make the machine being idle-running for a few hours. And each moving parts shall be lubricated with fresh lubricating oil.
- Pay attention to observe whether running direction of the motor is in accordance with specified one.
- Check coolant, and pour it if necessary.

#### 1.5 Routine Inspection

##### DANGER

- Never insert your finger(s) in-between the pulley and belts when you check tension of the belts.

##### NOTICE

- Check if there is any abnormal noise coming from motor, gearbox, or other parts.
- Check lubrication state of moving parts.
- Check if the safeguard device or protective cover is under good status.
- Check tension of the belts. If they are too loose, replace them with new match-able ones.

#### 1.6 Preparation before Operating the Machine

##### NOTICE

- Tools should be adaptive with installing and clamping size of the tool post.
- Excessive worn tools can result in damage; therefore, they should be replaced by new ones beforehand.
- The working area should have adequate brightness for convenience of safety check.
- Tools or other articles around the machine or equipment should be arranged in perfect order and easy to reach, the path is unlocked.
- Tools or other any articles cannot be put on the headstock, the cover of the tool post or other similar positions.
- If the center hole of a heavy cylindrical workpiece is too small, the workpiece may skip out of the center when it is loaded, so pay attention to the size and angle of the center hole.
- The length of workpiece should be limited within the limitation specified range to avoid interference.

- Rust-protecting grease on surface of the machine must be carefully cleaned with kerosene and wash the interior of the headstock with worm kerosene before operating the machine. After all oil wicks are washed and dried, be sure to put them back to their original positions. Remove the oilpaper and grease on the guideways; refill the guide way lubricating oil after cleaning. Never use emery cloth or other hard things scrape the machine.
- It's necessary to fill proper lubricating oil and coolant separately into the oil tank and the water tank according to the requirement.

### **CHECK**

- Before operating the machine, carefully check whether the electric system is satisfactory, the connecting wires and the plugs are correctly connected; there is any loose or imaginary case(s) due to vibration during transportation. After switch-on of the power supply, check whether running direction of the motor is in accordance with the stipulations specified.
- Check whether action of all operating handle of the machine is nimble and make every operating handle being at its neutral step position.
- Check functions of all protecting devices such as power-off function while the door is opening, limit stop switch, interlock mechanism, etc.
- Before operating the machine, close the protecting cover of chuck, the protecting cover (front chip guard screw) of carriage and the door of belt cover well.
- Any person who is irrelevant with operating the machine should withdraw from around the working area.

## **1.7 Operation**

### **DANGER**

- Do not shift the handle for changing spindle speed on the headstock in any case during spindle running; it is forbidden to start the spindle while the machine is set at the neutral step.
- Long hair should be covered with cap when operating the machine.
- Do not operate the switches with gloves to avoid accidental operation or accident of winding or involving in.
- Workpiece and tools must be tightly chucked to avoid being thrown off resulting in personnel injury.
- The chuck jaws must clamp workpiece to avoid being thrown off from their positions when the chuck is running at high speed.
- When the chuck is extended to clamp workpiece, the holding range of the chuck should not exceed the range stipulated by the technical document supplied by chuck factory.

- Workpiece can be unloaded only when the tool and the spindle are under stop status. And never touch the workpiece or the spindle that is running by hand or other any way.
- Do not operate the machine before the safe guard devices are not well closed.

### WARN

- The nozzle of coolant can be adjusted under only the machine stop status.
- Do not clean chip during machining.
- Clean chips with special hook. Do not clean chips on the cutter by bare hand and to use brush for cleaning it.
- It is only permissible to install or dismount the tools while the machine is under stop status.
- Pulling outwards the hand wheel of the apron make it unengaged. It is necessary to unengaged the hand wheel when rapid speed to avoid the hand wheel injure person.
- While the machine is running, unrelated personnel are forbidden to stay within the working zone.
- While heavy-loading cutting, special attention must be paid to prevent scalding causing by the hot chips.

### NOTICE

- The chip-guarding screen should be used for defending when turning workpiece.
- The chuck guarding cover should be used for defending when the spindle running.
- The chuck cover is disposed for the standard chuck of  $\phi 500$  (it is only available for the machine to be exported, and if there is no special requirement from the customer, it is not available for the machine that for domestic market).When the faceplate or the chuck of over  $\phi 500$  is used, it is necessary to dismount chuck cover. And because the switch JLXK1-411M/TH is used, after the chuck cover is dismounted, the switch shall be pressed by adhesive tape to make the machine run normally, and during the running of the machine, the operator must be pay attention to the safety to avoid accidents.
- The spindle speed of the machine provided with chuck of  $\phi 500$  is  $\leq 360\text{r/min}$ ,with the chuck of  $\phi 800$  is  $\leq 140\text{r/min}$ ,with the chuck of  $\phi 1000$  is  $\leq 114\text{r/min}$ .

## 1.8 Interruption of Machining

### NOTICE

- After completion of turning one pressing, before operator wants to leave from the machine temporally, the operator should turn off the stop button of the main motor and also the switch of the main power supply at the same time.

## 1.9 After Machining

### NOTICE

- After stopping the machine, it is necessary to clean the chips, doors, covers and windows, etc. by means of special hook or other complements, do not clean by bare hand.
- Do not do cleaning work before the machine stops.
- Back all parts of the machine to their original positions.
- Check if the chip scraper is damaged and replace it with a new one if damaged.
- Check coolant and lubricating oil. If the lubricating oil is very dirty, change it with fresh oil.
- Check the amount of coolant and lubricating oil. Add them when necessary.
- Clean the oil filter of oil plate.
- Before you leave from the machine, turn off the switch of the general power supply.
- Oil or water can make the floor slipping to cause danger. So, always keep the floor clean and dry to avoid accidents, if necessary, set foot antiskid plate.

## 1.10 Safety Equipment

- Rear guarding cover
- Front guarding cover
- Guarding cover for chuck
- Belt cover
- Tailstock protection
- E-stop button

## 1.11 Maintenance

### DANGER

- During the period of maintenance, anyone who has no relationship with the maintenance should not operate the main circuit switch or the power ON switch on the pendant, therefore a sign plate with “The machine is under maintaining, don’t touch the switch” or with words similar to meaning should be hang on the switch or other suitable place. This plate should be easy to see and to pick off but uneasy to fall down.
- It’s dangerous to maintain the machine with power on, in principle, the main circuit switch should be turn off during maintenance.

**WARN**

- Electric maintenance work should be done by a professional maintainer and the man should always get contact with the chief, never make any decision by himself.

**NOTICE**

- The interlock mechanism like travel limit device, etc is not permissible to be dismantled or modified at will.
- Electric elements like cables, etc. used for the machine should be from certificated manufacturers.
- After maintenance is finished the working place should be cleaned and rearranged, the oil, water on every part should be cleared away to get a good working ambience.
- Take the dismantled parts and dirty oil far away from the machine to guarantee safety.

**1.12 Prohibition**

- Shifting change-speed levers when the spindle is running is prohibited.
- Shifting levers on the feed box when running at the high and middle speed is prohibited.
- The abnormal operation is prohibited, such as loading, unloading and checking workpiece, shooting trouble and clearing chip while the machine is running.
- While operating the machine, wearing loose overalls and adornments that are obstructive to work and with long hair are prohibited.
- It is forbidden for any unauthorized personnel to start, operate and maintain the machine; to open the door of electric cabinet and touch the electric elements are also prohibited.
- The chuck cover is disposed for the standard chuck of max.  $\phi 500$  (it is only available for the machine to be exported). When the faceplate or the chuck of over  $\phi 500$  is used, it is necessary to dismount chuck cover. And because the switch JLXK1-411M/TH is used, after the chuck cover is dismantled, the switch shall be pressed by adhesive tape to make the machine run normally, and during the running of the machine, the operator must be pay attention to the safety to avoid accidents.
- When the chuck is extended to clamp workpiece, the holding range of the chuck should not exceed the range stipulated by the technical document supplied by chuck factory.



## 2 GENERAL DESCRIPTION

### 2.1 Application Scope

The machines described by this INSTRUCTION BOOK belongs to series machines including following sizes:

CW80 Series: CW6180B × 1500, 3000, 4000, 5000, 6000, 8000, 11000, 14000;

CW6280B × 1500, 3000, 4000, 5000, 6000, 8000, 11000, 14000;

CW6180C × 1500, 3000, 4000, 5000, 6000, 8000, 11000, 14000;

CW6280C × 1500, 3000, 4000, 5000, 6000, 8000, 11000, 14000;

CW110 Series: CW61110B × 1500, 3000, 4000, 5000;

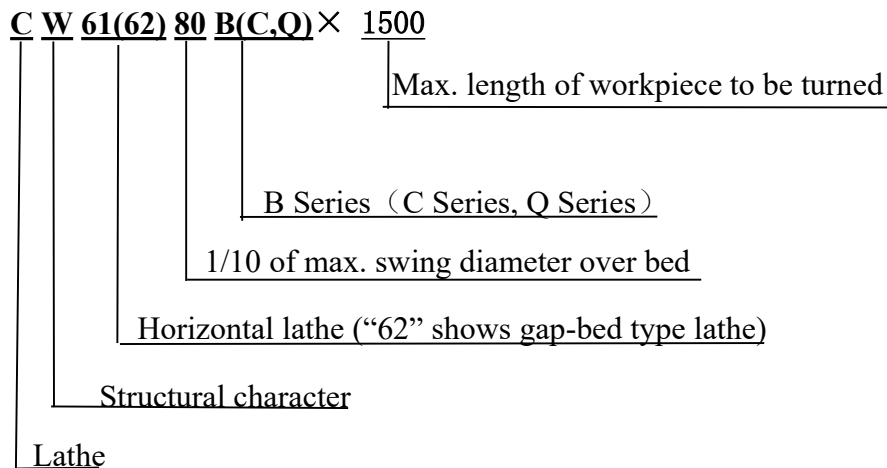
CW62110C × 1500, 3000, 4000, 5000;

CW100Q Series: CW61100Q × 1500, 3000, 4000, 5000;

CW62100Q × 1500, 3000, 4000, 5000.

The machines of each size are divided into the machine provided with hand-braking and the machine with foot-pedal braking.

### 2.2 Identification Marking of Model



### 2.3 Application and Turning Range of the Machine

#### 2.3.1 Application of the Machine

The machine can perform various turning jobs, such as internal and external cylindrical, cone surfaces and other surfaces, cutting of various metric, Whitworth, module and

diametral threads, as well as facing also drilling, reaming and broaching oil grooves, etc.

The machine is available to turn workpieces made from steel, casting ferrous metal material, etc.

The workpiece produced on the machine can achieve the working accuracy of Grade IT6-IT7 and lower value of surface roughness. The gap-bed lathe is also capable of turning flat and grotesque workpieces besides the turning jobs mentioned above.

The machine possesses foot-pedal function as well as hand-braking function; therefore, the machine is convenient in operation, sensitive and reliable in braking.

### 2.3.2 Turning Range of the Machine

Turning range of the machine should be determined according to size and technical data of the machine. Strictly forbid the operation of the machine under over-performance and over-local, otherwise, resulting in damage of the machine and personal injury or death caused by an accident.

### 2.4 Accuracy of the Machine

Accuracy of the machine is in accordance with the standard GB/T4020-1997 《Accuracy Test for Horizontal Lathe》 of the People's Republic of China.

### 2.5 Noise of the Machine

Sound pressure level of idle running noise of the machine is  $\leq 80\text{dB(A)}$  through measurement according to the standard EN11202.

### 2.6 Illumination of the Machine

In order to meet the needs of illuminating intensity in working zone of the machine in normal shining case, the machine is fully considered about illuminating problem in the design. The specifications of which are as follows:

Type of illuminating light:	JC 38B
Voltage:	24V
Power:	40W

The local illuminating light can move with the apron together for ensuring that the operator observes workpiece being turned without interfering shadow, dizzy and frequent flashing.

### 2.7 Requirements of Environment to the Machine

The machine is to be used in environment available following specified practical environment conditions and running conditions.

- Environmental temperature: Range of  $5^{\circ}\text{C}$  -  $40^{\circ}\text{C}$ . not more than  $35^{\circ}\text{C}$  of even temperature for 24 hours.
- Relative humidity: Range of 30% - 95% and the principle of humidity changing can

result in condensation.

- Sea elevation: Lower than 1000 m.
- Atmosphere: There is no excessive dust, acidity gas, corrosive gas and salt component.
- Sun light does not directly light up the machine or heat radiation makes the machine resulting in temperature rising to make changing of environment.
- Location for installation of the machine should be far away from vibrating source.
- Location for installation of the machine should be far away from flammable and hazard articles.

### **2.8 Affection of the Machine to Environment**

The machine does not produce harmful effects to environment, also no discharge of harmful gas or liquid.

### 3 TRANSPORTATION, HANDLING AND INSTALLATION

#### 3.1 Transport of the Machine

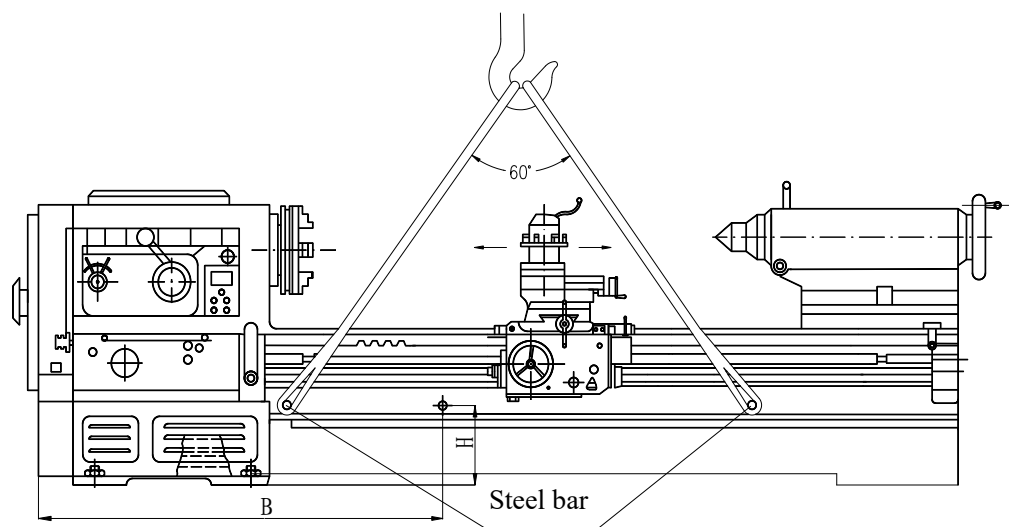
We have taken some measure such as moisture-proof, anti-vibration and anti-shock during packing the machine, therefore, the machine can bear transport and storage under temperature from  $-25^{\circ}\text{C}$ ~ $55^{\circ}\text{C}$  and also transport and storage in short time within 24 hours under status of temperature of  $70^{\circ}\text{C}$ .

Material of the packing case is wood that will not pollute environment.

#### 3.2 Handling of the Machine

To lift the machine packed in wooden case by a crane, strong steel wire rope should be looped in the rope marks pointed lateral sides of the case, when transporting and unloading the case, bumping and shocking should be avoided. In any case, do not over incline the case. If rolls are used for the transport of the case, it is important that the inclination of condition or the slope should not exceed  $15^{\circ}$ , the diameter of the rolls used must not be over 70 mm. Never place the case on a prismatic body or upside down.

When the machine is unpacked, first, inspect its exterior condition and check attachments according to the "PACKING LIST". When lifting the unpacked machine with a crane, use strong steel bars with  $\phi 50$  mm, 1000 mm long, and made them insert into the in front and rear hanging holes of bed leg. And the wooden blocks should be padded between the strong steel wire ropes and the position touched with the wire ropes of the machine or the steel wire ropes slipped with rubber pipe to prevent the machine from being damaged. While lifting, you should to move the carriage to make the machine under balancing and the tailstock shall be fixed on the machine bed. (Before lifting, remove the front chip guard and while lifting the tailstock should be fixed on the machine bed.). See Fig. 1, please.



B: Horizontal location of the center gravity

H: Vertical location of the center gravity

Fig. 1 Handling plan of the machine

### 3.3 Overall Dimensions, Center gravity and Weight of the Machine

Refer to Tables 1, 2 and 3.

Table 1 for CW80 Series

Type of Product		CW6180B, C	CW6280B, C
Profile Dimensions	L×W×H (mm)	1500	3660×1450×1630
		3000	5155×1450×1630
		4000	6210×1450×1630
		5000	7390×1450×1630
		6000	8150×1450×1630
		8000	10500×1450×1630
		11000	13190×1450×1630
		14000	16310×1450×1630
Center of Gravity	Horizontal location (mm)	1500	1610
		3000	2270
		4000	2810
		5000	3395
		6000	3910
		8000	4890
		11000	6380
		14000	7910
	Vertical height (mm)		725
Weight of the Machine (kg)	1500	4900	4950
	3000	5500	5900
	4000	6100	6700
	5000	6900	7350
	6000	7500	8000
	8000	9000	9500
	11000	10700	11000
	14000	13500	13800

Table 2 for CW110 Series

Type of Product		CW61110B ( C )		CW62110B ( C )	
Profile Dimensions	L×W×H (mm)	1500	3660×1560×1790		
		3000	5155×1560×1790		
		4000	6120×1560×1790		
		5000	7390×1560×1790		
Center of Gravity	Horizontal location B (mm)	1500	1705		
		3000	2365		
		4000	2880		
		5000	3485		
	Vertical height H (mm)		735		
Weight of the Machine (kg)		1500	5500	5550	
		3000	6100	6165	
		4000	6700	6790	
		5000	7500	7600	

Table 3 for CW100Q Series

Type of Product		CW61100Q		CW62100Q	
Profile Dimensions	L×W×H (mm)	1500	3660×1560×1730		
		3000	5155×1560×1730		
		4000	6210×1560×1730		
		5000	7390×1560×1730		
Center of Gravity	Horizontal location B (mm)	1500	1705		
		3000	2365		
		4000	2885		
		5000	3485		
	Vertical height H (mm)		745		
Weight of the Machine (kg)		1500	5400	5450	
		3000	6000	6065	
		4000	6600	6690	
		5000	7400	7500	

**NOTE**

- In order to keep balancing of the machine being lifted up in both horizontal and vertical directions, it is just away from ground (very beginning) that the machine is lifted up should be kept balancing.
- Angle of the steel wire rope under lifting up or down shall be not more than 60°.
- Whenever handling the machine, it is necessary to give signal with each other for coordinated working provided the handling work is not carried out by one person.

**3.4 Installation of the Machine****3.4.1 Preparation Work before Installation**

Installation of the machine should be in accordance with the stipulations given in the Chapter 2.7. Besides, also pay attention to the following:

- The machine shall be installed in workshop with arrester.
- The floor for installing the machine should not be soft and not strong enough. If the machine has to be installed on this kind of soft soil floor, it is necessary to use the pile way or similar measures to increase the supporting force of the soil so that the machine will not sink or incline.
- If the machine has to be installed near the position with vibration resource, it is necessary to dig a canal around the machine or make similar measures for anti-vibration.

**3.4.2 Power Interface**

Connection of power supply:

For the machine with hand-braking: Wiring terminal of the power supply is located on the switchboard in the electric cabinet of the machine.

For the machine with foot-pedal braking: Wiring terminal of the power supply is located on the switchboard in the electric cabinet of the machine, and the wire is connected with the foot-pedal brake via the through-hole at the front side of the machine bed.

**3.4.3 General Power Supply**

The voltage of power supply and the frequency available for this machine will be determined according to concerned contract. Refer to Table 4, please.

Table 4

Frequency	Rated Voltage					
50Hz	~220V	~380V	~415V	~420V	~440V	~600 V
60Hz						

Allowed fluctuation range of the voltage and the frequency:

Voltage: Stabilizing voltage value is as much as 0.9 ~1.1 times of rated voltage.

Frequency: Stabilizing frequency value is as much as 0.99 ~ 1.01 times of rated frequency (continuous working); Stabilizing frequency value is as much as 0.98 ~ 1.02 times of rated frequency (short-time working).

### 3.4.4 Installation of the Machine

The performance of a machine is greatly influenced by an installing way. If the guide ways of a machine is precisely machined, but the original accuracy cannot be obtained due to the reason of bad installation of the machine. And most troubles of the machine are caused by this reason.

It is necessary to dispose wedge irons or adjustable pad irons near the foundation bolts before installation of the machine, and the wedge irons shall be supplied by the user (for the parts, please refer to Fig. 2), and the adjustable pad irons are disposed for special order.

#### NOTE

**It is necessary to read the installing procedures carefully and install the machine according to the requirements specified, otherwise accuracy and service life of the machine will be affected.**

### 3.4.5 Foundation of the Machine

For the machine installation, a plane installation place should be first found, then, determine the installing space and prepare the foundation according to the Foundation plan (refer to Fig. 4~11) and specified ambient requirements. For the arrangement for a few machines, the space required for operation and maintenance should be considered and space of one meter at least far away from the max. profile of the machine.

### 3.4.6 Installation Steps

- The machine and the foundation bolt shall be supported by the same number of iron wedges which shall be placed near the foundation bolt in pairs. When placing each pair of cement mortar, for convenient adjustment, for the top wedge, the large end shall be facing outward, and that of the bottom wedge facing inward.
- Roughly adjust installing accuracy of the machine. The accuracy of installation is tested by means of a spirit level that is placed respectively at two ends of the bed ways. The readings of the level should all not be over 0.02/1000 in both longitudinal



and traverse directions. If not so, first make rough adjustment by means of wedges.

- After rough adjustment of the machine, pour cement into the foundation boltholes, and carry out the fine adjustment after the dry out of the cement.
- Adjust the installing accuracy of the machine precisely. On the one hand, adjust the pad wedges; on the other hand, adjust the foundation bolts, until the installing accuracy is up to the requirements.
- All foundation bolts should be evenly tightened, and no bad effects to the accuracy of installation.
- After the accuracy catches up the requirements, fill cement into the space between foundation and lathe legs and trim the surface around the base leg to prevent ingress of lubricating oil.

### 3.4.7 Connection of Inner Devices of the Machine

After the leveling, before switching on the machine, following preparation should be done:

- Re-check whether every connector is firmly connected.
- Check and be sure that the input power supply is in correct phase。 Viewing from the spindles nose, the only reverse is permissible for the motor. If the phase of the power supply is wrong, running direction of the motor will not be the same as one specified.

### 3.4.8 Trial-run

After completion of connecting wires of inner devices, following preparation work before trial-run should be carried out.

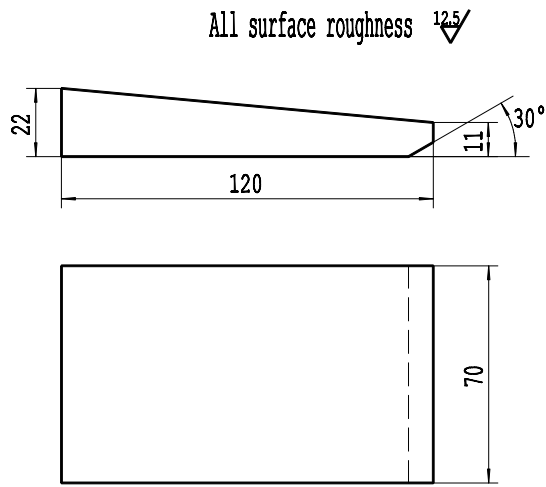
- Re-install those protection covers dismantled for convenient transport on their original positions.
- Clearing:

Sliding surface and some metal parts has been painted with antirust, and during the transportation, dust, sand powder, and other dirty things may enter into the coating for anti-rust, so it is necessary to clean them out, otherwise, the machine cannot be allowed to be started.

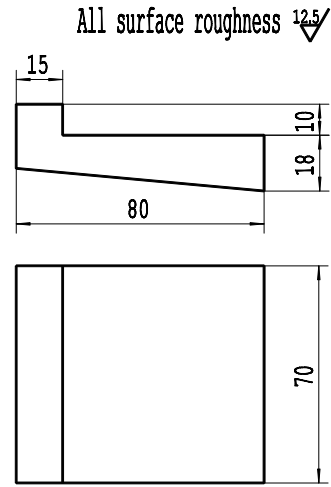
- During the clearance, it is necessary to use kerosene to clean the anti-rust coating, heated kerosene for cleaning inside of the headstock. After all oil wicks (knitting wool) have been washed and dried, be sure to put them back to their original positions. Leadscrew, feed rod, guideways, etc., should be carefully wiped dry and covered with a film of oil against rusting. Before using the machine, lubrication shall be done in accordance with the stipulations specified by the lubricating system.

- Check
  - ◆ Whether every part of the machine is damaged.
  - ◆ Whether any part or accessory is lost.
  - ◆ All positions that should be lubricated are enough lubricated.
  
- Trial-run
  - ◆ After completion of installing and the preparation work before trial-run mentioned above, it is necessary to do trial-run very carefully. Time for trial-run is about one hour. Larger load is not allowed to be used during the period of trial-run.

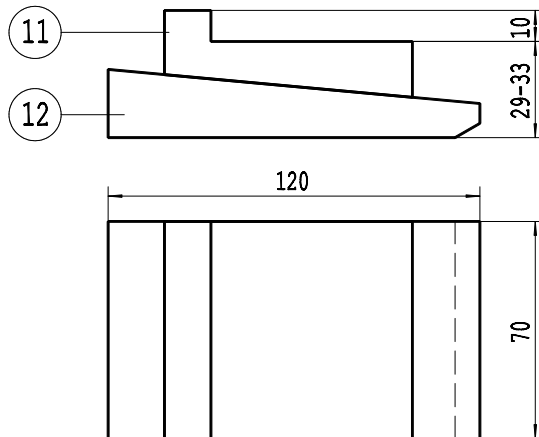
3.5 Part Drawing for Wedge Irons



Part drawing for bottom wedge iron



Part drawing for top wedge iron



Part No.	Name	Mat.L.	Qty.
11	Top wedge iron	Q235A	1
12	Bottom wedge iron	Q235A	1

Fig. 2 Drawing for hook wedge

### 3.6 Appearance View of the Machine

Appearance view of the machine, refer to Fig. 3, please.

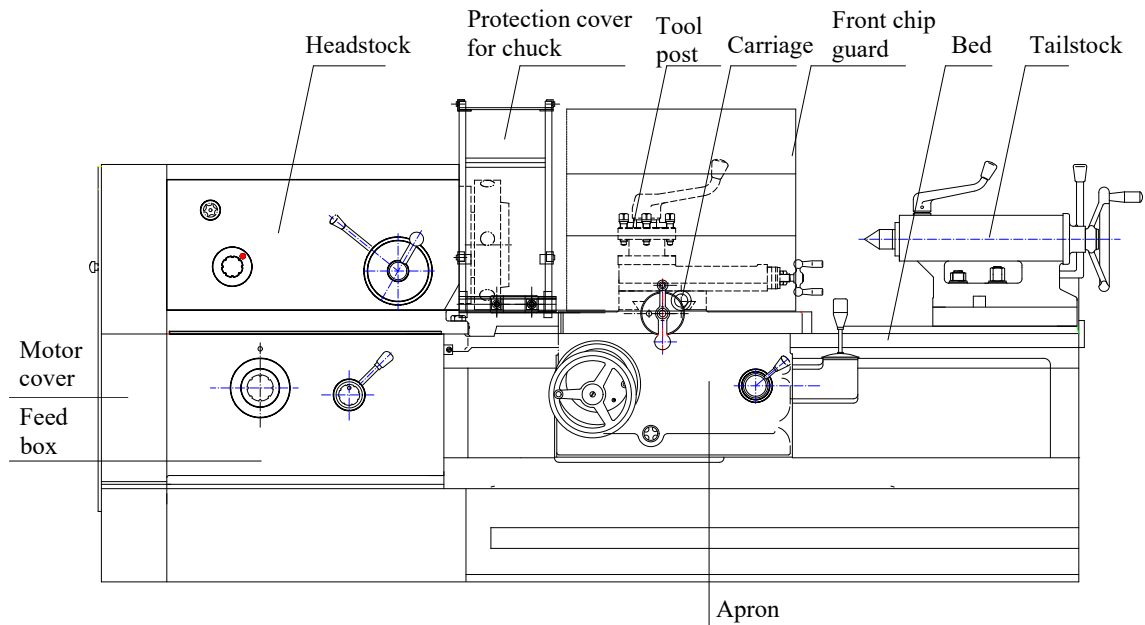
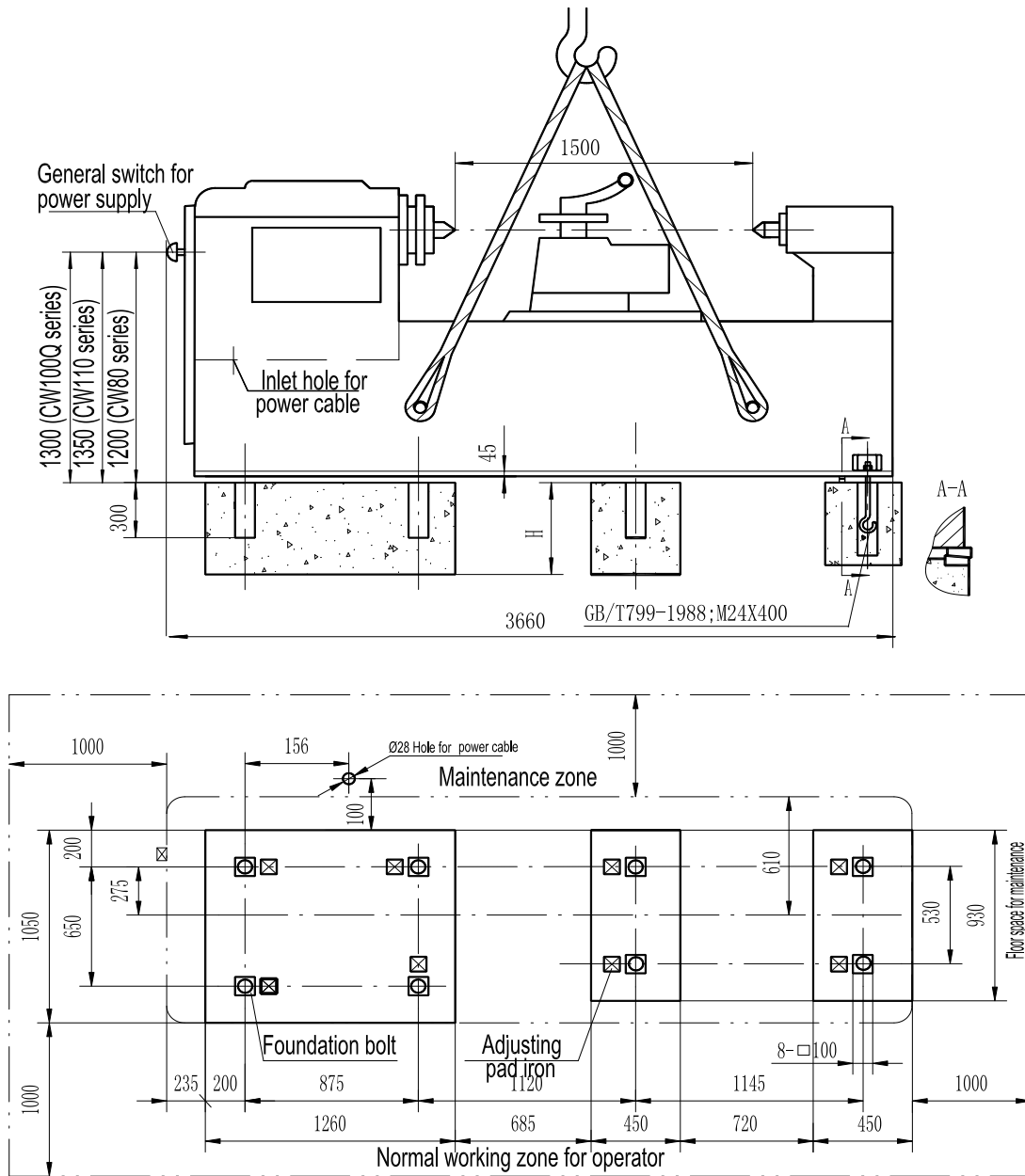


Fig. 3 Appearance view of the machine

3.7 Foundation Plan

3.7.1 Foundation Plan for the Machine of 1500 mm

Refer to Fig. 4, please.



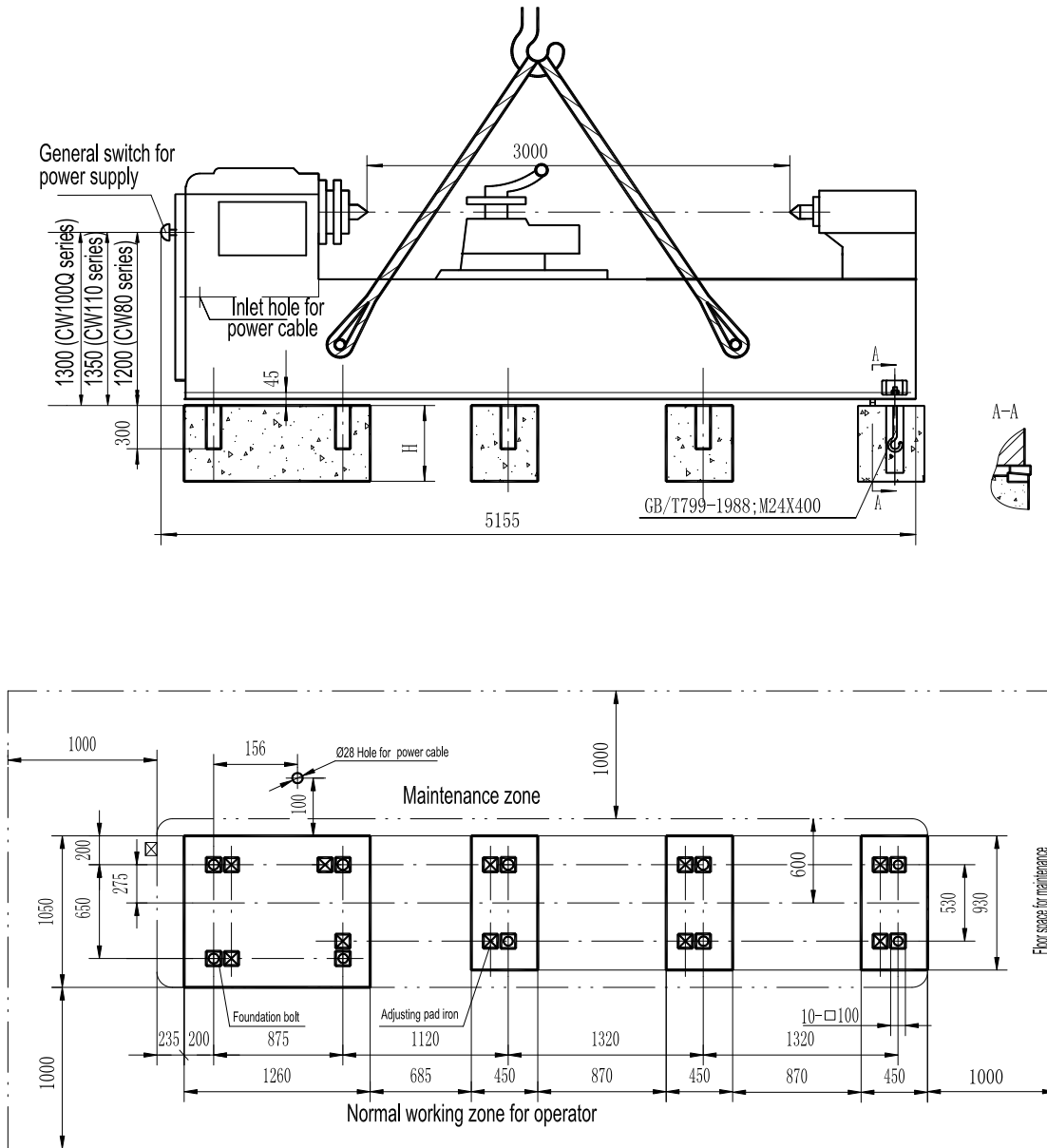
Note: 1. H: decided according to property of the local soil.

2. Mark  $\boxtimes$  shows the position of wedge.

Fig. 4 Foundation plan for the machine of 1500 mm

3.7.2 Foundation Plan for the Machine of 3000 mm

Refer to Fig. 5, please.



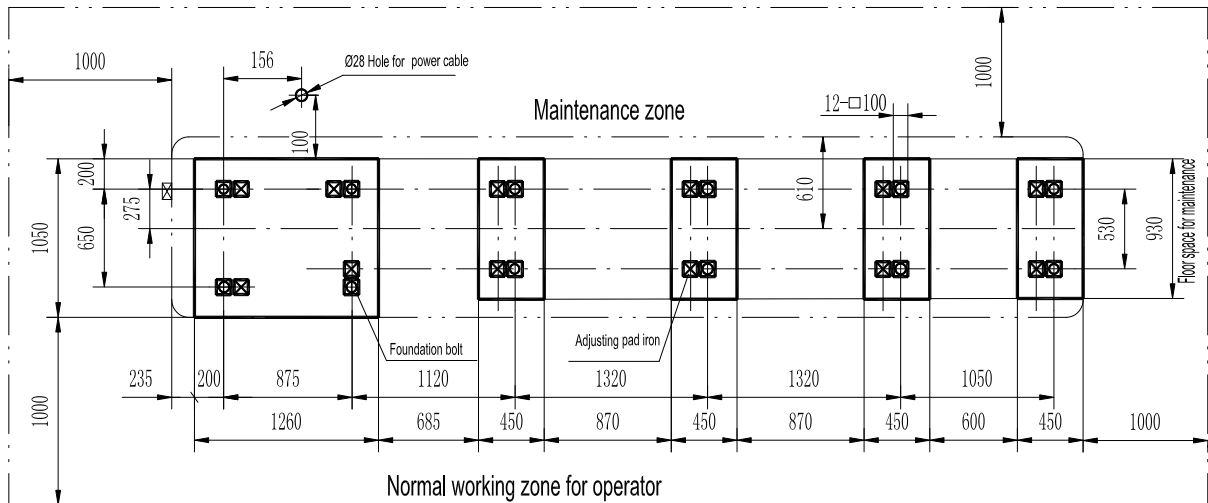
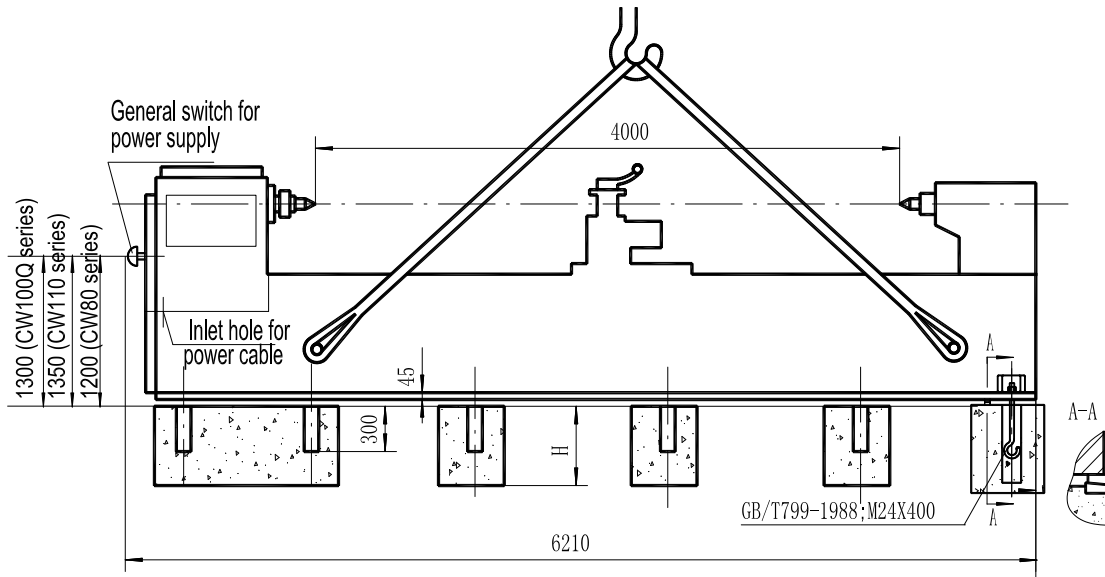
Note: 1. H: decided according to property of the local soil.

2. Mark  $\boxtimes$  shows the position of wedge.

Fig. 5 Foundation plan for the machine of 3000 mm

### 3.7.3 Foundation Plan for the Machine of 4000 mm

Refer to Fig. 6, please.



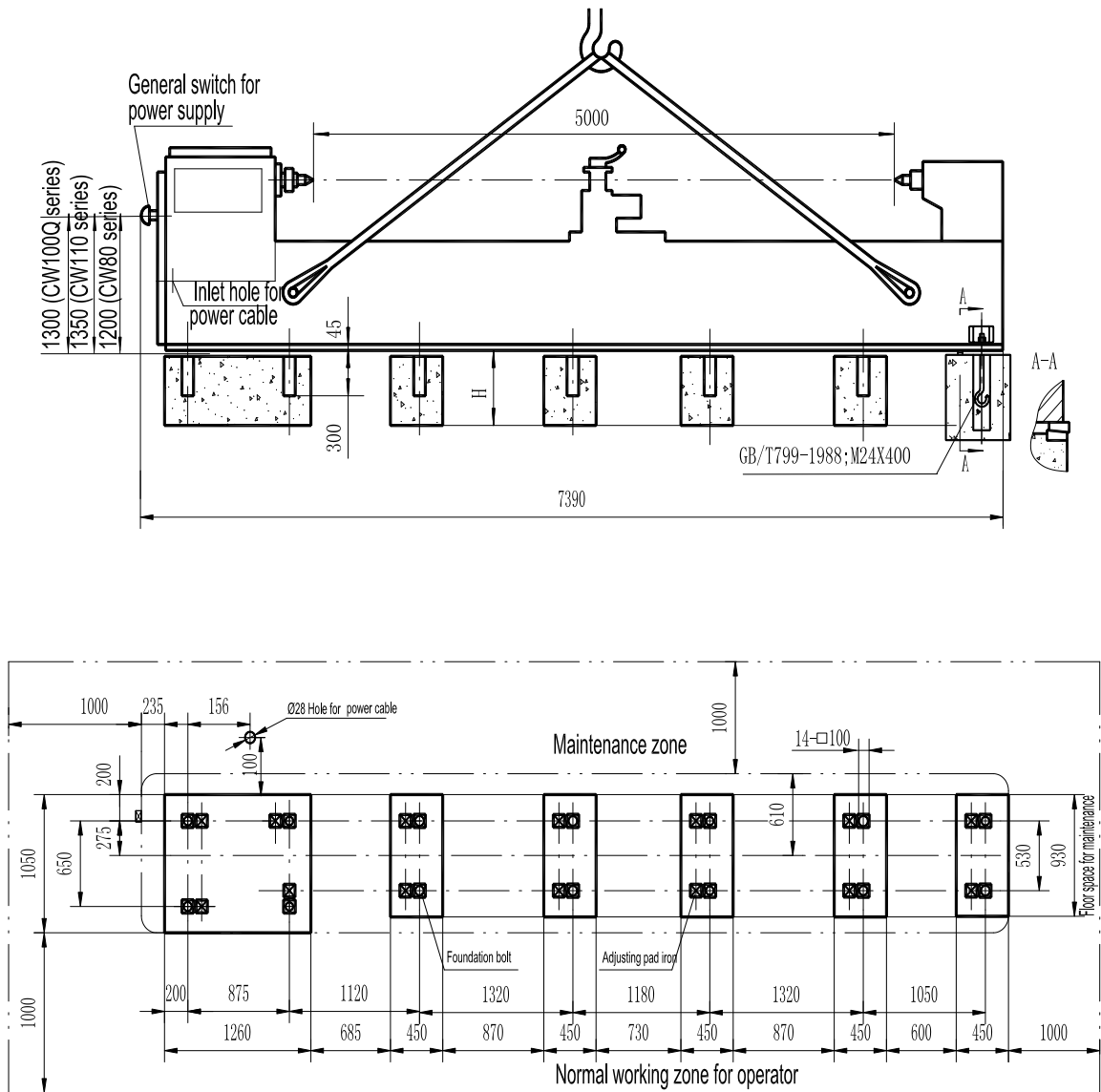
Note: 1. H: decided according to property of the local soil.

2. Mark ☒ shows the position of wedge.

Fig. 6 Foundation plan for the machine of 4000 mm

3.7.4 Foundation Plan for the Machine of 5000 mm

Refer to Fig. 7, please.



Note: 1. H: decided according to property of the local soil.

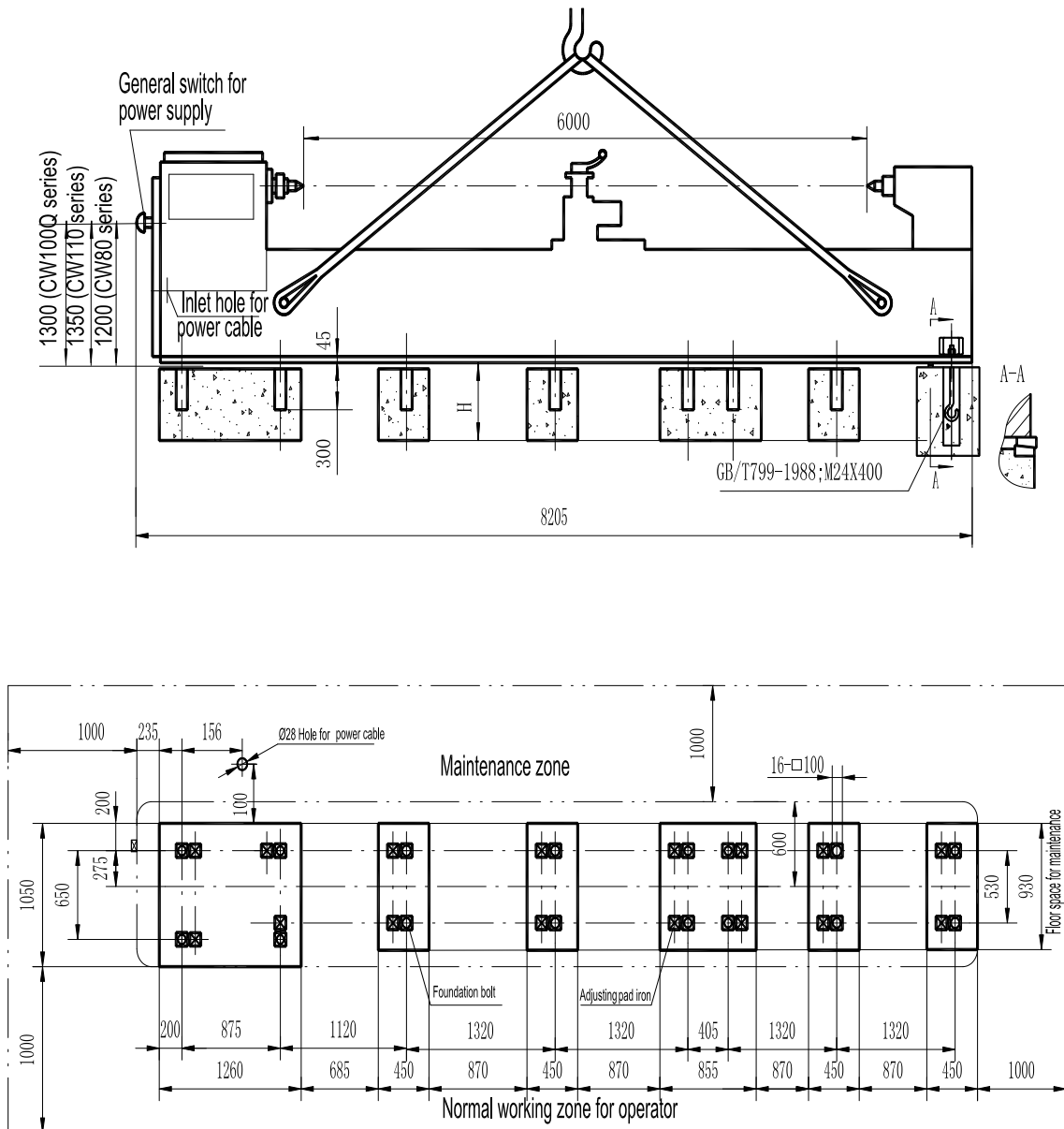
2. Mark  $\boxtimes$  shows the position of wedge.

Fig. 7 Foundation plan for the machine of 5000 mm



**3.7.5 Foundation Plan for the Machine of 6000 mm, for intergrated bed lathe of 6000mm(Accessory 1)**

Refer to Fig. 8, please.



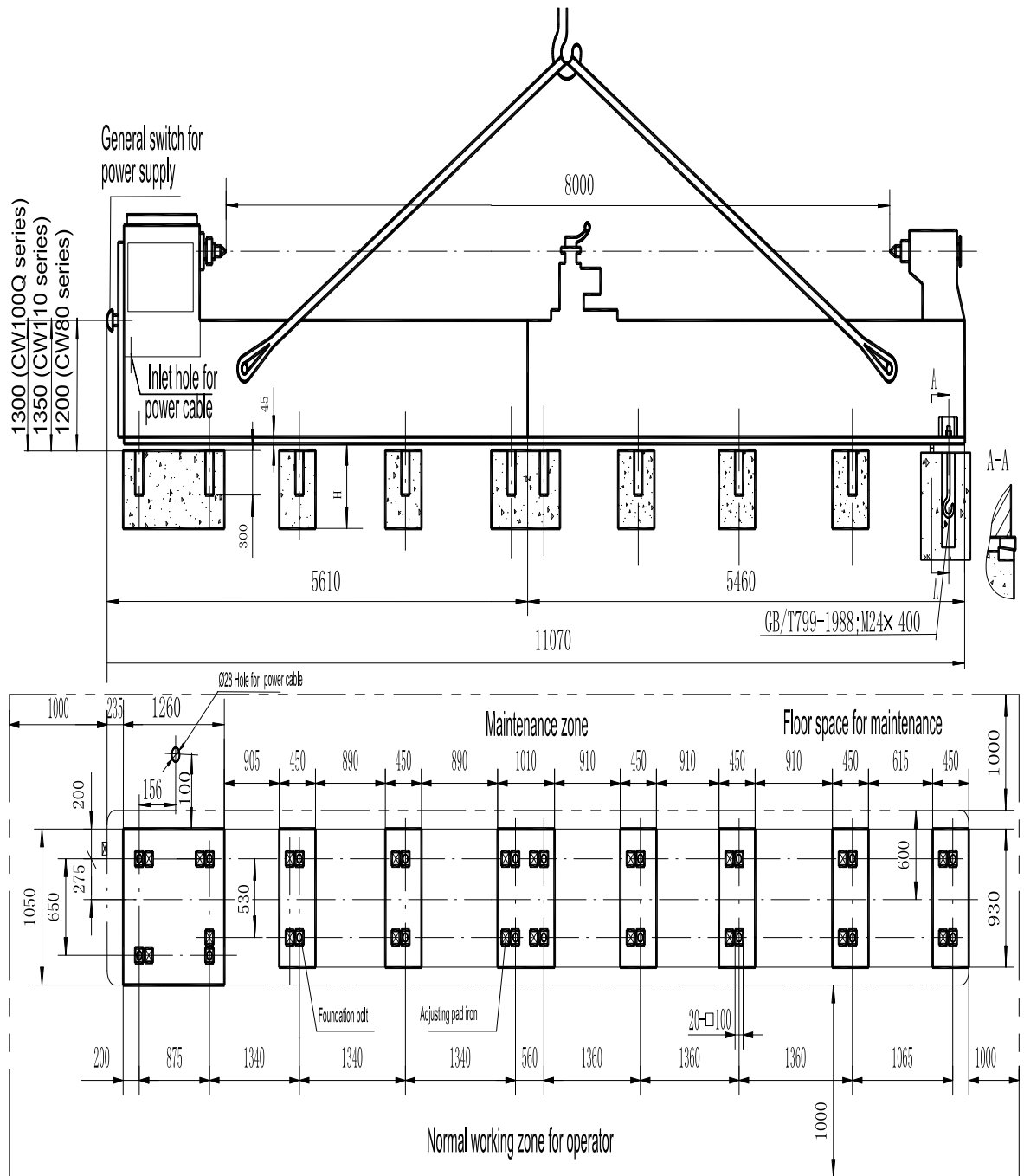
Note: 1. H: decided according to property of the local soil.

2. Mark  $\boxtimes$  shows the position of wedge.

Fig. 8 Foundation plan for the machine of 6000 mm

**3.7.6 Foundation Plan for the Machine of 8000 mm, for intergrated bed lathe of 8000mm(Accessory 2)**

Refer to Fig. 9, please.

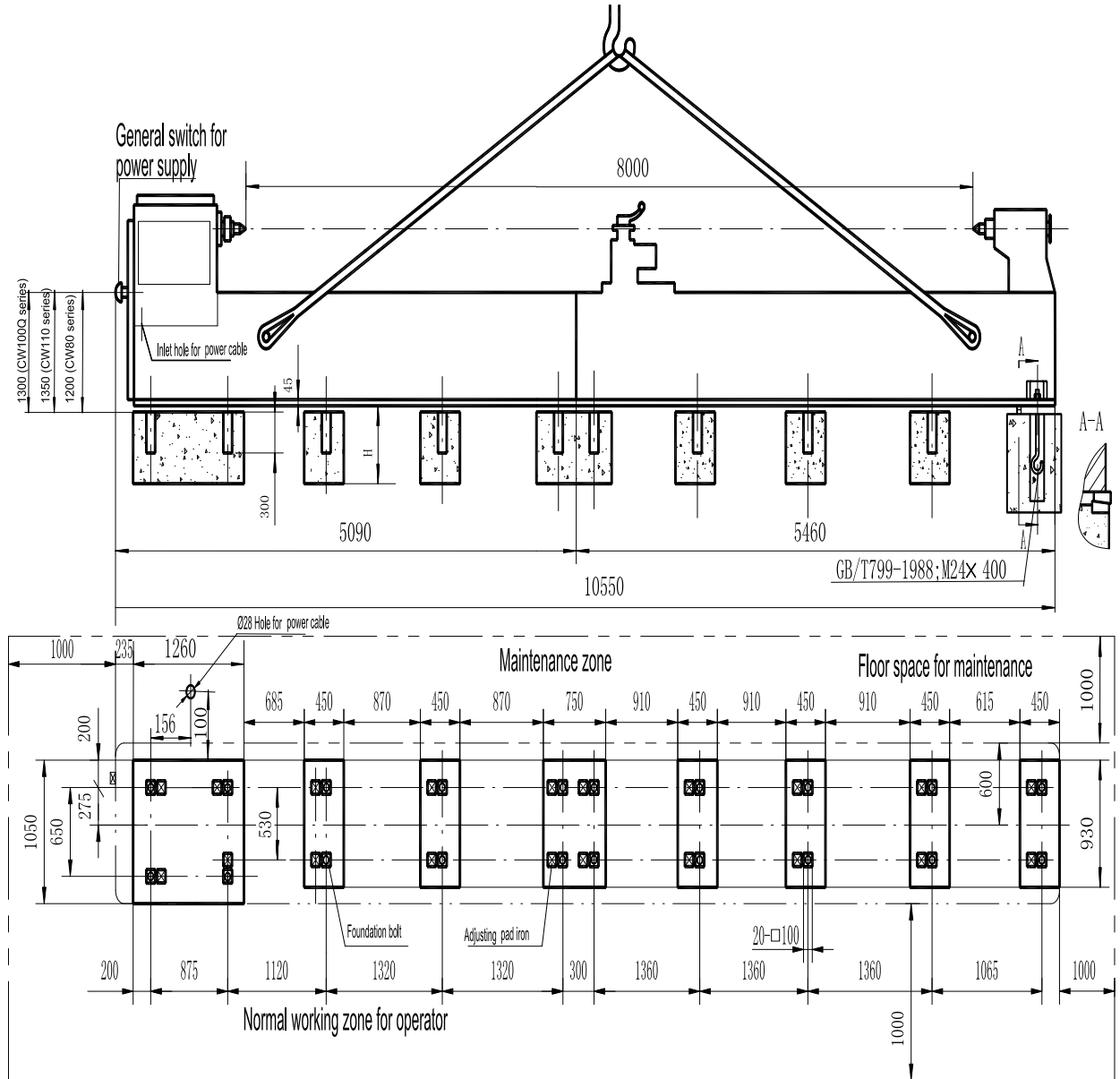


- Note: 1. H: decided according to property of the local soil.  
 2. Mark  $\boxtimes$  shows the position of wedge.

Fig. 9 Foundation plan for the machine of 8000 mm

3.7.7 Foundation Plan for the Machine of 8000 mm(The gap-bed type lathe)

Refer to Fig. 10, please.



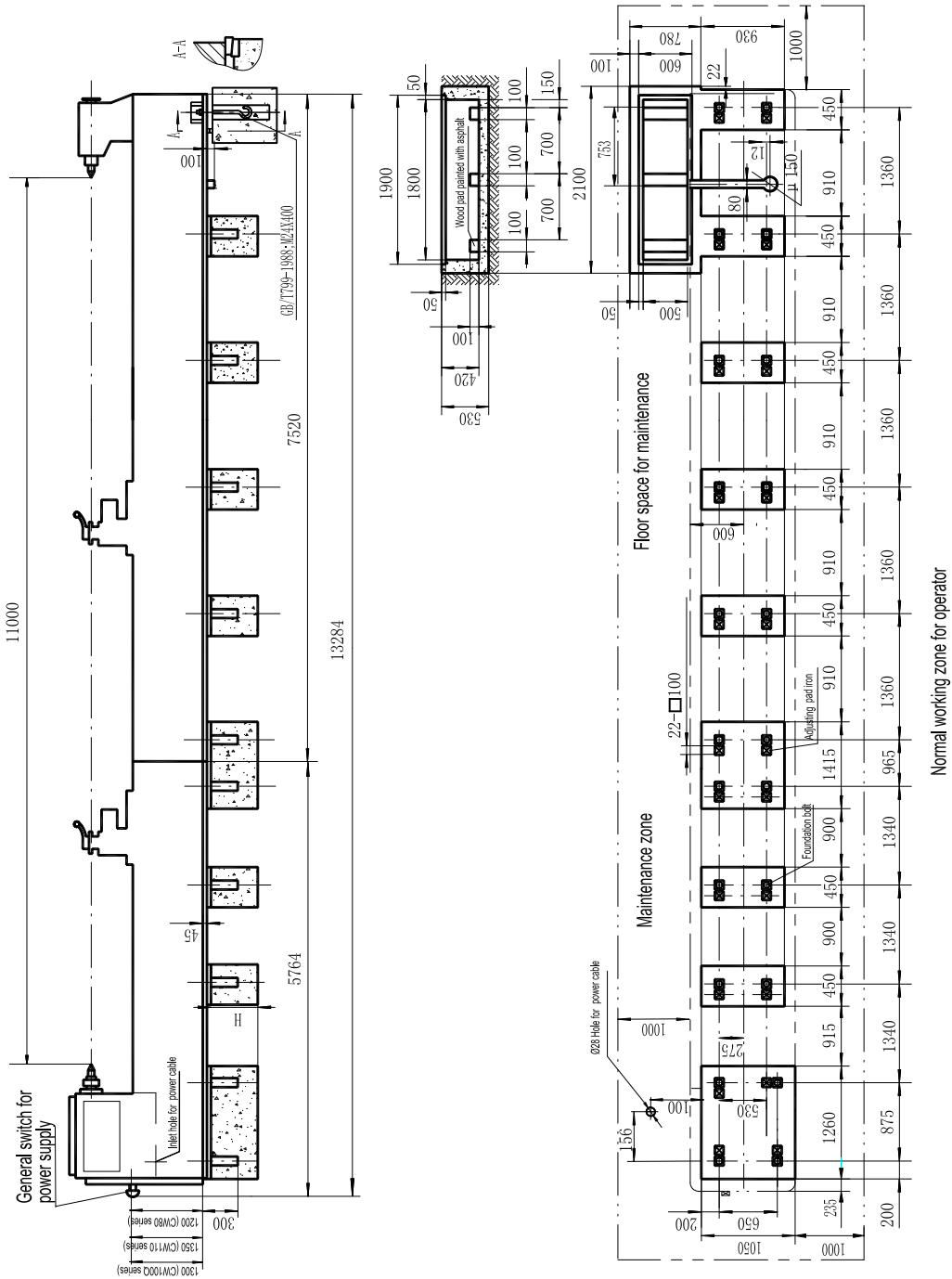
Note: 1. H: decided according to property of the local soil.

2. Mark  $\boxtimes$  shows the position of wedge.

Fig. 10 Foundation plan for the machine of 8000 mm(The gap-bed type lathe)

3.7.8 Foundation Plan for the Machine of 11000 mm

Refer to Fig. 11, please.

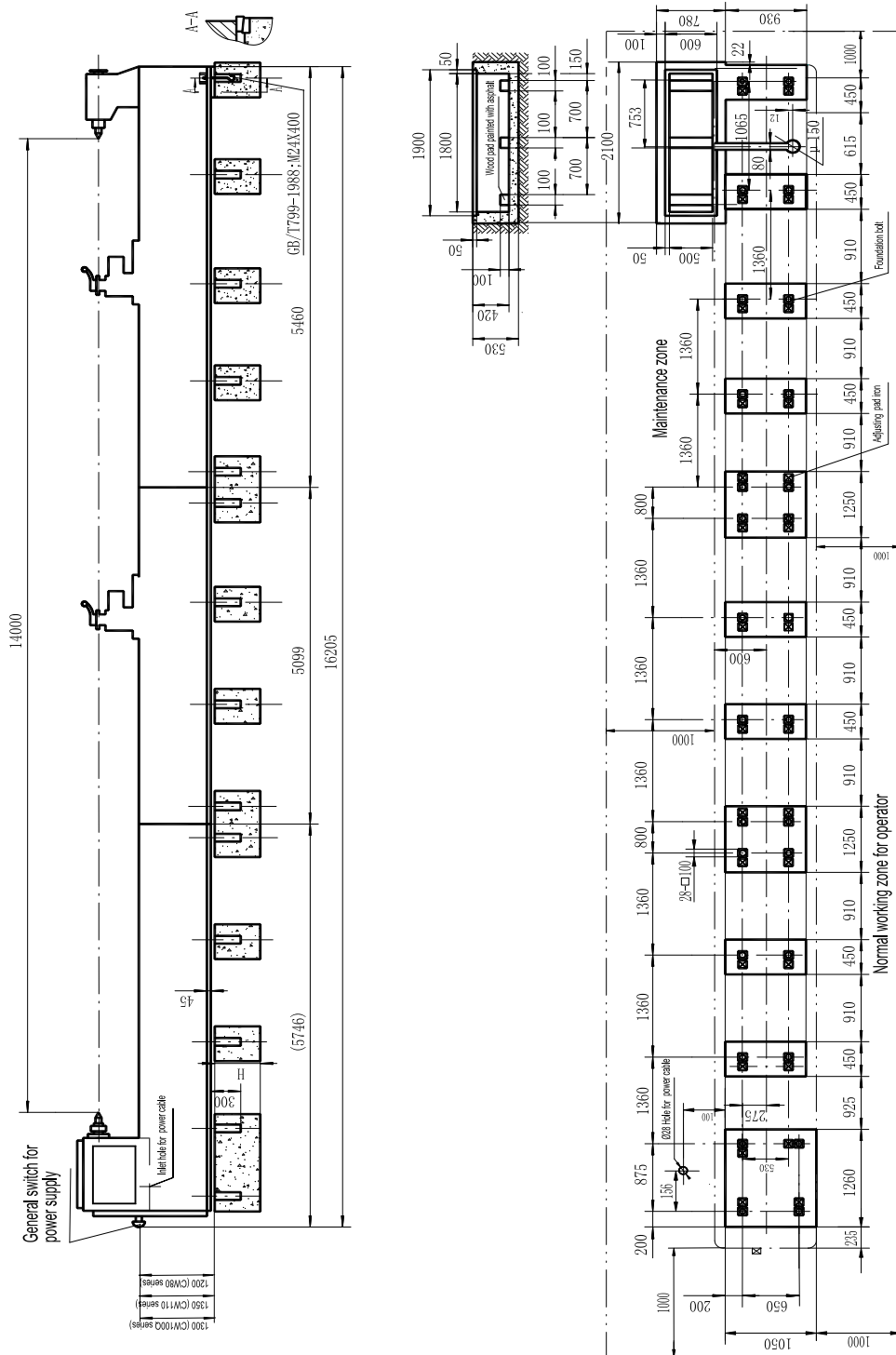


- Note: 1. H: decided according to property of the local soil.  
 2. Mark ⊠ shows the position of wedge.

Fig. 11 Foundation plan for the machine of 11000 mm

3.7.9 Foundation Plan for the Machine of 14000 mm(The gap-bed type lathe)

Refer to Fig. 12, please.



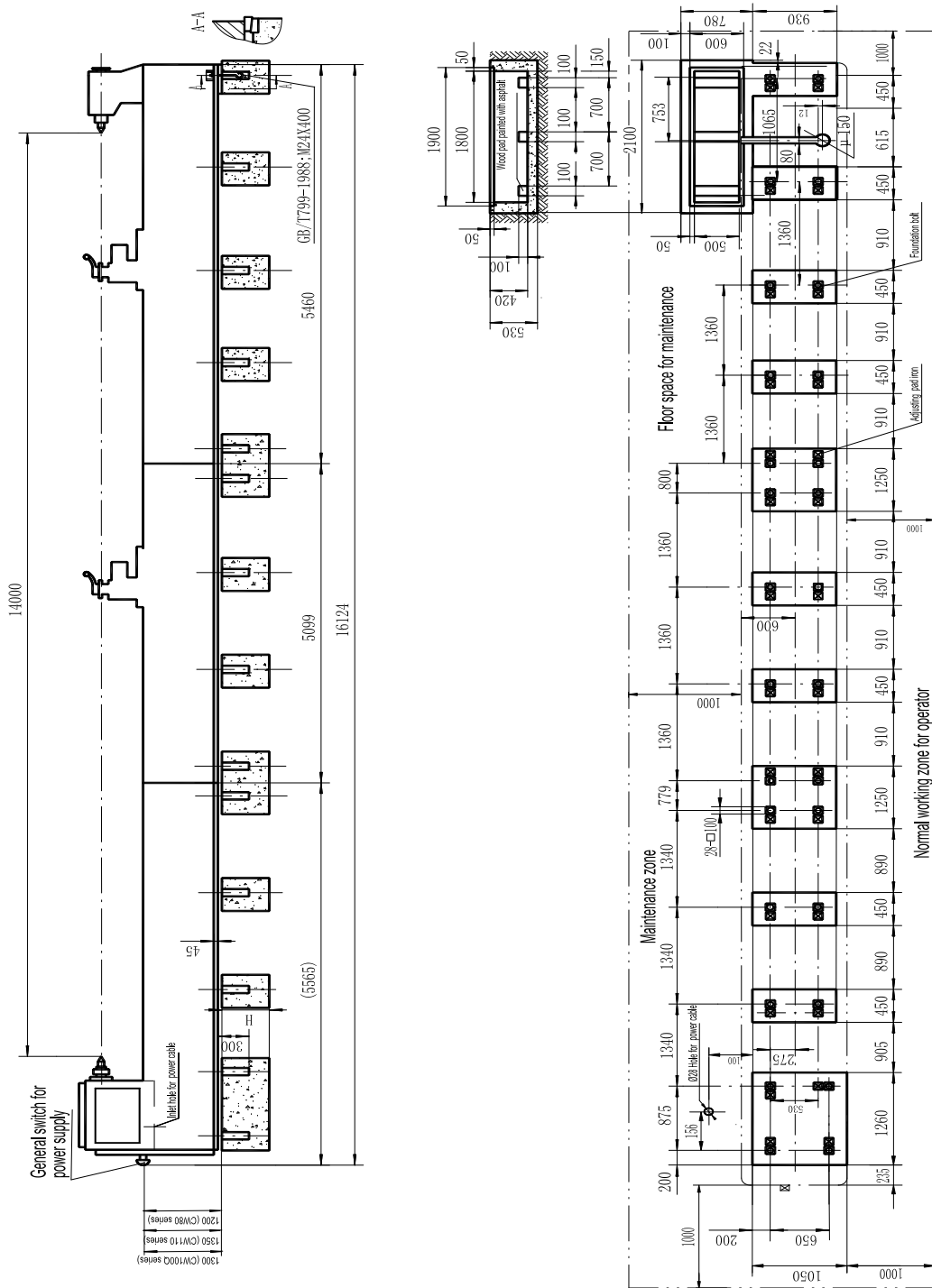
Note: 1. H: decided according to property of the local soil.

2. Mark  $\boxtimes$  shows the position of wedge.

Fig. 12 Foundation plan for the machine of 14000 mm (The gap-bed type lathe)

### 3.7.10 Foundation Plan for the Machine of 14000 mm

Refer to Fig. 13, please.



- Note: 1. H: decided according to property of the local soil.
- 2. Mark  $\boxtimes$  shows the position of wedge.

Fig. 13 Foundation plan for the machine of 14000 mm

## 4 SPECIFICATIONS OF THE MACHINE

### 4.1 Explanation for Main Specifications

The machine has many types and sizes. You should first confirm which one is your machine before reading this Instruction Book and other description.

### 4.2 Table for Main Specifications

Table 5

Item	Type of the machine									
	CW6180B	CW6180C	CW6280B	CW6280C	CW61110B	CW61110C	CW62110B	CW62110C	CW61100Q	CW62100Q
Max. swing dia. over bed mm	800				1100				1000	
Max. swing dia. over gap mm			1000				1300		1200	
Valid length within the gap mm			310				310		310	
Max. length of workpiece to be turned mm	1500, 3000, 4000, 5000, 6000, 8000, 11000, 14000				1500, 3000, 4000, 5000				1500, 3000, 4000, 5000	
Max. turning length mm	1350, 1850, 3850, 4850, 5850, 7850, 1085, 13850	1040, 2540, 3540, 4540, 5540, 7540, 10540, 13540		1350, 2850, 3850, 4850		1040, 2540, 3540, 4540		1350 2850 3850 4850	1040 2540 3540 4540	
Max. swing dia. over carriage mm	480				800				680	
Diameter of spindle bore mm	104	130	104	130	104	130	104	130	104	

Item		Type of the machine									
		CW6180B	CW6180C	CW6280B	CW6280C	CW61110B	CW61110C	CW62110B	CW62110C	CW61100Q	CW62100Q
Spindle	Taper of front bore of spindle	Metric 120	Metric 140	Metric 120	Metric 140	Metric 120	Metric 140	Metric 120	Metric 140	Metric 120	
	Taper of center	Morse No. 5									
	Steps; range	18, 5.4-720 r/min					18, 4.8—640 r/min				
Item		CW80 series			CW110 series			CW100Q series			
		Type of the machine									
Feed system	Number of longitudinal and transverse feeds:	64, each									
	Range of longitudinal feeds for driving gear ratio of 1: 1	0.1—1.52 mm/r									
	Range of longitudinal feeds for driving gear ratio of 16: 1	1.6—24.3mm/r									
	Range of longitudinal fine feeds:	0.05—0.912 mm/r (with change gears)			0.05—0.76 mm/r (with change gears)						



Item		Type of the machine		
		CW80 series	CW110 series	CW100Q series
Feed system	Rapid speed of carriage movement	4000 mm/min		
	Transverse feed is equal to:	1/2 time of longitudinal feed		
	Leadscrew pitch	12 mm		
	Number of valid metric threads	50		
	Range of valid metric threads:	1—240 mm		
	Number of valid inch threads:	26		
	Range of valid inch threads:	14—1 t.p.i		
	Number of valid module threads:	53		
	Range of valid module threads:	0.5-120 mm		
	Number of valid diametral pitch threads:	24		
	Range of valid diametral pitch threads:	28-1t.p.i		
	Carriage	Vertical distance from center line of spindle to bottom of tool	33 mm	
Size of tool shank's section		32×32 mm		
Swing degree of compound slide rest		±90° (The swing degree must be adjusted by precise measuring equipment)		
Max. travel of cross slide:		500 mm	500 mm	450 mm
Max. travel of compound rest:		200 mm		
Max. permissible cutting force PZ:		21574N		
Max. permissible feed force PX:		7840N		

Item		Type of the machine		
		CW80 series	CW110 series	CW100Q series
Tailstock	Diameter of center sleeve:	100 mm		
	Travel of center sleeve:	250 mm		
	Taper of tailstock center:	Morse No. 5		
	Max. cross movement of tailstock	± 15 mm		
Power system	Type of main drive motor	Y160M—4—B3		
	Power of main drive motor	11kW (15kW is available according to the contract)	11kW	
	Speed of main drive motor	1460 r/min		
	Type of rapid motor	NJ12—4 (middle-flanged-type)		
	Power of rapid motor	1.1kW		
	Speed of rapid motor	1450 r/min		
Item		Type of the machine		
		CW80series	CW110 series	CW100Q series
Cooling system	Type of cooling motor:	YSB-II-20		
	Power of cooling motor:	120W		
	Flow volume of cooling pump	20 L/min		
Control and lubricating system	Type of gear pump	(Counter-clockwise rotating)CB—B6		
	Capacity of gear pump:	6 ml/r		
	Pressure of gear pump:	2.5MPa		
	Speed of gear pump:	1450 r/min		
	Working pressure of cylinder:	1—1.5MPa		

### 4.3 Accessories for the Machine

#### 4.3.1 Accessories for the Machines of CW80 Series

3-jaw chuck	$\phi$ 315 mm (Type: K11 315C/D11)
	$\phi$ 380 mm (Type: K11 380/D11)
4-jaw chuck	$\phi$ 400 mm (Type: K72 400/D11)
	$\phi$ 500 mm (Type: K72 500/D11)
	$\phi$ 630 mm (Type: K72 630/D11)
Face plate	$\phi$ 800 mm (for CW6280B and CW6280C)
Steady rest	$\phi$ 40 mm~ $\phi$ 350 mm
	$\phi$ 40 mm~ $\phi$ 320 mm
	$\phi$ 120 mm~ $\phi$ 450 mm
	$\phi$ 150 mm~ $\phi$ 500 mm
Follower rest	$\phi$ 30 mm~ $\phi$ 130 mm
Taper attachment	
Max. turning length of taper attachment	500 mm
Max. turning taper of taper attachment	Inner cone 10°
	Outer cone 15°

#### 4.3.2 Accessories for the Machines of CW110 Series

3-jaw chuck	$\phi$ 315 mm (Type: K11 315C/D11)
	$\phi$ 380 mm (Type: K11 380/D11)
4-jaw chuck	$\phi$ 400 mm (Type: K72 400/D11)
	$\phi$ 500 mm (Type: K72 500/D11)
	$\phi$ 630 mm (Type: K72 630/D11)
	$\phi$ 800 mm (Type: K72 800/D11)
Face plate	$\phi$ 1120 mm (for CW62110B and CW62110C)
Steady rest	$\phi$ 40 mm~ $\phi$ 460 mm
Follower rest	$\phi$ 30 mm~ $\phi$ 180 mm
Taper attachment	
Max. turning length of taper attachment	500 mm
Max. turning taper of taper attachment	Inner cone 10°
	Outer cone 15°

#### 4.3.3 Accessories for the Machines of CW100Q Series

3-jaw chuck	$\phi$ 315 mm (Type: K11 315C/D11)
	$\phi$ 380 mm (Type: K11 380/D11)
4-jaw chuck	$\phi$ 400 mm (Type: K72 400/D11)
	$\phi$ 500 mm (Type: K72 500/D11)
	$\phi$ 630 mm (Type: K72 630/D11)
	$\phi$ 800 mm (Type: K72 800/D11)
Face plate	$\phi$ 1000 mm (for CW62100Q)

Steady rest	$\phi$ 40 mm~ $\phi$ 480 mm
Follower rest	$\phi$ 50 mm~ $\phi$ 220 mm
Max. turning length of taper attachment	500 mm
Max. turning taper of taper attachment	Inner cone 10°
	Outer cone 15°

## 5 HYDRAULIC SYSTEM

The hydraulic system of this machine is used for controlling forward, reverse and braking of the spindle. It's also used to lubricate the headstock and feed box. It consists of the following elements:

### 5.1 Gear Pump

Type:	CB-B6 reverse rotation pump
Pressure:	2.5 Mpa
Delivery capacity:	6 ml/r
Speed:	1450 r/min

### 5.2 Rotary Valve for Special-purpose:

350Y-8B (used for machine with center distances of less than 3000.)

It's controlled by the lever in the front of the bed, which controls separately forward rotation, reverse rotation and braking of the spindle. The valve is provided with a pressure valve and a pressure meter switch. Readings is read out from the pressure meter.

Overflow oil from the pressure valve is used for lubricating the headstock and the feed box. Its pressure is regulated up to 1-1.5Mpa.

### 5.3 Solenoid Valve

Solenoid valve: SWH-G02-C4-D24-20 (Northman of Taiwan)

SWH-G02-B2S-D24-20 (Northman of Taiwan) or D5-02-3C4-D2 (Janus of Taiwan), D5-02-2B2 converse-D2 (Janus of Taiwan), which are available for the machine with distance between the two centers of 4000-5000 and the machine with distance between the two centers of 400-5000 and provided with foot-pedal brake. The voltage of the solenoid valve is DC24V.

Forward: YV2 electromagnet for SWH-G02-C4-D24-20 (Northman of Taiwan) or D5-02-3C4-D2 (Janus of Taiwan) is energized.

Reverse: YV3 electromagnet for SWH-G02-C4-D24-20 (Northman of Taiwan) or D5-02-3C4-D2 (Janus of Taiwan) is energized.

Braking: YV1 electromagnet for SWH-G02-B25-D24-20 D5-02-2B2 converse-D2 (Janus of Taiwan) is energized.

Pressure valve Y-10B is regulated up to 1-1.5Mpa, overflow oil is used for lubricating the headstock and the feed box.

#### **5.4 Oil Filter**

It consists of a special oil filter and net oil fitter WU-63×100-J.

#### **5.5 Oil Reservoir**

It contains about 35L hydraulic oil of HL32 and lies inside the bed leg. The first cleaning and changing oil should be carried out in one month after using.

CB-B6 gear pump is only allowed reverse rotation, viewing from end of spindle.

While the spindle is running, and it is necessary to change direction or change steps for the spindle, it is necessary to make the spindle retard to lower than 500r/min, to avoid damage to the machine or the influence to the service life.

#### **5.6 Hydraulic Principle Diagram**

For Hydraulic Principle Diagram of the machine of 1.5 m-3m, please refer to Fig. 12. For Hydraulic Principle Diagram of the machine of 4m and more than 4m, please refer to Fig. 13.

5.6.1 Hydraulic Principle Diagram of the Machine of 1.5 m-3m

Refer to Fig. 14, please.

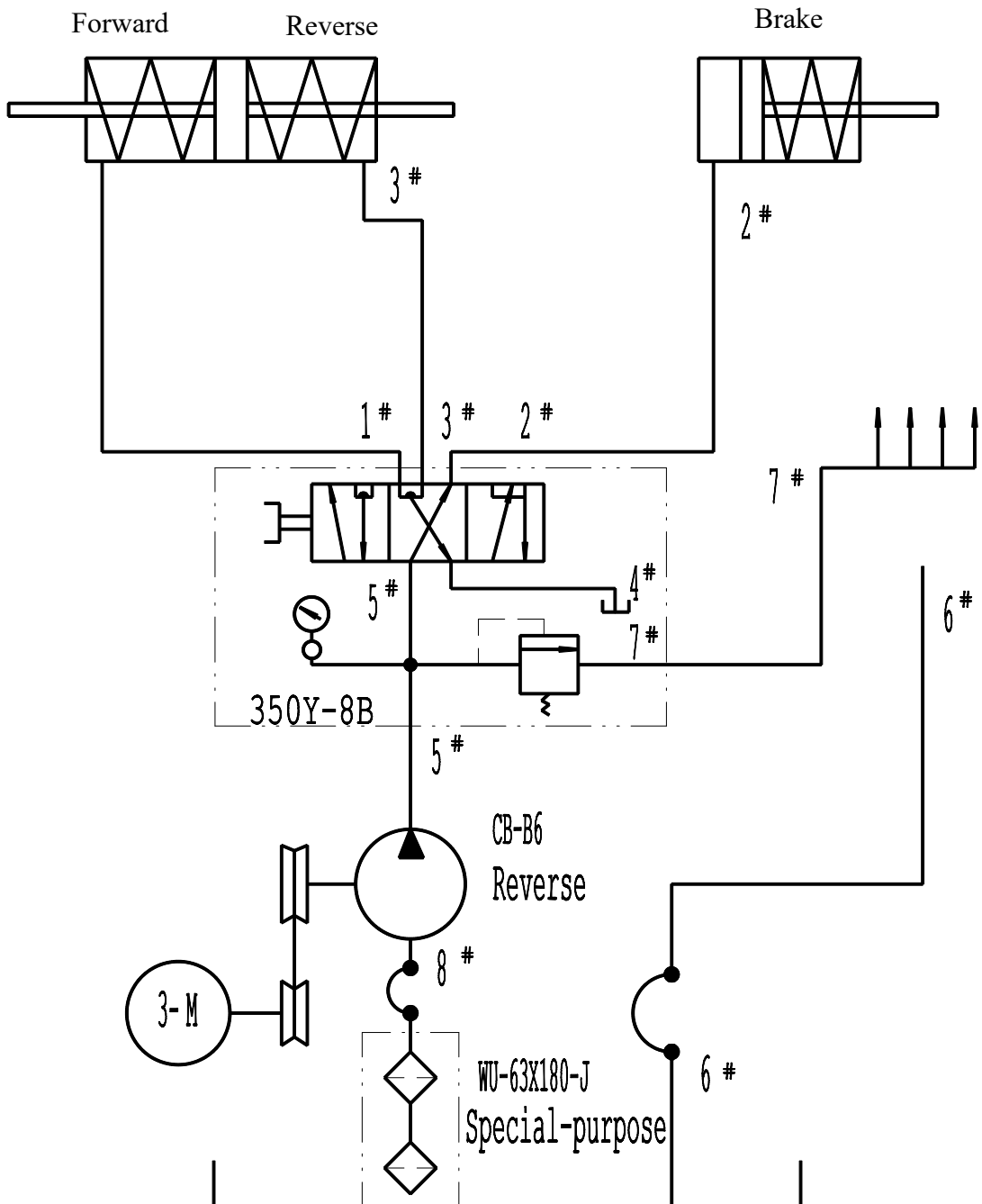


Fig.14 Hydraulic principle diagram for the machine of 1.5-3m

5.6.2 Hydraulic Principle Diagram of the Machine of 4m and More than 4m

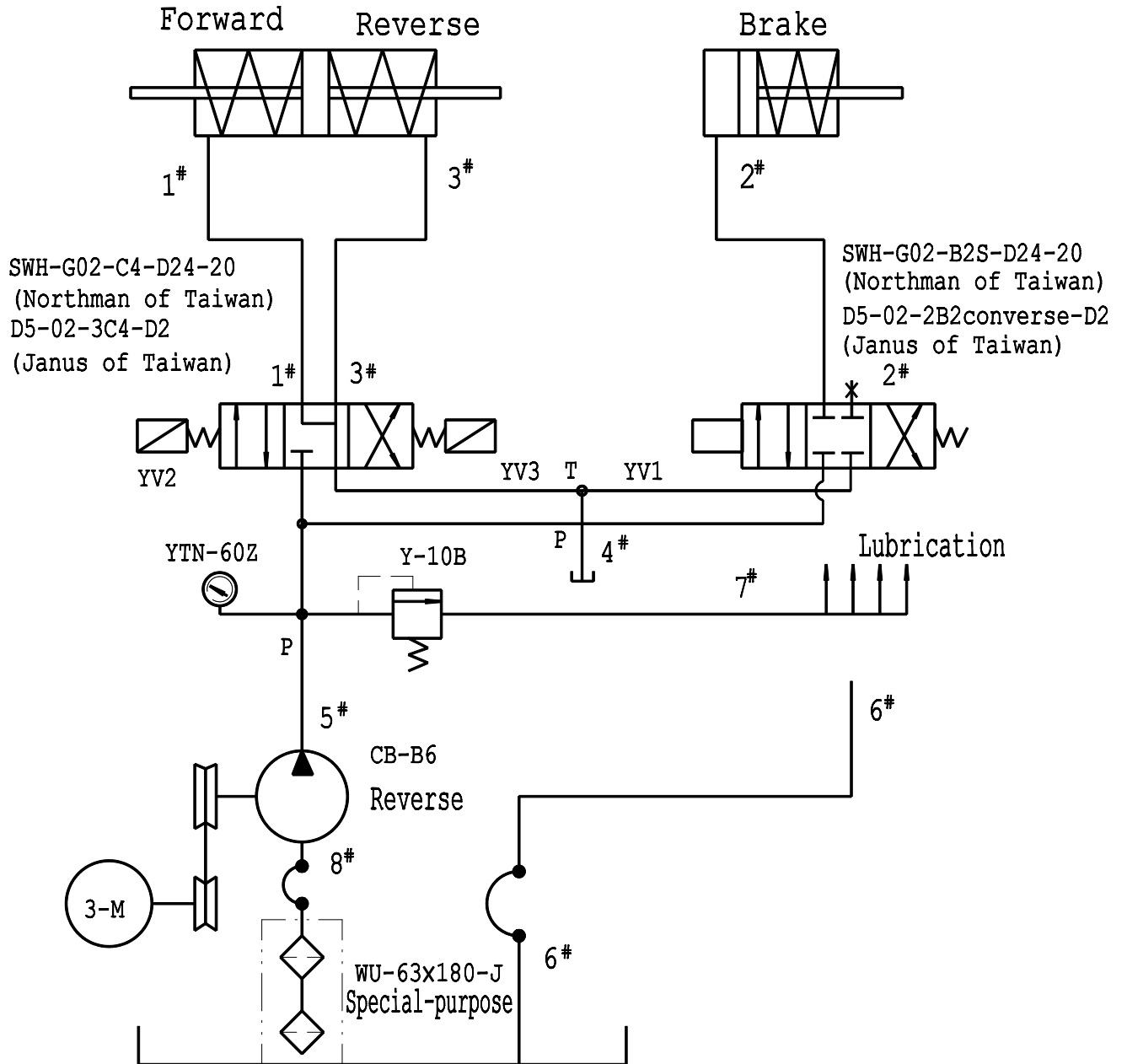


Fig. 15 Hydraulic principle diagram for the machine of 4m or more than 4m



## 6 DRIVING SYSTEM AND ARRANGEMENT OF BEARING SIZES

### 6.1 Driving System Diagram for CW80B, CW110B and CW100Q

Refer to Fig. 16, please.

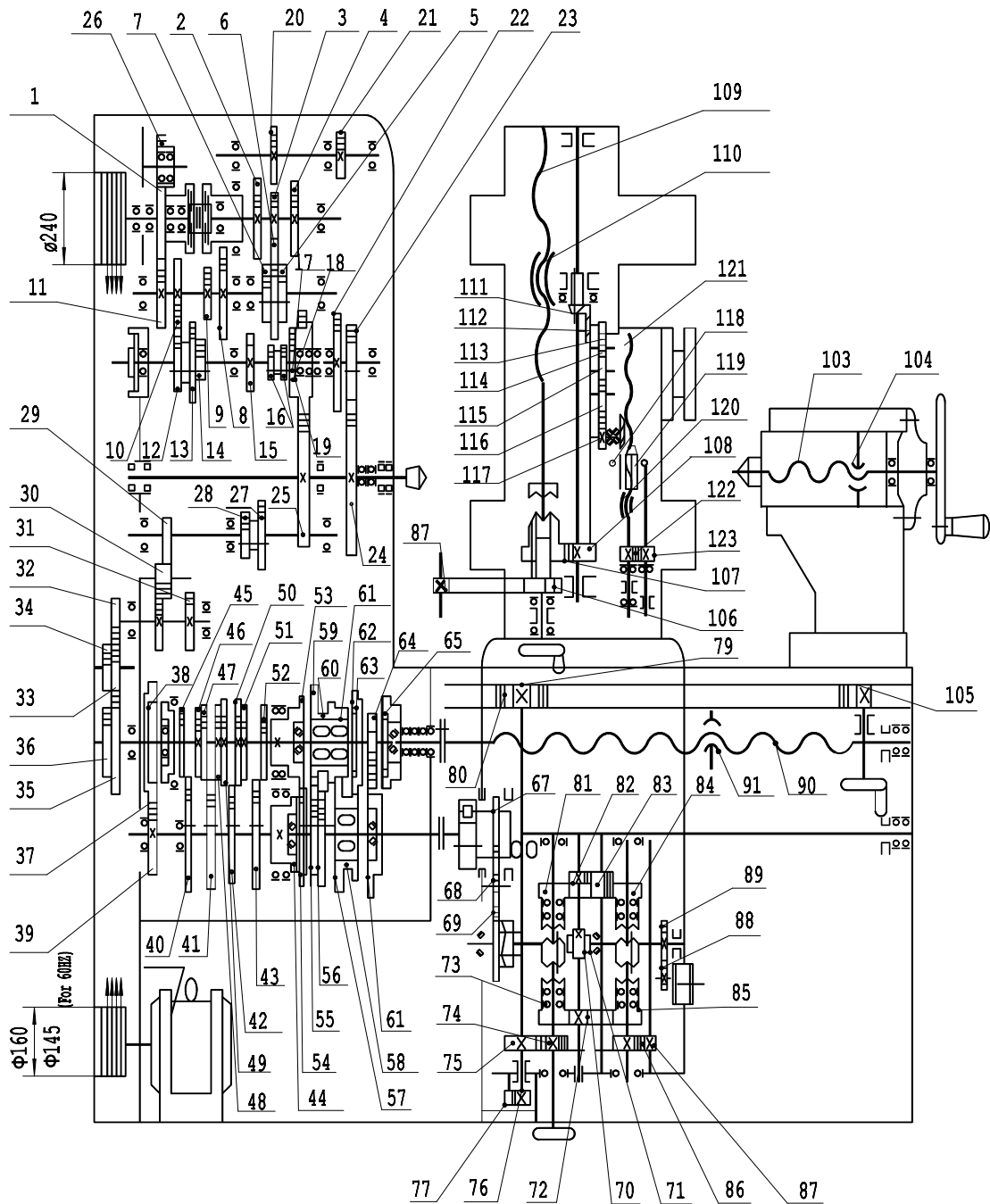


Fig. 16 Driving system diagram for CW80B series, CW110B series and CW100Q series

**6.2 List of Gears, Wormwheels, Leadscrews and Nuts for CW80B, CW110B and CW100Q**

Table 6

Components	Headstock ※※								
No. in Fig.	1	2	3	4	5	6	7	8	9
No. of Teeth/Threads	46	46	33	39	57	64	50	53	18
Module/Pitch mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	2.5
Correction Coefficient and Helix Angle						$\xi = -0.47$			$\xi = 0.7$
No. in Fig.	10	11	12	13	14	15	16		17
No. of Teeth/Threads	34	49	58	72	38	44	20	28	28
Module/Pitch mm	3	2.5	3	3	3	3	3.5	2.5	2.5
Correction Coefficient and Helix Angle	$\xi = 0.3$	$\xi = 0.3$	$\xi = -0.3$	$\xi = 0.38$	$\xi = 0.5$		$\xi = 0.7$		
No. in Fig.	18	19	20	21	22	23	24	25	26
No. of Teeth/Threads	40	44	50	18	45	20	80	75	32
Module/Pitch mm	3	4	3.5	4	4	4.5	4.5	4	2.5
Correction Coefficient and Helix Angle			$\xi = 0.4$			$\xi = 0.57$ Right 6°	$\xi = 0.35$ Left 6°		$\xi = 0.33$
No. in Fig.	27	28	29	30	31				
No. of Teeth/Threads	48	44	32	24	35				
Module/Pitch mm	3	3	2.5	2.5	2.5				
Correction Coefficient and Helix Angle		※※	※※	※※	※※				
Components	Change gear box ※※								
No. in Fig.	32	33	34	35	36				
No. of Teeth/Threads	42	70	57	42	66				
Module/Pitch mm	2.25	2.25	2.25	2.25	2.25				
Correction Coefficient and Helix Angle	※※	※※	※※	※※	※※				

CW80/110/100Q SERIES DRIVING SYSTEM AND ARRANGEMENT OF BEARING SIZES

Components	Feed box								
No. in Fig.	37	38	39	40	41	42	43	44	45
No. of Teeth/Threads	40	36	27	24	36	36	48	32	28
Module/Pitch mm	2.5	2	2.5	3	2.25	2.5	2	2	3
Correction Coefficient and Helix Angle			$\xi = 0.1$	1.17	$\xi = 0.2$	-0.3	$\xi = 1$		$\xi = 1.3$
Components	Feed box								
No. in Fig.	46	47	48	49	50	51	52	53	54
No. of Teeth/Threads	30	39	36	30	33	36	32	40	42
Module/Pitch mm	3	2.25	2.25	2.5	2.5	2	2	2	2
Correction Coefficient and Helix Angle	$\xi = 0$	$\xi = 0.36$	$\xi = 1.3$	0.94	$\xi = 0.5$	$\xi = -1$	$\xi = 1.33$		$\xi = 1.08$
No. in Fig.	55	56	57	58	59	60	61	62	63
No. of Teeth/Threads	28	42	56	28	56	42	28	38	56
Module/Pitch mm	2	2	2	2	2	2	2	2	2
Correction Coefficient and Helix Angle	$\xi = 0.3$		$\xi = -0.3$	$\xi = 0.3$	$\xi = -0.3$		$\xi = 0.3$	$\xi = 0.3$	$\xi = -0.3$
No. in Fig.	64	65	66						
No. of Teeth/Threads	27	27	57						
Module/Pitch mm	2	2	2						
Correction Coefficient and Helix Angle	$\xi = 0.3$	$\xi = 0.3$	$\xi = -0.3$						
Components	Apron								
No. in Fig.	67	68	69	70	71	72	73	74	75
No. of Teeth/Threads	25	22	30	3	30	36	34	15	62
Module/Pitch mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Correction Coefficient and Helix Angle				Right $8^{\circ} 32'$	Right $8^{\circ} 32'$			$\xi = 0.7$	$\xi = 0.045$
No. in Fig.	76	77	78	79	80	81	82	83	84
No. of Teeth/Threads	20	49		13	Rack	34	36	35	30

CW80/110/100Q SERIES DRIVING SYSTEM AND ARRANGEMENT OF BEARING SIZES

Module/Pitch mm	1.5	1.5		3	3	2.5	2.5	2.5	2.5
Correction Coefficient and Helix Angle				$\xi = 0.5$					
No. in Fig.	85	86	87	88	89	90	91		
No. of Teeth/Threads	30	42	60	20	22	1	1		
Module/Pitch mm	2.5	2.5	2.5	2	2	12	12		
Correction Coefficient and Helix Angle									
Components	Tailstock								
No. in Fig.			103	104	105				
No. of Teeth/Threads			1	1	12				
Module/Pitch mm			6	6	3				
Correction Coefficient and Helix Angle					0.294				
Special transmitting parts for CW6180B									
Components	Carriage								
No. in Fig.	106	107	108	109	110	111	112	113	114
No. of Teeth/Threads	16	24	18	1	1	26	26	21	35
Module/Pitch mm	2.5	2.5	2.5	5	5	2.5	2.5	2.5	2.5
Correction Coefficient and Helix Angle				Left	Left				
No. in Fig.	115	116	117	118	119	120	121	122	123
No. of Teeth/Threads	35	20	56	28	28	1	1	30	30
Module/Pitch mm	2.5	2.5	2.5	2.5	2.5	5	5	2	2
Correction Coefficient and Helix Angle						Left	Left		

Note: The items with symbol “※※” are special transmitting parts available for CW6180B, and the others are common parts of CW6163B.

### 6.3 Arrangement of Bearings of CW80B, CW110B and CW100Q

Refer to Fig. 17, please.

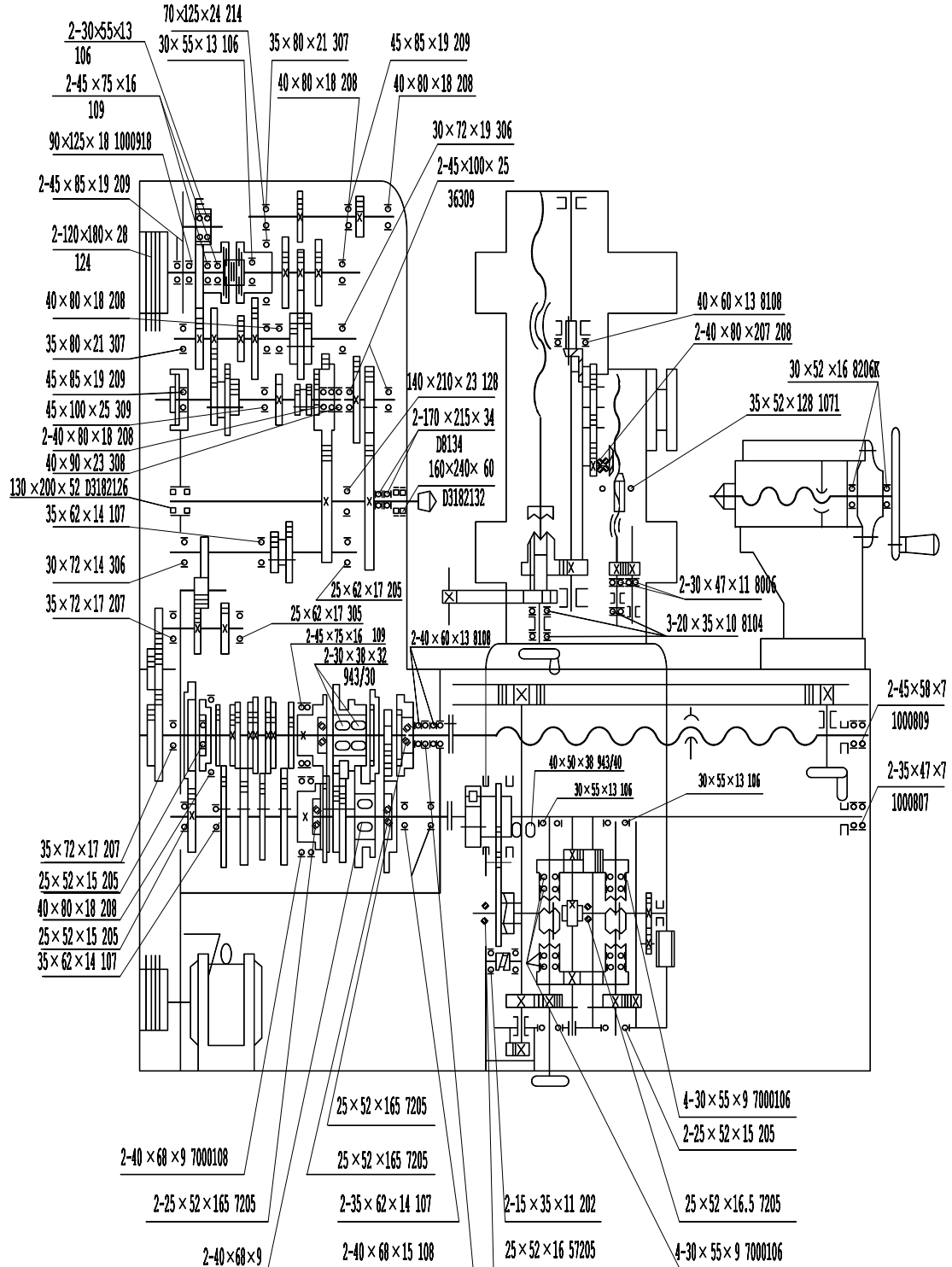


Fig. 17 Arrangement of rolling bearings for CW80B, CW110B and CW100Q

### 6.4 Driving System Diagram for CW80C, CW110C

Refer to Fig. 18, please.

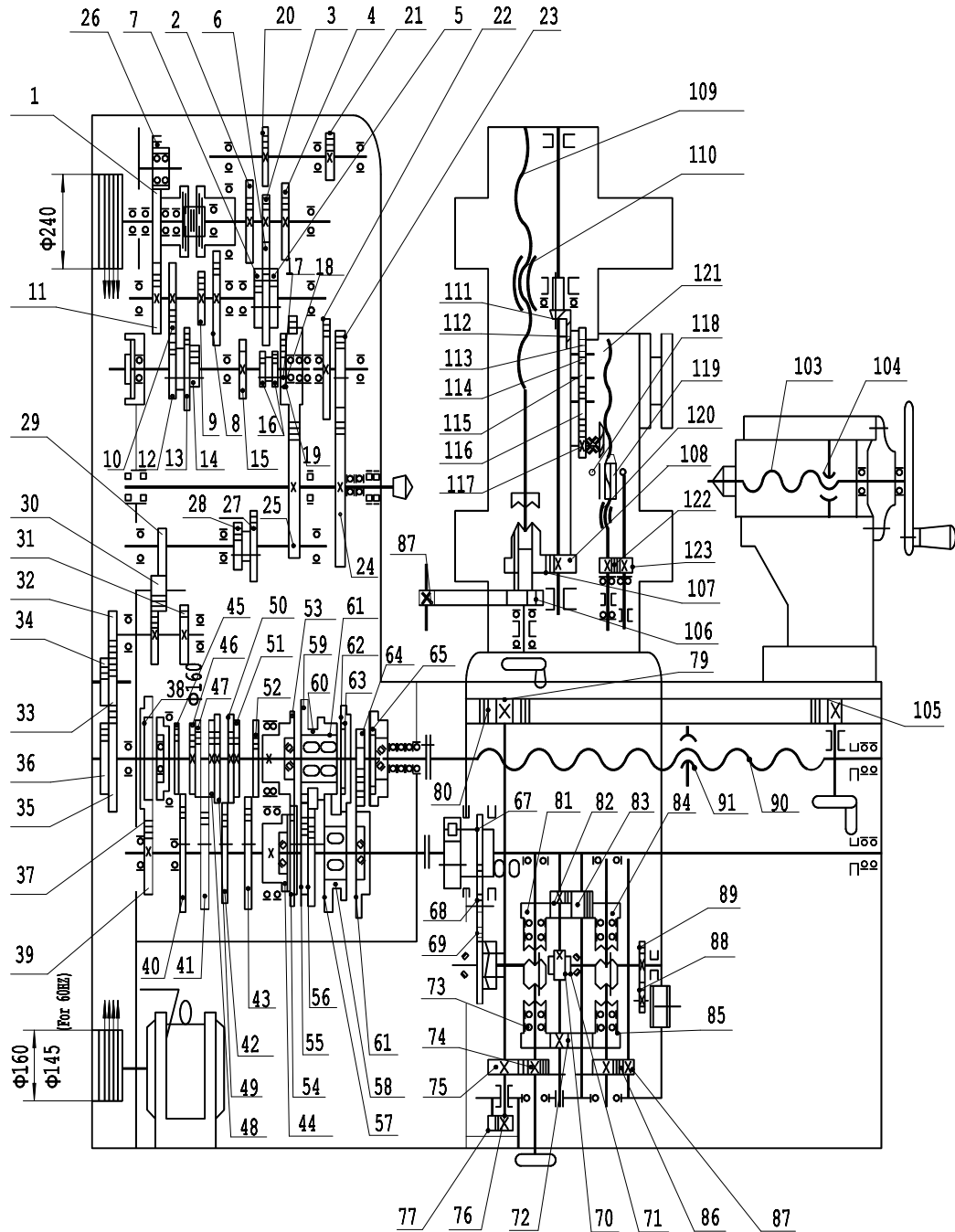


Fig. 18 Driving System Diagram for CW80C, CW110C

6.5 List of Gears, Wormwheels, Leadscrews and Nuts for CW80C and CW110C

Table 7

Components	Headstock					※※	☆		
	1	2	3	4	5	6	7	8	9
No. in Fig.	1	2	3	4	5	6	7	8	9
No. of Teeth/Threads	46	46	33	39	57	64	50	53	18
Module/Pitch mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Correction Coefficient and Helix Angle						$\xi = -0.47$			$\xi = 0.7$
No. in Fig.	10	11	12	13	14	15	16		17
No. of Teeth/Threads	34	49	58	72	38	44	20	28	34
Module/Pitch mm	3	2.5	3	3	3	3	3.5	2.5	3
Correction Coefficient and Helix Angle	$\xi = 0.3$	$\xi = 0.3$	$\xi = -0.3$	$\xi = 0.38$	$\xi = 0.5$		$\xi = 0.7$		
No. in Fig.	18	19	20	21	22	23	24	25	26
No. of Teeth/Threads	40	44	50	18	45	20	80	75	32
Module/Pitch mm	3	4	3.5	4	4	4.5	4.5	4	2.5
Correction Coefficient and Helix Angle			$\xi = 0.4$		$\xi = 0.57$ Right 6 °	$\xi = 0.315$ Left 6 °			$\xi = 0.33$
No. in Fig.	27	28	29	30	31				
No. of Teeth/Threads	48	44	32	24	50				
Module/Pitch mm	3	3	2.5	2.5	2.5				
Correction Coefficient and Helix Angle		※※	※※	※※	※※		☆	☆	
Components	Change gear box					※※			
No. in Fig.	32	33	34	35	36				
No. of Teeth/Threads	42	70	57	42	66				
Module/Pitch mm	2.25	2.25	2.25	2.25	2.25				
Correction Coefficient and Helix Angle	※※	※※	※※	※※	※※				

Table 7 continued

Components	Feed box								
No. in Fig.	37	38	39	40	41	42	43	44	45
No. of Teeth/Threads	40	36	27	24	36	36	48	32	28
Module/Pitch mm	2.5	2	2.5	3	2.25	2.5	2	2	3
Correction Coefficient and Helix Angle			$\xi = 0.1$	1.17	$\xi = 0.2$	-0.3	$\xi = 1$		$\xi = 1.3$
Components	Feed box								
No. in Fig.	46	47	48	49	50	51	52	53	54
No. of Teeth/Threads	30	39	36	30	33	36	32	40	42
Module/Pitch mm	3	2.26	2.25	2.5	2.5	2	2	2	2
Correction Coefficient and Helix Angle	$\xi = 0$	$\xi = 0.36$	$\xi = 1.3$	0.94	$\xi = 0.5$	$\xi = -1$	$\xi = 1.33$		$\xi = 1.08$
No. in Fig.	55	56	57	58	59	60	61	62	63
No. of Teeth/Threads	28	42	56	28	56	42	28	28	56
Module/Pitch mm	2	2	2	2	2	2	2	2	2
Correction Coefficient and Helix Angle	$\xi = 0.3$		$\xi = -0.3$	$\xi = 0.3$	$\xi = -0.3$		$\xi = 0.3$	$\xi = 0.3$	$\xi = -0.3$
No. in Fig.	64	65	66						
No. of Teeth/Threads	27	27	57						
Module/Pitch mm	2	2	2						
Correction Coefficient and Helix Angle	$\xi = 0.3$	$\xi = 0.3$	$\xi = -0.3$						
Components	Apron								
No. in Fig.	67	68	69	70	71	72	73	74	75
No. of Teeth/Threads	25	22	30	3	30	36	34	15	62
Module/Pitch mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Correction Coefficient and Helix Angle				Right $8^{\circ} 32'$	Right $8^{\circ} 32'$			$\xi = 0.7$	$\xi = 0.045$
No. in Fig.	76	77	78	79	80	81	82	83	84
No. of Teeth/Threads	20	49		13	Rack	34	36	35	30



Table 7 continued

Module/Pitch mm	1.5	1.5		3	3	2.5	2.5	2.5	2.5
Correction Coefficient and Helix Angle				$\xi = 0.5$					
No. in Fig.	85	86	87	88	89	90	91		
No. of Teeth/Threads	30	42	60	20	22	1	1		
Module/Pitch mm	2.5	2.5	2.5	2	2	12	12		
Correction Coefficient and Helix Angle									
Components	Tailstock								
No. in Fig.			103	104	105				
No. of Teeth/Threads			1	1	12				
Module/Pitch mm			6	6	3				
Correction Coefficient and Helix Angle					$\xi = 0.294$				

Note: The items with symbol ☆ in the table are special transmitting parts available for CW6180B, and the others are common to the parts of CW6163B.

### 6.6 Arrangement of Bearings of CW80C and CW110C

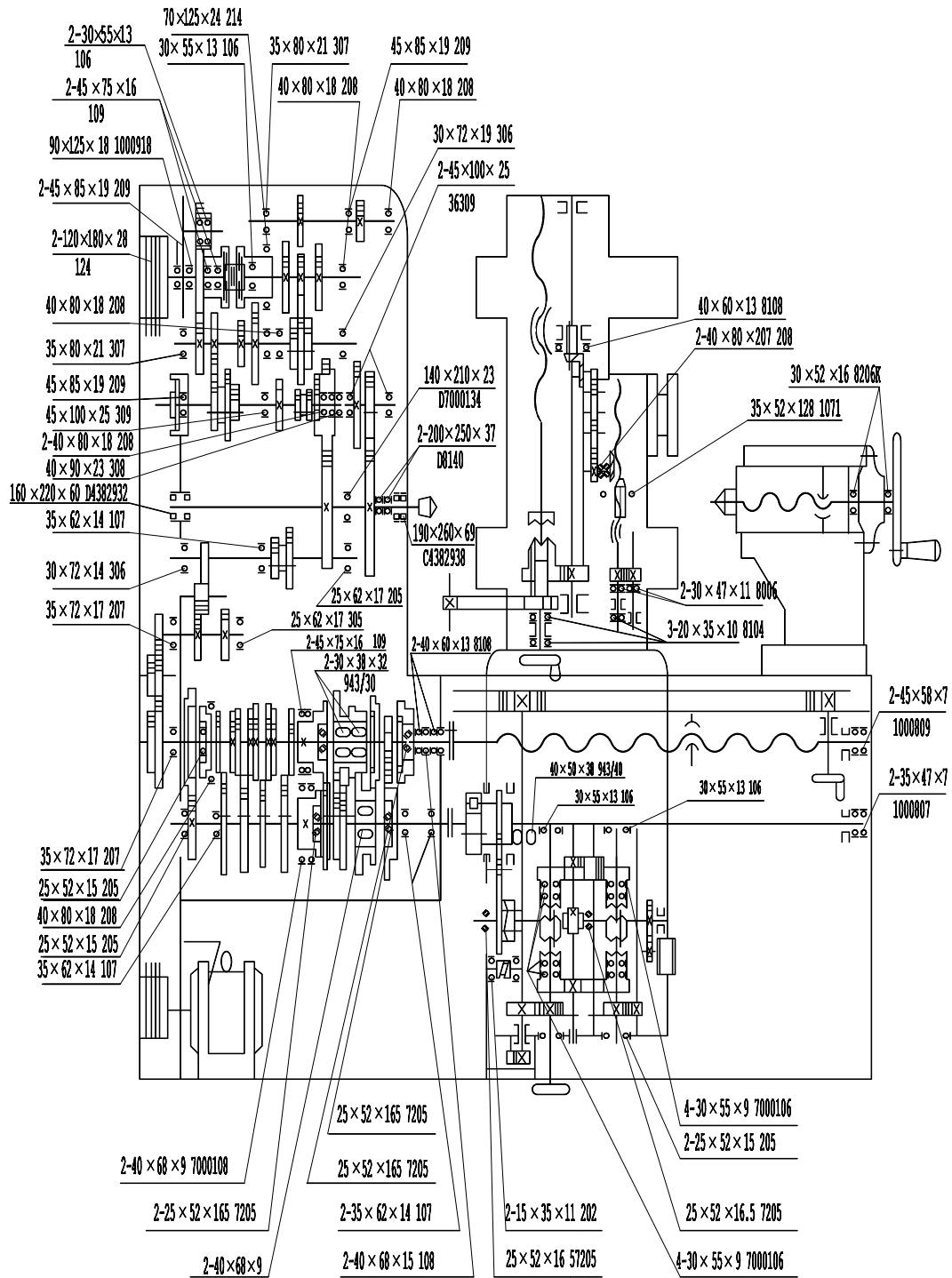
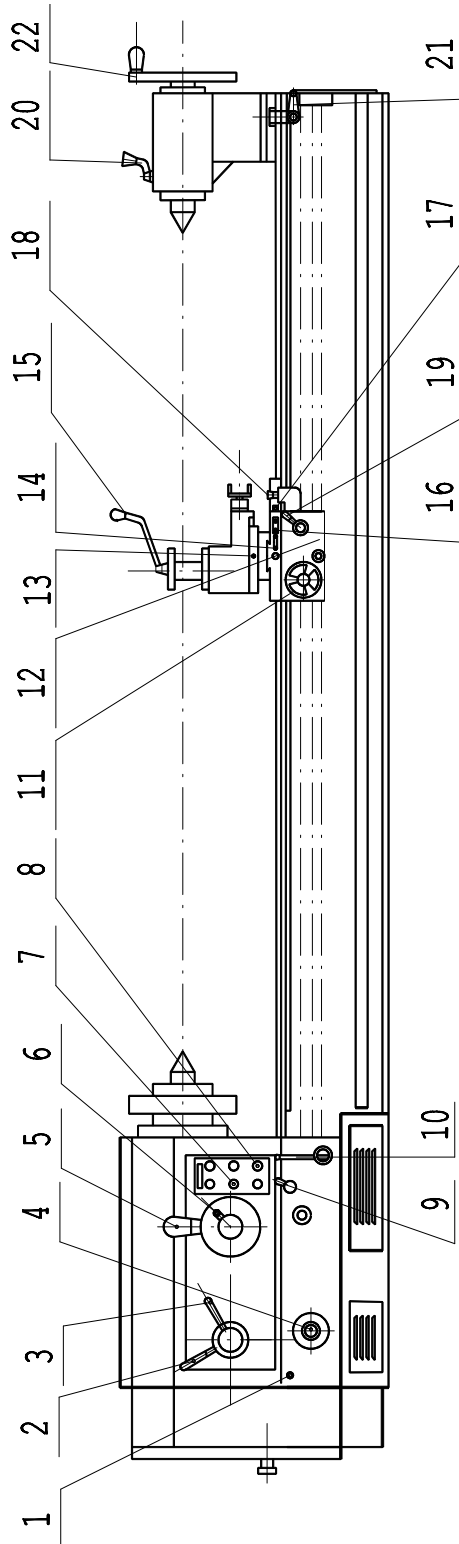


Fig. 19 Arrangement of Roller Bearings of CW80C and CW110C

## 7 CONTROL SYSTEM OF THE MACHINE

### 7.1 Arrangement Diagram of Control Levers for the Machine of Center Distance of 1.5m and 3m

Refer to Fig. 20, please.



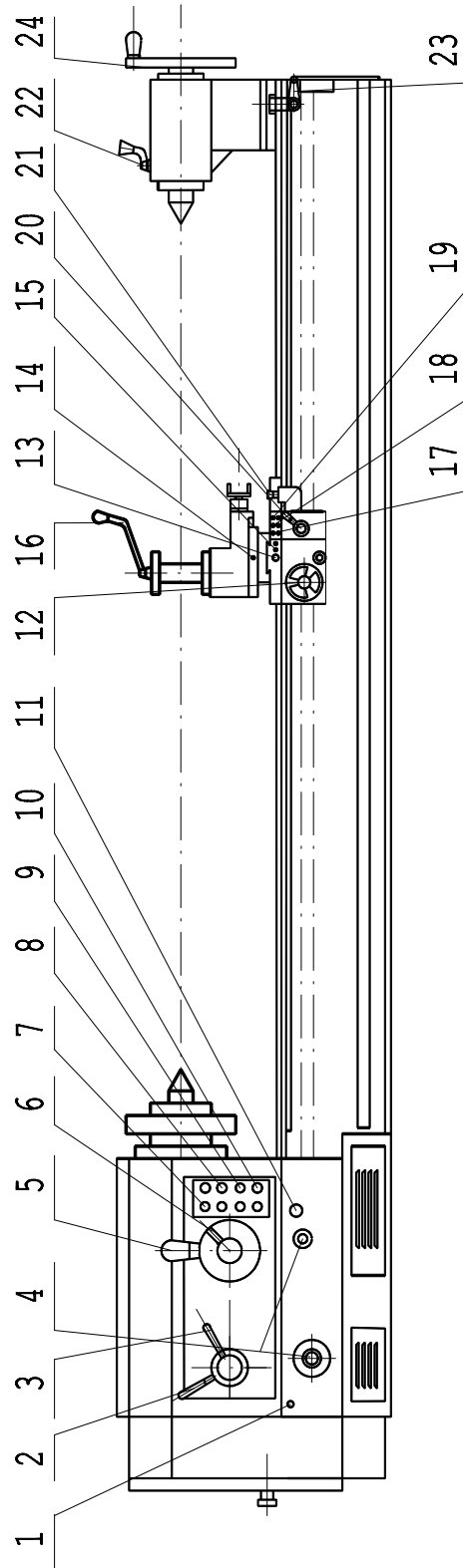
*Note: Changing speed and sudden reverse are not allowed while the machine is running at high speed.*

1	Lever for metric and inch thread changing
2	Lever for left/right thread changing
3	Lever for coarse the pitch
4	Handwheel for adjusting pitch or feed rate
5	Changing lever for rapid/slow speed of spindle
6	Lever for changing spindle speed
7	Button for main motor
8	Button for cooling pump
9	Changing lever for leadscrew and feed rod
10	Lever for spindle controlling
11	Handwheel for longitudinal movement of carriage
12	Handwheel for cross slide movement
13	Changing lever for manual and power feed of compound slide
14	Changing lever for power feed of compound slide and cross slide
15	Handle for indexing and fixing square tool post
16	Button of main motor
17	Lever for spindle controlling
18	Lever for longitudinal/cross feed and four-way rapid movement controlling
19	Lever for controlling split nut
20	Lever for clamping tailstock sleeve
21	Lever for tailstock movement
22	Lever for tailstock sleeve movement

Fig. 20 Arrangement Diagram of Control Levers for the Machine of Center Distance of 1.5m and 3m

**7.2 Arrangement Diagram of Control Levers for the Machine of Center Distance of 4m and More than 4m**

Refer to Fig. 21, please.



Note: Changing speed and sudden reverse are not available while the machine is running at high speed.

1	Lever for metric or inch thread changing
2	Lever for left/right thread changing
3	Lever for coarse the pitch
4	Handwheel for adjusting pitch or feed rate
5	Changing lever for rapid/slow speed of spindle
6	Lever for changing spindle speed
7	Button for main motor
8	Button for cooling motor
9	Changing button for spindle start/stop
10	Button for jogging spindle forward
11	Changing lever for leadscrew and feed rod
12	Handwheel for longitudinal movement of carriage
13	Handwheel for cross slide movement
14	Changing lever for manual and power feed of compound slide
15	Handle for changing power feed of compound slide rest and cross slide
16	Lever for indexing and fixing square tool post
17	Changing button for spindle start/stop
18	Button for main motor
19	Button for jogging spindle forward
20	Lever for controlling split nut
21	Joystick lever with a button for longitudinal, cross feed and rapid movement controlling
22	Lever for clamping tailstock sleeve
23	Lever for tailstock movement
24	Lever for tailstock sleeve movement

Fig. 21 Arrangement Diagram of Control Levers for the Machine of Center Distance of 4m and More than 4m

### 7.3 Definition of Operating Directions of Handles and Handwheel of the Machine

The relationship between the operating directions of the handwheel for moving the carriage in longitudinal direction, the handwheel for moving the cross slide in cross direction and the handle for moving the compound rest and corresponding movement of the carriage, the cross slide and the compound rest of the machine is in accordance with the standard GB/T17161-1997 (eqv.ISO447;1984) 《Operating Direction of Control Devices of the Machine》. When the handwheel is clockwise rotated (viewing from operator's facing to the shaft end used for installation of the handwheel), the controlled carriage makes straight movement toward right (see Fig. 22), the cross slide and the compound rest make straight movement far from operator (see Fig. 23)

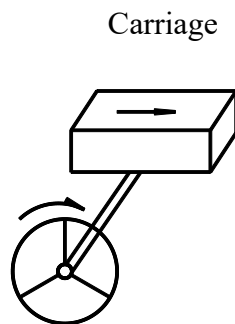


Fig. 22 Handwheel and moving directions of the carriage

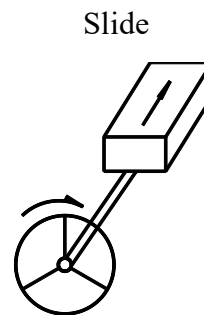


Fig. 23 Handwheels and moving directions of slides

For relationship between the operating directions of the handle for forward and reverse of spindle of the machine and running direction of the spindle, see Fig. 24. The handle is lifted up, the spindle makes counter-clockwise rotating movement

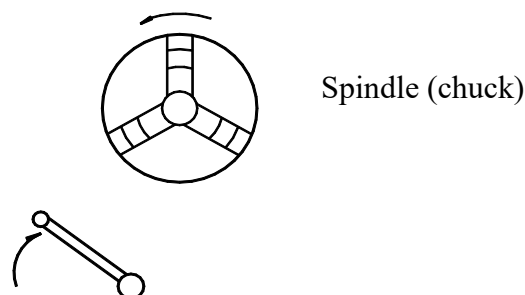


Fig. 24 Relation between operating handle for spindle forward and reverse and rotating direction of spindle (for 3m and less than 3m, viewing in front of the chuck)

## 7.4 Operating Procedures of the Machine

### 7.4.1 Preparing Procedures

- Turn right the rotary switch of general power supply to the position ON. Switch on the switch for illuminating light.
- Open the chuck cover before loading workpiece.
- Load the workpiece and clamp it firmly in chuck in a way in accordance with requirements of workpiece to be clamped.
- Select the tool, the material and parameters of which can be in accordance with requirements of the material of workpiece to be turned.
- Close the chuck cover and the protection cover of tool post before starting the machine.
- Using the handle and the speed tablet on headstock can select spindle speed. During changing speed, rotate the spindle by hand to solve it if the gears' standing up occurs.
- Shifting the handles on the changing box according to the Table of Threads and Feed can obtain proper feed.
- Using the automatically feed handle and the rapid traveling button for longitudinal/traverse feed of the slide makes it move to the position near the workpiece.

#### NOTE

**Owing to that height of operator may be different, the foot pedal should be disposed at operator's operating position of the machine for convenient operation, also to avoid that water or oil makes floor slipping with resulting in danger of slipping up of operator. In general case, it is suitable that height of the foot pedal is of 100-150 mm.**

### 7.4.2 Requirements of Loading and Clamping Workpiece

Different loading and clamping methods should be used owing to that shape, size and quality of workpiece to be machined are different.

- 3-jaw chuck is available to load/unload regular workpieces that belong to small and middle type size of large batch production. When you want to turn shaft workpiece, especially, more heavy workpiece, you should use the method that one end of the workpiece is chucked and the other end of it tightened up with the tailstock.
- Workpiece with un-regular shape of larger size should be chucked in 4-jaw chuck or faceplate, and it is necessary to balance the workpiece, such as eccentric bush and crank shaft.



- Longer workpiece or workpiece which is completed for turning through many time leadings should be clamped between two centers, for example, turning long shaft and long leadscrew or workpiece which needs processes and milling and grinding after turning.
- Thin and longer shaft workpiece ( $L/d \geq 25$ ) should be turned in case of follow rest or steady rest used to increase rigidity of the workpiece.

#### **WARN**

- Workpiece to be turned and turning tool to be used must be firmly clamped to prevent it from throwing out to avoid personal injury.
- When positive jaws of 3-jaw chuck will be intended to clamp workpiece, the diameter of it should not be too large. In general case, the jaw's extending length out from the chuck circle should not exceed 1/3 of the jaw length, otherwise, the chuck's plane thread plate is easy to be broken off when the jaws are stressed. Workpiece with larger diameter should use counter-jaws to chuck it as far as possible.
- If long stick is installed to be turned, it shall not be extended exceeding the edge of the pulley cover.
- If a loaded workpiece with special shape possesses displaced bar center, it may be under unbalancing status when rotating. In this case, you first consider selecting balancing weight method to make it balancing. If difficult, you should take the measures like reducing speed, etc. to be sure safety.

#### **7.4.3 Requirements from the Machine for Tool**

Tool size: Tool size should suit the installation of tool post of the machine. turning tools to be used on the tool post should be 30 mm × 30 mm. And the tool tip of turning tool installed must be equal height with spindle center line.

Tool material: Tool material should suit the material of workpiece to be turned. In general case, for example, tungsten-cobalt alloy (YG) tool is available for turning fragile material such as cast iron and some non-ferrous metal. Tungsten-titanium-cobalt alloy (YT) for turning plastic material such as steel workpiece and high speed steel tool is often used to turn workpiece with irregular shape and possessing larger impact performance, also often used as finishing larger impact performance, also often used as finishing turning tool, such larger feed turning tool with wide edge, finishing thread tool, forming turning tool, etc.

Geometric parameter of tool should suit the turning requirements.

#### **7.4.4 Manual Feed**

- Press the start buttons for main motor and shift the lever for changing forward/reverse of spindle to the forward, with the spindle starting.

- Shift the joystick lever for longitudinal or cross feed of slide to the neutral position in the cross-way groove manual controlling handwheel for longitudinal travel of carriage and the handwheel for traversing of cross slide and then, turning the handwheel right and left and the handwheel forwards and backwards, thus, longitudinal/traverse feed of slide can be realized.
- Manually control the handwheel for controlling the movement of the compound rest slide, and according to the different angle shifted, obtaining longitudinal/transverse/diagonal feed is possible.
- After the tailstock is manually moved to the position where the workpiece can be turned, lock it on the bed by the quick clamping lever of tailstock, then manual controlling the handwheel for traveling of tailstock quill can manually perform drilling, augmenting (board) hole, reaming, tapping threads, etc.

#### 7.4.5 Automatic Feed

- Press the start button for main motor, then, shift the changing forward/reverse levers for spindle to forward, with spindle running.
- Manual controlling the handwheel for longitudinal travel of carriage and the handle for traveling of cross slide can modify the distance between the tool and the workpiece to select suitable feed depth.
- The joystick lever is shifted to the neutral position in cross way groove, the feed stop feeding.
- If rapid moving of the carriage is needed during the controlling, you should press on the button set on the top of the joystick, when releasing it, rapid moving stops.

#### NOTE

**If the rapid button is out of order, it is necessary immediately to shift the lever for automatic feed of the carriage in longitudinal/traverse direction to the neutral position and then press the emergency stop button and turn the rotary switch to the position OFF to switch off the general power supply.**

#### 7.4.6 Threads Cutting

There are two kinds of methods for cutting threads.

##### 7.4.6.1 No Opening the Split Nut

Shift the control lever for split nut to the position engaging with leadscrew, to cutting threads with forward/reverse of spindle. In general case, this method is used to cut the pitch of threads cut which cannot be exactly divided by the pitch of leadscrew.

##### 7.4.6.2 Opening Split Nut

After shifting the control lever for split nut to the position engaging with leadscrew to

cut threads, cut threads with forward of spindle. When completion for cutting threads, shift the lever to make the split nut unengaged with the leadscrew, then return the carriage to original cutting position, after feeding, make the split nut engaging with the leadscrew again to cut threads. In general, this method is used to cut threads pitch of which can be exactly divided by the pitch of leadscrew of the machine.

- Shift the lever on the headstock to select L&R threads or coarse pitch threads, and then, select suitable spindle speed by the levers.
- Select suitable metric, Inch system, Modular and diametric threads by means of different changing gears according to the Table of Threads and Feeds on the gear box by shifting the lever for pitch or feed and the lever to connecting feed rod.
- Move the carriage to the position of threads to be cut by the lever for longitudinal, cross feed and rapid movement, then, shift the lever to the neutral position in the cross-way groove.
- Press the start button for main motor, then, shift the lever for changing forward/reverse of spindle to the forward position, with the spindle running.
- Modify the distance between the tool and the workpiece through manual controlling the handwheel for longitudinal movement of carriage and the handwheel for bottom slide, then make the tool move for a certain distance in longitudinal direction to select suitable feed depth.
- After the lever for split nut is shifted to the position engaging with the leadscrew, turning can be carried out in any way given by “7.4.6.1 and 7.4.6.2”.

#### NOTE

**When the machine with hand-braking is used to cut threads, the control lever is not allowed to be shifted directly from forward to reverse, it is necessary to shift it to the neutral braking position and make it stay for about two seconds, then, to the reverse position. This operating method is benefit for increasing service life of the machine.**

#### 7.4.7 Operation of Spindle Stop

During the machining procedure, if it is necessary to stop the running of the spindle while adjusting the machine, changing the parts or at the end of the work, the following procedures shall be carried out:

For the machine with hand-braking: the lever for forward/reverse of spindle is shifted to the stop position, the spindle stops running.

For the machine with foot-pedal braking: step the foot-pedal brake, the spindle stops running. If needing to restart the spindle, it is necessary to return the lever for forward/reverse of spindle to the stop position, re-shift it forward or reverse, the spindle can be re-started.

**NOTE**

**For the machine with foot-pedal braking, after stepping the foot-pedal brake, in order to work conveniently, return the lever for forward/reverse of spindle to the stop position.**

**7.4.8 Operation of Machine Stop**

- Move the carriage to the position near the end of tailstock by means of the lever for automatic longitudinal/traverse feed and transversely to the position close to the end of the lever.
- Shift the lever for forward/reverse of spindle to the neutral position.
- Press the stop button to stop the main motor.
- If coolant is used, switch off the switch for cooling pump.
- Switch off the switch for illuminating light.
- Turn the general switch to the position “OFF”.

**7.5 Re-start after Power-off and Emergency Stop of the Machine**

It is necessary to switch off the general power supply when suddenly power-off during working of the machine, then, shift the lever for spindle forward/reverse to the middle position. When power-on, turn the switch of the general power supply right to the position ON, following, push the start button of the main motor, then, shift the lever for spindle forward/reverse to forward position to start the spindle.

**7.6 Rescue in Emergency Status**

At first, push the red Emergency Stop button and cut off the power supply then take efficient emergency treatment measures to relieve sick or injured person if operator is involved in or wound by related rotating part of the machine, for example, manually turn the rotary part to make the involved article withdrawing.

**7.7 Cleaning of Chips**

Chip accumulated during the period of turning should be thoroughly cleaned out from the machine at the end of working for every shift.

When cleaning chips, it is necessary for you to use special hook or other proper outfits, and to wear protection gloves to avoid injury caused by chips.

## 8 SETTING UP OF THE MACHINE

According to the construction of feed system, the machine can be divided into two kinds: Metric Lathe and Inch Lathes.

### 8.1 Characteristic Table for Power Vs Torque of Spindle for CW80 Series

Table 8

Setting up of the Machine											
Spindle Speed (r/min)		Driving Efficiency	Working Ability of Spindle		Weakest part	Coarse pitch					
Forward	Reverse		Output Power (kW)	Max. Torque (N·m)							
720	732	0.80	10.4	153	Friction clutch	Without					
540				205							
405				274							
300	309			367							
225				490							
170				661							
125	131			0.75			9.75	882	Friction clutch	16 times	
95								1156			
72								1538			
54	55							1960			
40		2567									
30		3430									
22.5	23	0.75	7.5		4233	Friction clutch		16 times			
16.5											5.6
125											5.6
9.5	9.6										4.3
7				3.0							
5.4				2.37							

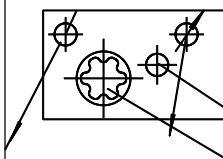
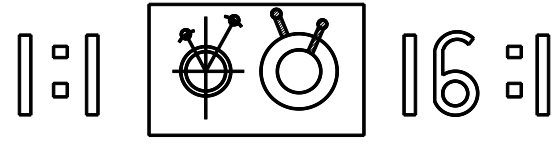
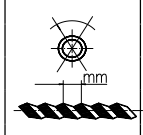
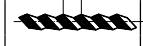
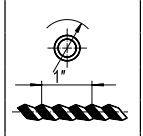

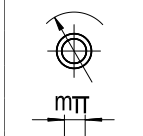

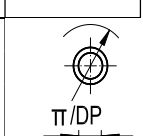
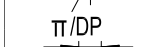
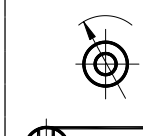

**8.1.1 Characteristic Table for Power Vs Torque of Spindle for CW110 Series and CW100Q Series**

Table 9

Setting up of the Machine										
Spindle Speed (r/min)		Driving Efficiency	Working Ability of Spindle		Weakest part	Coarse pitch				
Forward	Reverse		Output Power (kW)	Max. Torque (N • m)						
640	650	0.80	8.8	134	Friction clutch	Without				
480				179						
360				238						
270	273			318						
200				429						
150				572						
114	117	0.75		8.25			753	Friction clutch	16 times	
85							1009			
64							1341			
48	49						1676			
36			2234							
27			3979							
20	20.5	0.75	8.25		4022	Friction clutch	16 times			
15										6.2
125										4.7
8.5	8.7									3.5
6.4				2.5						
4.8				1.9						

**8.2 Table of Feed Amount and Threads for CW80 Series, CW110 Series and CW100Q Series Machines of Metric System**

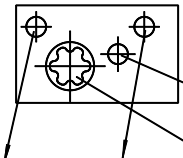
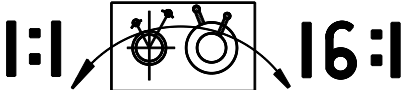
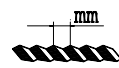

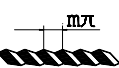
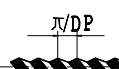
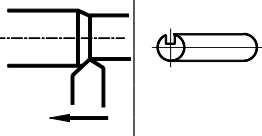
Table 10

Thread or feed rate											
			I	II	III	IV	I	II	III	IV	
Metric thread mm			1	1	2	4	8	16	32	64	128
			2			4.5	9	18	36	72	144
			3	1.25	2.5	5	10	20	40	80	160
			4			5.5	11	22	44	88	176
			5	1.5	3	6	12	24	48	96	192
			6								
			7	1.75	3.5	7	14	28	56	112	224
			8			7.5	15	30	60	120	240
Inch thread t.p.i			1	8	4	2	1				
			2	9	4 1/2	2 1/4	1 1/8				
			3	10	5	2 1/2	1 1/4				
			4	11	5 1/2	2 3/4	1 3/8				
			5	12	6	3	1 1/2				
			6			3 1/4	1 5/8				
			7	14	7	3 1/2	1 3/4				
Module thread m			1	0.5	1	2	4	8	16	32	64
			2			2.25	4.5	9	18	36	72
			3		1.25	2.5	5	10	20	40	80
			4			2.75	5.5	11	22	44	88
			5		1.5	3	6	12	24	48	
			6			3.25	6.5	13	26	52	104
			7		1.75	3.5	7	14	28	56	112
			8			3.75	7.5	15	30	60	120
Diametral pitch thread DP			1	16	8	4	2	1			
			2	18	9	4 1/2	2 1/4				
			3	20	10	5	2 1/2	1 1/4			
			4								
			5	24	12	6	3	1 1/2			
			6								
			7	28	14	7	3 1/2	1 3/4			
Longitudi- nal feed amount mm/r			2	0.11	0.22	0.45	0.9	1.8	3.60	7.20	14.4
			3	0.13	0.26	0.52	1.04	2.08	4.16	8.30	16.6
			4	0.14	0.28	0.58	1.12	2.24	4.48	9.00	18.0
			5	0.15	0.30	0.60	1.20	2.40	4.80	9.60	19.2
			6	0.17	0.34	0.68	1.36	2.72	5.44	10.9	21.8
			7	0.18	0.36	0.72	1.44	2.88	5.76	11.5	23.0
			8	0.19	0.38	0.76	1.52	3.04	6.08	12.2	24.3

- Note:
1. Cross feed of the cross slide is equal to 1/2 of feed rate of carriage and feed rate of the compound slide rest is equal to 1/4 of feed rate of carriage.
  2. 0.5 times of fine feed rate can be obtained with change gears.
  3. Inch thread of 19t.p.i can be obtained with change gears.

**8.3 Table of Feed Amount and Threads for CW80 Series, CW110 Series and CW100Q Series Machines of Inch System**

Table 11

Thread or feed rate										
		I	II	III	IV	I	II	III	IV	
Metric thread mm		1	1	2	4	8	16	32	64	128
		2			4.5	9	18	36	72	144
		3	1.25	2.5	5	10	20	40	80	160
		4			5.5	11	22	44	88	176
		5	1.5	3	6	12	24	48	96	192
		6								
		7	1.75	3.5	7	14	28	56	112	224
		8			7.5	15	30	60	120	240
Inch thread tpi		1	8	4	2	1				
		2	9	4 1/2	2 1/4	1 1/8				
		3	10	5	2 1/2	1 1/4				
		4	11	5 1/2	2 3/4	1 3/8				
		5	12	6	3	1 1/2				
		6			3 1/4	1 5/8				
		7	14	7	3 1/2	1 3/4				
		8								
Module thread m		1	0.5	1	2	4	8	16	32	64
		2			2.25	4.5	9	18	36	72
		3		1.25	2.5	5	10	20	40	80
		4			2.75	5.5	11	22	44	88
		5		1.5	3	6	12	24	48	96
		6			3.25	6.5	13	26	52	104
		7		1.75	3.5	7	14	28	56	112
		8			3.75	7.5	15	30	60	120
Diametral pitch thread DP		1	16	8	4	2	1			
		2	18	9	4 1/2	2 1/4				
		3	20	10	5	2 1/2	1 1/4			
		4								
		5	24	12	6	3	1 1/2			
		6								
		7	28	14	7	3 1/2	1 3/4			
		8								
Longitudinal feed amount mm/r		1	0.00375	0.0075	0.015	0.03	0.06	0.12	0.24	0.48
		2	0.00425	0.0085	0.017	0.034	0.068	0.136	0.272	0.544
		3	0.00475	0.0095	0.019	0.038	0.076	0.152	0.304	0.608
		4	0.00525	0.0105	0.021	0.042	0.084	0.168	0.336	0.672
		5	0.00575	0.0115	0.023	0.046	0.092	0.184	0.368	0.736
		6	0.00625	0.0125	0.025	0.05	0.1	0.2	0.4	0.8
		7	0.00675	0.0135	0.027	0.054	0.108	0.216	0.432	0.864
		8	0.00725	0.0145	0.029	0.058	0.116	0.232	0.464	0.928

Note: 1. Cross feed of the cross slide is equal to 1/2 of feed rate of carriage.  
 2. 0.5 times of fine feed rate can be obtained with change gears.



3. Inch thread of 19t.p.i can be obtained with change gears.

**8.4 Setting Up of Feed System for the Machines of Metric System of CW80 Series**

**8.4.1 Ordering of Change Gears**

By arrangement of levers on the headstock and feed box, various feed and threads listed in the table can be cut directly, as shown by Fig.25. Only module threads and diametral pitch threads need change gear for ordering. For the form of the threads after ordering by change gears, please refer to Fig.26.

For cutting metric and inch threads

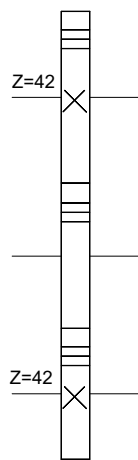


Fig. 25

For cutting module and diametral pitch threads

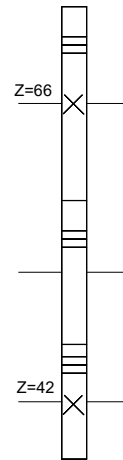


Fig. 26

**8.4.2 Normal Setting Formulas for Various Threads**

For cutting various threads, they can be calculated according to the following formulas:

For cutting Metric threads:  $j = \frac{Z \times t}{I \times T}$

For cutting Module threads:  $j = \frac{I \times T}{Z \times m}$

For cutting Inch threads:  $j = \frac{Z \times 25.4}{I \times T \times N}$

For cutting Diametral threads:  $j = \frac{Z \times 25.4}{I \times T \times P}$

Where :

J:change gear ratio

I: feed box gear ratio

T: pitch of leadscrew (12 mm)

t: pitch of workpiece mm

Z: number of threads to be cut

m: Module mm

N: t.p.i of workpiece

P: diametral pitch of workpiece

### 8.4.3 For Cutting Special Threads by Means of Change Gears

For cutting special pitch and higher precision threads, it is necessary to use change gears to cut them by shifting the lever or the handwheel to the position “pitch 12 mm” thus the gear ratio of feed box is  $i=1$ .

Change gear ratio is calculated by the following formula:  $J = \frac{Z \times T}{12}$

### 8.4.4 For Cutting Inch Threads of 19 t.p.i

Turn the control lever and handwheel on feed box to the position “14 t.p.i” and set change gear as shown in Fig. 27 to turn threads of 19 t.p.i.

### 8.4.5 Realization of Fine Feeds

If required feed rates are finer than that listed on the feed chart, it is necessary to set the change gear as shown by following figures, and fine feed obtained is equal to 0.5 time of the standard feed (Fig.28).

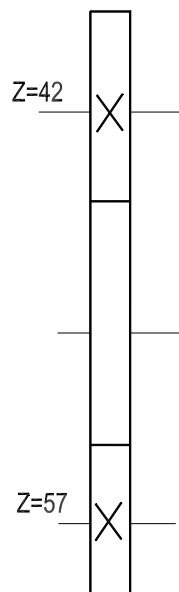


Fig.27

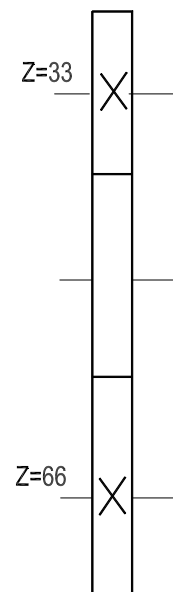


Fig.28

### 8.4.6 For Broaching Oil Groove or Keyways with Carriage

By shifting the spindle speed change lever to the neutral position to make the spindle stop and the coarse pitch lever is shifted to the position “16:1”, the reciprocal movement of carriage can be obtained.

### 8.5 Setting Up of Feed System for the Machines of Inch System of CW80 Series

#### 8.5.1 Ordering of Change Gears

By arrangement of levers on the headstock and feed box, various feed and threads listed in the table can be cut directly, as shown by Fig.29. Only module threads and diametral pitch threads need change gear for ordering. For the form of the threads after ordering by change gears, please refer to Fig.30.

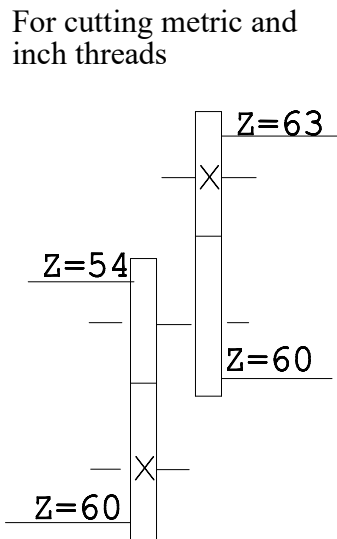


Fig. 29

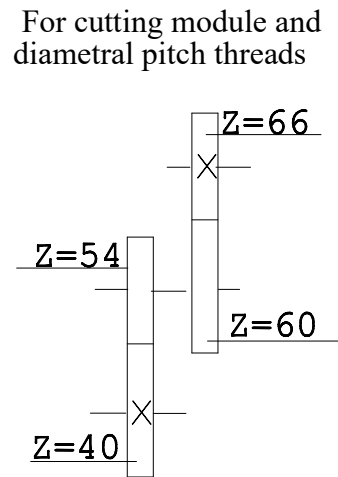


Fig. 30

#### 8.5.2 For Cutting Inch Threads of 11.5 t.p.i

Turn the control lever and handwheel on feed box to the position “10 t.p.i” and set change gear as shown in Fig. 31 to turn threads of 11.5 t.p.i..

#### 8.5.3 For Cutting Inch Threads of 19 t.p.i

Turn the control lever and handwheel on feed box to the position “10 t.p.i” and set change gear as shown in Fig. 32 to turn threads of 19 t.p.i.

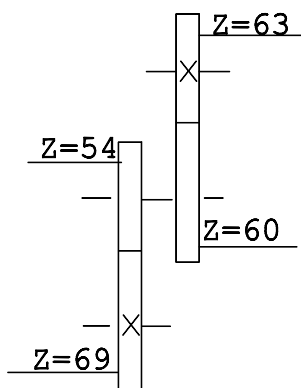


Fig. 31

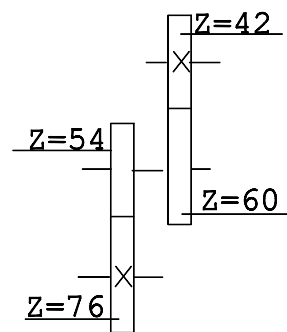


Fig. 32

**8.5.4 For Cutting Inch Threads of 27 t.p.i**

Turn the control lever and handwheel on feed box to the position “15 t.p.i” and set change gear as shown in Fig. 33, to turn threads of 27 t.p.i.

**8.5.5 Realization of Fine Feed**

As shown by following figures, fine feed obtained is equal to 0.5 time of the standard feed (Fig.34). Turn the control lever and handwheel on feed box to the position “8 t.p.i, 9 t.p.i., 10 t.p.i., 11 t.p.i., 12 t.p.i., 13 t.p.i., 14 t.p.i., ” and set change gear as shown in Fig. 35 to turn threads of “16 t.p.i, 18 t.p.i., 20 t.p.i., 22 t.p.i., 24 t.p.i., 26 t.p.i., 28 t.p.i. ”

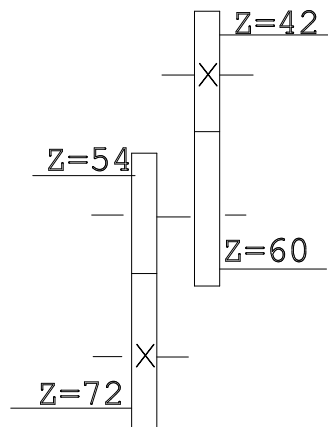


Fig. 33

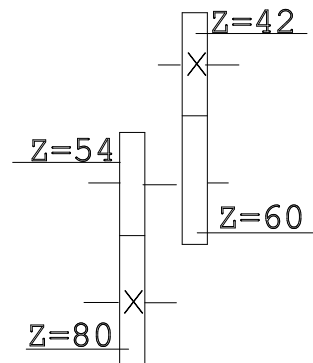


Fig. 34

**8.6 Setting Up of Feed System for the Machines of Metric System of CW110 Series**

**8.6.1 Ordering of Change Gears**

By arrangement of levers on the headstock and feed box, various feed and threads listed in the table can be cut directly, as shown by Fig.35. Only module threads and diametral pitch threads need a change gear for ordering, and please refer to Fig.36.

For cutting metric and inch threads

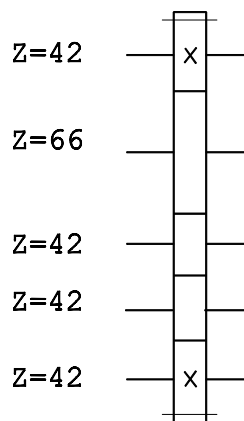


Fig. 35

For cutting module and diametral pitch threads

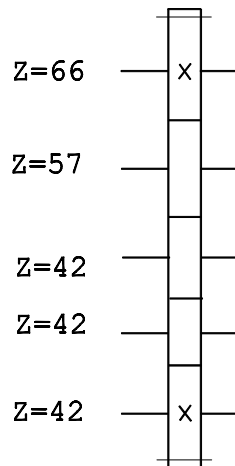


Fig. 36

**8.6.2 Setting Formulas for Various Threads**

For setting formulas for various threads, please refer to normal setting formulas for various threads in Chapter 8.4.2

**8.6.3 For Cutting Special Threads by Means of Change Gears**

Refer to Chapter 8.4.3.

**8.6.4 For Cutting Inch Threads of 19 t.p.i**

Turn the control lever and handwheel on feed box to the position “14 t.p.i” and set change gear as shown in Fig. 37.

**8.6.5 Realization of Fine Feeds**

If required feed rates are finer than that listed on the feed chart, it is necessary to set the change gear as shown by following figures, and fine feed obtained is equal to 0.5 time of the standard feed (Fig.38).

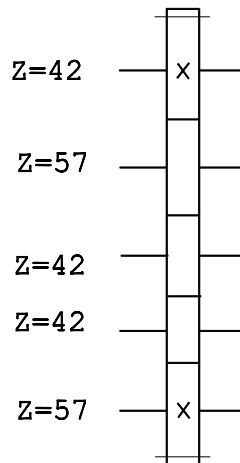


Fig. 37

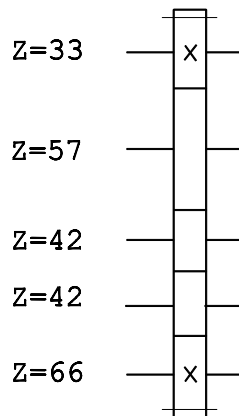


Fig. 38

**8.6.6 For Broaching Oil Groove or Keyways with Carriage**

By shifting the spindle speed change lever to the neutral position to make the spindle stop and the coarse pitch lever is shifted to the position “16:1”, the reciprocal movement of carriage can be obtained.

**8.7 Setting Up of Feed System for the Machines of Inch System of CW110 Series**

**8.7.1 Ordering of Change Gears**

By arrangement of levers on the headstock and feed box, various feed and threads listed in the table can be cut directly, as shown by Fig. 39. Only module threads and diametral pitch threads need a change gear for ordering, and please refer to Fig.40.

For cutting metric and inch threads

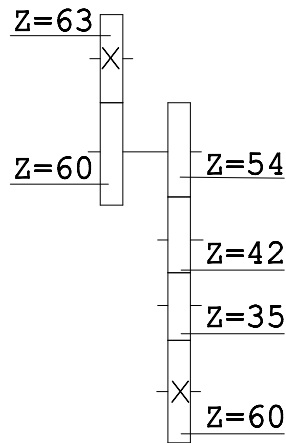


Fig. 39

For cutting module and diametral pitch threads

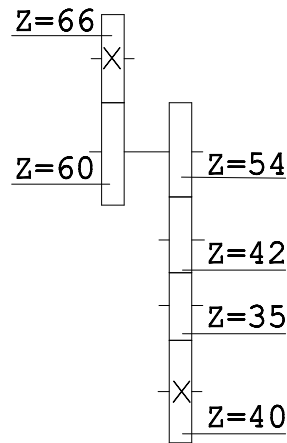


Fig. 40

**8.7.2 For Cutting Inch Threads of 11.5 t.p.i.**

Turn the control lever and handwheel on feed box to the position “10 t.p.i” and set change gear as shown in Fig. 41 to turn threads of 11.5 t.p.i..

**8.7.3 For Cutting Inch Threads of 19 t.p.i**

Turn the control lever and handwheel on feed box to the position “10 t.p.i” and set change gear as shown in Fig. 42 to turn threads of 19 t.p.i.

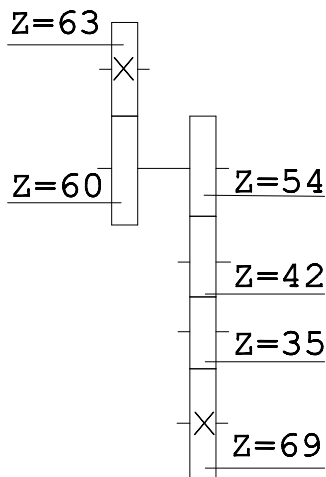


Fig. 41

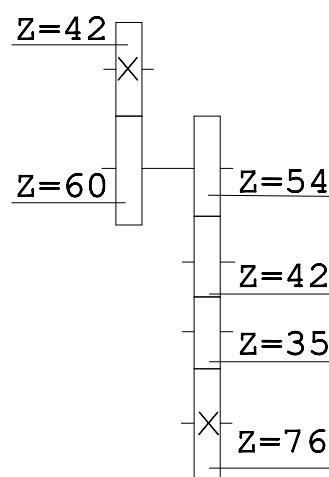


Fig. 42

**8.7.4 For Cutting Inch Threads of 27 t.p.i.**

Turn the control lever and handwheel on feed box to the position “15 t.p.i” and set change gear as shown in Fig. 43, to turn threads of 27 t.p.i.

As shown by following figures, fine feed obtained is equal to 0.5 time of the standard feed (Fig.44). Turn the control lever and handwheel on feed box to the position “8 t.p.i, 9 t.p.i., 10 t.p.i., 11 t.p.i., 12 t.p.i., 13 t.p.i., 14 t.p.i.,” and set change gear as shown in Fig. 42 to turn threads of “16 t.p.i, 18 t.p.i., 20 t.p.i., 22 t.p.i., 24 t.p.i., 26 t.p.i., 28 t.p.i. ” .

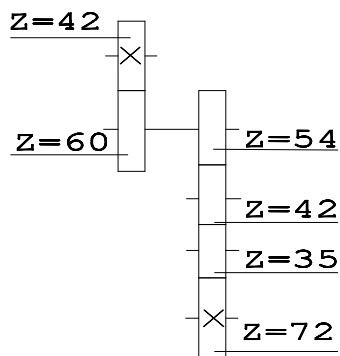


Fig. 43

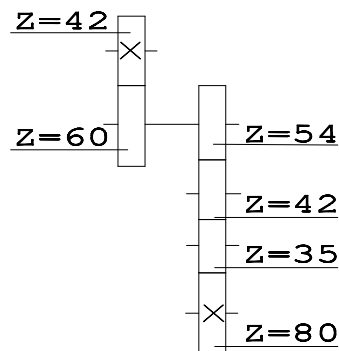


Fig. 44

**8.8 Setting Up of Feed System for the Machines of Metric System of CW100Q Series**

**8.8.1 Ordering of Change Gears**

By arrangement of levers on the headstock and feed box, various feed and threads listed in the table can be cut directly, as shown by Fig.45. Only module threads and diametral pitch threads need a change gear for ordering, and please refer to Fig.46.

For cutting metric and inch threads

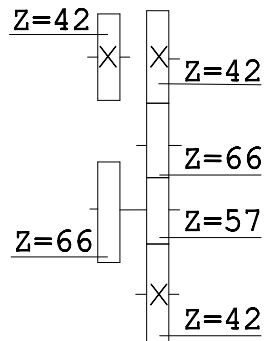


Fig. 45

For cutting module and diametral pitch threads

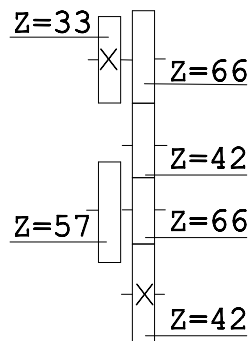


Fig. 46

### 8.8.2 Setting Formulas for Various Threads

Please refer to Chapter 8.4.2.

### 8.8.3 For Cutting Special Threads by Means of Change Gears

Please refer to chapter 8.4.3.

### 8.8.4 For Cutting Inch Threads of 19 t.p.i

Turn the control lever and handwheel on feed box to the position “14 t.p.i” and set change gear as shown in Fig. 47 .

### 8.8.5 Realization of Fine Feeds

If required feed rates are finer than that listed on the feed chart, it is necessary to set the change gear as shown by following figures, and fine feed obtained is equal to 0.5 time of the standard feed (Fig.48).

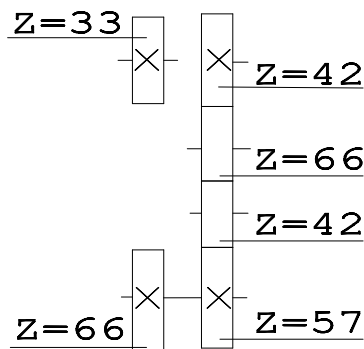


Fig. 47

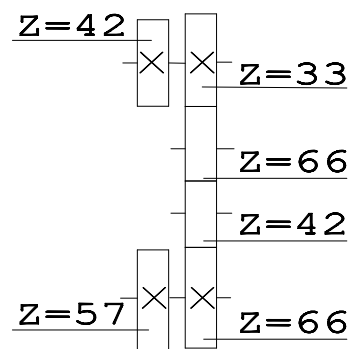


Fig. 48

### 8.8.6 For Broaching Oil Groove or Keyways with Carriage

By shifting the spindle speed change lever to the neutral position to make the spindle stop and the coarse pitch lever is shifted to the position “16:1”, the reciprocal movement of carriage can be obtained.

### 8.9 Turning Tapers

When the length of taper workpiece is less than 200 mm, short tapers of any angle can be individually turned by means of compound slide rest, when the length of taper workpiece is longer than 200 mm, use the saddle and compound slide rest to feed together at the same time, a half cone angle of the longer tapers can not exceed  $14^\circ$  .

The relationship between the angle of movement of compound rest  $\alpha$  (the angle relative to the movement of the carriage) and the half cone angle of workpiece  $\beta$  is:

$$\alpha = \beta + \arcsin(4\sin \beta) \text{ (Refer to Fig. 49)}$$



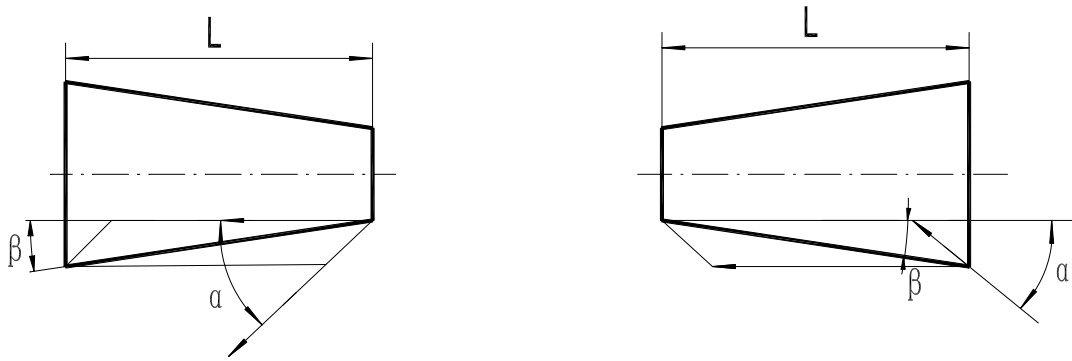


Fig. 49

Max. cutting travel:

$$\text{Max.} = 200 (4 + \sin \alpha) \text{ mm}$$

For compound motion of both saddle and compound slide rest, turn the cross-grooved guiding cover which is under the apron control lever by  $45^\circ$  (loosen the screw first), therefore, let the lever move along the direction of  $45^\circ$ , as shown by Fig.50.

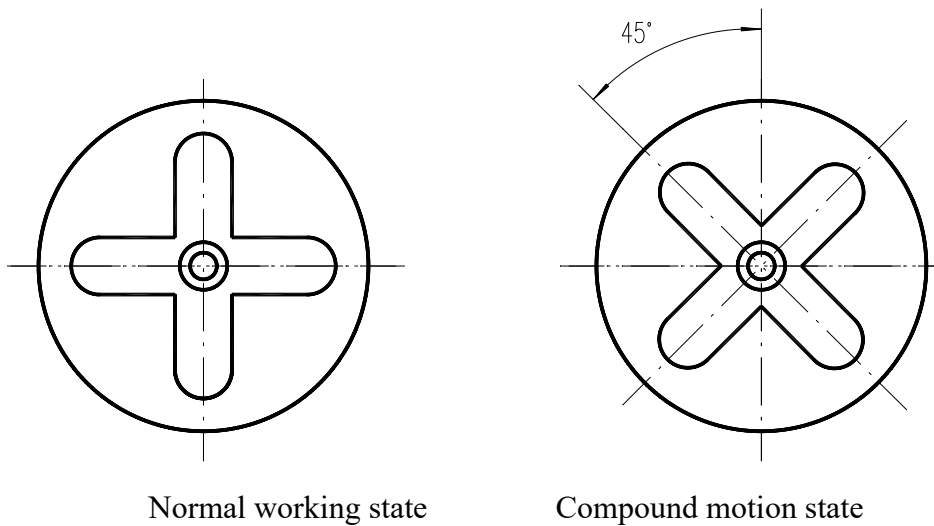


Fig.50

## 9 ADJUSTMENT OF THE MACHINE

### 9.1 Adjustment of the Spindle Bearings

Bearings used for the spindle of the machines of CW6180B, CW6280B, CW6180C and CW6280C are rolling bearings.

Nut 1 is used to adjust axial clearance of two ball thrust bearings and nut 2 is used to adjust radial clearance of double row roller bearings. And by means of nut 3 the axial clearance of the double row roller bearings on rear support of the spindle is adjusted, refer to Fig.51.

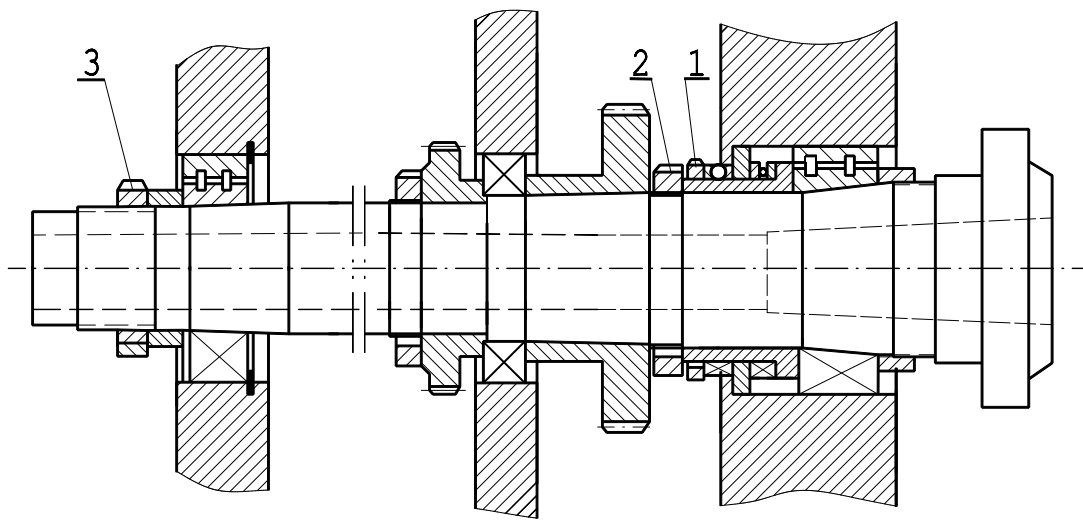


Fig.51 Spindle structure

## 9.2 Adjustment of Safety Device in the Apron.

The single direction over-run clutch that consists of gear 6, start-shape part 7 and roller 8 located at the left of the apron is provided to prevent simultaneous engagement of the feed motion and the rapid traverse motion as well as rotating at high speed of the feed rod during rapid traverse(see section E-E in figure below). A safe device of preventing from over-load, which is mounted on the worm shaft 5 which consists of spiral double claw type end face clutch (2, 3 )and sausage spring group ( 4 ). In normal working condition, the motion from feed rod is transmitted to the worm shaft (5 ) through the clutch. In the case of overload of the feed system, the clutch is unengaged, the motion of the apron is under longitudinal slippage.

The tension of the spring had been well adjusted in our shop before dispatch, so it is unnecessary for you to adjust it, otherwise, safety of the spring may be failed. If you find that the torque driven by the clutch is really not enough to drive the worm during working, the tension can be adjusted by nut 1, as shown by Fig. 52.

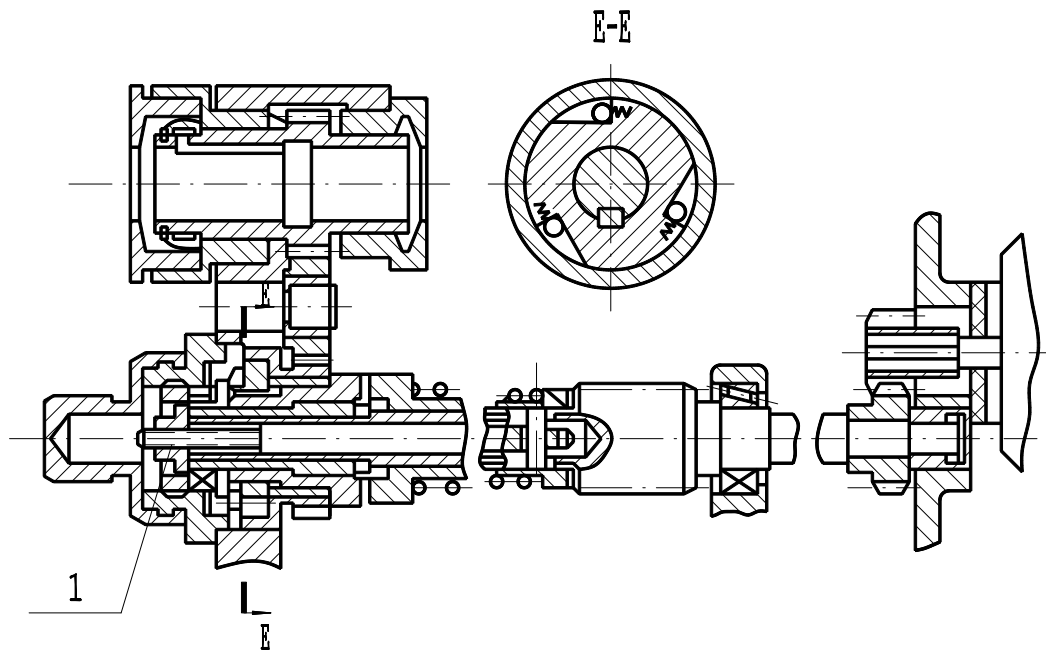


Fig. 52 Drawing of safety device in apron

## 9.3 Adjustment of the Backlash Between the Cross Slide Leadscrew and Nut

The nut of the cross slide is open type. When the leadscrew and the nut are worn with slipping, tighten the adjusting nut of screw to make the nut be deformed to obtain proper play. Refer to Fig.53.

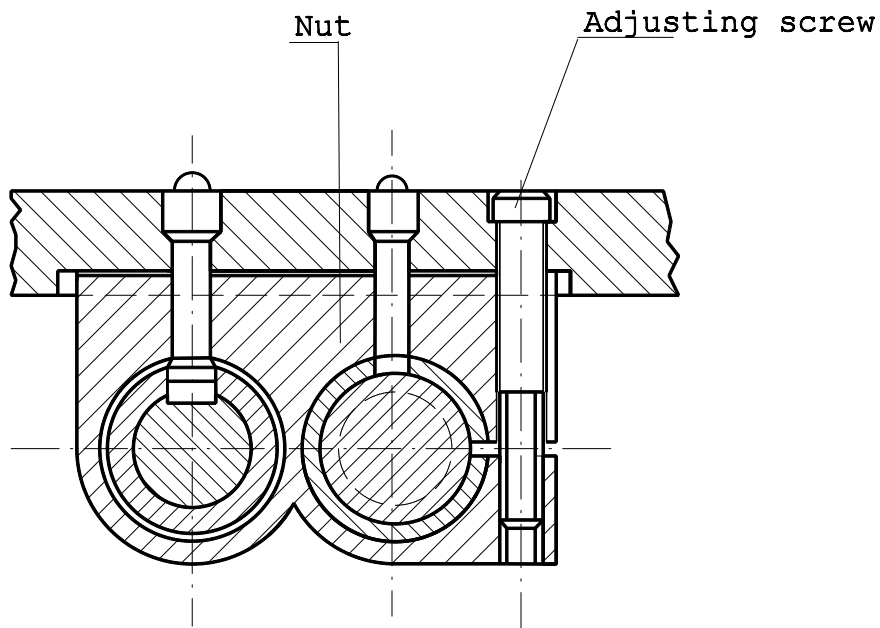


Fig.53 Adjustment of leadscrew of cross slide

#### 9.4 Adjustment for Taper Attachment

In case the sliding members of the taper attachment is loose, adjusting the adjustable screws 1 and 2 to properly tighten the gibs to prevent the play between sliding members. In the case of looseness of cross feed screw, properly tighten the nut 3 mounted on the screw to eliminate play between the screw and cross slide 4, as shown by Fig. 54.

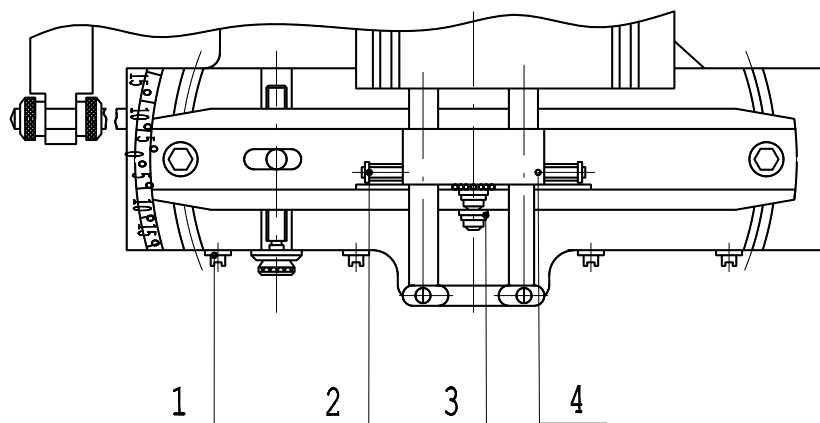


Fig. 54 Adjustment of taper attachment

## 10 MAINTENANCE AND LUBRICATING OF THE MACHINE

### 10.1 Maintenance of the Machine

- The oil level in all oil tanks shall always be maintained on the center of oil leveler, otherwise the machine may be damaged due to ineffective lubrication or overheating.
- All oiling points shall be filled with pure oil on time.
- Frequently inspect the oil flow through sight glass ensuring proper lubrication of the headstock and feedbox.
- Check and adjust the tension of V-belts of the motor at regular intervals.
- That start the spindle at once is not allowed after start the main motor every time. It is necessary for you to wait for the time only when the lubricating pump works normally and there is oil-flow through the oil window, thus, you are allowed to start the spindle to let the machine work.
- With the spindle running at high speed, the changing speed handle is not absolutely allowed to be shifted any case.
- The leadscrew is used for thread cutting only. Never use it for turning operation so that its accuracy and serving life can be ensured.
- When applying steady rest or follower rest, contacting surface of supporting block and workpiece should be lubricated.
- It is necessary to add lubricating oil into the lubricating box 1 for lubricating guide way every shift for ensuring adequate lubricating when the carriage moving. For practical lubricating method, refer to “Lubrication of the Machine”.
- If you want to stop the machine while the spindle is running, shift the handle to the stop position and stop the spindle by means of braking device.

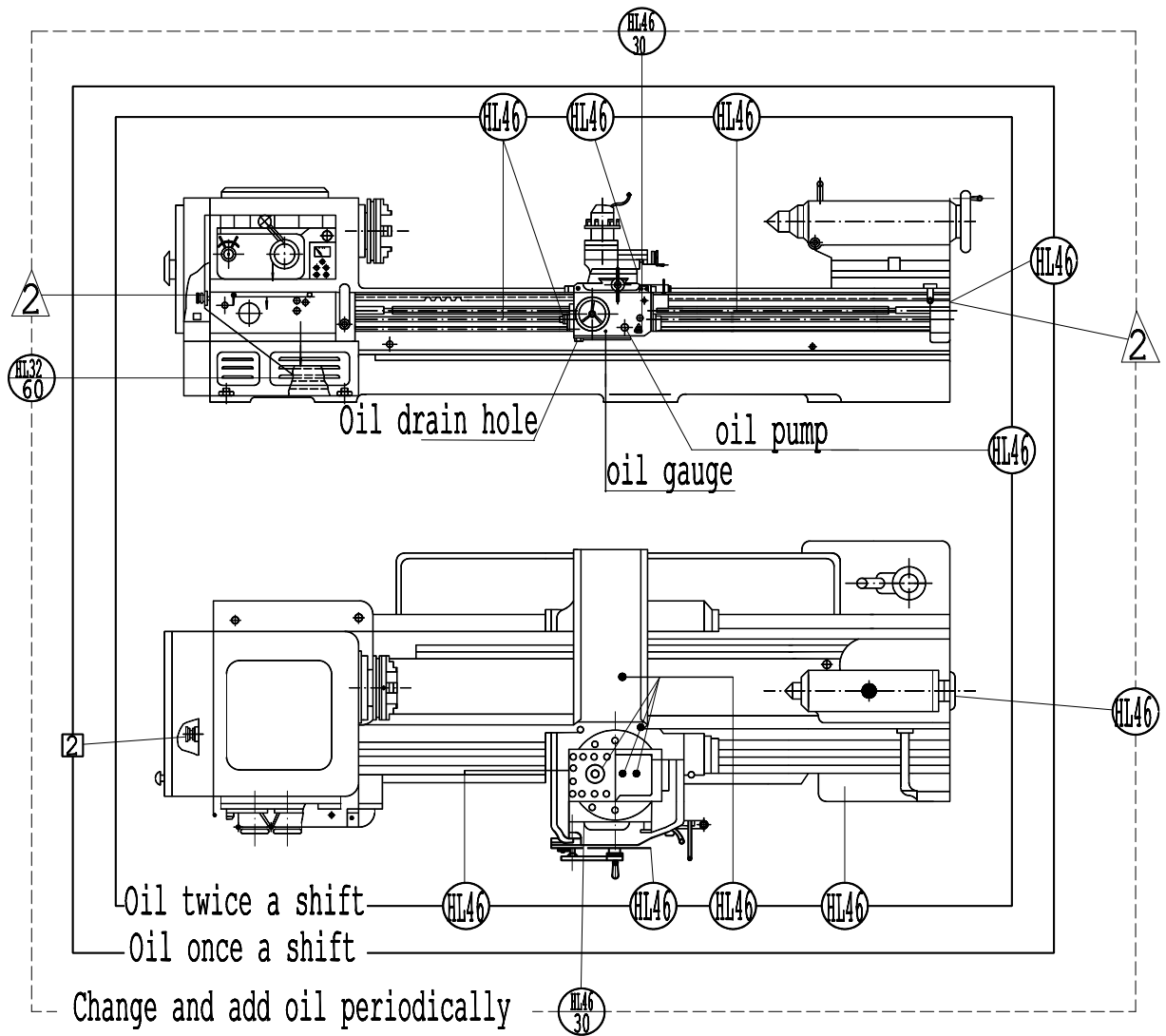
**It is absolutely forbidden to use controlling reverse running of the spindle to break the machine. If needing reverse running of the spindle, first, stop the spindle, then, start reverse running of the spindle.**

### 10.2 Lubrication of the Machine

All friction surfaces of the machine should be regularly and systematically lubricated to ensure the reliability of operation and to reduce the wear of the parts of the machine and power consumption. The operator should know the distribution of all lubricating points, the trade mark of lubricants, the lubricating cycle, the lubricating manner, etc.

For the distribution of lubricating points, brand of lubricating grease and lubricating period, refer to Fig. 53. The corresponding lubricating points are marked on the machine.

10.3 Lubrication of the Machine



	HL46		Calcium grease No.2, turn it once every shift	—	Oiling location by operator
	Common lithium grease No. 2, renewed once every three years			---	Oiling location by lubricator
	Hydraulic oil HL32/lubricating intervals(days)for work in two-shift.				

Fig.55 Lubrication chart of the machine

## 11 USE AND CLEANING OF CUTTING FLUID

### 11.1 Preparation before Pouring Cutting Fluid

Before pouring cutting fluid, user should in detail read the technical material for used cutting fluid and be acquainted with various technical performances, chemical components and the matters needing attention and dispose cutting fluid strictly according to disposing method of the cutting fluid. At the same time, also confirm whether the cooling system is clean and firm.

### 11.2 Pouring of Cutting Fluid

Pour the cutting fluid disposed according to the technical requirements from the oil pan to make it flowing into the water tank and to ensure sufficient amount for using.

#### NOTE

**Pouring cutting fluid over the coolant pump is absolutely forbidden to prevent the motor from being burnt.**

### 11.3 Usage of Cutting Fluid

#### 11.3.1 Application of Cutting Fluid

On principle, it is necessary to use cutting fluid to turn workpiece of steel, ream holes and cut threads.

#### 11.3.2 Using Method of Cutting Fluid

If you want to use cutting fluid to turn workpiece. First, open the switch for coolant pump to start the coolant pump. When using cutting fluid, let the jet aiming at the position to be turned of workpiece so that the cutting fluid can play the role of cooling.

#### 11.3.3 Selection and Technical Specifications of Cutting Fluid

Common recommended cutting fluid:

Castrol Hysol GS water-solubility cutting fluid (Disposing ratio: 1:40)

Compound cutting fluid (Disposing ratio: 1:15)

For specification of cutting fluid, see Table 12 and Table 13.

Specifications of Castrol Cutting Fluid

Table 12

Item	Specifications	Test Method
Appearance	Limpid fluid with light yellow	BAM300
Density (g/ml); at 20°C	0.9975	IP365
pH (Dilutability 5%)	9.2	BS1647
Corrosion Test	Steel 0%	IP287
	Aluminum, no color changing	
Foam test (Sec)	10	IP312
Application	Available for turning ferrous metals such as iron and alloy steel with low/middle strength, etc.	
Feature	Castrol Hysol GS water-solubility cutting fluid is a kind of semi-synthetic cutting fluid with biological stability and without phenol and nitrite, it is characterized by good low foams.	

Note: In order to keep excellent biological stability of the product, its dilutability should not be lower than 3.5%.

Table of Specifications of Compound Cutting Fluid

Table13

Item	Specifications				Test Method
	I (Common Type)	II (Antirust Type)	III(Extreme pressure Type)	IV (Multiefficiency Type)	
Appearance of enriched products	Liquid state: No layer or precipitation, showing even liquid status. Past state: No foreign matter separated out and showing even past status. Solid state: Even powder which has no indurate block and easy to dissolve in water.				GB/T6144 -1985
Dilute Liquid	Penetrability	Vitreous or semi-vitreous			
	PH value	8~10			
	Foam performance mL/10min	<2			
Corrosion test	Cast iron: No rust, shine is like new. Red copper, aluminum: No rust, no color changing				



Item	Specifications				Test Method
	I (Common Type)	II (Antirust Type)	III(Extreme pressure Type)	IV (Multiefficiency Type)	
Feature	Compound cutting fluid consists from various water-solubility addition agents and water, there is no mineral oil in its composition. And its enriched product can be liquid state, past state and solid powder state. Before use, after it is disluted with water in a certain it is disluted with water in a certain scale, it becomes vitreous or vitreous or semi-vitreous dilute liquid.				
Application	Available for rough turning of common cast iron and steel workpiece.	Available for finishing turning of workpiece which needs high proof-rust.	Available for heavy duty turning.	Available for turning many kinds of ferrous metals, copper, aluminum, etc.	

**Flammable or baneful cutting fluid is forbidden to be used.**

## 11.4 Adding, Changing, Changing Cycle and Method of Cutting Fluid

### 11.4.1 Adding of Cutting Fluid

If following cases occur, you should change or add cutting fluid in time during the period of cutting fluid being used.

### 11.4.2 Changing of Cutting Fluid

During the period of cutting fluid being used, operator can judge whether the cutting fluid exceeds the time limit of quality guarantee through observing whether the cutting fluid has layer(s), peculiar sell, etc. and if the phenomenon mentioned above occur, it is necessary to change cutting fluids in time. (General the quality guarantee period is 2~3 months, for details, please refer to the Technical Materials of Cutting Fluids.)

### 11.4.3 Changing Cycle of Cutting Fluid

The quantity of cutting fluid poured every time can be used for two months according to calculation of work for eight hours every day. Exceeding more than two months, adds it in time. If working time a day is 16 hours or 24 hours, the using cycle of cutting fluid is one month or lack of one month. User should in time add cutting fluid according to practical using condition.

#### 11.4.4 Changing Methods of Cutting Fluid

##### NOTE

**Different kinds of cutting fluids should not be used in mixture. It is necessary to clean out the cooling system before changing cutting fluid.**

Changing methods of cutting fluid are as follows:

- Set the jet of cutting fluid in the prepared container, start the coolant pump to make cutting fluid flowing into the container.
- Switch off the power supply, then, the switch of coolant pump, and last, remove the aero-plug of the coolant pump from the power supply line.
- Pull out the coolant tank from the rear guard, then, drain remaining cutting fluid from the draining hole of the coolant tank.
- Screw out the screws for locking the coolant pump and the coolant tank, then, dismount the coolant pump.
- Clean out the coolant tank with cleaning water.
- Fix the coolant pump and the coolant tank, then, pour cutting fluid disposed as a certain disposing ratio until up to the required fluid level.
- Push back the coolant tank to the specified position in the rear guard.
- Connect the aero-plug of the coolant pump with the power supply line.
- Switch on the switch of the power supply of the machine, then the switch and observe the cycle flowing of cutting fluid for 3-5 minutes, if the flowing of cutting fluid is normal, the cutting fluid can be used.

#### 11.5 Cleaning Method and Matters Needing Attention to Cooling System

In general case, the cooling system of the machine should be cleaned after the machine has been used for six months to ensure that it can be normally used. The cleaning method is given below.

- Switch off the power supply of the machine, then the switch of the coolant pump and at last, remove the aero-plug of the coolant pump from the power supply line.
- Pull out the coolant tank from the rear guard, then, drain remaining cutting fluid from the draining hole of the coolant tank.
- Screw out the screws for locking the coolant pump and the coolant tank, then, dismount the coolant pump.
- Wash the coolant pump mouth with clean water.
- Clean the filtering net and precipitation in the coolant tank with clean water and clean out the coolant tank.

- Fix the coolant pump with the coolant tank.
- Push back the coolant tank to the specified position in the rear guard.
- Connect the aero-plug of the coolant tank with the power supply line.

**NOTE**

- **When dismount the aero-plug of power supply of the coolant pump, do not exert too strong force to prevent the aero-plug from being damaged.**
- **Do not make water falling down the plug of the power supply to avoid short-circuit of electrical system.**

## 12 INSPECTION AND MAINTENANCE OF THE MACHINE

Maintenance of the machine is necessary day-to-day work that keeps to the machine under. Good working status prolong service life and increasing productivity of the machine.

### 12.1 Routine Inspection

After the 500-hour operation, it is necessary to carry out the regular check and maintenance for the machine. In most cases, give priority to operators to carry out the process, and the inspector and maintainer should cooperate. While checking, it is necessary to switch off the power supply at first. For the check items, please refer to Table 14.

Table 14

No.	Checked Position	Checked Items
1	Electrical system	<p>Check whether the emergency stop button is sensitive and reliable or not.</p> <p>Check whether the motor is normal running or not, and is there any unnormal temperature raising?</p> <p>Check whether the electric wire and the cable are damaged or not.</p> <p>Check whether the travel switches, buttons function normally or not, and their action is reliable or not.</p>
2	Control system	<p>Check whether every control handle/lever and button is reliable or not.</p> <p>Check whether the clearance of change gears and shaft bush are loose or not.</p>
3	Cooling and lubricating systems	<p>Check whether cutting fluid and lubricating oil has been in accordance with requirements or not.</p> <p>Check whether the liquid levels in the oil tank and the cutting fluid tank has been in accordance with the requirements or not.</p> <p>Check whether every lubricating point has been reasonably lubricated or not.</p> <p>Check whether cutting fluid has been obviously polluted or not and whether the quality of the lubricating oil is up to the standard.</p> <p>Check whether the chip-scraper has been damaged or not.</p>

No.	Checked Position	Checked Items
4	Safety guards	Check whether the limit position device of apron, the protection cover of chuck and the chip guard can normally function or not.
5	Motor device	Check whether tension of the belts of motor has been proper or not, and is there any cracks, whether the pulley can normally run or not.
6	Front chip guard screen	Check whether the screen is so dirty that a decline in visibility is resulted in.

## 12.2 Periodic Inspection

After the machine has been working for a certain time, owing to there is wear between the parts touching each other, working performance of them can be gradually affected, it is necessary to check them regularly to guarantee the accuracy of the machine, in general case, operator of the machine should take charge of this job by remedial instruction of inspector and maintainer.

The maintaining cycle of the machine can be determined according to the Table 15, or do centralized maintenance for the machine after it has been used for 500 hours.

For the inspection and maintenance of the machine, please refer to Table 15.

Table 15

No.	Checked Object	Inspection and Maintenance	Period
1	Electrical device	Check and tighten the each connect screw. Check the grounding device. Check the interlocking of moving parts.	Six months
2	Control system	Check the braking device (manual, foot-pedal braking).	Three months
3	Cooling system	Clean the chip pan. Change the cutting fluid. Clean the filtering net and the water tank.	Do it at proper time Two months (calculated as working for eight hours per day) Six months
4	Lubricating system	Check the lubricating pump and the oil distributor. Check whether the pipeline is blocked or not; whether there is iron chip in oil hole, oil rope and the oil felt or not. Check the oiliness.	One year

No.	Checked Object	Inspection and Maintenance	Period
5	Safety protection	Check whether the safety device are reliable and adjust the over-load safety clutch.	Six months
6	V-belts	Appearance check: Tension and looseness. Clean the puley.	Six months
7	Miscellaneous	For the change gears, it is necessary to check whether shaft sleeve is shaken or not, and adjust the clearance of the gears. Adjust the friction discs and the brake. Adjust the compressing plate of carriage.	One year Six months Six months
8	Front chip guard screen	Check whether the front chip guard screen is polluted by besmirch to affect observing workpiece being turned. If affecting, the besmirch should be lightly cleaned with soft dishcloth with abluent, then, cleaned out with clean dishcloth.	1 month
Note: Unless otherwise specified, the time interval is determined on the basis of two-shift work.			

### 12.3 Overhauling of the Machine

The machine should be overhauled once for five years on the basis of two-shift work a day is executed and stipulated regulations are obeyed. During the overhauling, you should adjust, repair or change wearing part(s) according to practical conditions. After overhauling and before coming into production, it is necessary to check the accuracies and level the leveling of the machine according to the TEST CERTIFICATE.

### 13 COMMON TROUBLES AND TROUBLE-SHOOTING

Refer to Table 16, please.

Table 16

Trouble Phenomenon	Cause Analysis	Trouble-shooting and Remedy	Remarks
The motor does not rotate when the button is pressed.	1) The general switch of power supply is not switched on.	Switch on the power supply.	
	2) Touching of the start button is not good.	Check the terminal of the start button.	
The spindle does not stop running as soon as possible after the machine stops.	1) The friction clutch is adjusted too tightening.	Re-adjust or change the friction discs.	
	2) The brake is too loosening or the braking band has been worn.	Re-adjust the brake or change the braking band.	
There is no oil flowing in the oil window of headstock.	1) The oil level in the headstock has been too low.	Add oil up to the oil level.	
	2) There is air in the pump body in the pipeline due to not good sealing interface.	Pour oil in the pump body and seal every interface well.	
There is taper with cut threads.	The tool is bad in rigidity, lower-position in installation or the tool edge is too blunt.	Extend the diameter of the tool rod properly. Tip of the tool be higher than the centerline. Thin the tool edge to make it sharp.	
The automatic feed handle on apron is easy to unengaged.	1) The compressing spring of un-engaging worm in apron is too loosening.	Screw in the adjusting nut of un-engaging worm.	
	2) The positioning spring of automatic feed handle is loosening.	Tighten the spring.	

Trouble Phenomenon	Cause Analysis	Trouble-shooting and Remedy	Remarks
Spindle speed is reducing or automatically stop of the machine when heavy-cutting.	1) The friction clutch has been adjusted too loosen or it has been worn.	Adjust the friction clutch, thin or change the friction discs.	
	2) The transmitting belts of the motor is too loosen or too worn.	Adjust the transmitting belts properly or change the transmitting belts which are worn too much.	
There is deforming during the period of turning the screw of the thin long screw rod with follower rest.	1) Adjustment of the follower rest is not proper.	Re-adjust the touching position of the tracing head of follower rest and workpiece to make feeded workpiece without deforming.	
	2) Spindle speed is too high.	Speed is lower when finishing.	
	3) Feed amount is too large.	The feed amount be selected within range of 0.05-0.1 mm.	
Vibrating caused by the imbalance of the spindle	There is imbalance of the spindle owing to the fact that the assembling accessories for the spindle are not balancing or unbalancing after workpiece is clamped.	Adoption of bob-weight or change of the clamping condition can eliminate the vibration	
There is taper when machining the workpiece with tailstock.	The axis of centers of the spindle and the tailstock is not parallel with guideway of machine bed.	Adjust the adjusting screws at the two end of the tailstock, release one screw and then adjust the other one.	
<p>Note: 1. It is necessary for specialized people to perform maintenance for serious trouble in the headstock while opening the headstock is required, and the other personnel are not allowed to open the headstock for repair without permission.</p> <p>2. Do trial running again after the troubles related to safety performance is remedied.</p>			



## 14 WEARING PARTS

## 14.1 Table of Wearing Parts

Refer to Table 17, please.

Table 17

Part No.	Fig. No.	Part Name	Material	Heat Treatment	Qty.	Weight per piece (kg)	Remarks
16C04017	54	Leadscrew	Y40Mn		1	0.88	For the machines with Metric system
16C04018	55	Nut	HT200		1	0.5	
16C04031	56	Gib of carriage	HT150		1	0.8	
M16×70 GB83-76	57	Screw	45	C35 HY	12		
16C05050	58	Leadscrew	Y40Mn	D	1	2.8	For the machines with Metric system
16C05051	59	Nut			1	2.25	
16C05038	60	Guideway plate	TSF		1		
16C05036	61	Guideway plate	TSF		1		
16C05042	62	Gib	HT150		1	1.6	
16C06012	63	Worm wheel	HT100		1	1.2	
16C06020	64	Split nut			1	2	For the machines with Metric system
16C06025	65	Bush	MITI		1	0.13	
16C06135	67	Gear			1	0.24	
16C02204	66	Braking disc	Braking band of asbestos resin		14	0.052	
16C02025	68	Friction disc	15	S0.5-C59	15	0.16	
16C02024	69	Friction disc	15	S0.5-C59	2		
16C08H01	70	Gear	Cloth phenolics plate		1	0.33	
16C08H02	71	Gear	Cloth phenolics plate		1	0.23	

Part No.	Fig. No.	Part Name	Material	Heat Treatment	Qty.	Weight per piece (kg)	Remarks
16C06170	72	Split nut			1	1.6	For the machines with Inch system
16C05060	73	Leadscrew	Y40Mn		1	2.8	
16C63015	74	Helical gear	ZQSn6-6-3		1	0.09	
16C05061	75	Nut			1	2.25	
18B04036	76	Nut	HT200				
18B04035	77	Leadscrew	Y40Mn				

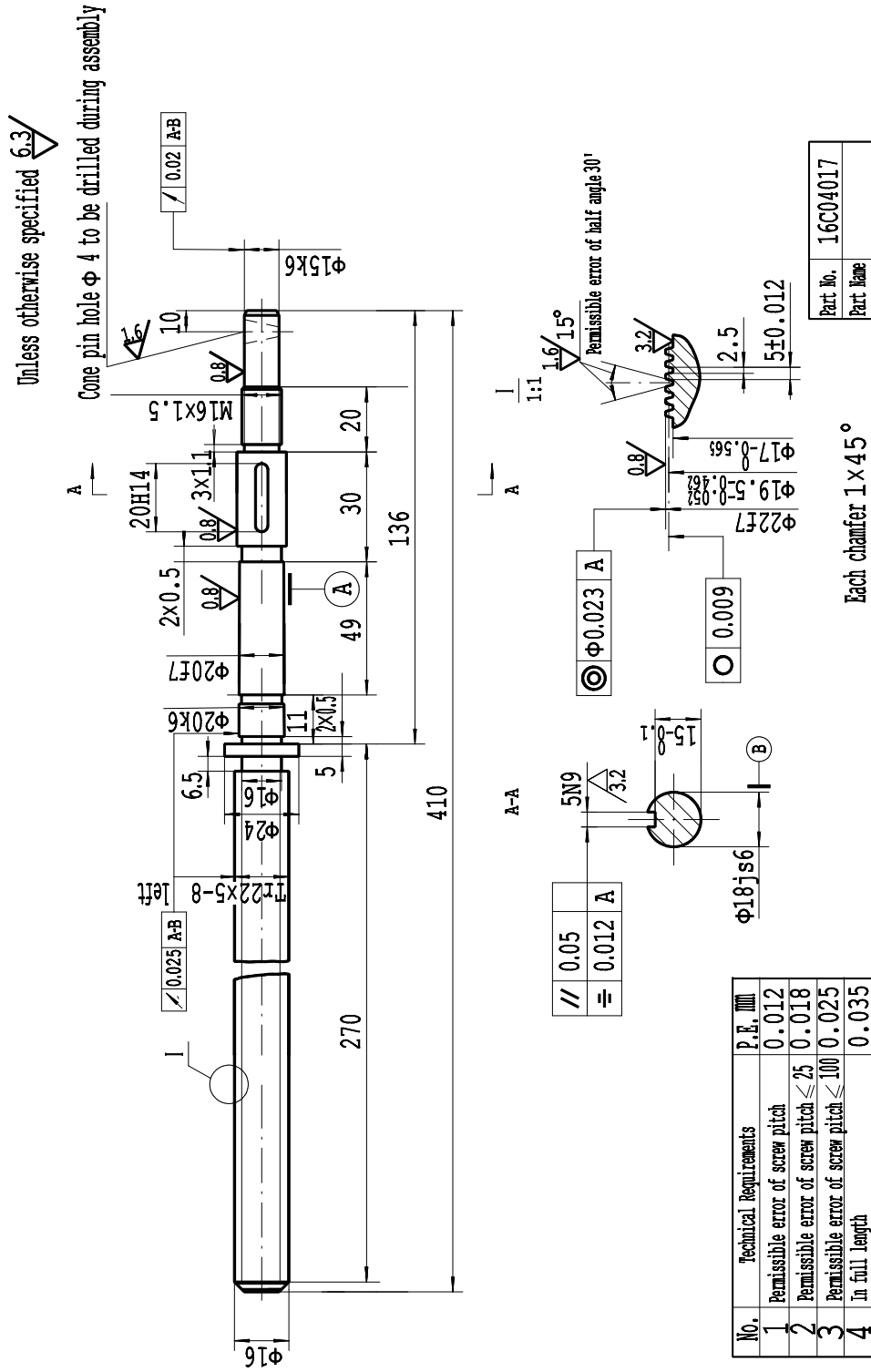
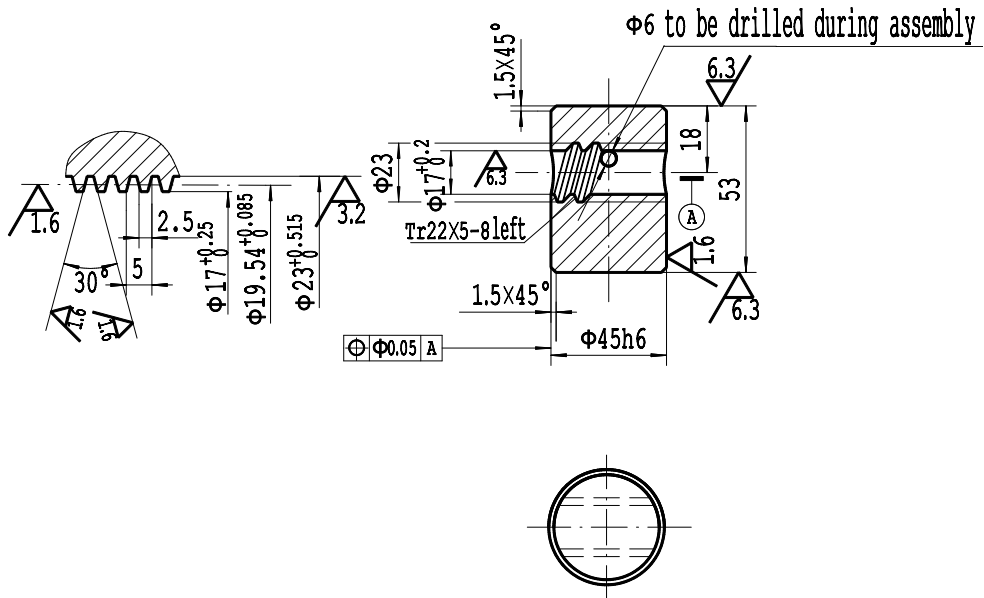


Fig. 56

Unless otherwise specified  $\sqrt{6.3}$



No.	Technical Requirements
1	By means of leadscrew, check accumulatd pitch error of nut
2	By means of template, check the tooth profile.

Part No.	16C04018
Part Name	Nut

Fig. 57

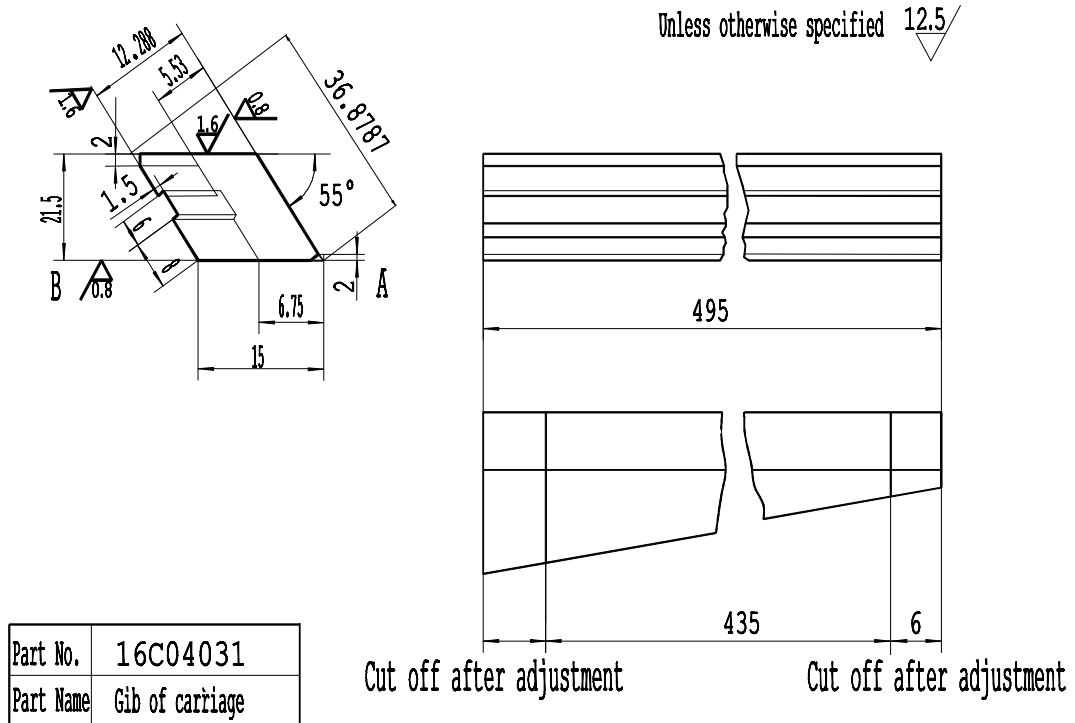
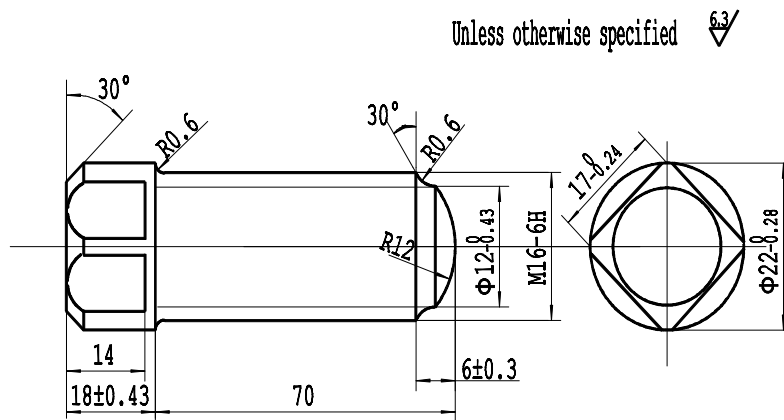


Fig.58



No.	Technical Requirements
1	Threads should be according to the accuracy of Grade II
2	H.Y.
3	H.T. C35

H.Y  
Screw M16×70 GB/T83-1988

Fig.59

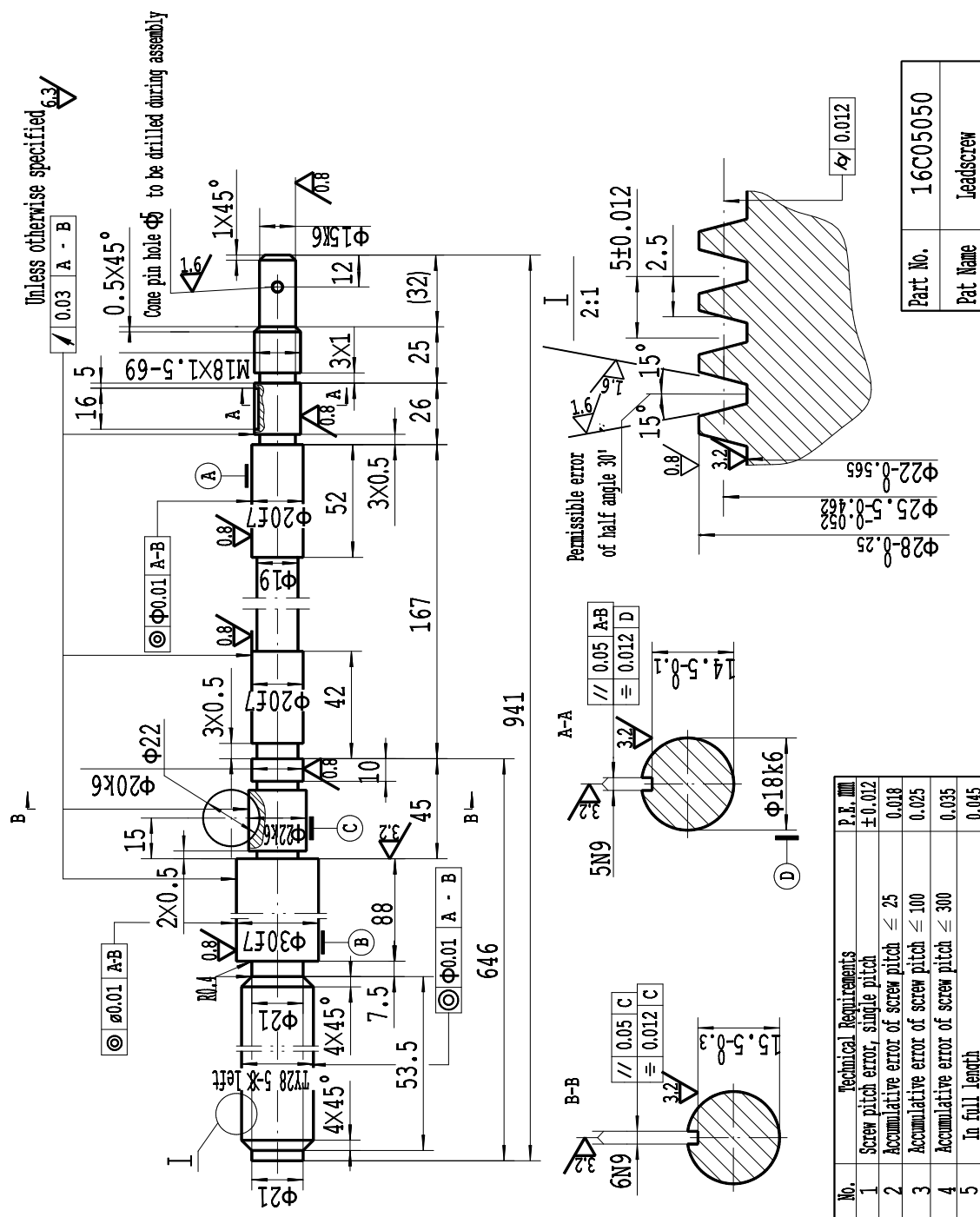


Fig. 60

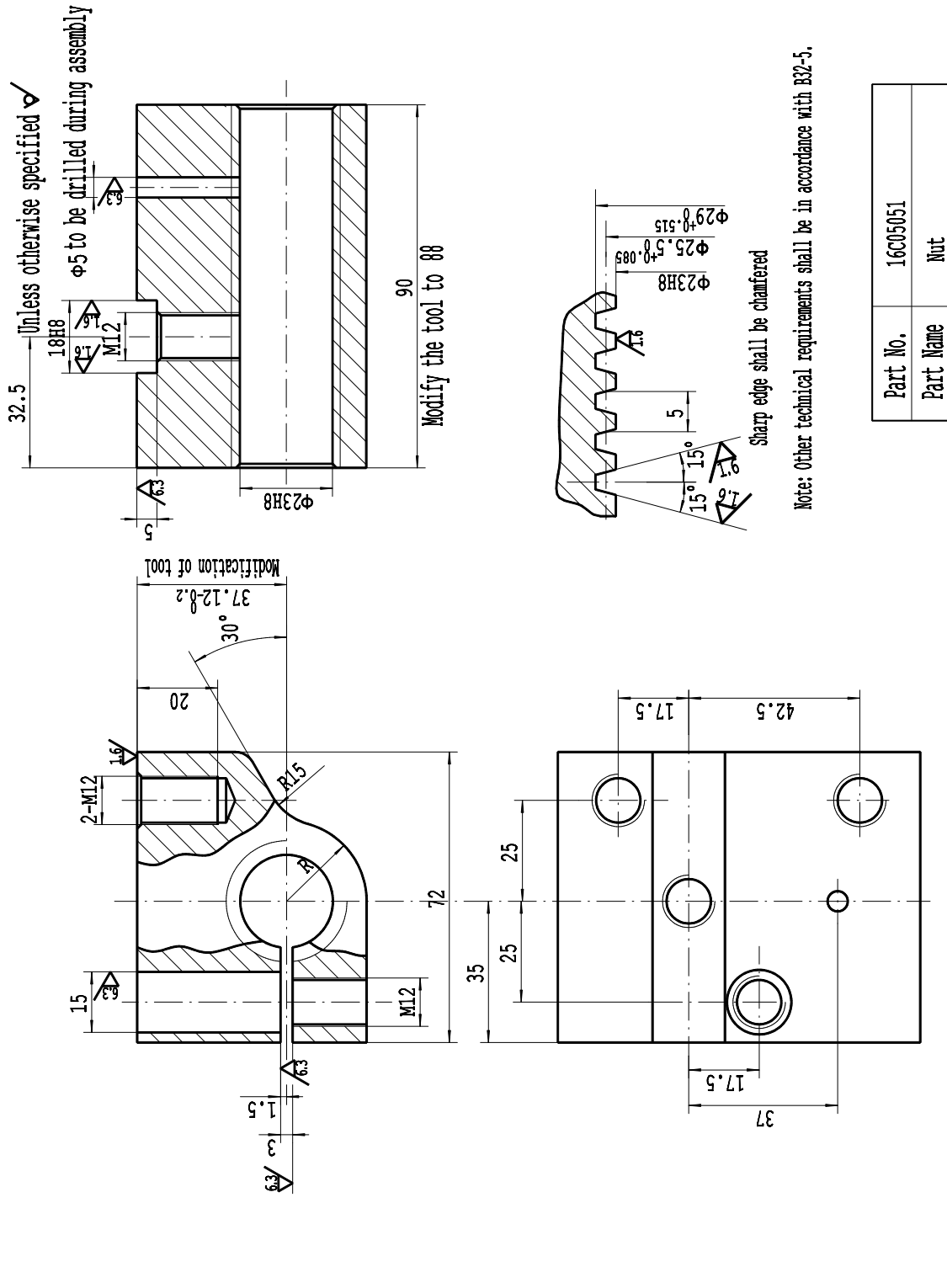
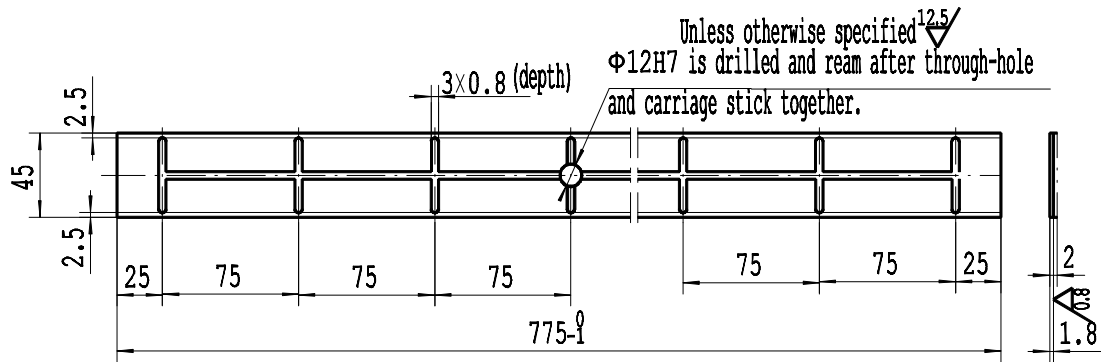


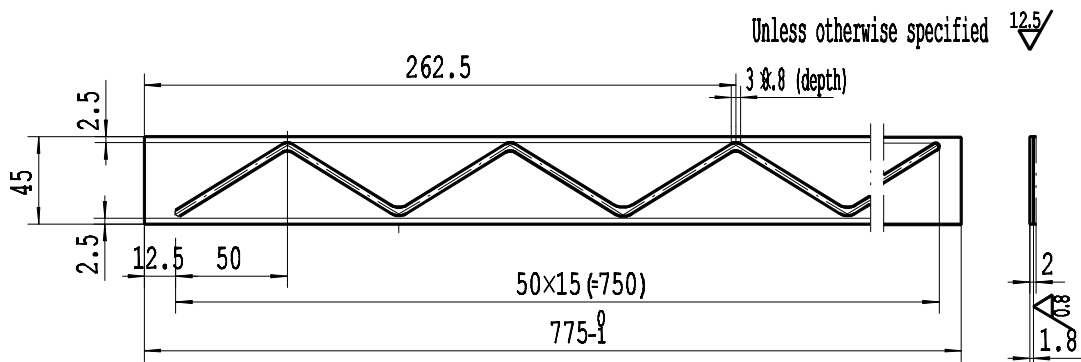
Fig. 61



Nate: Machine the oil groove on this piece adter it has been stuck together with the piece 16C05011.

Part No.	16C05038
Part Name	Guideway plate

Fig.62



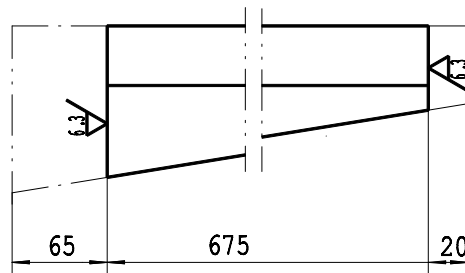
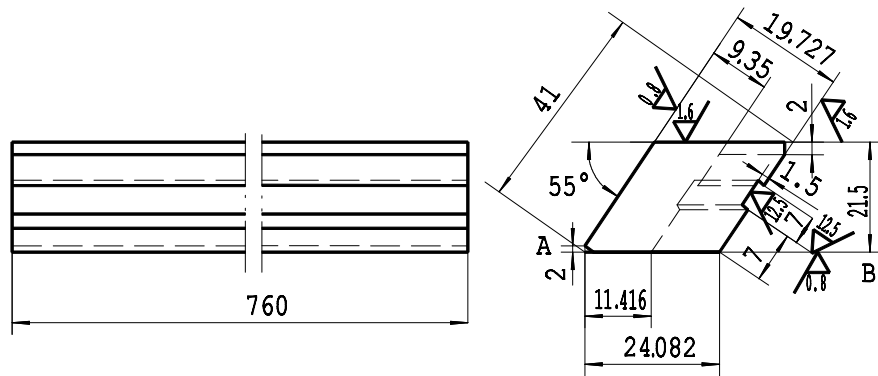
Nate: Machine the oil groove on this piece adter it has been stuck together with the piece 16C05011.

Part No.	16C05036
Part Name	Guideway plate

Fig.63



Unless otherwise specified  $\sqrt{12.5}$



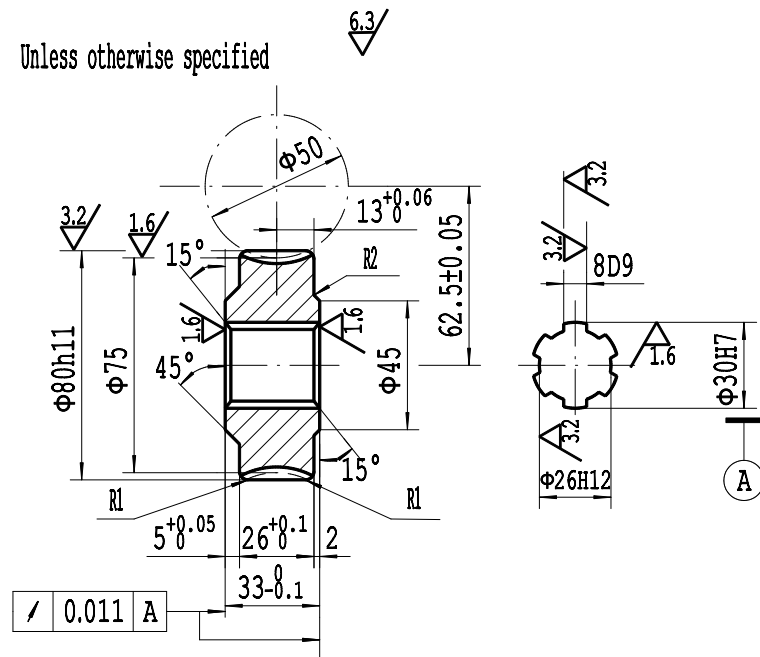
Cut off after adjustment

Cut off after adjustment

On surface AB  $\leq 1:60$

Part No.	16C05042
Part Name	Gib

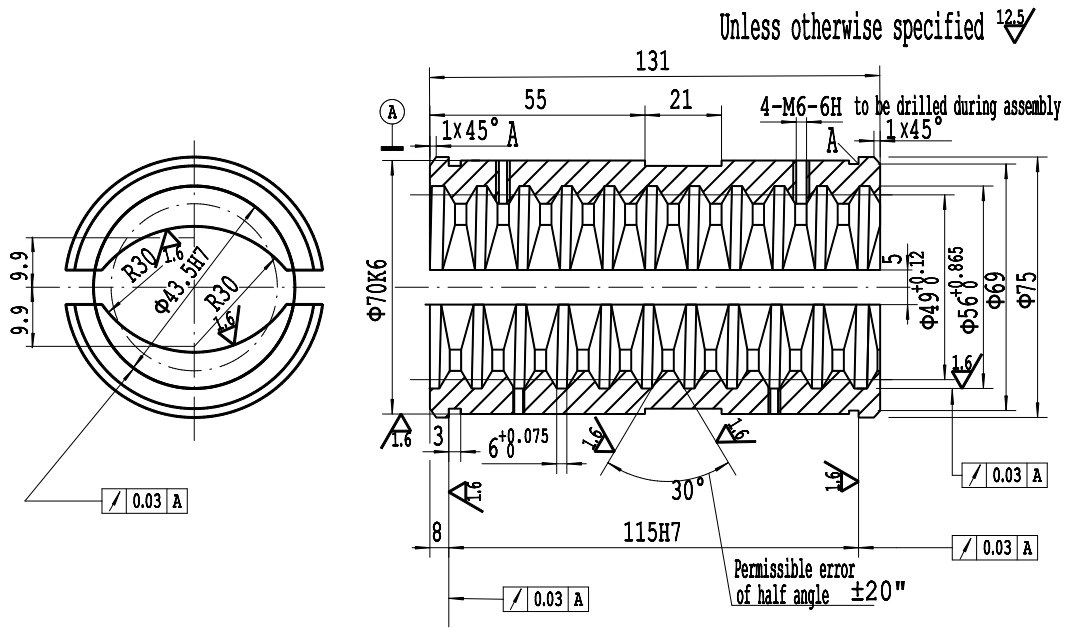
Fig. 64



Part No.	16C06012
Part Name	Worm wheel

Part No.	16C06012
Part Name	Worm wheel
No. of teeth	30
Accuracy	Grade 3
Module of worm	
No. of threads	III
Helix angle	8°32'
Helix direction	Right hand
Lead	23.562
Outside diameter	55
Axial module	2.5
Run out of pitch cone	0.09
Permissible error in distance between the axis of the worm wheel and the milling cutter in milling operation	±0.09
Faces to be square	
A	0.03
B	0.03
Bearing of worm teeth by red lead method:	
Profile bearing	60%
Lengthwise bearing	65%
Fitting part No.	

Fig. 65

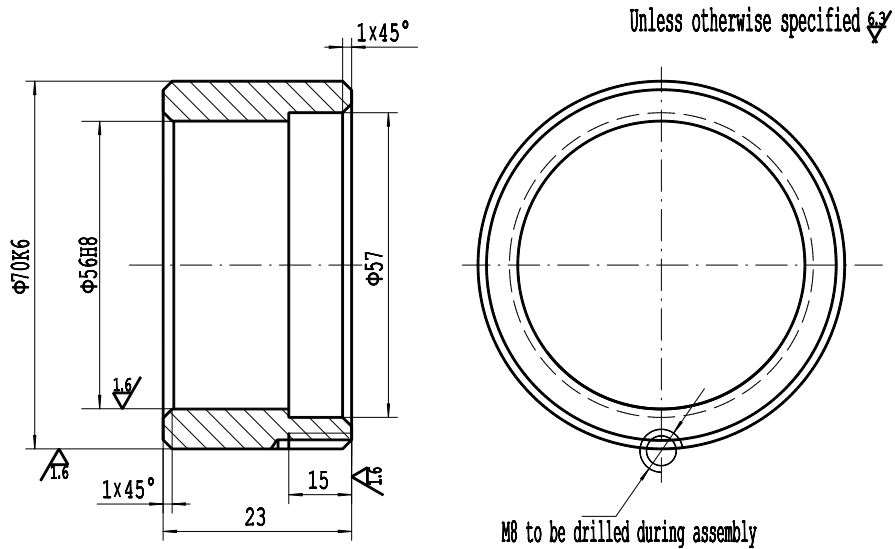


Trapezoidal thread pitch=12 mm

Note: Cut off machining of whole form casting

Part No.	16C06020
Part Name	Split nut

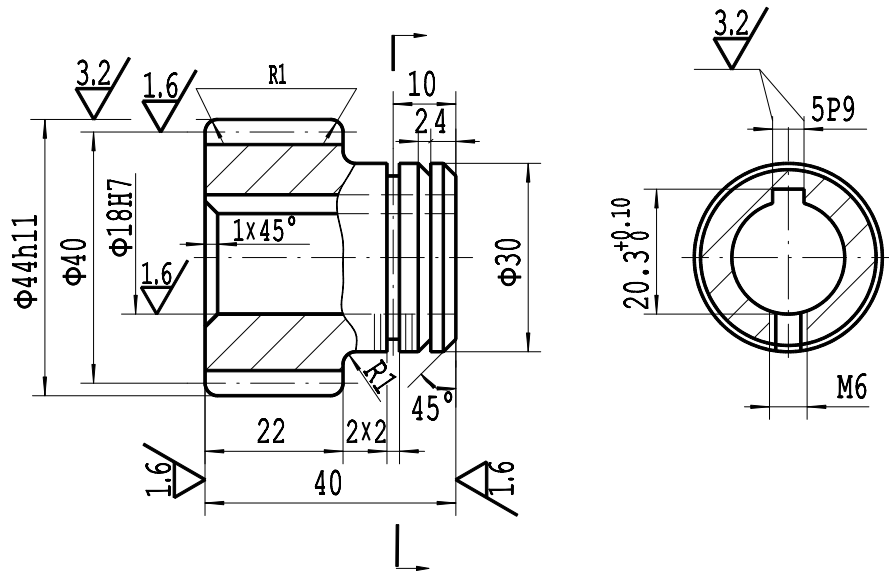
Fig. 66



Part No.	16C06025
Part Name	Bush

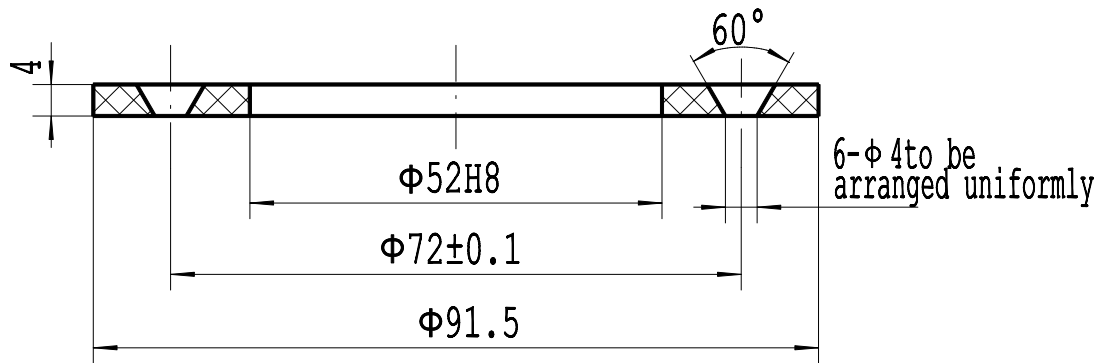
Fig. 67

Unless otherwise specified  $\sqrt{6.3}$



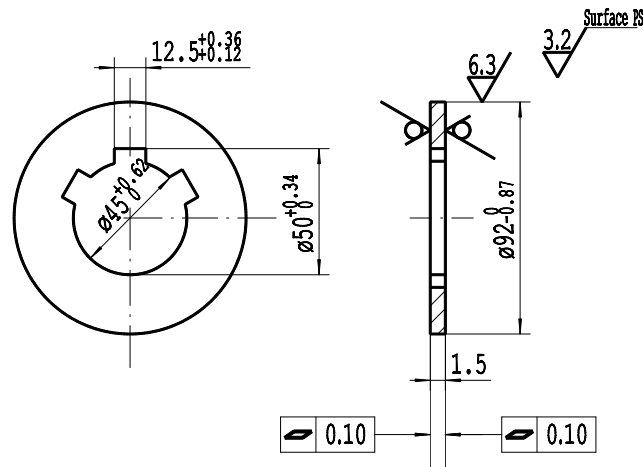
Part No.	16C06135		
Part Name	Gear		
Normal module	Mn	2	
Number of teeth	Z1	20	
Accuracy grade (JB179-83)	-	7-7C	
Addendum modification coefficients	X		
Helix direction	-		
Helix angle	$\beta$		
Base tangent length	Length	W	15.321
	Permissible error	average	
		Upper	Ews
	Lower	Ewi	-0.099
Spoused gear	Part No.	-	16C06139
	Number of teeth	Z2	22
Accumulated error of transverse pitch	Fp	0.036	
Limited deviation of transverse pitch	$\pm fpt$	$\pm 0.014$	
Permissible error of tooth profile	Ff	0.011	
Permissible error of tooth direction	F $\beta$	0.011	

Fig. 68



Part No.	16C02204
Part Name	Braking disc

Fig. 69



Technical Requirements:

1. H.T.: S0.5-C59
2. Deburring

Part No.	16C02025
Part Name	Friction disc

Fig. 70

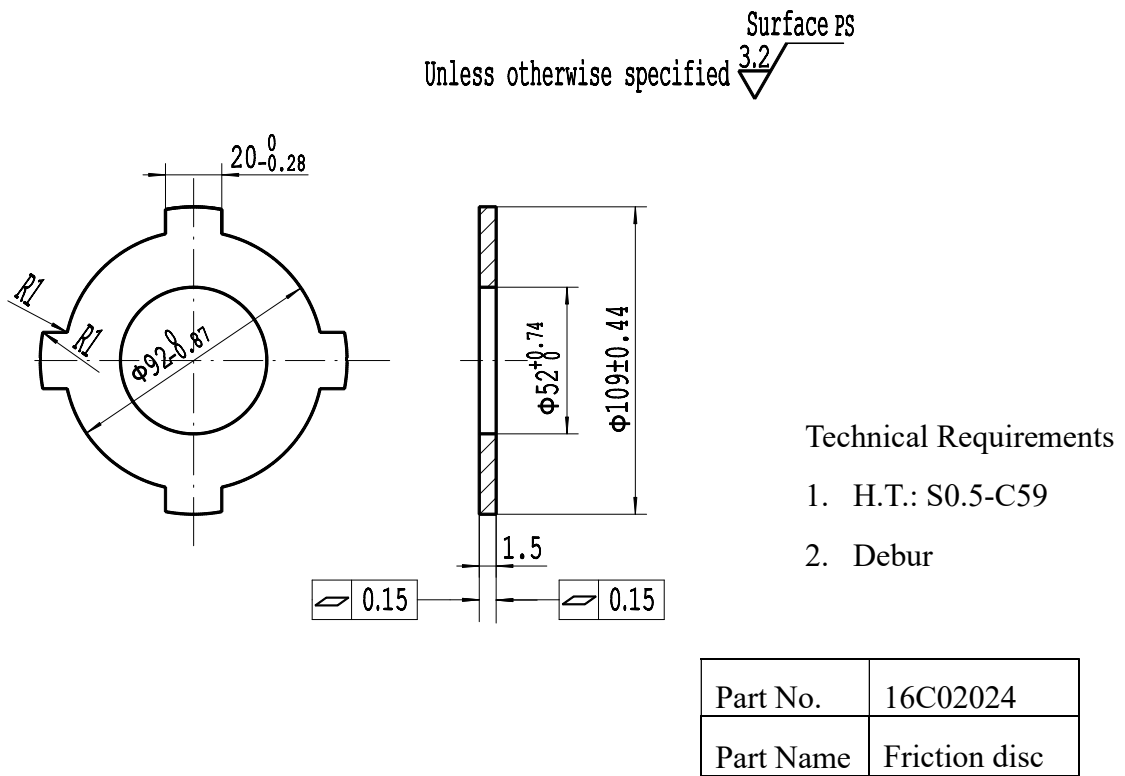
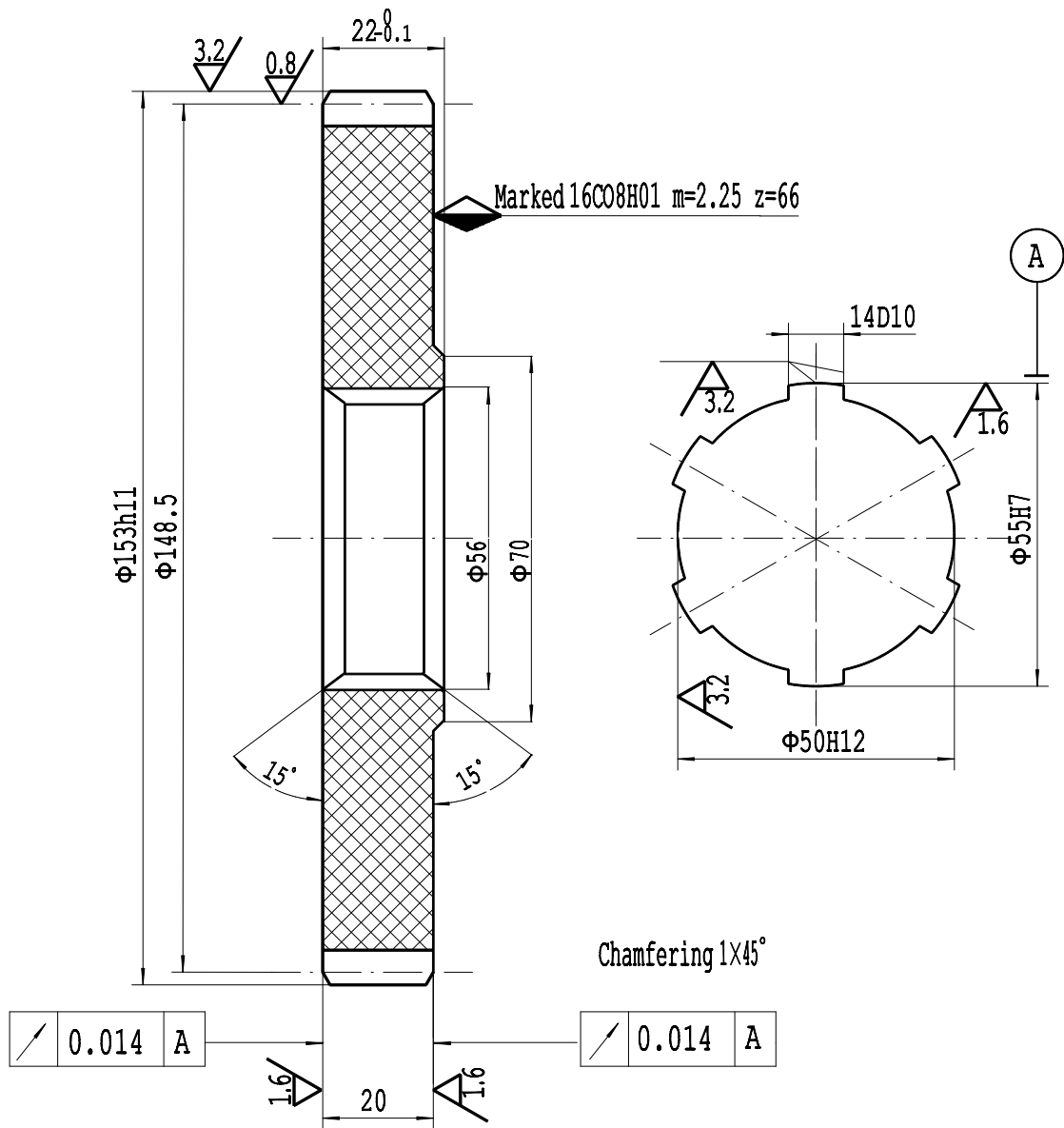


Fig. 71



Part No.	16C08H01
Part Name	Gear

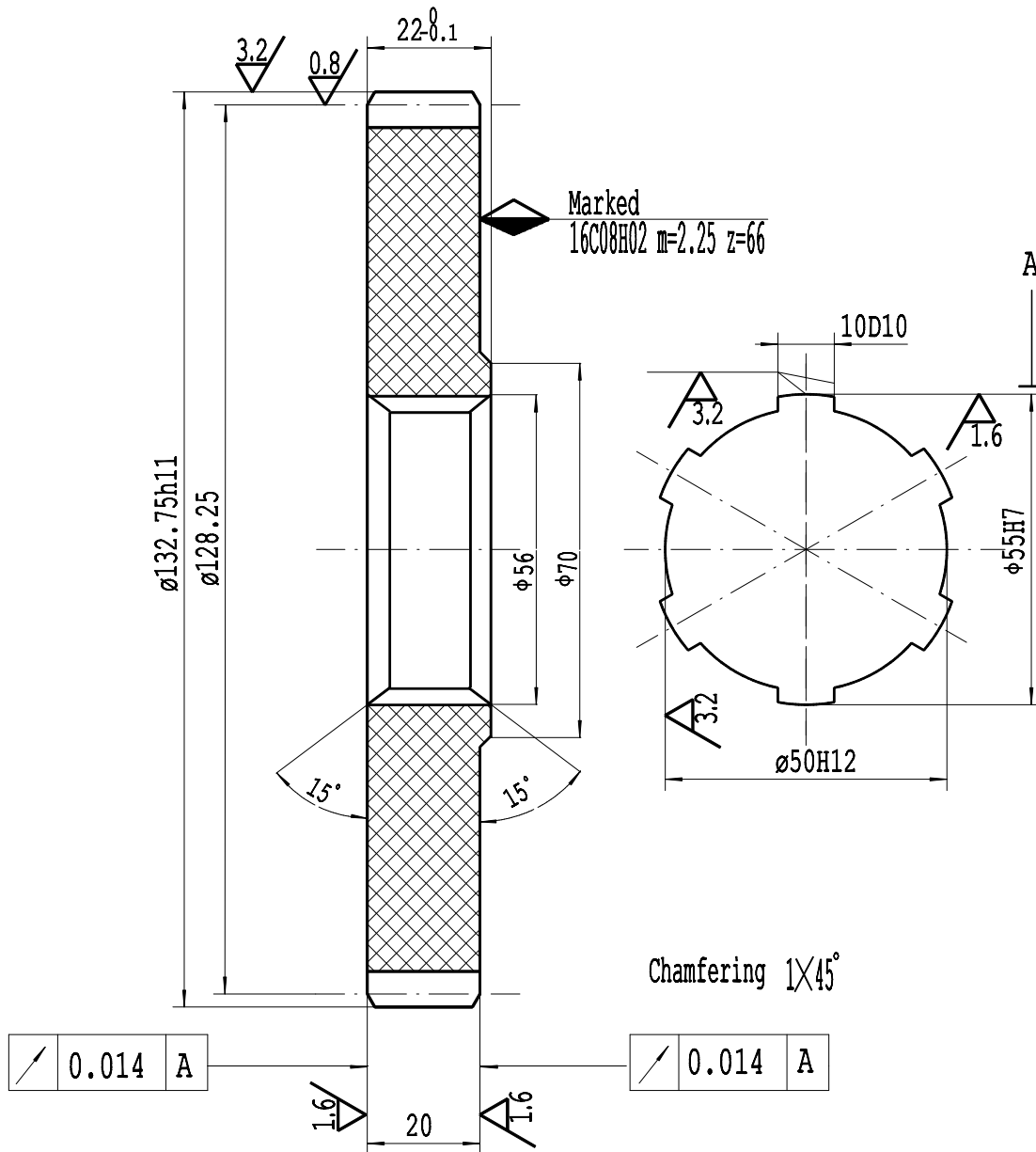
Normal module	Mn	2.25
---------------	----	------

Number of teeth		Z1	66	
Accuracy grade (JB179-83)		-	8-7C	
Addendum modification coefficients		X		
Helix direction		-		
Helix angle		$\beta$		
Base tangent length	Length	W	51.897	
	Permissible average error	Upper	Ews	-0.132
		Lower	Ewi	-0.176
Spoused gear	Part No.	-	013	
	Number of teeth	Z2	66	
Accumulated error of transverse pitch		Fp	0.090	
Limited deviation of transverse pitch		$\pm f_{pt}$	$\pm 0.020$	
Permissible error of tooth profile		Ff	0.018	
Permissible error of tooth direction		F $\beta$	0.018	

Fig. 72



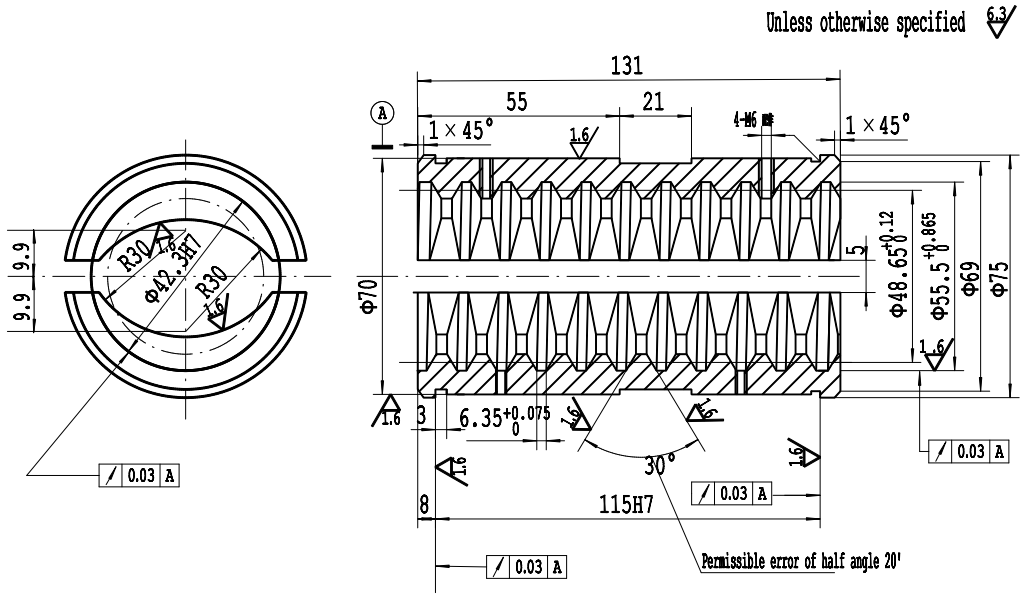
Unless otherwise specified  $\sqrt{6.3}$



Part No.	16C08H02
Part Name	Gear

Normal module		Mn	2.25	
Number of teeth		Z1	57	
Accuracy grade (JB179-83)		-	8-7C	
Addendum modification coefficients		X		
Helix direction		-		
Helix angle		$\beta$		
Base tangent length	Length	W	44.971	
	Permissible average error	Upper	Ews	-0.132
		Lower	Ewi	-0.176
Spoused gear	Part No.	-	16C08033	
	Number of teeth	Z2	66	
Accumulated error of transverse pitch		Fp	0.090	
Limited deviation of transverse pitch		$\pm f_{pt}$	$\pm 0.020$	
Permissible error of tooth profile		Ff	0.018	
Permissible error of tooth direction		F $\beta$	0.018	

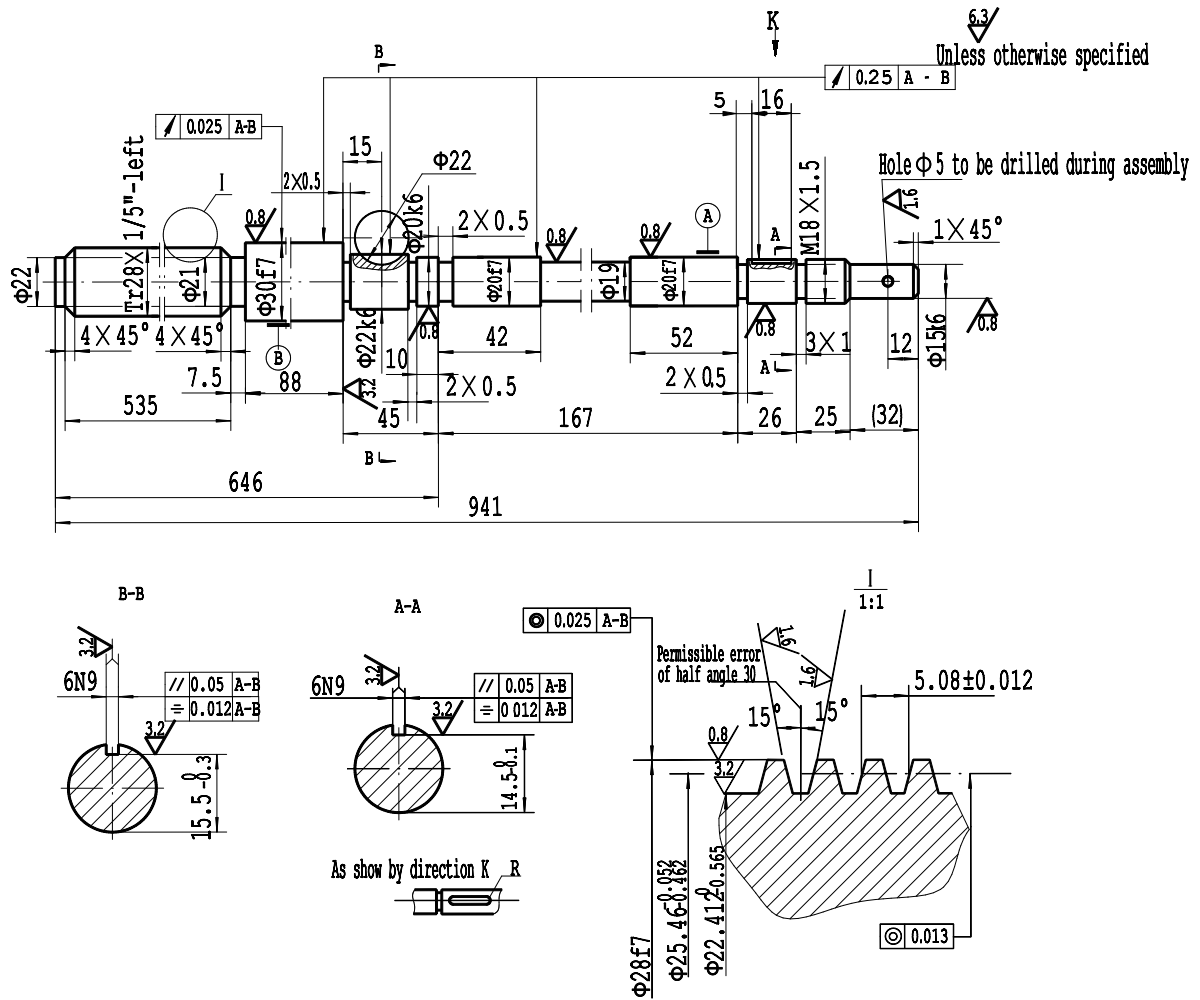
Fig. 73



NOTE: CUT IT OFF AFTER CASTING INTO WHOLE.

Part No.	16C06170
Name	Split nut

Fig. 74

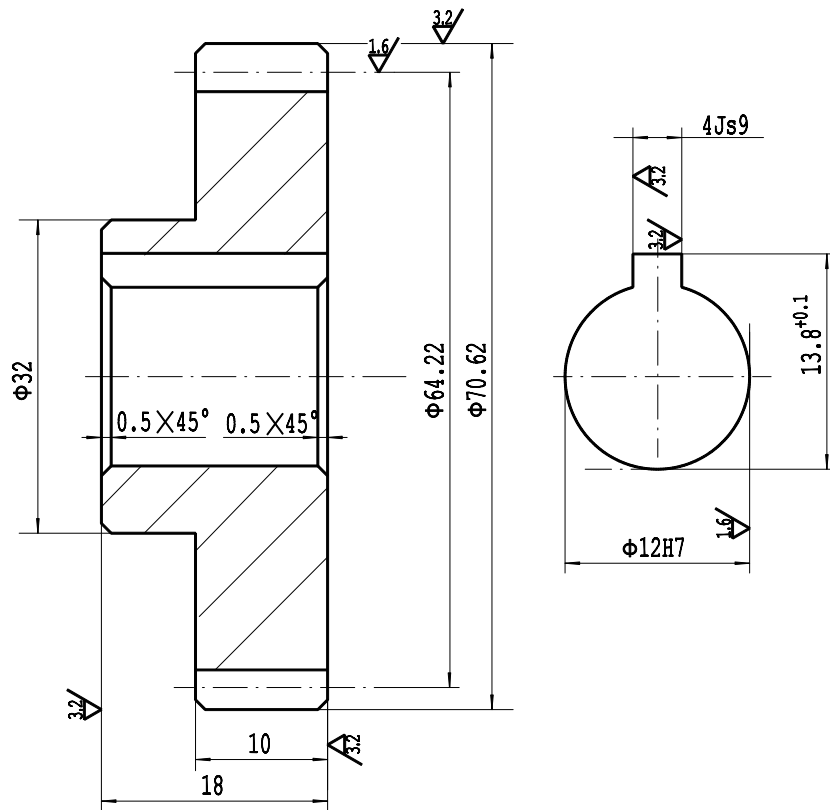


No.	Technical Requirements	Permissible Error mm
1	Accumulative error of pitch	0.018
	≤ 25	
	≤ 100	0.025
	≤ 300	0.035
	in full length	0.045

Part No.	16C05060
Name	Leadscrew

Fig. 75

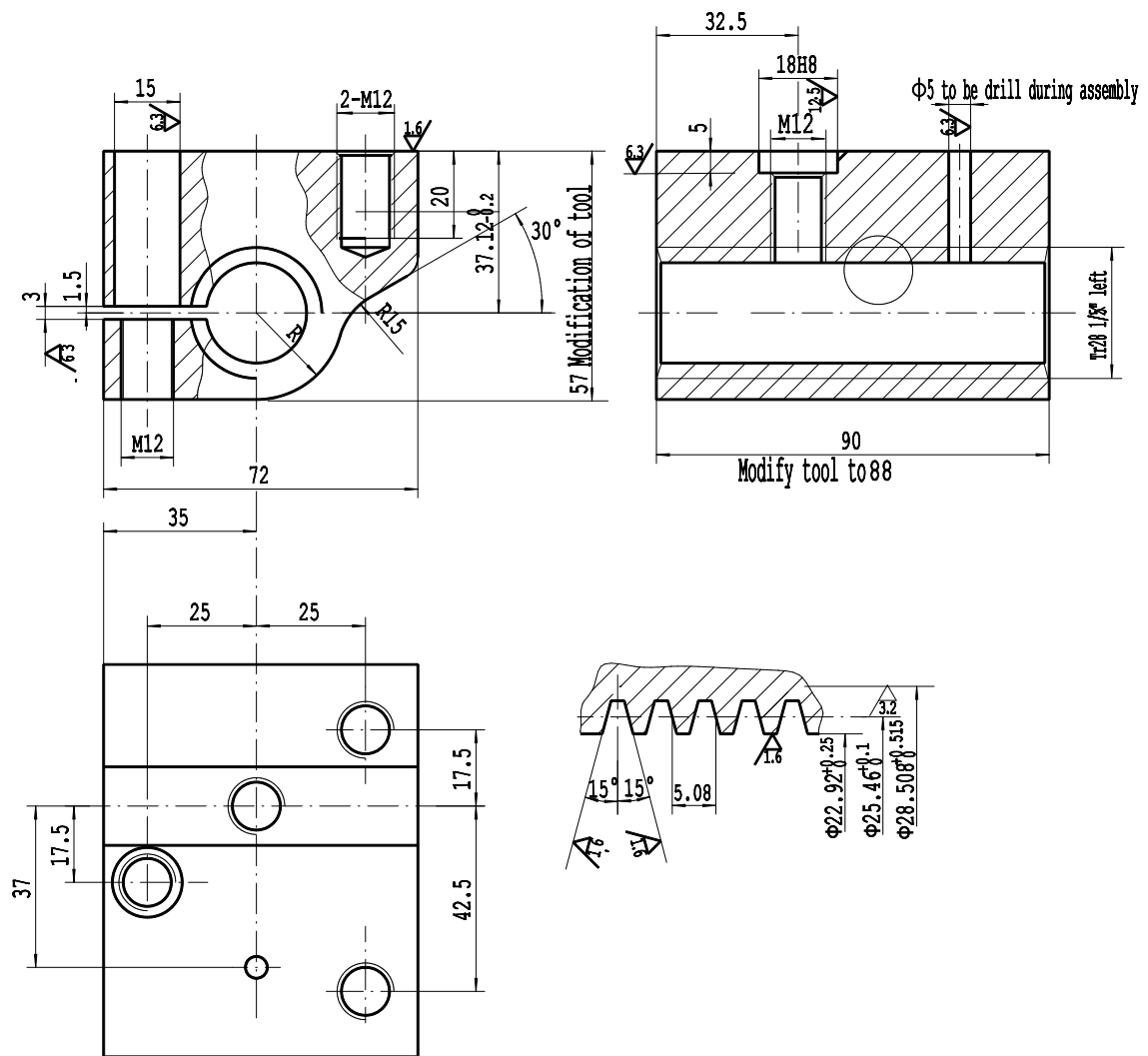
Unless otherwise specified  $\sqrt{6.3}$



Other chamfered  $1 \times 45^\circ$

		Part No.	16C63015
		Name	Bevel gear
Normal module	$m_n$	4	
No. of teeth	$Z_1$	16	
Accuracy grade (JB179-83)	-	8-8C	
Addendum modification coefficients	X		
Helix angle:	Degree	-	$4^{\circ}45'$
	Direction	$\beta$	Right
Common normal	Length:	W	18.596
	Permissible average length error:	Upper	EWS -0.090
		Lower	EWI -0.135
Accumulative pitch error	$F_p$	0.063	
Limited deviation of circular pitch	$\pm f_{pt}$	0.025	
Permissible error of tooth profile	$f_f$	0.020	
Permissible error of tooth direction	$F_\beta$	0.018	

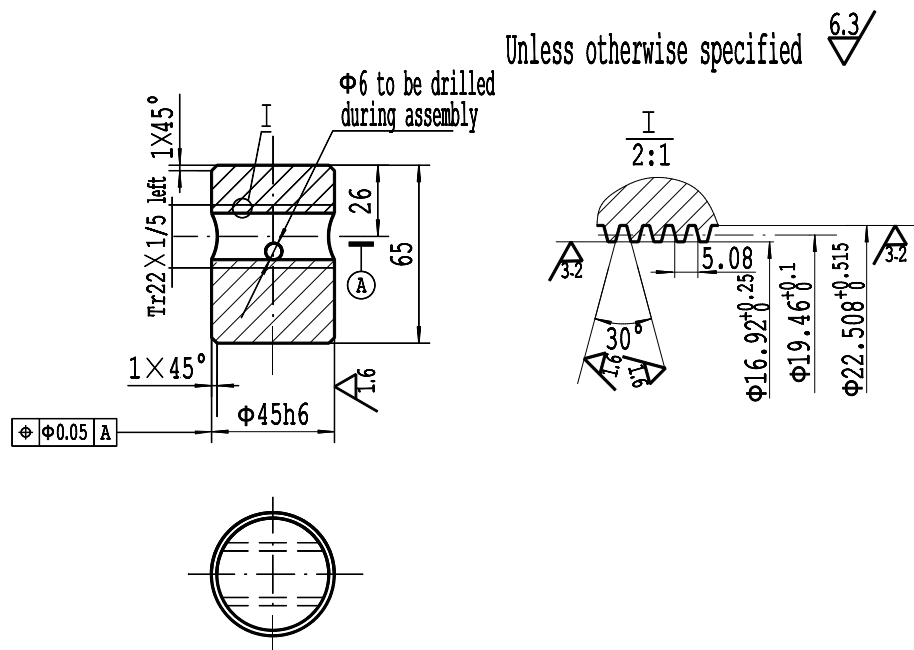
Fig. 76



Note: Other technical requirements should be in accordance with the standard B32-5.

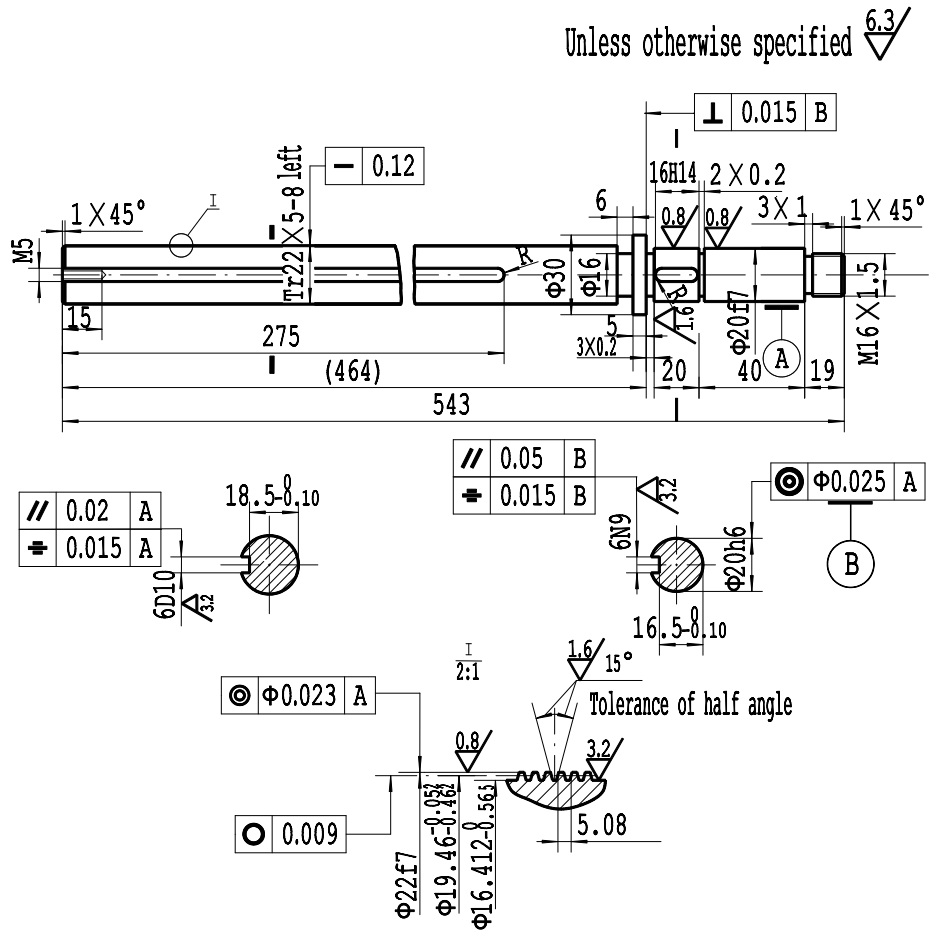
Part No.	16C05061
Part Name	Nut

Fig. 77



Part No.	18B04036
Part Name	Nut

Fig. 78



Part No.	18B04035
Part Name	Leadscrew

No.	Technical Requirements	Permissible Error mm
1	Permissible of pitch	0.012
2	Accumulative pitch error $\leq 25$	0.018
3	$\leq 100$	0.025
4	$\leq 300$	0.035
5	In full length	0.05

Fig. 79



## 15 PROTECTION MEASURES OF SAFETY OF THE MACHINE

### 15.1 Disposition of Necessary Safety Warning Labels

Although the machine has had many safety measures, there are still some potential and un-obvious risks. In order to promote operator, the machine is disposed with necessary safety warning labels. For illustration of the warning labels, see Fig. 80, Fig.81, Fig. 82 and Fig 83

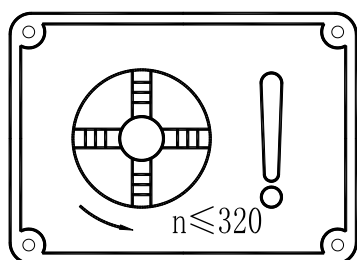


Fig. 80 Limit speed label of 4-jaw chuck

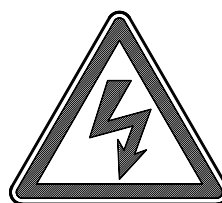


Fig. 81 Label for "Danger! Electricity!"

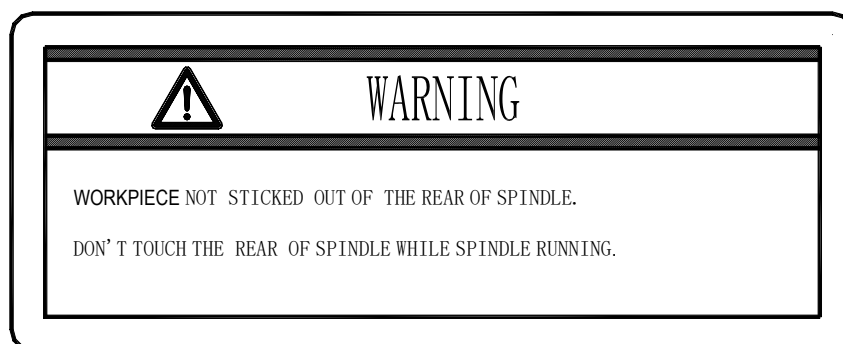


Fig. 82 Label for workpiece not stuck out of the rear of spindle

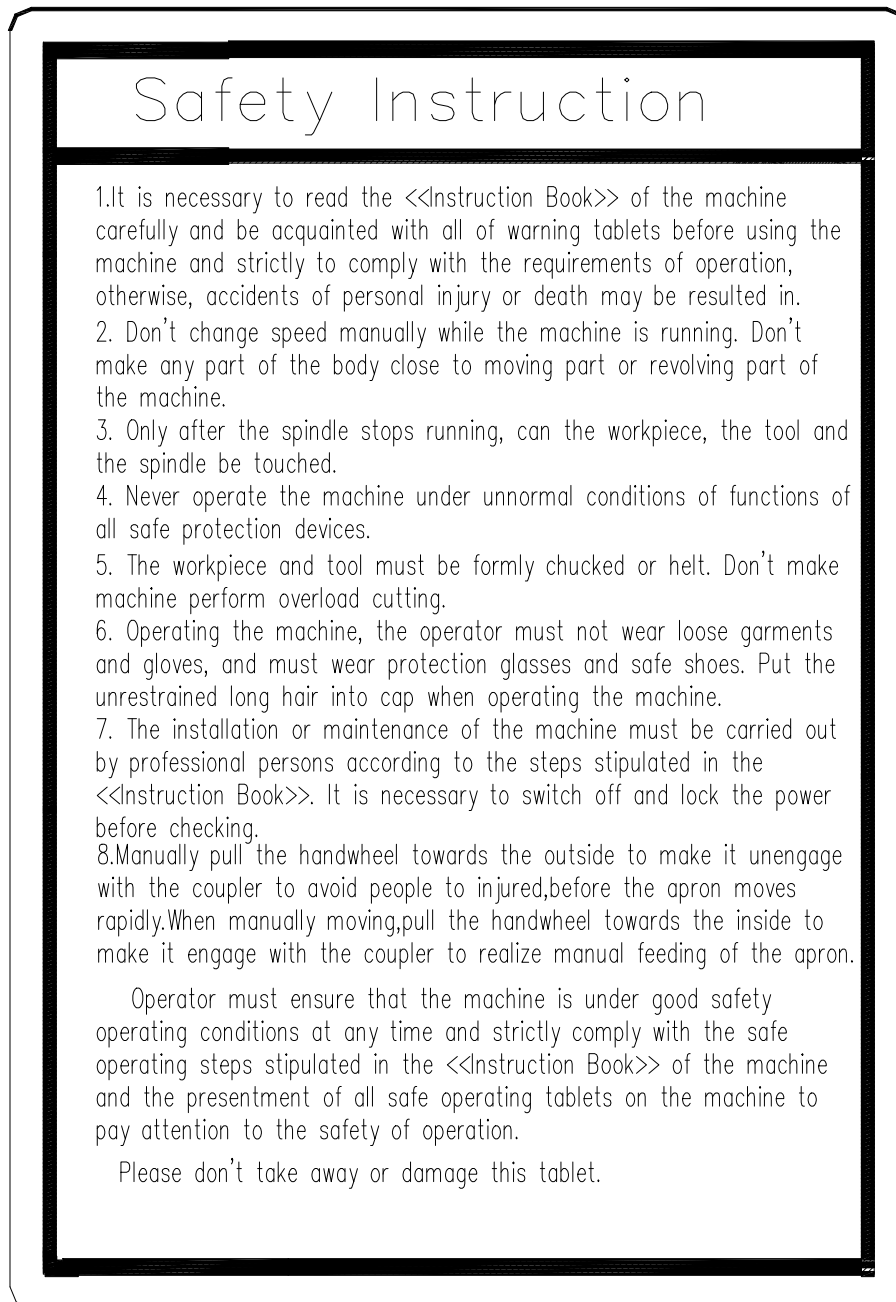


Fig. 83 Label for safety instruction

**Declaration of Conformity**

**The equipment which accompanies this declaration is in conformity with EU Directive(s):-**

2006/42/EC Machinery Directive

2004/108/EC Electromagnetic Compatibility Directive

**Manufacturer**

Name: SHENYANG No.1 LATHE WORKS

SHENYANG MACHINE TOOL CO., LTD

Address: No.1, 17 A, Kaifa Road, Shenyang Economic & Technological Development Area, China

**A copy of the Technical file for this equipment is available from:-**

CCQS UK Ltd., Suite B Regal Court, 112 London Road, Headington, Oxford OX3 9AW UK

**Description of Equipment**

CW63,80,93&110series horizontal lathes

**The following harmonised standards have been used:-**

EN 12840:2001 Manually controlled turning machines

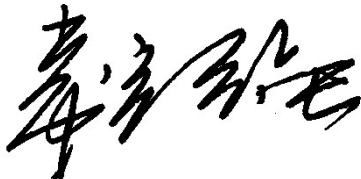
EN 60204-1:2006+A1:2009 Electrical equipment of machines — Part 1: General requirements

EN 50370-1:2005 EMC, Product family standard for machine tools — Part 1: Emission

EN 50370-2:2003 EMC, Product family standard for machine tools — Part 2: Immunity

**Authorised signatory of manufacturer**

Signature:

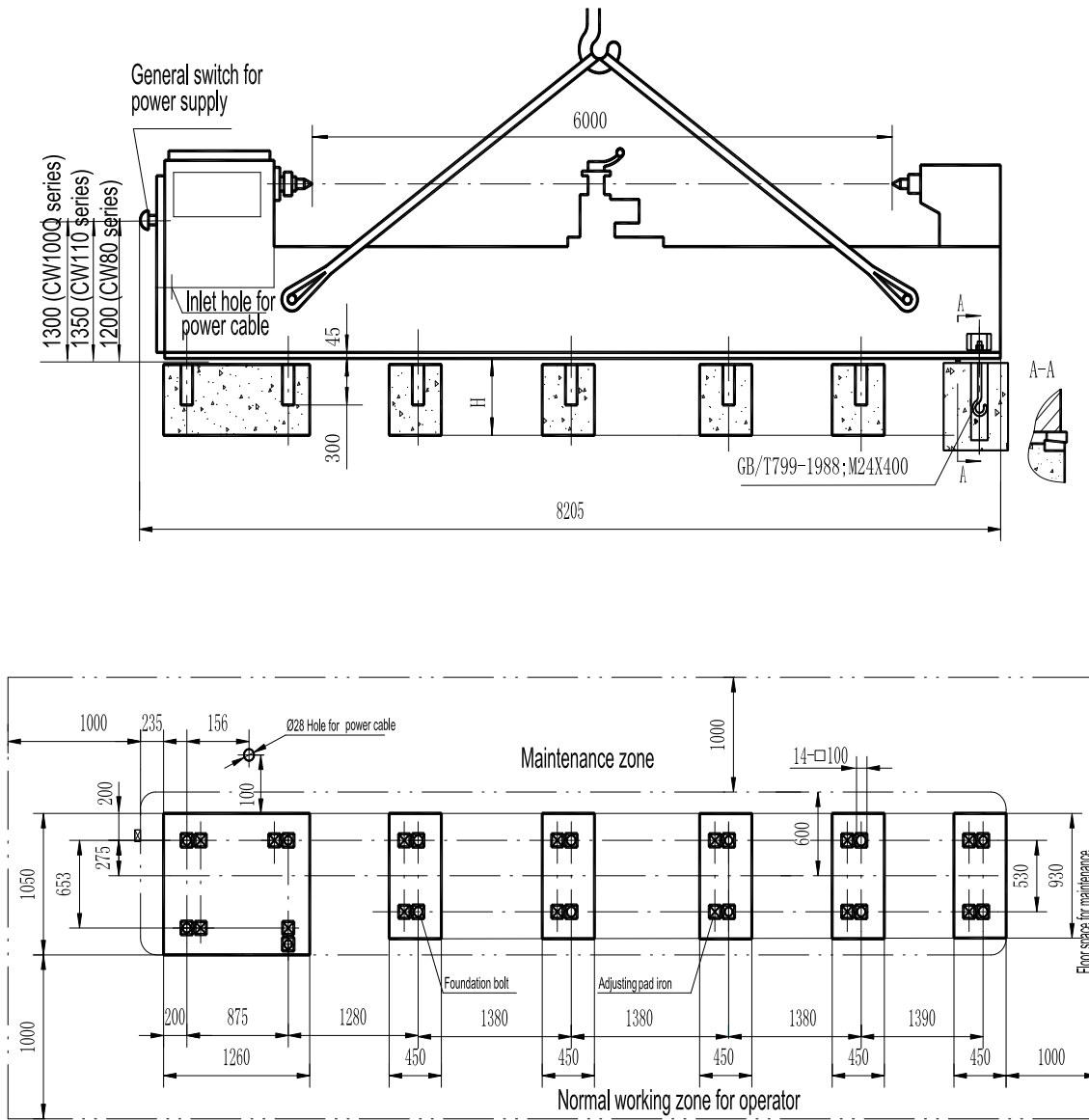


Name of signatory: Baoqiang Chang

Position in company: General Manager

Place and Date: Shenyang. Apr., 2010

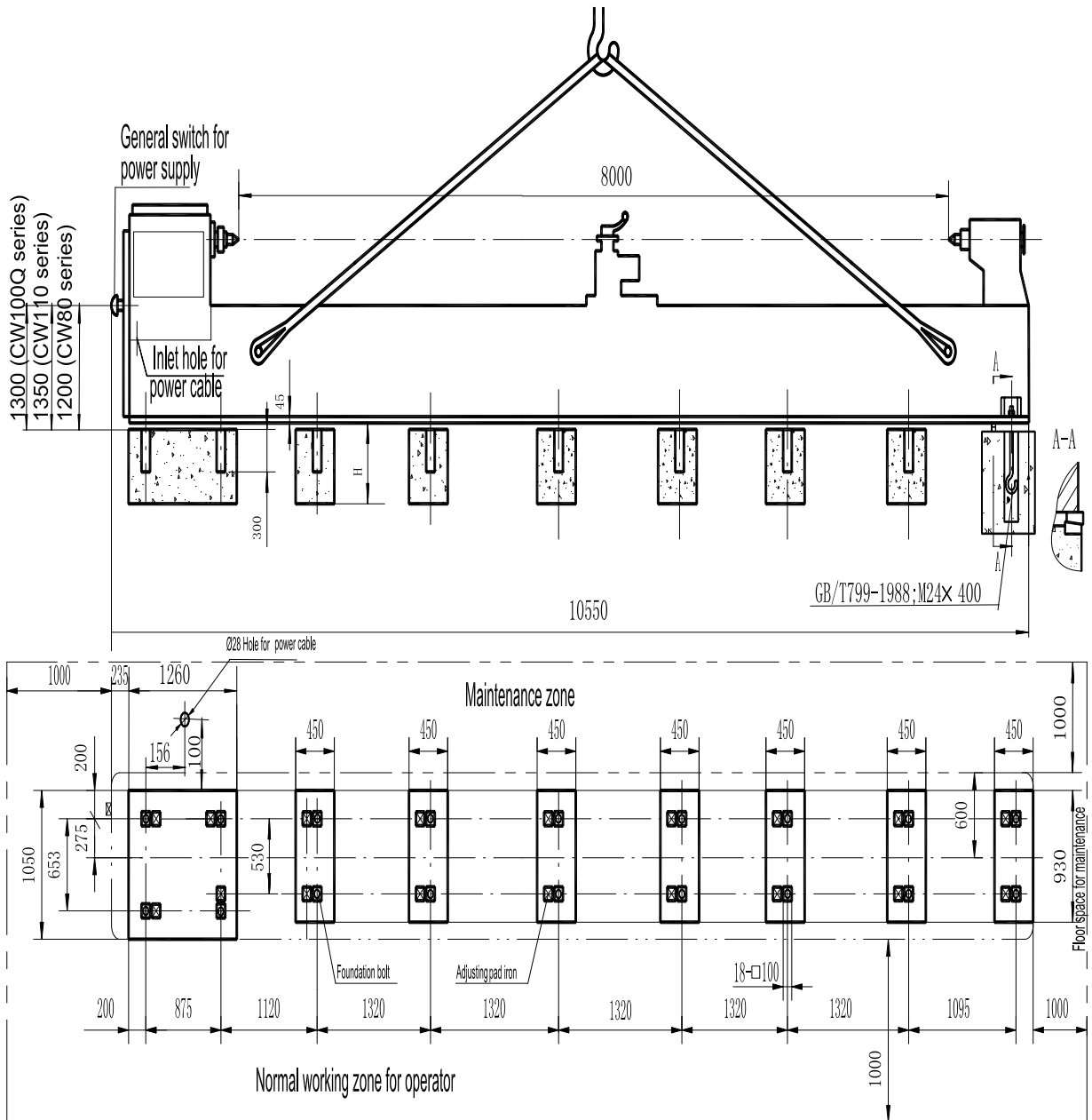
Accessory 1



Note: 1. H: decided according to property of the local soil.

2. Mark  $\boxtimes$  shows the position of wedge.

Accessory 2



Note: 1. H: decided according to property of the local soil.

2. Mark  $\boxtimes$  shows the position of wedge.