# OPERATION MANUAL

## GAP BED LATHE

## Model: BT1640

# CONTENTS



## Special attention

1、Removing the wooden crate,if the standard accessories do not accord with the packing list ,please contact the seller.

2、Never attempt to adjust or operate the lathe before reading the operation manual.If malfunction appears send for professionaltechnicians to make maintenance.

3、Check the power whether in accordance with the machine

4、Lubricate all parts requested according to the instruction

5、Check all handles whether well located

6、 Wear working cloth, hat, approved safty glass.

7、Forbidden to wear gloves, high-heel shoes and skirts

8、Be subject to alternation without notice during the production procedure

9、Under the condition of normal use and maintenance, if the operation of the machine is not satisfied ,please contact the seller.

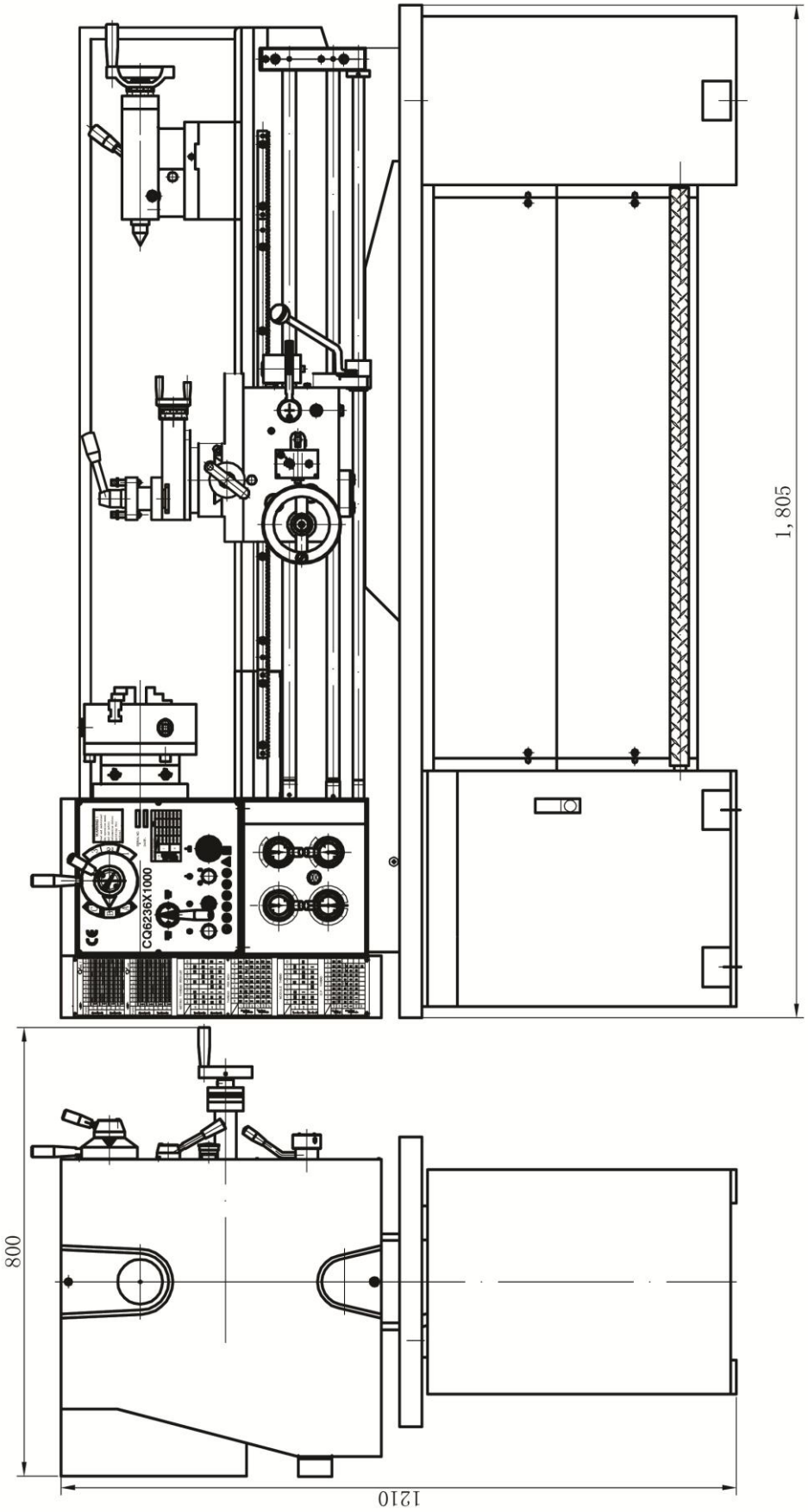



Fig1 Picture for reference

## Ⅱ PICTURE FOR REFERENCE SEE FIG1

## Ⅲ THE PRODUCTS' USE AND FEATURE:

The machine is widely used ,not only for turning processing like external circular, hole ,end, taper, cutting slot ,metric thread ,inch thread , module thread , D.P thread ,also for drilling , reaming, set of material, knurling and so on .

The machine with strong rigidity ,suit for powerful and high speed cutting of carbide cutting tools to kinds of black metal and non-ferrous metal.

It is widely used in instrument industry, repair industry, machine manufacturing industry, medium and small production of Metal cutting processing

Right and left handwheel ,metric and inch leadscrew are available for optional.

## Ⅳ MAIN TECHNICAL SPECIFICATION

### 1、 The main performance indexes

| | BT1640 |
|---|---|
| Max swing over bed | 15 3/4” |
| Max swing over gap | .20 3/4” |
| Max swing over tool post | 9 1/2” |
| Distance between centers | 39 1/2” |
| Hight center | 7 3/4” |
| Width of bed | 8 1/2” |
| Cutting tool max. section | 0.8”×0.8” |

### 2、Headstock

| | |
|---|---|
| Spindle bore | 2” |
| Spindle taper | M.T.NO.6 |
| Spindle nose | D5. 1:4(GB5900.3-1997) |
| Stindle speed rang no. | 9 or 18 |
| Spindle speed rang | 75-1400r.p.m or 65-1810r.p.m |

### 3、 THREAD &FEED

| | | |
|---|---|---|
| Guide screw | T24 mm×3 mm | |
| Guide screw of tool post | .T16 mm×2 mm | |
| Threads metric pitches | 0.4—7 mm | （32kinds） |
| Threads imperial pitches | 60—4T.P.I | （36kinds） |
| Modulus thread | 0.4—3 mm | （22kinds） |
| Diameter thread | 44—16D.P | （30kinds） |
| Longitudinal feeds | 0.053—1.291 mm | （40kinds） |
| | 0.002—0.051inches | （40kinds） |
| Cross feeds | 0.011—0.276 mm | （40kinds） |
| | 0.001—0.011inches | （40kinds） |
| Guide screw of compound rest | T14 mm×2 mm | |
| Tool post feeding | 0.02 mm | （0.001inches） |

### 4、COMPOUND REST AND TOP SLIDE

| | |
|---|---|
| Max turning Angle of tool post | ±90º |
| Top slide travel | 5 1/4” |
| Tool post travel | ..9 1/4” |

**5、Tailstock**

Dia. of tailstock sleeve……1 1/4”

Morse taper of tailstock sleeve……..M.T.NO.4

Travel of tailstock sleeve……4 3/4”

**6、Motor**

Power of main motor……..3HP (50HZ)

Power of coolant pump……...40w (50HZ)

**7、Weight & Measures**

Machine size（L×W×H）……..1900×800×1280mm

Packing size（L×W×H）……2000×900×1430mm

Net weight…… 700Kg

Gross weight…… 820Kg

## Ⅴ HOISTING &INSTALLATION

1、Checking the accessories according to the packing list after removing the wooden crate

2、Sling lathes as shown in the hoisting Fig2 when it is being transported

3、The fixed dimensions of the machine is shown in Fig3. The lathe stand cabinets should be fixed firmly to the base.

4、Remove the protection paper,clean all surfaces off anti-rust oil with mild commercial solvent like kerosene . Then add a layer of thin and even oil,move the parts with hands.

5、Level adjustment: stand cabinets and cement completely solid,then adjust the level.Start with two leveling instrument(with accurancy0.02/1000),located them on the tool post, the longitudinal and lateral (to each 90 °) two direction .Move the carriage by manual for the whole travel,adjust the mat iron, the gap should be within 2 cases in longitudinal,in cross not more than 3 case.Lock nut ,check again ,if changes lot ,adjust again till reach the request.

## Ⅵ TRANSMISSION SYSTEM&PARTS———— Fig4. Table 1 and table renewal.

## Ⅶ BEARING DISTRIBUTION AND LIST——— Fig5. Table 2

## Ⅷ LUBRICATION SYSTEM————————————Fig6. Table 3

## Ⅸ TEST OPERATION AND ADJUSTMENT

**1 Test:**

1）、Read the operation manual before start the machine ,know well of the request of the adjustment ,operation and lubrication.

2）、Check the tensioner degrees of the belt, finger can press 1-1.5 inch advisable

3）、Handles should be located on low speed first ,20 minutes later ,if no problem ,improve the speed one by one till the highest speed. Notice:Forbidden to change the speed before the spindle stopped,or damage the machine .

**2 Handles ---------- See Fig9, table 5**

1) Spindle speeds choose

Spindle can get 9 or 18 speeds with handles 1,handles 2 and double speed V type v-belts wheel,to reach work different diameter workpiece.See the plate of the spindle speed .

The turning and reversal turning rely on the position of handle 12.

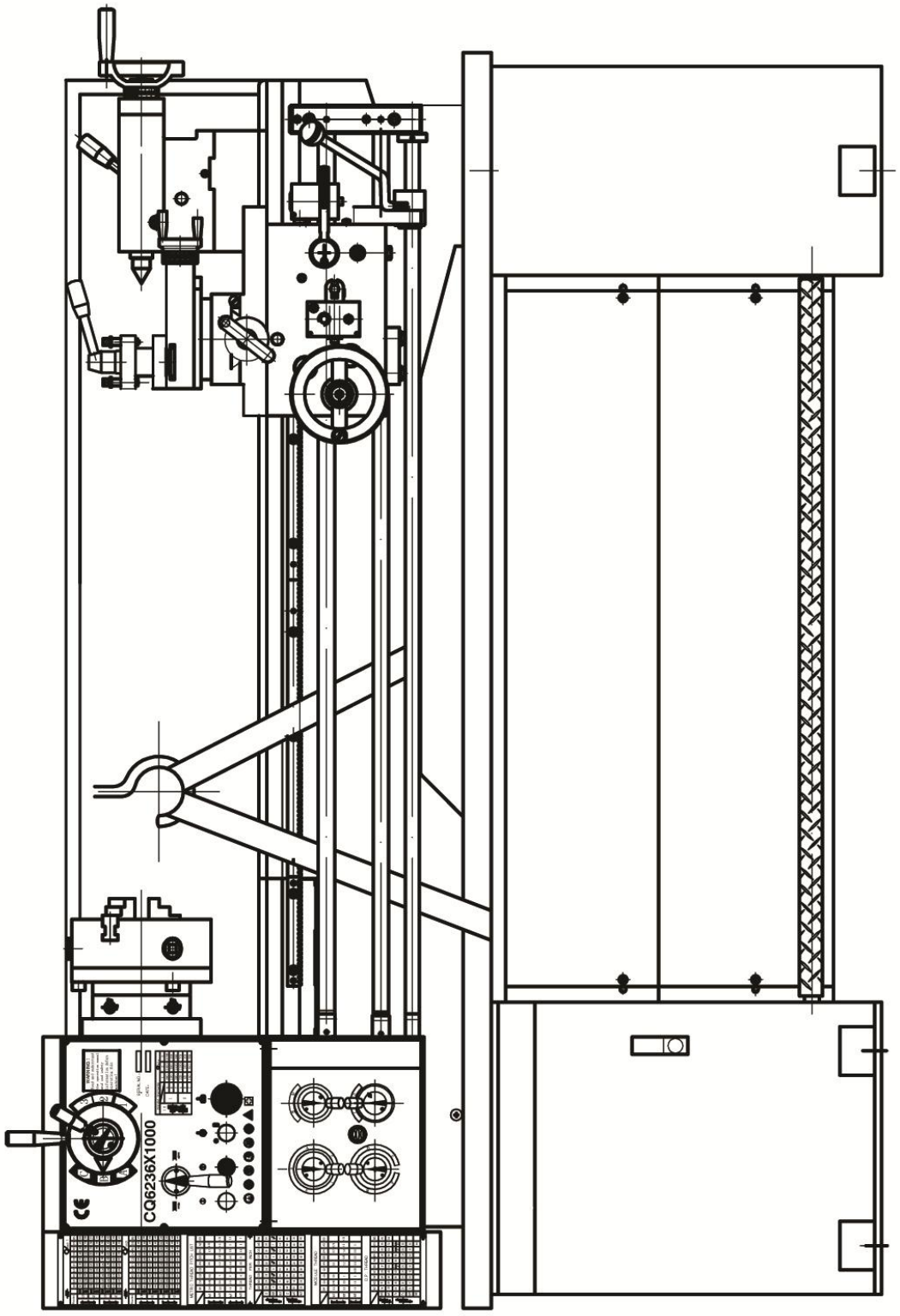



Fig2 Hoisting position

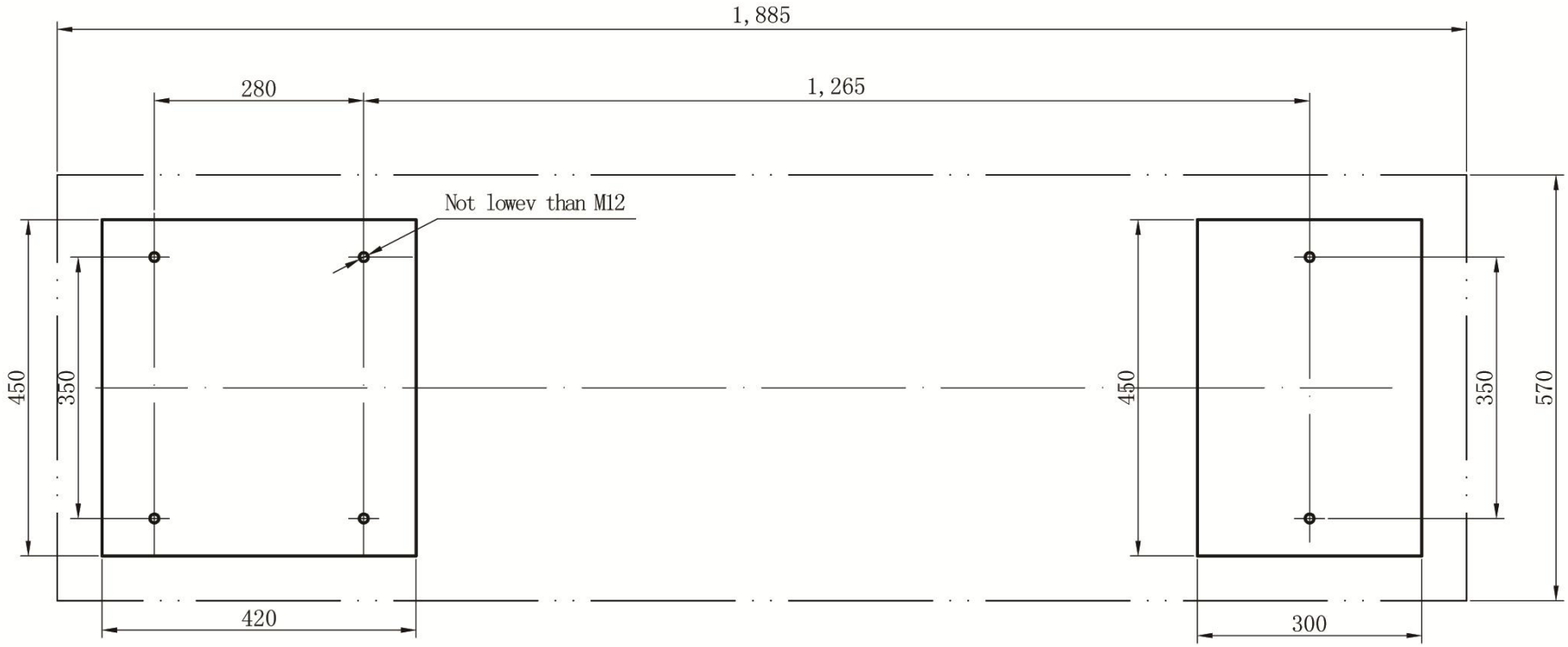



Fig3 Basic screws distribution

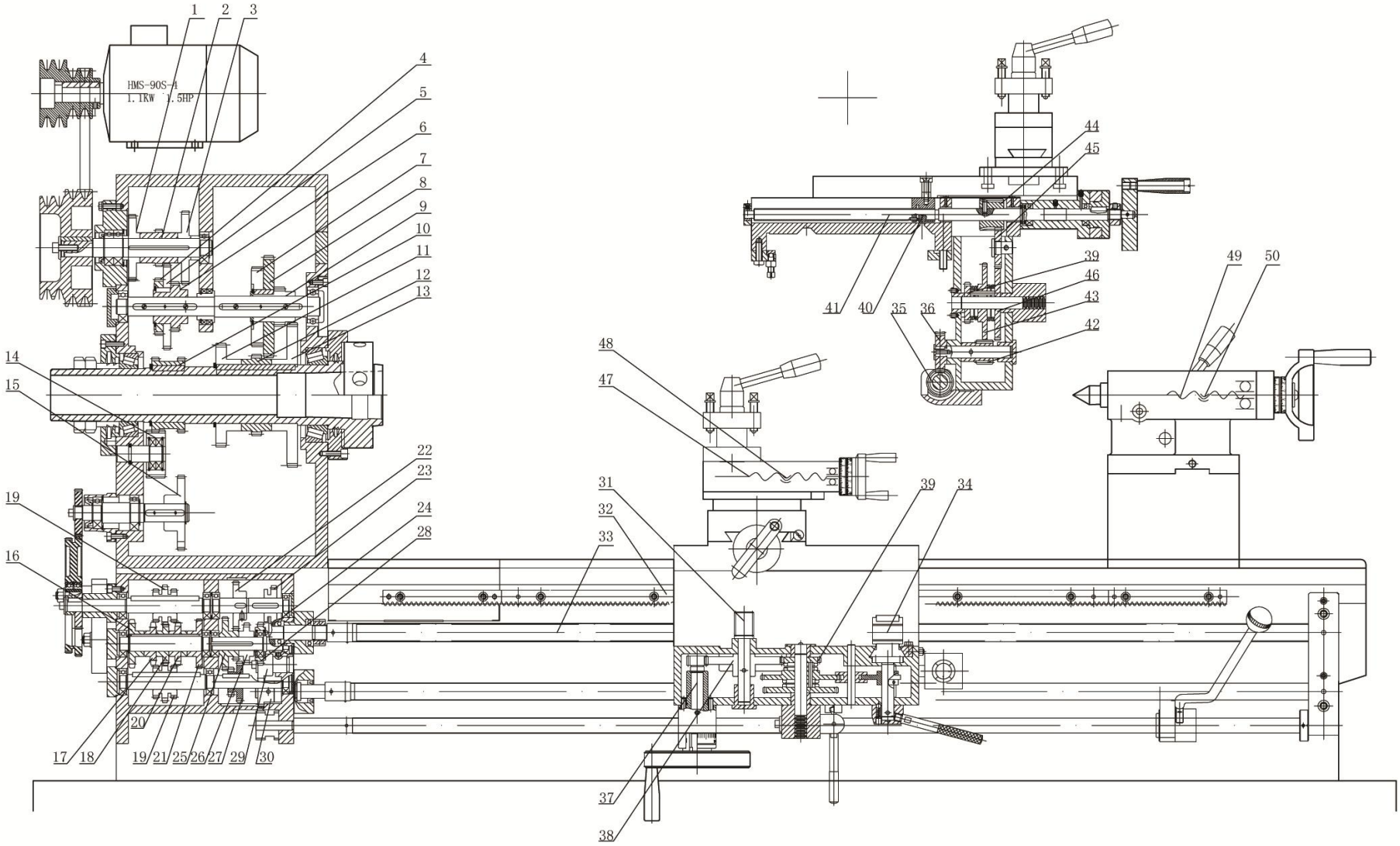



Fig4 Transmission system

# Ⅵ.TRANSMISSION SYSTEM&PARTS

**TRANSMISSION SYSTEM** **SEE FIG4 TABLE 1** **TABLE 1**

| Part | NO. | NAME | Teeth no. | Modulus | Pressure Angle | Material | Note |
|---|---|---|---|---|---|---|---|
| Headstok | 1 | Gear | 42 | M2 | 20º | 45 | 2013 |
| | 2 | Gear | 23 | M2 | 20º | 45 | 2018 |
| | 3 | Gear | 47 | M2 | 20º | 45 | 2019 |
| | 4 | Gear | 36 | M2 | 20º | 45 | 2021 |
| | 5 | Gear | 55 | M2 | 20º | 45 | 2020 |
| | 6 | Gear | 31 | M2 | 20º | 45 | 2022 |
| | 7 | Gear | 45 | M2 | 20º | 45 | 2016 |
| | ∞ | Gear | 58 | M2 | 20º | 45 | 2015 |
| | 9 | Gear | 21 | M2 | 20º | 45 | 2017 |
| | 10 | Duplicate gear | 48 | M2 | 20º | 45 | 2008 |
| | 11 | Gear | 59 | M2 | 20º | 45 | 2029 |
| | 12 | Gear | 46 | M2 | 20º | 45 | 2030 |
| | 13 | Gear | 83 | M2 | 20º | 45 | 2031 |
| | 14 | Duplicate gear | 30 | M2 | 20º | 45 | 2032 |
| | 15 | Gear | 48 | M2 | 20º | 45 | 2026 |
| Gear box | 16 | Gear | 24 | M2.25 | 20º | 45 | 3029B |
| | 17 | Gear | 16 | M2.75 | 20º | 45 | 3031B |
| | 18 | Gear | 18 | M2.75 | 20º | 45 | 3032B |
| | 19 | triple gear | 18 | M2.25<br>M2.75<br>M2.25 | 20º | 45 | 3005B |
| | 20 | Gear | 20 | M2.75 | 20º | 45 | 3003B |
| | 21 | Gear | 28 | M2.25 | 20º | 45 | 3002B |
| | 22 | Gear | 27 | M2.25 | 20º | 45 | 3027C |
| | 23 | Gear | 21 | M2.25 | 20º | 45 | 3025B |
| | 24 | Gear | 21 | M2.25 | 20º | 45 | 3018C |
| | 25 | Duplicate gear | 30<br>18 | M2.25 | 20º | 45 | 3026C |
| | 26 | Gear | 22 | M2.25 | 20º | 45 | 3007C |
| | 27 | Duplicate gear | 15<br>22 | M2.25 | 20º | 45 | 3006C |
| | 28 | Gear | 23 | M2.25 | 20º | 45 | 3009B |
| | 29 | Gear | 17 | M2.25 | 20º | 45 | 3016C |
| | 30 | Gear | 15 | M2.25 | 20º | 45 | 3014C |

# Ⅵ.TRANSMISSION SYSTEM&PARTS

**TRANSMISSION SYSTEM** **SEE FIG4** **RENEWAL TABLE**

| Part | NO. | NAME | Teeth | Modulus | Pressure Angle | Material | Note |
|---|---|---|---|---|---|---|---|
| Carriage box and saddle | 31 | Gear | 11 | M2 | 20° | 45 | 4028 |
| | 32 | Rack gear | | M2 | 20° | 45 | 1009, 1010 |
| | 33 | Guide screw | Single head | 3mm or8T.P.I | | 45 | 1005A |
| | 34 | Half nut | Single head | 3mm or 8T.P.I | | ZQSn6-6-3 | 4003A |
| | 35 | Worm | Single head | M2 | 20° | 45 | 4008 |
| | 36 | Worm gear | 24 | M2 | 20° | ZQSn6-6-3 | 4017 |
| | 37 | shaft | 12 | M2 | 20° | 45 | 4030 |
| | 38 | Gear | 50 | M2 | 20° | 45 | 4029 |
| | 39 | Gear | 25 | M2 | 20° | 45 | 4014 |
| | 40 | Guide screw nut | Single head | 2mmor10T.P.I | | ZQSn6-6-3 | 5104A |
| | 41 | Guide screw | Single head | 2mmor10T.P.I | | 45 | 5103A |
| | 42 | Gear | 14 | M2 | 20° | 45 | 4019 |
| | 43 | Gear | 51 | M2 | 20° | 45 | 4013 |
| | 44 | Gear | 19 | M2 | 20° | 45 | 5127 |
| | 45 | Gear | 25 | M2 | 20° | 45 | 4010 |
| | 46 | Gear | 48 | M2 | 20° | 45 | 4012 |
| | 47 | Guide screw | Single head | 2mmor10T.P.I | | 45 | 5011A |
| | 48 | Screw nut | Single head | 2mmor10T.P.I | | ZQSn6-6-3 | 5012A |
| Tail stock | 49 | Guide screw of tailstock | Single head | 2mmor10T.P.I | | 45 | 6006A |
| | 50 | screw nut of tailstock | Single head | 2mmor10T.P.I | | ZQSn6-6-3 | 6012A |
| Change gears | 1 | Gear | 21 | M1.25 | 20° | 45 | 3093 |
| | 2 | Gear | 22 | M1.25 | 20° | 45 | 3076C |
| | 3 | Gear | 24 | M1.25 | 20° | 45 | 2002C |
| | 4 | Gear | 26 | M1.25 | 20° | 45 | 3075C |
| | 5 | Gear | 28 | M1.25 | 20° | 45 | 3094 |
| | 6 | Gear | 38 | M1.25 | 20° | 45 | 3090C |
| | 7 | Gear | 41 | M1.25 | 20° | 45 | 3095 |
| | 8 | Gear | 44 | M1.25 | 20° | 45 | 3077C |
| | 9 | Gear | 47 | M1.25 | 20° | 45 | 3096 |
| | 10 | Gear | 48 | M1.25 | 20° | 45 | 3039C |
| | 11 | Gear | 52 | M1.25 | 20° | 45 | 3078C |
| | 12 | Duplicate gear | 120/127 | M1.25 | 20° | 45 | 3038C |

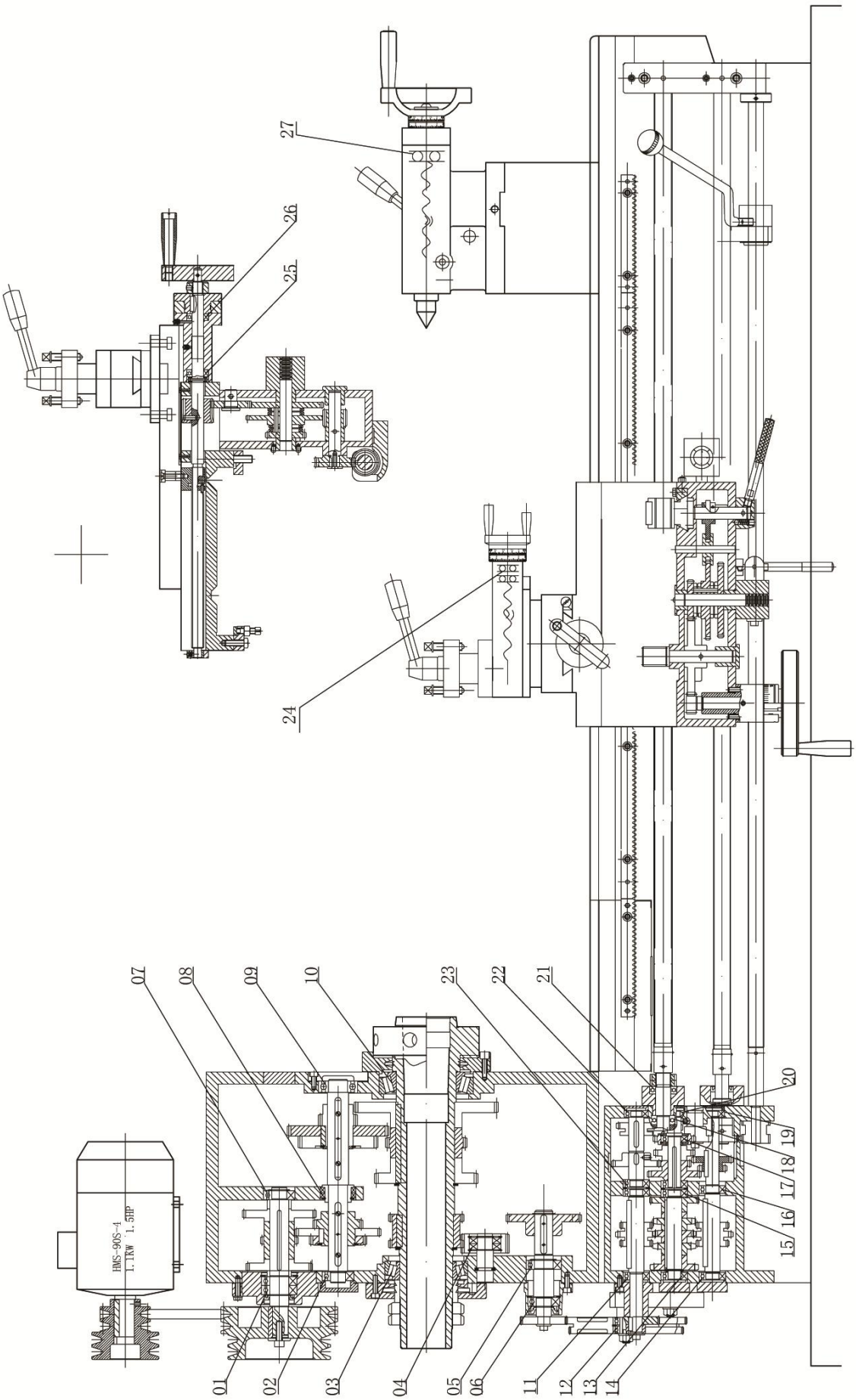



Fig5 Bearing distribution

# Ⅶ、BEARING DISTRIBUTION AND LIST

**BEARING LIST (SEE FIG 5)** **TABLE 2**

| NO. | NAME | Note | Specification | Qty | Parts |
|---|---|---|---|---|---|
| 01 | groove ball bearing | 6005 | 25×47×12 | 2 | headstock |
| 02 | groove ball bearing | 6004 | 20×42×12 | 1 | |
| 03 | conical roller bearing | 32014P5 | 70×140×25 | 1 | |
| 04 | groove ball bearing | 16004 | 20×42×8 | 2 | |
| 05 | groove ball bearing | 6005 | 25×47×12 | 1 | |
| 06 | groove ball bearing | 6004 | 20×42×12 | 1 | |
| 07 | groove ball bearing | 6004 | 20×42×12 | 1 | |
| 08 | groove ball bearing | 61807 | 35×47×7 | 2 | |
| 09 | groove ball bearing | 6205 | 25×52×15 | 1 | |
| 10 | conical roller bearing | 32016P5 | 80×125×29 | 1 | |
| 11 | groove ball bearing | 6003 | 17×35×10 | 1 | gear box |
| 12 | groove ball bearing | 6003Z | 17×35×10 | 2 | |
| 13 | groove ball bearing | 6003 | 17×35×10 | 1 | |
| 14 | groove ball bearing | 6003 | 17×35×11 | 1 | |
| 15 | groove ball bearing | 6003 | 17×35×12 | 2 | |
| 16 | groove ball bearing | 6003 | 17×35×13 | 1 | |
| 17 | groove ball bearing | 16003 | 17×35×8 | 1 | |
| 18 | thrust ball bearing | 51103 | 17×30×9 | 1 | |
| 19 | groove ball bearing | 6002 | 15×32×9 | 1 | |
| 20 | groove ball bearing | 6002 | 15×32×10 | 1 | |
| 21 | thrust ball bearing | 51104 | 20×35×10 | 1 | |
| 22 | groove ball bearing | 6002 | 15×32×9 | 1 | |
| 23 | groove ball bearing | 6003 | 17×35×11 | 1 | |
| 24 | thrust ball bearing | 51101 | 12×26×9 | 2 | saddle |
| 25 | thrust ball bearing | 51102 | 15×28×9 | 1 | |
| 26 | thrust ball bearing | 51102 | 15×28×10 | 1 | |
| 27 | thrust ball bearing | 51101 | 12×26×9 | 1 | tailstock |

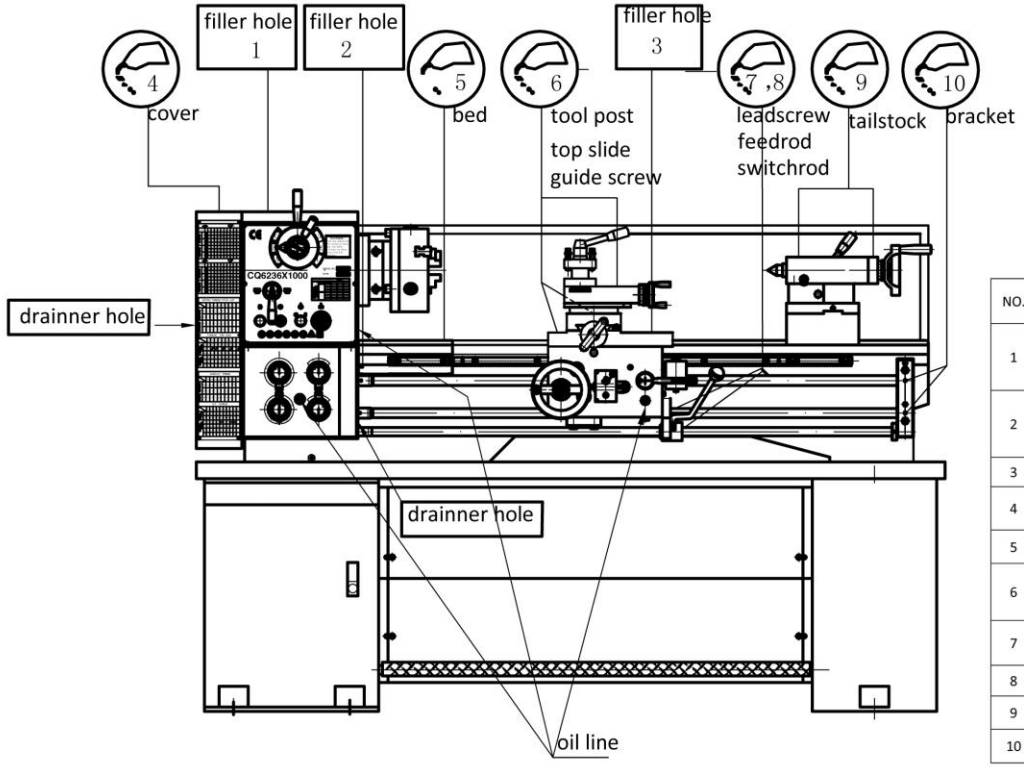



Fig 6 Lubrication

Table 3

| NO. | LOCATION | HOW | HOW MUCH | HOW LONG TO FILL UP | OIL QUALITY |
|---|---|---|---|---|---|
| 1 | HEADSTOCK | Remove the screws of filler on left side up | L | Onece first month,then every two month | NO.15 SY1229 |
| 2 | GEAR BOX | Open top cover remove the screws of filler | L | Once a month | N0.22 L-AN GB443-1989 |
| 3 | SADDLE | open oil plug | L | Once a day | N0.22 L-AN |
| 4 | CHANGE GEAR | open the cover | Approp | Once a day | N0.22 L-AN |
| 5 | BEDWAYS | By oil gun | Approp | Twice a day | N0.22 L-AN |
| 6 | TOOL POST,TOP SLIDE,GUIDE SCREW | By oil gun | Approp | Twice a day | N0.22 L-AN |
| 7 | LEADSCREW ,FEED ROD, SWITCH ROD | By oil gun | Approp | Once a day | N0.22 L-AN |
| 8 | HALF NUT | By oil gun | Approp | Once a day | N0.22 L-AN |
| 9 | TAILSTOCK | By oil gun | Approp | Once a day | N0.22 L-AN |
| 10 | BRACKET | open oil plug | L | Twice a day | N0.22 L-AN |

**2）Feed and pitch** The main way to maintain different feeding and pitch by gear box and change gears. According to the gears chart,different gears and movement of handle from 04-07 ,we can obtain 40 feeding,more than 30 metric and inch pitch,20 module and pitch

.**Notice:When change the position of the handles,spindle must stopped first .**

**3)Saddle compound rest**

Turn handwheel 08 ,make the saddle move left or right. Turn handwheel 08,make the tool post move forward or backward. Loosen nut 20 ,change the rotation Angle of top slide. Tighten nut 20, Turn handwheel 18,move the top slide to achieve the requirements of taper processing

Change the position of the handwheel 9 can obtain auto feeding .

UP-Saddle longitudinal move

DOWN-Tool post horizontal move

MIDDLE-Stop thread by manual with half nut

**4）Thread indicator 11**

When screw turn one circle,the work piece rotation is an integer ,teeth position same.If not an integer,teeth wrong . We can change the movement direction or thread chasing dial .See left Fig 7.Meaning checking Table 4.

INDICATOR TABLE

| T | mm | SCALE | T | mm | SCALE |
|---|---|---|---|---|---|
| 0 | 0.5 | / | 15 | 0.45 | 1 |
| | 0.6 | / | | 0.9 | 1 |
| | 0.75 | / | | 1.25 | 1 |
| | 1 | / | | 1.8 | 1 |
| | 1.5 | / | | 2.25 | 1 |
| | 3 | / | | 2.50 | 1 |
| 16 | 0.4 | 1—8 | | 4.50 | 1 |
| | 0.8 | 1· 3· 5· 7 | | 5 | 1 |
| | 1.2 | 1—8 | 14 | 0.7 | 1· 5 |
| | 1.6 | 1· 5 | | 1.4 | 1· 5 |
| | 2 | 1—8 | | 1.75 | 1· 5 |
| | 2.4 | 1· 3· 5· 7 | | 2.8 | 1 |
| | 3.2 | 1 | | 3.5 | 1· 5 |
| | 4 | 1· 3· 5· 7 | | 7 | 1· 5 |
| | 4.8 | 1· 5 | | | |
| | 6 | 1—8 | | | |

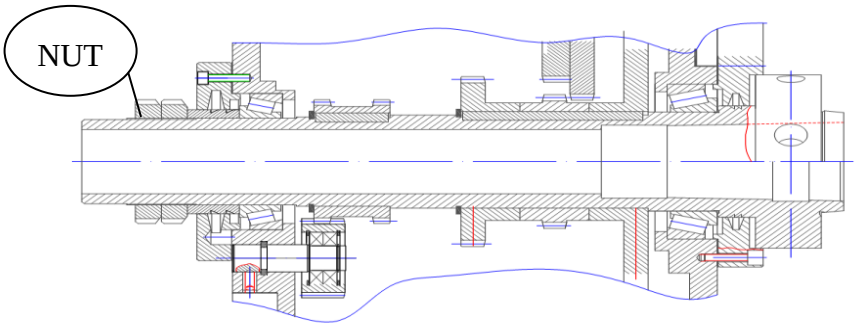
Fig7 thread indicator

Table 4

| code | significance |
|---|---|
| 1——8 | Any a scribed line alignment, press half nut ,teeth right |
| 1 | scribed line 1 alignment, press half nut ,teeth right |
| 1.5 | scribed line 1 or 5 alignment, press half nut ,teeth right |
| 1.3．5.7 | scribed line 1 or 3or 5 or 7 alignment, press half nut ,teeth right |
| / | No need of thread indicator ,press half nut anywhere,teeth right |

**3 Adjustment**

1)adjustment of clearance of the spindle see fig8( Turn below page16 )



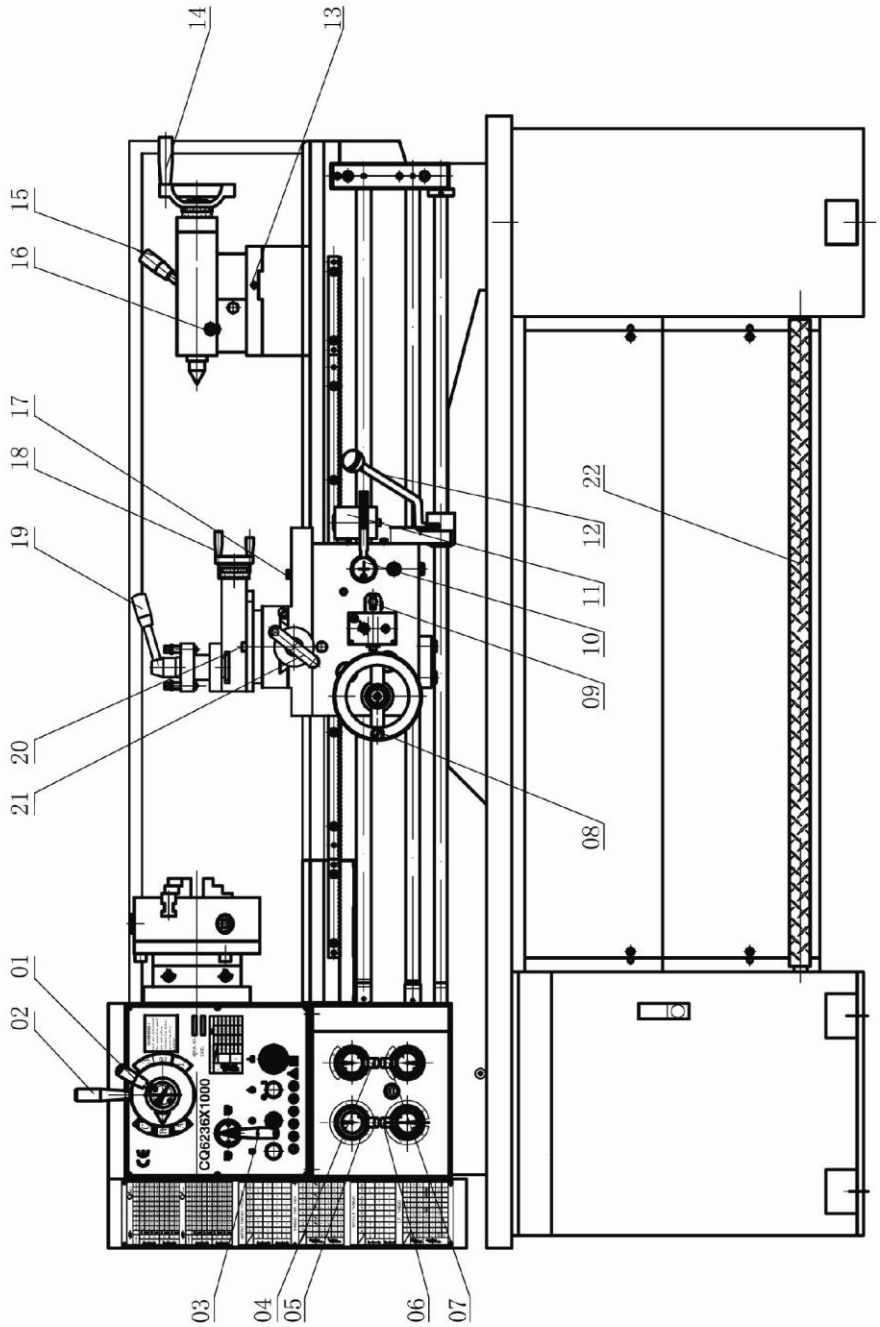



Fig 7 Handles

# Handles and use

Table 5

| NO. | INSTALLATION | NAME | FUNCTION |
|---|---|---|---|
| 01 | headstock | variable speed handle Ⅰ | spindle speed |
| 02 | | variable speed handle Ⅱ | spindle speed |
| 03 | | turn &reverse handls | change the move direction of the saddle |
| 04 | feed box | thread or feed handle | S-feeding M-threading |
| 05 | | feeding and pitch handle | obtain appropriate feeding or pitch |
| 06 | | feeding and pitch handle | |
| 07 | | increases times optional handle | |
| 08 | carriage | carriage movement handle | carriage move left or right |
| 09 | | vertical and horizontal handles | control move direction or manual |
| 10 | | handle of half nut | the combination or separation of the thread |
| 11 | | thread chasing dial | the combination or separation of thread dial |
| 12 | | start switch handle | turn or reverse turn or stop of the machine |
| 13 | tailstock | adjust screw of tailstock center | the coaxial tolerance of tailstock and spindle |
| 14 | | handwheel of tailstock sleeve | move forward or backward of the tailstock sleeve |
| 15 | | lock handle of the tailstock | tailstock movement |
| 16 | | lock handle of the tailstock sleeve | tailstock sleeve clearance and movement |
| 17 | compound rest and saddle | lock nut of bed | lock the saddle |
| 18 | | handwheel of top slide | make the top slide move forward or backword |
| 19 | | lock nut of tool | control of the rotation of the tool |
| 20 | | Lock nut of rotary tool | control of the rotation of the rotary tool |
| 21 | | tool post handwheel | tool post move forward or backward |
| 22 | bed | foot brake switch | control the rotation of the lathe |

Spindle adopt high precision conical roller bearing, after period of time, bearing trace to wear, the gap increases,so adjustment is needed ,please follow below steps:Loosen the two nut at spindle back-end,tighten front nut,test the spindle by hand with micro tight, backward 1/4 circle,then tighten one back nut .

2) clearance adjustment between tool post and top slide: Turn the screw at the right hand to right side ,the gap becomes small,otherwise becomes big.

3) gap adjustment of guidescrew nut:see fig10,Turn screw 1 to eliminate the gap ,the gap can't be too small or wear is intensified.

4)mount or detach of chuck and face plate:see fig11,the spindle connect the chuck by D-Cam and pull pins.When mounting,put the three pull pins of the chuck into the three wholes on the spindle face end,then turn the three cams with the aid of square headwrench,when turning the cams clockwise,the chuck will be locked,when turning the cams counter-clockwise to certain point,the chuckcan be detached.

## 十 Electrical system

1) 380V -400V 50HZ,60HZ Electrical dirgram see Fig 12 form8 Electrical components

2） 110V -220V 50HZ Electrical dirgram see Fig 13 form9 Electrical components

Check the power and frequency whether in accordance with the request of the machine ,add 25 A fuse.

Switch rod 12 located in the middle position,the machine stop,to make sure the machine unable to start ,KA with electricity,then next step continue.

Switch rod 12 move upwards,the spindle turn counterclockwise,move it down,the spindle turn clockwise.If not , cut off power supply, exchange of any two power into line

3）Lathe must have a good grounding lines.

4）The circuit diagram is only for reference. Practical circuit diagram covered at the back of the electrical box to facilitate the maintenance

## 十一 TROUBLE SHOOTING PART form 6

| No. | Name | Maerial | Qty | Specification | Note |
|---|---|---|---|---|---|
| 1 | Horizontal feeding nut | ZQSn6-6-3 | 1 | CQ6236-5104 | Fig14 |
| 2 | Half nut | ZQSn6-6-3 | 1 | CQ6236-4003 | Fig15 |

## 十二 OPTIONAL ACCESSORIES see Form9 form7

| No. | Name | Qty | Note |
|---|---|---|---|
| 1 | steady rest | 1SET | |
| 2 | follow rest | 1SET | |
| 3 | 4 jaw chuck | 1SET | |
| 4 | face palte | 1SET | |
| 5 | coolant system | 1SET | |
| 6 | chuck cover | 1SET | Switch power |
| 7 | live center | M.T.NO.3 | 1SET |
| p8 | footbrake system | 1SET | |

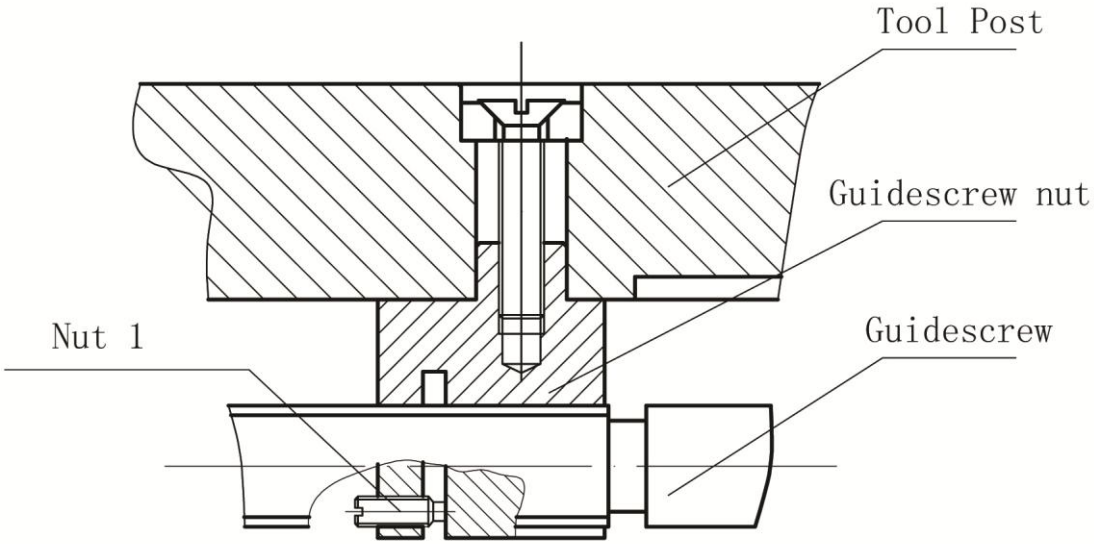



Fig 10 Adjust the gap of horizontal feeding nut

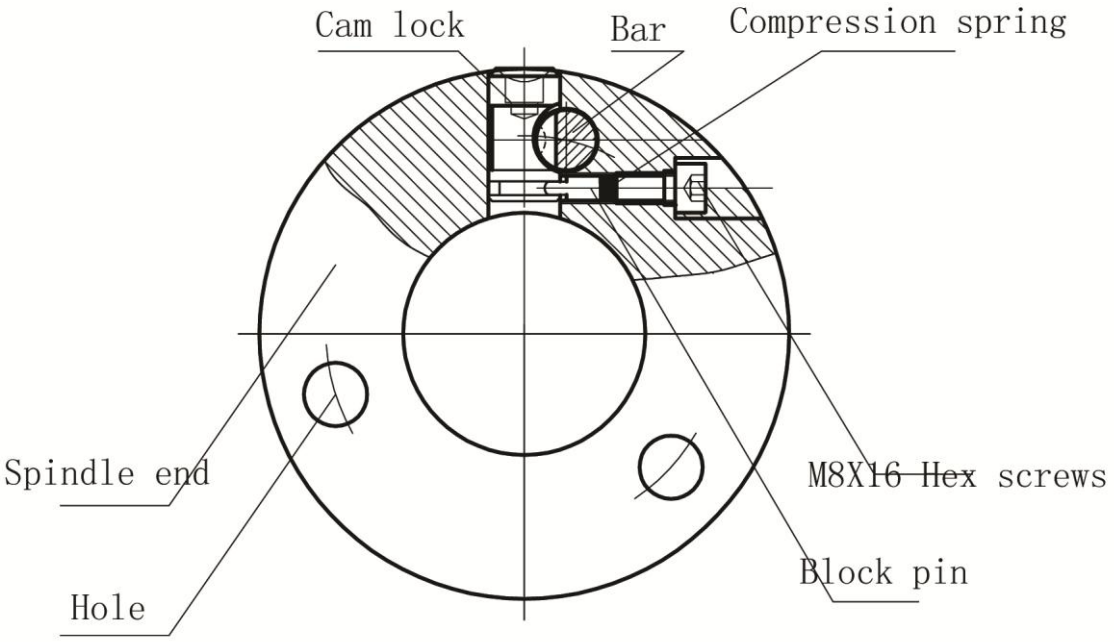



Fig 11 chuck or face plate lock structure

## Electrical components list Table 8

| NO. | CODE | NAME | MODEL | QTY |
|---|---|---|---|---|
| 1 | M1 | main motor | Y90S-4 380V | 1 |
| 2 | M2 | cooling motor | DB-12 | 1 |
| 3 | KM1 KM2 | contactor | LC1-D1209 24V | 2 |
| 4 | KM3 | cooling relay | LC1-D1209 24V | 1 |
| 5 | KA | middle relay | 32C4-40 24V | 1 |
| 6 | QM | circuit breaker | DZ47-63,3P | 1 |
| 7 | QF | circuit breaker | DZ47-63,1P | 1 |
| 8 | TC | transformer | JBK5-63 | 1 |
| 9 | EL | work light | JBK9-2A orJL50D-1 | 1 |
| 10 | HL | indicator | AD118.8/21-8GZ | 1 |
| 11 | $SB_1$ | emergency stop button | LA38 Ith 10A | 1 |
| 12 | $SB_2$ | point start button | L38-11/207 | 1 |
| 13 | 1SA,2SA | positive &negative switching | LXW5-11D1 | 2 |
| 14 | 3SA | switch power of cover | LXW5-M/L | 1 |
| 15 | 4SA | switch power of chuck cover | LXW5-M/L | 1 |
| 16 | 5SA | cooling control switch | LAY-11X/2 | 1 |
| 17 | SF | power switch of footbrake | LXW5-11N1/L | 1 |

## Electrical components list(Single phase) Table9

| | | | | |
|---|---|---|---|---|
| 1 | M1 | main motor | Y90L2-4 220V 1.5KW | 1 |
| 2 | FR | thermal relay | T16 | 1 |
| 3 | FU | fuse | RT23-16 24V 2A | 1 |
| 4 | SB1 | button | LA38 ITH 10A | 1 |
| 5 | SB2 | button | LA38-11/207 | 1 |
| 6 | SQ1 | micro switch | LXW5-11D1 | 1 |
| 7 | SQ2 | micro switch | LXW5-11D1 | 1 |
| 8 | HL | indicator | AD118.8/21-8GZ | 1 |
| 9 | T | control transformer | JBK5-63 | 1 |
| 10 | KA | middle relay | 32C4-40 24V | 1 |
| 11 | KM1 | Ac contactor | LC1-D1209 24V | 1 |
| 12 | KM2 | Ac contactor | LC1-D1209 24V | 1 |

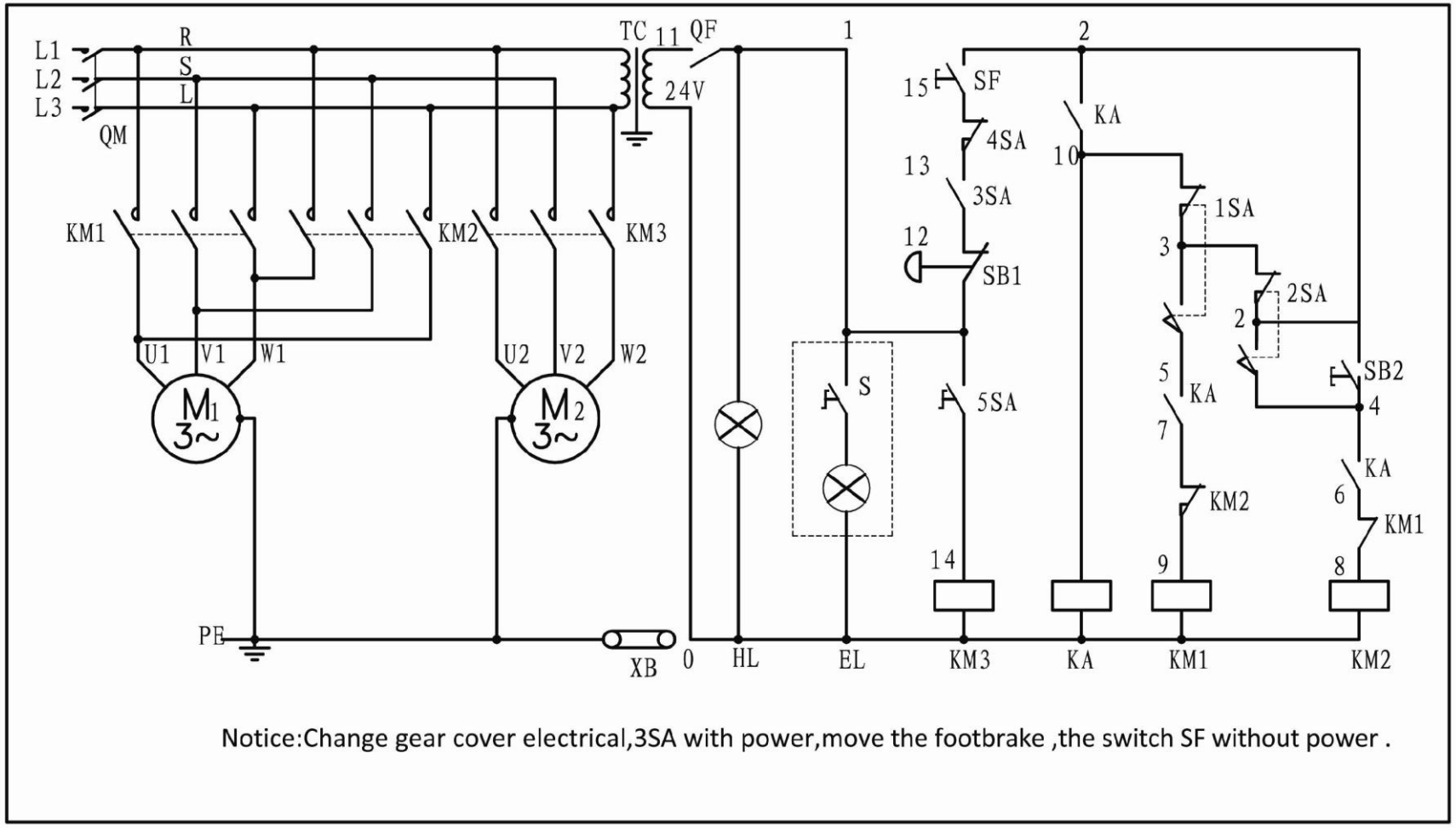



Fig12 380V-440V 50hz,60hz wire diagram

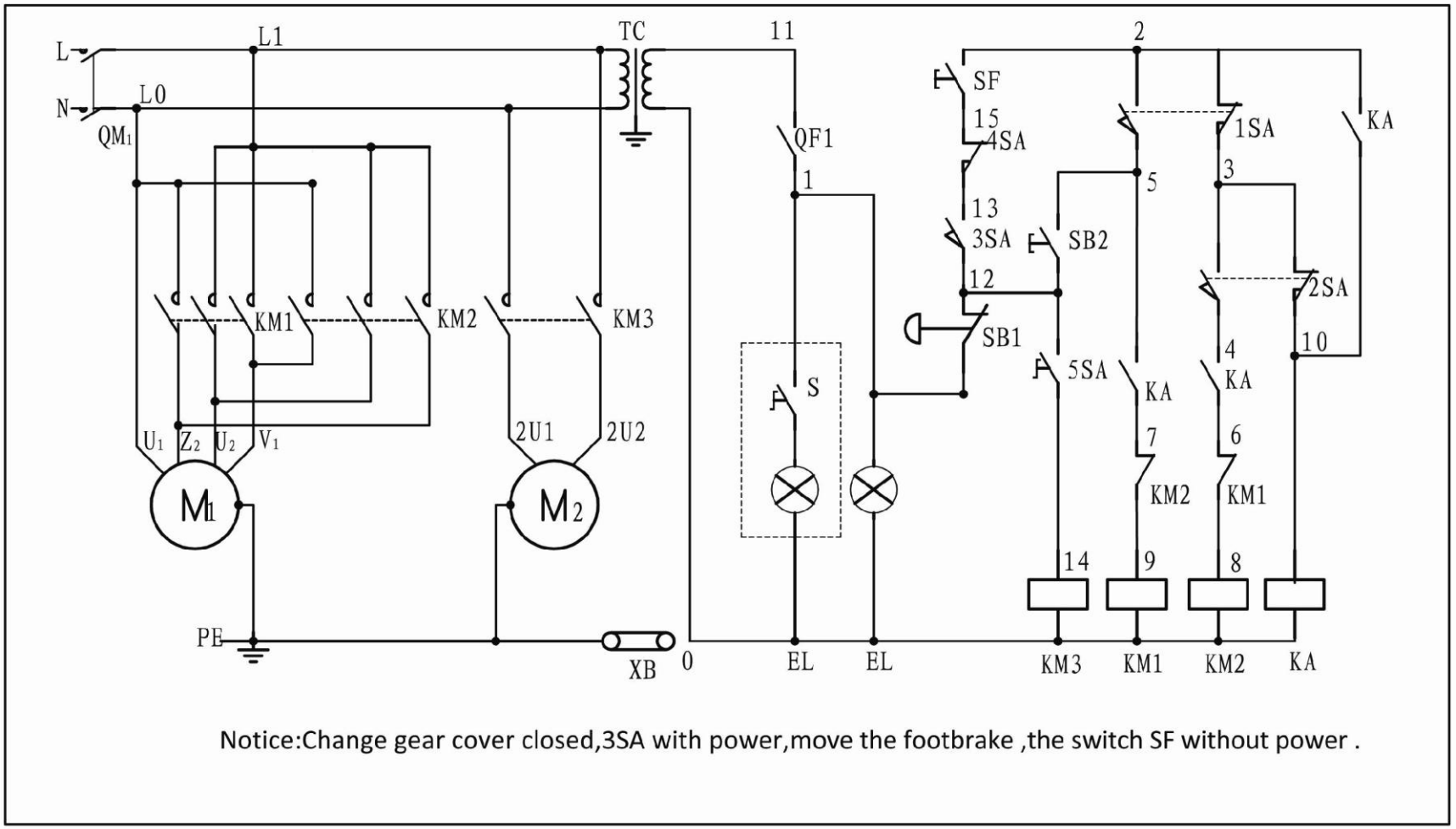



Fig13 110V-220V 50hz electrical diagram (single phase)

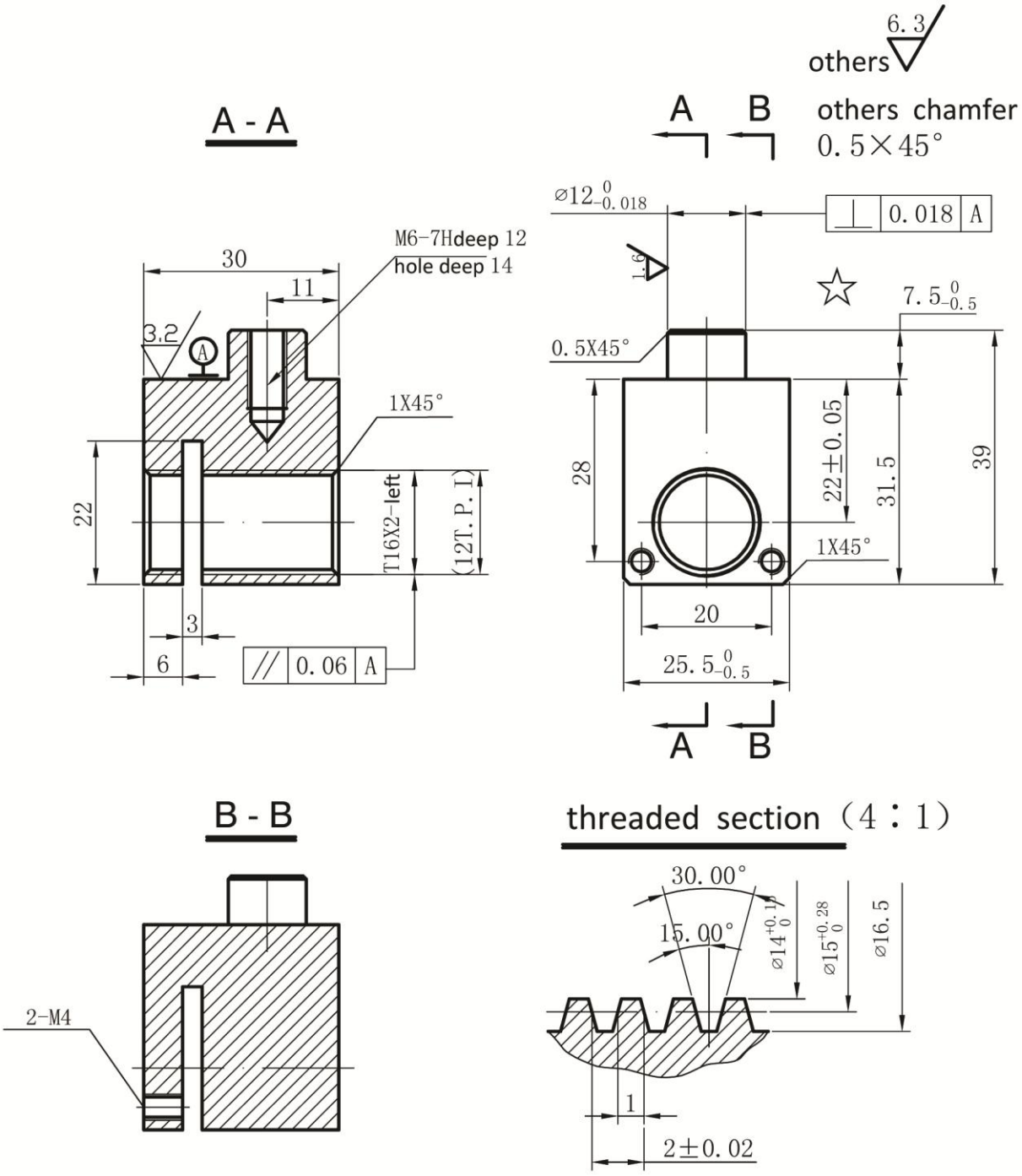



Fig14 Trouble shooting part--horizontal feeding nut

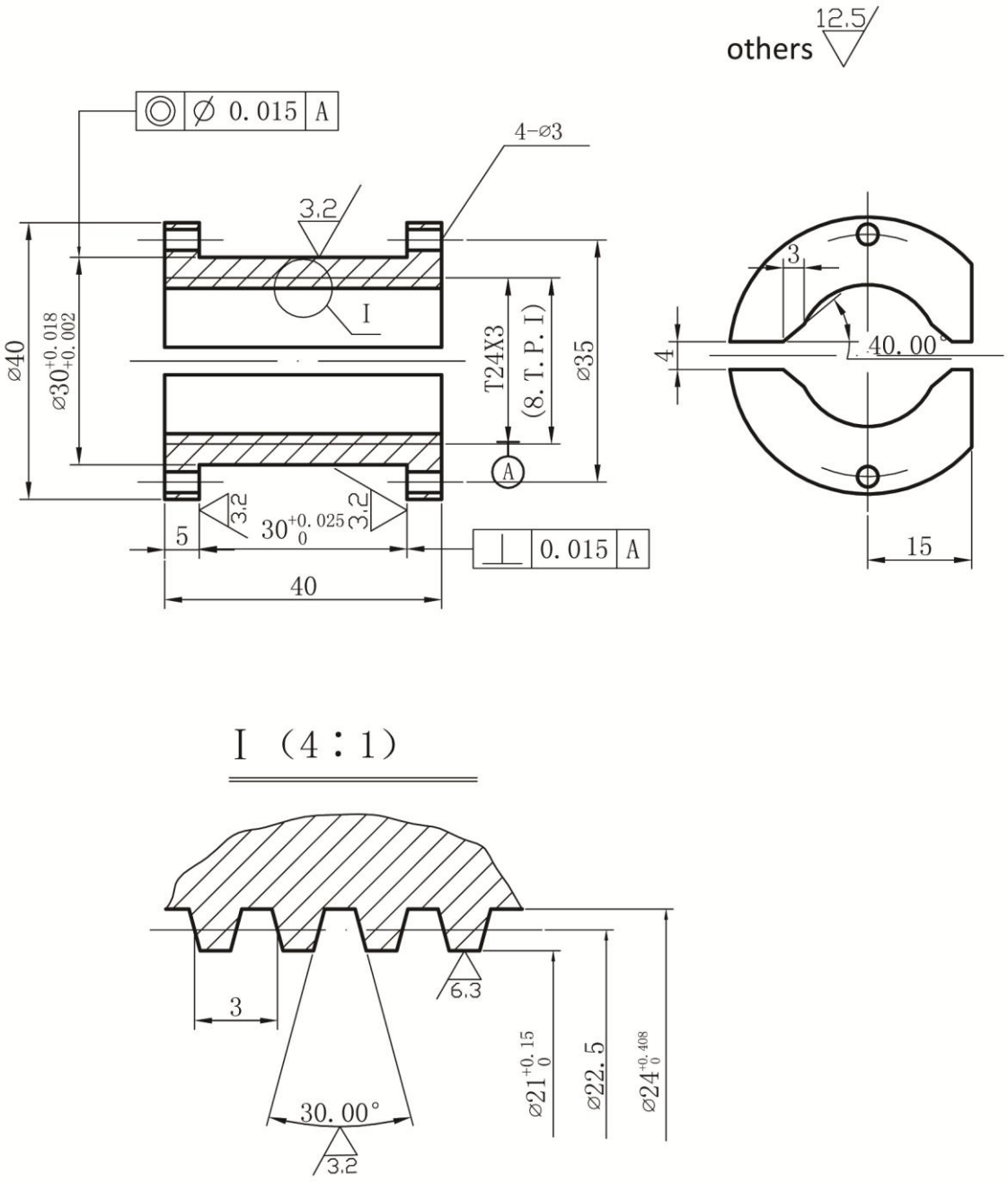



Fig15 Trouble shooting part--half nut

**Be Subject to alteration without notice**

**2012 EDITION**