

YAMAHA



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SPECIAL TOOLS AND HOW TO USE THEM

June, 1967

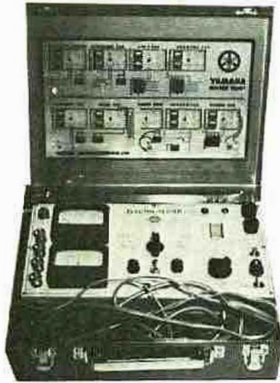
INTRODUCTION

To keep your shop in tip-top shape and to make the best possible use of your working time, Yamaha has designed this booklet telling you how to use the tools we have available. Some of our tools can be used on every model we have, while others will fit only one machine. The basic tool kit is selected from the tools we think you will most often use.

This booklet covers the usage of the most difficult tools or the ones that have no other special instructions available.

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YAMAHA ELECTRO TESTER V-0101



The Yamaha Electro Tester is a durable, well constructed electrical testing unit. It will complete most all of the electrical checking and testing to be done on any Yamaha Motorcycle. It can be used to check:

DC Voltage (0-20V) Such as generator output voltage.

AC Voltage (0-20V) Such as magneto voltage output.

DC Current (-5 to +5 Amps) Charging rate of AC magnetos.
(-20 to +20 Amps) Charging current of generators and magnetos.

(-100 to +100 Amps) Starter motor check.

Insulation test (0-20 Meg Ohms) Such as international resistance of secondary ignition coil to ground.

Resistance measurements (0-20 Kilo Ohms)

Condensor capacity measurements (0.5 Micro Farads, uF)

Spark test of ignition coil.

Ignition timing with timing light.

YAMAHA POCKET TESTER V-0106



The Yamaha Pocket Tester is a well built dependable meter with a wide range of electrical service uses. It can be used to check:

DC Current measurements (0.5 Amps) Such as charging current of magnetos.

AC Voltage (0-20 Volts) Such as magneto voltage output.

DC Voltage (0-20 Volts) Such as generator voltage output.

Resistance measurements (100-100 Kilo Ohms) for large resistances.

(0-100 Ohms) Such as contact breaker point check.

You will find this compact instrument very convenient and it will meet a large portion of electrical testing and checking on all Yamaha Motorcycles.

POINT CHECKER V-0104



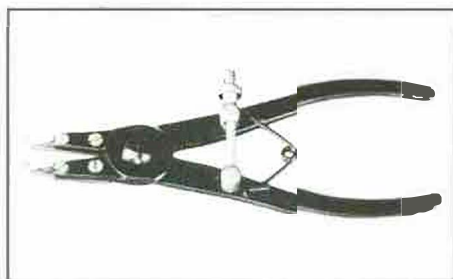
The POINT CHECKER is nothing more than a low resistance ohm meter. It tells you when the points are open or closed by a simple continuity reading. To use the tool, hook the two leads to the ignition points, one lead to each side. Rotate the crankshaft and turn the POINT CHECKER on. Watch the meter on the front of the tool, it will tell you when the points open and when they close. The dial indicator is always used with the POINT CHECKER to let you know at exactly what time the points are opening. Consult the SERVICE MANUAL for the correct time before top dead center that the points must open.

DIAL INDICATOR V-0209



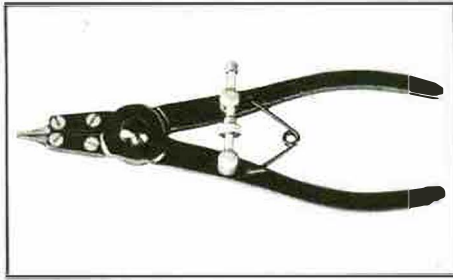
The DIAL INDICATOR or DIAL GAUGE is a very sensitive measuring device, capable of making accurate measurements to 0.01mm. It is used to check the alignment of our crankshafts and in conjunction with the point checker to set ignition timing. One full revolution of the dial needle is equal to 1 mm, each minor division on the dial is 0.01mm. The face of the dial turns to allow a reference setting for more accurate measurements.

CLIP PLIERS (RT-1) V-0317



These CLIP PLIERS or snap ring pliers are used to install or remove internal circlips or snap rings by squeezing the ends of the circlip together.

CLIP PLIERS (ST-1) V-0318



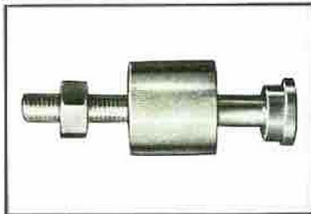
These CLIP PLIERS are used to remove or install external circlip. They are designed to spread the ends of the circlip for easy installation or removal.

CYLINDER HONING KIT V-0401



The CYLINDER HONING KIT is designed to be used in a small drill to break the glaze before installing new pistons or rings or to remove piston material from the cylinder wall in the case of a piston seizure. It is never to be used to bore a cylinder out to fit an over sized piston.

CONNECTING ROD BUSHING PULLER 15mm, V-0404



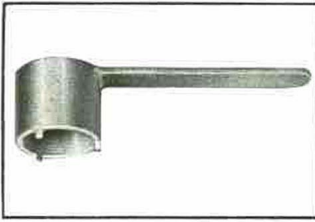
The CONNECTING ROD BUSHING PULLER is used on the 125 cc and larger machines to remove the bushing from the connecting rod. To use this tool, remove the bolt from the pot section and place the bolt through the bushing. Slip the pot over the threaded end and install the nut on the bolt. As the nut is tightened, it will draw the bushing into the pot.

CONNECTING ROD BUSHING PULLER 12mm V-0405



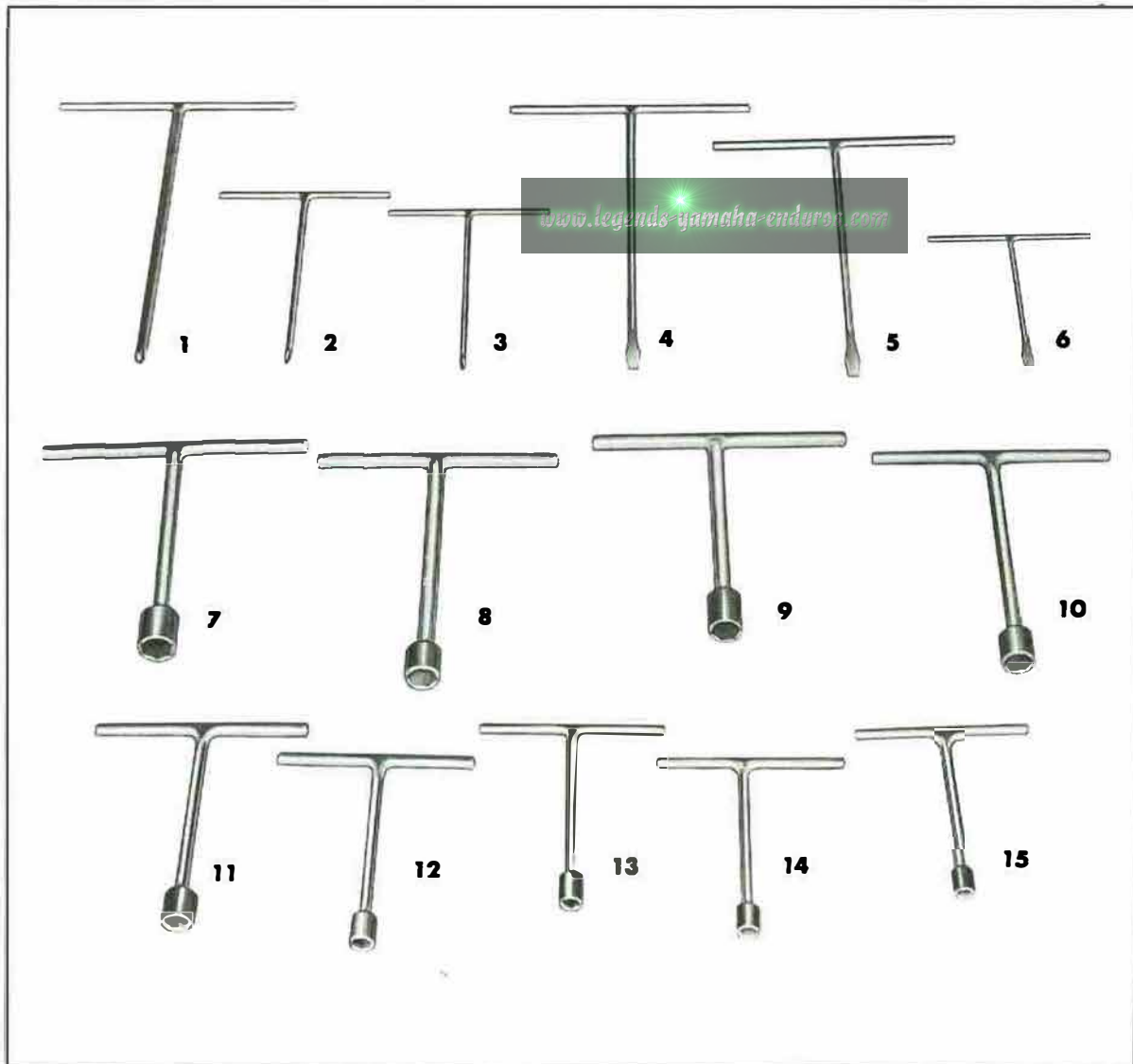
Same as above for machines less than 125 cc.

LEVEL GAUGE CLAMP LOCKING TOOL V-0406



The LEVEL GAUGE CLAMP LOCKING TOOL is used to loosen or tighten the clamp ring nut that secures the transparent oil level indicator in the side of the Autolube tank.

SCREW DRIVER AND SOCKET WRENCH SET V-0500



- 1) T Handle Screw Driver (+) Large
- 2) T Handle Screw Driver (+) Middle
- 3) T Handle Screw Driver (+) Small
- 4) T Handle Screw Driver (-) Large
- 5) T Handle Screw Driver (-) Middle
- 6) T Handle Screw Driver (-) Small
- 7) T Handle Socket Wrench 21 mm
- 8) T Handle Socket Wrench 19 mm

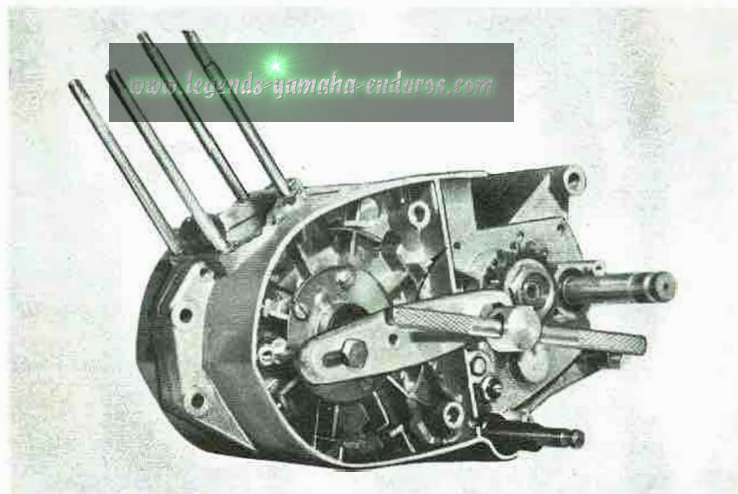
- 9) T Handle Socket Wrench 17 mm
- 10) T Handle Socket Wrench 14 mm
- 11) T Handle Socket Wrench 12 mm
- 12) T Handle Socket Wrench 11 mm
- 13) T Handle Socket Wrench 10 mm
- 14) T Handle Socket Wrench 9 mm
- 15) T Handle Socket Wrench 7 mm

INNER TUBE SETTING TOOL V-0601



The INNER TUBE SETTING TOOL is used to draw the inner front fork tube up into the steering crown on the YG1, YJ2, YA5, YA6, YD3 and the YDS2.

CRANKCASE DISASSEMBLY TOOL V-0602



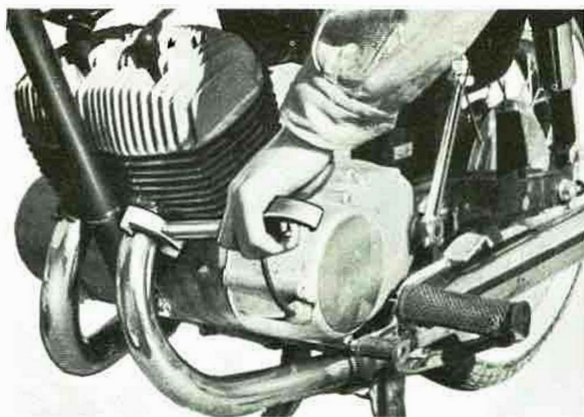
Install the CRANKCASE DISASSEMBLY TOOL as shown above. Make sure all of the engine case screws have been removed. Screw the securing screws all of the way down into the threads and make sure the cross piece is exactly level. Turn the center bolt clockwise and tap the cases with a rubber hammer to make sure the cases split evenly. Continue this turning and tapping process until the cases are completely separated. To remove the crankshaft from the remaining case, install the tool on the remaining crankcase and press the crankshaft out in the same manner in which you split the cases.

PRIMARY DRIVE GEAR PULLER V-0603



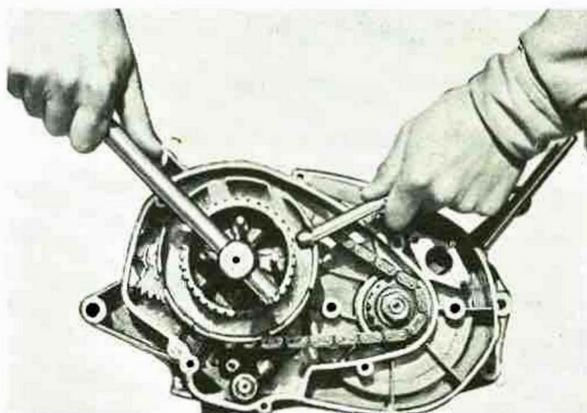
The PRIMARY DRIVE GEAR PULLER is used to remove the primary drive gear on any 250 or 305 cc machine. To use the tool, remove the securing nut on the gear and hook the claws of the gear puller over the primary gear as shown. Tighten the center bolt until the gear pulls free.

EXHAUST PIPE RING NUT WRENCH V-0604



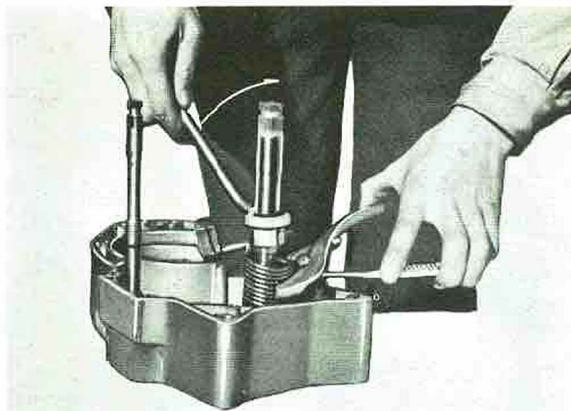
The EXHAUST PIPE RING NUT WRENCH is used as shown above to loosen or tighten the ring nuts on the exhaust pipes. A hammer and chisel should never be used here because of the possibility of damaging the cylinder or breaking the ring nut.

CLUTCH HOLDING TOOL V-0605



The CLUTCH HOLDING TOOL is used to hold the clutch when loosening or tightening the clutch hub nut. See illustration above.

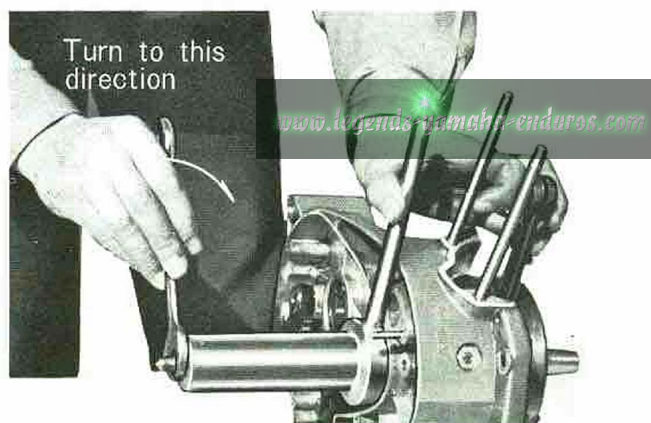
KICK SPRING TOOL V-0606



The KICK SPRING TOOL is used to wind the kick starter return spring on the 125, 250 and 305 cc machines. To use this tool install the spring over the kick starter shaft and seat the bottom of the spring in the provided hole in the case. Install the tool over the shaft and onto the spring and wind the spring around until the end of the spring aligns with the hole in the kick starter shaft. Place the end of the spring in the hole, remove the tool and place the retainer over the end of the spring.

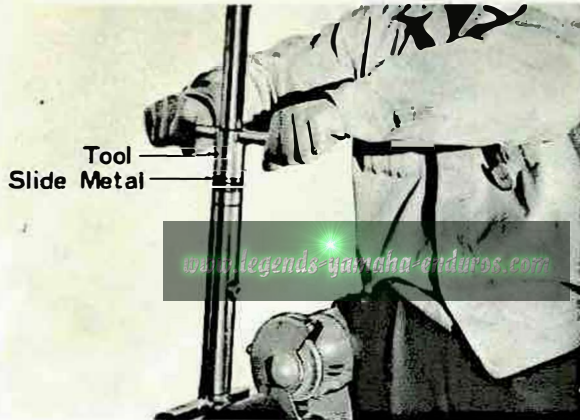
CRANK PULLING POT V-0607

CRANK PULLING BOLTS V-0608-V-0609



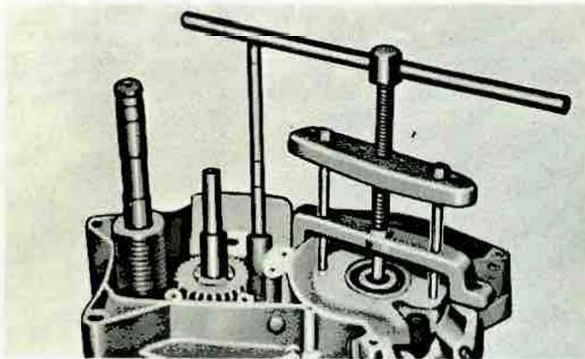
The CRANK PULLING POT is always used with the two CRANK PULLING BOLTS. When reinstalling a crankshaft into the case, these tools must be used. It is the only way you can install the crankshaft without misaligning it. Slip one end of the crankshaft through the case and install the proper pulling bolt on the end of the crank. Place the pot over the end of the bolt and install the nut on the bolt. Hold the connecting rod at top dead center and tighten the bolt. This will draw the crankshaft into the case. The CRANK PULLING BOLT #0608 is used on the YA5 and #0609 is for YD3's and YDS2's.

SLIDE METAL LOCKING TOOL V-0610



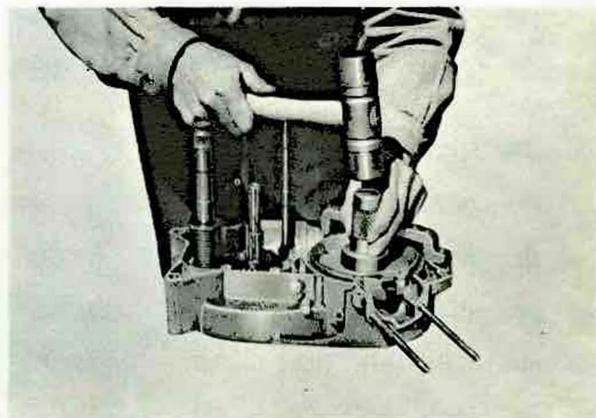
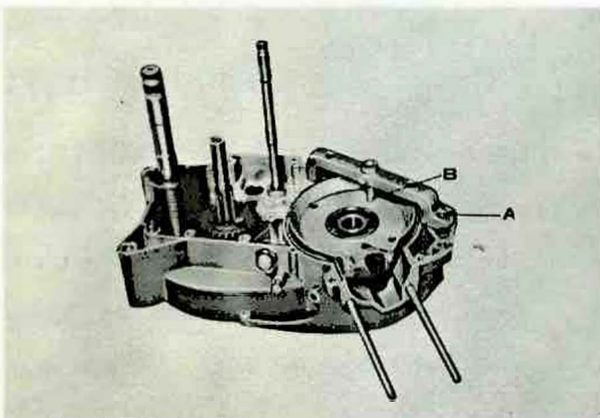
The SLIDE METAL LOCKING TOOL is used to tighten the slide metal on the front forks of the YA5. First, slip the inner tube into the outer tube with the threads down. Screw the slide metal into the outer tube and slide the tool over the inner tube. Position the tool so the claws on the bottom of the tool align with the slots in the slide metal. Use the tool to tighten the slide metal and remove the tool. See illustration above.

VALVE COVER TOOL V-0611

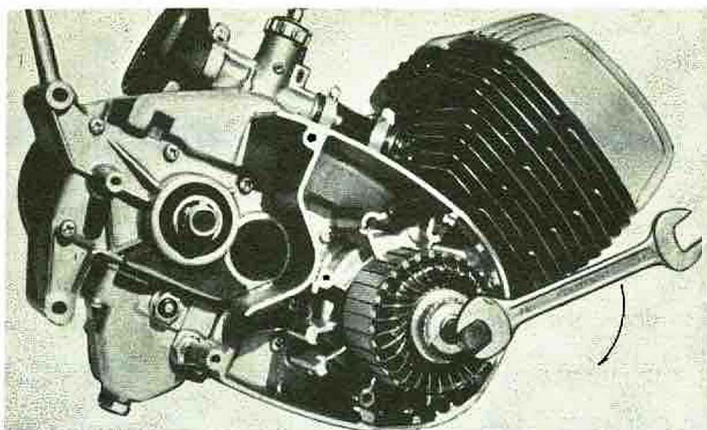


The VALVE COVER TOOL is used to remove and replace the rotary valve cover on the YA5. To remove the cover, the tool must be used in conjunction with the crankcase disassembly tool (0602), as shown in the above illustration. Be careful not to damage the outer O ring on the valve cover assembly. Attach the tools as shown above and lift the valve

cover from the case. To reinstall the valve cover, use the tool as shown below to align the cover and then tap the cover in place with a soft hammer and a piece of stock as shown on the right illustration. Never strike the cover directly with a hammer, always use something between the cover and hammer.

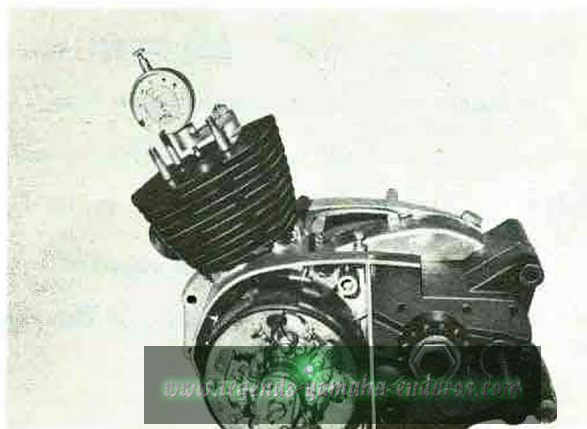


ARMATURE PULLERS V-0612, V-0613, V-0910

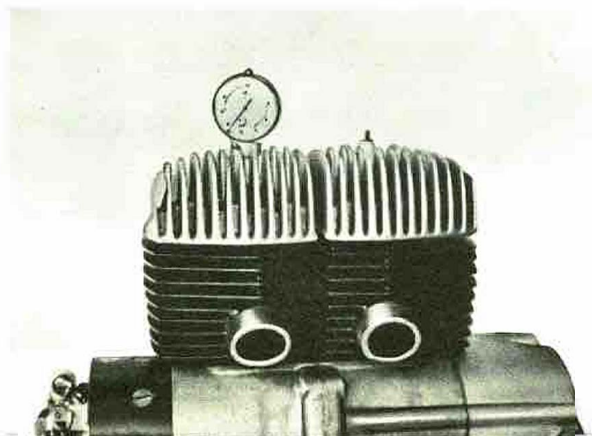


The ARMATURE PULLING BOLTS are used to remove armatures from the machines which have them. Remove the yoke assembly and install the bolt through the center of the armature as shown above. Tighten the bolt and the armature will come free. Tool #0612 is used on the YDS2,3 and YM1 series machines. #0613 is used on the MJ2, YA5, YA6, and YD3. #0910 is used on the YL1.

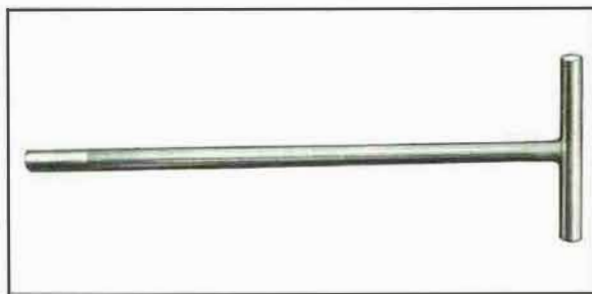
DIAL GAUGE ATTACHMENTS V-0614, V-0615



Tool #0614 is the type of attachment to be used when the head is removed from the engine. One end of the attachment slips over the cylinder stud bolt and the dial indicator positions in the other end, over the piston. Tool #0615 is the DIAL GAUGE ATTACHMENT which screws into the sparkplug hole. Never tighten the securing screws for the dial indicator too tight, it may cause the dial indicator to bind and malfunction. See illustrations above.



INNER TUBE SETTING TOOLS V-0901, V-0902



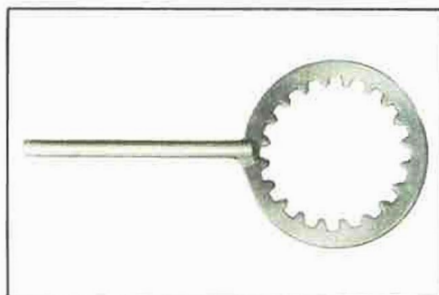
These tools are used to draw the inner tube on the front forks up into the steering crown. Tool #0901 is the old type with the coarse threads on the end. Tool #0902 has fine threads. Both tools are for the YDS-3 and YM1 series machines.

CRANKSHAFT PULLING TOOL V-0903



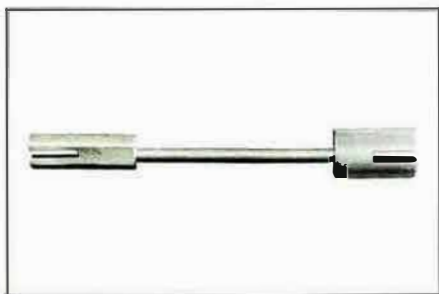
The CRANKSHAFT PULLING TOOL SET is designed for use on the YDS-3 and YM-1 series machines. Its use is identical to that of the other crank pulling pots and bolts mentioned earlier in this booklet.

CLUTCH HOLDING TOOL V-0904



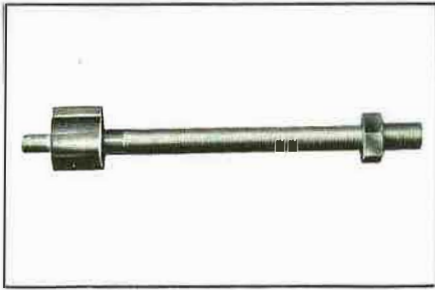
This CLUTCH HOLDING TOOL is used to hold the clutch when loosening or tightening the clutch hub nut on the YA6.

OIL PUMP ADJUSTING TOOL V-0905



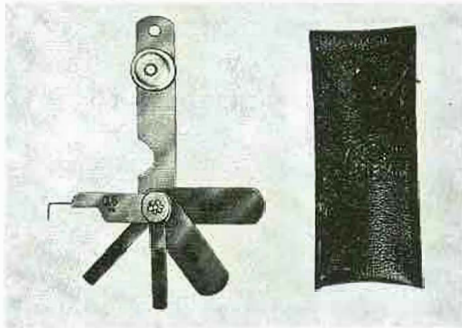
The OIL PUMP ADJUSTING TOOL is used to hold the carburetor slide at half throttle when adjusting the oil pump on single cylinder machines. The later models have a mark to indicate half-throttle, but the earlier machines have no mark on the slide.

CRANK PULLING BOLT V-0906



This CRANK PULLING BOLT is to be used with the pot portion of the crank pulling tool set when installing the crankshaft into the YDS-3 series machines. It is to be used in the same manner as the other pulling bolts.

FEELER GAUGE V-0911



This handy little tool is the only Feeler Gauge manufactured by Yamaha. It has four blades and one wire gauge. The four blades are used in setting and checking the minimum pump stroke on the Autolube oil pump. The blades can also be used to set and check ignition point gap. The wire gauge on the tool is used to check the sparkplug gap. Inside the small retainer on the opposite end of the FEELER GAUGE, is a supply of adjusting shims for the oil pump. The location on the pump for these shims is right behind the adjust plate. The minimum pump stroke allowable on any Yamaha Autolube oil pump is .15 mm. This measurement is taken with the throttle in the idle position and the starter plate rotated until the adjust plate is out as far as it will go. The place to make the measurement is between the adjust plate and the raised boss on the adjusting pulley. The optimum pump stroke is between .25 and .30 mm. Consult SERVICE NEW BULLETIN #161 for further information.

ARMATURE SHOCK PULLER (8mm) V-3028

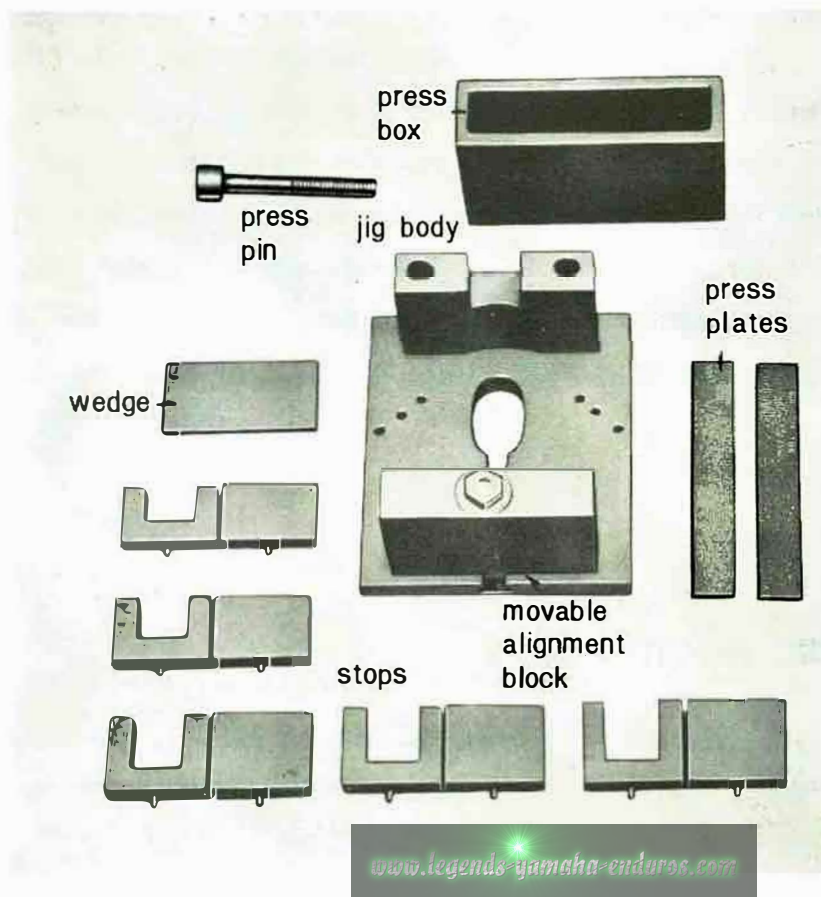


Remove yoke assembly and screw armature shock puller into armature. Pull shock puller back with enough force to cause sharp impact. The armature will then break free. This tool will fit all models with 8mm threads.

INSTRUCTIONS FOR THE NEW CRANK-SHAFT JIG ASSEMBLY AND CRANKSHAFT SEPARATOR

INTRODUCTION

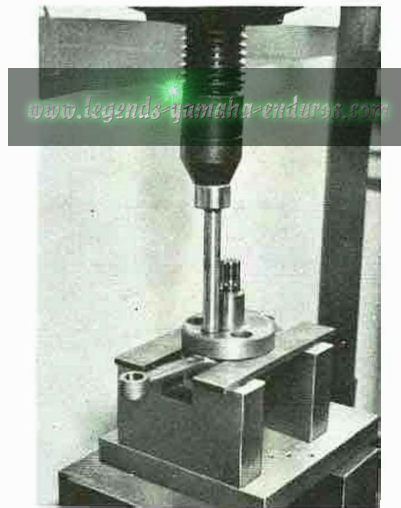
As you know, the old style cylindrical crankshaft disassembly tools have been replaced by the new Crankshaft Jig Assembly, part no. 0407. With this tool, it is possible to rebuild every Yamaha crankshaft. Pictured below is the entire Jig Assembly.



HOW TO USE TOOL V-0407 CRANKSHAFT JIG ASSEMBLY:

DISASSEMBLY:

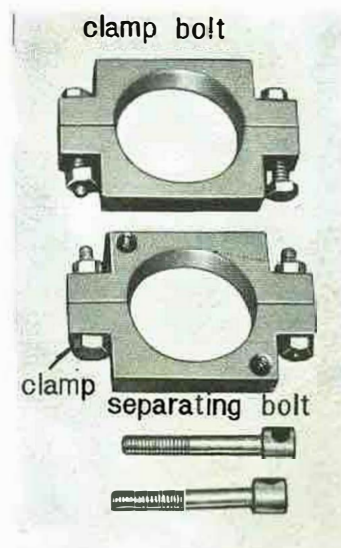
For single cylinder engines, place the Jig Body in the press. Install the two Press Plates between the crank wheels as shown below and set the crankshaft on the Jig Body. Notice the slot in the Jig Body to accept the crankshaft connecting rod. Place the small end of the Press Pin against the crank pin and with the Press, push the crank pin from the upper crank wheel.



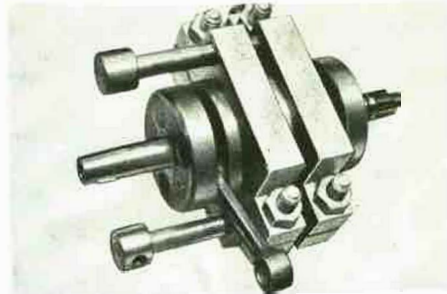
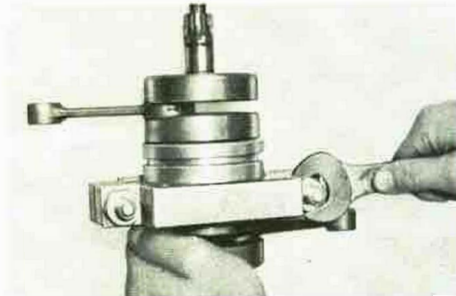
NOTE: Be sure the connecting rod is in the provided slot and that pressure is applied straight down. The Movable Alignment Block should be up tight against the lower crank wheel to relieve the strain on the Press Plates.

DISSASSEMBLY (cont.)

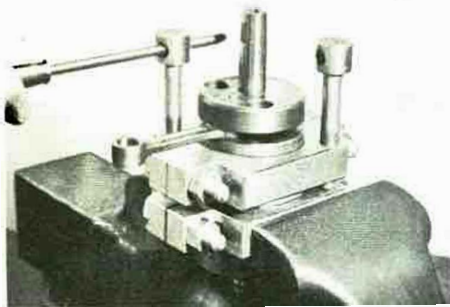
For twin cylinder crankshaft, the procedure is the same after you have separated the two halves of the crankshaft. To separate the two halves, another Yamaha tool will be needed, this tool is the Crankshaft Separator. There are two models available, tool no. 0912 is designed for the YL1 and tool no. 0403 is used to separate the crankshaft halves on the 250 and 305cc engines. The procedure for using both tools is identical. Pictured below is the Separator with its associated parts.



To use the Separating tool, place the two Clamps with the holes in their sides over the space between the center bearing carrier and crank wheel. Tap the two Clamp halves together with a soft hammer and install the Clamp Bolts as shown below in the illustration on the left. Install other Clamp and Bolts in the same manner. Screw the Separating Bolts in until they are firmly seated against the second Clamp as shown in the lower right illustration.



Place the entire assembly in a vice. Using a screwdriver or other suitable tool, make $\frac{1}{2}$ turn on each Separating Bolt alternately as shown in the lower left illustration until the crank halves are separated as shown in the lower right illustration.

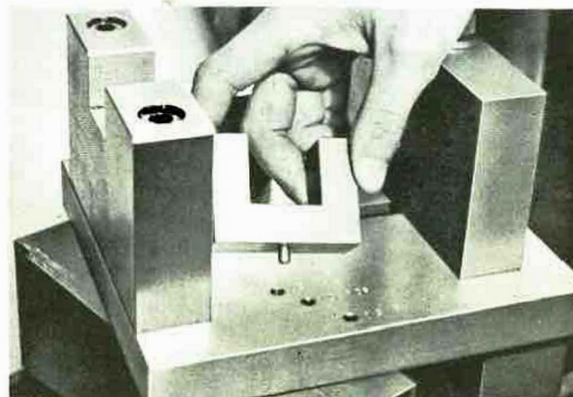


DISASSEMBLY (cont.)

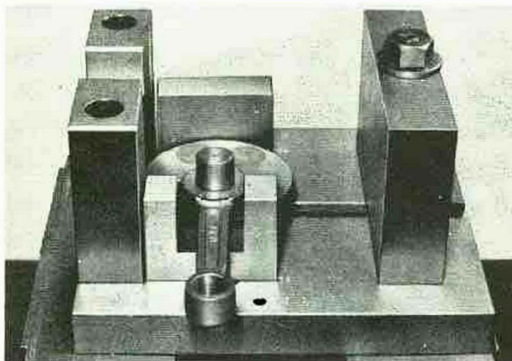
Once the two halves of the twin cylinder are separated, they may be disassembled in the same manner as the single cylinder crankshafts discussed earlier in this booklet.

ASSEMBLY:

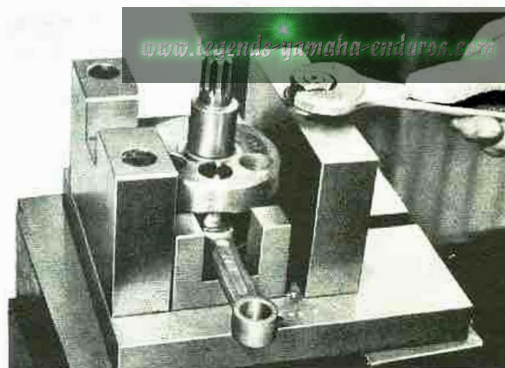
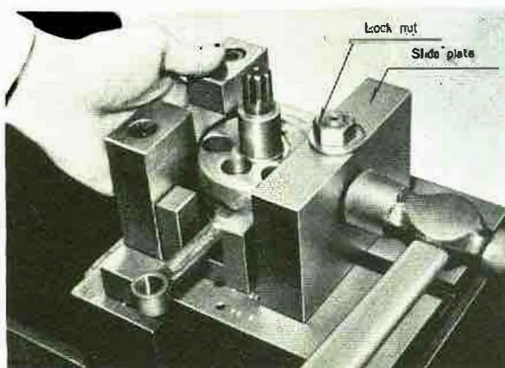
After a through inspection of all parts, assembly is ready to begin. In the Crankshaft Jig Assembly there are slotted and blank Stops, these are identified by a stamp on the side as are the holes in which they fit on the base of the Jig Body. Install the proper Stops in the correct holes in the base of the Jig Body as shown below.



Place the lower crank wheel, spacers, crank pin bearing and connecting rod in the Jig as shown below. Notice the slot in one Stop to accept the connecting rod.

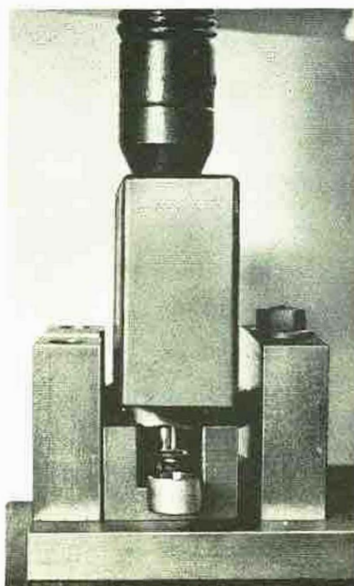


Install the upper crank wheel in place and tap the Movable Alignment block up tight against the crank wheels. Tighten the lock nut. See pictures below.

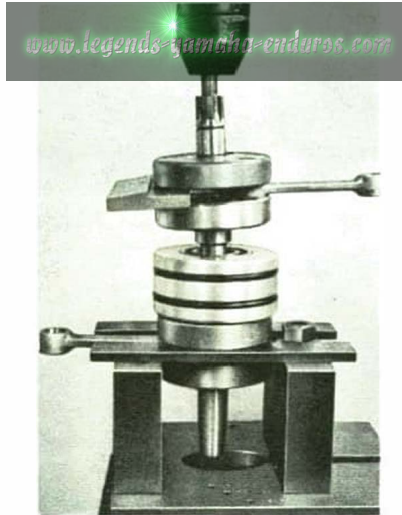


ASSEMBLY (cont.)

Place the Press Box over the upper crank wheel and with the press, apply pressure directly over the crank pin. Never use anything less than 2" in diameter against the upper surface of the press box, or damage to the Box may result. Continue applying pressure to the Press Box until the Box is flat against the two Stops on the Jig Body. This procedure will give perfect width of the wheels if the correct Stops are used. See picture below. On twin cylinder crankshafts, the crank wheels with male splines will make one half of the assembly and the other two wheels will make the other half.



When installing the two halves of a twin cylinder crankshaft together, make sure the crank pins are exactly opposite from each other (180° apart). Install the assembly into the Jig as shown below. The two Press Plates go between the two lower wheels and the Wedge must be between the two top wheels. Apply pressure until the two crank halves are firmly seated. The center splines are shouldered, so it is impossible press them too close together.



Refer to your service manual for proper alignment procedures and tolerance.

NOTE: Proper crankshaft widths are given in the Crankshaft section of your service manual