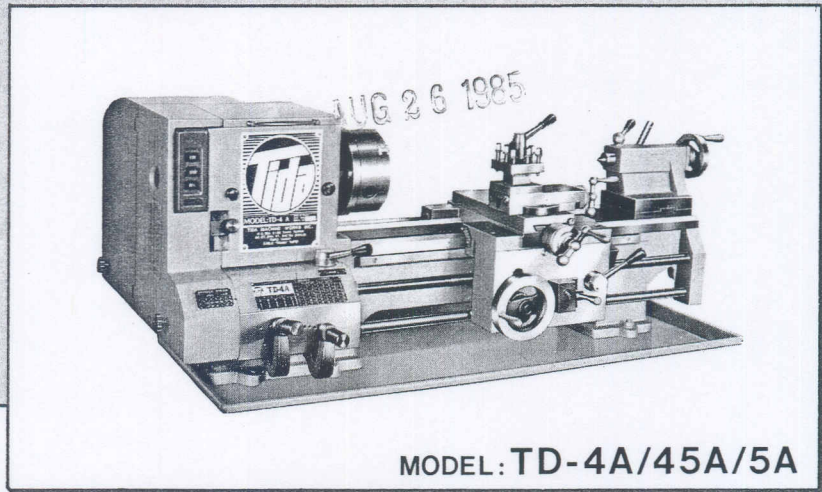


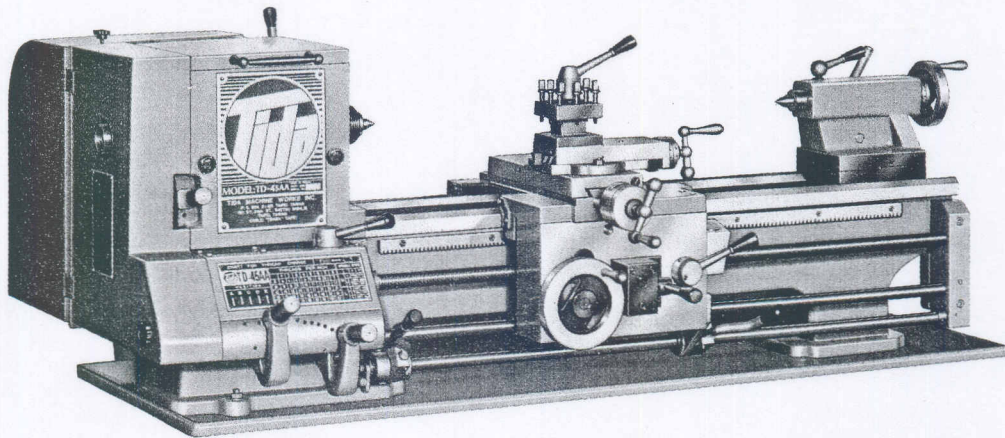
OPERATION MANUAL

tidal

PRECISION BENCH LATHE



MODEL: TD-4A/45A/5A



MODEL: TD-4AA/45AA/5AA

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UNPACKING AND CLEANING

Unpacking:

- * To prevent moisture and possible rust during transportation, small packs of absorbent are hanging on the lathe, and grease is applied on the bedways and unpainted parts of the lathe and then onto which paper is covered.
- * Both the standard and optional accessories are all packed in small wooden case nailed on the base of the package.
- * Inspection Report of each lathe is included in the packages too.

Cleaning:

- * After unpacking the case, take off the paper applied and wipe off the grease on the lathe with soft cloth.
- * In case of anti-corrosive is used for the lathe, use gasoline to take it off with brush.

NOTE : Do not move the carriage and tailstock before having entirely wiped off the grease or anti-corrosive.

INSTALLATON

Installing the Lathe:

- * Preferably using a rigid metal or wooden stand, putting onto the concrete floor, to support the bench lathe.
- * Firmly have the stand fixed onto the floor to avoid any unsteadiness.
- * Have the chip tray put onto the stand in the correct position for marking and drilling the 6 bolting holes.
- * Lay the lathe in the chip tray and have it bolted from underneath of the stand with 6 sets of bolts, nuts and washers.

Leveling:

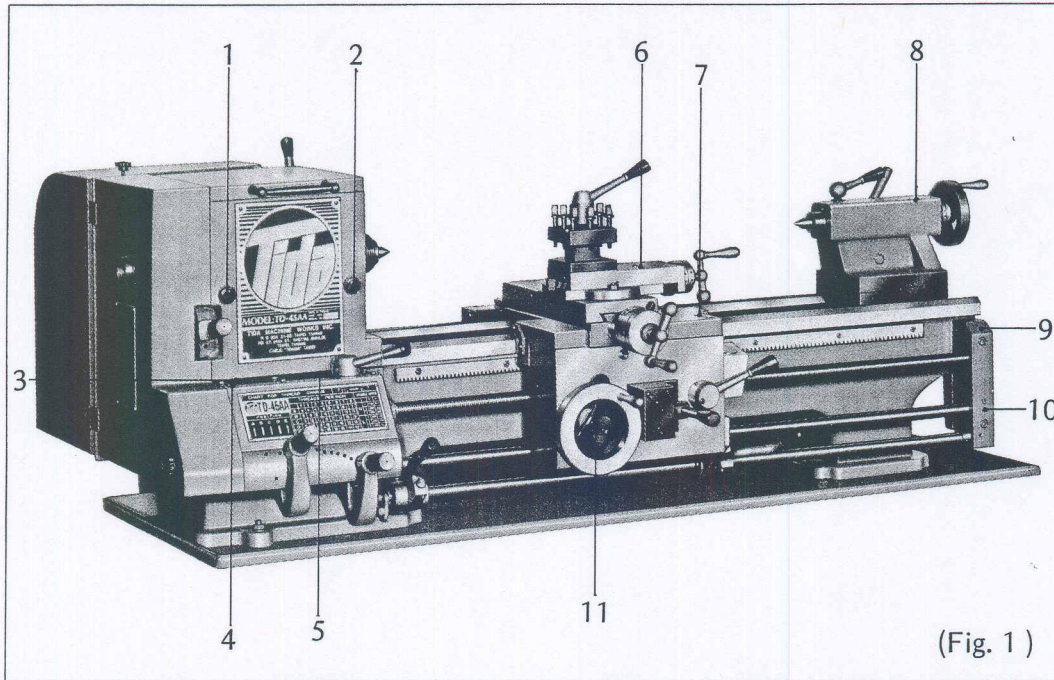
- * It is very important to keep always the bed leveled. If not completely leveled, the bed would become twisted that will move centers of the lathe out of alignment and result in inaccurate work and excessive wear.
- * Use a precision level at least 6" long on bedways, thoroughly cleaned, to check leveling of the stand and bed.
- * Put shims, if required, between the stand and floor until the bed is completely leveled.
- * Then, tighten the 6 mounting bolts securely and recheck the level.

Wiring:

- * It is very important to check if the line voltage corresponds with the specification of the motor before connecting wire with power source.
- * By wiring switch and motor to make motor pulley rotate in the directions clockwise and counter clockwise.
- * If there should be any difficulty or problem, consult with your electrical engineers or power company.

LUBRICATION

All moving parts and sliding surfaces should be regularly lubricated with clean lubricating oil. Refer to Fig. 1 for the lubrication holes.



(Fig. 1)

*Refer to Fig. 1 for the lubrication holes:

1. No. 1 & No. 2 is oil window.
2. No. 3 – No. 11 is lubrication holes.

*Refer to Fig. 2 for main spindle lubrication holes:

1. Two headstock lubrication holes: when you open the headstock cover you will find them locating both right and left sides of the inside of headstock.
2. Fill the lubrication oil till the oil lever reaches the window gauge mark.
3. Lubrication holes of back gear & main spindle pulley:
At the middle of back gear & main spindle pulley, set with screw.

*Oil Lubrication Chart

| Lubricating Point | Oil Exchange and/or Replenishment | Viscosity SSU 100°F |
|-----------------------|-----------------------------------|---------------------|
| Headstock | Twice a year | 160 |
| Feed Gear Box | Twice a year | 160 |
| Cross Slide | Once a day | 320 |
| Apron & Carriage | Twice a month | 320 |
| End Bracket | Once a day | 320 |
| Tail Stock | Once a day | 320 |
| Quadrant & Tool Slide | Twice a day | 320 |

*Oil Recommended

| HEAD STOCK | FEED BOX | APRON |
|--------------------|--------------|--------------|
| MOBIL D.T.E. LIGHT | D.T.E. LIGHT | VACTRA NO. 2 |

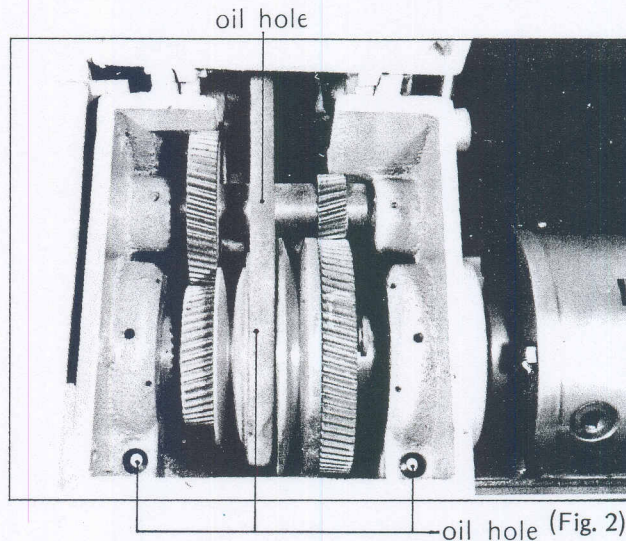
OPERATION

Headstock:

* Back Gear Drive:

For heavy cuts and large diameter work, drive back gear for slow spindle speeds, ranging from 75 to 280 r.p.m. The steps to engage the drive are as follows:

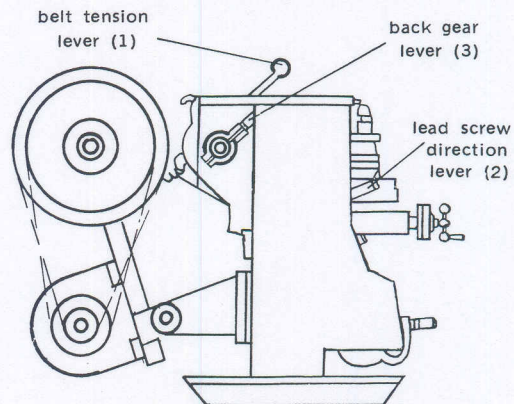
1. Turn off motor.
2. Raise headstock cover and pull out lock pin, disengaging bull gear from pulley (Fig. 2).
3. Move back gear lever to front engaged position.
4. Then start motor.



* Direct Drive:

Direct drive provides high spindle speeds from 295 to 1100 r.p.m. The steps to execute the drive are as follows:

1. Turn off motor.
2. Raise headstock cover. Push on lock pin and turn spindle pulley by hand until the pin slides in, locking bull gear and pulley together. (Fig. 2)
3. Move back gear lever (Fig. 3) to rear side (the disengaged position.)
4. Then start motor.



(Fig. 3)

CAUTION : The position of the back gear lever should not be changed unless motor and spindle have stopped turning.

* Changing Spindle Speeds:

Follow the following steps to change the spindle speeds:

1. Stop motor.
2. Pull belt tension lever to loosen belt tension. (Fig. 3)
3. Raise headstock cover and open pulley guards and shift belts to position required for desired speed.
4. Push belt tension lever to tighten the belts.

NOTE : For different spindle speeds, please refer to the chart attached with the lathe.

* Lead Screw Direction Lever (Fig. 3)

There are 3 positions for the lever to locate.

1. Center Position is neutral (lead screw does not rotate).
2. Upper Position makes carriage moving toward tailstock.
3. Lower Position makes carriage moving toward headstock.

CAUTION : Always stop motor and spindle before shifting the lead screw direction lever.

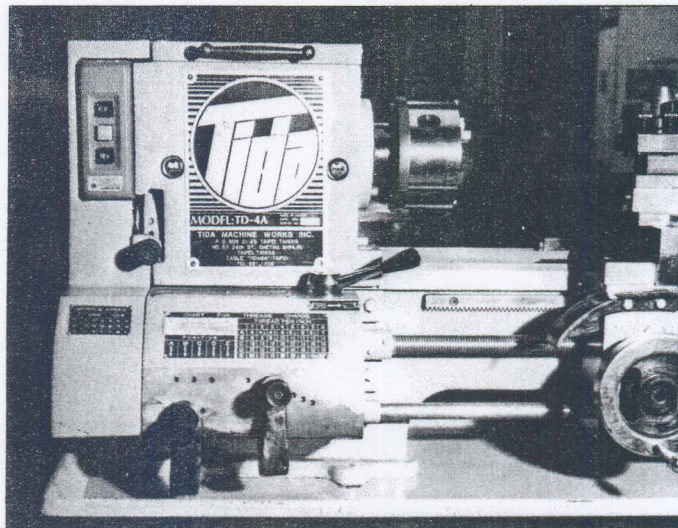
Quick Change Gear Box (Fig. 4)

The selections of the positions of gear box levers determine the rate of rotation of leadscrew which is related to r.p.m. of the spindle speed.

The left lever shifts to five positions: A, B, C, D and E. The right lever shifts to eight positions: 1, 2, 3, 4, 5, 6, 7 and 8 positions. To cut inch threads required, move the two levers to the positions indicated in the Inch Thread Cutting Chart on the gear box.

CAUTION:

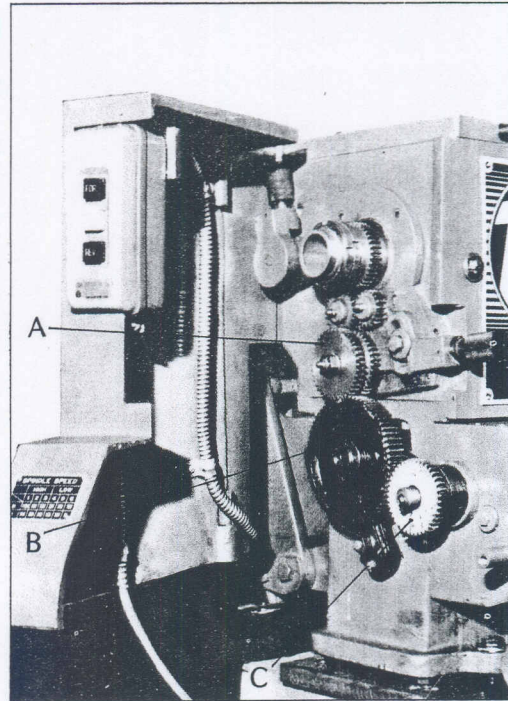
Always stop motor and spindle before changing the gear box levers.



(Fig. 4)

* Changing Gears for Cutting Metric Threads:

Unless the lathe is specially ordered, or the inch tumbler gears (Fig. 5) of the lathe are usually assembled as standard parts for cutting threads in inch and metric gears are to be provided with the lathe as special parts.



(Fig. 5)

For Metric Thread Cutting, note the followings:

1. Loosen the lock of inch tumbler gears and disassemble the gears. Then put metric tumbler gears for replacement.
2. After the metric tumbler gears is properly meshed, tighten the lock, But be sure to allow sufficient clearance among the metric gears.
3. If the exchanging procedures are completed, metric threads can be cut as shown on the Metric Thread Cutting Chart. (Fig. 6A)

| Feeds And Threads Table: | | | | | | | | |
|--------------------------|----------------|---------------|----------------|---------------|----------------|----------------|----------------|----------------|
| Position | ← m.m. → | | | | ← m.m. → | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| A | 2.361 0.323 | 2.10 0.28 | 1.98 0.27 | 1.88 0.258 | 1.72 0.235 | 1.57 0.215 | 1.452 0.20 | 1.35 0.185 |
| B | 1.18 0.161 | 1.05 0.14 | 0.99 0.136 | 0.96 0.129 | 0.86 0.117 | 0.78 0.107 | 0.726 0.10 | 0.67 0.092 |
| C | 0.59 0.080 | 0.52 0.07 | 0.49 0.068 | 0.48 0.065 | 0.43 0.058 | 0.39 0.053 | 0.363 0.05 | 0.33 0.046 |
| D | 0.259 0.04 | 0.26 0.035 | 0.25 0.034 | 0.24 0.032 | 0.215 0.029 | 0.195 0.026 | 0.181 0.025 | 0.168 0.023 |
| E | 0.147 0.02 | 0.13 0.018 | 0.125 0.017 | 0.12 0.016 | 0.107 0.015 | 0.098 0.013 | 0.09 0.012 | 0.085 0.011 |

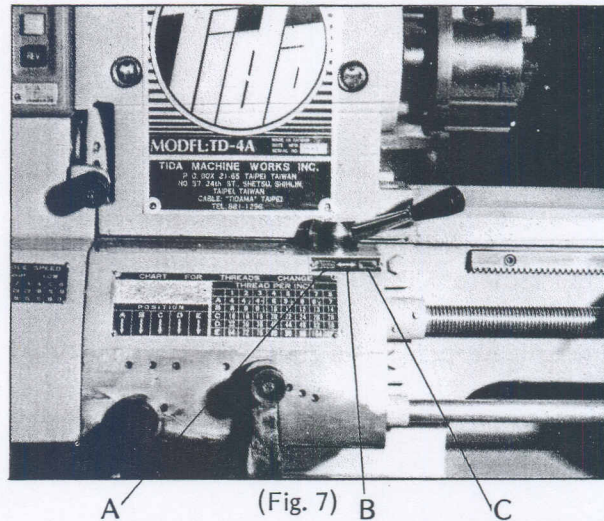
(Fig. 6B)

| CHANGE GEAR CHART FOR m.m SIZE | | | | | | | |
|----------------------------------|----------|---------------|------|---|---|-------|------|
| COMBINATIONS OF GEARS (GEAR BOX) | POSITION | m/m PER PITCH | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| 25 ANY 60 | A | | | | | | |
| | B | | 1.2 | | | | |
| | C | | 0.5 | | | | |
| | D | | 0.3 | | | | |
| | E | | | | | | |
| 26 ANY 60 | A | | | | | 2.0 | |
| | B | | | | | 1.0 | 0.9 |
| | C | 0.1 | | | | 0.5 | 0.45 |
| | D | 0.35 | | | | 0.75 | |
| | E | | | | | | |
| 43 ANY 60 | A | 4.5 | | | | | 3.0 |
| | B | 2.25 | | | | | 1.5 |
| | C | 1.35 | | | | | 0.75 |
| | D | | | | | | |
| | E | | | | | | |
| 46 ANY 60 | A | | | | | 3.5 | |
| | B | | | | | 1.75 | |
| | C | | | | | 0.875 | 0.8 |
| | D | | | | | | 0.4 |
| | E | | | | | | 0.2 |
| 47 ANY 60 | A | | | | | | |
| | B | 2.5 | 2.0 | | | | |
| | C | 1.25 | 1.0 | | | | |
| | D | | 0.55 | | | | |
| | E | | | | | | |

(Fig. 6A)

Thread Culling and Automatic Feeding (Fig. 7)

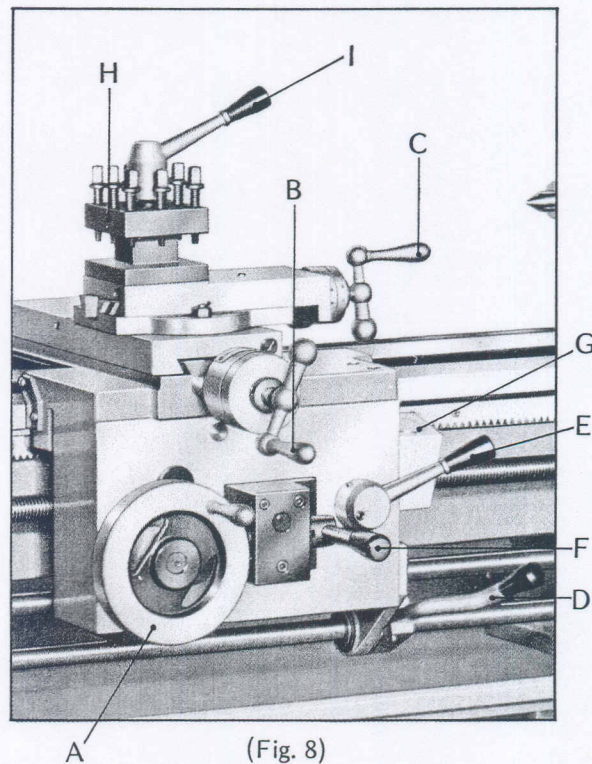
1. Position for transmission of lead screw for thread cutting. (Fig. 7A)
2. Disengaged position. (Fig. 7B)
3. Position for automatic feeding. (Fig. 7C)



Saddle and Carriage

Saddle may be moved along the bed by hand or by power feed and supports the cross slide, compound rest, tool post and cutting tool, etc. The apron (Fig. 8), anchored at front of the carriage, contains the power cross feed and longitudinal feed controls.

- * Handwheel (Fig. 8-A) for manually moving saddle along the lathe bed.
- * Tool Post Slide Crank (Fig. 8-c) moves the tool post slide left side or right side.
- * Cross Feed Crank (Fig. 8-B) moves the cross slide forward and backward.
- * Collars of Handwheel and Cross Feed Crank are graduated either for metric or inch thread cutting, depending on the necessity of the market.
- * Saddle Lock Screw locks saddle to bed for facing cut-off operations.
- * Longitudinal and Cross Feed Change Lever (Fig. 8-F) control longitudinal or cross feeding.
- * Half-Nuts Lever (Fig. 8-E) engages half-nuts with lead screw with threading and longitudinal feeding.



- * Thread Cutting Dial (Fig. 8-G) performs the important function of indicating the proper time to engage the half-nut with lead screw in order that tool will enter the same groove of the thread on each successive cut.
- * Tool Post (Fig. 8-H) may be rotated in counter-clockwise direction to change the position of the cutting tools.
To set the selected tool, tighten the tool post handle after selection.
- * Safety Detent Start Lever (Fig. 8-D) control main spindle running forward or reverse.

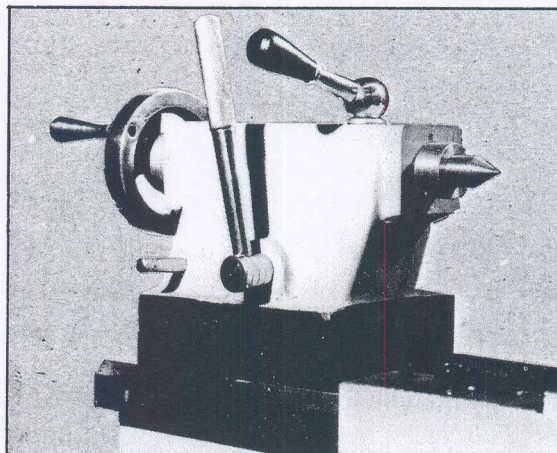
Automatic Feeding (Fig. 8-F)

- * Lower position: Automatic Cross Feed.
- * Central position: Off or disengaged position.
- * Upper position: Automatic Longitudinal Feed.

Tailstock:

The tailstock (Fig. 10) supports long work and holds tools for drilling and reaming operation.

- * Handwheel (Fig. 10) moves the tailstock ram. To advance spindle, turn handwheel clockwise, To retreat spindle or to eject center, turn handwheel counterclockwise.
- * Tailstock Fixing Lever (Fig. 10) locks tailstock to lathe bed or loosens the clamping.
- * Ram Lock Lever (Fig. 10) Locks ram in proper place.



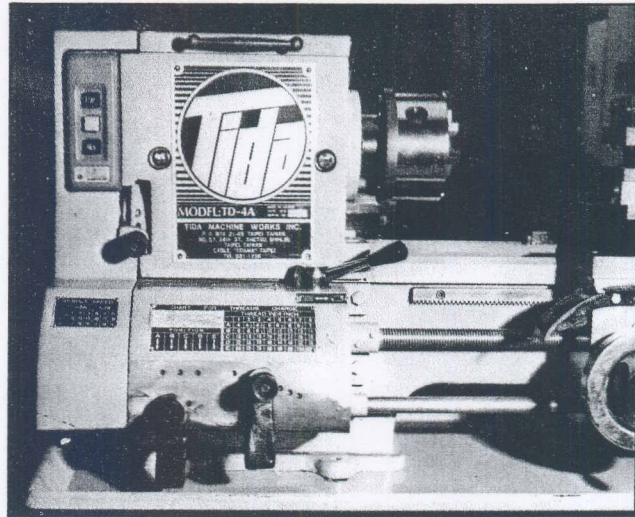
(Fig. 10)

The tailstock may be set over for taper turning by loosening the bed clamp lever and adjusting the two set over screws (Fig. 10)

Others (Chucks, Face Plate, Steady Rest and Follow Rest):

* Mounting Chucks or Face Plate: (Fig. 11)

1. The face of hub and threads must be cleaned by wiping off dust and possible chips.
2. Also clean spindle threads.
3. Apply some clean oil to the spindle threads.
4. Keep spindle from turning.
5. Screw chuck or face plate onto spindle. Turn it by force side rapidly as it getting close to spindle shoulder so that hub will seat firmly.



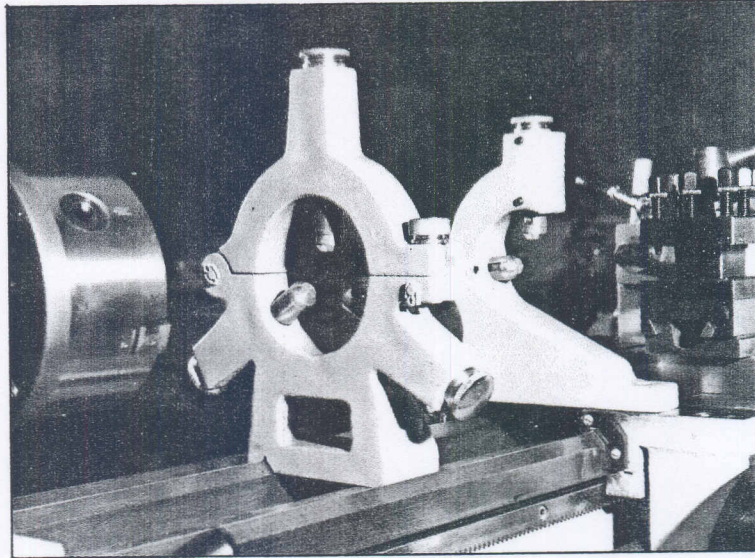
(Fig. 11)

* Removing Chucks or Face Plate:

1. Do not forget to put a piece of wooden board under the chuck and on the bed to protect bedways before removing chucks or face plate. Rotate chuck with hand until wrench hole is on top. Lock spindle by engaging back gears. Place chuck wrench in chuck hole and pull. If chuck does not release, tap the base of wrench lightly with a mallet. Then remove the chuck.

* Mounting Steady Rest (Fig. 12):

1. Carefully put steady rest on the bed ways at proper position.
2. Put steady rest clamber beneath the bedways and against the base rest.
3. Insert bolt through the holes of clamper and rest base. Place washer and screw nut bolt and tighten it.



(Fig. 12)

* Removing Steady Rest:

1. Loosen nut and bolt and take off clamper.
2. Remove steady rest from lathe bed.

MAINTENANCE AND IMPORTANT NOTICE

Special care and attention must be paid to the followings:

1. Always keep lathe clean and properly lubricated.
2. Do not use lathe as a work bench.
3. Do not leave tools on the bed ways.
4. Always shut off power before changing gears and leaving lathe.
5. Lock tailstock to bed firmly when using tailstock.
6. Frequently recheck level of the bed.
7. Keep lead screw threads clean and oil properly.
8. Before engaging a cut securely lock cutting tool in position.

ADJUSTMENT

Spindle Bearing Adjustment:

Spindle bearings seldom require adjustment. However, if spindle spins tool freely or too much play when spindle is pushed back and forth, adjust the bearings in accordance with the following steps:

1. Make adjustment only when spindle is at operating temperature, namely, run spindle at medium speed for about an hour.
2. Stop motor.
3. Raise stock cover and pull out disengaging bull gear from pulley. (Refer to Fig. 2)
4. Loosen mounting bracket holding countershaft and slip spindle belts off spindle pulley.
5. Loosen set screw in bearing adjustment nut and tighten nut until spindle and play has been eliminated.
6. Tighten the set screw in adjusting nut.
7. Place belts on pulleys, and check belts tension.

Belt Tension Adjustment:

To examine the belts if they are properly tensioned (approximately $\frac{1}{2}$ " depressed down) by depressing them with light pressure.

To adjust the belt tension:

- * Move belt tension lever to tighten position.
- * Adjust the belt tension adjusting nut until belt is properly tensioned.

Lead Screw Adjustment (Checking Lead Screw Alignment)

- * Raise half nut lever disengaging half nut from lead screw.
- * Disengage two tumbler levers.
- * Lead screw should turn freely when rotated with fingers. If lead screw binds or turns hard, it need adjustment by securing nut.

Carriage Bearing Plates Adjustment:

Carriage bearing plates, which bear on underside of front and back ways, hold the carriage firmly to the bed. Plates have shims of varying thickness for wear adjustment.

Cross Slide Gib Adjustment:

Adjust the cross slide gib screw until it moves with a slight drag.

Tool Post Slide Gib Adjustment:

Adjust the tool post slide gib screw until it moves with a slight drag.

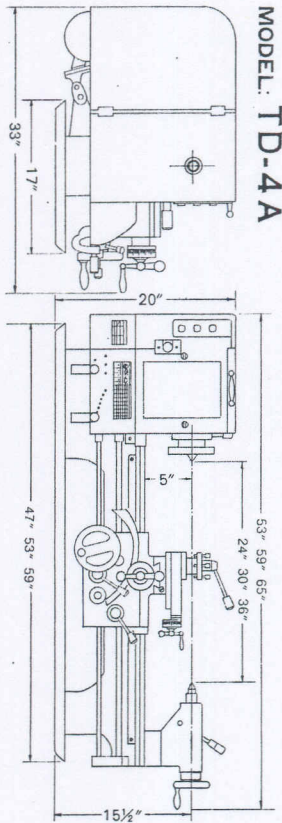
Compound and Cross Feed Crank Adjustment:

If the compound or cross feed crank is too free, to tighten the compound or cross feed crank set screw.

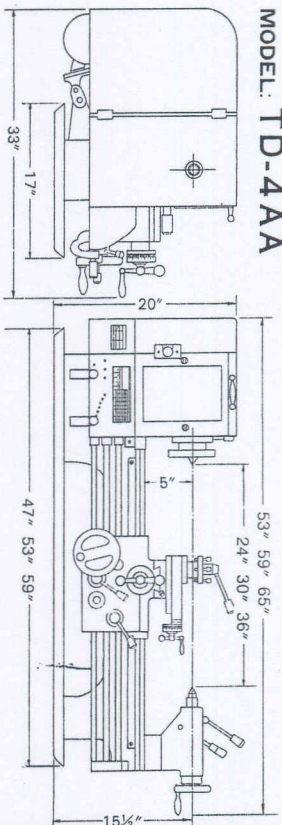
Tailstock Adjustment:

If the tailstock spindle center is out of alignment, to adjust the two set over screws for centerlizing.

MODEL: TD-4A



MODEL: TD-4AA



| SPECIFICATION | TD-4A | TD-4AA | TD-45A | TD-45AA | TD-5A | TD-5AA |
|--------------------------------------|---|---|---|---|---|---|
| SWING OVER BED | 10" (254MM) | 10" (254MM) | 10" (254MM) | 10" (254MM) | 10" (254MM) | 10" (254MM) |
| SWING OVER SADDLE | 5" (127MM) | 5" (127MM) | 5" (127MM) | 5" (127MM) | 5" (127MM) | 5" (127MM) |
| DISTANCE BETWEEN CENTERS | 24" (610MM) | 24" (610MM) | 30" (762MM) | 30" (762MM) | 36" (914MM) | 36" (914MM) |
| TOTAL LENGTH OF BED | 45" (1140MM) | 45" (1140MM) | 51" (1292MM) | 51" (1292MM) | 57" (1447MM) | 57" (1447MM) |
| WIDTH OF BED | 7 1/8" (180MM) | 7 1/8" (180MM) | 7 1/8" (180MM) | 7 1/8" (180MM) | 7 1/8" (180MM) | 7 1/8" (180MM) |
| HOLE THROUGH SPINDLE | 1 3/8" (35MM) | 1 3/8" (35MM) | 1 3/8" (35MM) | 1 3/8" (35MM) | 1 3/8" (35MM) | 1 3/8" (35MM) |
| TAPER OF SPINDLE NOSE | M. T. No.5 | M. T. No.5 | M. T. No.5 | M. T. No.5 | M. T. No.5 | M. T. No.5 |
| TAPER OF CENTER | M. T. No.2 | M. T. No.2 | M. T. No.2 | M. T. No.2 | M. T. No.2 | M. T. No.2 |
| RANGE OF SPINDLE SPEEDS | 12 CHANGES, 75~1100RPM | 12 CHANGES, 75~1100RPM | 12 CHANGES, 75~1100RPM | 12 CHANGES, 75~1100RPM | 12 CHANGES, 75~1100RPM | 12 CHANGES, 75~1100RPM |
| LEAD SCREW DIAMETER | 7/8" (22MM) | 7/8" (22MM) | 7/8" (22MM) | 7/8" (22MM) | 7/8" (22MM) | 7/8" (22MM) |
| THREAD PER INCH OF LEAD SCREW | 8 T. P. I. | 8 T. P. I. | 8 T. P. I. | 8 T. P. I. | 8 T. P. I. | 8 T. P. I. |
| INCH THREAD TPI | 4~112(40 KINDS) | 4~112(40 KINDS) | 4~112(40 KINDS) | 4~112(40 KINDS) | 4~112(40 KINDS) | 4~112(40 KINDS) |
| METRIC THREAD MM. | 0.2~4.5mm(29 KINDS) | 0.2~4.5mm(29 KINDS) | 0.2~4.5mm(29 KINDS) | 0.2~4.5mm(29 KINDS) | 0.2~4.5mm(29 KINDS) | 0.2~4.5mm(29 KINDS) |
| MOTOR HORSE POWER REQUIRED | 3/4 HP or 1HP | 3/4 HP or 1HP | 1HP | 1HP | 1HP | 1HP |
| NET WEIGHT | APPROX 260KG | APPROX 260KG | APPROX 275KG | APPROX 275KG | APPROX 290KG | APPROX 290KG |
| DIMENSION OF PACKING (2 SETS / CASE) | 56"X55"X28" 50c.ft. (1.42M ³) | 56"X55"X28" 50c.ft. (1.42M ³) | 61"X57"X28" 57c.ft. (1.62M ³) | 61"X57"X28" 57c.ft. (1.62M ³) | 69"X61"X28" 68c.ft. (1.93M ³) | 69"X61"X28" 68c.ft. (1.93M ³) |

TD-4A STANDARD ACCESSORIES

| | | | |
|----------------------------|------|-----------------------|-----|
| 1 REVERSIBLE SWITCH | 1pc | 7 TOOL POST WRENCH | 1pc |
| 2 CENTER M.T. No. 2 | 2pcs | 8 CHUCK BACK PLATE 5" | 1pc |
| 3 CENTER SLEEVE M.T. No. 5 | 1pc | 9 CHIP PAN | 1pc |
| 4 V-BELT | 1pc | 10 OPERATION MANUEL | 1pc |
| 5 THREAD CUTTING INDICATOR | 1pc | 11 PARTS LIST | 1pc |
| 6 TOOL BOX | 1set | | |

TD-4AA STANDARD ACCESSORIES

| | | | |
|----------------------------|------|-----------------------|-----|
| 1 MAGNETIC SWITCH | 1pc | 7 TOOL POST WRENCH | 1pc |
| 2 CENTER M.T. No. 2 | 2pcs | 8 CHUCK BACK PLATE 5" | 1pc |
| 3 CENTER SLEEVE M.T. No. 5 | 1pc | 9 CHIP PAN | 1pc |
| 4 V-BELT | 1pc | 10 OPERATION MANUEL | 1pc |
| 5 THREAD CUTTING INDICATOR | 1pc | 11 PARTS LIST | 1pc |
| 6 TOOL BOX | 1set | | |

OPTIONAL ACCESSORIES

| | | | |
|---|---------------------|---------------------|------|
| 1 ELECT. MOTOR, 3/4HP OR 1HP, 60 OR 50 CYCLES | 7 METRIC GEAR | 7 METERIC GEAR | 1set |
| 2 3-JAW CHUCK 5" or 6" | 8 CHUCK BACK PLATE | 8 CHUCK BACK PLATE | |
| 3 4-JAW CHUCK 6" or 8" | 9 FLOOR STAND | 9 FLOOR STAND | |
| 4 STEADY REST | 10 WORKING LAMP | 10 WORKING LAMP | |
| 5 FOLLOW REST | 11 COOLANT PUMP | 11 COOLANT PUMP | |
| 6 FACE PLATE | 12 TAPER ATTACHMENT | 12 TAPER ATTACHMENT | |

※ WE RESERVE THE RIGHT TO MAKE CHANGES IN DESIGN AND SPECIFICATIONS WITHOUT NOTICE.