

# **GH-2480ZHD ENGINE LATHE**

# **OPERATION MANUAL**

Max. Swing over Bed:            mm

Max. Length of Workpiece:            mm

Serial No.:

## 1. Appearance of the Machine

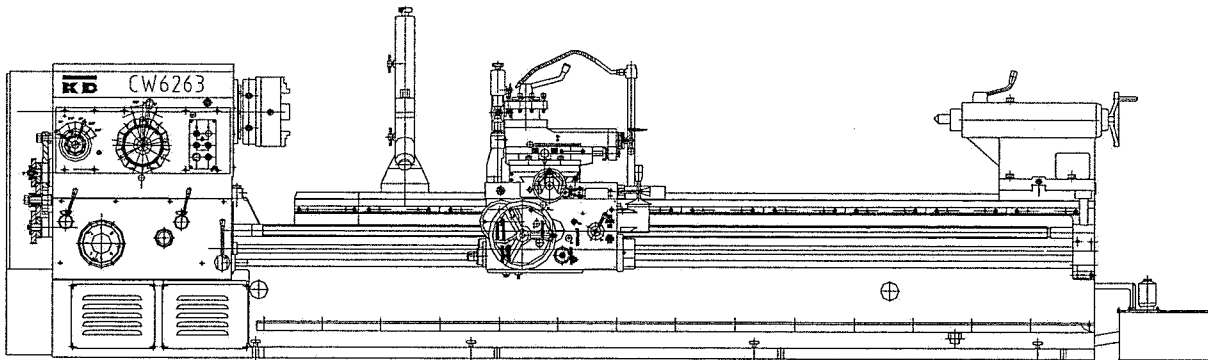


Fig. 1 Appearance of the machine

## 2. Application and characteristics of the machine

This series of machines are capable of many turning operations, such as internal and external turning, end facing and other rotary surface turning, it can cut threads which may be Metric or Inch, Module or Diametral. Grooving can also be carried out on them.

Size precision of a part cut on the machines can reach IT6 – IT7 grade. The top side can feed manually to cut different taper surfaces.

## 3. Main specifications of the machine

1) Max. swing over bed	$\Phi$ 630mm
2) Max. swing over slide	$\Phi$ 350mm
3) Max. swing over gap	$\Phi$ 830mm
4) Effective length of gap	310mm
5) Max. length of workpiece	1000/1500/2000/3000/4000mm
6) Max. cutting length	650/1150/1650/2650/3650mm
7) Spindle:	
Nose	cam lock type D-11
Spindle bore	$\Phi$ 105mm
Taper of spindle bore	Metric $\Phi$ 120
Steps of spindle speeds	18

23) Net weight

3400/3700/4200/4700Kg

## 4. Transportation, installation and test of the machine

### 4.1 Transportation

When transporting a machine in a wooden case with a crane, be sure to place the steel ropes according to the marks on the package. During craning and moving, avoid any shocking against the bottom or side of the package so as not to affect the machine precision.

Right after unpacking, check the machine outside condition, check the accessories and tools according to the "Packing list". If there is any problem, please contact the supplier.

### 4.2 Installation

The machine has been adjusted and tested before delivery. Attention must be paid to that incorrect installation may affect the precision and function of the machine. The longitudinal and cross levelness should not exceed 0.06/1000.

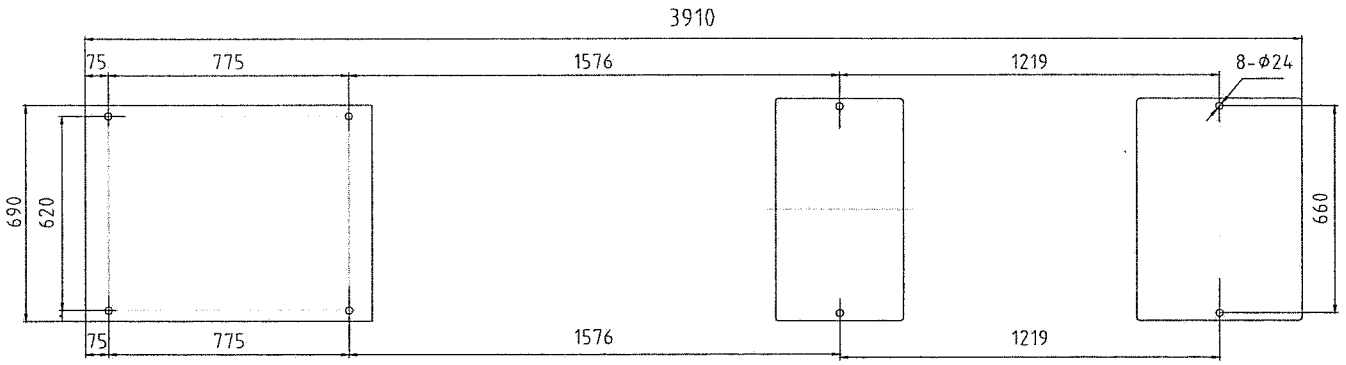
To ensure stable working, the machine foundation should have sufficient depth with regard to the local geological conditions. Before installation, put 50mm×50mm×10mm iron plates or wedged iron blocks under the adjusting bolts.

Use the above mentioned bolts or wedged iron blocks to adjust the position of the machine bed, then evenly tighten the foot bolts to reach the machine installation precision standard. Finally seal the gaps between the bed stands and the foundation with cement to prevent oil or coolant from seeping in.

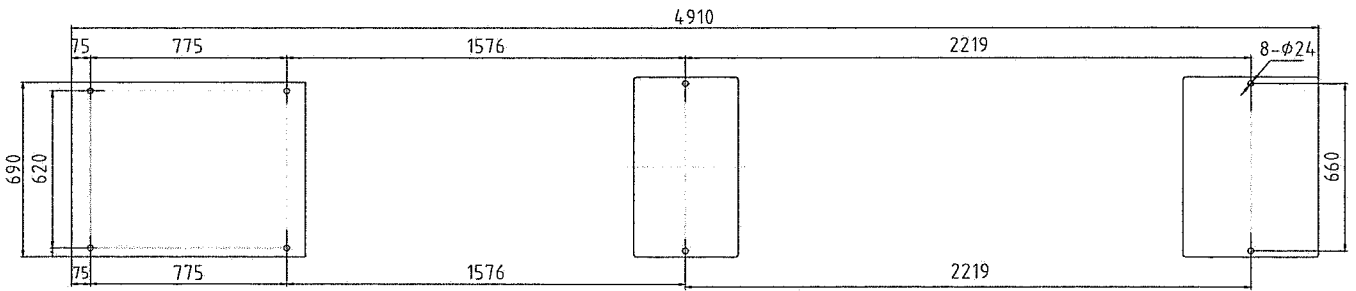
### 4.3 Cleaning and test

Use cotton yarn and kerosene to clean all rust prevention coating on each part of the machine, then smear lubrication oil on the cleaned surfaces. Never use hard substances to grind or scrape the machine for cleaning.

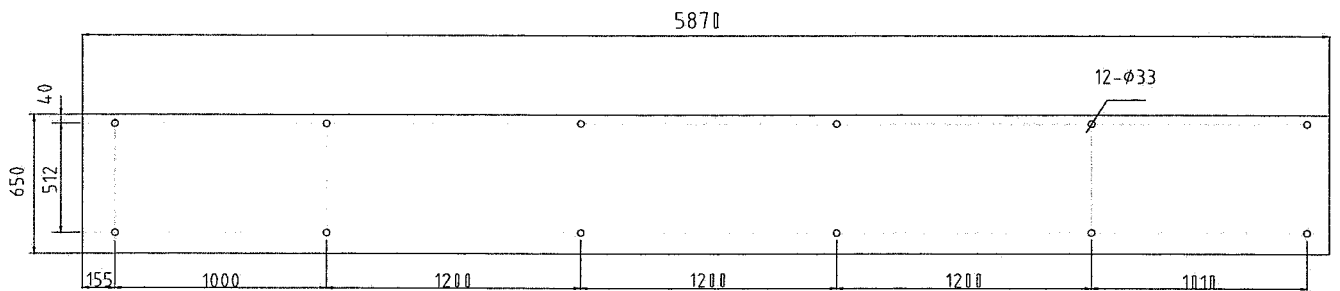
Before connecting the machine to the shop mains, check if the electric system is in proper order, especially with respect to moisture. After turning on the power, check if the motor runs in specified direction. Before operating the machine, read carefully the



Foundation diagram for 2000mm size machine



Foundation diagram for 3000mm size machine



Foundation diagram for 4000mm size machine

Fig.2 Diagram of foundation

- Chuck the workpiece with suitable chucking method.
- Select suitable cutting tool according to the workpiece materials.
- Select suitable spindle speed with spindle speed change lever according to the speed label. If the gears cannot be engaged during gear change, just manually turn the spindle for engagement.
- Turn lead screw or feed rod connector, handle for selecting metric or inch thread, lever for enlarging pitch and handle for adjusting pitch or feed rate according to the thread and feed label to select suitable feed rate.
- Move the tool post near the workpiece with longitudinal/cross feed and rapid feed lever.

Note: In consideration of operator's height of body, a step board may be placed under the operator's feet for convenience. This can also remove the danger of slip because of water or oil. The height of the step board should be 100 – 150mm.

## 5.2 Chucking requirement of the workpiece

Since the workpiece may have different shapes, size and quantities, different chucking method should be adopted.

- Chuck the workpiece with a 3-jaw chuck. This method is suitable for big lot medium or small size regular workpiece such as axle parts. When heavy shaft parts are to be cut, one end chucking one end jacking method should be used.
- For a large or irregular workpiece such as an eccentric sleeve or a crankshaft, it should be chucked by a 4-jaw chuck or faceplate and be balanced.
- For a long part or a part that is to be repeatedly chucked for machining, it should be mounted between two centers. This kind of parts include long axles, long lead screws and multi-process parts which should be milled or ground after turning.
- When a slender long axle ( $L/d \geq 25$ ) is to be cut, a steady rest or follower rest must be used to increase the rigidity of the part.

### Warning:

- The workpiece and cutting tool must be fastened securely to prevent them from flying out to make human injury.
- To chuck a workpiece with forward jaws of a 3-jaw chuck, the outside diameter of the

wheel to perform machining jobs such as drilling, counter sinking, reaming, tapping, etc.

### 5.5 Automatic feed

- Press main motor start button. Turn the spindle forward/reverse operating lever to forward. The spindle starts to run.
- Manually control the saddle longitudinal feed hand wheel and the bottom slide hand wheel to set the distance between the tool and the part. Select suitable cutting depth.
- Turn the longitudinal/cross feed lever to realize the longitudinal or cross forward or reverse feed. Turn the lever to the middle of the cross slots then the feed stops.
- If a rapid feed is needed, just press the button on top of the longitudinal/cross feed and rapid feed lever. Release the button, rapid feed stops.

Note: In case the rapid feed button fails, place the lever immediately to the middle position and turn the master power switch off.

### 5.6 Thread cutting

There are two ways for thread cutting:

#### 1) The half nuts remain engaged

Turn the half nuts operating lever to engage the lead screw. Cut thread by spindle forward and reverse turning. This method is generally used when the pitch of the machine lead screw divided by that of the thread to be cut is not a round figure.

#### 2) The half nuts may open

Turn the half nuts operating lever to engage the lead screw. Cut the thread by spindle running forward. When the tool cuts to the end of the thread, disengage the half nuts. Return the tool post to the original starting position. After feeding engage the half nuts again for threading. This method is generally used when the pitch of the machine lead screw divided by that of the thread to be cut is a round figure.

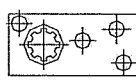










- Turn the lever for enlarging pitch on the headstock, select suitable right or left hand thread or extra big pitch thread. Turn the spindle speed change lever to select suitable spindle speed. When use the extra big pitch thread, the spindle speed is lower.
- According to the pitch and feed label on the feedbox, use different change gears and

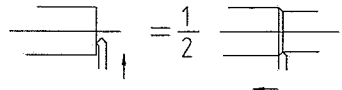
### 5.9 Rescue under emergent conditions

In case the operator has been winded by a rotating part of the machine, first press the red emergency button to cut off the power. Then take necessary rescue measures.

### 5.10 Feed system

Metric

		1:1				16:1				
		I	II	III	IV	I	II	III	IV	
		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
		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								
		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
		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								
		1	0.1	0.2	0.4	0.8	1.6	3.2	6.4	12.8
		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	0.56	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	12.16	24.32



## 6. Adjustment of the machine

### 6.1 Adjustment of spindle bearings

The spindle nose adopts standard D type nose. A manual chuck or hydraulic chuck can be supplied for easy and reliable operation. Nut 1 is used to adjust the axial clearance of two thrust bearings. Nut 2 is used to adjust the spindle back support double row roller bearing and the spindle axial clearance. They are shown in Fig. 5

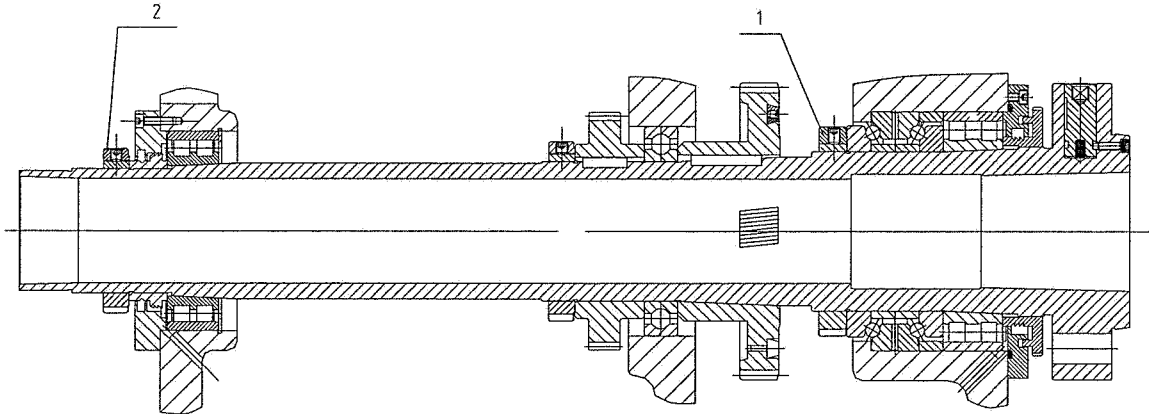


Fig. 5 Diagram of spindle structure

### 6.2 Adjustment of apron overload safety device

A one way overstep clutch is equipped on the left end of the apron. Its function is to avoid mutual interference of rapid feed system and feed system and to prevent the feed rod from too high speed turning (See section view E-E). There is an overload safety device on the worm which consists of a spiral double jaw type end clutch and a cylindrical spring. Under normal conditions, the movement of the feed rod is transmitted to the worm through the clutch. If the feed system is overloaded, the clutch disengages and the saddle slips.

The tightness of the spring has been adjusted before machine delivery. It should not be adjusted further at will. Otherwise the function of protection fails. If the torque of the clutch is really too small, then adjust nut 1 to change the pressure of the spring against the clutch (See Fig.6).



## 7. Maintenance and lubrication of the machine

### 7.1 Maintenance of the machine

- The lubrication oil in each casting case should not be lower than the middle of the oil sight glass. Otherwise the machine may be damaged because of insufficient lubrication.
- All lubrication point must be injected clean oil timely.
- Often observe the working conditions of the oil pump to ensure sufficient oil to the headstock and feed box.
- Check and adjust the tightness of V-belts regularly.
- Each time after starting the main motor, do not start the spindle at once. Only when the lubrication pump works normally and oil appears on the oil sight glass, can the spindle be started for machine working.
- When the spindle is running at a high speed, never turn the speed change levers.
- The lead screw can be used only for thread cutting to ensure its precision and service life.
- When a steady rest or follower rest is used, its workpiece supporters' contact surface must be lubricated.
- Oil must be added to guide way lubrication oil box each shift to ensure sufficient lubrication for the saddle movement. For details, please refer to " Machine lubrication".
- To stop the running spindle, turn the spindle operating lever to the middle position to brake the spindled.

The operation of braking the spindle by reversing the spindle turning direction is strictly prohibited. To reverse the spindle turning, it is necessary to stop the spindle first and then start to run in opposite direction.

### 7.2 Machine lubrication

All friction surfaces of the machine should be timely lubricated to ensure working reliability and reduce the machine parts wear and power lost. The operator of the machine should know the distribution of lubrication points, the lubricant specification,

## 8. Hydraulic system of the machine

The hydraulic system of the machine controls the spindle forward, reverse and stopping. It also lubricates the headstock and feed box.

### 8.1 Gear pump

Model CB-B10 reverse pump, pressure 2.45Mpa, flow volume 6 L/min.

### 8.2 Special rotary valve

Only for machines with center distance of less than 3000mm. It is controlled by the spindle operating lever to realize spindle forward, reverse or stopping. The valve consists of a pressure setting valve and a pressure meter switch. Turn the pressure setting handle and the pressure can be shown on the meter. The spilt oil are all used to lubricate the headstock and feed box. The pressure should be set to 0.98- 1.47Mpa.

### 8.3 Oil filter

The oil filter consists of a special net-type oil filter and a wire-clearance type WU-63×100-J oil filter to raise efficiency of filtering and to prevent dirt from entering the oil system.

### 8.4 Oil tank

The oil tank is located in the front bed-stand. Its size is 545×330×240 mm. About 35 liters of machine oil of 20# (New model is L-AN32 GB443-89) should be filled into it. When the rate of flow is not enough for the oil system, it is necessary to clean the oil tank and oil filter.

When the distance between centers of the machine is over 4000mm, 34D-10BY and 23D-10B electromagnetic switch valves and Y-10B pressure valve are used instead of a special rotating valve (See figure).

Pressure valve Y-10B is used to adjust pressure of oil system which is shown on a pressure meter. The overflow oil is used to lubricate the headstock and feedbox.

Forward running: 34D-10BY electromagnetic valve's 2DT is electrified.

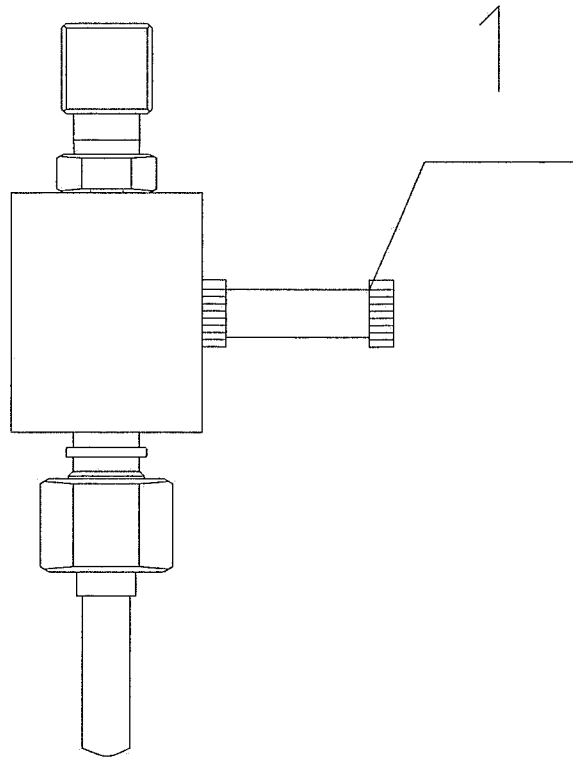
Reverse running: 34D-10BY electromagnetic valve's 3DT is electrified.

Brake: 23D-10B electromagnetic switch valve's 1DT is electrified, while 34D-10BY electromagnetic valve is de-electrified and at neutral position.

Note:

1. The hydraulic braking device of the machine is equipped with a throttle which can adjust the duration of spindle braking time. Please manually adjust the button 1 according the actual direction of the arrow. The method of adjusting is shown in the figure.

2. To avoid machine damage or shortening of service life, please prolong the braking time by turning the throttle in the direction of the arrow when the spindle is running at a high speed or when the rotary inertia of the workpiece is great.



### List of electric elements

Code	Description	Model	Specifications	Qty
			3~220/380V 50/60HZ	
QF1	Automatic switch	DZ15-40	3 poles, 50A(380V)	1
QF1	switch	NSC60E	3 poles, 60A(220V)	
QF2	switch	JCM5-32	22-32A(380V)	1
QF2	switch	JCM5-32	36-50A(220V)	1
QF3	switch	JCM5-20	0.4-0.63A	1
QF4	switch	JCM5-20	2.4-4A(380V)	1
QF4	switch	JCM5-20	3.2-5A(220V)	1
QF5-QF6	switch	DZ47-60/3A		2
TC	Control transformer	JBK5-160TH	220;380V/110V、24V	1
KM1	a. c. contactor	3TB44	Coil voltage 110V, 32A(380V)	1
KM1	a. c. contactor	3TF4622	Coil voltage 110V, 45A(220V)	1
KM2-KM3	a. c. contactor	3TB40	Coil voltage 110V, 9A	2
SQ1	Stroke switch	JW2-11H/W1		1
SQ2	Stroke switch	LXW5-11Q1		1
SB1-SB2	Button	LAY3-01ZS/1	Red	2
SB3	Button	XB2BD53C	Green	1
SB4-SB5	Button	LAY3-10	1NO	2
SA1	Turning switch	LAY3-11X/2	Black	1
EL	Machine light	JC52A	Bulb 24V, 40W	1
HL	Indicator	XB2EV163	24V, Green	1