

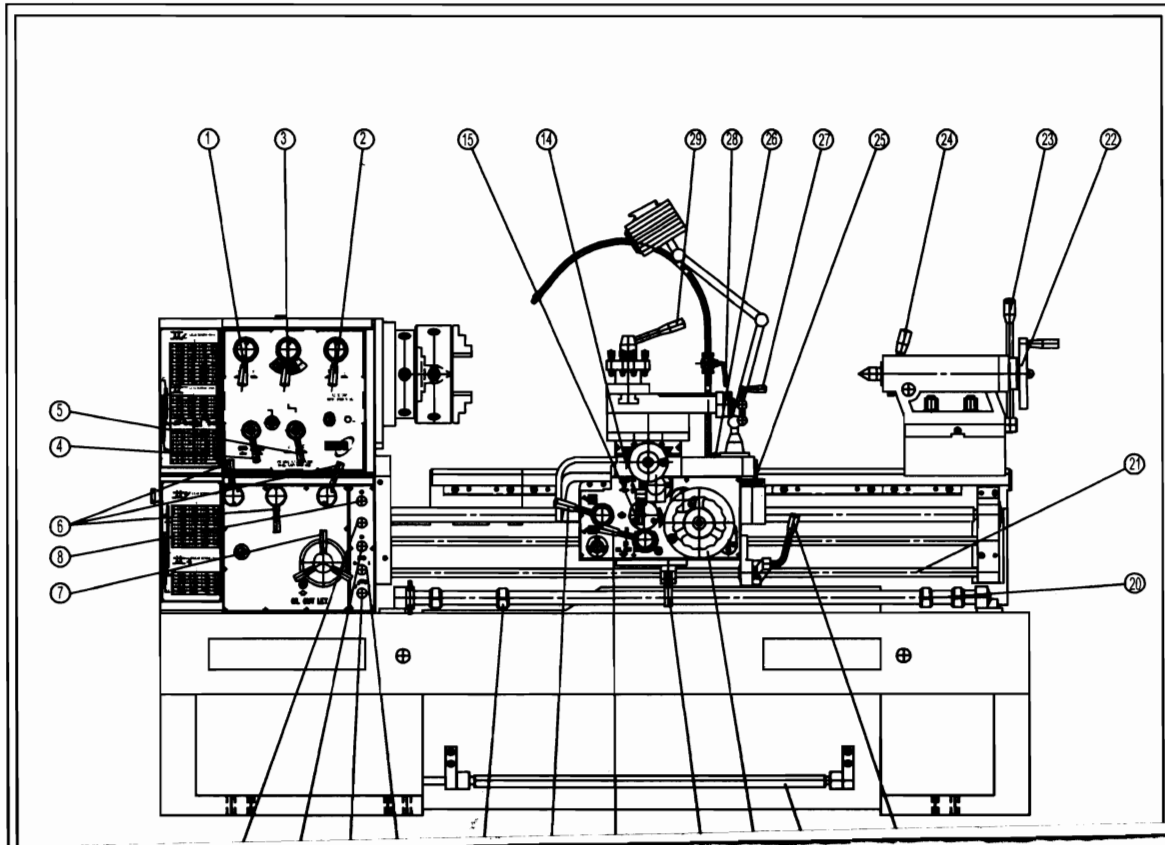
Box 21

1M-23 - 1M-36



# Operating Manual of Lathe

for CDL6151 Universal type & CDL6251 Gap Bed type



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## 1. Cautions

We are pleased that you will use our CDL series of machines. The machine is produced meticulously and so it is of a lathe with high properties and conforming to the international standards.

The operators should read the operating manual carefully and strictly obey the rules and descriptions about the machine during operating so as to get effective and correct operation and prolong the service life of the machine. With any trouble, please contact us in time if the trouble can not be removed by means of the operating manual.

### Cautions

Besides chapters mentioned later, the following items should be noticed:

- 1.1 Don't install the machine at a place where the sun shines directly or radiator is working around.
- 1.2 Only use the specified brand of lubricant to lubricate the machine.
- 1.3 Be sure to wipe and cleanse it after operation is done daily, it is better to cover it when it is not in-use so as to prevent it from being dirtied by dust.
- 1.4 Don't let the machine be infected with chip or dust, particularly the guide way should be kept clean.
- 1.5 In case in guide way of lathe surface, there is defect caused by article dropped, don't move apron up there. It should be used after repair.
- 1.6 When clamping workpiece with three-jaw chuck of  $\varnothing 250\text{mm}(10\text{'})$ , Max. clamping diameter for positive jaw is  $\varnothing 100\text{mm}(4\text{'})$ (Clamping diameter can be enlarged if reverse jaw is used.), i.e, Max. rotating diameter of the jaws extension outside is  $\varnothing 320\text{mm}(12\ 19/22\text{'})$ . When exceeds this value, the chuck cover should be removed to prevent from impacting.
- 1.7 When using four-jaw chuck of  $\varnothing 400\text{mm}(16\text{'})$ , the speed of spindle should not be allowed to exceed 700r/min.
- 1.8 To prevent the rear guard from being impacted in transportation, two ends of the guard are fixed by screws on the vertical post. Remove the screws when opening the box.

## 2. Main technical specifications and data

### 2.1 Main specifications

|                                      |          |           |               |
|--------------------------------------|----------|-----------|---------------|
| Max. length of workpiece             | 750(30") | 1000(40") | 1500 mm(60")  |
| Max. swing of dia. over bed          |          |           | 510 mm(20")   |
| Max. swing of dia. over carriage     |          |           | 320 mm(12")   |
| Max. swing of dia. in gap            |          |           | 735 mm(29")   |
| Effective length of workpiece in gap |          |           | 200 mm(8")    |
| Bed width                            |          |           | 300 mm(11.8") |

### 2.2 Headstock

|                          |                 |
|--------------------------|-----------------|
| Diameter of spindle bore | 82 mm(3")       |
| Taper in spindle bore    | 1 : 20          |
| Speed steps of spindle   | 12 steps        |
| Range of spindle speeds  | 16~1600 r / min |

### 2.3 Feedbox

|                            |                      |
|----------------------------|----------------------|
| Range of metric thread     | 0.5 ~ 14 mm          |
| Range of inch thread       | 2 ~ 56 tooth / in    |
| Range of module thread     | 0.5 ~ 14 mm          |
| Range of pitch thread      | 2 ~ 56 tooth / in    |
| Range of cross feed        | 0.017 ~ 0.242 mm / r |
| Range of longitudinal feed | 0.06 ~ 0.82 mm / r   |

### 2.4 Tailstock

|                            |                 |
|----------------------------|-----------------|
| Taper of center            | M 4             |
| Travel of tailstock sleeve | 127mm ( 5")     |
| Dia of tailstock sleeve    | 60 mm (2 9/25") |

### 2.5 Motor

|                       |                   |
|-----------------------|-------------------|
| Power of main motor   | 5.5 kw(7.375 hp)  |
| Power of cooling pump | 0.09 kw (0.12 hp) |

### 2.6 Overall dimension and weight of machine

|            |         |         |         |
|------------|---------|---------|---------|
| Length     | 1992mm  | 2242mm  | 2742mm  |
| Width      | 1010mm  | 1010mm  | 1010mm  |
| Height     | 1280mm  | 1280mm  | 1280mm  |
| Net weight | 1660kgs | 2040kgs | 2250kgs |

### 2.7 Main accessories (the packing list prevails)

|               |             |
|---------------|-------------|
| 3-Jaw chuck   | ø250mm      |
| 4-Jaw chuck   | ø315mm      |
| Face plate    | ø500mm      |
| Steady rest   | ø80 ~ 200mm |
| Follower rest | ø20~90mm    |

### **3. Handling, Installation and adjustment**

#### **3.1 Handling**

When hoisting, the steel ropes should be in the hoisting holes of the machine base and then place the hoisting rings to the hook of the crane. In hoisting, should move the apron and tailstock for keeping balance. When reaching the installation position, place the machine lightly. It is strictly forbidden that the machine is impacted with the ground to prevent the machine accuracy from being affected. The wood blocks should be put between the steel wire ropes and the machine where contacted to avoid damaging to the surface of the machine.

#### **3.2 Installation**

Before installation of the machine, the foundation should be prepared according to the foundation diagram(Fig. 3.2) and in order to ensure good cutting conditions, the foundation must be firm.

#### **3.3 Cleaning**

During installation and adjustment of the machine, clean the rust-proof painting on the surfaces of the machine with cleaning agent. The surfaces of guideways, lead screw, feed rod and the other exposing machined surfaces should be smeared with machine oil to prevent them from rusting. After the surfaces of the machine are cleaned and clear, supply the machine with enough lubrication oil according to the lubrication system diagram of the machine.

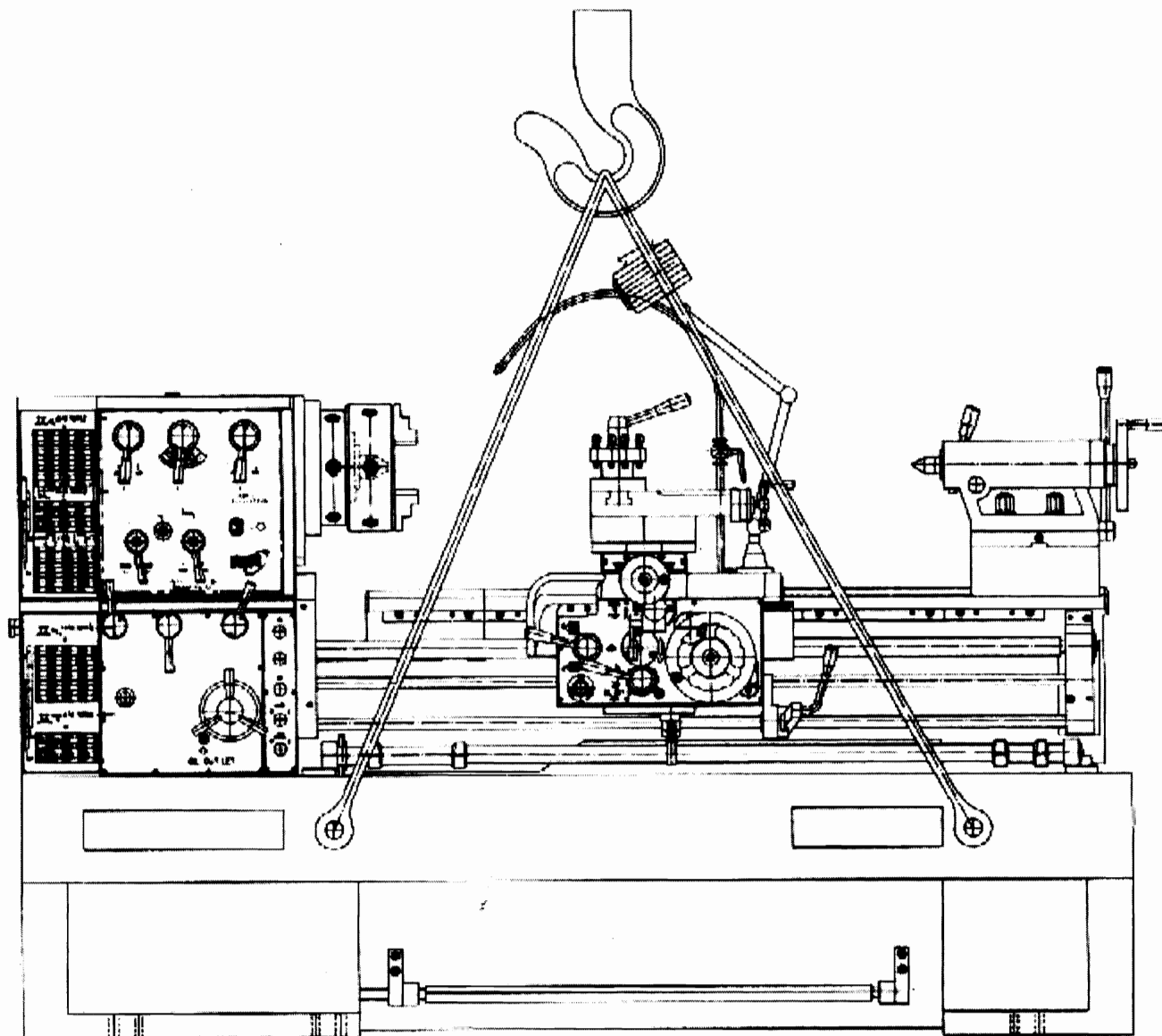
#### **3.4 Adjustment**

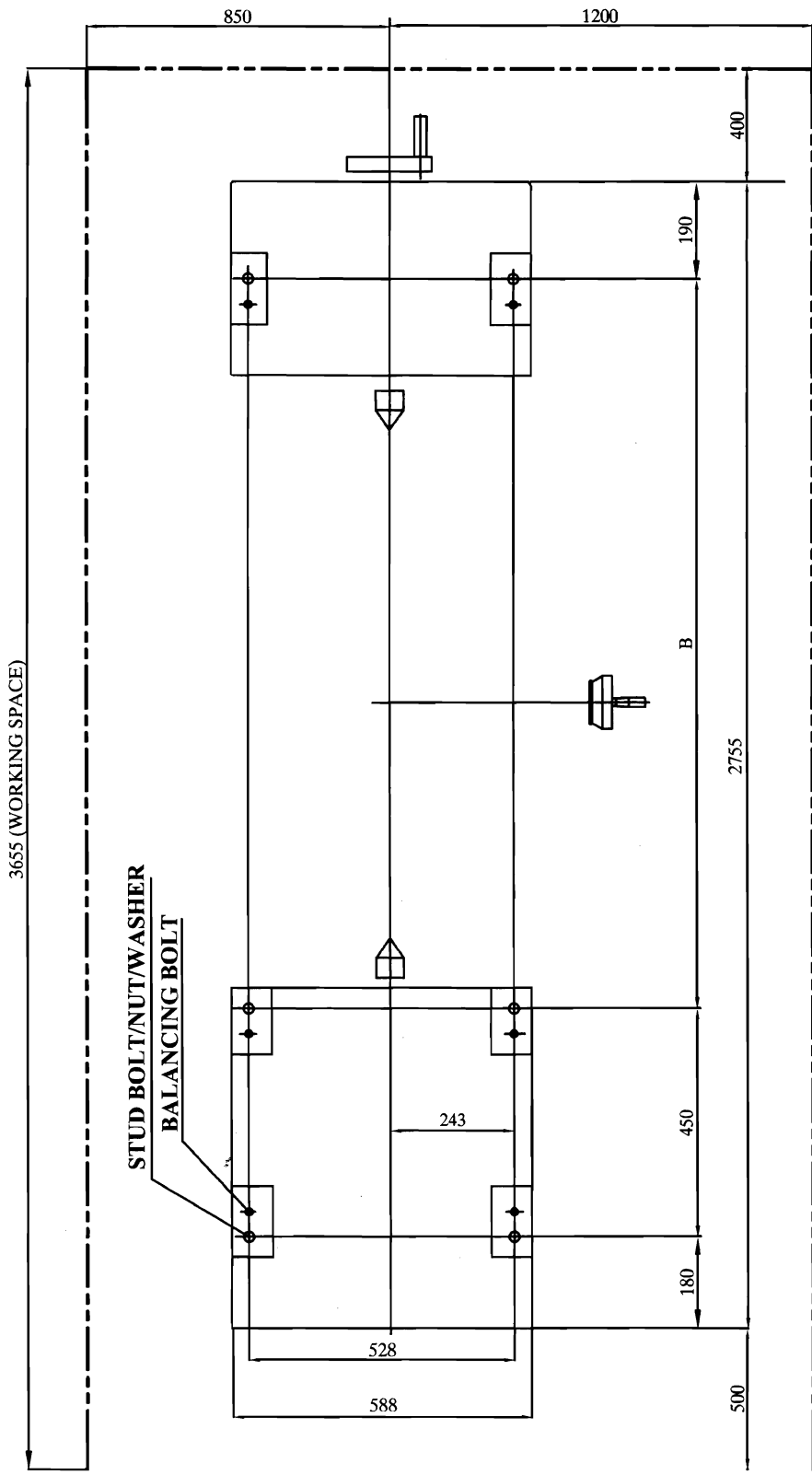
After the machine is placed on the foundation, adjust the installation level of the machine with leveler through the adjusting screws.

#### **3.5 Test running**

Before test running of the machine, the operating manual must be read carefully so as to get learned of the structure of the machine and to master the actions and usage of the mechanism. Inspect working conditions of every part manually. The electric system must be inspected before the power is on to see if it is in good condition and the motor is moistened. It is necessary to check whether the rotation direction of the motor is correct. After the machine is checked up, idle run should be carried out. At first, make the start/stop lever of the spindle be in the position of stop, and start the main motor. Make the spindle run at the lowest speed for a certain period of time and then speed up the spindle gradually. A new machine can only be put into use after the idle running test mentioned above has been finished.

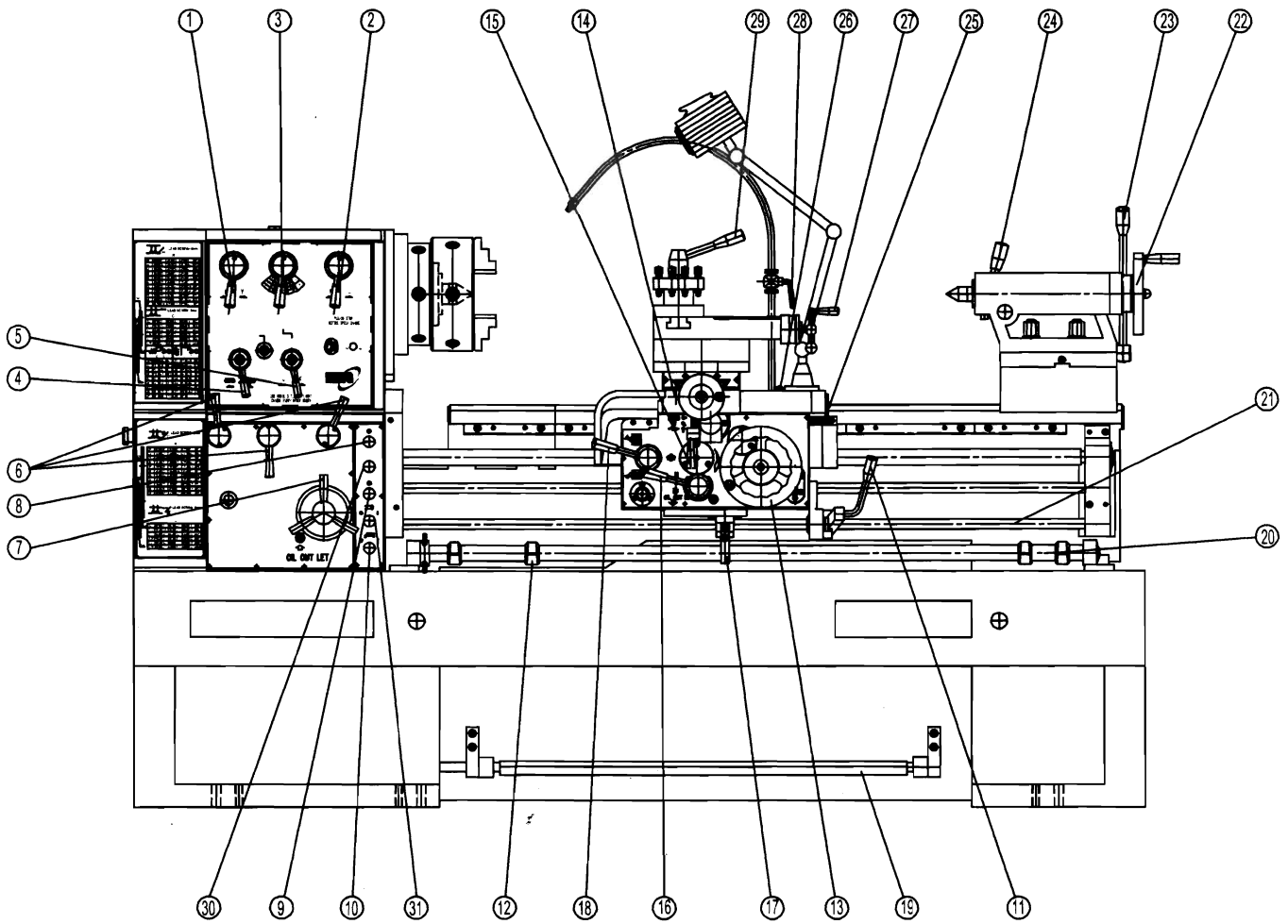
# Hoisting Diagram





For machine of 1500mm(60inch): A=3655mm B=1935mm C=2755mm  
 For machine of 1000mm(40inch): A=3155mm B=1435mm C=2255mm  
 For machine of 750mm(30inch) : A=2905mm B=1185mm C=2005mm

## 4. Operation




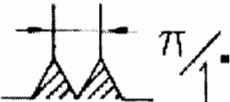


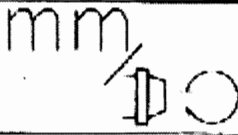












#### **4.1 Name list of operating levers and buttons**

- 1) Speed selecting lever
- 2) High-low speed selecting lever
- 3) Spindle speed selecting lever
- 4) Normal/Reverse selecting lever for feed rod and lead screw
- 5) Thread (thread pitch) and feed selecting lever
- 6) Feed speed selecting lever
- 7) Thread (thread pitch) and feed selecting dial
- 8) Pilot push button (for speed selection easily)
- 9) Signal Lamp (for main motor, spindle ready)
- 10) Cooling pump switch
- 11) Spindle control lever
- 12) Longitudinal feed auto-stop positioning ring
- 13) Longitudinal feed handwheel
- 14) Cross feed handwheel
- 15) Longitudinal-cross feed selecting lever
- 16) Auto-feed lever
- 17) Locating inspection device
- 18) Half nut lever
- 19) Foot Brake pedal
- 20) Auto-stop rod of longitudinal feed
- 21) Spindle Control (direction-change) lever
- 22) Tailstock sleeve moving handwheel
- 23) Tailstock clamp lever
- 24) Tailstock sleeve clamp lever
- 25) Thread chasing dial
- 26) Saddle locking screws
- 27) Compound rest lever
- 28) Coolant control switch
- 29) Clamping lever for square tool post
- 30) Emergency stop button
- 31) Power on / off switch (except cooling pump)

## 4.2 Meaning and action of control symbols

|    |   |                     |    |   |  |
|----|---|---------------------|----|---|--|
| 1  | <b>HIGH</b>   | High-speed rotation | 11 |               | Withworth thread   |
| 2  | <b>LOW</b>  | Low-speed rotation  | 12 |               | Metric thread  |
| 3  |    | Forward rotation    | 13 |               | Pitch thread   |
| 4  | <b>N</b>  | Neutral             | 14 |              | Modular thread   |
| 5  |  | Backward rotation   | 15 |             | Feed per rotation of spindle   |
| 6  |  | Pilot switch        | 16 |             | Pressure adjustment<br>(increase in clockwise,<br>decrease in<br>counterclockwise) |
| 7  |  | Transverse feed     | 17 |             | Pump   |
| 8  |  | Logitudinal feed    | 18 | <b>I GREEN</b>  | Switch (on)  |
| 9  |  | Conic clutch        | 19 |  <b>RED</b> | Switch (off)   |
| 10 |  | Electric cabinet    | 20 | <b>OIL</b>  | Oil hole   |

### **4.3 Spindle rotation**

According to the material property and cutting condition, select a spindle speed from the cutting speed plate. After the speed required is got through fitting of the levers of (1), (2) and (3) turn on the main (9). When the control lever (11) of the spindle is raised upward, the spindle rotates forward (counter clockwise); when the lever is lowered, the spindle is rotated backward (clockwise); when the lever is in neutral position, the spindle stops rotating.

- NOTE:
- 1) When select the spindle speed, all of the relative gears must be engaged completely.
  - 2) When it need emergency stop, pedal down the foot brake pedal (19). If the foot pedal is used, the lever (11) should be in the neutral position and then the machine may be restarted.
  - 3) Before changing the spindle speed, stop the machine so as to protect the gears.

### **4.4 Operation of the feed box**

The levers (5), (6) and the select dial (7) are set to the correct positions according to the indications get from the plate of thread pitch and feed, and then the thread pitch or spindle is rotating.

- NOTE: When it needs turning the lever (5), the spindle should be in stop; but the lever (6) can be turned only when the spindle is rotating.

### **4.5 Manual feed**

Move the auto-feed lever (16) and the reverse lever (4) to the N (neutral) positions at first, and then raise the half nut lever (18) and push down the lever (15). A longitudinal motion may be got with the handwheel (13) and a transverse motion may be got with the lever (14) or compound rest lever (27).

#### **Graduated ring on the handwheel for longitudinal motion:**

Metric: 170 graduations. One graduation is 0.1mm, one turn is 17mm.

Whitworth: 200 graduations. One graduation is 0.0035", one turn is 0.7"

#### **Graduated ring on the handwheel for cross motion:**

Metric: 250 graduations. Diameter value of one graduation is 0.02mm, one turn is 5mm.

Whitworth: 200 graduations. Diameter value of one graduation is 0.001", one turn is 0.2"

#### **Graduated ring on the handwheel for compound rest:**

Metric: 100 graduations. One graduation is 0.021mm, one turn is 2.5mm.

Whitworth: 100 graduations. One graduation is 0.001", one turn is 0.1".

#### **Graduated ring on the handwheel for tailstock:**

Metric: 100 graduations. One graduation is 0.05mm, one turn is 5mm.

Whitworth: 100 graduations. One graduation is 0.002", one turn is 0.2".

- NOTE: For 5mm Cross screw, 100 divisions. One division is 0.1mm in dia. one turn is 10mm.

## 4.6 Auto-feed

Operation of auto-feed procedure is as follows:

- 1) Select a feed rate from the indication plate and then move all of the select levers to the assigned position.
- 2) Select the feed direction with the reverse select lever (4).
- 3) Move the levers (5), (6) and (7) to the assigned position.
- 4) Move the levers (18) up to the disengaged position.
- 5) Move the levers (16) downward to the auto-feed position.
- 6) Move the levers (15) to select longitudinal or transverse feed.

## 4.7 Auto touching-stop operation

The auto touching-stop device is in the apron. A fixed length may be got by means of it.

The procedure is as follow:

- 1) Adjust the auto touching-stop locating ring (12) to a proper position
- 2) Lower the lever (16) to start cutting.
- 3) When the locating inspection device (17) touches the positioning ring, longitudinal feed is stopped automatically. There are 4 cam auto touching-stop positioning rings on the auto touching-stop rod (20). Turn the rod manually, the cam can be fixed on 4 positions as required.

## 4.8 Cutting of threads ( For Lathes Model CDL6151 and CDL6251)

### 4.8.1 Operation of lead screw

When the reverse select lever (4) is moved to the right, the lead screw rotates counter-clockwise. When the lever is the left, the lead screw rotates clockwise.

### 4.8.2 Procedure of thread cutting

1. Define metric thread or Whitworth thread desired (Table 4.1)
2. Move the lever (5) to "J" or "K" position
3. Move the select levers (6), (7) to the assigned positions to engage gears.
4. Pull the half-nut lever (18) downward to begin cutting.

NOTE: For Whitworth thread system, the half-nut should be engaged with lead screw until the thread cutting is finished.

### 4.8.3 Usage of thread chasing dial

The Thread chasing dial gives a visual indication as to when the half-nut lever should be actuated to engage the lead screw, in order to make the tool enter the thread groove. To cut metric thread, only when the pitch for workpiece is the integral multiples of the lead screw pitch, can the half nut optionally engaged with the lead screw.

When the pitch for workpiece is not the integral multiples of the lead screw pitch, it

is necessary to extract the correct number of mismatched pieces, i.e. to delimit the pitch ratio of workpieces and lead screw to the least pithy fractions. The scale divisions to be swiveled by the thread chasing dial should be:

Number of the scale divisions

= the number of mismatch pitches  $\times$   $1/2$  of total number of scale divisions

**For example:** When the pitch of workpiece is 4mm, the lead screw pitch is 6mm.

Pitch of workpiece / Lead screw pitch =  $4/6 = 2/3$  (least pithy fraction)

In this formula, 2 is the number of mismatched pitches, which is integral multiples of 16, the wormwheel tooth number of the thread chasing dial. Therefore, the number of scale division to be swiveled by the thread chasing dial is  $2 \times 1/2 = 1$  division at this time, the half nut is correctly engaged with the lead screw without mismatch.

**NOTE:** When the number of mismatched pitches is not integral multiples of the number of wormwheel teeth of the thread chasing dial, mismatch will still occur.

**For example:** When the pitch of workpiece is 1.25mm, the lead screw pitch is 6mm.

Pitch of workpiece / Lead screw pitch =  $1.25/6 = 5/24$  ( least pithy fraction )

In the formula, 5 is the number of mismatched pitches, therefore, the number of scale division to be swiveled by the thread chasing dial is  $5 \times 1/2 = 2.5$ , which is not integral multiples of the wormwheel tooth number of the thread chasing dial. So mismatch will occur.

#### 4.8.4 Module and D.P. threads cutting

For cutting Module and D.P. threads, only change two gears, as shown at table 4.2.

## 4.8 Cutting of threads ( For Lathes Model CDL2000 and CDL2000G)

### 4.8.1 Operation of lead screw

When the reverse select lever (4) is moved to the right, the lead screw rotates counter-clockwise. When the lever is the left, the lead screw rotates clockwise.

### 4.8.2 Procedure of thread cutting

1. Define metric thread or Whitworth thread desired (Table 4.3)
2. Move the lever (5) to "J" or "K" position
3. Move the select levers (6), (7) to the assigned positions to
4. Let tool point at zero position of thread by turning the hand wheel (13), regulate the home position of dial thread indicator (25).
5. Close half nut (18), then start cutting.
6. Retract the tool by manual handle. Open half nut (18).
7. Return apron to home by longitudinal feed hand wheel (13).
8. Repeat the operation steps 5, 6, 7 after readjust the home position of dial thread indicator (25)

NOTE: Retract through spindle (motor) forward or reverse is forbidden. (avoid damaging the motor)

Pull the half-nut lever (18) downward to begin cutting.

NOTE: For metric thread system, the half-nut should be engaged with lead screw until the thread cutting is finished.

### 4.8.3 Usage of thread chasing dial

The thread chasing dial gives a visual indication as to when the half-nut lever should be actuated to engage the lead screw in order to make the tool enter the thread groove. When cut the thread with odd number of teeth in every inch, the half nut can be closed with the indicator on any graduation work.

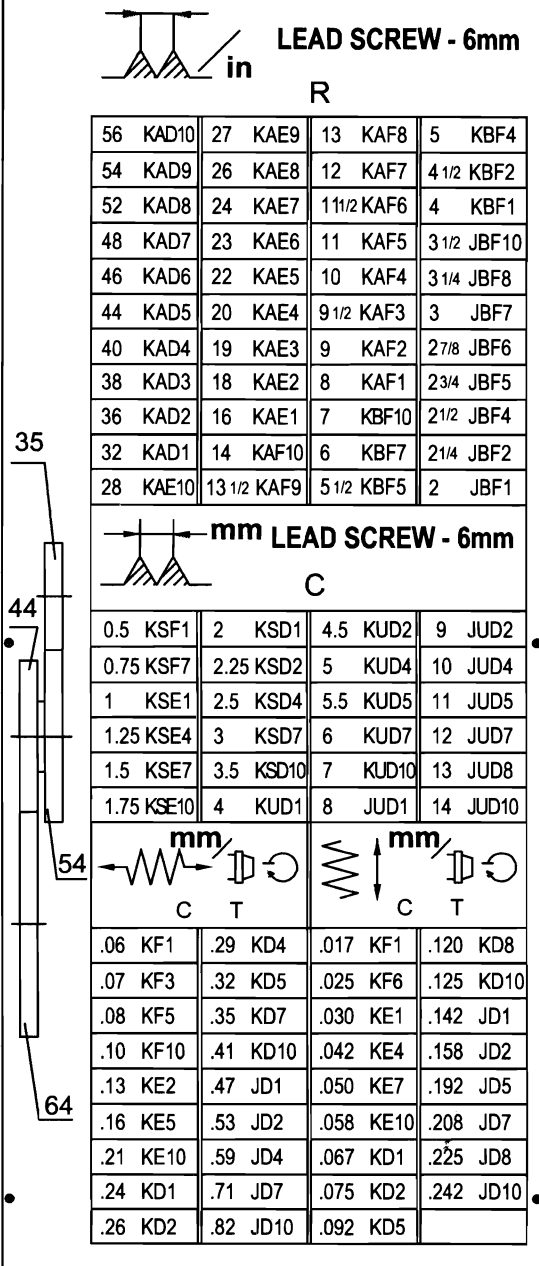
In case cutting the fractional thread with  $1/2$  or  $1/4$  tooth in every inch, the half nut can be closed with instrument only when the indicator is on one of inner graduation marks.

For metric thread system, the half-nut should be engaged with lead screw until the thread cutting is finished. Next cut will start with the tool post returning to the initial position by means of making the spindle rotate backward.

### 4.8.4 Module and D.P. Threads cutting

For cutting Module and D.P. threads, only change two gears, as shown

Table 4.1



**LEAD SCREW - 6mm**  
in R

|    |       |        |       |        |       |       |       |
|----|-------|--------|-------|--------|-------|-------|-------|
| 56 | KAD10 | 27     | KAE9  | 13     | KAF8  | 5     | KBF4  |
| 54 | KAD9  | 26     | KAE8  | 12     | KAF7  | 4 1/2 | KBF2  |
| 52 | KAD8  | 24     | KAE7  | 11 1/2 | KAF6  | 4     | KBF1  |
| 48 | KAD7  | 23     | KAE6  | 11     | KAF5  | 3 1/2 | JBF10 |
| 46 | KAD6  | 22     | KAE5  | 10     | KAF4  | 3 1/4 | JBF8  |
| 44 | KAD5  | 20     | KAE4  | 9 1/2  | KAF3  | 3     | JBF7  |
| 40 | KAD4  | 19     | KAE3  | 9      | KAF2  | 2 7/8 | JBF6  |
| 38 | KAD3  | 18     | KAE2  | 8      | KAF1  | 2 3/4 | JBF5  |
| 36 | KAD2  | 16     | KAE1  | 7      | KBF10 | 2 1/2 | JBF4  |
| 32 | KAD1  | 14     | KAF10 | 6      | KBF7  | 2 1/4 | JBF2  |
| 28 | KAE10 | 13 1/2 | KAF9  | 5 1/2  | KBF5  | 2     | JBF1  |

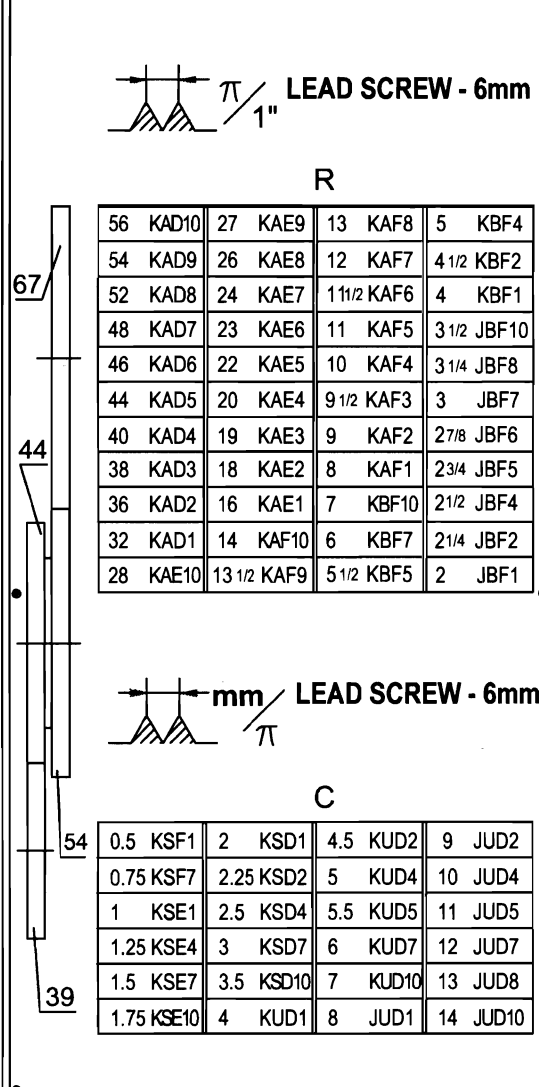
**mm LEAD SCREW - 6mm**  
C

|      |       |      |       |     |       |    |       |
|------|-------|------|-------|-----|-------|----|-------|
| 0.5  | KSF1  | 2    | KSD1  | 4.5 | KUD2  | 9  | JUD2  |
| 0.75 | KSF7  | 2.25 | KSD2  | 5   | KUD4  | 10 | JUD4  |
| 1    | KSE1  | 2.5  | KSD4  | 5.5 | KUD5  | 11 | JUD5  |
| 1.25 | KSE4  | 3    | KSD7  | 6   | KUD7  | 12 | JUD7  |
| 1.5  | KSE7  | 3.5  | KSD10 | 7   | KUD10 | 13 | JUD8  |
| 1.75 | KSE10 | 4    | KUD1  | 8   | JUD1  | 14 | JUD10 |

**mm**  
C T

|     |      |     |      |      |      |      |      |
|-----|------|-----|------|------|------|------|------|
| .06 | KF1  | .29 | KD4  | .017 | KF1  | .120 | KD8  |
| .07 | KF3  | .32 | KD5  | .025 | KF6  | .125 | KD10 |
| .08 | KF5  | .35 | KD7  | .030 | KE1  | .142 | JD1  |
| .10 | KF10 | .41 | KD10 | .042 | KE4  | .158 | JD2  |
| .13 | KE2  | .47 | JD1  | .050 | KE7  | .192 | JD5  |
| .16 | KE5  | .53 | JD2  | .058 | KE10 | .208 | JD7  |
| .21 | KE10 | .59 | JD4  | .067 | KD1  | .225 | JD8  |
| .24 | KD1  | .71 | JD7  | .075 | KD2  | .242 | JD10 |
| .26 | KD2  | .82 | JD10 | .092 | KD5  |      |      |

Table 4.2



**LEAD SCREW - 6mm**  
 $\pi/1$  R

|    |       |        |       |        |       |       |       |
|----|-------|--------|-------|--------|-------|-------|-------|
| 56 | KAD10 | 27     | KAE9  | 13     | KAF8  | 5     | KBF4  |
| 54 | KAD9  | 26     | KAE8  | 12     | KAF7  | 4 1/2 | KBF2  |
| 52 | KAD8  | 24     | KAE7  | 11 1/2 | KAF6  | 4     | KBF1  |
| 48 | KAD7  | 23     | KAE6  | 11     | KAF5  | 3 1/2 | JBF10 |
| 46 | KAD6  | 22     | KAE5  | 10     | KAF4  | 3 1/4 | JBF8  |
| 44 | KAD5  | 20     | KAE4  | 9 1/2  | KAF3  | 3     | JBF7  |
| 40 | KAD4  | 19     | KAE3  | 9      | KAF2  | 2 7/8 | JBF6  |
| 38 | KAD3  | 18     | KAE2  | 8      | KAF1  | 2 3/4 | JBF5  |
| 36 | KAD2  | 16     | KAE1  | 7      | KBF10 | 2 1/2 | JBF4  |
| 32 | KAD1  | 14     | KAF10 | 6      | KBF7  | 2 1/4 | JBF2  |
| 28 | KAE10 | 13 1/2 | KAF9  | 5 1/2  | KBF5  | 2     | JBF1  |

**mm LEAD SCREW - 6mm**  
C

|      |       |      |       |     |       |    |       |
|------|-------|------|-------|-----|-------|----|-------|
| 0.5  | KSF1  | 2    | KSD1  | 4.5 | KUD2  | 9  | JUD2  |
| 0.75 | KSF7  | 2.25 | KSD2  | 5   | KUD4  | 10 | JUD4  |
| 1    | KSE1  | 2.5  | KSD4  | 5.5 | KUD5  | 11 | JUD5  |
| 1.25 | KSE4  | 3    | KSD7  | 6   | KUD7  | 12 | JUD7  |
| 1.5  | KSE7  | 3.5  | KSD10 | 7   | KUD10 | 13 | JUD8  |
| 1.75 | KSE10 | 4    | KUD1  | 8   | JUD1  | 14 | JUD10 |

**mm**  
C T

|     |      |     |      |      |      |      |      |
|-----|------|-----|------|------|------|------|------|
| .06 | KF1  | .29 | KD4  | .017 | KF1  | .120 | KD8  |
| .07 | KF3  | .32 | KD5  | .025 | KF6  | .125 | KD10 |
| .08 | KF5  | .35 | KD7  | .030 | KE1  | .142 | JD1  |
| .10 | KF10 | .41 | KD10 | .042 | KE4  | .158 | JD2  |
| .13 | KE2  | .47 | JD1  | .050 | KE7  | .192 | JD5  |
| .16 | KE5  | .53 | JD2  | .058 | KE10 | .208 | JD7  |
| .21 | KE10 | .59 | JD4  | .067 | KD1  | .225 | JD8  |
| .24 | KD1  | .71 | JD7  | .075 | KD2  | .242 | JD10 |
| .26 | KD2  | .82 | JD10 | .092 | KD5  |      |      |

Table 4.3

**LEAD SCREW - 4TPI**

$\frac{\text{in}}{R}$

|    |       |        |       |        |       |       |       |
|----|-------|--------|-------|--------|-------|-------|-------|
| 56 | KAD10 | 27     | KAE9  | 13     | KAF8  | 5     | KBF4  |
| 54 | KAD9  | 26     | KAE8  | 12     | KAF7  | 4 1/2 | KBF2  |
| 52 | KAD8  | 24     | KAE7  | 11 1/2 | KAF6  | 4     | KBF1  |
| 48 | KAD7  | 23     | KAE6  | 11     | KAF5  | 3 1/2 | JBF10 |
| 46 | KAD6  | 22     | KAE5  | 10     | KAF4  | 3 1/4 | JBF8  |
| 44 | KAD5  | 20     | KAE4  | 9 1/2  | KAF3  | 3     | JBF7  |
| 40 | KAD4  | 19     | KAE3  | 9      | KAF2  | 2 7/8 | JBF6  |
| 38 | KAD3  | 18     | KAE2  | 8      | KAF1  | 2 3/4 | JBF5  |
| 36 | KAD2  | 16     | KAE1  | 7      | KBF10 | 2 1/2 | JBF4  |
| 32 | KAD1  | 14     | KAF10 | 6      | KBF7  | 2 1/4 | JBF2  |
| 28 | KAE10 | 13 1/2 | KAF9  | 5 1/2  | KBF5  | 2     | JBF1  |

**mm LEAD SCREW - 4TPI**

$\frac{\text{mm}}{C}$

|      |       |      |       |     |       |    |       |
|------|-------|------|-------|-----|-------|----|-------|
| 0.5  | KSF1  | 2    | KSD1  | 4.5 | KUD2  | 9  | JUD2  |
| 0.75 | KSF7  | 2.25 | KSD2  | 5   | KUD4  | 10 | JUD4  |
| 1    | KSE1  | 2.5  | KSD4  | 5.5 | KUD5  | 11 | JUD5  |
| 1.25 | KSE4  | 3    | KSD7  | 6   | KUD7  | 12 | JUD7  |
| 1.5  | KSE7  | 3.5  | KSD10 | 7   | KUD10 | 13 | JUD8  |
| 1.75 | KSE10 | 4    | KUD1  | 8   | JUD1  | 14 | JUD10 |

$\frac{\text{in}}{C}$   $\frac{\text{in}}{T}$

|       |      |      |      |       |      |       |      |
|-------|------|------|------|-------|------|-------|------|
| .002  | KF1  | .011 | KD4  | .001  | KF1  | .0043 | KD8  |
| .0026 | KF3  | .012 | KD5  | .0012 | KF10 | .0047 | KD10 |
| .0031 | KF5  | .014 | KD7  | .0015 | KE2  | .0052 | JD1  |
| .0039 | KF10 | .016 | KD10 | .0017 | KE4  | .0060 | JD2  |
| .0051 | KE2  | .018 | JD1  | .002  | KE7  | .0071 | JD5  |
| .006  | KE5  | .020 | JD2  | .0023 | KE10 | .0078 | JD7  |
| .008  | KE10 | .023 | JD4  | .0026 | KD1  | .0086 | JD8  |
| .009  | KD1  | .027 | JD7  | .0030 | KD2  | .0091 | JD10 |
| .010  | KD2  | .032 | JD10 | .0036 | KD5  |       |      |

Table 4.4

**LEAD SCREW - 4TPI**

$\frac{\pi}{1''}$

$R$

|    |       |        |       |        |       |       |       |
|----|-------|--------|-------|--------|-------|-------|-------|
| 56 | KAD10 | 27     | KAE9  | 13     | KAF8  | 5     | KBF4  |
| 54 | KAD9  | 26     | KAE8  | 12     | KAF7  | 4 1/2 | KBF2  |
| 52 | KAD8  | 24     | KAE7  | 11 1/2 | KAF6  | 4     | KBF1  |
| 48 | KAD7  | 23     | KAE6  | 11     | KAF5  | 3 1/2 | JBF10 |
| 46 | KAD6  | 22     | KAE5  | 10     | KAF4  | 3 1/4 | JBF8  |
| 44 | KAD5  | 20     | KAE4  | 9 1/2  | KAF3  | 3     | JBF7  |
| 40 | KAD4  | 19     | KAE3  | 9      | KAF2  | 2 7/8 | JBF6  |
| 38 | KAD3  | 18     | KAE2  | 8      | KAF1  | 2 3/4 | JBF5  |
| 36 | KAD2  | 16     | KAE1  | 7      | KBF10 | 2 1/2 | JBF4  |
| 32 | KAD1  | 14     | KAF10 | 6      | KBF7  | 2 1/4 | JBF2  |
| 28 | KAE10 | 13 1/2 | KAF9  | 5 1/2  | KBF5  | 2     | JBF1  |

**mm LEAD SCREW - 6MM**

$\frac{\text{mm}}{\pi}$

$C$

|      |       |      |       |     |       |    |       |
|------|-------|------|-------|-----|-------|----|-------|
| 0.5  | KSF1  | 2    | KSD1  | 4.5 | KUD2  | 9  | JUD2  |
| 0.75 | KSF7  | 2.25 | KSD2  | 5   | KUD4  | 10 | JUD4  |
| 1    | KSE1  | 2.5  | KSD4  | 5.5 | KUD5  | 11 | JUD5  |
| 1.25 | KSE4  | 3    | KSD7  | 6   | KUD7  | 12 | JUD7  |
| 1.5  | KSE7  | 3.5  | KSD10 | 7   | KUD10 | 13 | JUD8  |
| 1.75 | KSE10 | 4    | KUD1  | 8   | JUD1  | 14 | JUD10 |



Table 4.5 (For machine with leadscrew pitch being of 5mm)

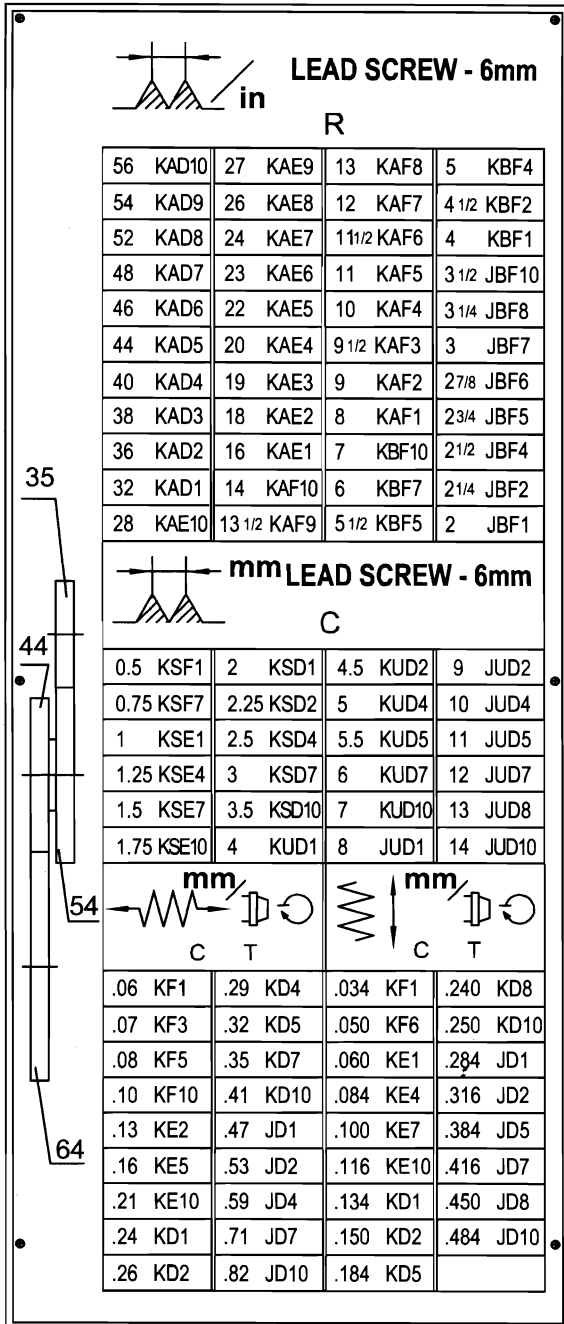
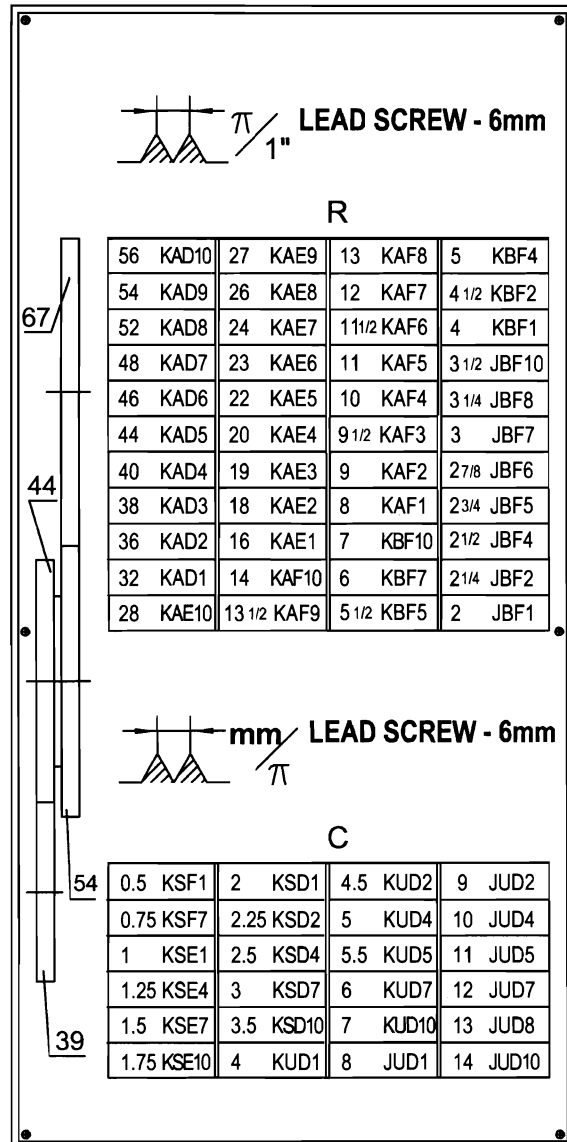


Table 4.6 (For machine with leadscrew pitch being of 5mm)



## **5. Lubrication**

### **5.1 The bath lubrication is adopted for headstock, the oil**

Splashes and lubricates the bearings, gears and shaft while the shaft and gears are rotating. Oil should remain in a certain level, which can be read from the oil leveler of headstock. For changing oil, all oil can be drained by taking off the plug on headstock, the oil supplied by opening the oil cap on the upper cover. Fill with Heavy Medium oil until the oil level reaches the option indicated on the oil leveler.

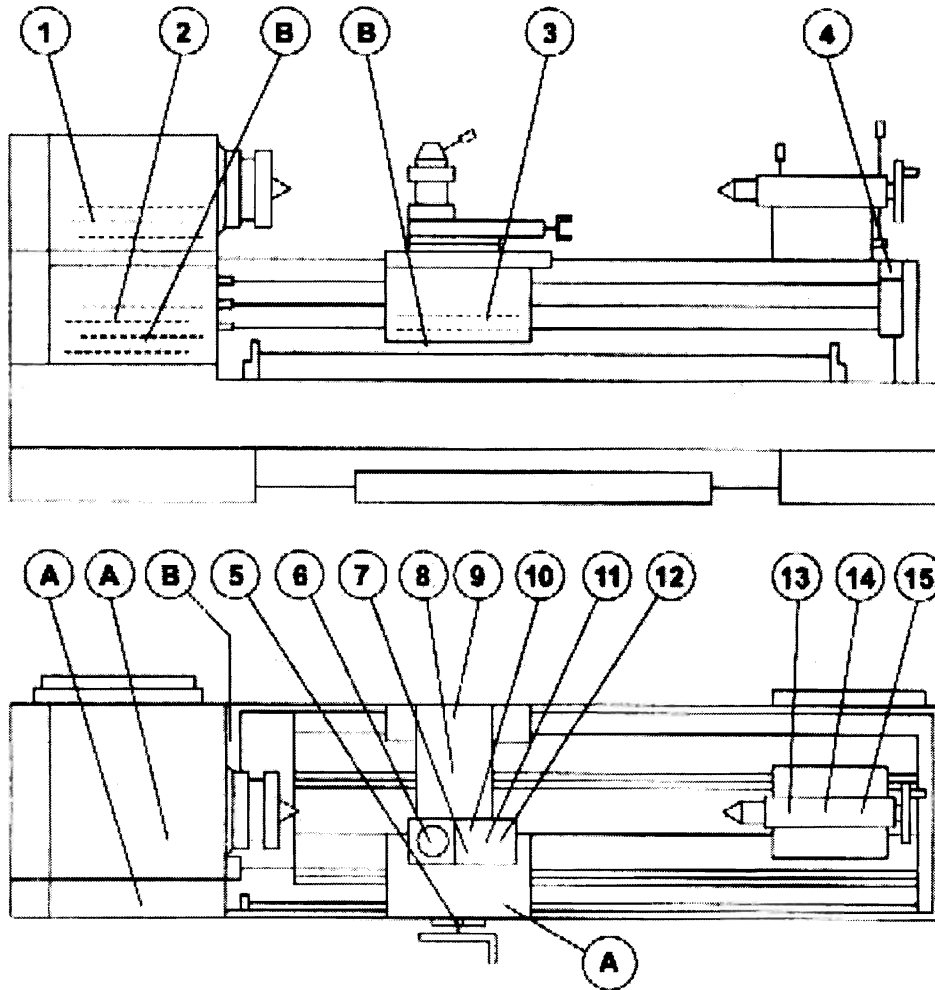
### **5.2 Feedbox**




The bath lubrication is adopted for feedback. For changing oil, drain all oil by taking off the plug, the oil is supplied by opening the oil cap and fill oil until the level reaches the position indicated on the oil leveler.

### **5.3 Apron, guideway and saddle**

The bath lubrication is adopted for apron. But the manual pump lubrication is adopted for guideway and saddle. When lubrication is necessary, press the pump rod. For changing oil, take off the plug on the apron to drain all oil, and supply oil by opening the plug on the saddle until the oil level reaches the position indicated on the oil leveler.

**Fig. 5.1 Lubricating diagram**



| Lubricating period                      | Lubricating                                | Lubricating method and lubricant  |
|---|--|---|
| Once every shift                        | 4, 5, 6, 7, 8, 9, 10<br>11, 12, 13, 14, 15 |  MOBIL-D.T.E.25 |
| Fill oil according to oil level in time | 3  |  MOBIL-D.T.E.25 |
| Once every half year                    | 2  |  MOBIL-D.T.E.24 |
| Once every two months                   | 1  |   |
| A: Oiling position                      |  | B: Draining position  |

**Table 5.1**

| <b>No.</b> | <b>Lubrication Place</b> | <b>Filling method</b>                                 | <b>Lubricating method</b> | <b>Oil amount</b>           | <b>Specified oil No.</b> | <b>Schedule of oil renewal</b>                        |
|------------|--------------------------|---|---------------------------|-----------------------------|--------------------------|---|
| <b>1</b>   | Headstock                | Open oil cap of upper cover                           | steeping                  | To the level of oil leveler | MOBIL:<br>D.T.E. 24      | Once for the first month, later once every two months |
| <b>2</b>   | Feedbox                  | Open upper cover then open oil cap                    | steeping                  | To the level of oil leveler | MOBIL:<br>D.T.E. 25      | Refuel once every month, renewal once every half year |
| <b>3</b>   | Apron                    | Open upper cover nut                                  | steeping                  | To the level of oil leveler | MOBIL:<br>D.T.E. 25      | Refuel regular  |
| <b>4</b>   | Compound rest            | Use oil gun   | Manual operation          | Proper amount               | MOBIL:<br>D.T.E. 25      | daily   |
| <b>5</b>   | Feed rod                 | Use oil gun   | Manual operation          | Proper amount               | MOBIL:<br>D.T.E. 25      | daily   |
| <b>6</b>   | Tailstock                | Use oil gun   | Manual operation          | Proper amount               | MOBIL:<br>D.T.E. 25      | daily   |
| <b>7</b>   | Lead screw               | Use oil gun   | Manual operation          | Proper amount               | MOBIL:<br>D.T.E. 25      | daily   |
| <b>8</b>   | Lead screw bracket       | Use oil gun   | Manual operation          | Proper amount               | MOBIL:<br>D.T.E. 25      | daily   |
| <b>9</b>   | Guideway & saddle        | Oil come from apron automatically when press pump rod | Manual operation          | Proper amount               | MOBIL:<br>D.T.E. 25      | daily   |

## 6. Adjustment

Before the machine is delivered from our works, it has been through strict inspection and careful adjustment in each part. Please don't do adjustment again. However, if any adjustment necessary after few months operation, please do the adjustment according to the following methods.

### 6.1 Adjustment of spindle bearings [see fig. 6.1]

The front and rear bearings of the spindle are taper roller bearings. A proper pressure is necessary for keeping high precision so as to reach the cutting properties required. After long-period operation, reach the cutting properties required. After long-period operation, the locking nut will be loosened a little so that some wave track may occur on the machine surface. At this time, adjustment should be made. Loosen 3 tightening screw 2 on nut 1 and then turn nut 1 so as to apply proper axial force on bearings. When adjusting, check the spindle for axial slip and diametral run-out until reaching the requirements stipulated according to the methods and requirements of G4 and G5 in <Certificate of Quality>. The tighten screw2.

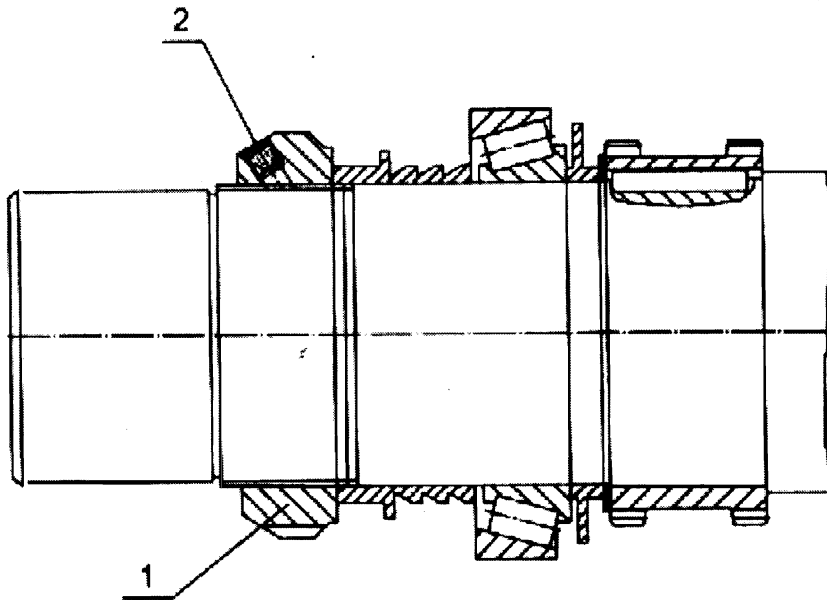


Fig. 6.1

## 6.2 Adjustment of clearance between lead screw and nut at compound rest

Loosen the cross sliding set screw 1. Turn the tightening screw 2 clockwise and the space will be decreased. Having a proper space, tighten the set screw.

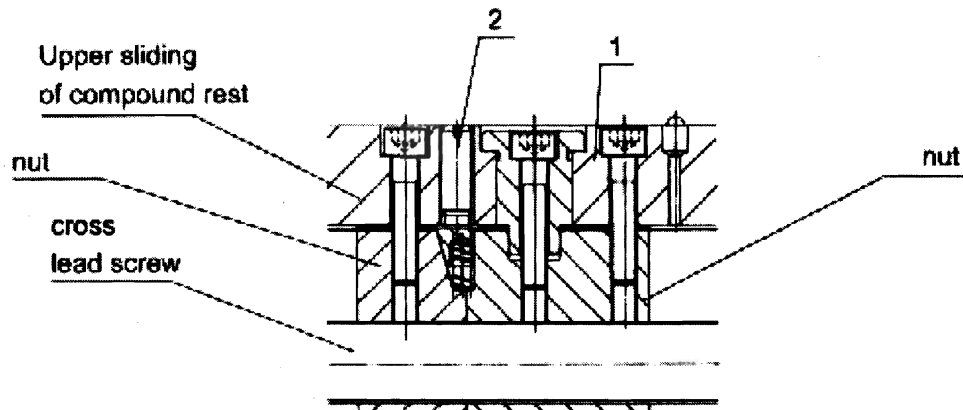


Fig. 6.2

## 6.3 Adjustment of V-belt tension and foot brake belt [see fig. 6.3]

### 6.3.1 Adjustment of V-belt tension

Loosen adjustment nut 1 to make the motor lower to a certain height so as to get a normal tension and then tighten nut 1.

6.3.2 In case that the brake belt is worn-out and loosened, it is necessary to adjust the nuts of the brake belt. Loosen the upper nut 2 at first and turn the lower nut upward to a proper position and then tighten the two nuts

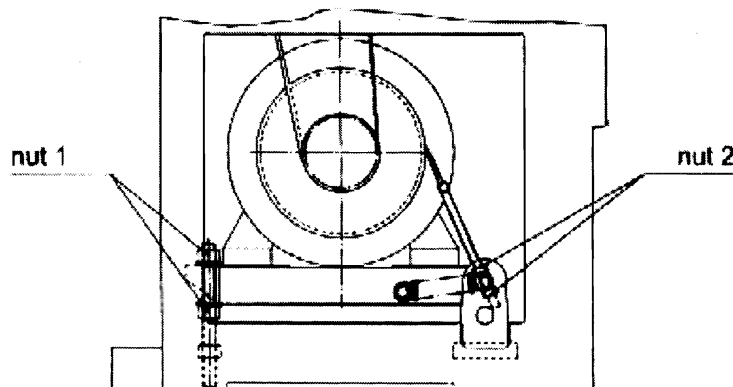


Fig. 6.3

## 6.4 Trouble and removal

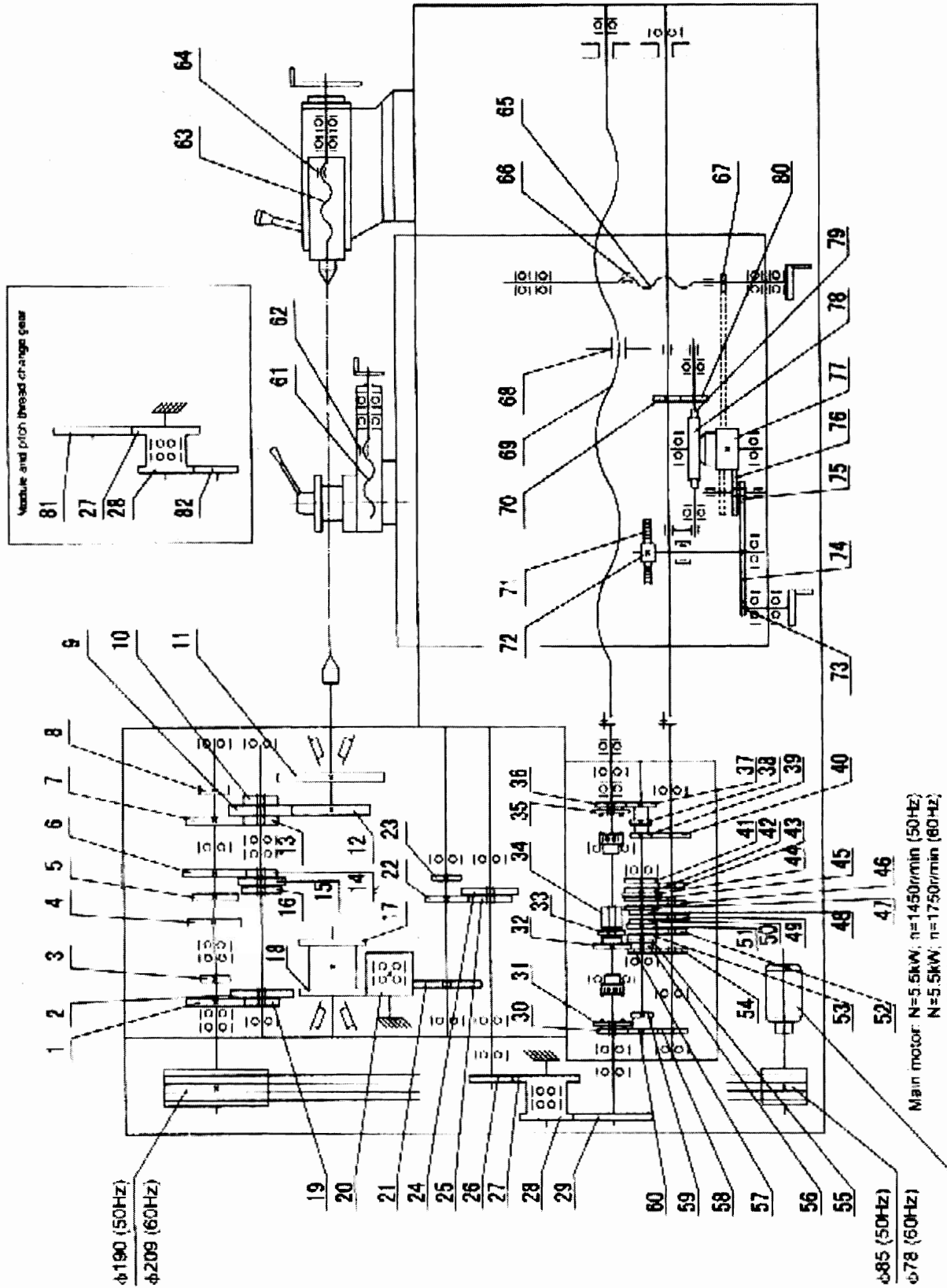
| Trouble   | Possible cause  | Removal   |
|---|---|---|
| <p><b>Vibration</b></p>                                 | <ol style="list-style-type: none"> <li>1. Motor pulley is loose.</li> <li>2. Workpiece or chuck is out balance in operation.</li> <li>3. Torn or mismatched V-belts.</li> <li>4. Spindle speed is too high.</li> <li>5. Mounting bolts out of balance.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Tighten pulley</li> <li>2. Balance workpiece or chuck.</li> <li>3. Adjust or replace the V-belts with matched set.</li> <li>4. Reduce spindle speed.</li> <li>5. Adjust the alignment.</li> </ol>   |
| <p><b>Chatter</b></p>                                   | <ol style="list-style-type: none"> <li>1. Cutter bit improperly ground or too wide for contact area.</li> <li>2. Workpiece improperly clamped.</li> <li>3. Tool bit is not on (rotating center or overhang too long while cutting)</li> <li>4. Feed rate is not proper.</li> <li>5. Vibration</li> <li>6. Spindle bearing worn or loose.</li> </ol> | <ol style="list-style-type: none"> <li>1. Regrind cutter bit or adjust tool holder so that the contact area between tool bit and workpiece is decreased.</li> <li>2. Adjust tailstock center and use steady rest for long slender shafts.</li> <li>3. Adjust tool and tool-post</li> <li>4. Choose a proper feed rate.</li> <li>5. See vibration trouble above.</li> <li>6. Replace or adjust spindle bearing.</li> </ol> |
| <p><b>Half nut could not engaged with leadscrew</b></p> | <ol style="list-style-type: none"> <li>1. Chips stay inside the half nut or leadscrew.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Clean out the chips.</li> </ol>   |

| Trouble                                       | Possible cause  | Removal   |
|---|---|---|
| <b>Workpiece is out of round when turning</b> | <ol style="list-style-type: none"> <li>1. Spindle bearings loosed or worn.</li> <li>2. The centers are worn out.</li> <li>3. Workpiece is loosed between centers or centers are excessively worn.</li> <li>4. Chuck or face plate is improperly locked to spindle.</li> <li>5. The jaw of chuck is out of order.</li> </ol>                           | <ol style="list-style-type: none"> <li>1. Adjust the bearings.</li> <li>2. Re grind the centers.</li> <li>3. Adjust tailstock centers.<br/>Regrind centers or scrap centers.</li> <li>4. Adjust the improper locking device.</li> <li>5. Rearrange the jaw order of chuck.</li> </ol> |
| <b>Workpiece is not turned straightly</b>     | <ol style="list-style-type: none"> <li>1. Workpiece is not clamped properly on chuck.</li> <li>2. Headstock is not aligned with the tailstock center line.</li> <li>3. Level of bed is not proper.</li> <li>4. Tool is not on center while using taper (cutting) accessory.</li> <li>3. Workpiece is too thin or overcharged from chucked.</li> </ol> | <ol style="list-style-type: none"> <li>1. Adjust the workpiece on chuck.</li> <li>2. Align tailstock center.</li> <li>3. Relevel Bed</li> <li>4. Readjust the tool to center.</li> <li>5. Use steady rest or follower rest.</li> </ol>  |



## 7. Diagram of transmission system

### 7.1 Diagram of transmission system of CDL6151 and CDL6251



**Table of main parameters of gears, racks, wormwheels, worms, lead screws and nuts for lathes Model CDL6151 and CDL6251**

| No. | Name        | Module or start | Tooth | Material | Heat treatment | Dwg. No.    |
|-----|-------------|-----------------|-------|----------|----------------|-------------|
| 1   | Gear        | 2.5             | 41    | 45       | G52            | MA51-20703A |
| 2   | Gear        | 2.5             | 46    | 45       | G52            | MA51-20707  |
| 3   | Gear        | 2.5             | 20    | 40Cr     | G52            | MA51-20704  |
| 4   | Gear        | 2.5             | 38    | 45       | G52            | MA51-20711A |
| 5   | Gear        | 2.5             | 32    | 45       | G52            | MA51-20712A |
| 6   | Gear        | 2.5             | 45    | 45       | G52            | MA51-20713A |
| 7   | Gear        | 2.5             | 42    | 45       | G52            | MA51-20714A |
| 8   | Gear        | 2.5             | 20    | 45       | G52            | MA51-20715A |
| 9   | Gear        | 2.5             | 46    | 40Cr     | G52            | MA51-20723  |
| 10  | Gear        | 2.5             | 24    | 40Cr     | G52            | MA51-20722A |
| 11  | Gear        | 2.5             | 79    | 45       | G52            | MA51-20726  |
| 12  | Gear        | 2.5             | 57    | 45       | G52            | MA51-20727  |
| 13  | Gear        | 2.5             | 24    | 40Cr     | G52            | MA51-20722A |
| 14  | Gear        | 2.5             | 21    | 40Cr     | G52            | MA51-20710A |
| 15  | Gear        | 2.5             | 34    | 45       | G52            | MA51-20709  |
| 16  | Gear        | 2.5             | 28    | 45       | G52            | MA51-20708  |
| 17  | Gear        | 2               | 62    | 45       | G48            | MA51-20731  |
| 18  | Gear        | 2               | 62    | 45       | G48            | MA51-20731  |
| 19  | Gear        | 2.5             | 25    | 40Cr     | G52            | MA51-20706A |
| 20  | Gear        | 2               | 42    | 45       | G48            | MA51-20737A |
| 21  | Gear        | 2               | 62    | 45       | G48            | MA51-20739A |
| 22  | Gear        | 2               | 39    | 45       | G48            | MA51-20740  |
| 23  | Gear        | 2               | 26    | 45       | G48            | MA51-20741  |
| 24  | Gear        | 2               | 52    | 45       | G48            | MA51-20746  |
| 25  | Gear        | 2               | 39    | 45       | G48            | MA51-20745  |
| 26  | Gear        | 2.25            | 35    | 45       |                | MA51-28712  |
| 27  | Gear        | 2.25            | 54    | HT200    |                | MA51-28104A |
| 28  | Gear        | 2.25            | 44    | HT200    |                | MA51-28104A |
| 29  | Gear        | 2.25            | 64    | 45       |                | MA51-28716  |
| 30  | Clutch-gear | 2.5             | 19    | 45       | G48            | MA-27A707B  |
| 31  | Clutch-gear | 1.75            | 38    | 45       | G48            | MA-27A707B  |
| 32  | Clutch-gear | 2               | 36    | 45       | G48            | MA27A711B   |
| 33  | Clutch-gear | 2.25            | 23    | 45       | G48            | MA-27A710A  |
| 34  | Clutch-gear | 2               | 18    | 45       | G48            | MA-27A710A  |
| 35  | Clutch-gear | 2               | 35    | 45       | G48            | MA-27A734A  |

|            |             |                        |              |                 |                       |                        |
|------------|-------------|------------------------|--------------|-----------------|-----------------------|------------------------|
| 36         | Clutch-gear | 1.5                    | 35           | 45              | G48                   | MA-27A734A             |
| <b>No.</b> | <b>Name</b> | <b>Module or start</b> | <b>Tooth</b> | <b>Material</b> | <b>Heat treatment</b> | <b>Dwg. No.</b>        |
| 37         | Gear        | 1.5                    | 41           | 45              | G48                   | MA-27A732A             |
| 38         | Gear        | 2                      | 18           | 45              | G48                   | MA-27A732A             |
| 39         | Gear        | 2                      | 18           | 45              | G48                   | MA-27A732A             |
| 40         | Gear        | 2                      | 36           | 45              | G48                   | MA-27A755              |
| 41         | Gear        | 2                      | 28           | 45              | G48                   | MA-27A728A             |
| 42         | Gear        | 2                      | 27           | 45              | G48                   | MA-27A727              |
| 43         | Gear        | 2                      | 22           | 45              | G48                   | MA-27A730              |
| 44         | Gear        | 2                      | 36           | 45              | G48                   | MA-27A725              |
| 45         | Gear        | 2.25                   | 26           | 45              | G52                   | MA-27A724              |
| 46         | Gear        | 2.25                   | 22           | 45              | G52                   | MA-27A724              |
| 47         | Gear        | 2.25                   | 24           | 45              | G52                   | MA-27A722A             |
| 48         | Gear        | 1.75                   | 27           | 45              | G48                   | MA-27A721A             |
| 49         | Gear        | 1.75                   | 33           | 45              | G48                   | MA-27A720              |
| 50         | Gear        | 1.75                   | 24           | 45              | G48                   | MA-27A719              |
| 51         | Gear        | 2.25                   | 23           | 45              | G52                   | MA-27A717A             |
| 52         | Gear        | 2.25                   | 22           | 45              | G52                   | MA-27A718A             |
| 53         | Gear        | 2.25                   | 22           | 45              | G52                   | MA-27A715              |
| 54         | Gear        | 2.5                    | 22           | 45              | G52                   | MA-27A716              |
| 55         | Gear        | 2.5                    | 20           | 45              | G52                   | MA-27A714              |
| 56         | Gear        | 2                      | 18           | 45              | G48                   | MA-27A714              |
| 57         | Gear        | 2.5                    | 19           | 45              | G52                   | MA-27A712              |
| 58         | Gear        | 2.5                    | 22           | 45              | G52                   | MA-27A747A             |
| 59         | Gear        | 1.75                   | 20           | 45              | G48                   | MA-27A709A             |
| 60         | Gear        | 2.5                    | 20           | 45              | G52                   | MA-27A709A             |
| 61         | Screw rod   | T18X5-9                |              | Y40Mn           |                       | MA51-40703B            |
| 62         | Nut         | T18X5-9                |              | ZQSn6-6-3       |                       | MA51-40301             |
| 63         | Lead screw  | T22X5-9 LEFT           |              | Y40Mn           |                       | MA51-13A715            |
| 64         | Nut         | T22X5-9 LEFT           |              | ZQSn6-6-3       |                       | MA51-13A301            |
| 65         | Lead screw  | T19X2.5-9 LEFT         |              | Y40Mn           |                       | MA-45711               |
| 66         | Nut         | T19X2.5-9 LEFT         |              | ZQSn6-6-3       |                       | MA-45031A<br>MA-45302A |
| 67         | Gear shaft  | 2                      | 14           | 45              |                       | MA-45709A              |
| 68         | Nut         | T36X6-7                |              | ZQSn6-6-3       |                       | MA-26305A<br>MA-26306A |
| 69         | Lead screw  | T36X6-7                |              | Y40Mn           |                       | MAX-A10705A            |
| 70         | Gear        | 2                      | 24           | 45              |                       | MA51-26731A            |

|            |             |                        |              |                 |                       |                 |
|------------|-------------|------------------------|--------------|-----------------|-----------------------|-----------------|
| 71         | Gear        | 2                      |              | 45              |                       |                 |
| 72         | Gear shaft  | 2                      | 15           | 45              | G48                   | MA51-26701A     |
| <b>No.</b> | <b>Name</b> | <b>Module or start</b> | <b>Tooth</b> | <b>Material</b> | <b>Heat treatment</b> | <b>Dwg. No.</b> |
| 73         | Gear shaft  | 2                      | 11           | 45              | G48                   | MA51-26701A     |
| 74         | Gear        | 2                      | 61           | 45              | G48                   | MA51-26718A     |
| 75         | Gear        | 2                      | 18           | 45              |                       | MA51-26712      |
| 76         | Gear        | 2                      | 46           | 45              |                       | MA51-26712      |
| 77         | Gear        | 2                      | 48           | 45              | G48                   | MA51-26715A     |
| 78         | Worm wheel  | 3                      | 30           | 30              | G48                   | MA51-26302      |
| 79         | Worm        | 3                      | 1            | 1               |                       | MA51-26729      |
| 80         | Gear        | 2                      | 24           | 24              |                       | MA51-26729      |
| 81         | Gear        | 2.25                   | 67           | 67              |                       | MA51-28709      |
| 82         | Gear        | 2.25                   | 39           | 39              |                       | MA51-28710A     |

**For the machines whose lead screw pitch is 5mm, the following parts will be modified:**

| No. | Name       | Module and start | Tooth | Material  | Heat treatment | Dwg. NO.               |
|-----|------------|------------------|-------|-----------|----------------|------------------------|
| 65  | Lead screw | T19X2.5-9 LEFT   |       | Y40Mn     |                | MA-A45701              |
| 66  | Nut        | T19X2.5-9 LEFT   |       | ZQSn6-6-3 |                | MA-A45301<br>MA-A45301 |



## **9. Digital display measuring device**

This machine is based on universal lathe CDL6(1/2)51. It adopts two DRO grating scales on X-axis and Z-axis respectively. Its performance and specification are the same as that of CDL6(1/2)51, so refer to operating manual CDL6(1/2)51 for reference.

The DRO equipment has been adopted to reach high accuracy, stable performance and good product quality. It also can realize easy operating, convenient adjustment and higher efficiency.

### **9.1. Main technical parameter**

- 9.1.1 Grating pitch 0.02mm (50 graduations of 1mm)
- 9.1.2 Accuracy  $\pm 0.08\text{mm}$  (within  $20^{\circ}\text{C}$  1000mm)
- 9.1.3 Transverse measurement length: 270mm  
Longitudinal measurement length: 750; 1000; 1500mm
- 9.1.4 Working temperature  $0^{\circ}\text{C} - 45^{\circ}\text{C}$
- 9.1.5 2-position square wave signal of amplitude value 5V and phase angular difference.

### **9.2. Installation**

- 9.2.1 The parallelism error between guideway and two vertical side planes of the scale should be within 0.01mm.
- 9.2.2 The clearance of two adjustment parallel planes between reading head and scale body is 1.2-1.5mm or 3mm. See DRO ruler manual.

### **9.3. Inspection**

Move the work table when power is on. Check if the figures on the DRO display are normal. The zero setting error should be within  $\pm 0.001$ .

### **9.4. Usage and maintenance**

- 9.4.1 When the reading head output plug put in or get out from DRO, the power should be off.
- 9.4.2 Clean the swarf and oil from the scale in time to prevent any foreign matter getting into the protective cover.
- 9.4.3 Inspect if the coupling screws are loose regularly.
- 9.4.4 Smear slight silicone oil on the protective cover regularly, which can prolong the working life of the cover. Be careful not splash oil onto the grating scale.

## **10. Electric system of machine**

### **10.1 Service of electric equipment**

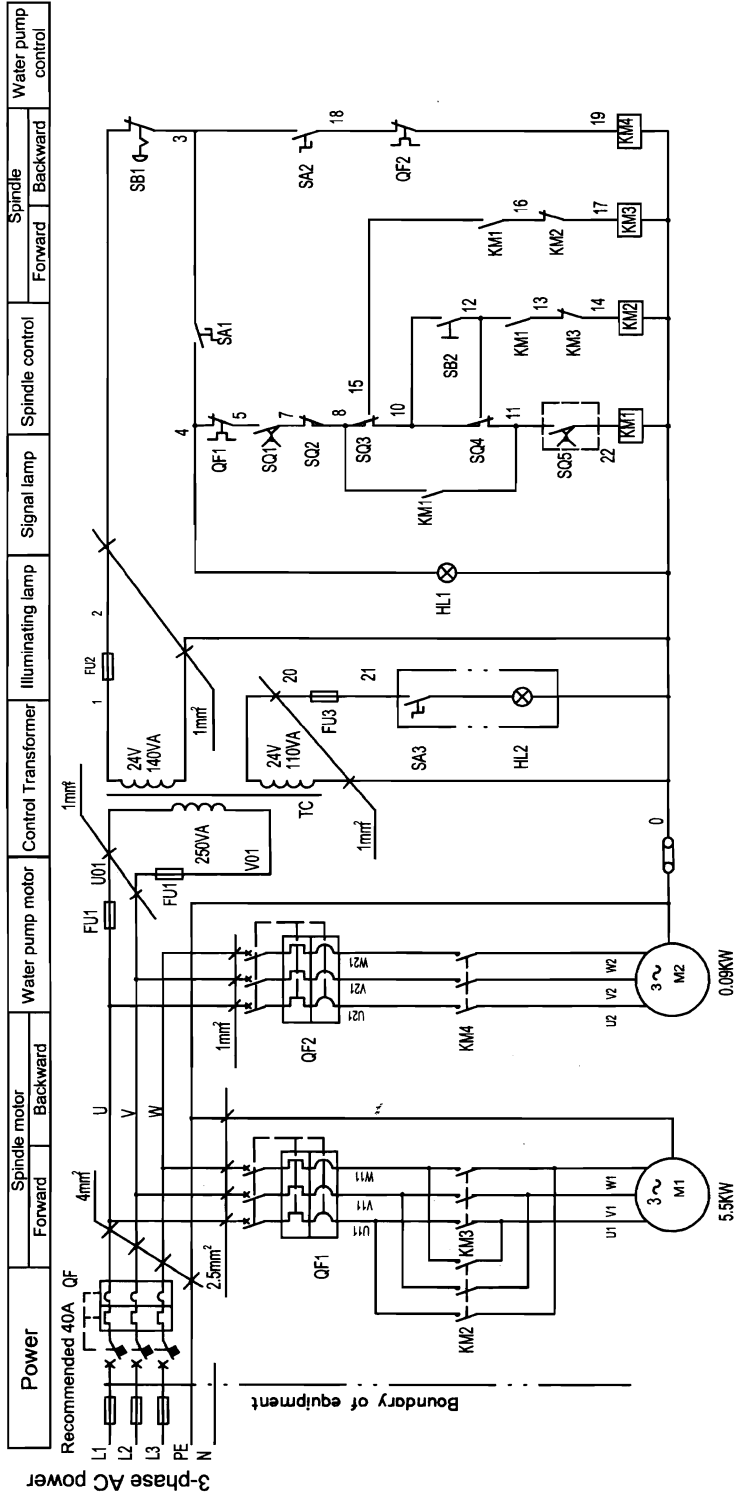
The power must be turned off when checking the machine electric equipment. The motors must be cleaned thoroughly once a year, and the dust should be removed off the motor coils with dry cloth and manual air blower. Check often the contacts of contactors. If there is any converse-concave in the contactor, it is necessary to recondition it with file or fine abrasive paper, otherwise the service life will be shortened.

### **10.2 Machine Control**

This machine will be controlled according to the electric Circuit Diagram (Fig. 10.2.1) and Electric wiring diagram (Fig. 10.2.3). For the layout of distributing board, see (Fig. 10.2.2).

This machine is pedal brake lathe. The main power switch of emergency button for the machine, that is to say, when emergency happens to the machine, press this button to stop the spindle motor and water pump motor of the machine. The switch SA1 is spindle enable switch, it means that only after this switch is on, can the spindle be enabled. SQ2-switch for spindle pedal brake, is used for the turning off and braking of spindle. SQ3 and SQ4 are buttons for spindle forward & backward respectively. The forward and backward of the spindle can be realized by pressing down and releasing spindle controlling handle. SB2 is spindle inching button, by this button, only spindle forward inching can be realized: and the spindle control handle must be in the neutral position. SA2 is switch for controlling water pump. SA3 is switch for illuminating.

# Electric circuit diagram



**Technical requirement**  
 When the chuck protection switch SQ5 is not used, short-circuit No. 11 and No. 22.

Option : SQ5 - Limit switch for Chuck Guard

Electric circuit diagram (Fig.10.2.1)



**Diagram of electric distribution board**

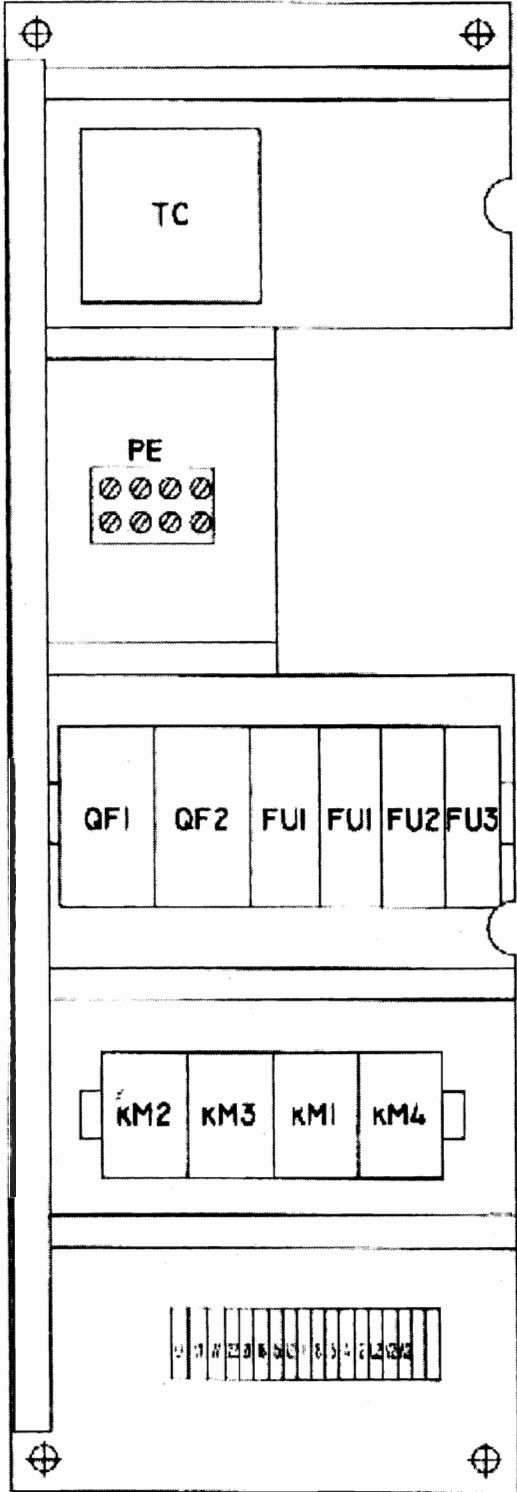
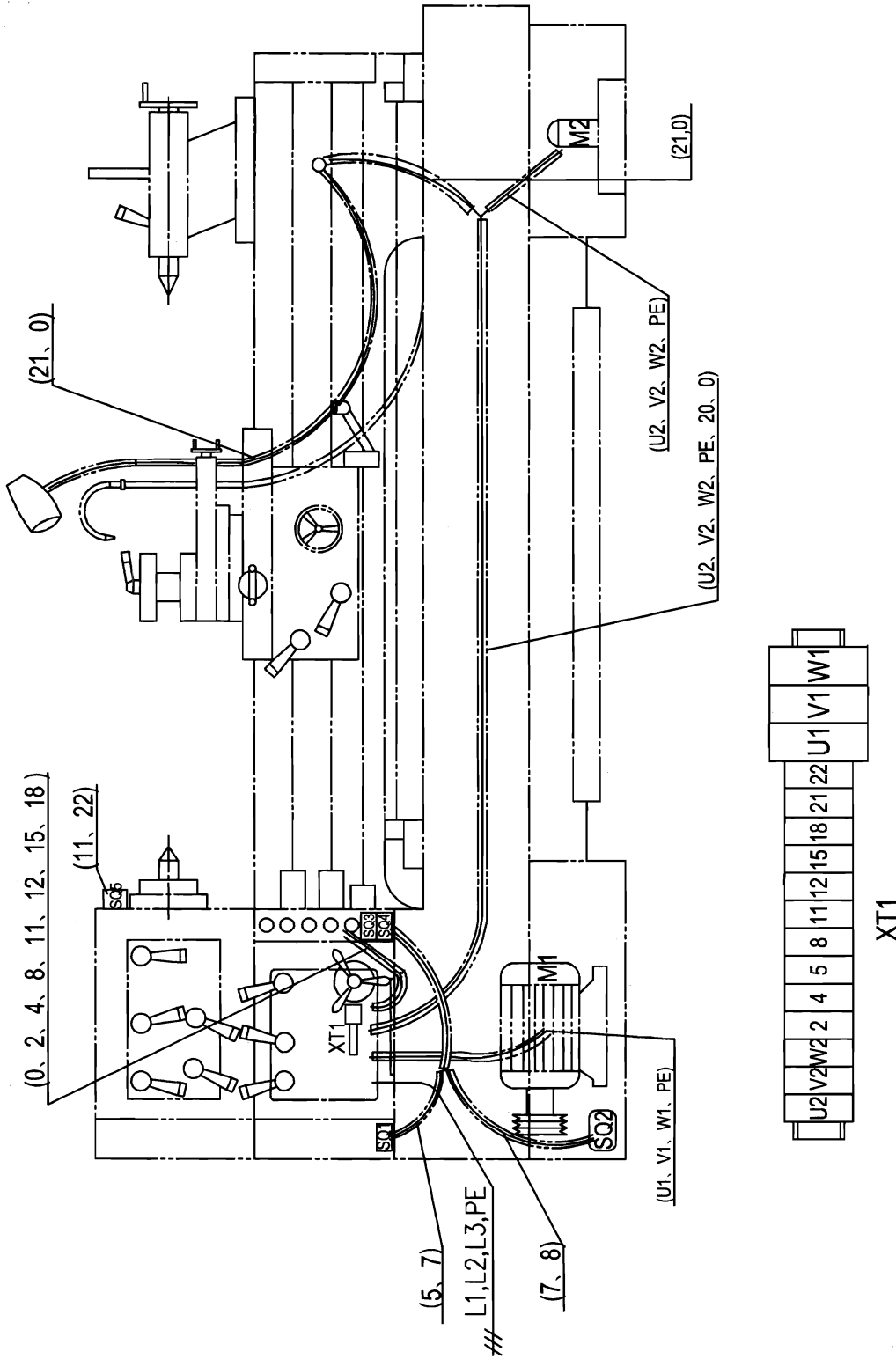


Diagram of electric distribution board diagram (Fig. 10.2.2)

# Electric wiring diagram



Electric wiring diagram (Fig.10.2.3)

## List of electric equipment

| Code       | Name                       | Application                         | Model& specification                    | Q'ty |
|------------|----------------------------|-------------------------------------|---|------|
| <b>M1</b>  | 3-phase asynchronous motor | Main drive                          | Y132S-4B3                               | 1    |
| <b>M2</b>  | Cooling pump motor         | Cooling pump                        | AOB2-25                                 | 1    |
| <b>QF</b>  | Power switch               | Power inlet                         | SIN125R40 FFC3P                         | 1    |
| <b>TC</b>  | Control Transformer        | Circuit control                     | JBK5-TH 250VA<br>440/24V140VA; 24V110VA | 1    |
| <b>KM1</b> | AC contactor               | Spindle control                     | CJX3-9/22                               | 1    |
| <b>KM2</b> | AC contactor               | Spindle forward control             | CJX3-16/11                              | 1    |
| <b>KM3</b> | AC contactor               | Spindle backward control            | CJX3-16/11                              | 1    |
| <b>KM4</b> | AC contactor               | Water pump motor control            | CJX3-9/22                               | 1    |
| <b>QF1</b> | Manual motor trigger       | Main power protect                  | 3VE1015-2MUOO                           | 1    |
| <b>QF2</b> | Manual motor trigger       | Water pump protect                  | 3VE1015-2DUOO                           | 1    |
| <b>FU1</b> | FUSE                       | Transfer primary coil protect       | RT23-16/1A                              | 2    |
| <b>FU2</b> | FUSE                       | Control circuit shorts protect      | RT23-16/6A                              | 1    |
| <b>FU3</b> | FUSE                       | Illumination circuit shorts protect | RT23-16/2A                              | 1    |
| <b>HL1</b> | Single lamp                | Main motor ready                    | AD-11B                                  | 1    |
| <b>HL2</b> | Single lamp                | Machine working lamp                | JC38-B AC24V40W                         | 1    |
| <b>SB1</b> | Button                     | Emergency stop                      | LAY3-02ZS/1                             | 1    |
| <b>SB2</b> | Button                     | Spindle inching control             | LAY3-11                                 | 1    |
| <b>SA1</b> | Button                     | Spindle control                     | LAY3-11X/23                             | 1    |
| <b>SA2</b> | Button                     | Water pump control                  | LAY3-11X/23                             | 1    |

Regarding specific models and specifications of some of the electric components

Please refer to the components on spot.

**List of electric equipment ( Siemens )**

| <b>Code</b> | <b>Name</b>                | <b>Application</b>                  | <b>Model&amp; specification</b>         | <b>Q'ty</b> |
|-------------|----------------------------|-------------------------------------|---|-------------|
| <b>M1</b>   | 3-phase asynchronous motor | Main drive                          | Y132S-4B3                               | 1           |
| <b>M2</b>   | Cooling pump motor         | Cooling pump                        | AOB2-25                                 | 1           |
| <b>QF</b>   | Power switch               | Power inlet                         | SIN125R40 FFC3P                         | 1           |
| <b>TC</b>   | Control Transformer        | Circuit control                     | JBK5-160 160VA<br>380/24V60VA; 24V100VA | 1           |
| <b>KM1</b>  | AC contactor               | Spindle control                     | 3TF4010-0X                              | 1           |
| <b>KM2</b>  | AC contactor               | Spindle forward control             | 3TF4211-0X                              | 1           |
| <b>KM3</b>  | AC contactor               | Spindle backward control            | 3TF4211-0X                              | 1           |
| <b>KM4</b>  | AC contactor               | Water pump motor control            | 3TF4010-0X                              | 1           |
| <b>QF1</b>  | Manual motor trigger       | Main power protect                  | 3VU1340-1MM00                           | 1           |
| <b>QF2</b>  | Manual motor trigger       | Water pump protect                  | 3VU1340-1MD00                           | 1           |
| <b>FU1</b>  | FUSE                       | Transfer primary coil protect       | RT23-16/1A                              | 2           |
| <b>FU2</b>  | FUSE                       | Control circuit shorts protect      | RT23-16/4A                              | 1           |
| <b>FU3</b>  | FUSE                       | Illumination circuit shorts protect | RT23-16/2A                              | 1           |
| <b>HL1</b>  | Single lamp                | Main motor ready                    | 3SB3744-6BA60                           | 1           |
| <b>HL2</b>  | Single lamp                | Machine working lamp                | JC38-B AC24V 40W                        | 1           |
| <b>SB1</b>  | Button                     | Emergency stop                      | 3SB3603-1HA20                           | 1           |
| <b>SA1</b>  | Button                     | Spindle control                     | 3SB3602-2KA11                           | 1           |
| <b>SA2</b>  | Button                     | Water pump control                  | 3SB3602-2KA11                           | 1           |
| <b>SB2</b>  | Button                     | Spindle inching control             | 3SB3602-0AA41                           | 1           |

**Regarding specific models and specifications of some of the electric components  
Please refer to the components on spot.**

**List of electric equipment ( Schneider )**

| <b>Code</b> | <b>Name</b>                | <b>Application</b>                  | <b>Model&amp; specification</b>         | <b>Q'ty</b> |
|-------------|----------------------------|-------------------------------------|---|-------------|
| <b>M1</b>   | 3-phase asynchronous motor | Main drive                          | Y132S-4B3                               | 1           |
| <b>M2</b>   | Cooling pump motor         | Cooling pump                        | AOB2-25                                 | 1           |
| <b>QF</b>   | Power switch               | Power inlet                         | SIN125R40 FFC3P                         | 1           |
| <b>TC</b>   | Control Transformer        | Circuit control                     | JBK5-160 160VA<br>380/24V60VA; 24V100VA | 1           |
| <b>KM1</b>  | AC contactor               | Spindle control                     | LC1-DO910B5C                            | 1           |
| <b>KM2</b>  | AC contactor               | Spindle forward control             | LC1-D1201B5C                            | 1           |
| <b>KM3</b>  | AC contactor               | Spindle backward control            | LC1-D1201B5C                            | 1           |
| <b>KM4</b>  | AC contactor               | Water pump motor control            | LC1-D0910B5C                            | 1           |
| <b>QF1</b>  | Manual motor trigger       | Main power protect                  | GV2-M16C                                | 1           |
| <b>QF2</b>  | Manual motor trigger       | Water pump protect                  | GV2-M03C                                | 1           |
| <b>FU1</b>  | FUSE                       | Transfer primary coil protect       | RT23-16/1A                              | 2           |
| <b>FU2</b>  | FUSE                       | Control circuit shorts protect      | RT23-16/4A                              | 1           |
| <b>FU3</b>  | FUSE                       | Illumination circuit shorts protect | RT23-16/2A                              | 1           |
| <b>HL1</b>  | Single lamp                | Main motor ready                    | XB2-BVB1C                               | 1           |
| <b>HL2</b>  | Single lamp                | Machine working lamp                | JC38-B AC24V40W                         | 1           |
| <b>SB1</b>  | Button                     | Emergency stop                      | XB2-BS542C/ZB2-BY9101                   | 1           |
| <b>SA1</b>  | Button                     | Spindle control                     | XB2-BD21C                               | 1           |
| <b>SA2</b>  | Button                     | Water pump control                  | XB2-BD21C                               | 1           |
| <b>SB2</b>  | Button                     | Spindle inching control             | XB2-BA31C                               | 1           |

**Regarding specific models and specifications of some of the electric components  
Please refer to the components on spot.**

**List of electric equipment ( ABB )**

| Code       | Name                       | Application                         | Model& specification                    | Q'ty |
|------------|----------------------------|-------------------------------------|---|------|
| <b>M1</b>  | 3-phase asynchronous motor | Main drive                          | Y132S-4B3                               | 1    |
| <b>M2</b>  | Cooling pump motor         | Cooling pump                        | AOB2-25                                 | 1    |
| <b>QF</b>  | Power switch               | Power inlet                         | SIN125R40 FFC3P                         | 1    |
| <b>TC</b>  | Control Transformer        | Circuit control                     | JBK5-160 160VA<br>380/24V60VA; 24V100VA | 1    |
| <b>KM1</b> | AC contactor               | Spindle control                     | EB9-30-10                               | 1    |
| <b>KM2</b> | AC contactor               | Spindle forward control             | EB9-30-01                               | 1    |
| <b>KM3</b> | AC contactor               | Spindle backward control            | EB9-30-01                               | 1    |
| <b>KM4</b> | AC contactor               | Water pump motor control            | EB9-30-10                               | 1    |
| <b>QF1</b> | Manual motor trigger       | Main power protect                  | MS325                                   | 1    |
| <b>QF2</b> | Manual motor trigger       | Water pump protect                  | MS325                                   | 1    |
| <b>FU1</b> | Breaker                    | Transfer primary coil protect       | S252S-K1 2P1A                           | 2    |
| <b>FU2</b> | Breaker                    | Control circuit shorts protect      | S251S-K6 1P4A                           | 1    |
| <b>FU3</b> | Breaker                    | Illumination circuit shorts protect | S251S-K2 1P2A                           | 1    |
| <b>HL1</b> | Single lamp                | Main motor ready                    | XDY11 AC24V                             | 1    |
| <b>HL2</b> | Single lamp                | Machine working lamp                | JC38-B AC24V40W                         | 1    |
| <b>SB1</b> | Button                     | Emergency stop                      | LAY11-02ZS/1                            | 1    |
| <b>SA1</b> | Button                     | Spindle control                     | LAY11-11X/23                            | 1    |
| <b>SA2</b> | Button                     | Water pump control                  | LAY11-11X/23                            | 1    |
| <b>SB2</b> | Button                     | Spindle inching control             | LAY11-11                                | 1    |

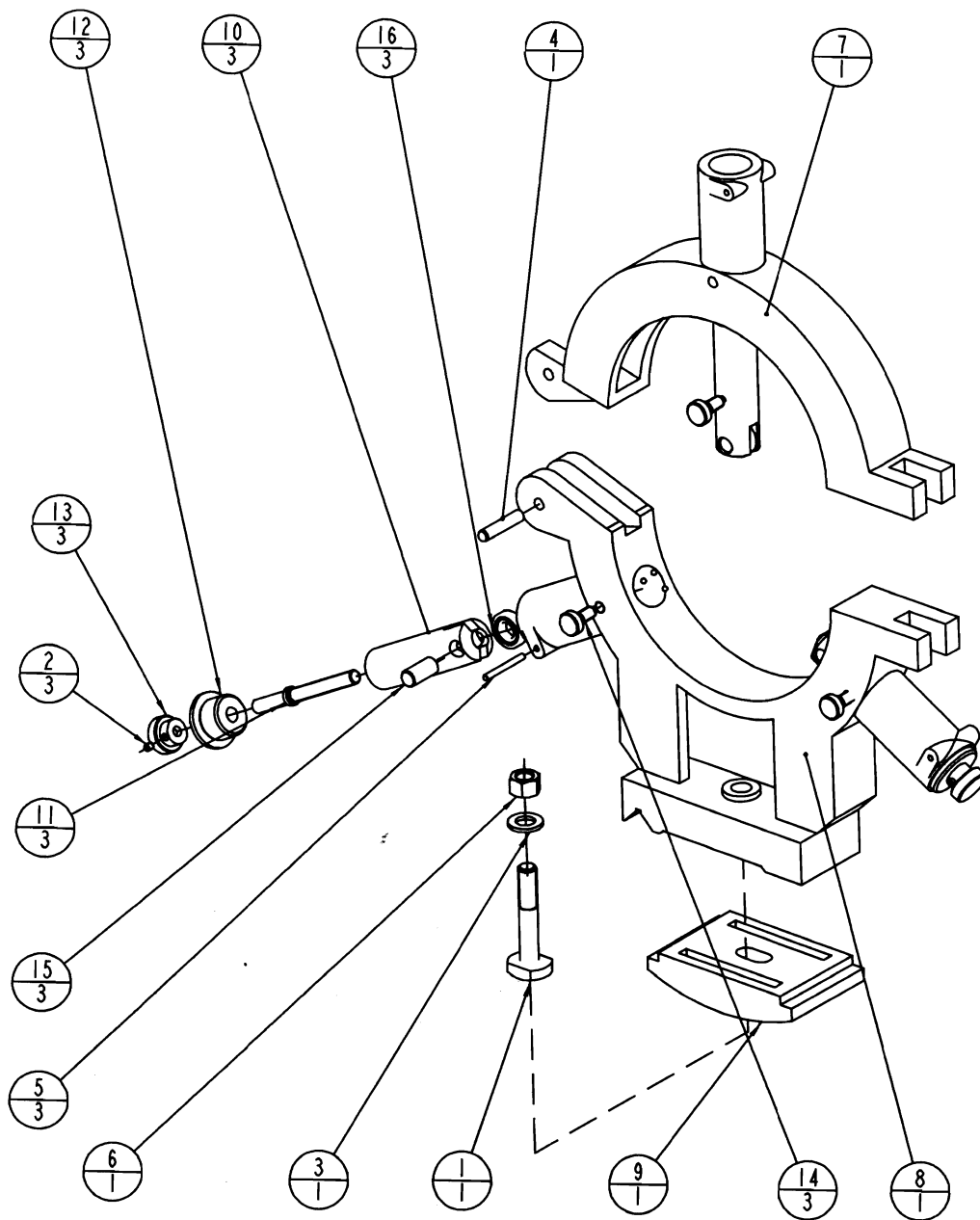
**Regarding specific models and specifications of some of the electric components  
Please refer to the components on spot.**

**Adjust list of electric components**

| Electric net<br>Components | 220V<br>50Hz/60Hz  | 380V<br>50Hz/60Hz | 400V<br>50Hz/60Hz | 420V<br>50Hz/60Hz | 440V<br>50Hz/60Hz | 220V/440V 60Hz<br>(for American region) |       |
|----------------------------|--|-------------------|-------------------|-------------------|-------------------|---|-------|
|                            |  |                   |                   |                   |                   | 220V                                    | 440V  |
| <b>QF1</b>                 | 20A  | 11.6A             | 11A               | 10.5A             | 10A               | 20A                                     | 10A   |
| <b>QF2</b>                 | 0.55A  | 0.32A             | 0.3A              | 0.29A             | 0.28A             | 0.55A                                   | 0.28A |
| <b>FU1</b>                 | 1A (2A) Note: 160A Control transformer 1A, 250VA Control transformer 2A          |                   |                   |                   |                   |   |       |
| <b>FU2</b>                 | 4A (2A) (6A) Note: 24V Control 4A, 110V Control 2A, 250VA Control transformer 6A |                   |                   |                   |                   |   |       |
| <b>FU3</b>                 | 2A (1A) Note: 24V 40W Illuminating lamp 2A, 110V 40W Illuminating lamp 1A        |                   |                   |                   |                   |   |       |

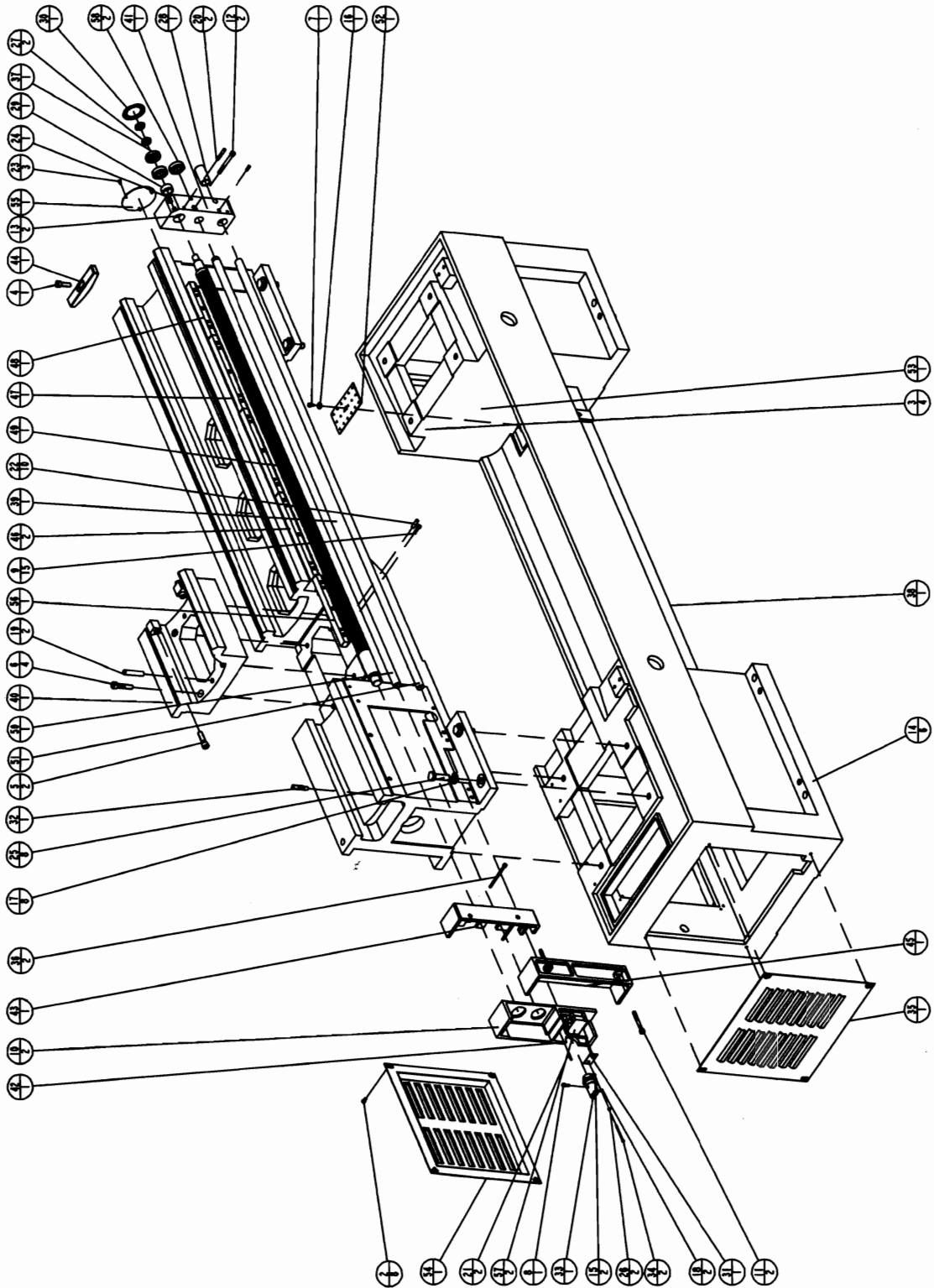
**Note:** The adjusted values of breakers are referenced values and used according to the values marked on the labels of motors.

# STEADY REST

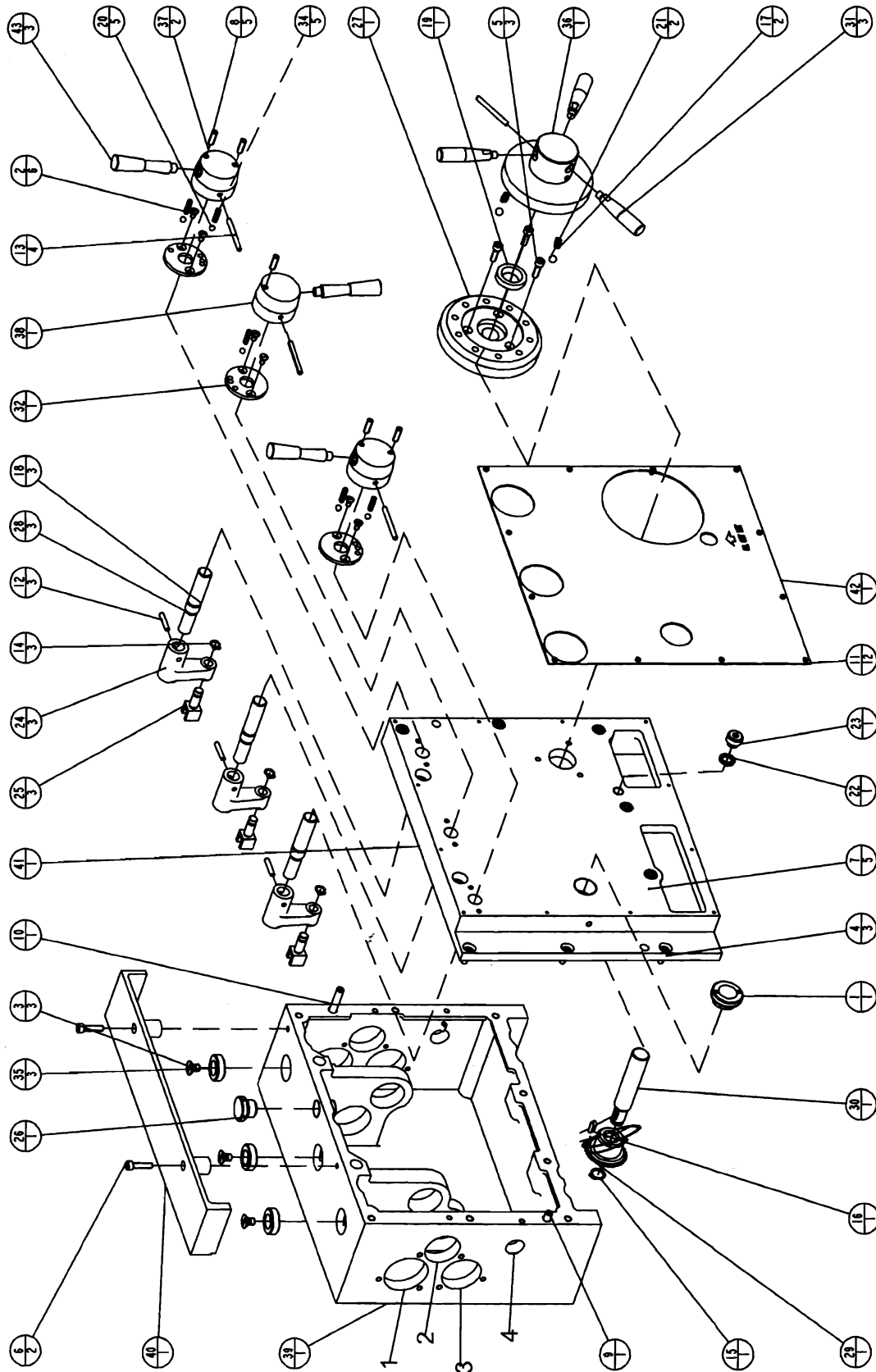




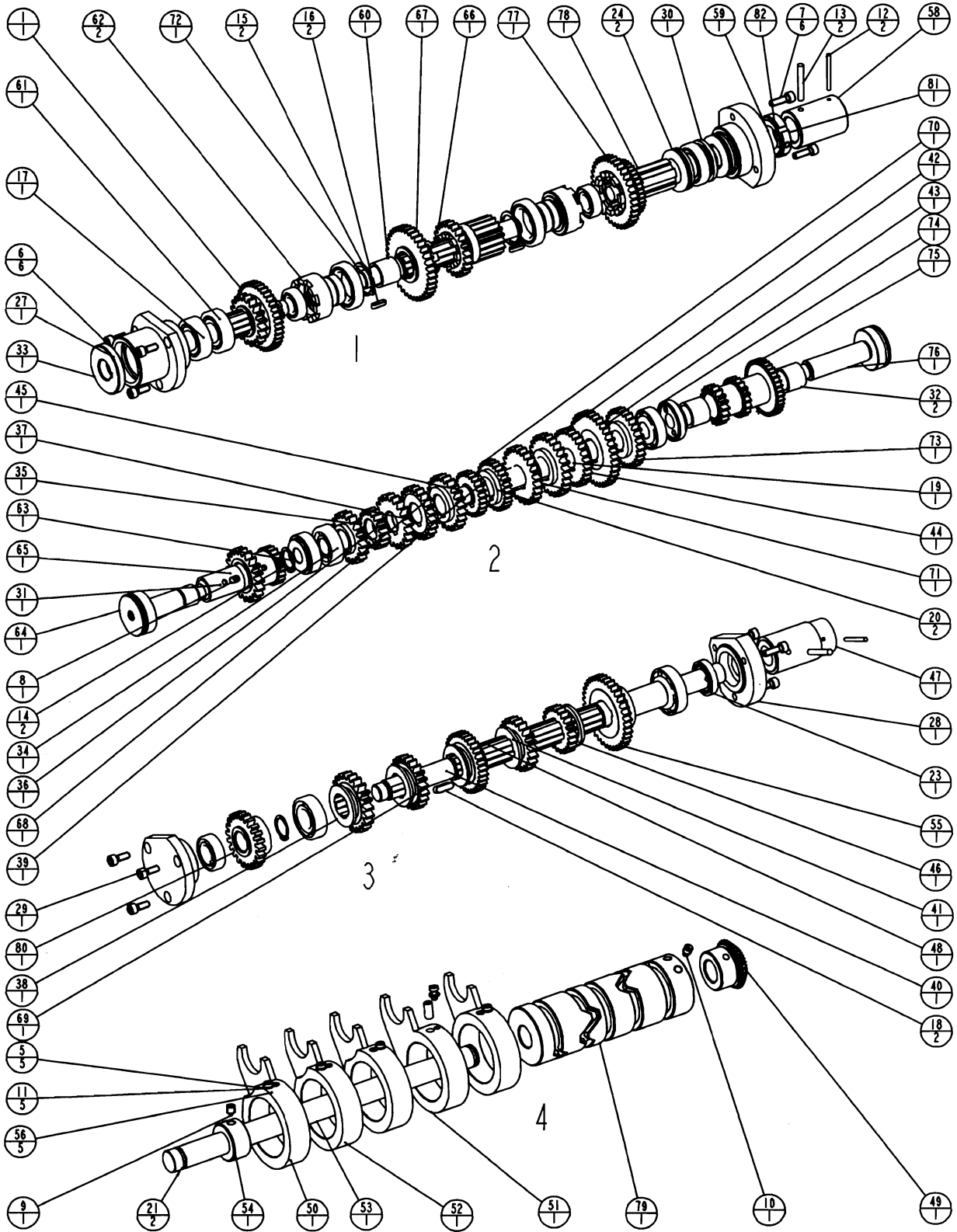
# BED



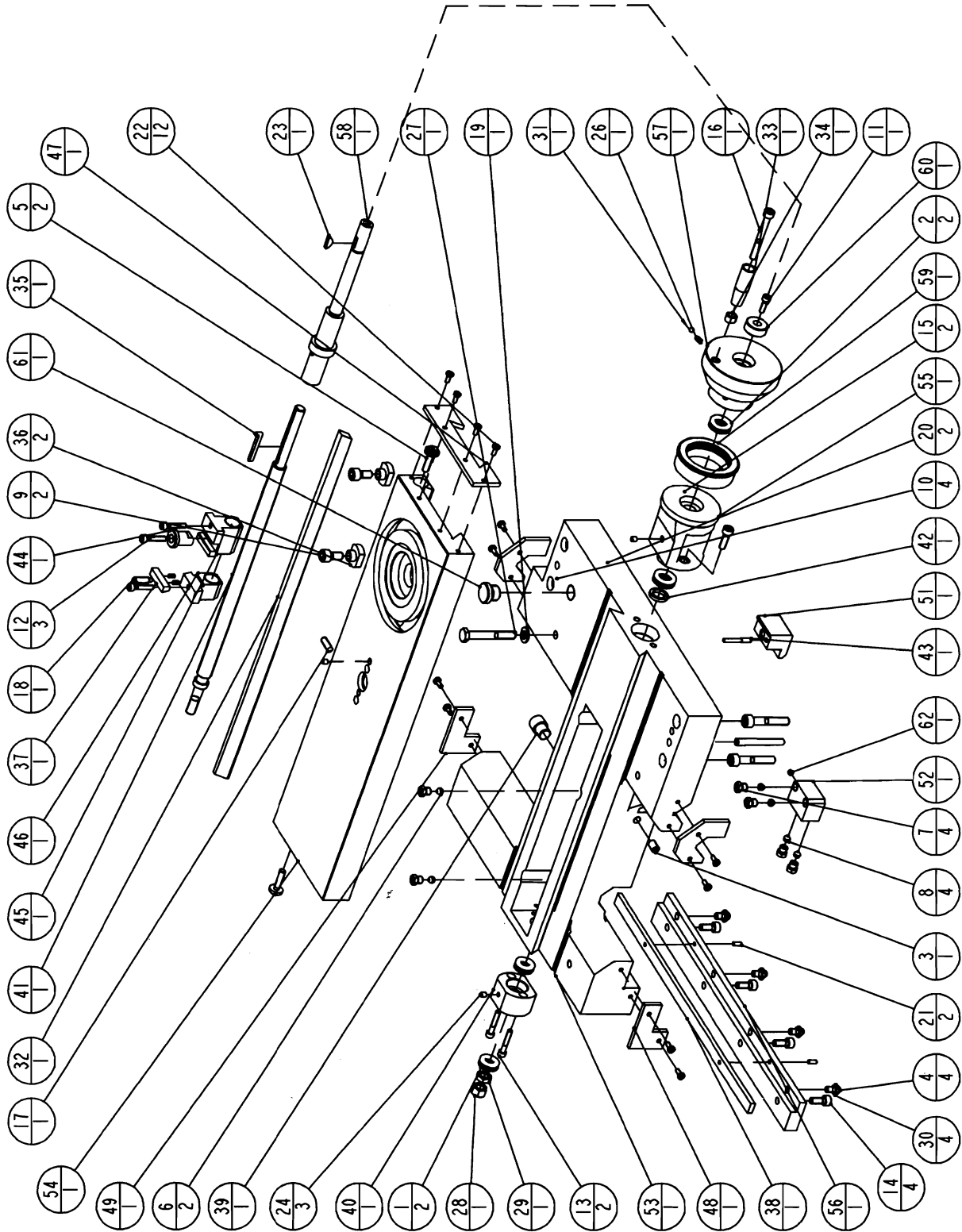
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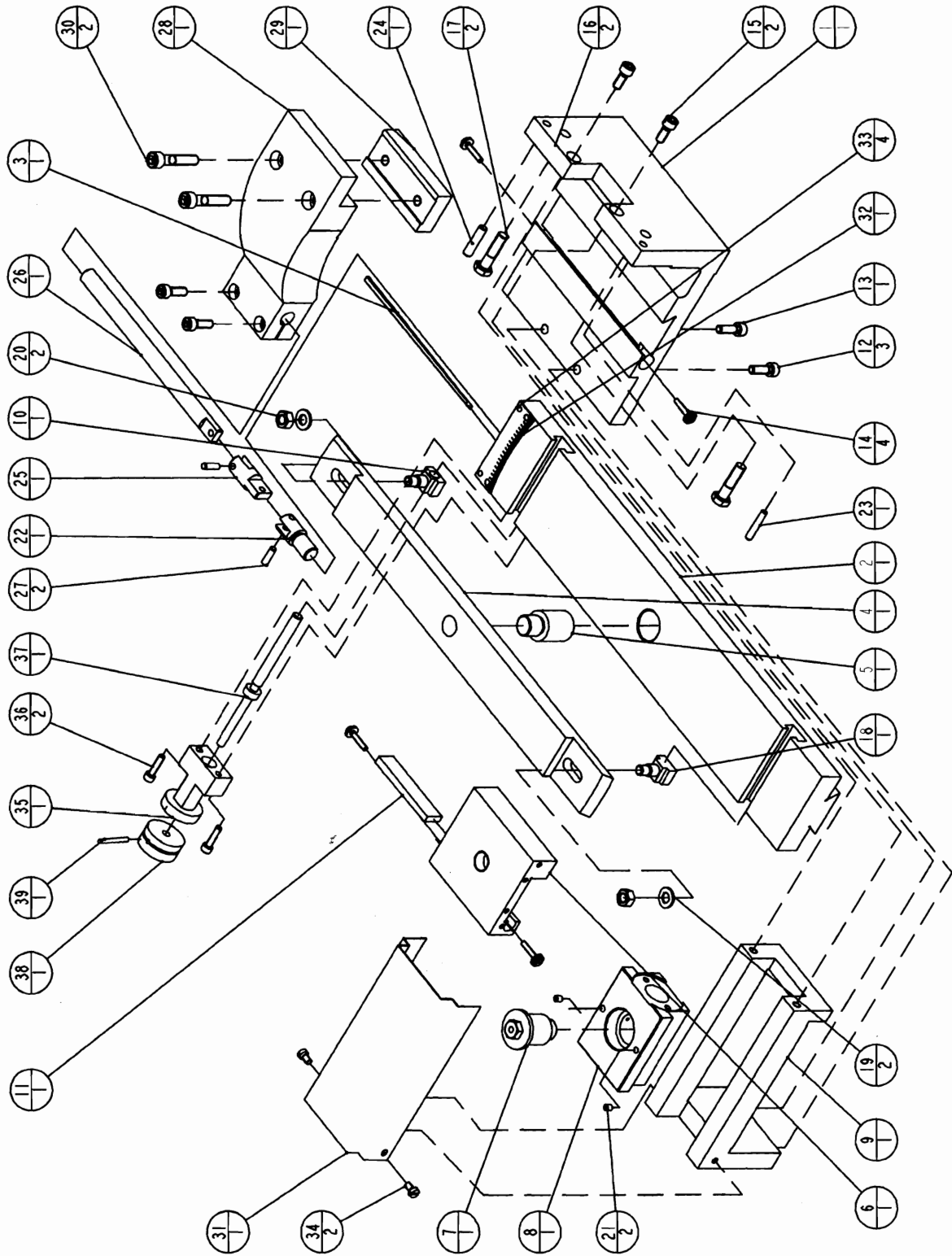
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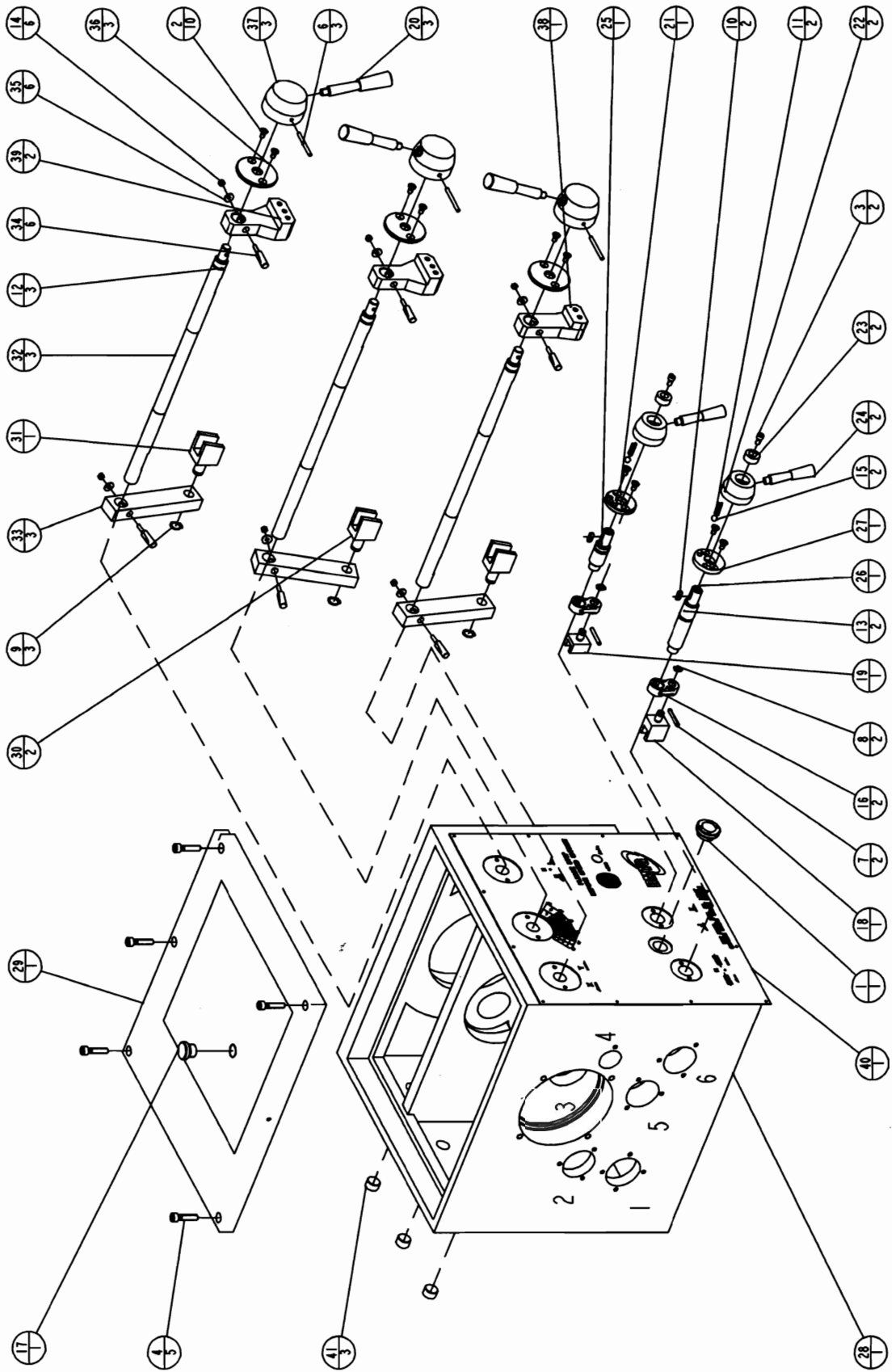
# CARRIAGE



# TAPER ATTACHMENT

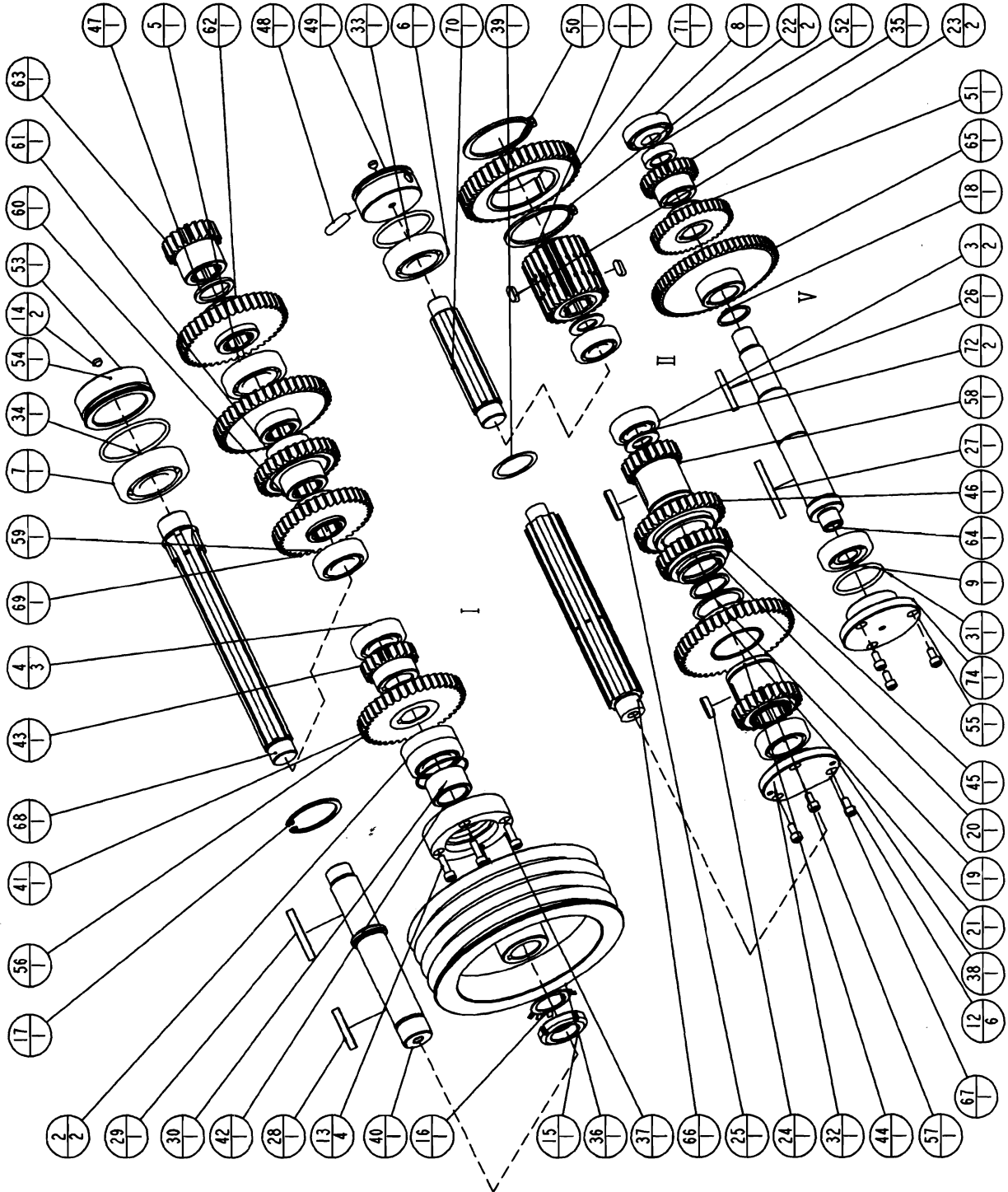


# HEAD STOCK

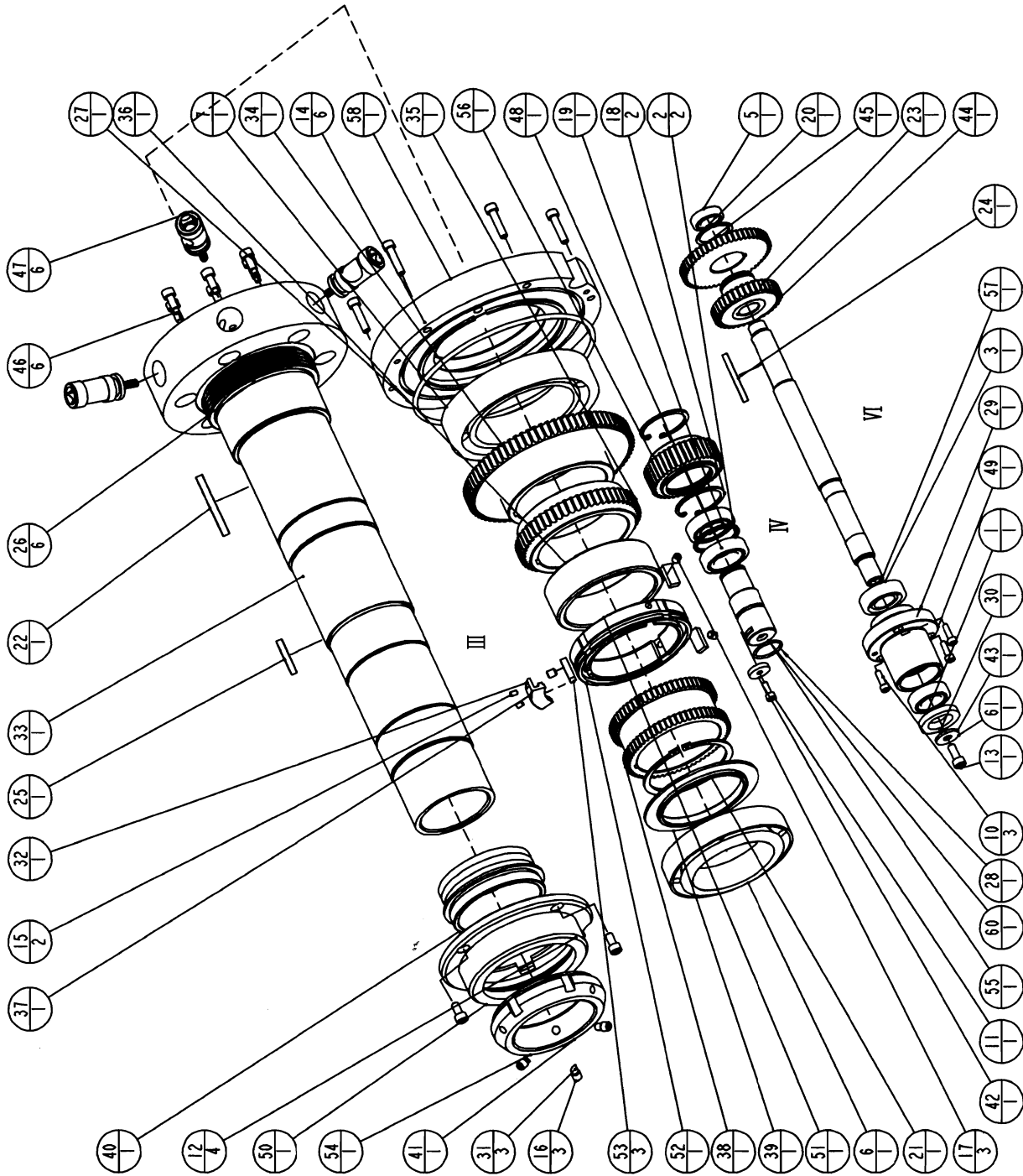


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# HEAD BOX

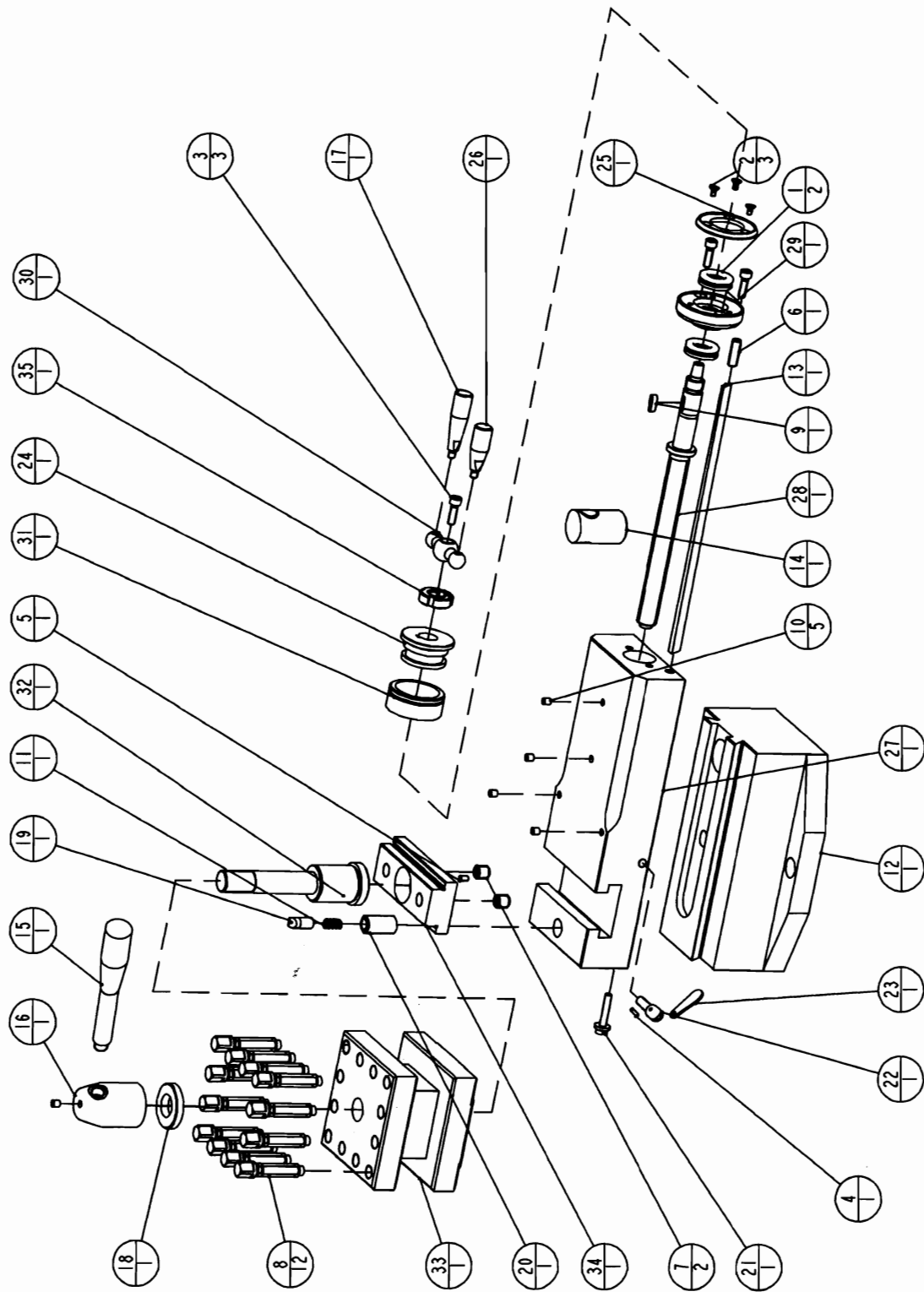


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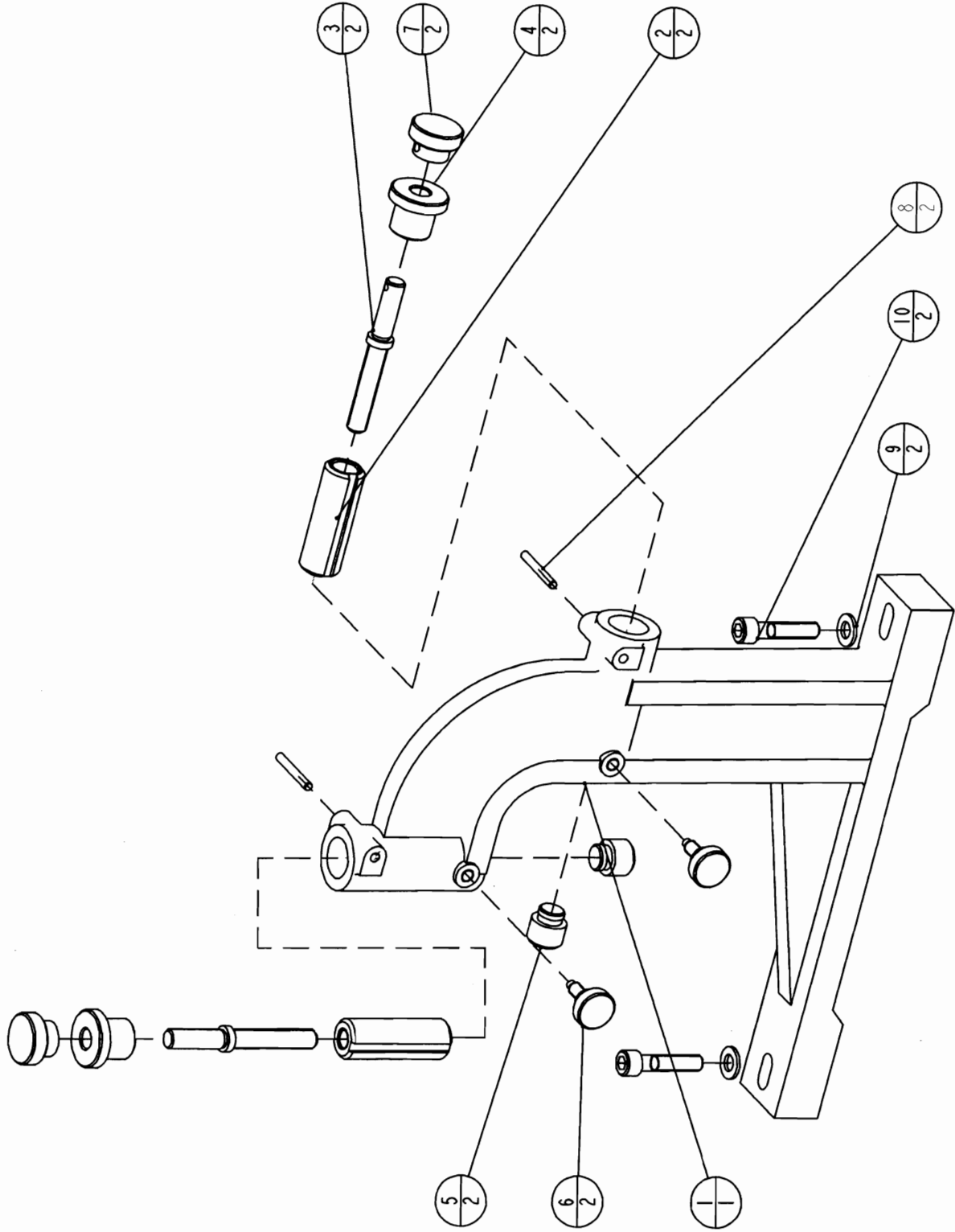




# TOOL POSTS



# FOLLOWER REST



# APRON

