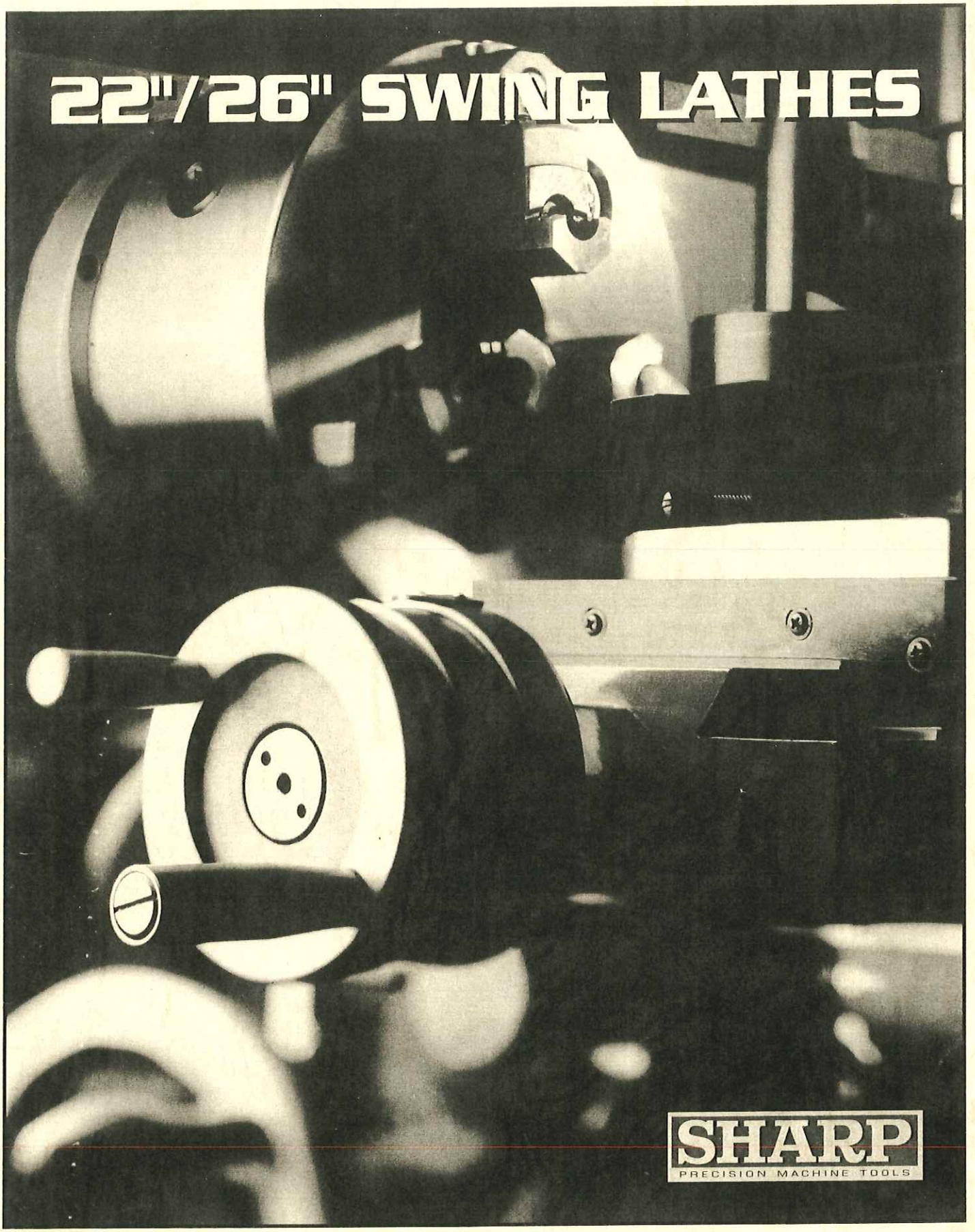
# OPERATION & PARTS MANUAL



HIGH SPEED PRECISION

OPERATOR'S MANUAL

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# PREFACE

Thank you for choosing Sharp as your choice for a high precision lathe. We at sharp take pride in the workmanship, durability and precision of our machines.

Read this manual in its entirety in order to get the best possible results from the machine and prolong its life, and become familiar with its operation, safety features and recommended maintenance.

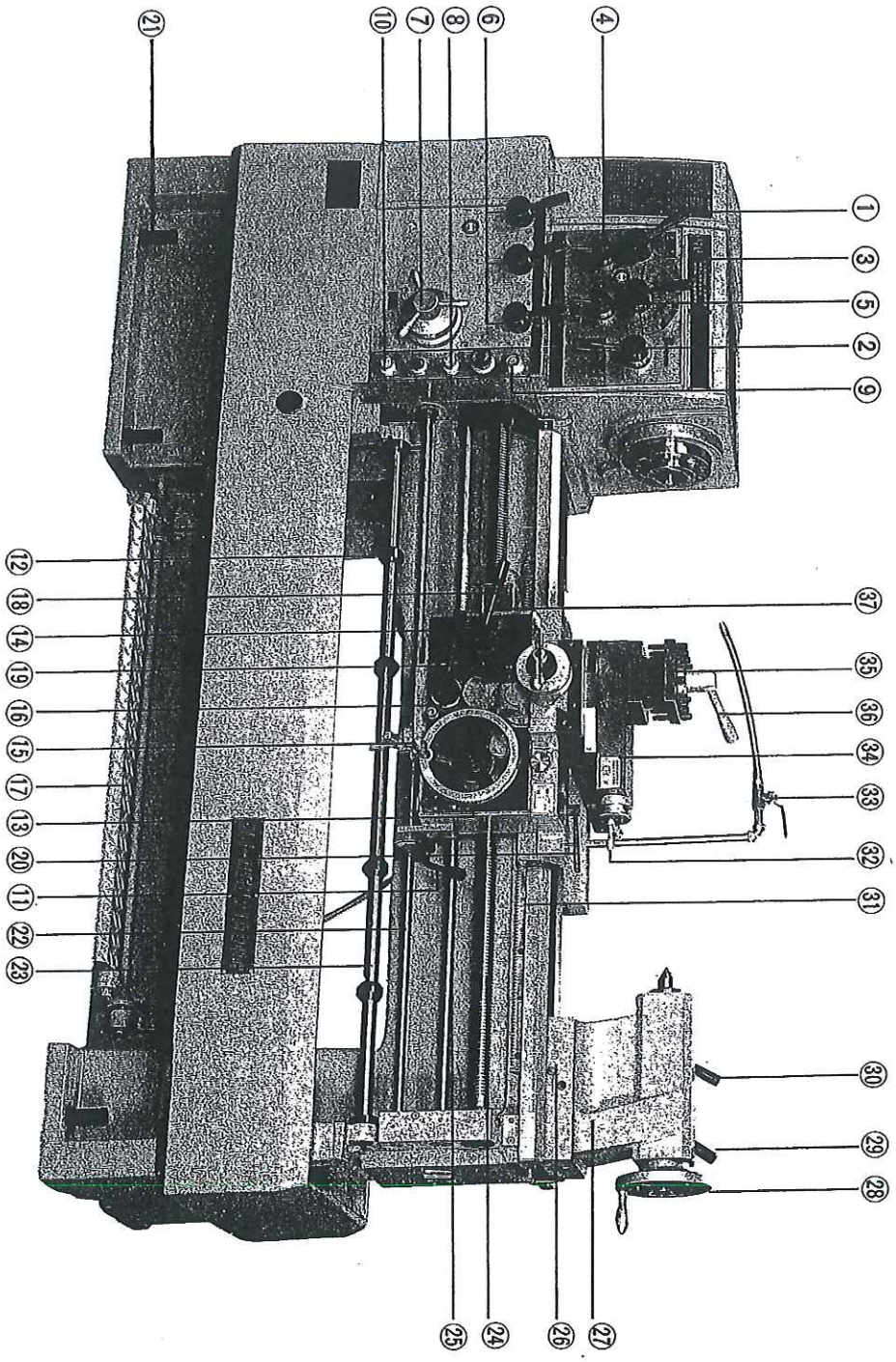
The 1 year warranty would be void if the machine was damaged due to improper use or disregard to any operational instruction contained in this manual.

Some precautions to be taken not listed later in this manual are:

1. Do **NOT** install the machine in direct sunlight or directly in front of any cooling system blowers.
2. Use only recommended lubricants.
3. Always keep machine clean
4. Should the ways become damaged do not move the carriage until they have been repaired.

## 1. SJ HIGH PRECISION LATHE

### 1 - 1 Machine Assembly



| ITEM | DESCRIPTION | ITEM | DESCRIPTION |
|---|---|---|---|
| 1 | Spindle speed shifting lever | 20 | Carriage clamping lever |
| 2 | Spindle speed H/L shifting lever | 21 | Foundation adjusting bolt |
| 3 | Spindle speed shifting selection lever | 22 | Spindle operation control rod |
| 4 | Forward/Reverse shifting lever | 23 | 4 position automatic feed stop selection rod |
| 5 | Thread/Feed selection lever | 24 | Leadscrew |
| 6 | Thread/Feed shifting lever | 25 | Auto-feeding rod |
| 7 | 10 step feed selection dial | 26 | Tailstock set over adjusting screw |
| 8 | Power source switch (Main switch) | 27 | Tailstock body |
| 9 | Intermittent button | 28 | Tailstock handwheel |
| 10 | Coolant supply button | 29 | Tailstock body Clamping lever |
| 11 | Spindle operation control lever | 30 | Tailstock spindle locking lever |
| 12 | Adjustable trip dog | 31 | Rack |
| 13 | Longitudinal feed hand wheel | 32 | Compound rest handle |
| 14 | Cross slide handle | 33 | Coolant control valve |
| 15 | Trip plunger | 34 | Compound rest |
| 16 | Auto feeding engaged lever | 35 | Four way tool post |
| 17 | Foot brake pedal | 36 | Tool post clamping lever |
| 18 | Half nut engaged lever | 37 | Thread dial indicator |
| 19 | Feed axis selector | | |

# 2.UNPACKING & MACHINE INSTALLATION

## 2-1 Unpacking

When the machine arrives:

Check first to see if the crate or container is damaged.

Open the case and inspect for any damage to the machine or missing parts.

If you find any damage or missing parts, contact our company or the appropriate insurance company immediately.

Failure to report any discrepancies or damage immediately could result in a delay or the possibility of a claim being denied.

## 2-2 Lifting

Please refer to figure 2-2 for unloading and moving of machine.

1.Use two steel bars,780mm long and 40mm in diameter. Lifting holes are provided in the bed. Appropriate steel cables should be used for lifting.

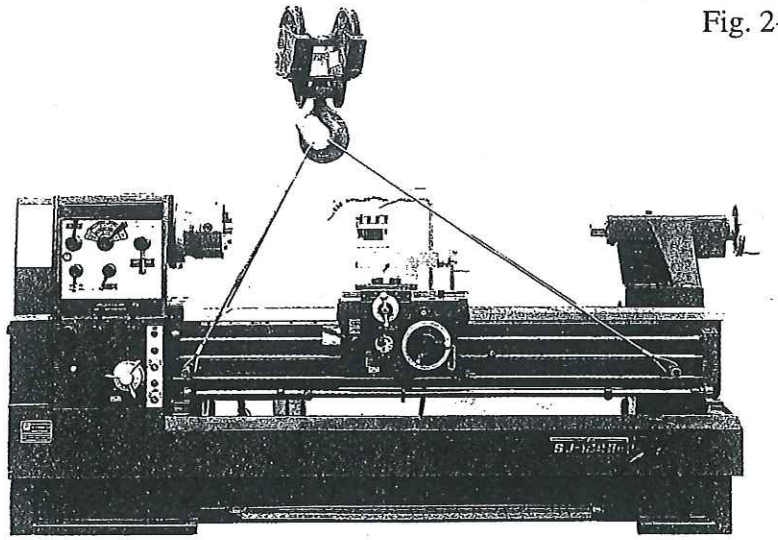
2.For best results a hook should be used.

3.Before lifting, be sure to move the apron and tailstock towards the end of the bed to balance the weight.

4.To insure machine accuracy, care should be taken not to jar the machine when it is placed on its foundation.

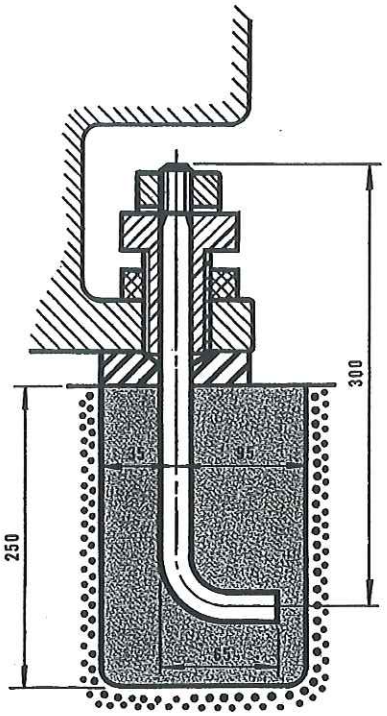
5.The back of the machine should be a minimum of 600mm from any wall or obstruction to allow sufficient space for wiring the electrical control box.

Fig. 2-2



## 2-3 Basic Foundation

With today's common use of tungsten carbide cutting tools, heavy cutting practices and higher spindle speeds, a good machine foundation is a must to avoid vibration . Please refer to fig 2-3 for reccomended foundation.




UNIT-mm Fig 2-3

## 2-4 Cleaning

Before shipping, the machine is protected with a special anti-rust agent. Before operating the machine, this agent must be removed. This can be done using a soft brush/cloth soaked with cleaning solvent or kerosene. To avoid the danger of fire or explosion, do NOT use gasoline or cellulose solvent. After the anti-rust agent is removed, the machine should be properly lubricated and all moving prats be checked for proper operation.

## 2-5 Leveling

Once the machine is on its foundation it is time for leveling. A machinist level (accuracy 0.02mm/1000mm) should be used. Place level on bed to level machine for longitudinal and transverse leveling. Tighten foundation bolts, and recheck. If not level loosen foundation bolts and re-level machine. Tolerance should be within 0.04mm/1000mm.

( See Figure 2-5 )

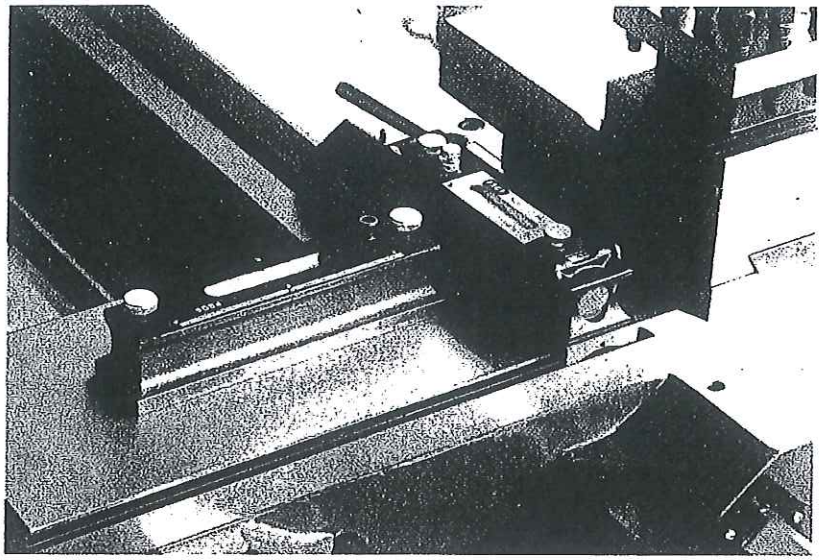


Fig 2-5

## 3. Electrical Circuit Control

### 3 -1. Electrical wiring

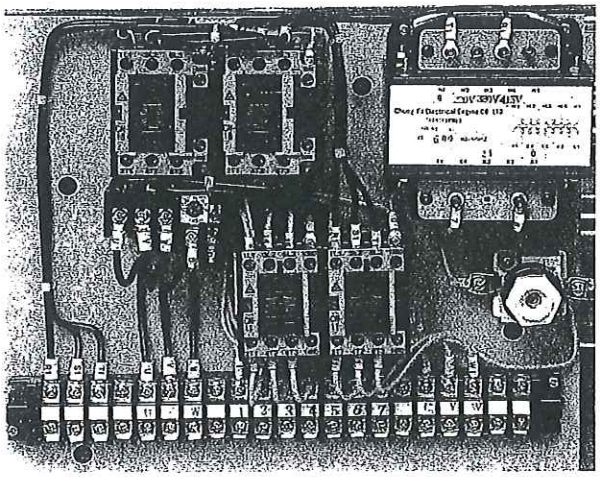


Fig 3-1

The electrical wiring can be found by opening the electrical control box located on the back of the machine. Connect the power source to the terminals labeled R.S.T. (For 16"& 18"use 8gauge Wire, for 22" &26" use 4 gauge wire).

The connection between the power source and the machine should be equipped with a safety fuse. Also make sure the machine is grounded.

## 3-2 Electrical Equipment

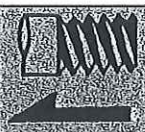
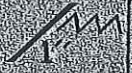
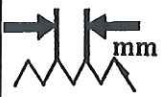
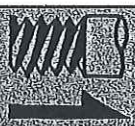
1. To protect the motor from burning out due to an overload, the electrical control box is equipped with an overload circuit breaker and magnetic contactor.
2. A micro switch protects the main switch.
3. The foot brake is connected to a micro switch. Stepping on the foot brake stops the lathe much faster than turning off the switch. After using the foot brake. The forward/reverse lever must be returned to neutral before the spindle can be operated.
4. The spindle will rotate continuously as long as the intermittent button (T) is depressed .

## 3-3 Electrical Cautions

After wiring, the rotation of the spindle must be checked. To do this, turn the main switch to "ON" and push the intermittent button (T), if the rotation is counter clockwise (looking from the tailstock, the rotation is correct. If the rotation is clockwise changing any two of the three wires, (R.S.T.)will correct the problem.

## 4. TESTING & OPERATION

### 4 — 1 Operation Symbols

| | | | | | |
|---|---|---|---|---|---|
| 1 | HIGH | High speed revolution | 11 |  | Variable adjustment (pressure) (clockwise pressure increased counterclockwise pressure decreased) |
| 2 | LOW | Low speed revolution | 12 |  | Electrical control box |
| 3 |  | Forward revolution | 13 | THREADS  | Imperial threads |
| 4 | N | Neutral gear | 14 |  | Metric threads |
| 5 |  | Reverse revolution | 15 | mm  | Auto feeding rate per revolution |
| 6 |  | Feeding | 16 |  | Pump |
| 7 |  | Intermittent button | 17 | GREEN | Power switch-ON |
| 8 |  | Cross feeding | 18 | RED | Power switch-OFF |
| 9 |  | Longitudinal feeding | 19 | OIL | Oil inlet (hole) |
| 10 |  | Cone clutch | | | |

## 4-2 Transmission & Spindle Operation

After all the previously decribed procedures have been done, it is time to test the machine. Position the spindle H/L lever #(2)to "L", the spindle speed selection lever #(3) to the very left side and forward/reverse lever # (4) to the "N" position Lift the spindle operation control lever (#(11)of item 1-1), and the spindle will rotate in the forward direction. To reverse spindle direction, push the lever down. To stop place lever in neutral. The foot brake is used for emergency stops. After using the foot brake, the forward/revere lever must be returned to neutral before the spindle can be operated.

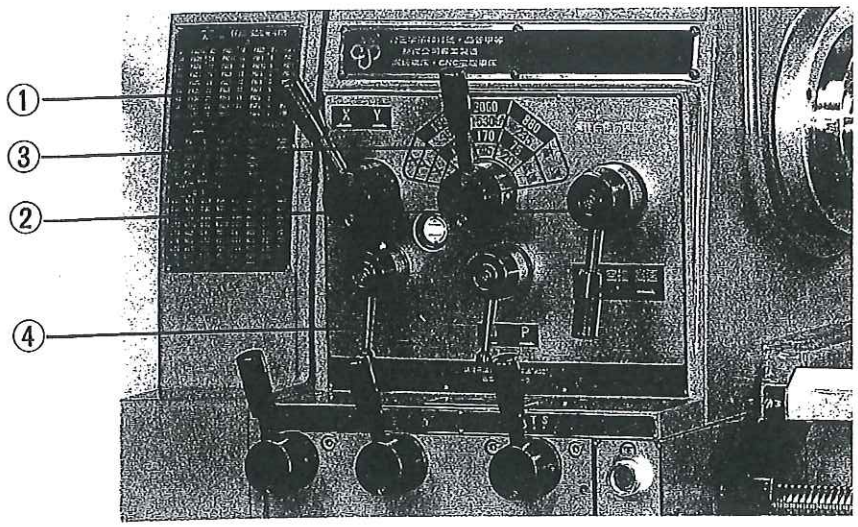



Fig 4-2

## 4-3 Spindle Speed Selection

There are three levers for selecting the desired spindle speed. (1) speed shifting lever, (2) H/L shifting lever and (3) speed selection lever, for a total of 12 speeds.

To rotate the spindle by hand, place the H/L lever to neutral.

(Between "H"&"L").

For safety and to protect the gears from damage, only change speeds when the motor is completely stopped. If the gear does not engage easily, you can use the intermittent (T) button to jog the machine to engage gears. Be sure gears are properly engaged before starting lathe.

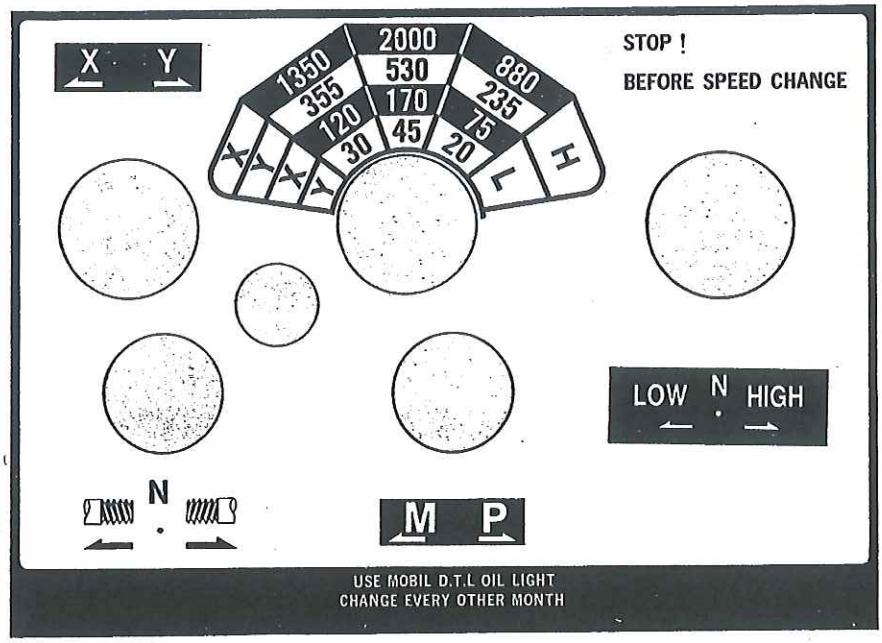
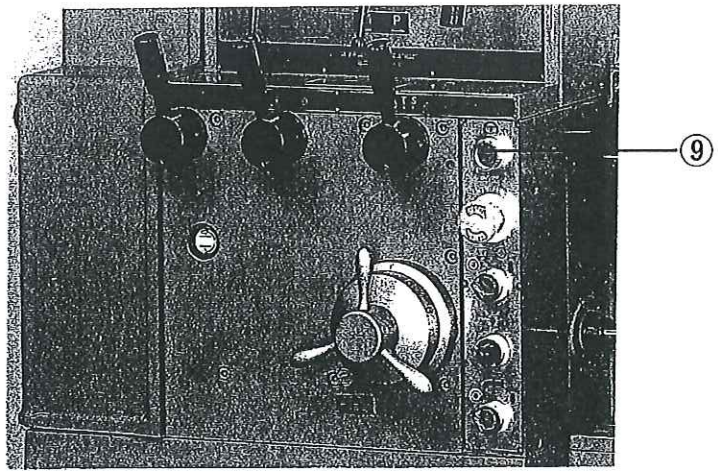



Fig 4-3

## 4-4 Intermittent Operation of Spindle

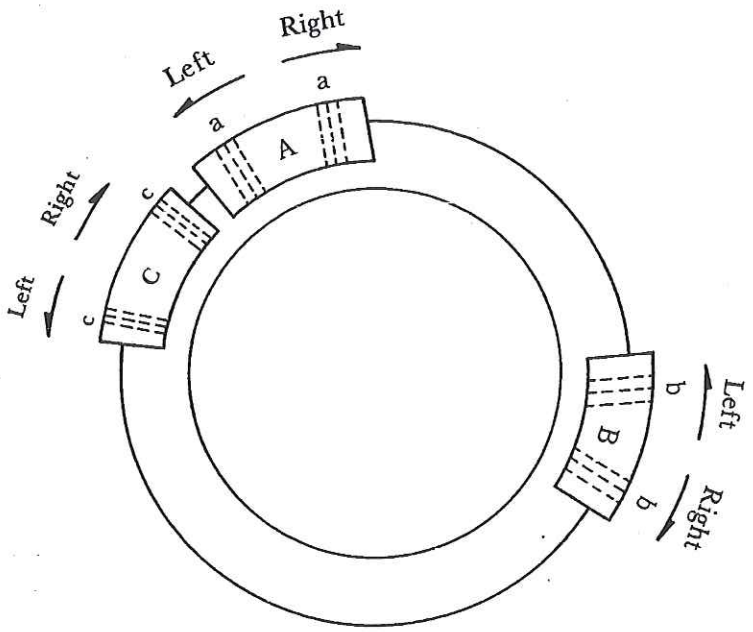
The lathe has been equipped with an intermittent button (#9) to simplify speed changes, check rotation and work piece centerline. This function only works in the forward direction.



## 4-5 The Importance and Method of Spindle Balancing

1. A lathe with a spindle that is out of balance can cause chatter and a poor finish on the workpiece. To ensure proper spindle balance Sharp lathes are equipped with balancing weights located on the locking ring at the rear of the spindle.

2. To properly balance the spindle, first run the lathe at 1350 r.pm. Put the palm of your hand on the headstock and check for any vibration. Moving the balance weights left or right can eliminate any vibration detected.




## 4-6 Transmitting Power to the Gear Box

Lever #4 of item 1-1, controls the direction of the lead screw. This lever has three positions. left, Right and Nutral.

## 4-7 Gear Box Operation

### 1.Threading:

With our special design, there is no need to re-arrange the back gears for threading. Please refer to the threading and feed tables for correct settings. The levers used for setting the feed rate or T.P.I. are:1. Feed direction #4 of item 1-1, 2. Thread, feed lever #5 of item 1-1, Thread feed lever #6 of item 1-1 and 10 step feed selection dial #7 of item 1-1.

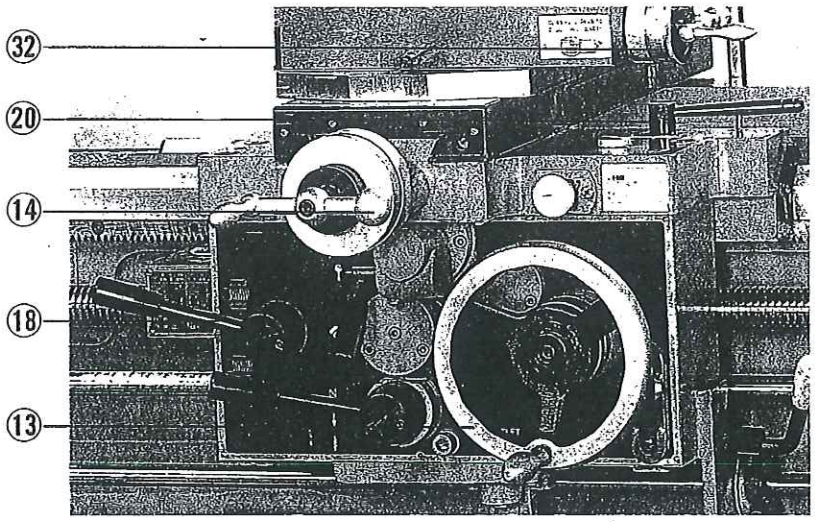
### 2.Auto feed:

After selecting the proper setting for either fed rate or threading you can use the appropriate lever for the desired operation. Auto feed #16 of item 1-1, or half nut engagement lever #18 of item 1-1.

## 4-8 Manual Operation

For manual operation, move both the half nut lever #18 and lever#4 of item 1-1 to neutral position. Hand wheel #13 Fig. 4-8 controls the apron movement, #14 controls the cross slide and #32 controls the compound. The graduations on all the dials are graduated in both metric and inch. Metric is 0.02 mm per graduation and inch is . **0.001**" per graduation...

Fig. 4-8



## 4-9 Automatic feed

1. Position lever #4 of item 1-1 to the required position
2. Move lever #5 & #6 of item 1-1 to the desired feed rate or thread
3. For threading, use lever #18 of item 1-1. Be sure lever is fully engaged.
4. For cross feed, push the feed axis selector lever #19 of item 1-1 down.
5. To reverse the cross feed pull the feed axis selector lever #19 of item 1-1up.

## 4-10 Automatic Feed Stop

The apron is equipped with an automatic stop device. To set this stop, loosen the setscrew on the top of the dog #12 fig. 4-10 and move to the desired location. with the dog in place and the top tip facing out tighten the setscrew. when the dog comes in contact with the trip plunger ( #15 of item 1-1 located at the bottom of the apron) the carriage will stop always test the stop before you start machining to avoid damage to the lathe and or workpiece.

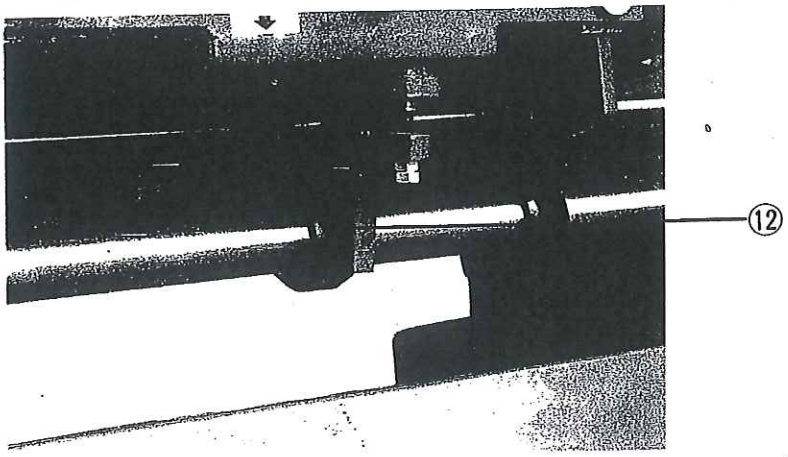



Fig. 4-10

## 4-11 4 Position Automatic Feed Stop

This feature gives you the option to set up to 4 stops. dogs are set individually and can be set to trip the plunger going in ether direction. If the dog is not needed, simply turn it so the top tip is facing inward and the plunger arm will pass by it.

## 4-12 Tailstock Operation

1. The tailstock handwheel dial is divided in .001" per graduation. Rotating the handwheel clockwise moves the quill out, counter clockwise retracts the quill Retracting quill will release the center or other tool being used.
2. To lock the quill push locking lever forward. (#30 Fig. 4-12).
3. The center line of the tailstock can be adjusted using set-over adjusting screw #26 Fig. 4-12. After adjusting be sure to tighten screws on both sides.

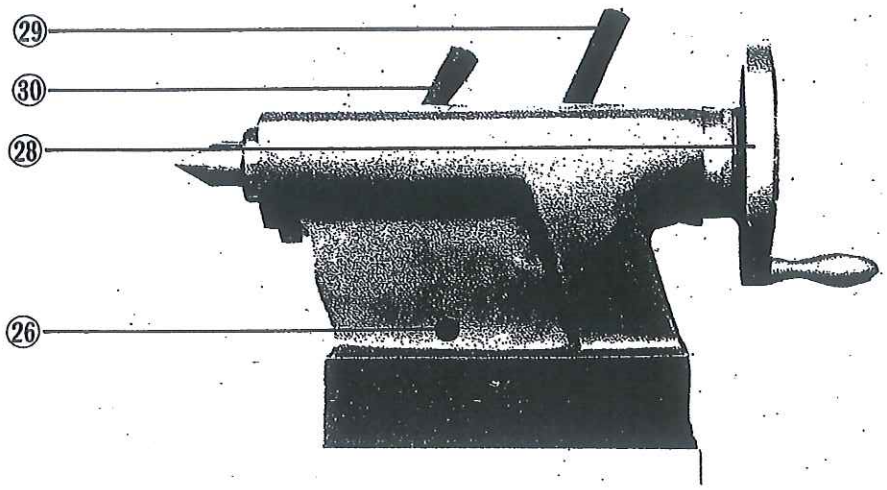
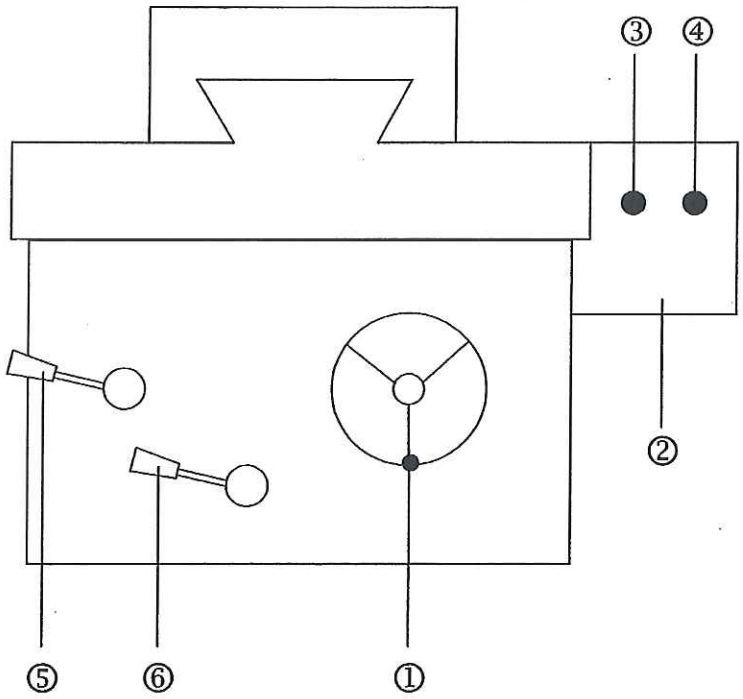



Fig 4-12

## 4-13 Rapid Traverse Operation

1. When using rapid traverse, please keep #5 and #6 off.
2. To have safer operation, clutch #1 must be off.
3. To make clutch come off, pull the hand wheel outward. Thus hand wheel does not rotate in high speed feeding, and does not injure the operator.
4. If it is necessary to feed by hand wheel, push the hand wheel inward. Meanwhile, turn the hand wheel counterclockwise to make the clutch engaged.
5. For rapid traverse toward right and left, buttons #3 and #4 are required.
6. Apron moves leftwards when button #3 is pressed, and stops when button #3 is released. Apron moves rightwards when button #4 is pressed, and stops when button #4 is released.




① Longitudinal feed hand wheel
② Rapid traverse control box
③ Rapid traverse button – left
④ Rapid traverse button – right
⑤ Half nut engaged lever
⑥ Auto feeding engaged lever

## 5. Threading

### 5-1 Leadscew Drive.

Moving the forward/reverse lever (#4 item 1-1) to the right will cause the leadscrew to rotate backwards, moving the lever to the left the leadscrew will rotate forward and when lever is in neutral the leadscrew will stop.

### 5-2 Threading

1. After selecting the thread to be cut, set the following levers to the appropriate position: #5, #6 & #7 of item 1-1. (Example 18t.p.i. PAE2).
2. Turn of the lathe.
3. Engage the halfnut by pushing #18 of item 1-1 down, making sure it is fully engaged.

## 5-3 Thread Dial Indicator

1.Thread dial indicator for Imperial leadscrew

To cut even number threads the leadscrew can be engaged on any number or line. For odd number threads the leadscrew can be engaged on any number. Fractional threads (1/2,1/4 etc) leadscrew can only beengaged on the same number or line.

**Note:** When cutting metric threads on a lathe with an Imperial leadscrew be sure the half nut is engaged at all times.

(If not the thread will not repeat).

2. Thread dial indicator for Metric leadscrew for cutting metric threads.

There are two dials used for metric leadscrews, 2&7 divisions and 3&5 divisions. To cut threads with pitches of 1.25,2.5,5.0,2.25,4.5 use the 3&5 division dial, for the balance of threads use the 2&7 division dial. For cutting thread pitches of 0.5,0.75,1.0,1.5,2.0,3.0,4.0, and 6.0, use the 14T worm gear and the 2&7 division dial. The Maximum number of divisions on the dial are 7, however you can only engage the dial on 2 of these numbers.

| Gcar Tccth | Pitch | | Dial Division | Haofnuts Cngaged Number |
|---|---|---|---|---|
| 1 1 T | 2.75 | 5.5 | 2 | 1 |
| 1 3 T | 3.25 | 6.5 | 2 | 1 |
| 1 4 T | 1.75 | 3.5 | 2 | 1,2 |
| | 7 | | | |
| | 0.5 | 0.75 | 7 | 1,2,3,4,5,6,7 |
| | 1 | 1.5 | | |
| | 2 | 3 | | |
| | 4 | 6 | | |
| 1 5 T | 1.25 | 2.5 | 3 | 1,2,3, |
| | 5 | | | |
| | 2.25 | 4.5 | 5 | 1,2,3 |
| 1 8 T | 6.75 | | 2 | 1,2 |

## 5 – 4 Thread & Feed Chart

For Swing 16", 18", 20" (410mm, 460mm, 510mm) Series while Metric Leadscrew & Metric Feed

/in **LEAD SCREW-P=6mm**

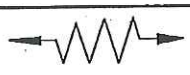
R

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 56 | PAD10 | 32 | PAD1 | 18 | PAE2 | 9½ | PAF3 |
| 54 | PAD9 | 28 | PAE10 | 16 | PAE1 | 9 | PAF2 |
| 52 | PAD8 | 27 | PAE9 | 14 | PAF10 | 8 | PAF1 |
| 48 | PAD6 | 26 | PAE8 | 13½ | PAF9 | 7 | PBF 10 |
| 46 | PAD6 | 24 | PAE7 | 13 | PAF8 | 6 | PBF7 |
| 44 | PAD5 | 23 | PAE6 | 12 | PAF7 | 5½ | PBF5 |
| 40 | PAD4 | 22 | PAE5 | 11½ | PAF6 | 5 | PBF4 |
| 38 | PAD3 | 20 | PAE4 | 11 | PAF5 | 4½ | PBF2 |
| 36 | PAD2 | 19 | PAE3 | 10 | PAF4 | 4 | PBF1 |

mm **LEAD SCREW-P=6mm**

C

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.5 | PSF1 | 1.75 | PSE10 | 3.5 | PSD10 | 6 | PUD7 |
| 0.75 | PSF7 | 2 | PSD1 | 4 | PUD1 | 7 | PUD10 |
| 1 | PSE1 | 2.25 | PSD2 | 4.5 | PUD2 | | |
| 1.25 | PSE4 | 2.5 | PSD4 | 5 | PUD4 | | |
| 1.5 | PSE7 | 3 | PSD7 | 5.5 | PUD5 | | |



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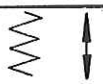


mm/

C.T.

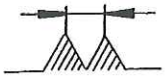
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.05 | MF1 | 0.30 | MD4 | 0.02 | MF1 | 0.15 | MD5 |
| 0.06 | MF2 | 0.34 | MD5 | 0.03 | MF3 | 0.17 | MD7 |
| 0.08 | MF5 | 0.37 | MD7 | 0.04 | MF7 | 0.20 | MD10 |
| 0.10 | MF10 | 0.42 | MD10 | 0.05 | ME1 | 0.24 | PD2 |
| 0.13 | ME2 | 0.48 | PD1 | 0.06 | ME3 | 0.27 | PD4 |
| 0.17 | ME5 | 0.54 | PD2 | 0.07 | ME5 | 0.30 | PD5 |
| 0.21 | ME10 | 0.60 | PD4 | 0.08 | ME7 | 0.34 | PD7 |
| 0.24 | MD1 | 0.74 | PD7 | 0.1 | MD1 | 0.40 | PD10 |
| 0.27 | MD2 | 0.82 | PD10 | 0.12 | MD2 | | |

For Swing 16", 18", 20" (410mm, 460mm, 510mm) Series, while Imperial Leadscrew & Imperial Feed.

in **LEAD SCREW—4TPI**

R

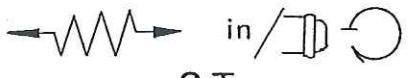
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 56 | PAD10 | 32 | PAD1 | 18 | PAE2 | 9½ | PAF3 |
| 54 | PAD9 | 28 | PAE10 | 16 | PAE1 | 9 | PAF2 |
| 52 | PAD8 | 27 | PAE9 | 14 | PAF10 | 8 | PAF1 |
| 48 | PAD7 | 26 | PAE8 | 13½ | PAF9 | 7 | PBF10 |
| 46 | PAD6 | 24 | PAE7 | 13 | PAF8 | 6 | PBF7 |
| 44 | PAD5 | 23 | PAE6 | 12 | PAF7 | 5½ | PBF5 |
| 40 | PAD4 | 22 | PAE5 | 11½ | PAF6 | 5 | PBF4 |
| 38 | PAD3 | 20 | PAE4 | 11 | PAF5 | 4½ | PBF2 |
| 36 | PAD2 | 19 | PAE3 | 10 | PAF4 | 4 | PBF1 |



mm **LEAD SCREW—4TPI**

C

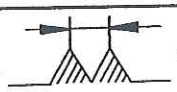
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.5 | PSF1 | 1.75 | PSE10 | 3.5 | PSD10 | 6 | PUD7 |
| 0.75 | PSF7 | 2 | PSD1 | 4 | PUD1 | 7 | PUD10 |
| 1 | PSE1 | 2.25 | PSD2 | 4.5 | PUD2 | | |
| 1.25 | PSE4 | 2.5 | PSD4 | 5 | PUD4 | | |
| 1.5 | PSE7 | 3 | PSD7 | 5.5 | PUD5 | | |



in C.T. in C.T.

| | | | |
|---|---|---|---|
| 0.002 MF1 | 0.001 MD4 | 0.001 MF7 | 0.0043 MD8 |
| 0.0025 MF2 | 0.012 MD5 | 0.0012 MF10 | 0.0047 MD10 |
| 0.0031 MF5 | 0.014 MD7 | 0.0015 ME2 | 0.0052 PD1 |
| 0.0039 MF10 | 0.016 MD10 | 0.0017 ME4 | 0.0060 PD2 |
| 0.0051 ME2 | 0.018 PD1 | 0.002 ME7 | 0.0071 PD5 |
| 0.006 ME5 | 0.020 PD2 | 0.0023 ME10 | 0.0078 PD7 |
| 0.008 ME10 | 0.023 PD4 | 0.0026 MD1 | 0.0086 PD8 |
| 0.009 MD1 | 0.027 PD7 | 0.0030 MD2 | 0.0094 PD10 |
| 0.010 MD2 | 0.032 PD10 | 0.0036 MD5 | |

For Swing 16", 18", 20" (410mm, 460mm, 510mm) Series, while Imperial Leadscrew but Metric Feed.

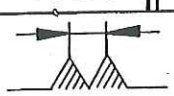


/in

## LEAD SCREW—4TPI

R

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 56 | PAD10 | 32 | PAD1 | 18 | PAE2 | 9½ | PAF3 |
| 54 | PAD9 | 28 | PAE10 | 16 | PAE1 | 9 | PAF2 |
| 52 | PAD8 | 27 | PAE9 | 14 | PAF10 | 8 | PAF1 |
| 48 | PAD7 | 26 | PAE8 | 13½ | PAF9 | 7 | PBF10 |
| 46 | PAD6 | 24 | PAE7 | 13 | PAF8 | 6 | PBF7 |
| 44 | PAD5 | 23 | PAE6 | 12 | PAF7 | 5½ | PBF5 |
| 40 | PAD4 | 22 | PAE5 | 11½ | PAF6 | 5 | PBF4 |
| 38 | PAD3 | 20 | PAE4 | 11 | PAF5 | 4½ | PBF2 |
| 36 | PAD2 | 19 | PAE3 | 10 | PAF4 | 4 | PBF1 |

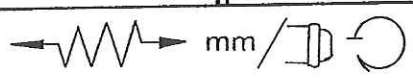


mm

## LEAD SCREW—4TIP

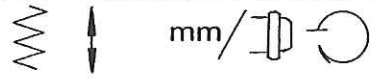
C

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.5 | PSF1 | 1.75 | PSE10 | 3.5 | PSD10 | 6 | PUD7 |
| 0.75 | PSF7 | 2 | PSD1 | 4 | PUD1 | 7 | PUD10 |
| 1 | PSE1 | 2.25 | PSD2 | 4.5 | PUD2 | | |
| 1.25 | PSE4 | 2.5 | PSD4 | 5 | PUD4 | | |
| 1.5 | PSE7 | 3 | PSD7 | 5.5 | PUD5 | | |



mm

C.T.

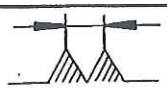


mm

C.T.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.05 | MF1 | 0.29 | MD4 | 0.02 | MF1 | 0.14 | MD5 |
| 0.06 | MF2 | 0.32 | MD5 | 0.03 | MF3 | 0.16 | MD7 |
| 0.08 | MF5 | 0.35 | MD7 | 0.04 | MF7 | 0.18 | MD10 |
| 0.10 | MF10 | 0.40 | MD10 | 0.05 | ME1 | 0.2 | PD1 |
| 0.13 | ME2 | 0.45 | PD1 | 0.06 | ME3 | 0.24 | PD2 |
| 0.16 | ME5 | 0.52 | PD2 | 0.07 | ME5 | 0.28 | PD5 |
| 0.20 | ME10 | 0.58 | PD4 | 0.08 | ME7 | 0.32 | PD7 |
| 0.23 | MD1 | 0.70 | PD7 | 0.1 | MD1 | 0.36 | PD10 |
| 0.26 | MD2 | 0.80 | PD10 | 0.12 | MD2 | | |

For Swing 22", 26" (560mm, 660mm) Series, while Metric Leadscrew & Metric Feed.



/in **LEAD SCREW – P:6mm**

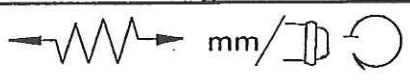
R

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 56 | KAD10 | 27 | KAE9 | 13 | KAF8 | 5 | KBF4 |
| 54 | KAD9 | 26 | KAE8 | 12 | KAF7 | 4½ | KBF2 |
| 52 | KAD8 | 24 | KAE7 | 11½ | KAF6 | 4 | KBF1 |
| 48 | KAD7 | 23 | KAE6 | 11 | KAF5 | 3½ | JBF10 |
| 46 | KAD6 | 22 | KAE5 | 10 | KAF4 | 3¼ | JBF8 |
| 44 | KAD5 | 20 | KAE4 | 9½ | KAF3 | 3 | JBF7 |
| 40 | KAD4 | 19 | KAE3 | 9 | KAF2 | 2-7/8 | JBF6 |
| 38 | KAD3 | 18 | KAE2 | 8 | KAF1 | 2¾ | JBF5 |
| 36 | KAD2 | 16 | KAE1 | 7 | KBF10 | 2½ | JBF4 |
| 32 | KAD1 | 14 | KAF10 | 6 | KBF7 | 2½ | JBF2 |
| 28 | KAE10 | 13½ | KAF9 | 5½ | KBF5 | 2 | JBF1 |

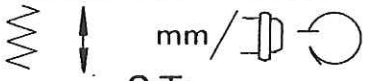
mm **LEAD SCREW–P=6mm**

C

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.05 | 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 | KSD7 | 7 | KUD10 | 13 | JUD8 |
| 1.75 | KSE10 | 4 | KUD1 | 8 | JUD1 | 14 | JUD10 |



mm C.T.



mm C.T.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.05 | KF1 | 0.30 | KD4 | 0.02 | KF1 | 0.15 | KD5 |
| 0.06 | KF2 | 0.34 | KD5 | 0.03 | KF3 | 0.17 | KD7 |
| 0.08 | KF5 | 0.37 | KD7 | 0.04 | KF7 | 0.20 | KD10 |
| 0.10 | KF10 | 0.42 | KD10 | 0.05 | KE1 | 0.24 | JD2 |
| 0.13 | KE2 | 0.48 | JD1 | 0.06 | KE3 | 0.27 | JD4 |
| 0.17 | KE5 | 0.54 | JD2 | 0.07 | KE5 | 0.30 | JD5 |
| 0.21 | KE10 | 0.60 | JD4 | 0.08 | KE7 | 0.34 | JD7 |
| 0.24 | KD1 | 0.74 | JD7 | 0.1 | KD1 | 0.40 | JD10 |
| 0.27 | KD2 | 0.82 | JD10 | 0.12 | KD2 | | |

For Swing 22", 26", 30" (560mm, 660mm, 760mm) Series while Imperial Leadscrew & Imperial Feed

| LEAD SCREW – P=4TPI /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 |
| LEAD SCREW – P=4TPI 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 |
| in C.T. | | | | in C.T. | | | |
| 0.0022 | KF1 | 0.011 | KD4 | 0.0026 | KF1 | 0.013 | KD4 |
| 0.0026 | KF3 | 0.012 | KD5 | 0.0029 | KF2 | 0.015 | KD6 |
| 0.003 | KF5 | 0.014 | KD8 | 0.0037 | KF6 | 0.017 | KD8 |
| 0.0037 | KF9 | 0.015 | KD9 | 0.0042 | KF8 | 0.0182 | KD10 |
| 0.005 | KE2 | 0.0176 | JD1 | 0.0052 | KE1 | 0.021 | JD1 |
| 0.006 | KE5 | 0.02 | JD2 | 0.0058 | KE2 | 0.023 | JD2 |
| 0.007 | KE8 | 0.022 | JD4 | 0.0078 | KE7 | 0.026 | JD4 |
| 0.009 | KD1 | 0.024 | JD5 | 0.009 | KE10 | 0.03 | JD6 |
| 0.01 | KD2 | 0.03 | JD9 | 0.01 | KD1 | 0.035 | JD9 |

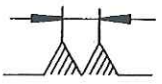
For Swing 22", 26" (560mm, 660mm) Series, while Imperial Leadscrew but Metric Feed.

/in

## LEAD SCREW – 4TPI

R

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 56 | KAD10 | 27 | KAE9 | 13 | KAF8 | 5 | KBF4 |
| 54 | KAD9 | 26 | KAE8 | 12 | KAF7 | 4½ | KBF2 |
| 52 | KAD8 | 24 | KAE7 | 11½ | KAF6 | 4 | KBF1 |
| 48 | KAD7 | 23 | KAE6 | 11 | KAF5 | 3½ | JBF10 |
| 46 | KAD6 | 22 | KAE5 | 10 | KAF4 | 3¼ | JBF8 |
| 44 | KAD5 | 20 | KAE4 | 9½ | KAF3 | 3 | JBF7 |
| 40 | KAD4 | 19 | KAE3 | 9 | KAF2 | 2-7/8 | JBF6 |
| 38 | KAD3 | 18 | KAE2 | 8 | KAF1 | 2¾ | JBF5 |
| 36 | KAD2 | 16 | KAE1 | 7 | KBF10 | 2½ | JBF4 |
| 32 | KAD1 | 14 | KAF10 | 6 | KBF7 | 2¼ | JBF2 |
| 28 | KAE10 | 13½ | KAF9 | 5½ | KBF5 | 2 | JBF1 |



mm

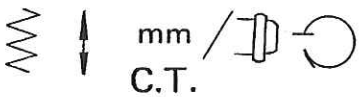
## LEAD SCREW – 4TPI

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.



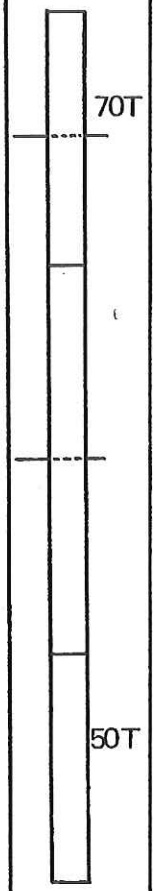
mm

C.T.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.05 | KF1 | 0.29 | KD4 | 0.02 | KF1 | 0.14 | KD5 |
| 0.06 | KF2 | 0.32 | KD5 | 0.03 | KF3 | 0.16 | KD7 |
| 0.08 | KF5 | 0.35 | KD7 | 0.04 | KF7 | 0.18 | KD10 |
| 0.10 | KF10 | 0.40 | KD10 | 0.05 | KE1 | 0.2 | JD1 |
| 0.13 | KE2 | 0.45 | JD1 | 0.06 | KE3 | 0.24 | JD2 |
| 0.16 | KE5 | 0.52 | JD2 | 0.07 | KE5 | 0.28 | JD5 |
| 0.20 | KE10 | 0.58 | JD4 | 0.08 | KE7 | 0.32 | JD7 |
| 0.23 | KD1 | 0.70 | JD7 | 0.1 | KD1 | 0.36 | JD10 |
| 0.26 | KD2 | 0.80 | JD10 | 0.12 | KD2 | | |

## 5—5 Module & D.P Thread Chart

For Swing 16", 18", 20" (410mm, 460mm, 510mm) Series, while Metric Leadscrew.




**LEAD SCREW — P = 6mm**

R

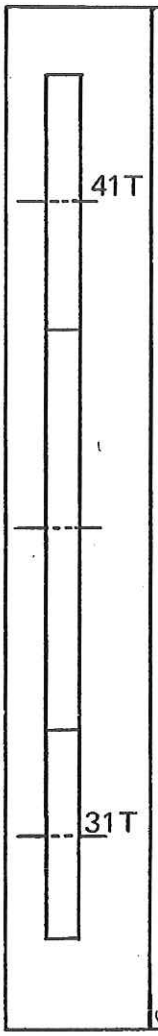
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 56 | PAD10 | 32 | PAD1 | 18 | PAE2 | 9½ | PAF3 |
| 54 | PAD9 | 28 | PAE10 | 16 | PAE1 | 9 | PAF2 |
| 52 | PAD8 | 27 | PAE9 | 14 | PAF10 | 8 | PAF1 |
| 48 | PAD7 | 26 | PAE8 | 13½ | PAF9 | 7 | PBF10 |
| 46 | PAD6 | 24 | PAE7 | 13 | PAF8 | 6 | PBF7 |
| 44 | PAD5 | 23 | PAE6 | 12 | PAF7 | 5½ | PBF5 |
| 40 | PAD4 | 22 | PAE5 | 11½ | PAF6 | 5 | PBF4 |
| 38 | PAD3 | 20 | PAE4 | 11 | PAF5 | 4½ | PBF2 |
| 36 | PAD2 | 19 | PAE3 | 10 | PAF4 | 4 | PBF1 |

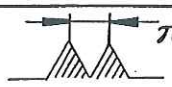
**LEAD SCREW — P = 6mm**

C

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.5 | PSF1 | 1.75 | PSE10 | 3.5 | PSD10 | 6 | PUD7 |
| 0.75 | PSF7 | 2 | PSD1 | 4 | PUD1 | 7 | PUD10 |
| 1 | PSE1 | 2.25 | PSD2 | 4.5 | PUD2 | | |
| 1.25 | PSE4 | 2.5 | PSD4 | 5 | PUD4 | | |
| 1.5 | PSE7 | 3 | PSD7 | 5.5 | PUD5 | | |

For Swing 16", 18", 20" (410mm, 460mm, 510mm) Series while Imperial Leadscrew.

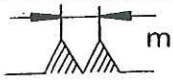



## LEAD SCREW – 4TPI

R

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 56 | PAD10 | 32 | PAD1 | 18 | PAE2 | 9½ | PAF3 |
| 54 | PAD9 | 28 | PAE10 | 16 | PAE1 | 9 | PAF2 |
| 52 | PAD8 | 27 | PAE9 | 14 | PAF10 | 8 | PAF1 |
| 48 | PAD7 | 26 | PAE8 | 13½ | PAF9 | 7 | PBF10 |
| 46 | PAD6 | 24 | PAE7 | 13 | PAF8 | 6 | PBF7 |
| 44 | PAD5 | 23 | PAE6 | 12 | PAF7 | 5½ | PBF5 |
| 40 | PAD4 | 22 | PAE5 | 11½ | PAF6 | 5 | PBF4 |
| 38 | PAD3 | 20 | PAE4 | 11 | PAF5 | 4½ | PBF2 |
| 36 | PAD2 | 19 | PAE3 | 10 | PAF4 | 4 | PBF1 |

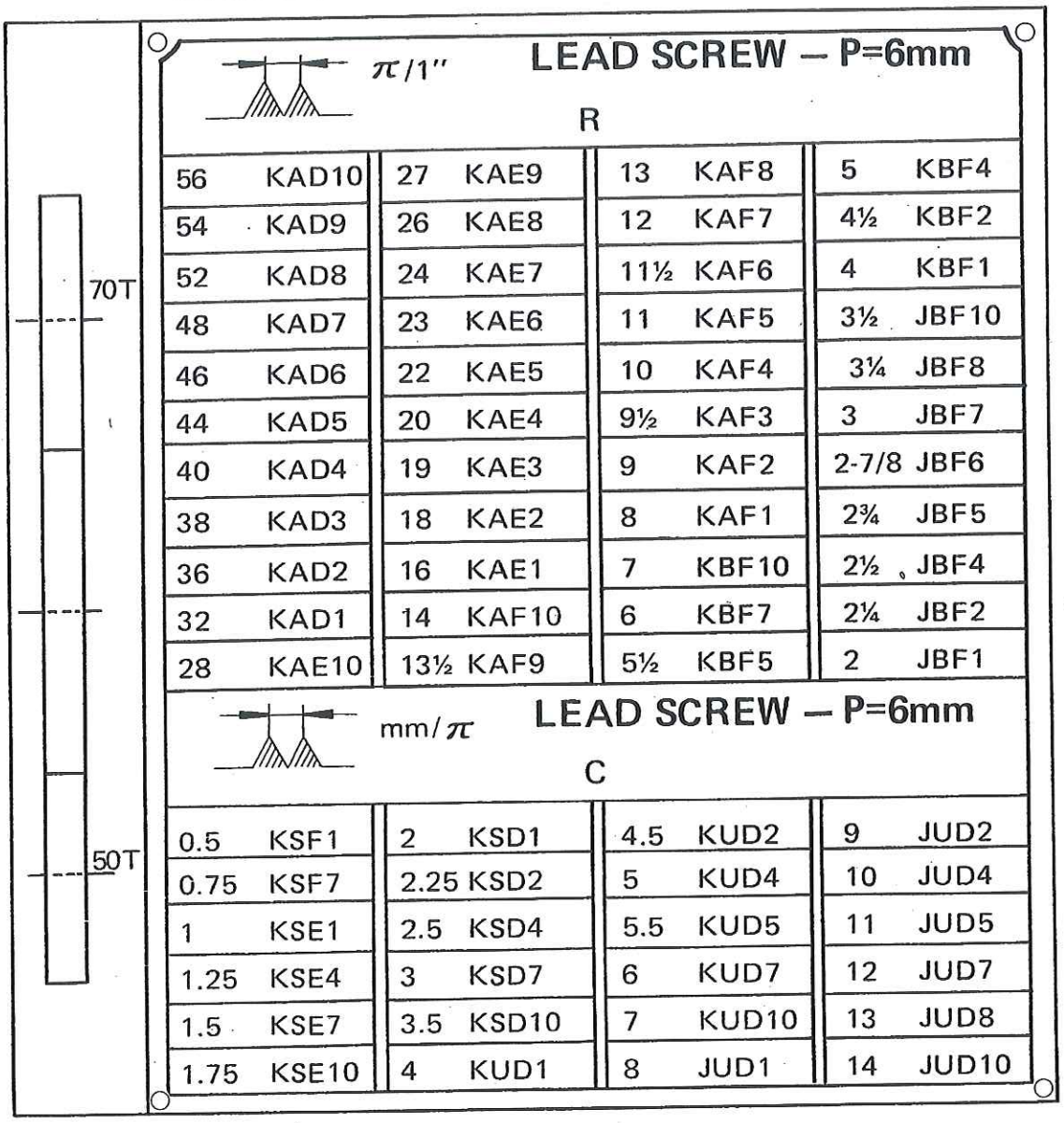



## LEAD SCREW – 4TPI

C

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0.5 | PSF1 | 1.75 | PSE10 | 3.5 | PSD10 | 6 | PUD7 |
| 0.75 | PSF7 | 2 | PSD1 | 4 | PUD1 | 7 | PUD10 |
| 1 | PSE1 | 2.25 | PSD2 | 4.5 | PUD2 | | |
| 1.25 | PSE4 | 2.5 | PSD4 | 5 | PUD4 | | |
| 1.5 | PSE7 | 3 | PSD7 | 5.5 | PUD5 | | |

For Swing 22", 26" (560mm, 660mm) Series, while Metric Leadscrew.




## LEAD SCREW — P=6mm

π/1"

R

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 56 | KAD10 | 27 | KAE9 | 13 | KAF8 | 5 | KBF4 |
| 54 | KAD9 | 26 | KAE8 | 12 | KAF7 | 4½ | KBF2 |
| 52 | KAD8 | 24 | KAE7 | 11½ | KAF6 | 4 | KBF1 |
| 48 | KAD7 | 23 | KAE6 | 11 | KAF5 | 3½ | JBF10 |
| 46 | KAD6 | 22 | KAE5 | 10 | KAF4 | 3¼ | JBF8 |
| 44 | KAD5 | 20 | KAE4 | 9½ | KAF3 | 3 | JBF7 |
| 40 | KAD4 | 19 | KAE3 | 9 | KAF2 | 2-7/8 | JBF6 |
| 38 | KAD3 | 18 | KAE2 | 8 | KAF1 | 2¾ | JBF5 |
| 36 | KAD2 | 16 | KAE1 | 7 | KBF10 | 2½ | JBF4 |
| 32 | KAD1 | 14 | KAF10 | 6 | KBF7 | 2¼ | JBF2 |
| 28 | KAE10 | 13½ | KAF9 | 5½ | KBF5 | 2 | JBF1 |

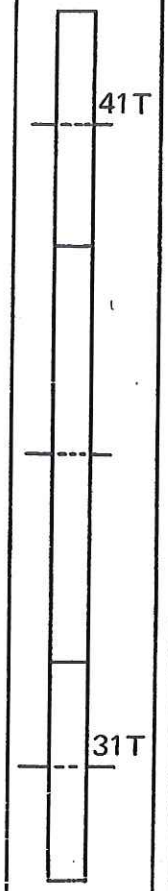
## LEAD SCREW — P=6mm

mm/π

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 |

For Swing 22", 26" (560mm, 660mm) Series, while Imperial Leadscrew.




## LEAD SCREW — 4TPI

π /1"

R

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 56 | KAD10 | 27 | KAE9 | 13 | KAF8 | 5 | KBF4 |
| 54 | KAD9 | 26 | KAE8 | 12 | KAF7 | 4½ | KBF2 |
| 52 | KAD8 | 24 | KAE7 | 11½ | KAF6 | 4 | KBF1 |
| 48 | KAD7 | 23 | KAE6 | 11 | KAF5 | 3½ | JBF10 |
| 46 | KAD6 | 22 | KAE5 | 10 | KAF4 | 3¼ | JBF8 |
| 44 | KAD5 | 20 | KAE4 | 9½ | KAF3 | 3 | JBF7 |
| 40 | KAD4 | 19 | KAE3 | 9 | KAF2 | 2-7/8 | JBF6 |
| 38 | KAD3 | 18 | KAE2 | 8 | KAF1 | 2¾ | JBF5 |
| 36 | KAD2 | 16 | KAE1 | 7 | KBF10 | 2½ | JBF4 |
| 32 | KAD1 | 14 | KAF10 | 6 | KBF7 | 2¼ | JBF2 |
| 28 | KAE10 | 13½ | KAF9 | 5½ | KBF5 | 2 | JBF1 |

## LEAD SCREW — 4TPI

mm/π

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 |

# 6. LUBRICATION

## 6-1 Headstock Lubrication

The headstock lubrication is of the splash injection type. Oil grooves have been provided around the headstock to provide lubrication to the spindle bearings and allow the oil to return to the oil reservoir. An oil plug has been provided on the headstock cover to simplify adding oil when needed. Oil level should be kept at the centerline of the sight glass. the oil drain is located on the right bottom side of the headstock.

**NOTE:**

Check oil level before operating lathe.

Change oil after one month of use and every two months thereafter.

Use Shell Tellus #32

## 6-2 Gear Box & Apron Lubrication

1. The gear box is a reservoir oil bath type. To ensure the long service life of the gear box and bedways, change the oil every six months.
2. The apron is also a reservoir oil bath type. Add oil as soon as the oil is lower than the center line of the sight glass.

## 6-3 Lubrication Charts

| | Location | Methods | Quantity | Oil time | Exchange time |
|---|---|---|---|---|---|
| 1. | Headstock | Loosen the oil input hole screw on the left top side of the headstock cover | L | Once per month | One month at the beginning, there-after once two months. |
| 2. | Gear Box | Open the top cover and loosen the oil input hole screw | L | Once per month | Every six mnoth |
| 3. | Apron | Loosen the oil input hole screw | L | Once per month | |
| 4. | Compound rest | Add oil with oil can | As required | Once per month | |
| 5. | Auto Feed-ing rod | Add oil with oil can | As required | Once per month | |
| 6. | Tailstock | Add oil with oil can | As required | Once per month | |
| 7. | Leadscrew | Add oil with oil can | As required | Once per month | |
| 8. | Bedway | Press the manual OIL PUMP | As required | Once per month | |

# 7. MAINTENANCE & ADJUSTMEENTS

## 7-1 Headstock

**1. Headsrock cover leaks:**

When the headstock cover is removed it is important to re-Install it properly to prevent leakage. To re-install, the connecting surfaces must be cleaned and coated with a thin layer of grease so it will seal properly.

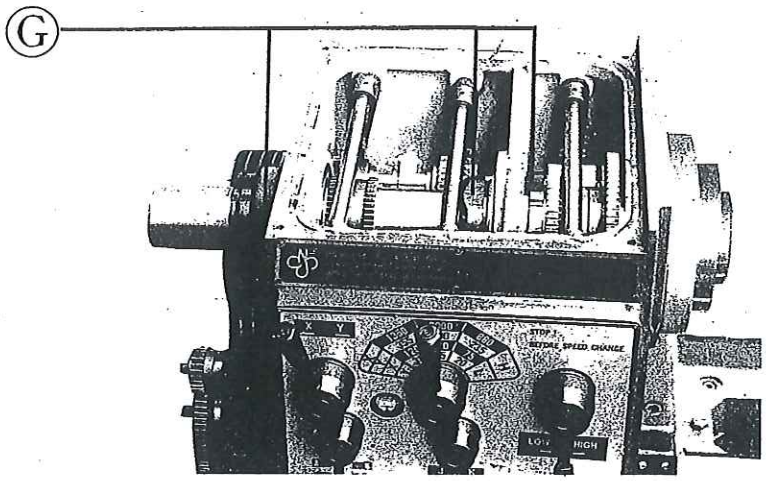
**2. There are three possible causes for oil to leak from the spindle covers.**

1. Reservoir over filled. (Correction: drain oil to proper level).
2. Wrong weight oil (Correction: Change to recommended lubricant)
3. Blocked oil return.(correction: Remove the headstock cover and while turning the spindle blow air through the small oil holes located in the top of the head.

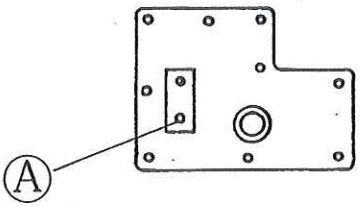
**3. Spindle bearing adjustment:**

The front and center bearings on the spindle are precision taper roller type. To maintain the accuracy and proper operation, the bearings must have the proper preload. To adjust the bearings loosen the set screws on locking nut "G" (Fig. 7-1-3) and tighten locking nut "G" to get the proper pre-load do not over tighten. After adjusting be sure to re-tighten the set screws.

Fig 7-1.3

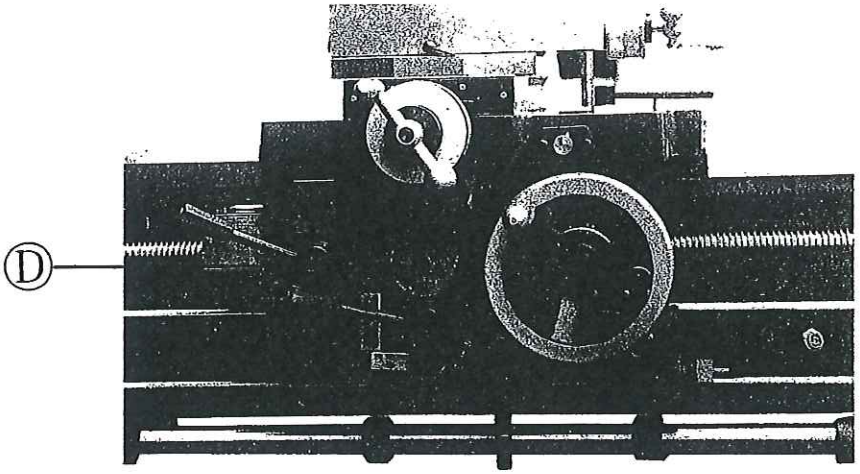


## 7-2 Apron & Saddle




1. The oil inlet is located on the right top side of the saddle base. (Plug marked "OIL")
2. The apron oil drain is located on the bottom of the apron. ( See drawing )
3. Recommended lubricant is Shell Tellus No. 220 and changed every 6 months
4. Half nut adjustment: First remove the thread dial indicator, then find the 4 gib strip adjusting screw and loosen slightly. While pressing down on the half nut engagement lever adjust **gib** as needed. Re-tighten screws and replace the thread dial indicator.
5. If the manual oil pump fails it may need to be cleaned or repaired. To remove the pump, remove the pump body and loosen the plug lever to dismantle the unit. Use air to blow out the line. If the oil flow is too low the O-ring may need replacing. After replacing the O-ring, re-install pump and test.
6. The cone clutch in the center of the apron is an overload device. The safety overload weight limitation is 12Kg. This can be adjusted using the hexagon screw, located in the center of the apron. Turning the screw clockwise will increase the tension, counter clockwise will decrease the tension. This devise should automatically slip out if the overload is over 12Kg. When the auto-feed is engaged (Fig. 7-2.6) and the handwheel is held.

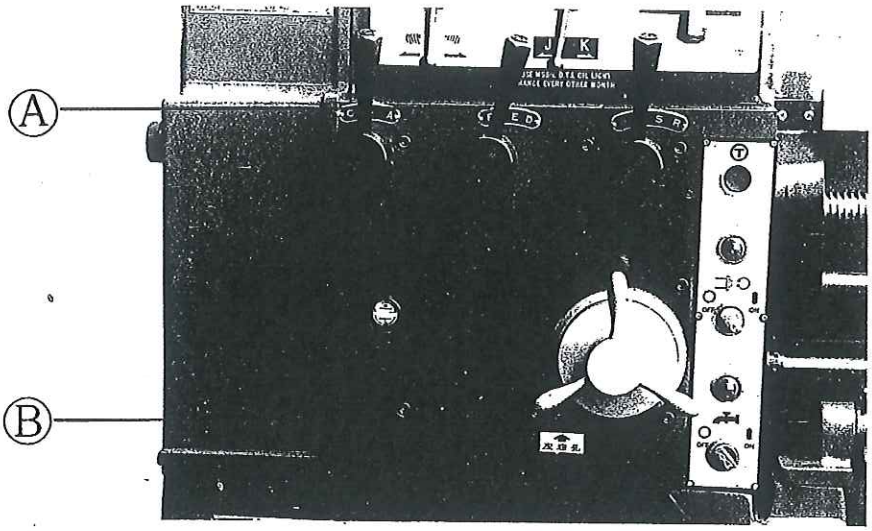
Fig 7-2.6



## 7-3 Gear Box

1. The oil inlet for the gear box is located under the cover on top of the gear box. (See Fig. 7-3A)
2. The drain is located on the left bottom side of the gear box near the 10 step feed selection dial as shown by arrow "B" Fig. 7-3.
3. Recommended lubricant is Shell Tellus No. 220 and should be changed ever 6 months.

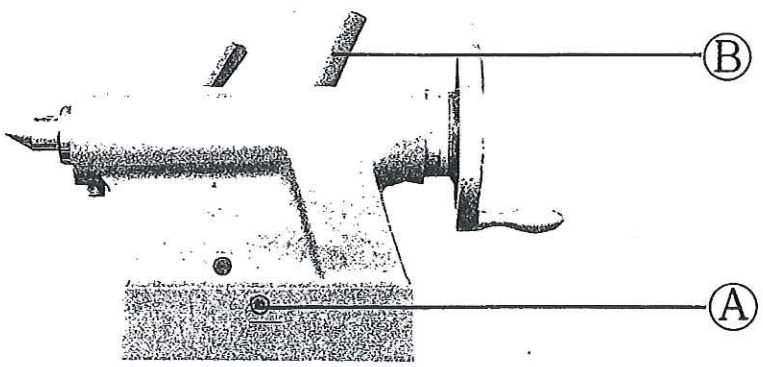
Fig 7-3




## 7-4 Tailstock Adjustment

1. Unclamp the tailstock – clamping lever
2. Loosen the 2 hexagon head screws ( one on each side of tailstock)
3. Using a test bar between dead centers, make necessary adjustments sing the slotted adjusting screws. (one on each side).
4. After adjusting re-tighten the two hexagon head screws and re-check for alignment.

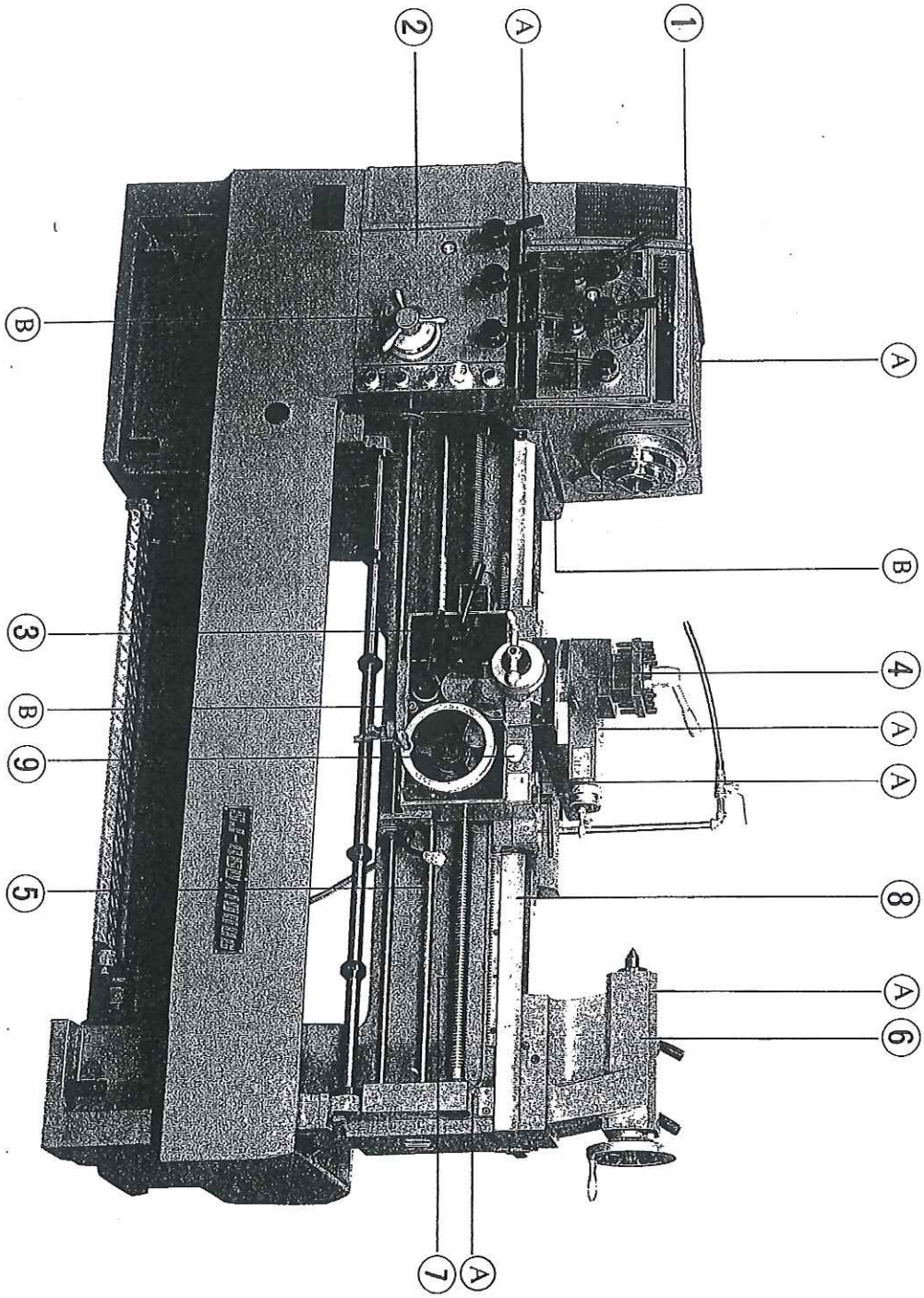
Fig 7-4



## 7 – 4 Lubrication Location

A: Oil input hole

B: Oil drain hole



## 7-5 Belt Tension Adjustment

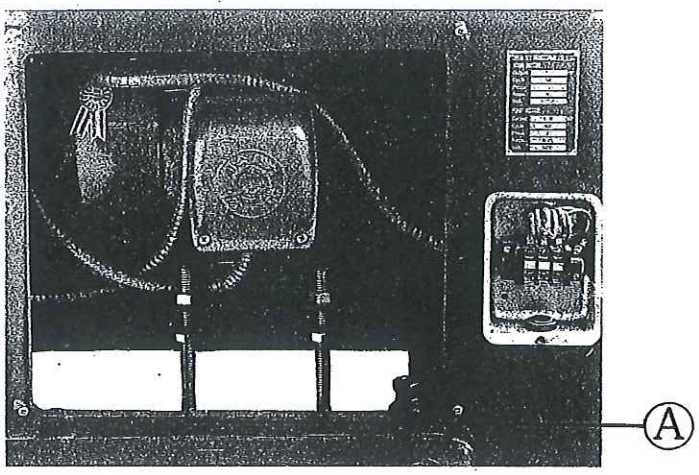
Aftet prolonged use the belts will stretch and require adjustment. To adjust belts:

1.Take off the cover on the left back side of the lathe.

2. Loosen adjusting lock nut "A" Fig. 7-5 and adjust belt to proper tention.

3. After adjustment is made, re–tighten lock nut and replace the cover.

Fig 7-5




## 7-6 Brake Belt Adjustment

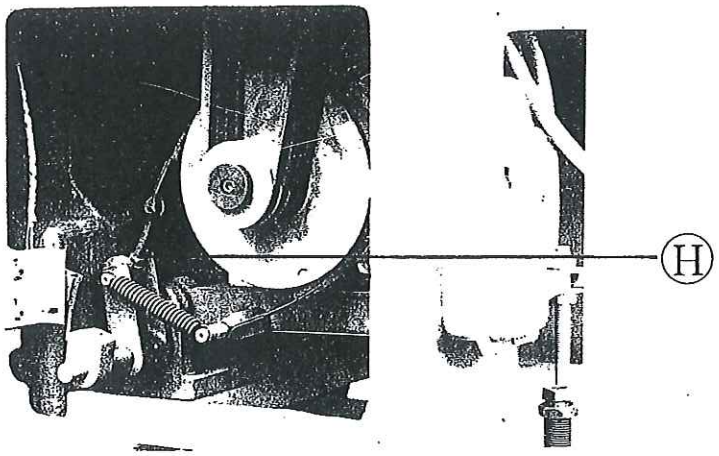
If the brake belt becomes worn or loose nut "H" Fig 7-6 on the brake band must be adjusted. This can be done by:

Remove the side rear cover.

2. Loosen the nuts on the top and tighten the nuts on the bottom to the appropriate height.

3. Re-tighten the top nuts and replace the cover

Fig 7-6



## 7-7 Brake & Micro Switch Adjustment

The foot brake is connected to a micro switch. there should be 0-1 mm end play between the. brake arm and the head of the micro switch. ( See Fig. 7-7 ). The proper function of the brake is to first, cut off the power and then engage the brake belt. Aftet using the brake, it is necessary to use the control lever to re-start the lathe.

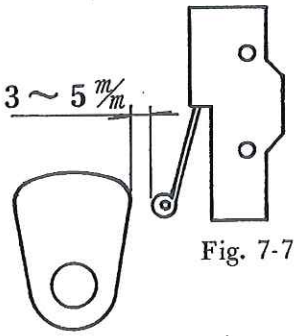
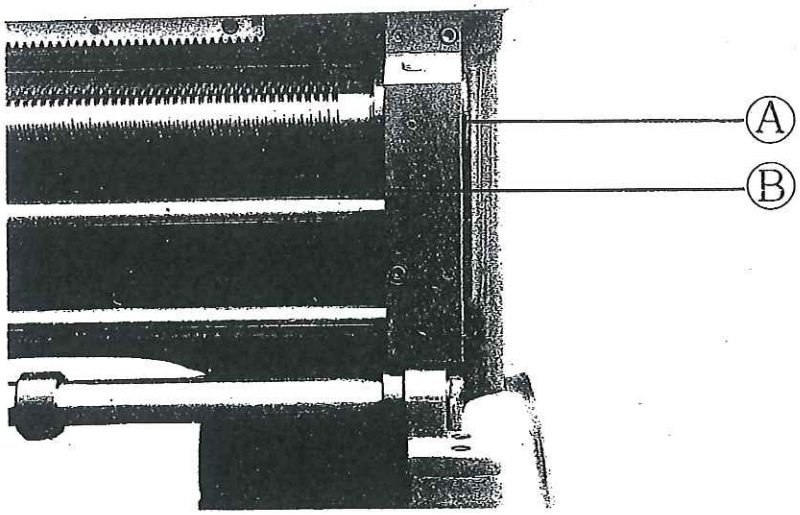



Fig. 7-7

## 7-8 Leadscrew Backlash Adjustment

Should the threading not repeat, the cause is most likely the leadscrew backlash. To adjust the backlash, remove the plastic cover on the leadscrew bracket (Fig. 7-8 ), loosen nut "A" then tighten the left side nut "B". To check the backlash, engage the half nut and while observing the connecting section of the leadscrew to the gearbox move the apron handwheel back and forth. If the backlash is properly set there should be no movement in the shaft. After adjusting, re-tighten nut "A" and replace plastic cover.

Fig 7-8



## 7-9 Coolant Pump

**Problem : No coolant flow**

**Solution :**

1. Make sure the switch is on .
2. Check if the pump motor is working.
3. Check if coolant level.
4. Check for blocked lines.
5. If all the above are normal, change the pump.

## 8. Taper Attachment

**Installation Taper Of Attachment :**

**STEP 1 :**

Install taper attachment on the carriage using screws NO.㉛ via hole "A" (Don't tighten too tight using screw M10 x 40L and flat washer.)

**STEP 2 :**

Disengaged screw NO. ⑧

**STEP 3 :**

Adjust the position of NO. ① and let arc gage point is contacted the with NO. 206009.

**STEP 4 :**

Set a dial gage on the NO. ⑲ , and gage point is contacted the surface of bed.

Moving NO. 19 pointer has to be constant lifit's not, adjusting the position of NO. ①

**STEP 5 :**

Disengaged screw NO.206010 then locked NO.206009 to NO. ⑦

**STEP 6 :**

Replaced screw NO. ⑧

**STEP 7 :**

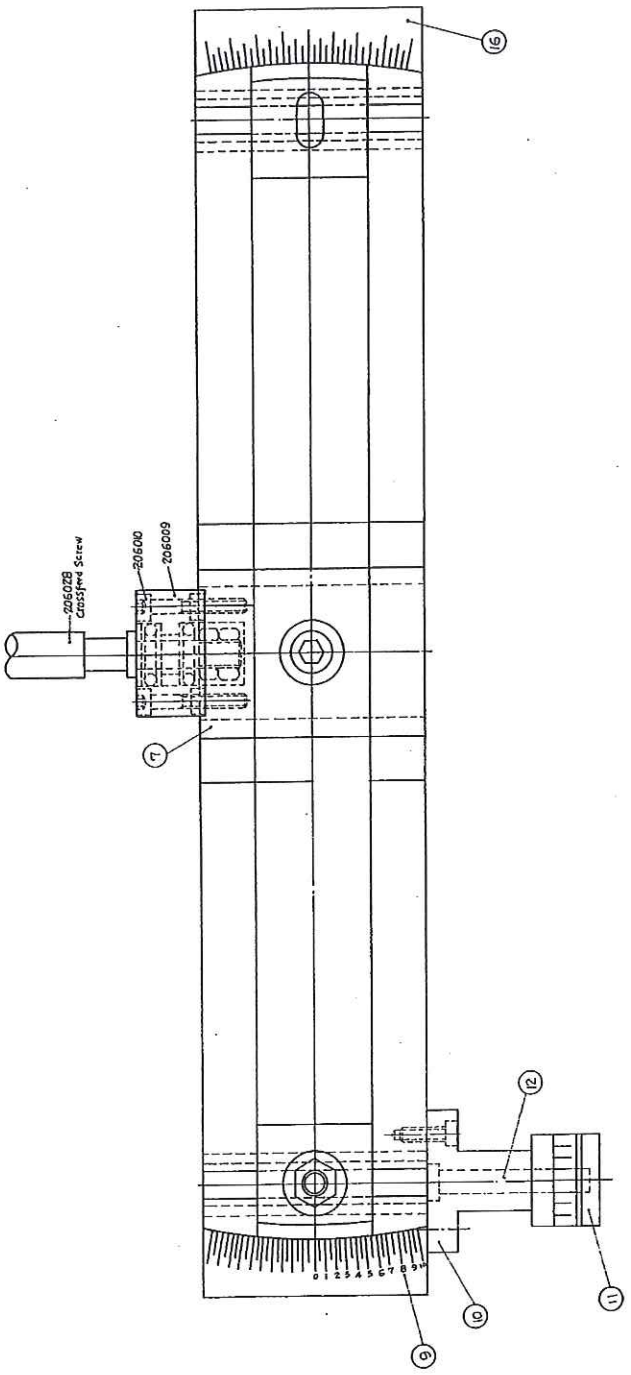
Drill B hole ( Using φ 6 m/m driller )

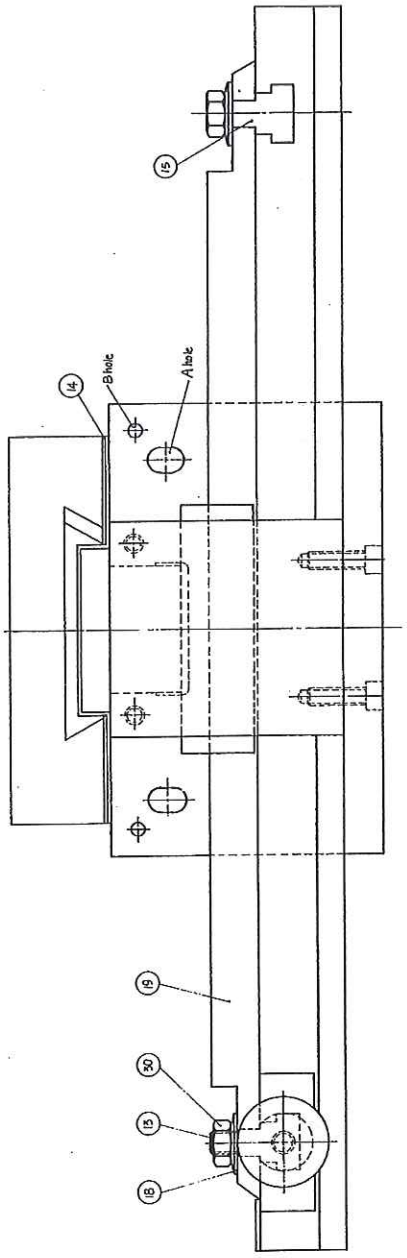
**STEP 8 :**

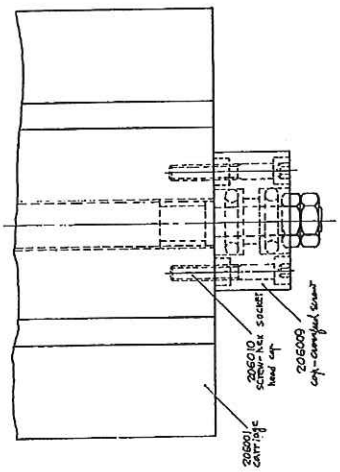
Set straight pin ( φ 6 x 451 )

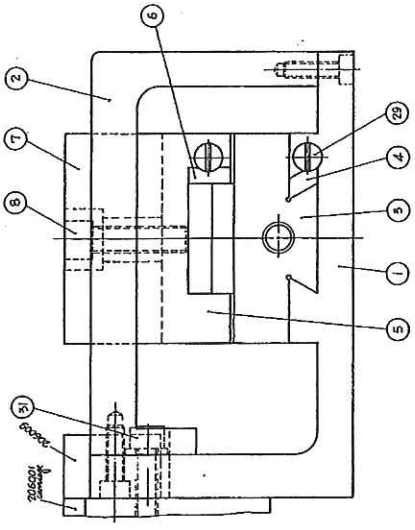
**STEP 9 :**

Install universal connected-rod


206028
Crossfeed Screw
206010
206009
16
7
12
11
10
9


15
14
B hole
A hole
19
20
13
18


206010
Screw-hex socket
head cap
206009
Cap-compound screw
206001
Cartridge


6
2
7
8
29
4
3
1
5
21
206001
Cartridge

# TROUBLESHOOTING THE "C" MODEL LATHE

The objective is to locate and isolate the problem

**NOISE IN HEADSTOCK/GEARBOX:**

Note: **85 %** of noise normally comes from the output shaft pulley.

1. Run lathe with all controls in neutral to see if the problem is in **the spindle.**

   a. If the problem is in the spindle and the finish is good the source is most likely in the rear bearing (Part #65). However if the finish is poor the problem could be the front bearings are either loose or damaged.

   b. If the problem is not in the spindle continue by engaging one control at a time until the problem is found. ( **Figure 1)**

   c. If the problem is not in the headstock, and before you continue to the gear box, check the change gears (Part # 41, 78 & 89) located on the back of the headstock for proper backlash and alignment. **(Figure 2)** If these gears are found to be in good working order perform the same sequence as above on the gearbox. (engage one control at a time until the problem is located. **(Figure 3)**

   d. Once you determine the problem is either in the gearbox or the headstock, that part of the machine must be opened up to inspect for possible worn or broken parts.

2. If the gearbox is in order and the feed or lead screws are not turning check the shear pins. (There are two shear pins on each shaft). **(Figure 4)**

**Notes:**

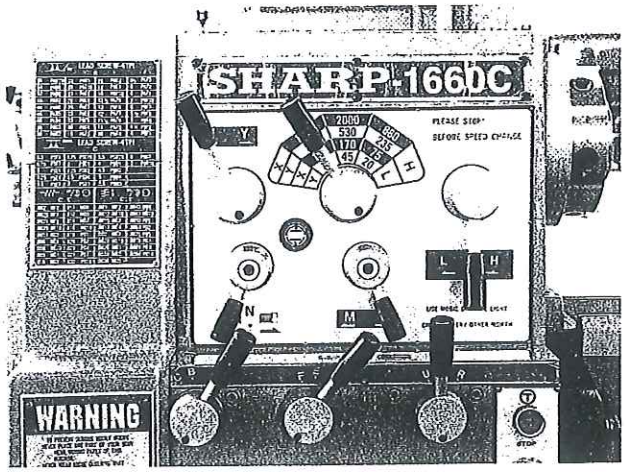



Figure 1

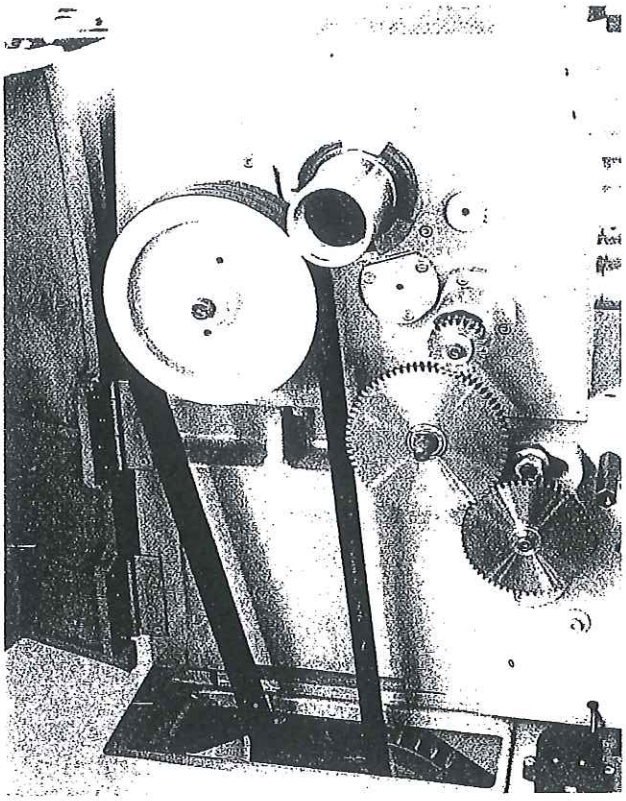


Figure 2

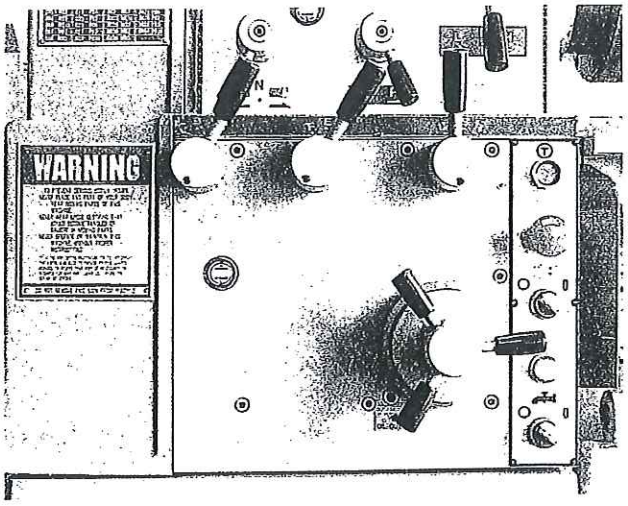



Figure 3

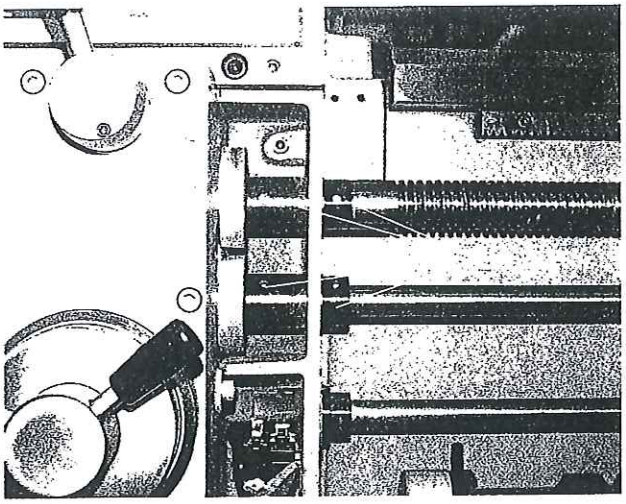


Figure 4

**THREADING PROBLEMS:**

Should there be a problem cutting **standard threads**:

a. Check the chasing dial to see if it is loose from shaft.

b. Check gear at bottom of shaft for tightness & proper fit against the lead screw.

c. Check the half nut for proper fit.

**Note:** All Sharp Lathes are made to cut ASE (Inch) threads. To cut metric threads, make sure the half nuts are engaged at all times, because it is not a metric based machine, and therefore will not repeat according to the threading dials.

**Notes:**

## CHATTER/VIBRATION PROBLEMS:

1. Spindle has excessive run out. **(Figure 5)**
2. Loose Compound, cross feed or saddle. **(Figure 6)**
3. Loose motor mount or motor not seated properly on base. **(Figure 7)**
4. Backlash on drive pulley shaft and key. **(Figure 2)**
5. New rack and old gear. (If machine has been crashed) **(Figure 8)**
6. Irregular power supply. (Not getting 3-phase)
7. Leveling bolts loose or lathe not properly leveled.
8. Defective live center. (On a long work piece chatter in the center & not on ends).

## COOLANT PUMP NOT WORKING OR PRESSURE TOO LOW.

a. Check coolant level.

b. Check pump shaft for rotation. (Proper rotation is clockwise).

c. Check for clogged line. (Both suction and discharge).

**Notes:**

# ADJUSTMENTS AND REPAIRS:

## ADJUSTING LEAD SCREW BACKLASH

a. Remove plastic cover on the lead screw bracket.

b. Loosen lock nut "A" under cover.

c. Tighten left side nut "B" until backlash has been removed.

d. Re-tighten lock nut "A" and replace plastic cover **(Figure 9)**

## ADJUSTING SPINDLE BEARINGS:

The front and middle spindle bearings are **precision taper roller bearings.** To adjust:

a. Loosen set screw (Part #60) on locking NUT (Part #62).

b. Tighten locking nut (Part #62)to obtain proper preload. (Check by spinning chuck by hand. Chuck should rotate freely for at least 2 revolutions).

c. Re-tighten set screw (Part #60) on lock nut. **(Figure 10)**

**Notes:**

## ADJUSTING THE FEED OVERLOAD

This machine is equipped with a safety overload which can be adjusted by the set screw (Part # 73) located in the center of cover (Part # 75) which is located in the center of the apron. (To increase tension tun clockwise, to reduce tension turn counterclockwise). **(Figure 13)**

## ADJUSTING HALFNUTS

1. Remove chasing dial assembly
2. Loosen 3 screws
3. Adjust half nuts and re-tighten the 3 screws
4. Test movement before reassembling.

   **(Figure 17)**

**Notes:**

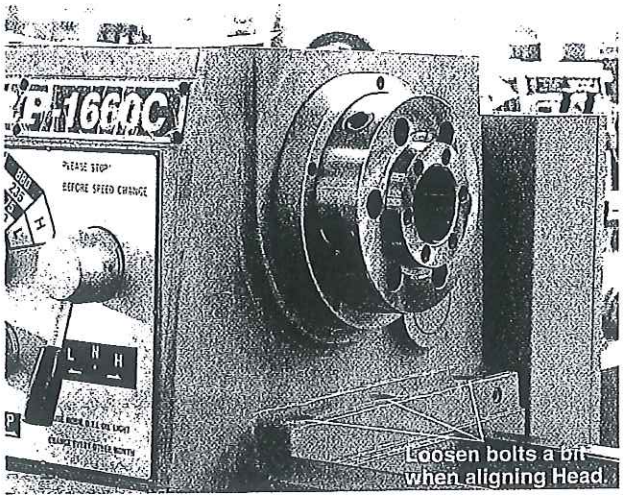



Figure 5

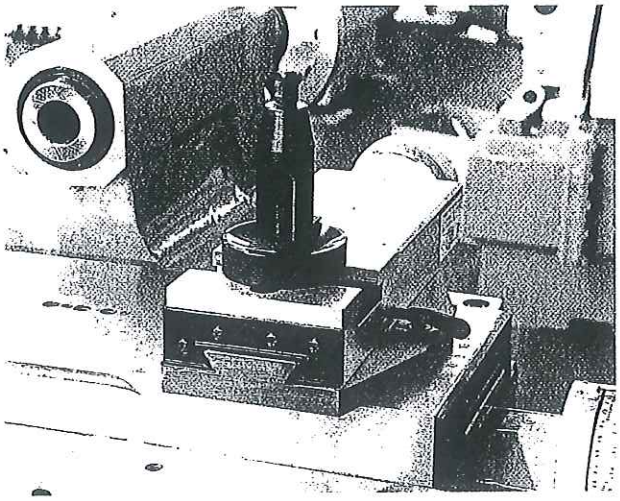


Figure 6

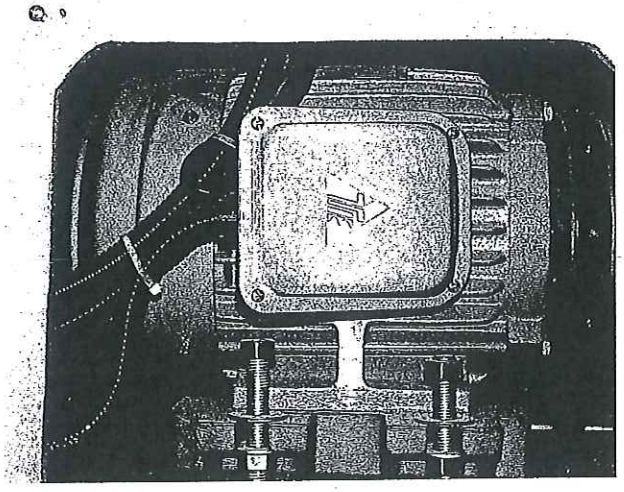
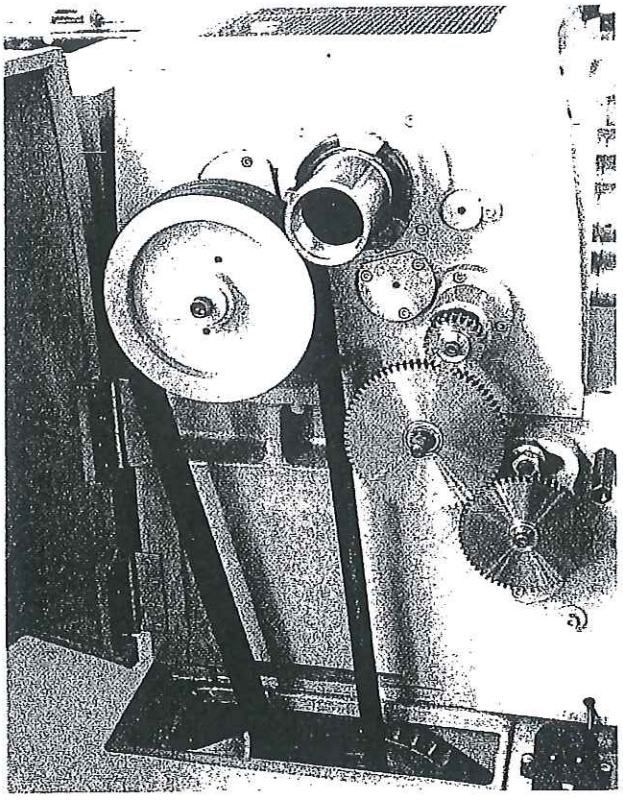


Figure 7



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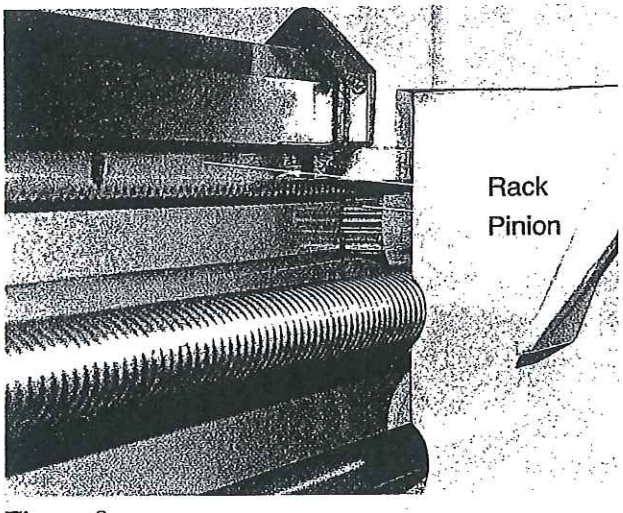
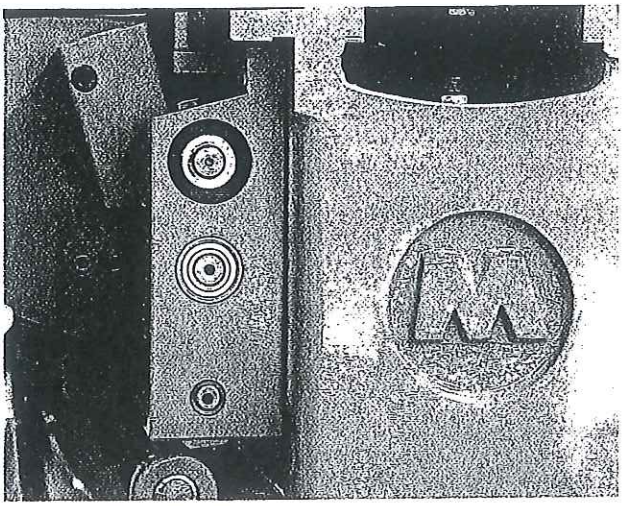



Figure 8



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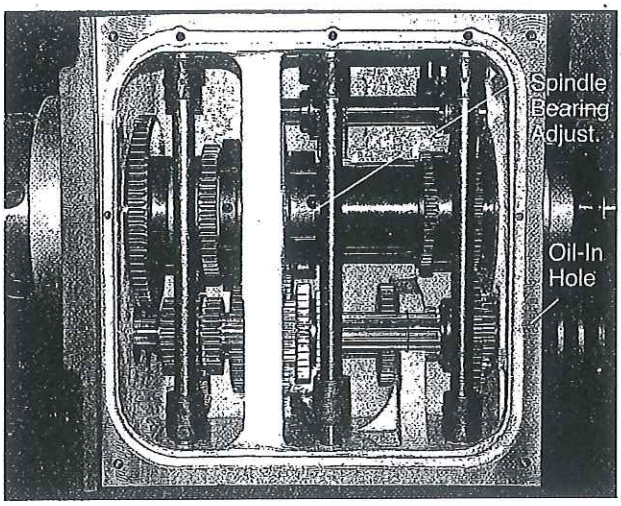


Figure 10

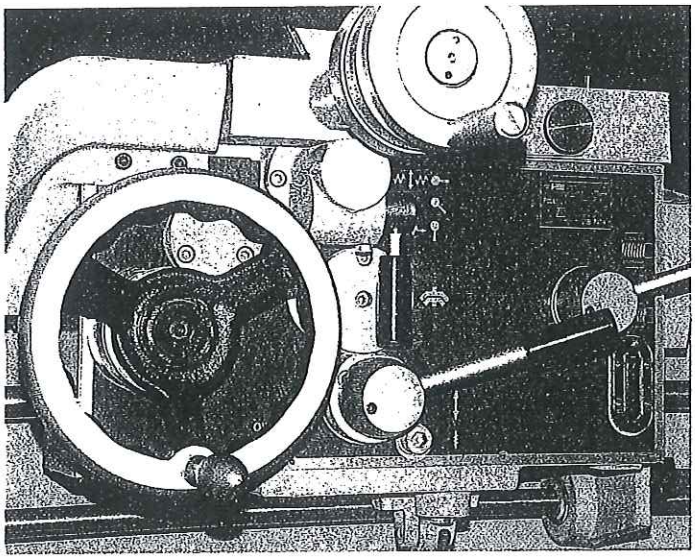

Figure 13

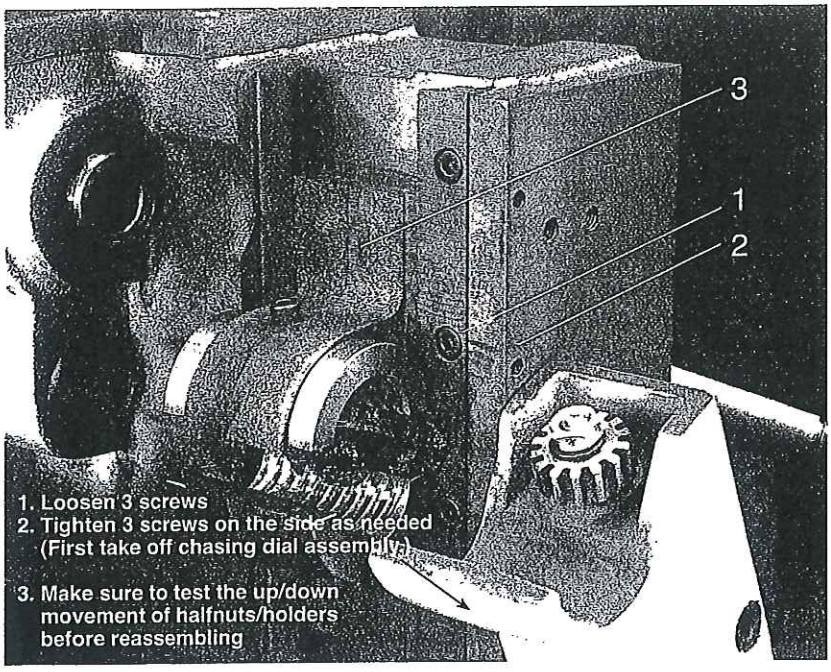


Figure 17

## OIL LEAKS

**Headstock top cover leak:** Remove cover, clean all surfaces with a clean rag, apply a small coat of *grease* on the gasket surface and reinstall the cover.

**Oil leak around the spindle** is most likely caused by the oil level begin too high or oil return hole over the spindle being blocked or restricted. Most of the time this oil inlet hole can be cleaned out by simply blowing air thorough the passage. **(Figure 10)**

*** *Note:* Make sure to use 10W Oil only! Higher viscousity will result in leak!

**Oil leak at the rear of spindle:**

1. Mark lock nut and spindle. **(Figure 11)**
2. Mark balance weights on lock nut **(Figure 11)**
3. Remove lock nut. (First remove set screw )
4. Remove cover
5. Clear oil return hole using air pressure. **(Figure 12)**
   **Note:** Be sure cover is not obstructing return.

## ALIGNING THE HEAD

A taper will most likely be created by the head being out of alignment. To align head:

1. Loosen bolts on base of head slightly. ( 3 in front and 3 in back) **(Figure 5)**
2. Make appropriate adjustment to correct problem.
   a. "C" Model adjusting screws are in front of lathe.
   b. "S" and "F" Models adjusting screws are in the back of the lathe.

**Notes:**

## APRON REMOVAL

1. Remove dowel pins from lead screw and feed shaft **(Figure 4)**
2. Remove chasing dial assembly **(Figure 15)**
3. Remove rotation lever assembly **(Figure 15)**
4. Remove lead screw bracket and slide lead screw & lead shafts out of apron.

   **(Figure 16)**
5. Removing 4 bolts will allow the apron to be removed. (Caution should be taken when removing, due to its weight).

**Notes:**

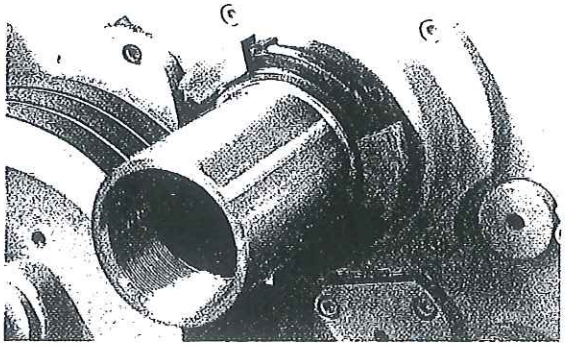

Figure 11

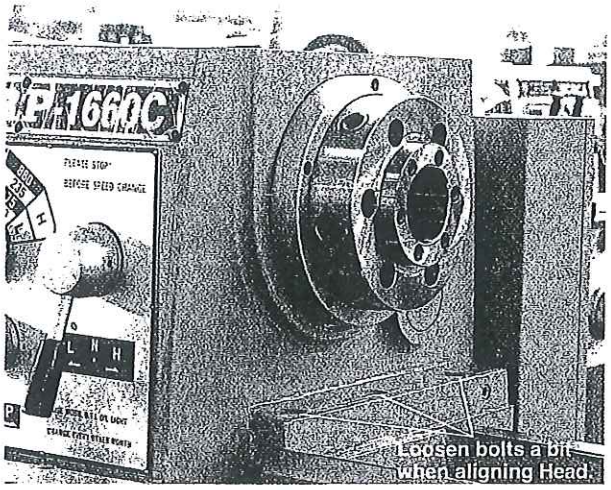


Figure 5

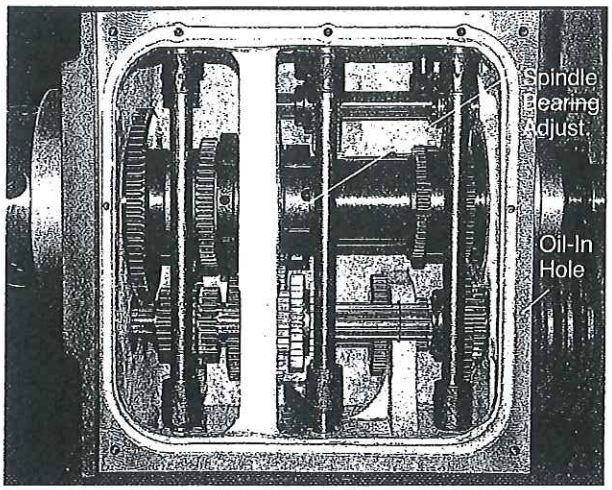


Figure 10

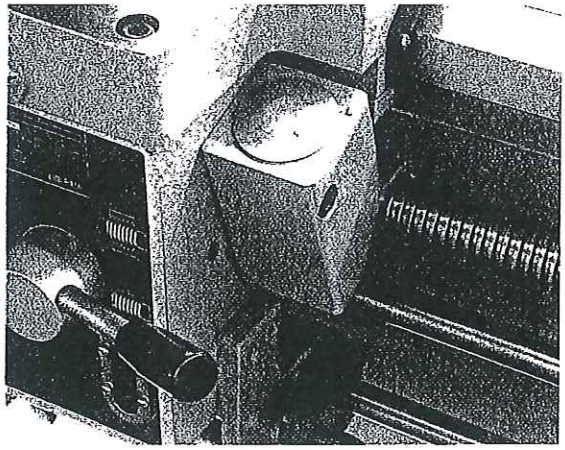

Figure 15

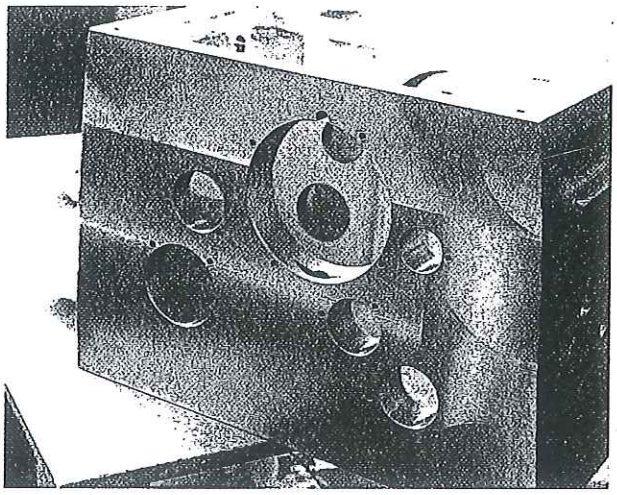

Figure 12

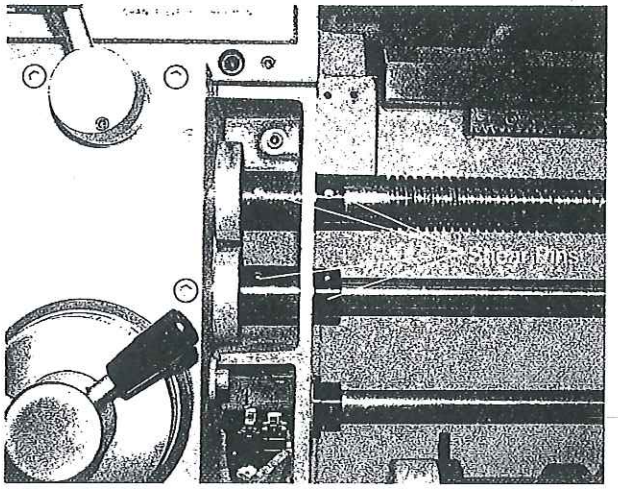

Figure 4

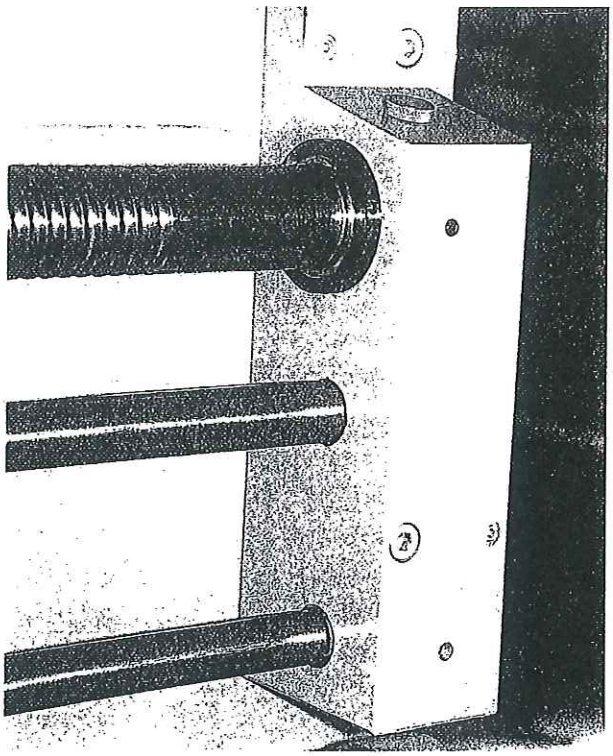

Figure 16

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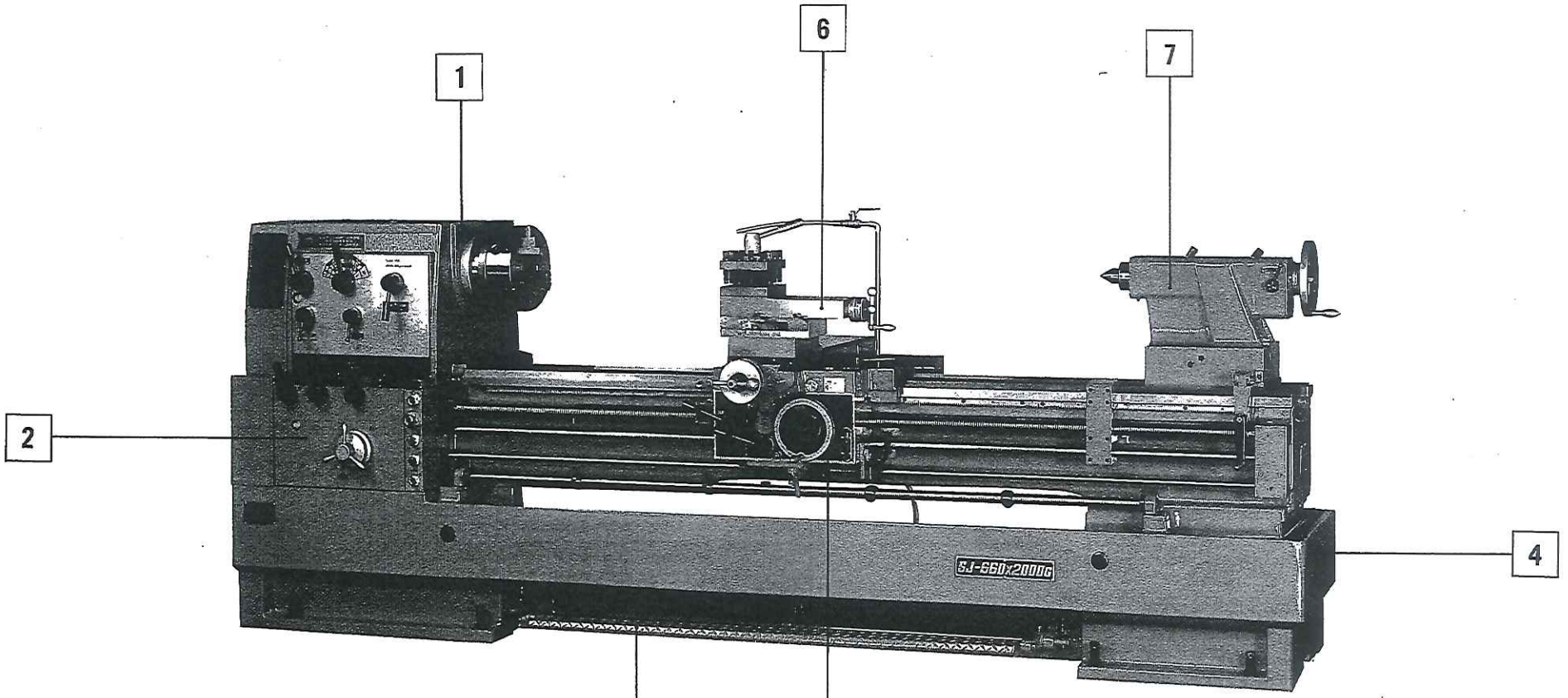


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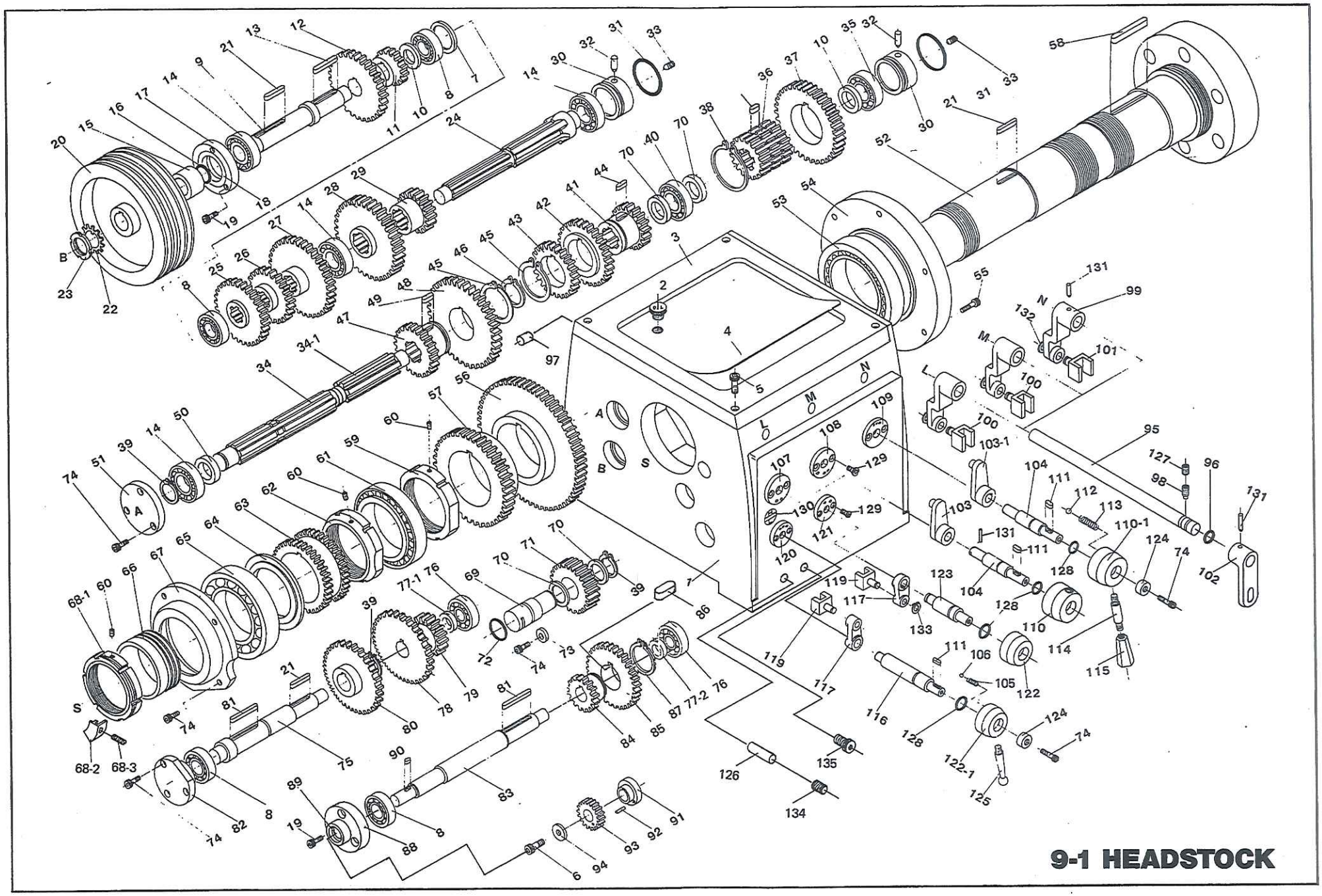
# 9 SYSTEM IN EACH UNIT



# 9-1 HEADSTOCK

# HEADSTOCK ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 1 | Head stock | 1 | 136026007 | 1430200106 | 1540200101 |
| 2 | Oil plug | 1 | 1122103405 | 1122103405 | 1122103405 |
| 3 | Head stock cover | 1 | 1360200505 | 1360200505 | 1440200305 |
| 4 | Blanket | 1 | 1003509403 | 1003509403 | 1003509501 |
| 5 | Hexagon socket screw , M8xP1.25x35L | 4 | 91110835 | 91110835 | 91110835 |
| 7 | Spacer | 1 | 1360207800 | 1360207800 | 1440201606 |
| 8 | Ball-bearing , 6205 | 4 | 91301020 | 91301020 | 91301020 |
| 9 | Input-shaft | 1 | 1360200603 | 1360200603 | 1440200403 |
| 10 | Spacer | 2 | 1360206605 | 1360206605 | 1360206605 |
| 11 | Gear-i (20T) | 1 | 1360200701 | 1360200701 | 1360200701 |
| 12 | Gear-g (41T) | 1 | 1360200809 | 1360200809 | 1360200809 |
| 13 | Square key , 8x7x55L | 1 | 91620804 | 91620804 | 91620804 |
| 14 | Ball-bearing , 6206 | 5 | 91301021 | 91301021 | 91301021 |
| 17 | Housing | 1 | 1120206903 | 1120206903 | 1120206903 |
| 18 | Oil-seal , TC30x50x8L | 1 | 91523001 | 91523001 | 91523001 |
| 19 | Hexagon socket screw , M6xP1.0x20L | 6 | 91110620 | 91110620 | 91110620 |
| 20 | Pulley wheel | 1 | 1360206105 | 1360206105 | 1360206105 |
| 21 | Square key , 8x7x45L | 3 | 91620803 | 91620803 | 91620803 |
| 22 | Spring-washer M12 | 1 | 91420012 | 91420012 | 91420012 |
| 23 | Screw , M12x30 | 1 | 91111230 | 91111230 | 91111230 |
| 24 | Shaft-B | 1 | 1360202509 | 1360202509 | 1440200609 |
| 25 | Gear-d (39T) | 1 | 1360200907 | 1360200907 | 1360200907 |
| 26 | Gear-b (32T) | 1 | 1360201002 | 1360201002 | 1360201002 |
| 27 | Gear-f (48T) | 1 | 1360201100 | 1360201100 | 1360201100 |
| 28 | Gear-k (46T) | 1 | 1360201208 | 1360201208 | 1360201208 |
| 29 | Gear-o (22T) | 1 | 1360201306 | 1360201306 | 1360201306 |
| 30 | Plug-cover | 2 | 1360202901 | 1360202901 | 1360202901 |
| 31 | O-ring , P55x3.5 | 2 | 9151P055 | 9151P055 | 9151P055 |
| 32 | Fixed pin | 2 | 1120206707 | 1120206707 | 1120206707 |
| 33 | Set screw | 2 | 1120206805 | 1120206805 | 1120206805 |
| 34 | Shaft-A | 1 | 1360202607 | 1360202607 | |
| 34-1 | Shaft-L | 1 | 1360202705 | 1360202705 | 1440200805 |
| 35 | Ball-bearing , 6305 | 1 | 91301029 | 91301029 | 91301029 |
| 36 | Gear-l (25T) | 1 | 1360201404 | 1360201404 | 1360201404 |
| 36-1 | Square key , 7x10x18L | 2 | | | |
| 37 | Gear-m | 1 | 1360206703 | 1360206703 | 1360206703 |
| 38 | Snap ring , S75 | 2 | | | |
| 39 | Snap ring , S30 | 3 | 9171S030 | 9171S030 | 9171S030 |
| 40 | Ball-bearing , 6006 | 2 | 91301013 | 91301013 | 91301013 |
| 41 | Gear-e | 1 | 1360201502 | 1360201502 | 1360201502 |
| 42 | Gear-a | 1 | 1440202407 | 1440202407 | 1440202407 |
| 43 | Gear-c | 1 | 1440202505 | 1440202505 | 1440202505 |
| 44 | Square key , 8x7x30L | 1 | | | |

# HEADSTOCK ASSEMBLY

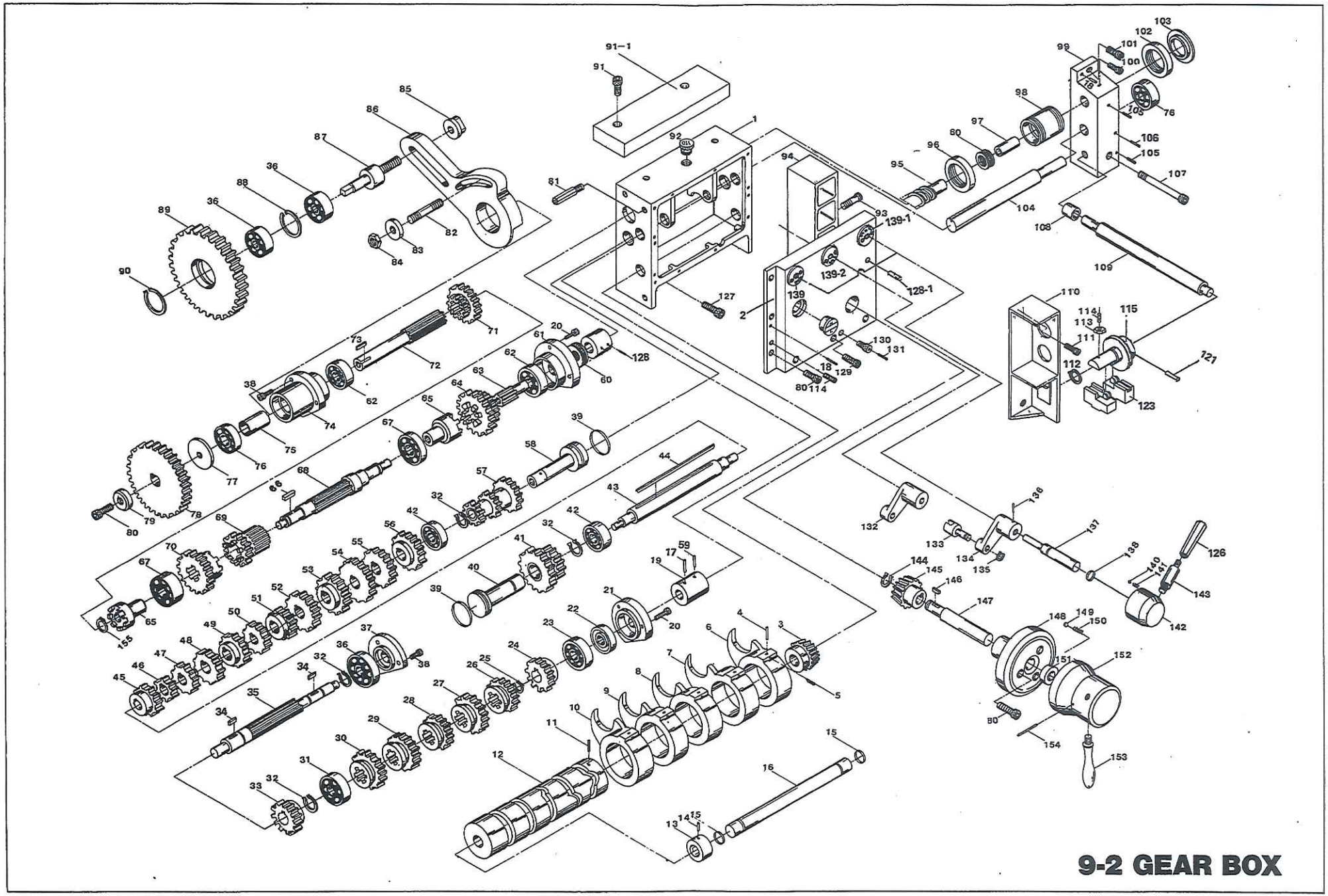
| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 45 | Snap ring , S55 | 2 | | | |
| 46 | Snap ring , S38 | 2 | | | |
| 47 | Gear-h (30T) | 1 | 1360201600 | 1360201600 | 1360201600 |
| 48 | Gear-j (51T) | 1 | 1360207504 | 1360207504 | 1360207504 |
| 49 | Square key , 8x7x25L | 1 | 91620801 | 91620801 | 91620801 |
| 50 | Spacer | 1 | 1360206801 | 1360206801 | 1360206801 |
| 51 | Cover | 1 | 1360203104 | 1360203104 | 1360203104 |
| 52 | Spindle (A1-8) | 1 | 1360200309 | 1360200309 | 1440200109 |
| | (D1-8) | 1 | 1360200407 | 1360200407 | 1440200207 |
| 53 | Taper roller bearing , 32024 | 1 | 91302016 | 91302016 | 91302016 |
| 54 | Cover (A1-8) | 1 | 1360200103 | 1360200103 | 1360200103 |
| | (D1-8) | 1 | 1360200201 | 1360200201 | 1360200201 |
| 55 | Hexagon socket screw , M6xP1.0x35L | 6 | 911110635 | 911110635 | 911110635 |
| 56 | Gear-p (78T) | 1 | 1360201708 | 1360201708 | 1360201708 |
| 57 | Gear-n (55T) | 1 | 1360201806 | 1360201806 | 1360201806 |
| 58 | Square key , 10x8x85L | 1 | 91621001 | 91621001 | 91621001 |
| 59 | Lock-nut | 1 | 1360203202 | 1360203202 | 1360203202 |
| 60 | Set screw , M8xP1.25x8L | 5 | 91120808 | 91120808 | 91120808 |
| 61 | Taper roller bearing , 32021 | 1 | 91301034 | 91301034 | 91301034 |
| 62 | Lock-nut | 1 | 1360203300 | 1360203300 | 1360203300 |
| 63 | Gear (48T) | 1 | 1360201904 | 1360201904 | 1360201904 |
| 64 | Collar | 1 | 1360203408 | 1360203408 | 1360203408 |
| 65 | Ball-bearing , 6020 | 1 | | | |
| 66 | Oil return collar | 1 | 1360203506 | 1360203506 | 1360203506 |
| 67 | Cover | 1 | 1360203604 | 1360203604 | 1360203604 |
| 68-1 | Lock nut | 1 | 1360203702 | 1360203702 | 1360203702 |
| 68-2 | Balance piece | 3 | 1360203800 | 1360203800 | 1360203800 |
| 68-3 | Set screw | 6 | 1120207008 | 1120207008 | 1120207008 |
| 69 | Idle gear shaft | 1 | 1120207508 | 1120207508 | 1120207508 |
| 70 | Spacer | 4 | 1120206609 | 1120206609 | 1120206609 |
| 71 | Idle gear (32T) | 1 | 1360202009 | 1360202009 | 1360202009 |
| 72 | O-ring , P29 | 1 | | | |
| 73 | Washer | 1 | 1120207606 | 1120207606 | 1120207606 |
| 74 | Hexagon socket screw , M6xP1.0x16L | 16 | 91110616 | 91110616 | 91110616 |
| 75 | Shaft-c | 1 | 1360202107 | 1360202107 | 1440200501 |
| 76 | Ball-bearing , 6304 | 2 | 91301028 | 91301028 | 91301028 |
| 77-1 | Spacer | 1 | 1360206909 | 1360206909 | 1360206909 |
| 77-2 | Spacer | 1 | 1360207004 | 1360207004 | 1360207004 |
| 78 | Gear | 1 | 1360207406 | 1360207406 | 1360207406 |
| 79 | Gear (22T) | 1 | 1360202205 | 1360202205 | 1360202205 |
| 80 | Gear (48T) | 1 | 1360202303 | 1360202303 | 1360202303 |
| 81 | Square key , 8x7x65L | 2 | 91620805 | 91620805 | 91620805 |

# HEADSTOCK ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 82 | Cover | 1 | 1360203908 | 1360203908 | 1360203908 |
| 83 | Shaft-D | 1 | 1360202803 | 1360202803 | 1440200903 |
| 84 | Gear (33T) | 1 | 1360202401 | 1360202401 | 1360202401 |
| 85 | Gear (44T) | 1 | 1440202309 | 1440202309 | 1440202309 |
| 86 | Square key , 8x7x20L | 1 | | | |
| 87 | Snap ring , S45 | 1 | | | |
| 88 | Housing | 1 | 1360204003 | 1360204003 | 1360204003 |
| 89 | Oil-seal , TC25x47x8L | 1 | 91522501 | 91522501 | 91522501 |
| 90 | Square key , 6x6x12L | 1 | 91610601 | 91610601 | 91610601 |
| 91 | Collar | 1 | 1121602203 | 1121602203 | 1121602203 |
| 92 | Taper pin , O#x25L | 1 | 92010025 | 92010025 | 92010025 |
| 93 | Gear (in) | 1 | 1121600405 | 1121600405 | 1121600405 |
| | Gear (mm) | 1 | 1121600307 | 1121600307 | 1121600307 |
| 94 | Washer | 1 | 91410008 | 91410008 | 91410008 |
| 95 | Shifting shaft | 3 | 1360204101 | 1360204101 | 1440201008 |
| 96 | O-ring , P16 | 6 | 9151P016 | 9151P016 | 9151P016 |
| 97 | Plug | 3 | 1120207704 | 1120207704 | 1120207704 |
| 98 | Set screw | 3 | 1360204209 | 1360204209 | 1360204209 |
| 99 | Shifting lever | 3 | 1360204307 | 1360204307 | 1360204307 |
| 100 | Shifting fork | 1 | 1120207802 | 1120207802 | 1120207802 |
| | | 1 | 1120207900 | 1120207900 | 1120207900 |
| 101 | Shifting fork | 1 | 1360204405 | 1360204405 | 1360204405 |
| 102 | Shifting lever | 3 | 1360204503 | 1360204503 | 1360204503 |
| 103 | Shifting lever | 3 | 1360204601 | 1360204601 | 1360204601 |
| 104 | Shaft | 3 | 1360204709 | 1360204709 | 1360204709 |
| 105 | Spring , D6xd0.8x25L | 2 | 91901060102902 | 91901060102902 | 91901060102902 |
| 106 | Ball steel , $\varphi$ 1/4" | 2 | | | |
| 107 | Detent plate | 1 | 1360204905 | 1360204905 | 1360204905 |
| 108 | Detent plate | 1 | 1360205000 | 1360205000 | 1360205000 |
| 109 | Detent plate | 1 | 1360205108 | 1360205108 | 1360205108 |
| 110 | Hub | 2 | 1360205206 | 1360205206 | 1360205206 |
| 110-1 | Hub | 1 | 1360205304 | 1360205304 | 1360205304 |
| 111 | Square key , 5x5x15L | 3 | 91610501 | 91610501 | 91610501 |
| 112 | Ball steel , $\varphi$ 5/16" | 3 | 91820516 | 91820516 | 91820516 |
| 113 | Spring , D8xd0.8x25L | 1 | | | |
| | Spring , D8xd1.1x29L | 2 | | | |
| 114 | Lever | 3 | 1120207302 | 1120207302 | 1120207302 |
| 115 | Knob | 3 | 1120207400 | 1120207400 | 1120207400 |
| 116 | Shaft | 1 | 1360207200 | 1360207200 | 1440201302 |
| 117 | Shifting lever | 2 | 1360205402 | 1360205402 | 1360205402 |
| 119 | Shifting fork | 2 | 1330200104 | 1330200104 | 1330200104 |
| 120 | Detent plate | 1 | 1360205608 | 1360205608 | 1360205608 |
| 121 | Detent plate | 1 | 1360205706 | 1360205706 | 1360205706 |
| 122 | Knob | 1 | 1360205804 | 1360205804 | 1360205804 |
| 122-1 | Knob | 1 | 1360205902 | 1360205902 | 1360205902 |

# HEADSTOCK ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 123 | Shaft | 1 | 1360207308 | 1360207308 | 1440201106 |
| 124 | Washer | 5 | 1120206109 | 1120206109 | 1120206109 |
| 125 | Lever | 2 | 1120207204 | 1120207204 | 1120207204 |
| 126 | Pin | 2 | 1361600107 | 1361600107 | 1361600107 |
| 127 | Set screw , M8xP1.25x8L | 3 | 91120808 | | |
| 128 | O-ring , P18 | 5 | 9151P018 | 9151P018 | 9151P018 |
| 129 | Screw , M6xP1.0x14L | 10 | 91160614 | 91160614 | 91160614 |
| 130 | Lenz-oil , $\varphi$ 28 | 1 | 93902003000004 | 93902003000004 | 93902003000004 |
| 131 | Spring pin , $\varphi$ 5x30L | 9 | 92030530 | 92030530 | 92030530 |
| 132 | Snap ring , S12 | 3 | | | |
| 133 | Snap ring , S10 | 2 | | | |
| 134 | Set screw , M12xP1.75x20L | 2 | 91121220 | 91121220 | 91121220 |
| 135 | Hexagon socket screw , M12xP1.75x95L | 2 | 91111295 | 91111295 | 91111295 |
| | | | | | |
| | | | | | |


9-2 GEAR BOX

# GEAR BOX ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 1 | Gear box | 1 | 1210300307 | 1210300307 | 1210300307 |
| 2 | Cover-gear box | 1 | 1420300108 | 1420300108 | 1420300108 |
| 3 | Gear-driven bevel | 1 | 1210300405 | 1210300405 | 1210300405 |
| 4 | Pin-fixed | 5 | 1210300503 | 1210300503 | 1210300503 |
| 5 | Pin-split | 5 | 92004000000014 | 92004000000014 | 92004000000014 |
| 6 | Claw-shifter | 1 | 1210300601 | 1210300601 | 1210300601 |
| 7 | Claw-shifter | 1 | 1210300709 | 1210300709 | 1210300709 |
| 8 | Claw-shifter | 1 | 1210300807 | 1210300807 | 1210300807 |
| 9 | Claw-shifter | 1 | 1210300905 | 1210300905 | 1210300905 |
| 10 | Claw-shifter | 1 | 1210301000 | 1210301000 | 1210301000 |
| 11 | Screw-hexa. socket headless set , M8xP1.25x8L | 1 | 1210301108 | 1210301108 | 1210301108 |
| 12 | Cam-shifter | 1 | 1210301206 | 1210301206 | 1210301206 |
| 13 | Collar | 1 | 1210301304 | 1210301304 | 1210301304 |
| 14 | Set-screw , M8x12 | 1 | | | |
| 15 | Ring-"O" , P18 | 2 | | | |
| 16 | Shaft-"A" | 1 | 1210301402 | 1210301402 | 1210301402 |
| 17 | Pin-taper , #4x38 | 2 | | | |
| 18 | Pin-taper , #6x38 | 2 | 1210702301 | 1210702301 | 1210702301 |
| 19 | Collar-linkage | 2 | 1210301500 | 1210301500 | 1210301500 |
| 20 | Screw-hexa. socket head cap , M6xP1.0x16L | 6 | | | |
| 21 | Cap-right | 1 | 1210301608 | 1210301608 | 1210301608 |
| 22 | Seal-oil , 20x40x10L | 1 | | | |
| 23 | Bearing-ball , 6204 | 1 | 91301018 | 91301018 | 91301018 |
| 24 | Gear-"B" shaft (36T) | 1 | 1210301706 | 1210301706 | 1210301706 |
| 25 | Snap ring , S25 | 2 | | | |
| 26 | Gear-"B" shaft | 1 | 1210301804 | 1210301804 | 1210301804 |
| 27 | Gear-"B" shaft | 1 | 1210301902 | 1210301902 | 1210301902 |
| 28 | Gear-"B" shaft | 1 | 1210302007 | 1210302007 | 1210302007 |
| 29 | Gear-"B" shaft | 1 | 1210302105 | 1210302105 | 1210302105 |
| 30 | Gear-"B" shaft | 1 | 1210302203 | 1210302203 | 1210302203 |
| 31 | Bearing ball , 6004 | 1 | 91301006 | 91301006 | 91301006 |
| 32 | Snap ring , S20 | 2 | | | |
| | Snap ring , S18 | 2 | | | |
| 33 | Gear-"B" shaft (22T) | 1 | 1210302301 | 1210302301 | 1210302301 |
| 34 | Key-square , 6x6x20L | 2 | 91610605 | 91610605 | 91610605 |
| 35 | Shaft-"B" | 1 | 1210302409 | 1210302409 | 1210302409 |
| 36 | Bearing ball , 6003 | 3 | 91301005 | 91301005 | 91301005 |
| 37 | Cap-left | 1 | 1210302507 | 1210302507 | 1210302507 |
| 38 | Screw-hexa. socket head cap , M6xP1.0x12L | 6 | | | |
| 39 | Ring-"O" , P36 | 2 | | | |
| 40 | Shaft-"C" | 1 | 1210302605 | 1210302605 | 1210302605 |
| 41 | Gear-"C" shaft | 1 | 1210302703 | 1210302703 | 1210302703 |

# GEAR BOX ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 42 | Bearing , 6203 | 2 | 91301016 | 91301016 | 91301016 |
| 43 | Shaft-"D" | 1 | 1210302801 | 1210302801 | 1210302801 |
| 44 | Key-square , 6x6x146L | 1 | | | |
| 45 | Gear-"D" shaft (19T) | 1 | 1210302909 | 1210302909 | 1210302909 |
| 46 | Gear-"D" shaft (18T) | 1 | 1210303004 | 1210303004 | 1210303004 |
| 47 | Gear-"D" shaft (20T) | 1 | 1210303102 | 1210303102 | 1210303102 |
| 48 | Gear-"D" shaft (22T) | 1 | 1210303200 | 1210303200 | 1210303200 |
| 49 | Gear-"D" shaft (23T) | 1 | 1210303308 | 1210303308 | 1210303308 |
| 50 | Gear-"D" shaft (24T) | 1 | 1210303406 | 1210303406 | 1210303406 |
| 51 | Gear-"D" shaft (27T) | 1 | 1210303504 | 1210303504 | 1210303504 |
| 52 | Gear-"D" shaft (24T) | 1 | 1210303602 | 1210303602 | 1210303602 |
| 53 | Gear-"D" shaft (26T) | 1 | 1210303700 | 1210303700 | 1210303700 |
| 54 | Gear-"D" shaft (36T) | 1 | 1210303808 | 1210303808 | 1210303808 |
| 55 | Gear-"D" shaft (27T) | 1 | 1210303906 | 1210303906 | 1210303906 |
| 56 | Gear-"D" shaft (28T) | 1 | 1210304001 | 1210304001 | 1210304001 |
| 57 | Gear-"E" shaft (18T.36T) | 1 | 1210304109 | 1210304109 | 1210304109 |
| 58 | Shaft-"E" | 1 | 1210304207 | 1210304207 | 1210304207 |
| 59 | Pin-taper , 3x38 | 1 | 1003502904 | 1003502904 | 1003502904 |
| 60 | Bearing-thrust , 51104 | 1 | 91303003 | 91303003 | 91303003 |
| 61 | Cap | 1 | 1210304305 | 1210304305 | 1210304305 |
| 62 | Bearing ball , 6004V | 2 | 91301008 | 91301008 | 91301008 |
| 63 | Shaft-"F" | 1 | 1210304403 | 1210304403 | 1210304403 |
| 64 | Gear-"F" shaft (35T.35T) | 1 | 1210304501 | 1210304501 | 1210304501 |
| 65 | Shaft -"F" | 1 | 1210304609 | 1210304609 | 1210304609 |
| | | 1 | 1210304707 | 1210304707 | 1210304707 |
| 66 | Square key , 4x4x20L | 2 | 91610401 | 91610401 | 91610401 |
| 67 | Bearing ball , 6005 | 2 | 91301010 | 91301010 | 91301010 |
| 68 | Shaft-"G" | 1 | 1210304805 | 1210304805 | 1210304805 |
| 69 | Gear-"G" shaft | 1 | 1210304903 | 1210304903 | 1210304903 |
| 70 | Gear-"G" shaft (36T) | 1 | 1210305008 | 1210305008 | 1210305008 |
| 71 | Gear-"H" shaft (38T.19T) | 1 | 1210305106 | 1210305106 | 1210305106 |
| 72 | Shaft-"H" | 1 | 1420300206 | 1420300206 | 1420300206 |
| 73 | Key-square , 6x6x13L | 1 | 91610602 | 91610602 | 91610602 |
| 74 | Cap-bearing | 1 | 1210305204 | 1210305204 | 1210305204 |
| 75 | Bushing-"H" shaft | 1 | 1210305302 | 1210305302 | 1210305302 |
| 76 | Bearing ball , 6004Z | 2 | 91301007 | 91301007 | 91301007 |
| 77 | Spacer | 1 | 1361600303 | 1361600303 | 1361600303 |
| 78 | Gear-drive shaft (in 57T) | 1 | 1121600601 | 1121600601 | 1541600203 |
| | (mm 92T) | 1 | 1121600503 | | |
| 79 | Washer , M8 | 1 | 1121602105 | 1121602105 | 1121602105 |
| 80 | Screw-hexa. socket head cap , M8xP1.25x16L | 1 | | | |
| 81 | Bolt-lock end cover | 1 | 1362100204 | 1362100204 | 1362100204 |
| 82 | Stud | 1 | 1361600509 | 1361600509 | 1361600509 |
| 83 | Washer , 5/8" | 1 | 1362101407 | 1362101407 | 1362101407 |

# GEAR BOX ASSEMBLY

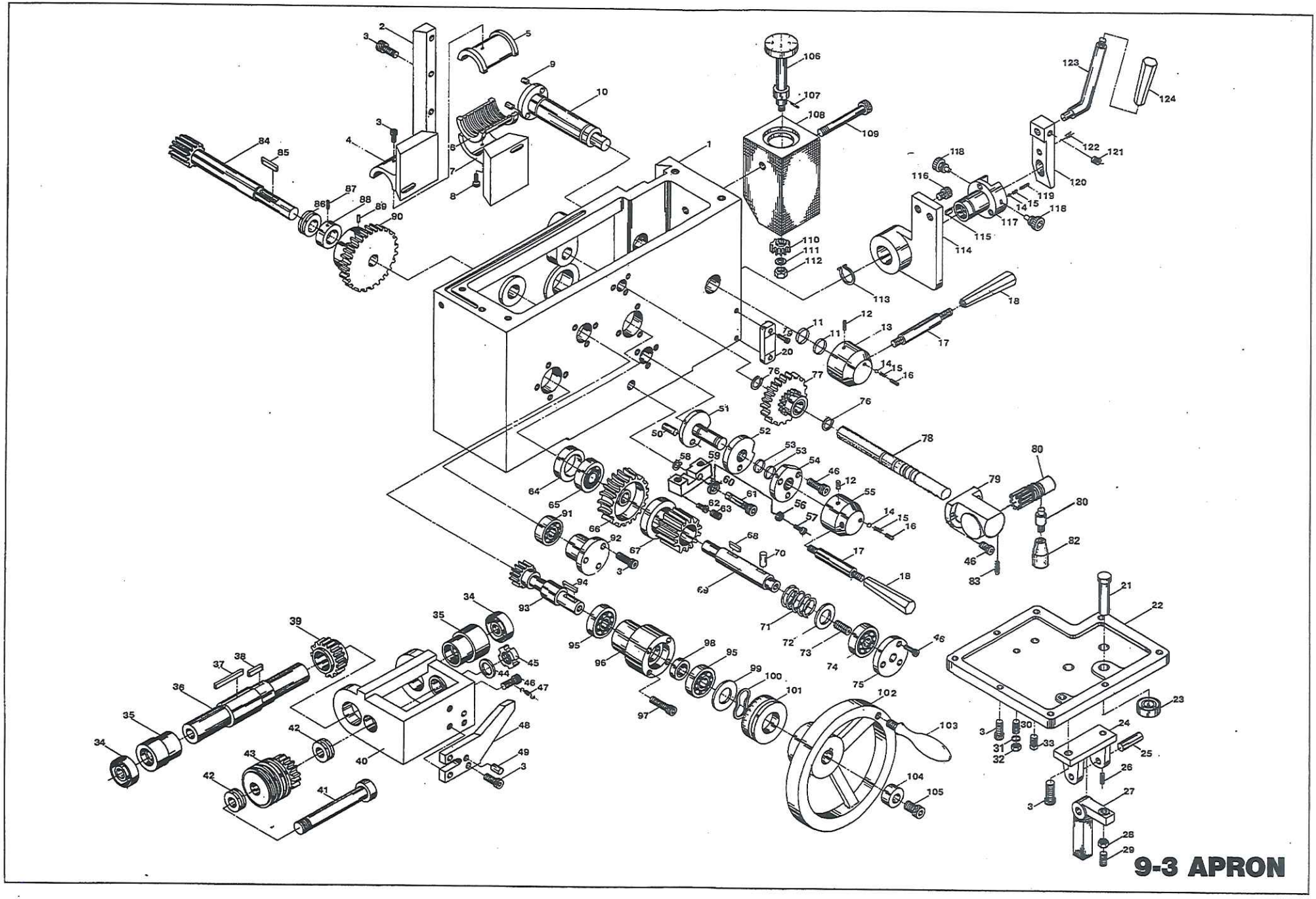
| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 84 | Nut , M16 | 1 | | | |
| 85 | Nut-lock stud | 1 | 1121601706 | 1121601706 | 1121601706 |
| 86 | Quadrat | 1 | 1361600401 | 1361600401 | 1361600401 |
| 87 | Stud-gear | 1 | 1361600607 | 1361600607 | 1361600607 |
| 88 | Snap ring , R40 | 1 | | | |
| 89 | Gear-quadrat (in 71T) | 1 | 1121600209 | | |
| | (in 82T) | 1 | | 1321600203 | |
| | (in 85T) | 1 | | | 1531600200 |
| | (mm 84T) | 1 | 1121600101 | | |
| | (mm 98T) | 1 | | 1321600105 | |
| | (mm 122T) | 1 | | | 1531600102 |
| 90 | Snap ring , S18 | 1 | | | |
| 91 | Screw-hexa. socket head cap , M6xP1.0x25L | 2 | | | |
| 91-1 | Cover | 1 | 1362101103 | 1362101103 | 1542100104 |
| 92 | Plug-oil inlet | 1 | 1122101401 | 1122101401 | 1122101401 |
| 93 | Screw-hexa. socket head cap , M6xP1.0x65L | 2 | | | |
| 94 | Seat-pilot light | | 1210701206 | 1210701206 | 1210701206 |
| 95 | Lead-screw (6 feet in) | 1 | 1420700206 | 1420700206 | |
| | (6 feet mm) | 1 | 1420700108 | 1420700108 | |
| | (8 feet in) | 1 | 1430700209 | 1430700209 | |
| | (8 feet mm) | 1 | 1430700101 | 1430700101 | |
| | (10 feet in) | 1 | | | 1440700202 |
| | (10 feet mm) | 1 | | | 1440700104 |
| 96 | Nut-lock | 1 | 1420700706 | 1420700706 | 1420700706 |
| 97 | Bushing-leadscrew | 1 | | | |
| 98 | Plug-lead screw | 1 | 1420700706 | 1420700706 | 1420700706 |
| 99 | Supporter-for leadscrew , feed rod | 1 | 1420700804 | 1420700804 | 1420700804 |
| 100 | Screw-hexa. socket head cap , M8xP1.25x25L | 1 | 1122101509 | 1122101509 | 1122101509 |
| 101 | Screw-hexa. socket head cap , M8xP1.25x30L | 1 | | | |
| 102 | Nut-lock | 1 | 1420700706 | 1420700706 | 1420700706 |
| 103 | Plug-plastic | 1 | 1122101607 | 1122101607 | 1122101607 |
| 104 | Rod-feed (6feet) | 1 | 1420700402 | 1420700402 | |
| | (8feet) | 1 | 1420700304 | 1420700304 | |
| | (10feet) | 1 | | | 1440700300 |
| 105 | Screw-hexa. socket headless set , M6xP1.0x20L | 2 | | | |
| 106 | Pin-taper , 6x100L | 1 | 1210700601 | 1210700601 | 1210700601 |
| 107 | Bolt-hexa. socket head cap , M8xP1.25x80L | 1 | | | |
| 108 | Bushing-spindle starting rod | 1 | 1420700902 | 1420700902 | 1420700902 |

# GEAR BOX ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 109 | Rod-spindle starting switch (6 feet) | 1 | 1420701105 | 1420701105 | |
| | (8 feet) | 1 | 1430700405 | 1430700405 | |
| | (10 feet) | 1 | | | 1440700408 |
| 110 | Seat-switch | 1 | 1210701304 | 1210701304 | 1210701304 |
| 111 | Screw-hexa. socket head cap , M8xP1.25x25L | 2 | | | |
| 112 | Snap ring , S30 | 1 | | | |
| 113 | Nut , M6xP1.0 | | | | |
| 114 | Screw-hexa. socket headless set , M6xP1.0x20L | 1 | 1210305400 | 1210305400 | 1210305400 |
| 115 | Bracket | 1 | 1210701402 | 1210701402 | 1210701402 |
| 121 | Pin , 5x25L | 1 | | | |
| 122 | Screw-hexa. socket headless set , M6xP1.0x8L | 1 | | | |
| 123 | Switch | 2 | | | |
| 126 | Knob | 3 | 1120207400 | 1120207400 | 1120207400 |
| 127 | Screw-hexa. socket head cap , M10xP1.5x35L | 4 | 1210701500 | 1210701500 | 1210701500 |
| 128 | Pin-taper , 0x35 | 1 | 1003502904 | 1003502904 | 1003502904 |
| 128-1 | Pin-taper , 6x45 | 1 | 2251002303 | 2251002303 | 2251002303 |
| 129 | Screw-hexa. socket head cap , M8xP1.25x40L | 7 | 1120207400 | 1120207400 | 1120207400 |
| 130 | Screw-taper,oil outlet , PT3/8 | 1 | | | |
| 132 | Shifter | 1 | 1210305606 | 1210305606 | 1210305606 |
| 133 | Shoe-shifter | 2 | 1210305704 | 1210305704 | 1210305704 |
| | | 1 | 1210305802 | 1210305802 | 1210305802 |
| 134 | Shifter | 1 | 1210306005 | 1210306005 | 1210306005 |
| | | 1 | 1210305900 | 1210305900 | 1210305900 |
| 135 | Snap ring , S10 | 3 | 91701010000002 | 91701010000002 | 91701010000002 |
| 136 | Pin-spring , 5x25 | 3 | | | |
| 137 | Shaft-shifter | 3 | 1210306103 | 1210306103 | 1210306103 |
| 138 | Ring-"O" , P12 | 3 | | | |
| 139 | Detent plate | 1 | 1210306201 | 1210306201 | 1210306201 |
| 139-1 | Detent plate | 1 | 1210306309 | 1210306309 | 1210306309 |
| 139-2 | Detent plate | 1 | 1210306407 | 1210306407 | 1210306407 |
| 140 | Ball-steel , 1/4 | 3 | 91820104 | 91820104 | 91820104 |
| 141 | Spring , 1x6x30L | 3 | | | |
| 142 | Hub | 3 | 1210306505 | 1210306505 | 1210306505 |
| 143 | Lever | 3 | 1210306701 | 1210306701 | 1210306701 |
| 144 | Snap ring , S15 | 1 | | | |
| 145 | Gear-drive bevel | 1 | 1210306809 | 1210306809 | 1210306809 |
| 146 | Key-square , 5x5x15L | 1 | 91610501 | 91610501 | 91610501 |
| 147 | Shaft-bevel gear | 1 | 1210306907 | 1210306907 | 1210306907 |
| 148 | Seat-gear shifting | 1 | 1210307002 | 1210307002 | 1210307002 |

# GEAR BOX ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 149 | Ball-steel , 5/16 | 2 | | | |
| 150 | Spring , 1x6x22L | 2 | | | |
| 151 | Seal-oil , 25x35x10L | 1 | 91504200351004 | 91504200351004 | 91504200351004 |
| 152 | Hub | 1 | 1210307100 | 1210307100 | 1210307100 |
| 153 | Handle | 3 | 1120207204 | 1120207204 | 1120207204 |
| | | 3 | 1220200100 | 1220200100 | 1220200100 |
| 154 | Pin , 5x50 | 1 | | | |
| | | | | | |
| | | | | | |



# 9-3 APRON

# APRON ASSEMBLY

| ITEM NO. | Part Name | Amt. Used | Type: 20 GW Part No. | Type: 22, 26 Part No. | Type:2280, 2680 Part No. | Type: 30 Part No. | 名稱 |
|---|---|---|---|---|---|---|---|
| 1 | Body-Apron (right hand) | 1 | 142090174 | 142090174 | 142090174 | 142090174 | 護床本體 |
| | (left hand) | 1 | 142090013 | 142090013 | 142090013 | 142090013 | |
| 2 | Gib | 1 | 1420900804 | 1420900804 | 1420900804 | 1420900804 | 炭條 |
| 3 | Hexagon socket screw, M6xP1.0x20L | 17 | | | | | 六角承窩螺絲 |
| 4 | Holder-half nut (right) | 1 | 1420900402 | 1420900402 | 1420900402 | 1420900402 | 半開螺帽座 |
| | (left) | 1 | 1420900304 | 1420900304 | 1420900304 | 1420900304 | |
| 5 | Nut-half (in) | 1 | 142090053 | 142090053 | 142090053 | 142090053 | 半開螺帽 |
| | (mm) | 1 | 142090063 | 142090063 | 142090063 | 142090063 | |
| 6 | Nut-half (in) | 1 | 142090053 | 142090053 | 142090053 | 142090053 | 半開螺帽 |
| | (mm) | 1 | 142090063 | 142090063 | 142090063 | 142090063 | |
| 7 | Holder-half nut | 1 | | | | | |
| 8 | Hexagon socket screw, M6xP1.0x16L | 1 | | | | | 六角承窩螺絲 |
| 9 | Pin-sliding | 2 | 1210902507 | 1210902507 | 1210902507 | 1210902507 | 滑塊銷 |
| 10 | Shaft-half nut (right) | 1 | 1210900807 | 1210900807 | 1210900807 | 1210900807 | 半開螺帽心軸 |
| | (left) | 1 | 1210900709 | 1210900709 | 1210900709 | 1210900709 | |
| 11 | Ring-O , P26 | 2 | | | | | O型環 |
| 12 | Set screw, M12xP1.75x20L | 2 | | | | | 固定螺絲 |
| 13 | Hub (right) | 1 | 121090141 | 121090141 | 121090141 | 121090141 | 撥桿軸套 |
| | (left) | 1 | 1210901304 | 1210901304 | 1210901304 | 1210901304 | |
| 14 | Ball-steel , 1/4" | 4 | 91820104 | 91820104 | 91820104 | 91820104 | 鋼珠 |
| 15 | Spring , φ 1x6x30L | 3 | | | | | 彈簧 |
| 16 | Set screw, M8xP1.25x10L | 2 | | | | | 固定螺絲 |
| 17 | Lever | 2 | 1210902703 | 1210902703 | 1210902703 | 1210902703 | 手柄 |
| 18 | Knob | 2 | 1120207400 | 1120207400 | 1120207400 | 1120207400 | 電木把手 |
| 19 | Hexagon socket screw, M10xP1.5x25L | 2 | | | | | 六角承窩螺絲 |
| 20 | Lenx-oil, CTA-8 | 1 | 1210902801 | 1210902801 | 1210902801 | 1210902801 | 油鏡 |
| 21 | Shaft-auto stop | 1 | 1210902909 | 1210902910 | 1210902911 | 1210902912 | 挺桿 |
| 22 | Cover-bottom apron | 1 | 1210903004 | 1210903004 | 1210903004 | 1210903004 | 護床底蓋 |
| 23 | Seal-oil , 15x25x7 | 1 | | | | | 油封 |
| 24 | Seat-tappet | 1 | 1121601804 | 1121601804 | 1121601804 | 1121601804 | 自動停止挺桿座 |
| 25 | Shaft-tappet | 1 | 1121601902 | 1121601902 | 1121601902 | 1121601902 | 止動心軸 |
| 26 | Set screw, M6xP1.0x16L | 2 | | | | | 固定螺絲 |
| 27 | Tappet | 1 | 1121602007 | 1121602007 | 1121602007 | 1121602007 | 自動停止挺桿座 |
| 28 | Nut , M8xP1.25 | 1 | | | | | 螺帽 |
| 29 | Set screw, M8xP1.25x30L | 1 | | | | | 固定螺絲 |
| 30 | Set screw, M6xP1.0x40L | 1 | | | | | 固定螺絲 |
| 31 | Ring-O , P6 | 1 | | | | | O型環 |
| 32 | Nut , M6xP1.0 | 1 | | | | | 螺帽 |
| 33 | Screw-oil leakage , PT 1/4 | 1 | | | | | 油塞 |

# APRON ASSEMBLY

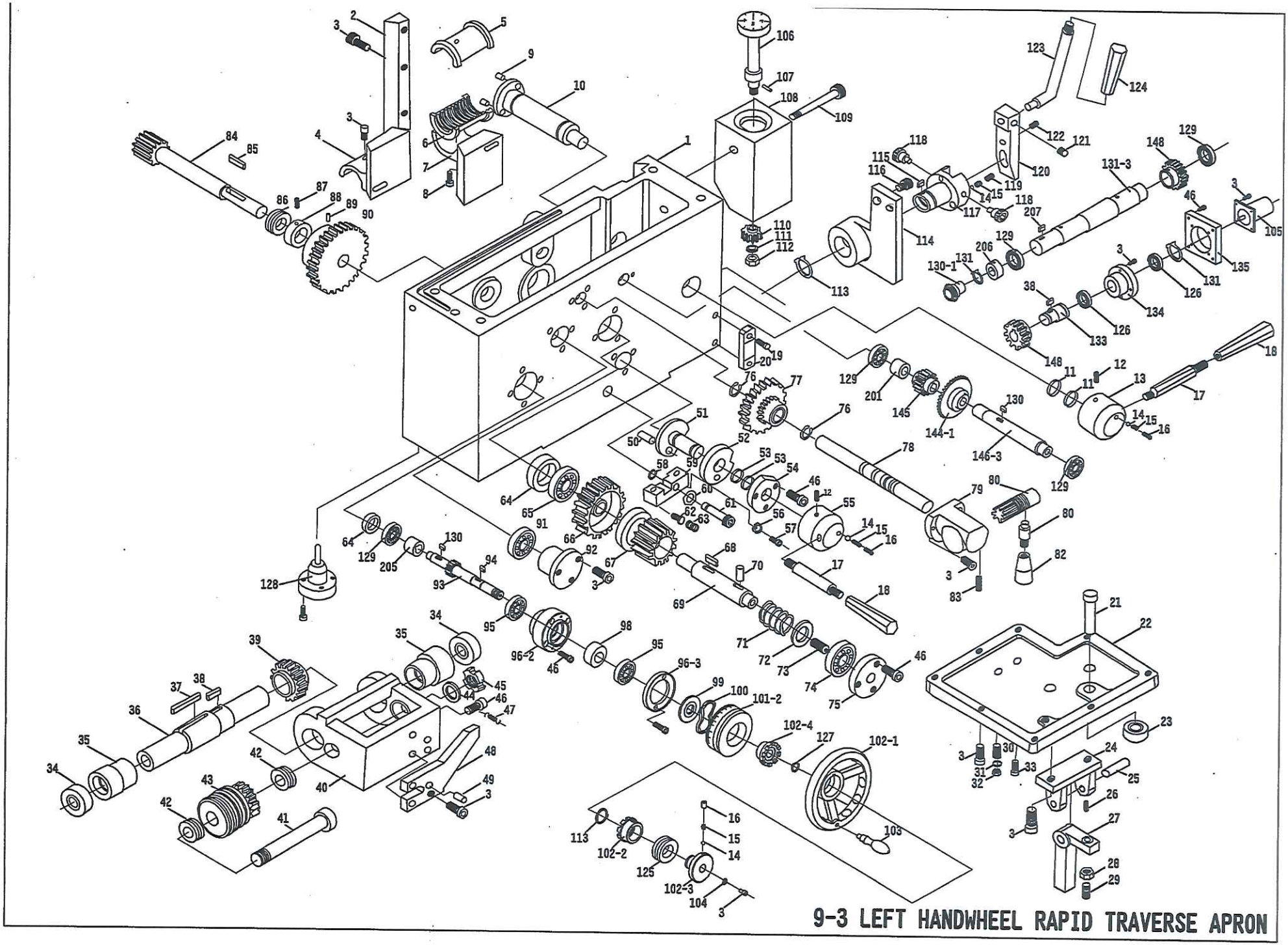
| ITEM NO. | Part Name | Amt. Used | Type: 20 GW Part No. | Type: 22, 26 Part No. | Type:2280, 2680 Part No. | Type: 30 Part No. | 名稱 |
|---|---|---|---|---|---|---|---|
| 34 | Seal-oil , 34x45x11L | 2 | | | | | 油封 |
| 35 | Bushing | 2 | 1420900902 | 1420900902 | 1420900902 | 1420900902 | 軸襯 |
| 36 | Sleeve-feed rod | 1 | 1420901007 | 1420901007 | 1420901007 | 1420901007 | 自動進刀軸套 |
| 37 | Key-square , 6x6x42L | 1 | | | | | 雙圓平行鍵 |
| 38 | Key-square , 6x6x12L | 1 | | | | | 雙圓平行鍵 |
| 39 | Gear | 1 | 1210903200 | 1210903200 | 1210903200 | 1210903200 | 齒輪 |
| 40 | Seat-worm | 1 | 1210903308 | 1210903308 | 1210903308 | 1210903308 | 蝸桿座 |
| 41 | Shaft-worm | 1 | 1210903406 | 1210903406 | 1210903406 | 1210903406 | 蝸桿心軸 |
| 42 | Bearing-thrust , 2904 | 2 | 91311005 | 91311005 | 91311005 | 91311005 | 止推軸承 |
| 43 | Worm gear | 1 | 1420901105 | 1420901105 | 1420901105 | 1420901105 | 蝸桿 |
| 44 | Washer-lock , 20 | 1 | | | | | 太陽墊圈 |
| 45 | Nut | 1 | | | | | 蝸桿心軸螺帽 |
| 46 | Hexagon socket screw, M6xP1.0x12L | 8 | | | | | 六角承窩螺絲 |
| 47 | Spring,φ 1x10x60L (right) | 1 | 121090541 | 121090541 | 121090541 | 121090541 | 彈簧 |
| | (left) | 1 | 121090551 | 121090551 | 121090551 | 121090551 | |
| 48 | Block-safe device (right) | 1 | 1210901000 | 1210901000 | 1210901000 | 1210901000 | 安全塊 |
| | (left) | 1 | 1420900706 | 1420900706 | 1420900706 | 1420900706 | |
| 49 | Pin , 5x18L | 2 | | | | | 彈簧銷 |
| 50 | Pin | 1 | | | | | |
| 51 | Shaft-auto feed (right) | 1 | 1210901206 | 1210901206 | 1210901206 | 1210901206 | 撥軸 |
| | (left) | 1 | 1210901108 | 1210901108 | 1210901108 | 1210901108 | |
| 52 | Collar | 1 | | | | | 撥軸 |
| 53 | Ring-O , P16 | 2 | | | | | O型環 |
| 54 | Cover | 1 | 1210903602 | 1210903602 | 1210903602 | 1210903602 | 軸蓋 |
| 55 | Hub (right) | 1 | 121090141 | 121090141 | 121090141 | 121090141 | 撥桿軸套 |
| | (left) | 1 | 1210901304 | 1210901304 | 1210901304 | 1210901304 | |
| 56 | Spring washer , M12 | 1 | | | | | 彈簧墊圈 |
| 57 | Hexagon socket screw, M8xP1.25x12L | 1 | | | | | 六角承窩螺絲 |
| 58 | Snap ring , S10 | 1 | | | | | 扣環 |
| 59 | Lever | 1 | 1210903700 | 1210903700 | 1210903700 | 1210903700 | 自動停止槓桿 |
| 60 | Spring washer , M12 | 1 | | | | | 彈簧墊圈 |
| 61 | Screw | 1 | 1210903808 | 1210903808 | 1210903808 | 1210903808 | 槓桿心軸 |
| 62 | Hexagon socket screw, M5xP0.8x20L | 1 | | | | | 六角承窩螺絲 |
| 63 | Spring | 1 | 1210905606 | 1210905606 | 1210905606 | 1210905606 | 彈簧 |
| 64 | Spacer | 1 | 1210903906 | 1210903906 | 1210903906 | 1210903906 | 密封塊 |
| 65 | Bearing ball , 6005V | 1 | 91301012 | 91301012 | 91301012 | 91301012 | 滾珠軸承 |
| 66 | Worm-wheel | 1 | 1420901203 | 1420901203 | 1420901203 | 1420901203 | 蝸輪 |
| 67 | Wheel-friction | 1 | 1420901301 | 1420901301 | 1420901301 | 1420901301 | 離合齒輪 |
| 68 | Key-square , 7x7x12L | 1 | | | | | 雙圓平行鍵 |
| 69 | Shaft-worm wheel | 1 | 1210904001 | 1210904001 | 1210904001 | 1210904001 | 離合器心軸 |
| 70 | Pin | 1 | 1210904109 | 1210904109 | 1210904109 | 1210904109 | 墊圈檔塊 |
| 71 | Spring, compressing | 1 | 1210905302 | 1210905302 | 1210905302 | 1210905302 | 彈簧 |
| 72 | Washer | 1 | 1210904207 | 1210904207 | 1210904207 | 1210904207 | 墊片 |
| 73 | Screw-hexa. Socket headless set | 1 | | | | | 固定螺絲 |

# APRON ASSEMBLY

| ITEM NO. | Part Name | Amt. Used | Type: 20 GW Part No. | Type: 22, 26 Part No. | Type:2280, 2680 Part No. | Type: 30 Part No. | 名稱 |
|---|---|---|---|---|---|---|---|
| 74 | Bearing ball , 6204 | 1 | 91301018 | 91301018 | 91301018 | 91301018 | 滾珠軸承 |
| 75 | Cover | 1 | 1210904305 | 1210904305 | 1210904305 | 1210904305 | 離合器 |
| 76 | Snap ring , S20 | 2 | | | | | 扣環 |
| 77 | Gear | 1 | 1420901409 | 1420901409 | 1420901409 | 1420901409 | 齒輪 |
| 78 | Shaft-cross feed | 1 | 121090441 | 121090441 | 121090441 | 121090441 | 縱橫變換軸 |
| 79 | Set (right) | 1 | 1210901608 | 1210901608 | 1210901608 | 1210901608 | 變換軸套 |
| | (left) | 1 | 1210901500 | 1210901500 | 1210901500 | 1210901500 | |
| 80 | Shaft-lever | 1 | 1210904501 | 1210904501 | 1210904501 | 1210904501 | 縱橫變換齒輪 |
| 81 | Lever | 1 | 1220900300 | 1220900300 | 1220900300 | 1220900300 | 手柄 |
| 82 | Knob | 1 | 1120207400 | 1120207400 | 1120207400 | 1120207400 | 電木把手 |
| 83 | Screw-hexa. Socket headless set | 1 | | | | | 固定螺絲 |
| 84 | Pinion-rack | 1 | 121094707 | 121094707 | 121094707 | 121094707 | 中間軸 |
| 85 | Key-square , 6x6x20L | 1 | | | | | 雙圓平行鍵 |
| 86 | Bering-niddle , NK20/22 | 1 | 91311001 | 91311001 | 91311001 | 91311001 | 滾針軸承 |
| 87 | Set screw, M6xP1.0x10L | 1 | | | | | 固定螺絲 |
| 88 | Collar | 1 | 1210904805 | 1210904805 | 1210904805 | 1210904805 | 固定圈 |
| 89 | Pin-spring , 6x36L | 1 | | | | | 彈簧銷 |
| 90 | Gear | 1 | 1210904903 | 1210904903 | 1210904903 | 1210904903 | 中間軸齒輪 |
| 91 | Bearing ball , 6003 | 1 | 91301005 | 91301005 | 91301005 | 91301005 | 滾珠軸承 |
| 92 | Cover | 1 | 1210905008 | 1210905008 | 1210905008 | 1210905008 | 軸套 |
| 93 | Pinion-handwheel | 1 | 1210905106 | 1210905106 | 1210905106 | 1210905106 | 手輪心軸 |
| 94 | Key-square , 6x6x25L | 1 | | | | | 雙圓平行鍵 |
| 95 | Bearing ball , 6004V | 2 | 91301008 | 91301008 | 91301008 | 91301008 | 滾珠軸承 |
| 96 | Seat | 1 | 1210905204 | 1210905204 | 1210905204 | 1210905204 | 軸承套 |
| 97 | Hexagon socket screw, M5xP0.8x20L | 4 | | | | | 六角承窩螺絲 |
| 99 | Waher | 1 | 1210701608 | 1210701608 | 1210701608 | 1210701608 | 墊塊 |
| 100 | Washer-wave type | 1 | | | | | 浪型墊圈 |
| 101 | Dial-rack (in) | 1 | 1220900104 | 1220900104 | 1220900104 | 1220900104 | 刻度環 |
| | (mm) | 1 | 1220900202 | 1220900202 | 1220900202 | 1220900202 | |
| 102 | Handwheel | 1 | 112210171 | 112210171 | 112210171 | 112210171 | 手輪 |
| 103 | Handle | 1 | 1121102002 | 1121102002 | 1121102002 | 1121102002 | 手柄 |
| 104 | Washer-lock | 1 | 1122101901 | 1122101901 | 1122101901 | 1122101901 | 鎖緊墊片 |
| 105 | Hexagon socket screw, M8xP1.25x20L | 1 | | | | | 六角承窩螺絲 |
| 106 | Dial-thread chasing | | | | | | 指示表規 |
| | (in, 4 parts) | 1 | 1003514708 | 1003514708 | 1003514708 | 1003514708 | |
| | (mm, 5 parts) | 1 | 100350241 | 100350241 | 100350241 | 100350241 | |
| | (mm, 7 parts) | 1 | 100351491 | 100351491 | 100351491 | 100351491 | |
| 107 | Pin | 1 | | | | | |
| 108 | Seat-dial shaft | 1 | 1003514502 | 1003514502 | 1003514502 | 1003514502 | 車牙表規座 |
| 109 | Hexagon socket screw, M10xP1.25x65L | 1 | | | | | 六角承窩螺絲 |

# APRON ASSEMBLY

| ITEM NO. | Part Name | Amt. Used | Type: 20 GW Part No. | Type: 22, 26 Part No. | Type:2280, 2680 Part No. | Type: 30 Part No. | 名稱 |
|---|---|---|---|---|---|---|---|
| 110 | Gear (in 16T) | 1 | 1003514600 | 1003514600 | 1003514600 | 1003514600 | 齒輪 |
| | (mm 11T) | 1 | 1003502502 | 1003502502 | 1003502502 | 1003502502 | |
| | (mm 13T) | 1 | 1003502600 | 1003502600 | 1003502600 | 1003502600 | |
| | (mm 14T) | 1 | 1003514806 | 1003514806 | 1003514806 | 1003514806 | |
| | (mm 15T) | 1 | 1003502708 | 1003502708 | 1003502708 | 1003502708 | |
| 111 | Washer-spring , 10 | 1 | | | | | 彈簧墊圈 |
| 112 | Nut , M10xP1.5 | 1 | | | | | 螺帽 |
| 113 | Snap ring , S30 | 1 | | | | | 扣環 |
| 114 | Seat-switch | 1 | 1210701706 | 1210701706 | 1210701706 | 1210701706 | 開關座 |
| 115 | Key-square , 6x8x25L | 1 | | | | | 雙圓平行鍵 |
| 116 | Hexagon socket screw, M8xP1.25x16L | 2 | | | | | 六角承窩螺絲 |
| 117 | Bracket | 1 | 121070181 | 121070181 | 121070181 | 121070181 | 啟動桿座 |
| 118 | Screw-lock | 2 | | | | | 特殊固定螺栓 |
| 119 | Screw-hexa. Socket headless cap | 1 | 1210702007 | 1210702007 | 1210702007 | 1210702007 | 停止定位銷 |
| 120 | Seat-lever | 1 | 1210702105 | 1210702105 | 1210702105 | 1210702105 | 啟動桿 |
| 121 | Set screw, M8xP1.25x8L | 2 | | | | | 固定螺絲 |
| 122 | Spring | 1 | | | | | 彈簧 |
| 123 | Lever | 1 | 1210702203 | 1210702203 | 1210702203 | 1210702203 | 把手 |
| 124 | Knob | 1 | 1122103602 | 1122103602 | 1122103602 | 1122103602 | 電木把手 |



9-3 LEFT HANDWHEEL RAPID TRAVERSE APRON

# RAPID TRAVERSE APRON ASSEMBLY

| ITEM NO. | Part Name | Amt. Used | Type: 20 GW Part No. | Type: 22, 26 Part No. | Type:2280, 2680 Part No. | Type: 30 Part No. | 名稱 |
|---|---|---|---|---|---|---|---|
| 1 | Body-Apron (right hand) | 1 | 142090174 | 142090174 | 142090174 | 142090174 | 護床本體 |
| | (left hand) | 1 | 142090013 | 142090013 | 142090013 | 142090013 | |
| 2 | Gib | 1 | 1420900804 | 1420900804 | 1420900804 | 1420900804 | 崁條 |
| 3 | Hexagon socket screw, M6xP1.0x20L | 24 | | | | | 六角承窩螺絲 |
| 4 | Holder-half nut (right) | 1 | 1420900402 | 1420900402 | 1420900402 | 1420900402 | 半開螺帽座 |
| | (left) | 1 | 1420900304 | 1420900304 | 1420900304 | 1420900304 | |
| 5 | Nut-half (in) | 1 | 142090053 | 142090053 | 142090053 | 142090053 | 半開螺帽 |
| | (mm) | 1 | 142090063 | 142090063 | 142090063 | 142090063 | |
| 6 | Nut-half (in) | 1 | 142090053 | 142090053 | 142090053 | 142090053 | 半開螺帽 |
| | (mm) | 1 | 142090063 | 142090063 | 142090063 | 142090063 | |
| 7 | Holder-half nut | 1 | | | | | |
| 8 | Hexagon socket screw, M6xP1.0x16L | 1 | | | | | 六角承窩螺絲 |
| 9 | Pin-sliding | 2 | 1210902507 | 1210902507 | 1210902507 | 1210902507 | 滑塊銷 |
| 10 | Shaft-half nut (right) | 1 | 1210900807 | 1210900807 | 1210900807 | 1210900807 | 半開螺帽心軸 |
| | (left) | 1 | 1210900709 | 1210900709 | 1210900709 | 1210900709 | |
| 11 | Ring-O , P26 | 2 | | | | | O型環 |
| 12 | Set screw, M12xP1.75x20L | 2 | | | | | 固定螺絲 |
| 13 | Hub (right) | 1 | 121090141 | 121090141 | 121090141 | 121090141 | 撥桿軸套 |
| | (left) | 1 | 1210901304 | 1210901304 | 1210901304 | 1210901304 | |
| 14 | Ball-steel , 1/4" | 4 | 91820104 | 91820104 | 91820104 | 91820104 | 鋼珠 |
| 15 | Spring , φ 1x6x30L | 4 | | | | | 彈簧 |
| 16 | Set screw, M8xP1.25x10L | 3 | | | | | 固定螺絲 |
| 17 | Lever | 2 | 1210902703 | 1210902703 | 1210902703 | 1210902703 | 手柄 |
| 18 | Knob | 2 | 1120207400 | 1120207400 | 1120207400 | 1120207400 | 電木把手 |
| 19 | Hexagon socket screw, M10xP1.5x25L | 2 | | | | | 六角承窩螺絲 |
| 20 | Lenx-oil, CTA-8 | 1 | 1210902801 | 1210902801 | 1210902801 | 1210902801 | 油鏡 |
| 21 | Shaft-auto stop | 1 | 1210902909 | 1210902910 | 1210902911 | 1210902912 | 挺桿 |
| 22 | Cover-bottom apron | 1 | 1210903004 | 1210903004 | 1210903004 | 1210903004 | 護床底蓋 |
| 23 | Seal-oil , 15x25x7 | 1 | | | | | 油封 |
| 24 | Seat-tappet | 1 | 1121601804 | 1121601804 | 1121601804 | 1121601804 | 自動停止挺桿座 |
| 25 | Shaft-tappet | 1 | 1121601902 | 1121601902 | 1121601902 | 1121601902 | 止動心軸 |
| 26 | Set screw, M6xP1.0x16L | 2 | | | | | 固定螺絲 |
| 27 | Tappet | 1 | 1121602007 | 1121602007 | 1121602007 | 1121602007 | 自動停止挺桿座 |
| 28 | Nut , M8xP1.25 | 1 | | | | | 螺帽 |
| 29 | Set screw, M8xP1.25x30L | 1 | | | | | 固定螺絲 |
| 30 | Set screw, M6xP1.0x40L | 1 | | | | | 固定螺絲 |
| 31 | Ring-O , P6 | 1 | | | | | O型環 |
| 32 | Nut , M6xP1.0 | 1 | | | | | 螺帽 |
| 33 | Screw-oil leakage , PT1/4 | 1 | | | | | 油塞 |

# RAPID TRAVERSE APRON ASSEMBLY

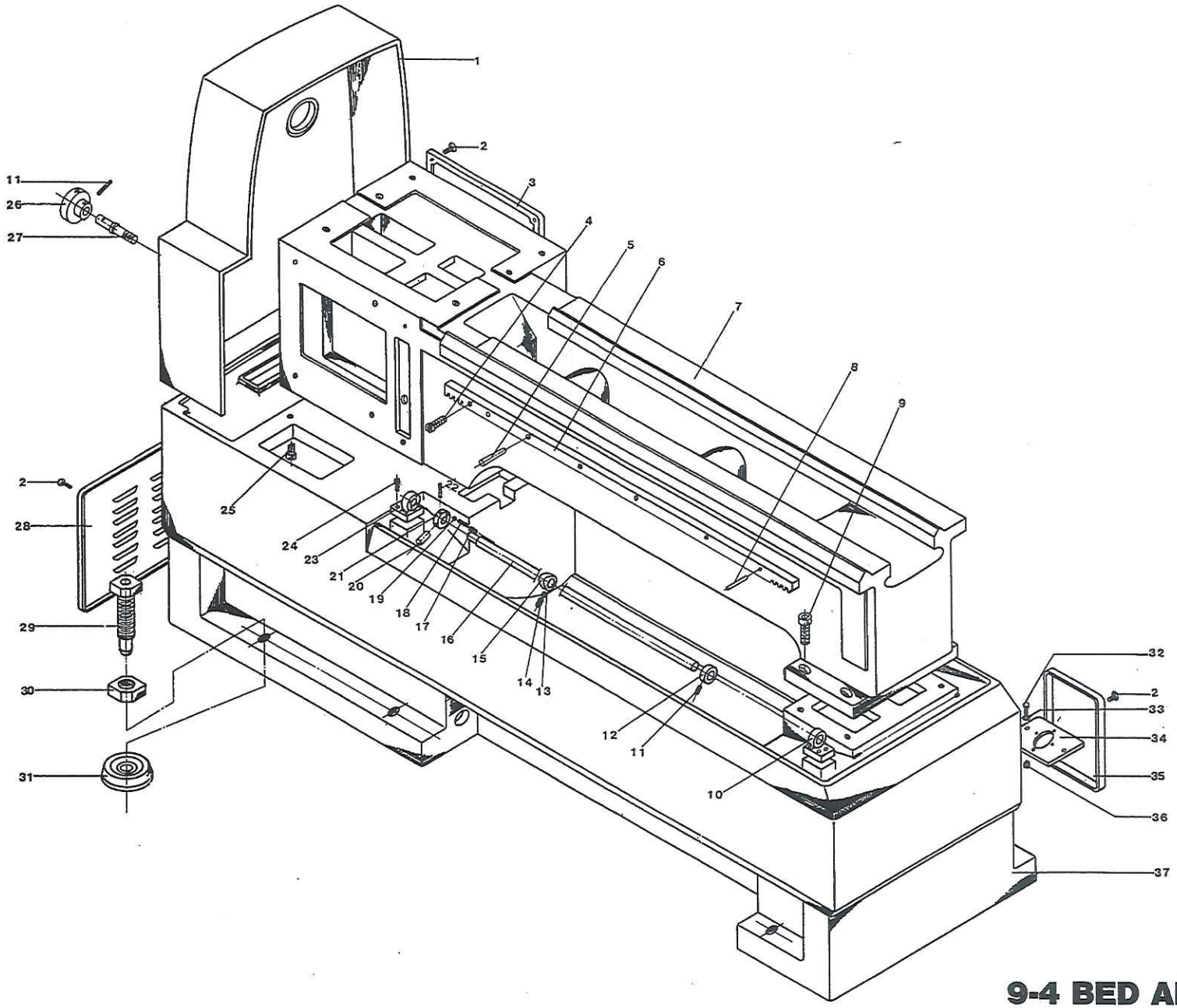
| ITEM NO. | Part Name | Amt. Used | Type: 20 GW Part No. | Type: 22, 26 Part No. | Type:2280, 2680 Part No. | Type: 30 Part No. | 名稱 |
|---|---|---|---|---|---|---|---|
| 34 | Seal-oil , 34x45x11L | 2 | | | | | 油封 |
| 35 | Bushing | 2 | 1420900902 | 1420900902 | 1420900902 | 1420900902 | 軸襯 |
| 36 | Sleeve-feed rod | 1 | 1420901007 | 1420901007 | 1420901007 | 1420901007 | 自動進刀軸套 |
| 37 | Key-square , 6x6x42L | 1 | | | | | 雙圓平行鍵 |
| 38 | Key-square , 6x6x12L | 2 | | | | | 雙圓平行鍵 |
| 39 | Gear | 1 | 1210903200 | 1210903200 | 1210903200 | 1210903200 | 齒輪 |
| 40 | Seat-worm | 1 | 1210903308 | 1210903308 | 1210903308 | 1210903308 | 蝸桿座 |
| 41 | Shaft-worm | 1 | 1210903406 | 1210903406 | 1210903406 | 1210903406 | 蝸桿心軸 |
| 42 | Bearing-thrust , 2904 | 2 | 91311005 | 91311005 | 91311005 | 91311005 | 止推軸承 |
| 43 | Worm gear | 1 | 1420901105 | 1420901105 | 1420901105 | 1420901105 | 蝸桿 |
| 44 | Washer-lock , 20 | 1 | | | | | 太陽墊圈 |
| 45 | Nut | 1 | | | | | 蝸桿心軸螺帽 |
| 46 | Hexagon socket screw, M6xP1.0x12L | 12 | | | | | 六角承窩螺絲 |
| 47 | Spring,φ 1x10x60L (right) | 1 | 121090541 | 121090541 | 121090541 | 121090541 | 彈簧 |
| | (left) | 1 | 121090551 | 121090551 | 121090551 | 121090551 | |
| 48 | Block-safe device (right) | 1 | 1210901000 | 1210901000 | 1210901000 | 1210901000 | 安全塊 |
| | (left) | 1 | 1420900706 | 1420900706 | 1420900706 | 1420900706 | |
| 49 | Pin , 5x18L | 2 | | | | | 彈簧銷 |
| 50 | Pin | 1 | | | | | |
| 51 | Shaft-auto feed (right) | 1 | 1210901206 | 1210901206 | 1210901206 | 1210901206 | 撥軸 |
| | (left) | 1 | 1210901108 | 1210901108 | 1210901108 | 1210901108 | |
| 52 | Collar | 1 | | | | | 撥軸 |
| 53 | Ring-O , P16 | 2 | | | | | O型環 |
| 54 | Cover | 1 | 1210903602 | 1210903602 | 1210903602 | 1210903602 | 軸蓋 |
| 55 | Hub (right) | 1 | 121090141 | 121090141 | 121090141 | 121090141 | 撥桿軸套 |
| | (left) | 1 | 1210901304 | 1210901304 | 1210901304 | 1210901304 | |
| 56 | Spring washer , M12 | 1 | | | | | 彈簧墊圈 |
| 57 | Hexagon socket screw, M8xP1.25x12L | 1 | | | | | 六角承窩螺絲 |
| 58 | Snap ring , S10 | 1 | | | | | 扣環 |
| 59 | Lever | 1 | 1210903700 | 1210903700 | 1210903700 | 1210903700 | 自動停止槓桿 |
| 60 | Spring washer , M12 | 1 | | | | | 彈簧墊圈 |
| 61 | Screw | 1 | 1210903808 | 1210903808 | 1210903808 | 1210903808 | 槓桿心軸 |
| 62 | Hexagon socket screw, M5xP0.8x20L | 1 | | | | | 六角承窩螺絲 |
| 63 | Spring | 1 | 1210905606 | 1210905606 | 1210905606 | 1210905606 | 彈簧 |
| 64 | Spacer | 2 | 1210903906 | 1210903906 | 1210903906 | 1210903906 | 密封塊 |
| 65 | Bearing ball , 6005V | 1 | 91301012 | 91301012 | 91301012 | 91301012 | 滾珠軸承 |
| 66 | Worm-wheel | 1 | 1420901203 | 1420901203 | 1420901203 | 1420901203 | 蝸輪 |
| 67 | Wheel-friction | 1 | 1420901301 | 1420901301 | 1420901301 | 1420901301 | 離合齒輪 |
| 68 | Key-square , 7x7x12L | 1 | | | | | 雙圓平行鍵 |
| 69 | Shaft-worm wheel | 1 | 1210904001 | 1210904001 | 1210904001 | 1210904001 | 離合器心軸 |
| 70 | Pin | 1 | 1210904109 | 1210904109 | 1210904109 | 1210904109 | 墊圈檔塊 |
| 71 | Spring, compressing | 1 | 1210905302 | 1210905302 | 1210905302 | 1210905302 | 彈簧 |
| 72 | Washer | 1 | 1210904207 | 1210904207 | 1210904207 | 1210904207 | 墊片 |
| 73 | Screw-hexa. Socket headless set | 1 | | | | | 固定螺絲 |

# RAPID TRAVERSE APRON ASSEMBLY

| ITEM NO. | Part Name | Amt. Used | Type: 20 GW Part No. | Type: 22, 26 Part No. | Type:2280, 2680 Part No. | Type: 30 Part No. | 名稱 |
|---|---|---|---|---|---|---|---|
| 74 | Bearing ball , 6204 | 1 | 91301018 | 91301018 | 91301018 | 91301018 | 滾珠軸承 |
| 75 | Cover | 1 | 1210904305 | 1210904305 | 1210904305 | 1210904305 | 離合器 |
| 76 | Snap ring , S20 | 3 | | | | | 扣環 |
| 77 | Gear | 1 | 1420901409 | 1420901409 | 1420901409 | 1420901409 | 齒輪 |
| 78 | Shaft-cross feed | 1 | 121090441 | 121090441 | 121090441 | 121090441 | 縱橫變換軸 |
| 79 | Set (right) | 1 | 1210901608 | 1210901608 | 1210901608 | 1210901608 | 變換軸套 |
| | (left) | 1 | 1210901500 | 1210901500 | 1210901500 | 1210901500 | |
| 80 | Shaft-lever | 1 | 1210904501 | 1210904501 | 1210904501 | 1210904501 | 縱橫變換齒輪 |
| 81 | Lever | 1 | 1220900300 | 1220900300 | 1220900300 | 1220900300 | 縱橫變換齒輪 |
| 82 | Knob | 1 | 1120207400 | 1120207400 | 1120207400 | 1120207400 | 電木把手 |
| 83 | Set screw, M4xP0.7x10L | 1 | | | | | 固定螺絲 |
| 84 | Pinion-rack | 1 | 121094707 | 121094707 | 121094707 | 121094707 | 中間軸 |
| 85 | Key-square , 6x6x20L | 1 | | | | | 雙圓平行鍵 |
| 86 | Bering-niddle , NK20/22 | 1 | 91311001 | 91311001 | 91311001 | 91311001 | 滾針軸承 |
| 87 | Set screw, M6xP1.0x10L | 1 | | | | | 固定螺絲 |
| 88 | Collar | 1 | 1210904805 | 1210904805 | 1210904805 | 1210904805 | 固定圈 |
| 89 | Pin-spring , 6x36L | 1 | | | | | 彈簧銷 |
| 90 | Gear | 1 | 1210904903 | 1210904903 | 1210904903 | 1210904903 | 中間軸齒輪 |
| 91 | Bearing ball , 6003 | 1 | 91301005 | 91301005 | 91301005 | 91301005 | 滾珠軸承 |
| 92 | Cover | 1 | 1210905008 | 1210905008 | 1210905008 | 1210905008 | 軸套 |
| 93 | Pinion-handwheel | 1 | 4003093 | 4003093 | 4003093 | 4003093 | 手輪心軸 |
| 94 | Key-square , 6x6x12L | 1 | | | | | 雙圓平行鍵 |
| 95 | Bearing ball , 6004V | 2 | 91301008 | 91301008 | 91301008 | 91301008 | 滾珠軸承 |
| 95-1 | Bearing-ball , 6005Z | 1 | 91301007 | 91301007 | 91301007 | 91301007 | 滾珠軸承 |
| 96-2 | Seat | 1 | 3003096-002 | 3003096-002 | 3003096-002 | 3003096-002 | 軸承蓋 |
| 96-3 | Indicator | 1 | 3003096-003 | 3003096-003 | 3003096-003 | 3003096-003 | 指示環 |
| 97 | Hexagon socket screw, M6xP1.0x30L | 8 | | | | | 六角承窩螺絲 |
| 99 | Waher | 1 | 1210701608 | 1210701608 | 1210701608 | 1210701608 | 墊塊 |
| 100 | Washer-wave type | 1 | | | | | 浪型墊圈 |
| 101-2 | Dial-rack (in) | 1 | 1220900104 | 1220900104 | 1220900104 | 1220900104 | 刻度環 |
| | (mm) | 1 | 1220900202 | 1220900202 | 1220900202 | 1220900202 | |
| 102-1 | Handwheel | 1 | 3003102-001 | 3003102-001 | 3003102-001 | 3003102-001 | 手輪 |
| 102-2 | Clutch | 1 | 3003102-002 | 3003102-002 | 3003102-002 | 3003102-002 | 離合器 |
| 102-3 | Cover | 1 | 3003102-003 | 3003102-003 | 3003102-003 | 3003102-003 | 導套 |
| 102-4 | Clutch | 1 | 3003102-004 | 3003102-004 | 3003102-004 | 3003102-004 | 離合器 |
| 103 | Handle | 1 | 1121102002 | 1121102002 | 1121102002 | 1121102002 | 手柄 |
| 104 | Washer-lock | 1 | 1122101901 | 1122101901 | 1122101901 | 1122101901 | 鎖緊墊片 |
| 105 | Motor(1/2HPx6P) | 1 | | | | | 快送馬達 |
| 106 | Dial-thread chasing | | | | | | 指示表規 |
| | (in, 4 parts) | 1 | 1003514708 | 1003514708 | 1003514708 | 1003514708 | |
| | (mm, 5 parts) | 1 | 100350241 | 100350241 | 100350241 | 100350241 | |
| | (mm, 7 parts) | 1 | 100351491 | 100351491 | 100351491 | 100351491 | |
| 107 | Pin | 1 | | | | | 銷 |
| 108 | Seat-dial shaft | 1 | 1003514502 | 1003514502 | 1003514502 | 1003514502 | 車牙表規座 |

# RAPID TRAVERSE APRON ASSEMBLY

| ITEM NO. | Part Name | Amt. Used | Type: 20 GW Part No. | Type: 22, 26 Part No. | Type:2280, 2680 Part No. | Type: 30 Part No. | 名稱 |
|---|---|---|---|---|---|---|---|
| 109 | Hexagon socket screw, M10xP1.25x65L | 1 | | | | | 六角承窩螺絲 |
| 110 | Gear (in 16T) | 1 | 1003514600 | 1003514600 | 1003514600 | 1003514600 | 齒輪 |
| | (mm 11T) | 1 | 1003502502 | 1003502502 | 1003502502 | 1003502502 | |
| | (mm 13T) | 1 | 1003502600 | 1003502600 | 1003502600 | 1003502600 | |
| | (mm 14T) | 1 | 1003514806 | 1003514806 | 1003514806 | 1003514806 | |
| | (mm 15T) | 1 | 1003502708 | 1003502708 | 1003502708 | 1003502708 | |
| 111 | Washer-spring , 10 | 1 | | | | | 彈簧墊圈 |
| 112 | Nut , M10xP1.5 | 1 | | | | | 螺帽 |
| 113 | Snap ring , S30 | 2 | | | | | 扣環 |
| 114 | Seat-switch | 1 | 1210701706 | 1210701706 | 1210701706 | 1210701706 | 開關座 |
| 115 | Key-square , 6x8x25L | 1 | | | | | 雙圓平行鍵 |
| 116 | Hexagon socket screw, M8xP1.25x16L | 2 | | | | | 六角承窩螺絲 |
| 117 | Bracket | 1 | 121070181 | 121070181 | 121070181 | 121070181 | 啟動桿座 |
| 118 | Screw-lock | 2 | | | | | 特殊固定螺栓 |
| 119 | Screw-hexa. Socket headless cap | 1 | 1210702007 | 1210702007 | 1210702007 | 1210702007 | 停止定位銷 |
| 120 | Seat-lever | 1 | 1210702105 | 1210702105 | 1210702105 | 1210702105 | 啟動桿 |
| 121 | Set screw, M8xP1.25x8L | 2 | | | | | 固定螺絲 |
| 122 | Spring | 1 | | | | | 彈簧 |
| 123 | Lever | 1 | 4010305 | 4010305 | 4010305 | 4010305 | 弓型把手 |
| 124 | Knob | 1 | 1122103602 | 1122103602 | 1122103602 | 1122103602 | 電木把手 |
| 125 | Bearing niddle , FJ-3020 | 1 | | | | | 滾針軸承 |
| 126 | Bearing-ball , 6905 | 2 | | | | | 滾珠軸承 |
| 127 | Snap ring , S17 | 1 | 9171S017 | 9171S017 | 9171S017 | 9171S017 | 扣環 |
| 128 | Auto-lubrication device | 1 | 92120013 | 92120013 | 92120013 | 92120013 | 自動打油器 |
| 129 | Bearing ball , 6003Z | 4 | | | | | 滾珠軸承 |
| 130 | Key-square , 6x6x25L | 2 | | | | | 雙圓平行鍵 |
| 130-1 | Gear | 1 | 4003130-001 | 4003130-001 | 4003130-001 | 4003130-001 | 傳動齒輪 |
| 131 | Snap ring , S25 | 2 | 9171S025 | 9171S025 | 9171S025 | 9171S025 | 扣環 |
| 131-3 | Pinion (left hand) | 1 | 4003131-003 | 4003131-003 | 4003131-003 | 4003131-003 | 傳動軸 |
| 133 | Gear (left hand) | 2 | 4003133 | 4003133 | 4003133 | 4003133 | 齒輪 |
| 134 | Set (left hand) | 1 | 4003134 | 4003134 | 4003134 | 4003134 | 軸套 |
| 134-1 | Set (right hand) | | 4003134-001 | 4003134-001 | 4003134-001 | 4003134-001 | |
| 135 | Bracket | 1 | 4003135 | 4003135 | 4003135 | 4003135 | 馬達支架 |
| 144-1 | Gear | 1 | 4003144-001 | 4003144-001 | 4003144-001 | 4003144-001 | 從動齒輪 |
| 145 | Gear (left hand) | 1 | 4003145 | 4003145 | 4003145 | 4003145 | 齒輪 |
| 146-3 | Pinion (left hand) | 1 | 4003146-003 | 4003146-003 | 4003146-003 | 4003146-003 | 惰輪軸 |
| 148 | Gear (left hand) | 2 | 4003148 | 4003148 | 4003148 | 4003148 | 齒輪 |
| 201 | Spacer (left hand) | 1 | 4003201 | 4003201 | 4003201 | 4003201 | 間隔圈 |
| 202 | Gear (right hand) | 1 | 4003202 | 4003202 | 4003202 | 4003202 | 齒輪 |
| 203 | Pinion (right hand) | 1 | 4003203 | 4003203 | 4003203 | 4003203 | 惰輪軸 |
| 204 | Gear (right hand) | 1 | 4003204 | 4003204 | 4003204 | 4003204 | 齒輪 |
| 205 | Cam | 1 | 4003205 | 4003205 | 4003205 | 4003205 | 凸輪 |
| 206 | Spacer (left hand) | 1 | 4003206 | 4003206 | 4003206 | 4003206 | 間隔圈 |
| 207 | Key-square , 5x5x15L | 1 | 91610510 | 91610510 | 91610510 | 91610510 | 雙圓平行鍵 |



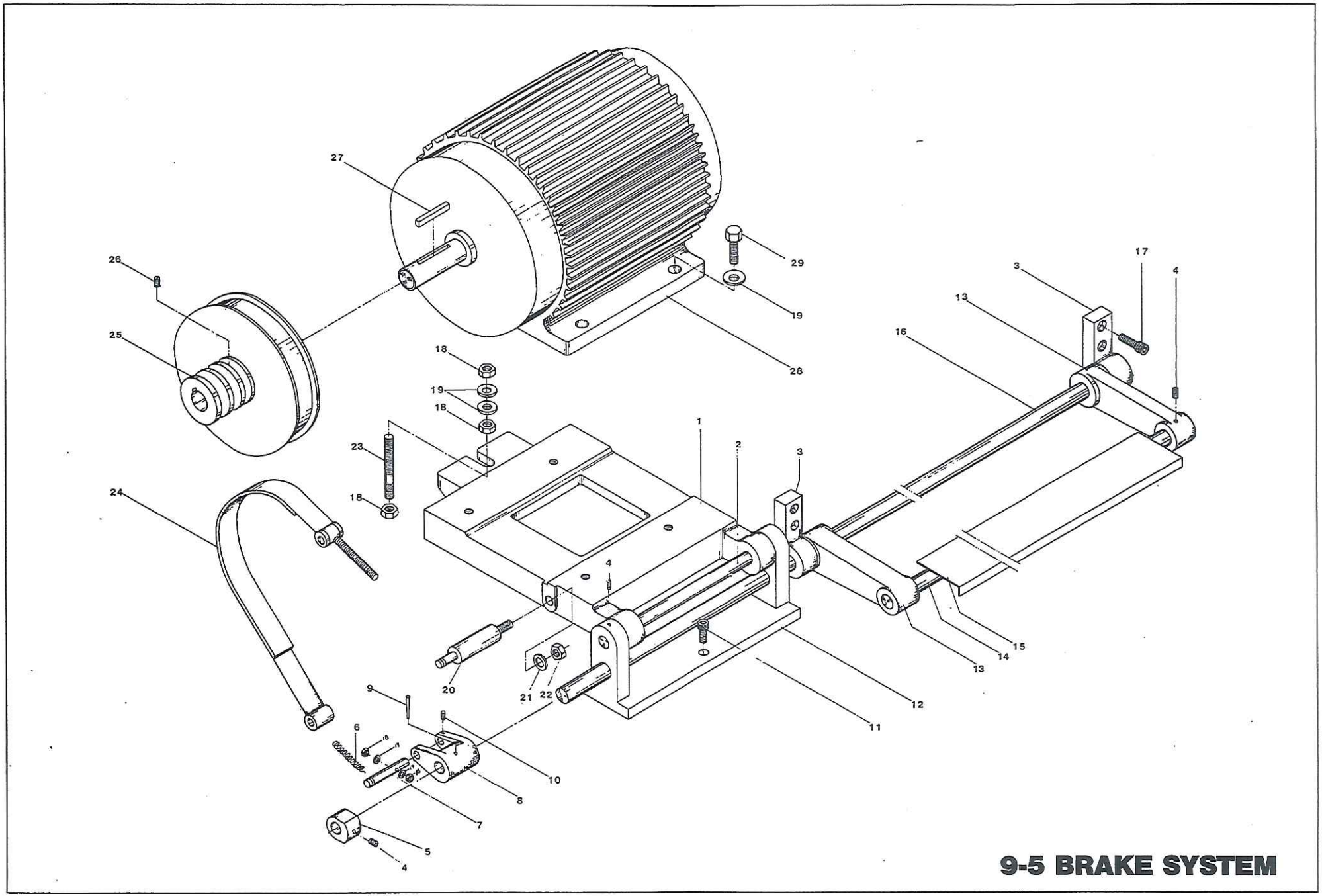

## 9-4 BED AND BASE

# BED AND BASE ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 1 | Cover-end | 1 | 1361600705 | 1431600100 | 1541600301 |
| 2 | Screw-cross-recessed head , M6xP1.0x20L | 12 | | | |
| 3 | Cover-electric box | 1 | 1122102006 | 1122102006 | 1122102006 |
| 4 | Screw-hexa. socket head cap , M6xP1.0x25L | 10 | | | |
| 5 | Pin-taper , 6x35 (6 feet) | 2 | | | |
| | (8 feet) | 5 | | | |
| | (10 feet) | 5 | | | |
| 6 | Rack (6 feet) | 1 | 1420701007 | 1420701007 | |
| | (8 feet) | 1 | 1430700503 | 1430700503 | |
| | (10 feet) | 1 | | | 1440700506 |
| 7 | Bed (6 feet) | 1 | 1420100108 | 1420100108 | |
| | (8 feet) | 1 | 1430100101 | 1430100101 | |
| | (10 feet) | 1 | | | 1440100104 |
| 9 | Screw-hexa. socket head cap , M16xP2.0x45L | 4 | | | |
| 10 | Supporter-shaft | 1 | 1122102104 | 1122102104 | 1122102104 |
| 11 | Screw-hexa. socket headless set , M6xP1.0x10L | 2 | | | |
| 12 | Collar | 1 | 1122102202 | 1122102202 | 1122102202 |
| 13 | Shoe-brass | 4 | 1122102300 | 1122102300 | 1122102300 |
| 14 | Screw-hexa. socket headless set , M6xP1.0x6L | 1 | | | |
| 15 | Cam-auto feed stopping | 4 | 1122102408 | 1122102408 | 1122102408 |
| 16 | Shaft-auto stopping (6 feet) | 1 | 1222100308 | 1222100308 | |
| | (8 feet) | 1 | 1432100109 | 1432100109 | |
| | (10 feet) | 1 | | | 1242100108 |
| 17 | Screw-hexa. socket headless set , M8xP1.25x8L | 1 | | | |
| 18 | Spring , 1x6x10L | 1 | | | |
| 19 | Ball-steel , 1/4" | 1 | 91820104 | 91820104 | 91820104 |
| 20 | Lever-turning shaft | 4 | 1122103807 | 1122103807 | 1122103807 |
| 21 | Collar | 1 | 1122103905 | 1122103905 | 1122103905 |
| 22 | Screw-hexa. socket headless set , M8xP1.25x10L | 1 | | | |
| 23 | Supporter-shaft | 1 | 1122102604 | 1122102604 | 1122102604 |
| 24 | Screw-hexa. socket head cap , M8xP1.25x16L | 4 | | | |
| 25 | Screw-hexa. socket head cap , M16xP2.0x55L | 8 | | | |
| 26 | Plug | 1 | 1122102702 | 1122102702 | 1122102702 |
| 27 | Bolt-lock | 1 | | | |
| 28 | Cover-motor seat | 2 | 1362100900 | 1362100900 | 1362100900 |
| 29 | Bolt-set machine | 6 | 1122102800 | 1122102800 | 1122102800 |
| 30 | Nut-lock | 6 | 1122102800 | 1122102800 | 1122102800 |

# BED AND BASE ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 31 | Block-leveling | 6 | 1003501809 | 1003501809 | 1003501809 |
| 32 | Bolt-hexa. head , M8x38 | 2 | | | |
| 33 | Washer , W5/8" | 2 | 91401051600003 | 91401051600003 | 91401051600003 |
| 34 | Seat-coolant pump (5 、6 feet) | 1 | 1210100503 | 1210100503 | 1210100503 |
| | (8 feet) | 1 | 1230100509 | 1230100509 | 1230100509 |
| | (10 feet) | 1 | 1240100502 | 1240100502 | 1240100502 |
| 35 | Cover-coolant motor seat Plug | 1 | 1005000403 | 1005000403 | 1005000403 |
| | No Plug | 1 | 1005000501 | 1005000501 | 1005000501 |
| 36 | Nut-lock , M8 | 2 | | | |
| 37 | Base (6 feet) | 1 | 1420100206 | 1420100206 | |
| | (8 feet) | 1 | 1430100209 | 1430100209 | |
| | (10 feet) | 1 | | | 1440100202 |
| | | | | | |



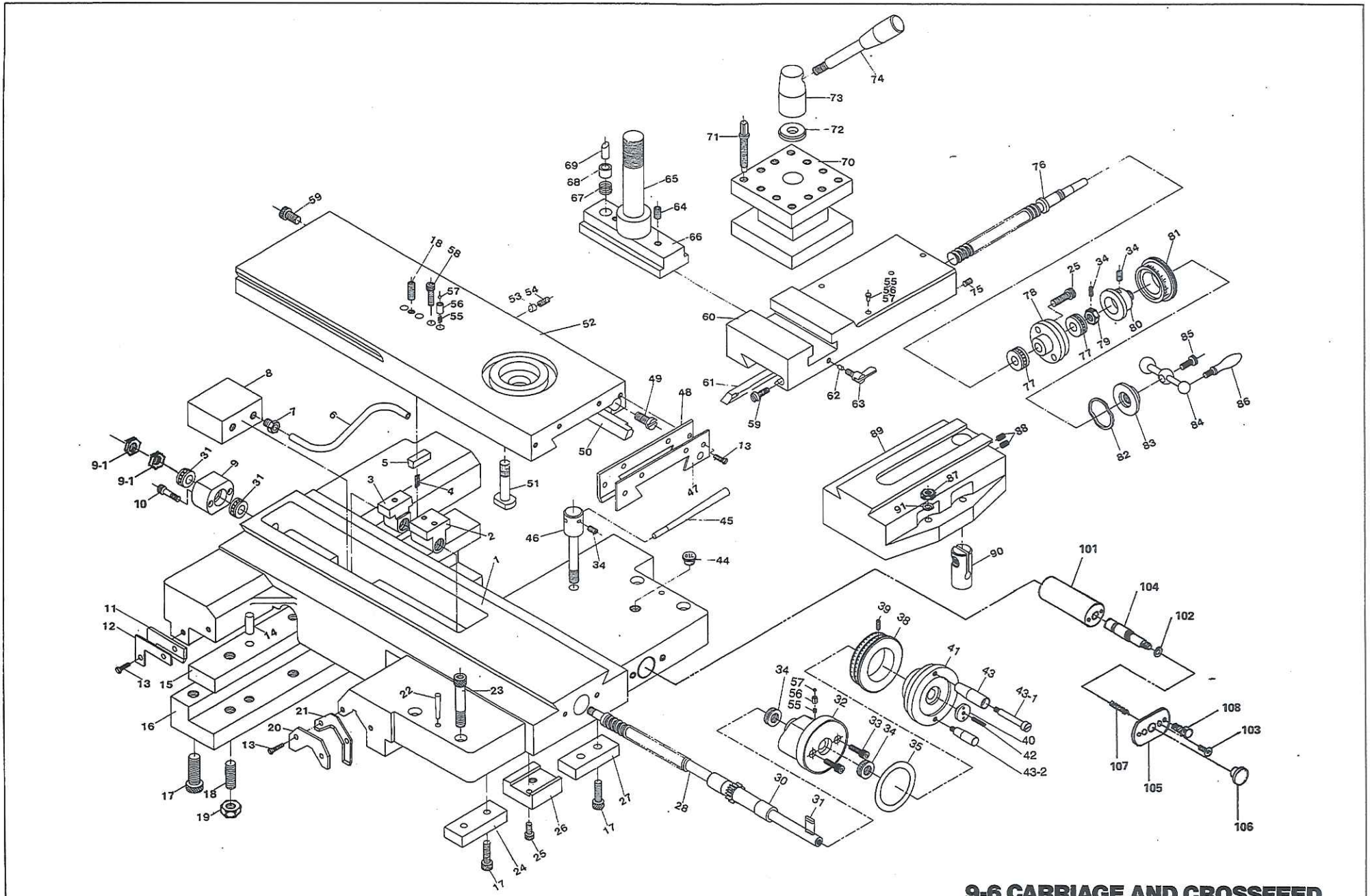

# 9-5 BRAKE SYSTEM

# BRAKE SYSTEM ASSEMBLY

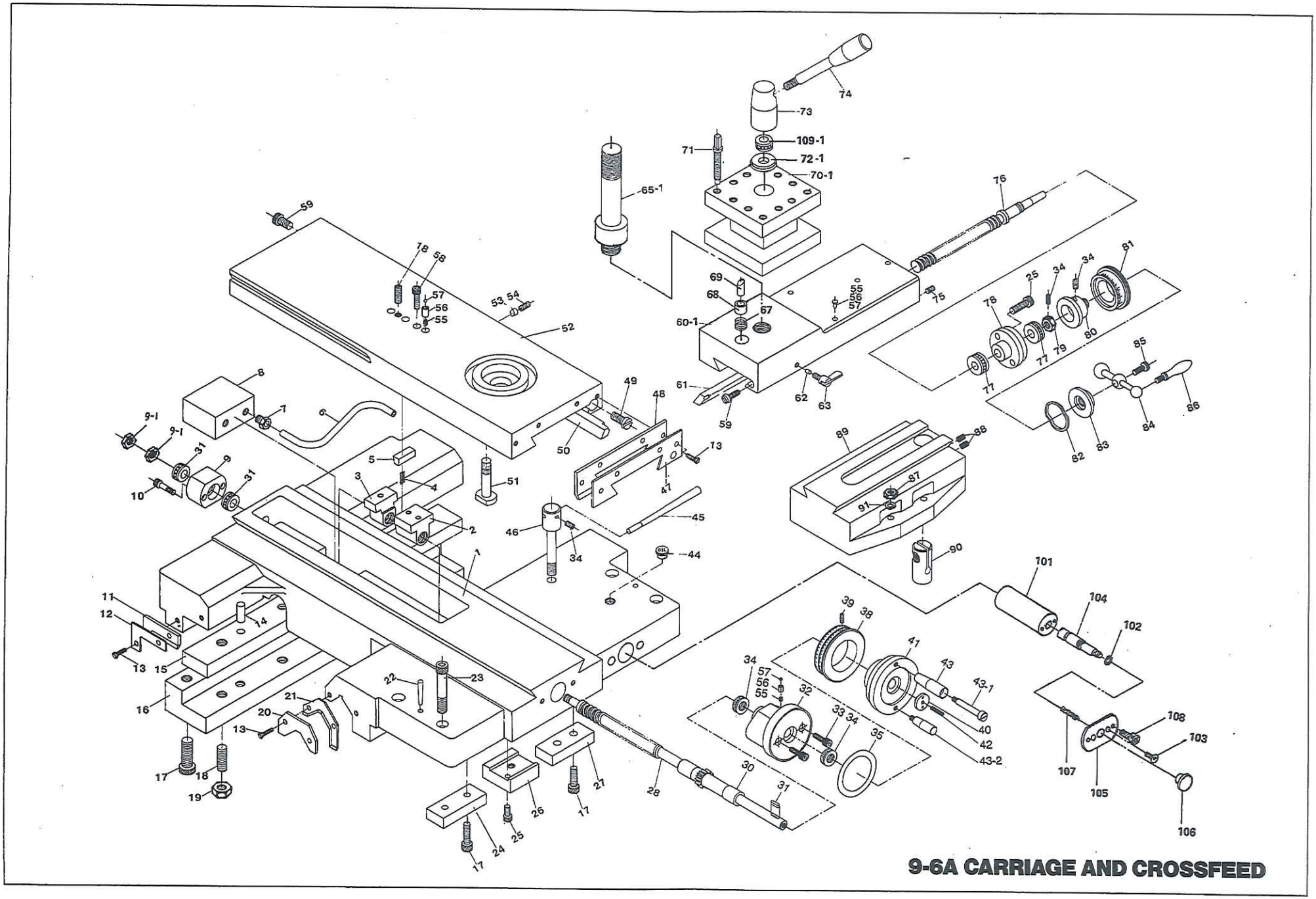
| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 1 | Seat-motor | 1 | 1420400103 | 1420400103 | 1420400103 |
| 2 | Shaft-motor seat | 1 | 1420400201 | 1420400201 | 1420400201 |
| 3 | Block | 2 | 1420100500 | 1420100500 | 1420100500 |
| 4 | Screw-hexa. socket headless set , M6xP1.0x12L | 1 | | | |
| 5 | Cam | 1 | 1210400606 | 1210400607 | 1210400609 |
| 6 | Spring | 1 | 1420400309 | 1420400309 | 1420400309 |
| 7 | Shaft-brake belt | 1 | 1210400704 | 1210400704 | 1210400704 |
| 8 | Arm-brake | 1 | 1210400802 | 1210400802 | 1210400802 |
| 9 | Pin-taper , 4x38L | 1 | | | |
| 10 | Screw-hexa. socket , M6xP1.0x10L | 1 | | | |
| 11 | Screw-hexa. socket head cap , M10xP1.5x30L | 3 | | | |
| 12 | Bracket-motor seat | 1 | 1420100608 | 1420100608 | 1420100608 |
| 13 | Bracket-pedal | 2 | 1210400900 | 1210400900 | 1210400900 |
| 15 | Pedal-brake (6 feet) | 1 | 1220400109 | 1220400109 | |
| | (8 feet) | 1 | 1230400102 | 1230400102 | |
| | (10 feet) | 1 | | | 1240400105 |
| 16 | Shaft-pedal bracket (6 feet) | 1 | 1420100402 | 1420100402 | |
| | (8 feet) | 1 | 1430100307 | 1430100307 | |
| | (10 feet) | 1 | | | 1440100408 |
| 17 | Screw-hexa. socket head cap , M8xP1.25x25L | 4 | | | |
| 18 | Nut , M16 | 6 | | | |
| 19 | Washer , M16 | 4 | | | |
| 20 | Bolt-adjusting | 1 | 1210401005 | 1210401005 | 1210401005 |
| 21 | Washer , M12 | 1 | | | |
| 22 | Nut , M12 | 1 | | | |
| 23 | Bolt-adjusting | 1 | 1420400407 | 1420400407 | 1420400407 |
| 24 | Belt-brake | 1 | 1003519605 | 1003519605 | 1003519605 |
| 25 | Belt pulley (7.5HP/50HZ) | 1 | 1000401106 | 1000401106 | 1000401106 |
| | (7.5HP/60HZ) | 1 | 1000401008 | 1000401008 | 1000401008 |
| | (15HP/50HZ) | 1 | 1000400903 | 1000400903 | 1000400903 |
| | (15HP/60HZ) | 1 | 1000401302 | 1000401302 | 1000401302 |
| 27 | Key , 7x7x55L | 1 | 91620804 | 91620804 | 91620804 |
| 28 | Motor | 1 | | | |
| 29 | Bolt-hexa. head , M10x30L | 4 | | | |
| | | | | | |
| PS | Motor | | ALL | | |
| | 5HP 220/380V 60HZ | | 81000101 | | |
| | 7.5HP 220/380V 60HZ | | 81000202 | | |
| | 10HP 220/380V 60HZ | | 81000302 | | |
| | 15HP 220/380V 60HZ | | 81000402 | | |
| | 5HP 220/440V 60HZ | | 81000103 | | |

# BRAKE SYSTEM ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| | 7.5HP 220/440V 60HZ | | 81000205 | | |
| | 10HP 220/440V 60HZ | | 81000304 | | |
| | 15HP 220/440V 61HZ | | 81000404 | | |
| | 5HP 220/380V 50HZ | | 81000101 | | |
| | 7.5HP 220/380V 50HZ | | 81000201 | | |
| | 10HP 220/380V 50HZ | | 81000301 | | |
| | 15HP 220/380V 50HZ | | 81000401 | | |
| | 5HP 220/440V 50HZ | | 81000303 | | |
| | 5HP 415V 50HZ | | 81000104 | | |
| | 7.5HP 415V 50HZ | | 81000206 | | |
| | 10HP 415V 50HZ | | 81000305 | | |
| | 15HP 415V 50HZ | | 81000406 | | |
| | | | | | |
| | | | | | |




**9-6 CARRIAGE AND CROSSFEED**




## 9-6A CARRIAGE AND CROSSFEED

# CARRIAGE AND CROSSFEED ASSEMBLY

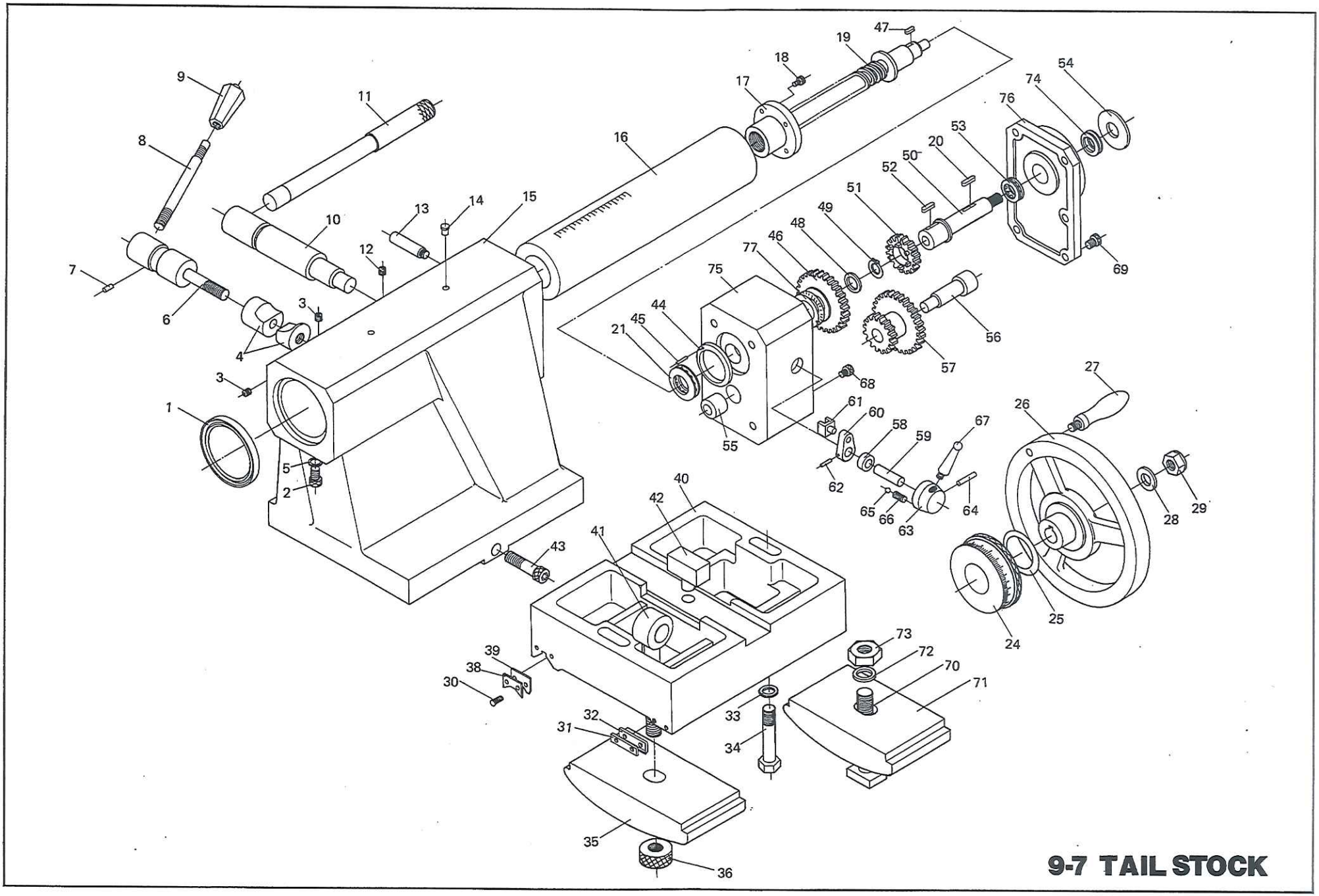
| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 1 | Carriage | 1 | 1430800204 | 1430800204 | 1540800101 |
| 2 | Nut-crossfeed | 1 | | | |
| 3 | Nut-crossfeed | 1 | | | |
| 4 | Spring , 1x5x25L | 1 | 91901050041507 | 91901050041507 | 91901050041507 |
| 5 | Shim-crossfeed nut | 1 | 1120800901 | 1120800901 | 1120800901 |
| 6 | Pipe-lubrication oil | 1 | | | |
| 7 | Nut-copper | 1 | | | |
| 8 | Conveyor-oil | 1 | 1120801006 | 1120801006 | 1120801006 |
| 9 | Cap-crossfeed screw | 1 | 1120801104 | 1120801104 | 1120801104 |
| 9-1 | Nut-hexa. head , M12xP1.25 | 2 | | | |
| 10 | Screw-hexa. socket head cap , M6xP1.0x25L | 2 | | | |
| 11 | Wiper-rear | 1 | 1362100106 | 1362100106 | 1362100106 |
| 12 | Case-wiper , rear | 1 | 1362100302 | 1362100302 | 1362100302 |
| 13 | Screw-cross-recessed , M4xP0.7x10L | 8 | | | |
| 14 | Pin | 2 | | | |
| 15 | Gib | 1 | 1430800302 | 1430800302 | 1430800302 |
| 16 | Holder-gib | 1 | 1430800704 | 1430800704 | 1430800704 |
| 17 | Screw-hexa. socket head cap , M8xP1.25x25L | 4 | | | |
| 18 | Screw-hexa. socket headless set , M8xP1.25x25L | 4 | | | |
| 19 | Nut , M8xP1.25 | 4 | | | |
| 20 | Case-wiper , front | 1 | 1362100400 | 1362100400 | 1362100400 |
| 21 | Wiper-front | 1 | 1362100106 | 1362100106 | 1362100106 |
| 22 | Pin-taper , 6#x75L | 2 | 1420700500 | 1420700500 | 1420700500 |
| 23 | Screw-hexa. socket head cap , M10xP1.5x70L | 4 | | | |
| 24 | Gib-left-front | 1 | 1120801202 | 1120801202 | 1120801202 |
| 25 | Screw-hexa. socket head cap , M6xP1.0x16L | 3 | | | |
| 26 | Clamp-carriage | 1 | 1120801300 | 1120801300 | 1120801300 |
| 27 | Gib-right-front | 1 | 1120801408 | 1120801408 | 1120801408 |
| 28 | Screw-crossfeed (10TPI , in) | 1 | 1000801204 | 1000801204 | 1000801606 |
| | (4M/M , mm) | 1 | 1000800805 | 1000800805 | 1000801302 |
| 30 | Pinion-crossfeed | 1 | 1430801103 | 1430801103 | 1540800601 |
| 31 | Bearing-thrust , 51103 | 2 | 91303001 | 91303001 | 91303001 |
| 32 | Bracket , M8xP1.25x40L | 1 | 1430800106 | 1430800106 | 1430800106 |
| 33 | Bolt-hexa. socket , M8xP1.25x30L | 2 | | | |
| 34 | Screw-hexa. socket headless set , M6xP1.0x6L | 2 | 91120606 | 91120606 | 91120606 |
| 35 | Nut | 1 | 1120802905 | 1120802905 | 1120802905 |

# CARRIAGE AND CROSSFEED ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 36 | Screw-hexa. socket head cap headless set , M6xP1.0x10L | 1 | 91120610 | 91120610 | 91120610 |
| 37 | Clutch-dial | 1 | 1120802807 | 1120802807 | 1120802807 |
| 38 | Dial-crossfeed (10TPI/left) | 1 | 1000803708 | 1000803708 | 1000803708 |
| | (4MM/left) | 1 | 1000802701 | 1000802701 | 1000802701 |
| 39 | Washer-wave type , 36x44 | 2 | | | |
| 40 | Nut-lock clutch | 1 | 1120803108 | 1120803108 | 1120803108 |
| 41 | Handle (local) | 1 | 1430801201 | 1430801201 | 1430801201 |
| | (export) | 1 | 1430801309 | 1430801309 | 1430801309 |
| 42 | Screw-hexa. socket head cap , M8xP1.25x16L | 1 | | | |
| 43 | Knob-handle (local) | 1 | 1430801201 | 1430801201 | 1430801201 |
| | (export) | 1 | 1430801407 | 1430801407 | 1430801407 |
| 44 | Plug-oil inlet | 1 | 1122103405 | 1122103405 | 1122103405 |
| 45 | Lever | 1 | 1120801506 | 1120801506 | 1120801506 |
| 46 | Screw-carriage clamp | 1 | 1120800607 | 1430800606 | 1430800606 |
| 47 | Case-wiper | 1 | | | |
| 48 | Wiper | 1 | 1362101005 | 1362101005 | 1362101005 |
| 49 | Screw-adjusting | 1 | 1120801604 | 1120801604 | 1120801604 |
| 50 | Gib | 1 | 1540800307 | 1540800307 | 1540800307 |
| 51 | Bolt | 4 | 1430800508 | 1430800508 | 1430800508 |
| 52 | Cover-cross sliding | 1 | 1430800900 | 1430800900 | 1430800900 |
| 53 | Shoe-clamp | 1 | 1220800707 | 1220800707 | 1220800707 |
| 54 | Screw-hexa. socket headless cap , M6xP1.0x20L | 1 | | | |
| 55 | Spring , $\varphi$ 3x $\varphi$ 5x8L | 5 | | | |
| 56 | Sleeve | 5 | | | |
| 57 | Ball-steel , 1/4" | 5 | | | |
| 58 | Screw-hexa. socket head cap , M6xP1.0x20L | 3 | | | |
| 59 | Screw-gib | 2 | 1120801702 | 1120801702 | 1120801702 |
| 60 | Compound rest (mm) | 1 | 1000806101 | 1000806503 | 1000806503 |
| | (in) | 1 | 1000806405 | 1000806807 | 1000806807 |
| 61 | Gib-compound rest | 1 | | | |
| 62 | Shoe-clamp | 1 | 1220800709 | 1220800709 | 1220800709 |
| 63 | Screw-clamp | 1 | | | |
| 64 | Screw-hexa. socket headless cap , M8xP1.25x10L | 4 | 9824S01 | 9824S01 | 9824S01 |
| 65 | Shaft-tool post | 1 | 9824S01 | 9824S01 | 9824S01 |
| 65-1 | Shaft-tool post | 1 | 9824S01 | 9824S01 | 9824S01 |
| 66 | Block-tee | 1 | 9824S01 | 9824S01 | 9824S01 |
| 67 | Spring , 1x8x20L | 1 | 9824S01 | 9824S01 | 9824S01 |
| 68 | Sleeve | 1 | 9824S01 | 9824S01 | 9824S01 |
| 69 | Button | 1 | 9824S01 | 9824S01 | 9824S01 |
| 70 | Tool post-square (in) | 1 | 1003518804 | 1003518804 | 1003518804 |
| | (mm) | 1 | 1003512900 | 1003512900 | 1003512900 |

# CARRIAGE AND CROSSFEED ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 71 | Screw-square head | 1 | 1000804205 | 1000804205 | 1000804205 |
| 72 | Washer | 1 | | | |
| 72-1 | Washer | 1 | | | |
| 73 | Knob-lever | 1 | | | |
| 74 | Lever | 1 | | | |
| 75 | Screw-gib , M8xP1.25x30L | 1 | | | |
| 76 | Screw-compound rest | 1 | | | |
| 77 | Bearing-thrust , 51102 | 2 | | | |
| 78 | Seat-compound rest screw | 1 | | | |
| 79 | Nut | 1 | | | |
| 80 | Collar | 1 | | | |
| 81 | Dial-compound rest | 1 | | | |
| 82 | Washer-wave type | 1 | | | |
| 83 | Nut | 1 | | | |
| 84 | Handle | 1 | | | |
| 85 | Screw-hexa. socket head cap , M6xP1.0x16L | 1 | | | |
| 86 | Knob-handle | 1 | | | |
| 87 | Nut , M10xP1.5 | 4 | | | |
| 88 | Screw-hexa. socket headless set , M8xP1.25x8L | 2 | | | |
| 89 | Swivel | 1 | | | |
| 90 | Nut-compound rest screw | 1 | | | |
| 91 | Spring washer , M10 | 4 | | | |
| 101 | Body-pump | 1 | 1120801800 | 1120801800 | 1120801800 |
| 102 | Ring-O , PA10 | 1 | | | |
| 103 | Screw , M5xP0.8x12L | 2 | | | |
| 104 | Rod-pump | 1 | 1120801908 | 1120801908 | 1120801908 |
| 105 | Stopper | 1 | 1120802003 | 1120802003 | 1120802003 |
| 106 | Plug | 1 | 1120802101 | 1120802101 | 1120802101 |
| 107 | Spring-compressing , $\varphi$ 1.2x10x63L | 1 | | | |
| 108 | Screw-hexa. socket head cap , M6xP1.0x10L | 2 | 1120802209 | 1120802209 | 1120802209 |
| 109 | Bearing-thrust , 51104 | 1 | | | |



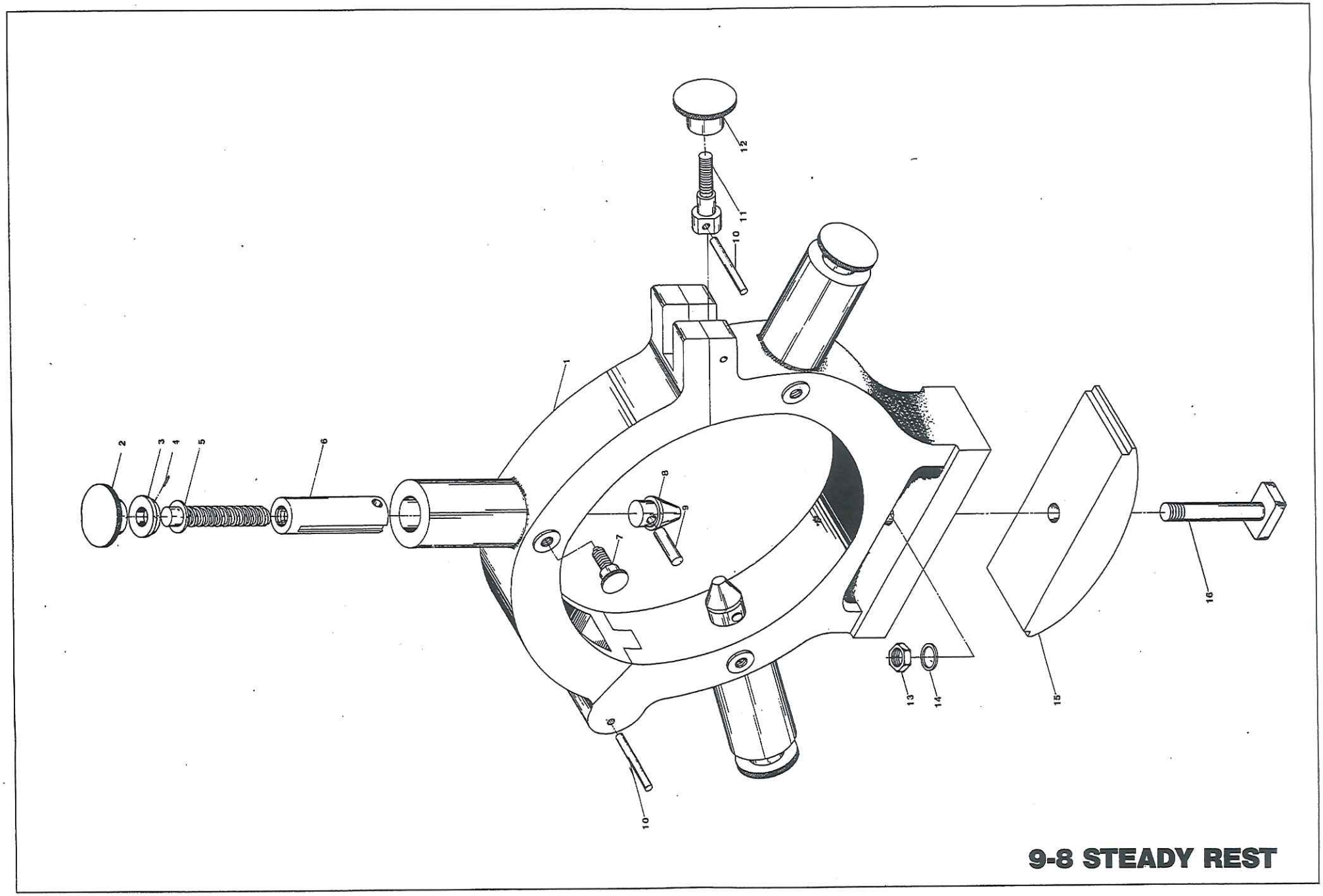

# 9-7 TAIL STOCK

# TAILSTOCK ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 1 | Seal-oil , TC75x90x8 | 1 | | | |
| 2 | Screw-hexa. socket head cap , M6xP1.25x10L | 1 | | | |
| 3 | Screw-hexa. socket headless set , M6xP1.0x12L | 1 | | | |
| 4 | Block-clamp | 1 | 1361101001 | 1361101001 | 1441100608 |
| 5 | Spring washer , M12 | 1 | | | |
| 6 | Shaft-clamp spindle | 1 | 1361101109 | 1361101109 | 1441100608 |
| 7 | Pin , 5x12 | 2 | | | |
| 8 | Lever | 1 | 1121102100 | 1121102100 | 1121102100 |
| 9 | Sleeve-lever | 1 | 1120207400 | 1120207400 | 1120207400 |
| 10 | Shaft-clamp bottom | 1 | 1361101207 | 1361101207 | 1441100706 |
| 11 | Lever | 1 | 1361101207 | 1361101207 | 1441100706 |
| 12 | Screw-hexa. socket , M6xP1.0x20L | 1 | | | |
| 13 | Screw-brake | 1 | 1121102306 | 1121102306 | 1121102306 |
| 14 | Plug-oil , 1/4" | 3 | | | |
| 15 | Body-tailstock | 1 | 1361100102 | 1361100102 | 1541100100 |
| | (TYPE:2280) | | | | 1441100108 |
| 16 | Spindle-tang slot | 1 | 1361101305 | 1361101305 | 1441100804 |
| 17 | Cap-spindle | 1 | | | |
| 18 | Screw-hexa. socket head cap,M6xP1.0x16L | 4 | | | |
| 19 | Screw-spindle feed (in) | 1 | 136110041 | 136110041 | 144110041 |
| | (mm) | 1 | 136110031 | 136110031 | 144110031 |
| 20 | Key-square , 6x6x25 | 1 | 91610606 | 91610606 | 91610606 |
| 21 | Bearing-thrust , 51205 | 1 | 91303006 | 91303006 | 91303006 |
| 24 | Dial-feed (in) | 1 | 1361100504 | 1361100504 | 1361100504 |
| | (mm) | 1 | 1361100602 | 1361100602 | 1361100602 |
| 25 | Washer-wave type , WW-46 | 2 | | | |
| 26 | Handwheel | 1 | 1361100906 | 1361100906 | 1361100906 |
| 27 | Knob | 1 | 1121102002 | 1121102002 | 1121102002 |
| 28 | Washer , W1/2" | 1 | | | |
| 29 | Nut , 1/2"-20UNF | 1 | | | |
| 30 | Screw-cross-recessed , M4xP0.7x10L | 8 | | | |
| 31 | Case-wiper | 2 | 1362100508 | 1362100508 | 1362101603 |
| 32 | Wiper | 2 | 1362100106 | 1362100106 | 1432100305 |
| 33 | Washer-flat , M12 | 2 | | | |
| 34 | Bolt-clamp , M12xP1.75x75L | 2 | | | |
| 35 | Clamp | 1 | 1362100802 | 1362100802 | 1442100102 |
| 36 | Nut | 1 | 1362101505 | 1362101505 | 1362101505 |
| 38 | Case | 2 | 1362100606 | 1362100606 | 1362100606 |
| 39 | Wiper | 2 | 1362100106 | 1362100106 | 1362100106 |
| 40 | Bottom-tailstock | 1 | 1361100200 | 1431100105 | 1541100306 |
| | (TYPE:2280) | | | | 1441100206 |

# TAILSTOCK ASSEMBLY

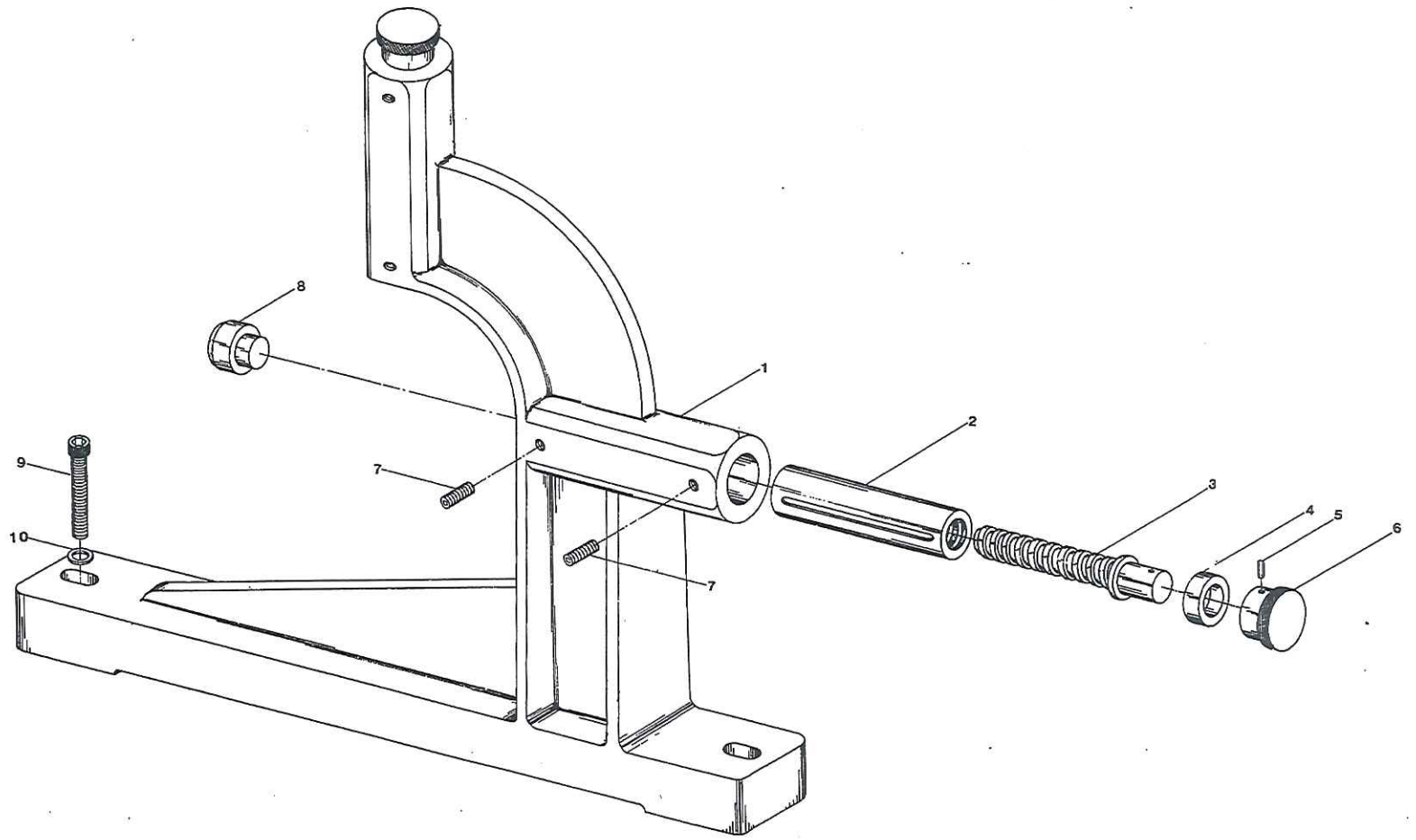
| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 41 | Bolt-clamp | 1 | 1361100700 | 1431100203 | 1541100306 |
| | (TYPE:2280) | | | | 1431100203 |
| 42 | Block-adjusting | 1 | 1221101301 | 1221101301 | 1221101301 |
| 43 | Screw-hexa. socket , M10xP1.5x80L | 2 | | | |
| 44 | Socket washer | 1 | 1361101805 | 1361101805 | 1541100904 |
| 45 | Pin , $\phi$ 4x22.5L | 1 | | | |
| 46 | Clutch shaft | 1 | 1361101903 | 1361101903 | 1361101903 |
| 47 | Square key , 5x5x10L | 1 | | | |
| 48 | Washer | 1 | 13611020008 | 13611020008 | 13611020008 |
| 49 | Snap ring , S18 | 1 | | | |
| 50 | Clutch shaft | 1 | 1361102106 | 1361102106 | 1361102106 |
| 51 | Gear | 1 | 1361102204 | 1361102204 | 1361102204 |
| 52 | Square key , 5x5x25 | 1 | 91610505 | 91610505 | 91610505 |
| 53 | Thrust bearing , 51104 | 1 | 91303003 | 91303003 | 91303003 |
| 54 | Washer | 1 | 1361102302 | 1361102302 | 1361102302 |
| 55 | Spacer | 1 | 1361102400 | 1361102400 | 1361102400 |
| 56 | Idle shaft | 1 | 1361102508 | 1361102508 | 1361102508 |
| 57 | Gear | 1 | 1361102606 | 1361102606 | 1361102606 |
| 58 | Spacer | 1 | 1361102704 | 1361102704 | 1361102704 |
| 59 | Shaft | 1 | 1361102802 | 1361102802 | 1361102802 |
| 60 | Shifting lever | 1 | 1361102900 | 1361102900 | 1361102900 |
| 61 | Shifting fork | 1 | | | |
| 62 | Spring pin , $\varphi$ 4x25L | 1 | | | |
| 63 | Knob | 1 | | | |
| 64 | Spring pin , $\varphi$ 5x38L | 1 | | | |
| 65 | Ball steel , $\varphi$ 1/4" | 1 | | | |
| 66 | Spring , D6xd1x20L | 1 | | | |
| 67 | Lever | 1 | 1120207204 | 1120207204 | 1120207204 |
| 68 | Hexagon socket screw , M8xP1.25x25L | 4 | 1220200100 | 1220200100 | 1220200100 |
| 69 | Hexagon socket screw , M6xP1.0x16L | 6 | | | |
| 70 | Bolt clamp | 1 | 1432100207 | 1432100207 | 1542100202 |
| 71 | Clamp | 1 | 1003506206 | 1003506206 | 1003506304 |
| 72 | Washer , W3/4 | 1 | | | |
| 73 | Nut , W3/4-10NC | 1 | | | |
| 74 | Ball bearing , 6004 | 1 | | | |
| 75 | Shifting box | 1 | 1361101403 | 1361101403 | 1441100902 |
| 76 | Shifting cover | 1 | 1361103201 | 1361103201 | 1441101007 |
| 77 | Bearing thrust | 1 | | | |




## 9-8 STEADY REST

# STEADY REST

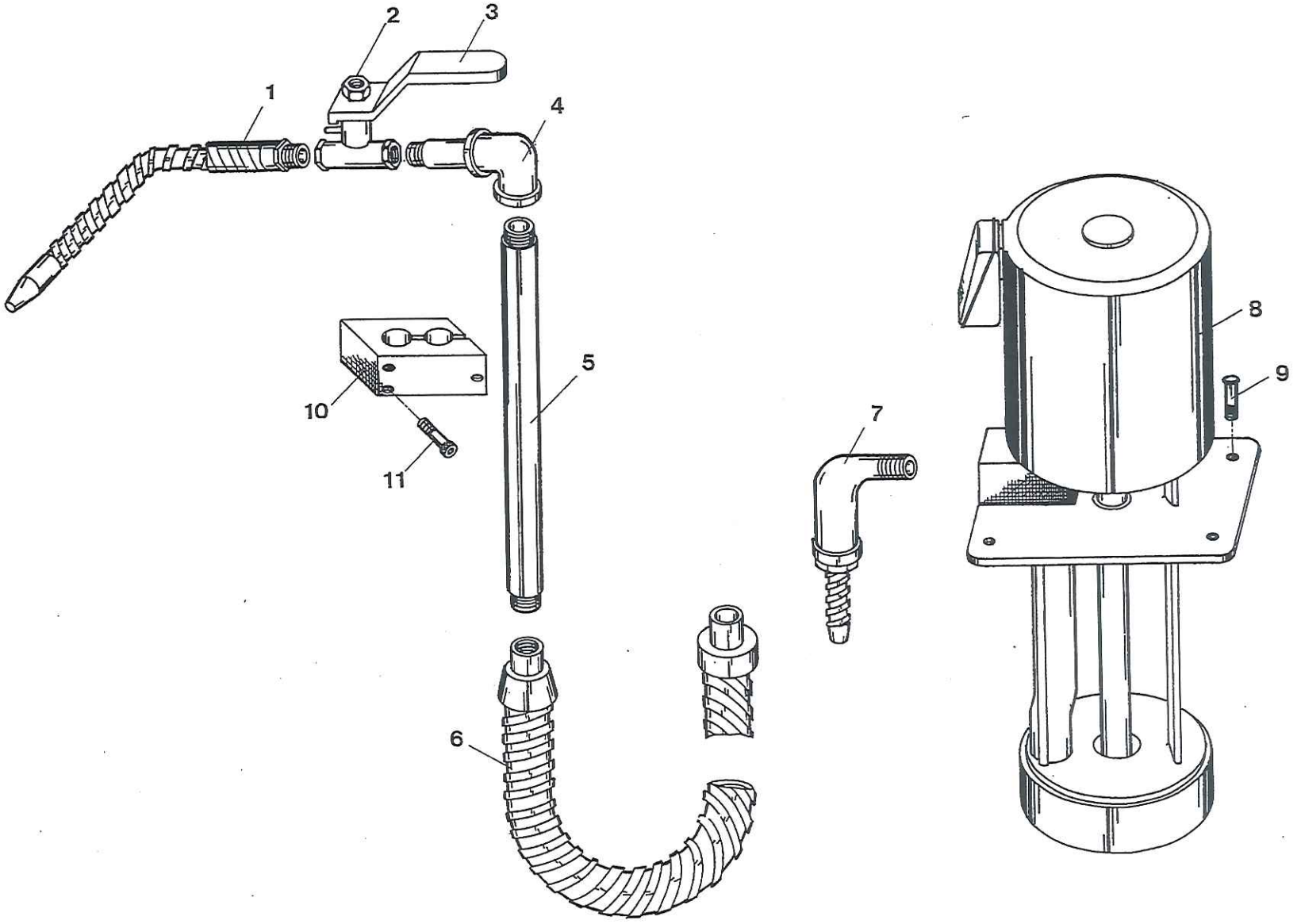
| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 1 | Steady-rest | 3 | | | |
| 2 | Plug-lead screw | 3 | | | |
| 3 | Cap , 6x52L | 12 | | | |
| 4 | Pin | 3 | | | |
| 5 | Lead-screw | 3 | | | |
| 6 | Nut-lead screw | 1 | | | |
| 7 | Screw-fixed | 3 | | | |
| 8 | Jaw | 3 | | | |
| 9 | Pin-fixed | 3 | | | |
| 10 | Pin , 9x25L | 2 | | | |
| 11 | Screw | 1 | | | |
| 12 | Plug | 1 | | | |
| 13 | Nut , W5/8" | 1 | | | |
| 14 | Washer | 1 | | | |
| 15 | Block-clamp | 1 | 1003506206 | 1003506206 | 1003506206 |
| 16 | Bolt | 1 | | | |
| | | | | | |
| | ( 9" Sleeve ) | | 1003509305 | 1003508700 | |
| | ( 9" Bearing ) | | 1003509207 | 1003508308 | |
| | ( 12" Sleeve ) | | | 1003508406 | 1003509001 |
| | ( 12" Bearing) | | | 1003508504 | 1003508808 |
| | ( 12" Sleeve) TYPE : 2280 | | 1003508602 | | |
| | ( 12" Bearing) TYPE : 2280 | | 1003508200 | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |




## 9-9 FOLLOW REST

# FOLLOW REST ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 1 | Body-follow rest | 1 | | | |
| 2 | Nut-lead screw | 2 | | | |
| 3 | Lead-screw | 2 | | | |
| 4 | Collar | 2 | | | |
| 5 | Pin , 4x25L | 2 | | | |
| 6 | Plug-lead screw | 2 | | | |
| 7 | Screw-hexa. socket headless cap , M8xP1.25x10L | 4 | | | |
| 8 | Shoe | 2 | | | |
| 9 | Screw-hexa. socket head cap , M10xP1.5x30L | 2 | | | |
| 10 | Washer | 2 | | | |
| | | | | | |
| | ( 9" Sleeve ) | | 1003510004 | 1003509707 | |
| | ( 9" Bearing ) | | 100352730 | 100352740 | |
| | ( 12" Sleeve ) | | | 1003509707 | 1003509903 |
| | ( 12" Bearing) | | | 100352740 | 100352770 |
| | ( 12" Sleeve) TYPE : 2280 | | 1003509609 | | |
| | ( 12" Bearing) TYPE : 2280 | | 100352750 | | |
| | | | | | |
| | | | | | |




## 9-10 COOLANT SYSTEM

# COOLANT SYSTEM ASSEMBLY

| Item No. | Part Name | Amt. Used | Type : 20GW Part No. | Type : 22 Part No. | Type : 2680 Part No. |
|---|---|---|---|---|---|
| 1 | Nozzle | 1 | | | |
| 2 | Nut-lock | 1 | | | |
| 3 | Cock-lever | 1 | | | |
| 4 | Elbow | 1 | | | |
| 5 | Rod-support | 1 | | | |
| 6 | Pipe | 1 | | | |
| 7 | Elbow | 1 | | | |
| 8 | Pump body | 1 | | | |
| 9 | Bolt-hex. head , M6xP1.0x12L | 2 | | | |
| 10 | Supporter-lock pipe | 1 | | | |
| 11 | Screw-hexa. socket head cap , M6xP1.10x20L | 3 | | | |
| | | | | | |
| | | | | | |

# OPERATION & PARTS MANUAL

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