

INSTRUCTIONS FOR 608-PV SCREW CUTTING LATHE
MOUNTED ON KNEE-HOLE CABINET

Item 1 - Receiving and Unpacking

If any damage is noticed to packaging of machine or parts, call representative of delivering carrier to inspect condition before removing crate or taking parts from boxes and enter claim against the transportation company. The shipper holds receipt in good order for the entire consignment.

Carefully unpack, using nail puller for removing crate, box covers and braces. Avoid jarring machine or machine parts when doing this. Leave the lathe with mounting on the skid on which it was shipped, until machine has been finally located. Check all items against packing list. If any shortage exists, re-examine packing material before discarding. Small pieces may easily be lost unless all excelsior and wrapping paper is thoroughly overhauled.

Remove slushing grease using fresh cotton waste or cloth and gasoline or kerosene. Immediately go over all polished and scraped surfaces with an oiled rag.

Item 2 - Setting Up

Machine should be moved close to its location on its skid, lag screws then removed and machine placed carefully on its prepared position in accordance with floor plan print # in this manual. Fasten to flooring with four 1/2" lag screws or bolts. Level machine using precision level lengthwise and crosswise on lathe bedways.

Item 3 - Assembling Machine

A Installing Quick Change Gear Box -

Attach the quick change gear box to the left end of the bed after first removing the two binder bolts from bed. Locate the gear box by engaging the two driving pins on the end of the lathe feed rod with the corresponding holes in the cone gear shaft. Fasten the gear box to end of lathe bed with hex binder bolt through radial slot in rear and tee binder bolt finger tight and screw in binder handle used for locking gear box in position after swinging to engage proper stud gear. See Quick Change Gear Box, print #608-20, and Bed, Print #608-23, a part of this manual.

B Installing Compound Slide Rest -

Carefully wipe and oil contacting slide surfaces. Place slide rest on top of carriage angle with clamping tee bolt engaged in tee slot of slide rest base. Slide rest can be held in any position on carriage angle by clamping both operated by the binder handle at right. If power cross feed is used, the guard slide in front end of carriage angle is rotated to the right exposing the driver gear. Mount slide rest almost flush with the front of the carriage angle so as to permit driving gear to be swung upward by small handle at front right side of carriage angle to mesh with slide rest gear under front end of slide rest base.

Item 4 - Lubrication

The headstock spindle bearings are equipped with wick feed oil cups and should be kept well filled. Other lubrication points on lathe are equipped with small spring oilers, or oil holes marked "OIL". They should receive several drops of oil once or twice a day or shift. Use a high grade machine oil for ALL lubrication. An oil film should be maintained on all slides and finished surfaces to prevent rust.

Item 5 - Headstock

(Numbers refer to print 608-5C-12A)

The back gears are thrown in and out of mesh by ball handle #62 on the left end of eccentric shaft. A knurled-head pin #50 in the web of the gear inside left end of headstock sheave is pulled out to disconnect gear from sheave when using back gears & is pushed in to engage hole in sheave web when using open belt.

To Adjust Spindle - to adjust the rear spindle bearing #10 remove draw-in spindle #5. Remove spindle gear #7 after loosening set screw #38, being careful not to lose ball #36 and spring #37. With small screw driver turn the slotted head screw at the bottom of the bearing. Turning this screw right handed compresses the split bearing and compensates for wear. To adjust the front spindle bearing #34 loosen the round slotted head screw #14 inside the web of the large spindle gear at the left of the headstock sheave and with a screw driver or other flat tool engage the slot in the adjusting nut #15. Turning this nut right handed draws the spindle into the tapered front bearing. The front bearing should be snut without being tight. Always adjust the spindle at normal operating temperature. After adjusting the front spindle bearing, tighten the locking screw #14 to hold the setting.

To Replace Headstock Belt - Remove the belt and back gear guards. Remove the tie block in the "U" opening in cabinet top. Loosen lever screws #27 and remove gear shaft lever #62. Loosen the two set screws #64 holding the back gear shaft bearings. Insert flat tool in slots provided on underside of bearings and pry bearings from their mounting. Remove shaft #33 and back gear #32. Slip the vee belt off the driving sheave and pull the lower loop through the "U" opening in cabinet top. Replace with new vee belt and reverse the sequence of operations to reassemble.

Item 6 - Quick Change Gear Box
(Numbers in text refer to print 608-20)

The driving gear is keyed to the spindle at the left of the rear headstock bearing and drives the quick change gear box through switch and stud gears. By knurled knob this driving gear can be moved along spindle to three detented positions. In right detented position the driving gear engages the switch gear through intermediate gear which through quick change gear box moves the lathe carriage to the right. In center detented position the driving gear is out of mesh and all speed gearing is stopped. In left detented position the driving gear directly engages the switch gear, which through quick change gear box moves carriage to left.

The driving stud, driven by the switch gears is permanently fitted with 18 and 30 tooth gears #66 and #67. The upper gear box shaft carries a sliding compound gear #48 with 60 and 72 teeth. This gives two selective ratios, one to four and one to two from the driving stud. Compound gearing as tabulated in print GT-12 of this manual, drives from the upper gear box shaft to the sliding tumbler gear shaft. For standard thread pitches ten to one hundred and forty-four per inch 70 on to 70 and 28 on to 112 compound gears are used. For thread pitches less than ten per inch special gears, 4 to 1 ratio (80-20) are used. This set up requires an idler connecting gear mounted on a stud on the quadrant. The gear box provides four groups of seven thread pitches. Each group is controlled by positioning the compound gear #48 on the upper shaft and the sliding compound gears #1 and #2 on the tumbler shaft. Two additional thread pitches, 30 and 120 are obtained by swinging the gear box so as to mesh the 60 tooth gear of the sliding compound #48 on the upper shaft, with the 18 tooth stud gear #66. The thread pitches within each group are controlled by the setting of the index lever. A plate on the front of the gear box indicates the location of the lever for each pitch of thread.

By mounting pick-off gear on the auxiliary quadrant provided, additional threads may be cut, see print GT-12 of this manual. Pick-off gears for 11-1/2, 15 and 27 pitch threads are included with standard lathe equipment. When pick-off gears are used, the index lever must be out of engagement.

Item 7 - Carriage
(Numbers in text refer to print 608-26)

Longitudinal travel is available through ball handle (#47) rack and pinion. Power feed is from the feed rod and is obtained by pulling outward the sloping lever #21 on the left end of the carriage until the spring latch moves up and supports the lever in its full "OUT" position. This engages a friction clutch and establishes gear connection from the feed rod to the feed rack on the front underside of the bed. Feed is thrown out automatically by the carriage stop clamped at any desired position on the lower dovetail on the front face of the bed. The conical point of the stop screw eccentrically contacts a hole in the spring latch and forces it downward releasing the sloping friction lever.

When cutting threads from the lead screw, the gear train for the power feed may be disconnected by pulling out the knurled round knob (#20), at the lower left front of the carriage. This saves wear on the gears and eliminates their drag which is conducive to higher precision of thread cutting.

To engage the lead screw and nut for thread cutting the eccentric ball handle lever #63 at the extreme right end of the apron is swung upward to a vertical position. The carriage is fitted with a safety interlock #31 print #608-26A to prevent simultaneous engagement of the lead screw and power feed. With the operating lever moved to the left the lead screw nut may be engaged and with the operating lever moved to the right the friction clutch can be engaged. Thus when either feed is engaged, the other feed is prevented.

A threading dial used to pick up threads without reversing the lathe, is located on the right end of the carriage. When any radial graduation mark on the revolving dial comes into line with the reference mark, the lead screw nut may be thrown into engagement to feed the tool along the work until the end of the cut is reached. The lead screw nut may be thrown out by swinging the ball handle downward and the carriage quickly run back by hand without reversing the lathe. With the carriage back to re-starting position, the lead screw nut is thrown in when the proper radial graduation mark (same mark on which first cut was started) on the revolving dial comes into line with the reference mark. The tool will accurately pick up its cut.

Power cross feed is obtained from the feed rod and is transmitted to the slide rest through a cam-mounted driving gear #14, print 608-26A, in the front top of the carriage angle. The driving gear is protected from chips and dirt by a guard closed by handle #10 print 608-26A on front of carriage angle, when power cross feed is not in use. The cam-mounted driving gear is raised by lever #3 print 608-26A to engage slide rest lower feed screw intermediate gear #24 print 608-9A when power cross feed is required.

When power rod feed is in use and not thread cutting is to be done the pinion on the left end of the lead screw #3, print 608-26, under the sliding guard, should be moved to the right.

Thus disengaging lead screw and stopping all unnecessary wear on this ultra-precision member. The carriage may be locked to the bed by clamp, operated by lever handle #58 located under the front of the carriage angle. This feature is particularly valuable when using the lathe for facing.

To Adjust Carriage Gib - The upper front dovetailed guideway of the carriage apron and the rear slide block of the carriage saddle are gibbed to compensate for wear. The front gib is tapered and extends the length of the carriage. To adjust the tension of this gib loosen the slotted screw at the left end of the carriage directly above the lead screw and tighten the corresponding slotted screw #75 print 608-26 similarly located at the right end of the carriage. The slide block gib bearing on the rear of the bed is adjusted by three headless slotted screws #37 print 608-26A.

To Adjust Carriage Friction Clutch - the friction clutch controlling the feed rod transmits sufficient power for the heaviest cut. To compensate for any wear, the stop screw #11 at the top of the spring latch, left end of carriage is backed out. This holds the spring friction lever #21 further "OUT" which in turn throws the clutch friction plunger #32 further "IN" by leverage and increases the expansion of the internal clutch ring #34. To adjust the stop screw, just loosen the slotted locking screw #10 and after resetting the stop screw, re-tighten the locking screw.

Item 8 - Tailstock
(Numbers in text refer to print 608-22C)

The tailstock mounts in any position on the lathe bed and is locked in place by binder handle #30 located in the rear. Spindle movement is obtained by hand operated ball handle and is registered by fractional graduations on the upper periphery of the spindle and by dial graduations to .001". Center or other attachment is automatically ejected when spindle is fully retracted. Tailstock spindle can be adjusted off center by front and rear screws #32.

Item 9 - Slide Rest
(Numbers in text refer to print 608-9A)

To adjust Slide Rest Feed Screws -tighten slotted head screws #33 on the ends of lower and upper feed screws.

To adjust Slide Rest Gibs - both slides are fitted with gibs to compensate for wear. The top slide is gibbed at the front so all thrust from work is taken on the ungibbed surface. This gib is adjusted by two Allen screws with lock nuts #1. The lower gib is adjusted by four Allen screws with lock nuts #51.

Item 10A - Variable Speed Drive
(numbers in text refer to Variable Speed Drive Print
918S-16W)

The Worthington Variable Speed Drive is powered by a single speed motor. The entire drive is completely wired per print # enclosed, and tested in the factory. Main power line of proper electrical characteristics should be connected to leads of rear of cabinet. (Motor should turn clockwise viewed from left end when control lever is in forward position). If lathe is equipped with disconnect line switch, electrical control compartment door must be closed before disconnect switch can be thrown to "ON" position. Start, Stop and Reverse switch is mounted on pedestal at rear of headstock and an electro-mechanical interlock prevents line current from passing through the drum switch until finger contacts are engaged.

The speed control and indicator assembly is mounted on front of cabinet. To increase speed move lever to right, to decrease speed move lever to left. Ball handle #1 locks lever in position by turning clockwise. Always release same by turning counter clockwise before moving lever. Never try to change position of speed lever when drive is not running.

If headstock driving vee belt is changed, height adjustment to secure correct belt tension may be obtained by turning jack screw #20 counter-clockwise to tighten, clockwise to loosen belt. To tension motor belt loosen nut #63 and lower belt idler pulley #60 to proper belt tension. To tension variable speed drive belts turn screw #A clockwise to tighten, counter-clockwise to loosen.

Grease gun fittings #76 are provided to lubricate motor which should be greased yearly with a good grade of light motor grease.

Item 10B - Motor Jackshaft Drive
(Numbers in text refer to Motor Jackshaft Drive
Print 918R-16) (No Brake is furnished)

The motor jackshaft drive is powered by a two speed motor. The entire drive is completely wired per print enclosed, and tested in the factory. Main power line of proper electrical characteristics should be connected to leads at rear of cabinet. (Motor should turn clockwise viewed from left end when control lever is in forward position). If lathe is equipped with disconnect line switch, electrical control compartment door must be closed before disconnect switch can be thrown to "ON" position. Start, Stop and Reverse switch is mounted on pedestal at rear of headstock and an electro-mechanical interlock prevents line current from passing through the drum switch until finger contacts are engaged.

To obtain proper production speeds, three ranges are available by shifting vee belt on 3-step motor and jackshaft sheaves. Release latching handle #1 by swinging forward, thus bringing motor plate and motor forward. Shift belt manually for speed desired referring to chart on control lever. Lock latching handle #1 by pushing back. Never run drive with motor in forward position.

If headstock driving vee belt is changed, height adjustment to secure correct belt tension may be obtained by loosening hex stud clamping bolts #47 and turning jackscrew #6 counter-clockwise to tighten, clockwise to loosen belt. Jackshaft is mounted in self-aligning ball bearings, but alignment of sheaves must be maintained. Alteration of headstock driving belt ordinarily required a corresponding tensioning of motor vee belt on three step sheaves which is accompanied by turning toggle rod nut #23 clockwise to tighten, counter clockwise to loosen belt. After adjusting toggle rod nut #23 hex nuts #5 on either side of motor should be slightly tightened to secure proper locking action of latching handle #1

Motor is provided with grease fittings which should be greased yearly with good grade of light motor grease.