

LJ20 Distributor - Disassembly Inspection Repair

“Old Codger New To Old Suzuki Jeeps”

The odometer on this 1972 LJ20 indicated the distributor had less than 10,000 miles of wear but during that time it had accumulated 34 years of grime. The initial plan was to remove the distributor from the engine to partly disassemble, clean, lubricate internally, install new points, condenser, rotor and cap and grease the drive gear. However, after it was removed from the engine and with the points out, hand spinning the shaft produced the sound of a rough ball bearing coming from the upper part of the shaft. Replacing the bearing required complete disassembly of the distributor. The following information and pictures relate to the steps involved.

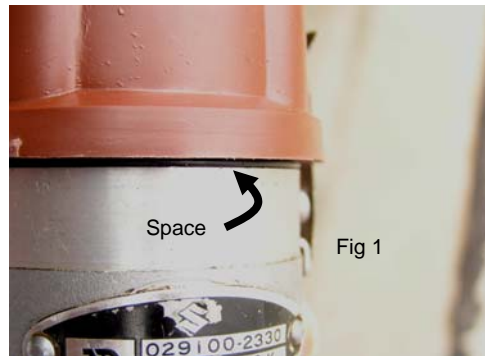
Please note: The distributor was very dirty inside and out. To provide pictures with more detail, the cleaning and repair was completed first. Then the distributor was again disassembled and reassembled while the pictures were taken.

1. Removed distributor per instructions in the service manual available on this website.

Disassembly

2. Determined the thickness of the “O” ring under the cap. (Fig 1)

A. The cap sets on top of the “O” ring instead of fitting over it. Replacing the “O” ring with one that was thicker could affect the distance between the rotor and terminals inside cap.



3. Removed distributor cap.

4. Scribed a mark on the outer housing where the condenser is attached. (Fig. 2)

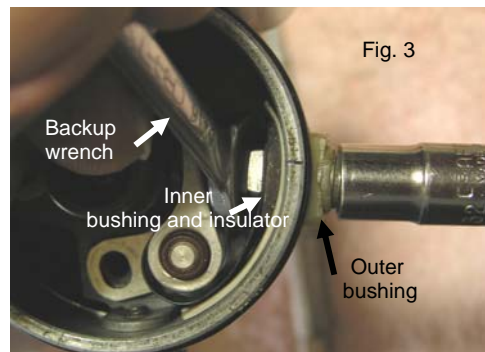
A. All scribe marks were made to help with re-assembly.



5. Removed rotor.

6. Removed the nuts (2) and all washers from the terminal bolt going through the distributor housing. (Fig. 3)

Caution: Used a backup wrench on the bolt head to prevent turning and damage to the inner or outer plastic bushings and insulator.



7. **Removed points carefully to protect insulating material and inner bushing.** (the insulator was old and brittle and broke into two pieces anyway)
8. **Removed terminal bolt with inner bushing attached.**
Did this carefully and by working bolt to one side.
(Fig. 4)

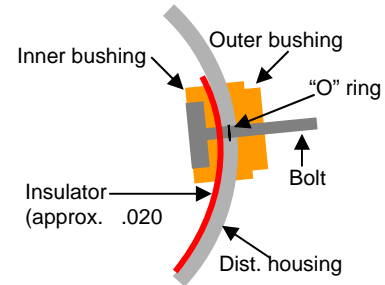
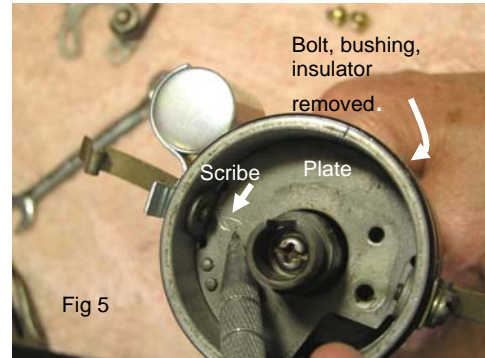


Fig. 4

9. **Removed distributor plate. (Fig. 5)**
 - A. Scribed a mark on the plate where the bolt holding the condenser and distributor cap clip comes through the case.
 - B. Removed screws from both of the clips that hold the cap on then removed the clips.
 - Caution: There is an "O" ring for each of the bolts.**
 - C. Removed plate from housing.



10. **Removed centrifugal advance weights. (Fig.6)**
 - A. Removed one end of springs from each of the weights. Removed at the end with the "e" clips leaving spring attached at other end. (Hook for removing springs was made from MIG welding wire) **Caution: Was careful not to overstretch or damage springs.**
 - B. Removed both "e" clips. (Fig 6)
 - C. Lifted weights with springs attached from their shafts.



11. **Removed distributor cam. (Fig. 7)**
 - A. Removed center screw from cam. Had to hold gear to do this.
Caution: Screw was rusted in place. It would be very hard to drill out if damaged. Applied penetrating oil (PB Blasters) followed by holding Phillips screwdriver (with good tip) in place while gently tapping down on handle with a light hammer. Did this intermittently over a period of several hours before screw could be removed.
 - B. Lifted cam from shaft.



C. Picture with plate, cam and weights removed. (Fig 8)

Note: If the upper shaft bearing was not going to be replaced, this would have been the extent of the disassembly.



12. Removed the tapered pin holding the gear to the shaft.

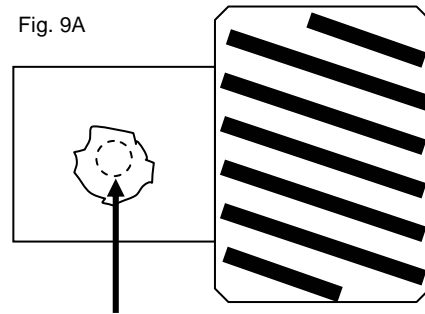
I tried both of the following steps before finally getting the pin out.

Removing pin without drilling.

- A. Used small grinder and file to cut each end of the pin to where it was very slightly below the surface of the gear. This allowed a faint outline of the pin to be seen. **(Fig. 9A)**
- B. Determined what end of the pin was the smallest diameter.
- C. Used a pin punch smaller than the pin and hammer to try to back the pin out. *Was not successful*

Caution: The gear and housing were both supported properly with wooden blocks to prevent damage to the shaft, housing and gear.

Fig. 9A



Faint outline of pin in ground off area

Removing pin by first drilling.

- D. Used a small square and scribe to mark alignment of center of pin with bottom of gear. Did this for both ends of pin. **(Fig. 9B)**



- E. Used scribe and straight edge to mark bottom of gear connecting the two marks made in the previous step. **(Fig. 9C)**



- F. Visually aligned mark on bottom of gear with drill bit and then drilled part way through the length of the pin. (Fig. 9D)

Caution: Used bit smaller than pin
Caution: The drilling was done very carefully as the bit needs to stay inside the pin to prevent damage to the gear and shaft.

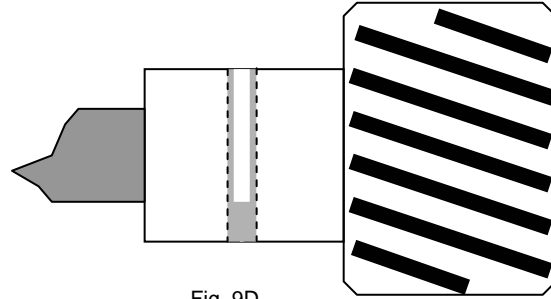


Fig. 9D

- G. Using a pin punch smaller than the drill bit, the remaining portion of the pin was driven out with a hammer. (Fig. 9E)

Note: Placing the punch in the bottom of the hole caused the force of the hammer to actually pull the pin out of the shaft.

Caution: Both gear and housing must be properly supported to prevent bending the shaft due to hammering.

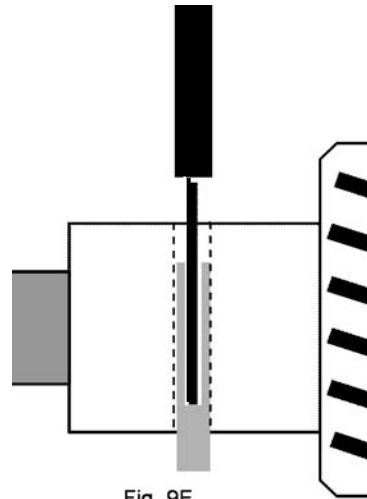


Fig. 9E

13. **Removed gear from shaft.** Had to twist gear to get it off.
14. **Removed shaft from housing.** Used plastic hammer on bottom end of shaft to drive it out of housing. A press could also be used for this step.
Damage to the upper bearing was not a concern as it was going to be replaced.

15. **Removed ball bearing from housing.** (There has to be a puller somewhere for this purpose but this is how this "Okie" did it)
- A. Working from the top of housing, removed "C" clip from top of bearing.
- B. Working through the bottom bushing, a small rod and light hammer was used to drive the bearing out of the housing.
- i. Did this by moving the rod back to forth and right to left, to tap lightly on alternating sides of the bearing race. The intent was to cause the bearing to move a small amount with each tap.

Caution: As the steel rod was harder than the aluminum housing, this had to be done very carefully to prevent damage to housing.

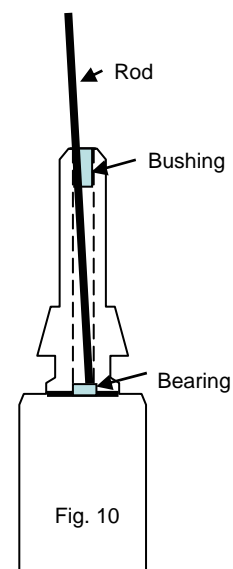
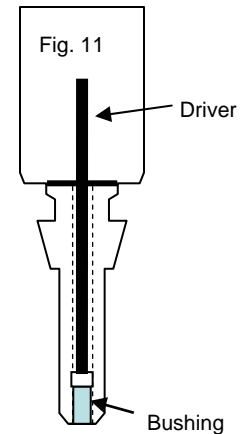
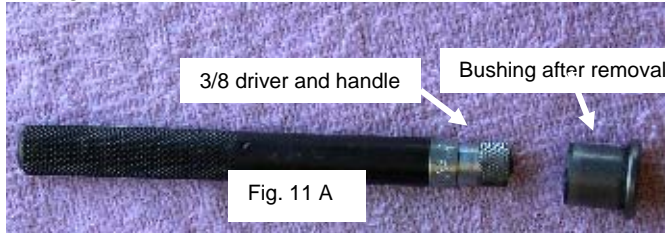


Fig. 10

16. Removed bushing from bottom of housing. Note: Although the bushing was reused, it had to be removed to allow the new upper bearing to be properly pressed back into the housing and the shaft back into the bearing.

A. Working from top of housing, a driver with a 3/8 in. end was used to drive the bushing out the bottom of the housing. (Fig. 11 and Fig 11A)



Cleaning

17. Non metal parts that were to be reused were wiped clean with dry cloth.

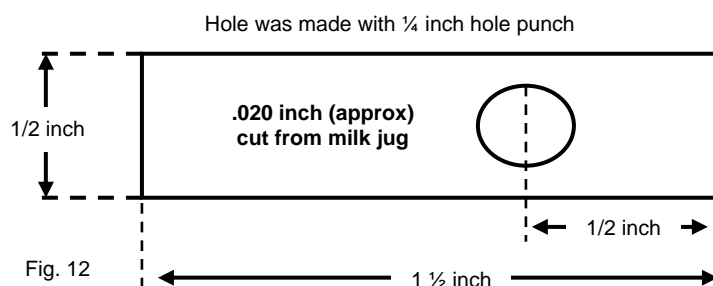
18. Metal parts that were to be reused were cleaned as follows:

- A. Used solvent suitable for aluminum.
- B. Because they are so fragile, little cleaning was done to the springs on the centrifugal advance.
- C. Took special care to clean the spiral groove in bottom of shaft as it was full of hard residue. (The bushing gets its lubrication through this groove.)
- D. After cleaning with solvents, all parts were washed in hot soapy water.
- E. The parts were then washed in clear hot water.

Inspection

19. Inspected as follows:

- A. Cam – Used calipers to compare worn area with non-worn area. Wear was approximately .001 inch overall (.0005 on each lobe). It looked worse than it was. Not the best but the best I had.
- B. Cam – With the cam on the shaft no side to side movement could be detected by hand.
- C. Advance weights and shafts - When mounted on their shafts, very little wear was indicated.
- D. Upper ball bearing – Replaced with new one available at local parts stores. Note: This bearing can be found in a wide range of prices as it is used for automotive and also skate boards, wheel chairs, etc. I chose to use the higher priced one.
- E. Bottom bushing – With both parts cleaned and the bushing placed on the area of the shaft where it normally runs, hand pressure applied side to side on the bushing produced no noticeable movement between the bushing and shaft. .
- F. “O” rings - Was able to find replacements that would work for all “O” rings except the outer one on the part of the case that fits down into the engine.
 - i. For the new ring under the cap, had to use one with a smaller outside diameter ring. The resulting stretch reduced the diameter of the rubber to where the space under the cap was acceptable. (See step 1.0 Fig. 1)
- G. Points, condenser, rotor and cap were purchased new from Steve @ Brute 4 Parts.
- H. Inner and outer plastic bushings on bolt were reused.
- I. Due to the broken insulator, a new one was made using plastic cut from side of one gallon

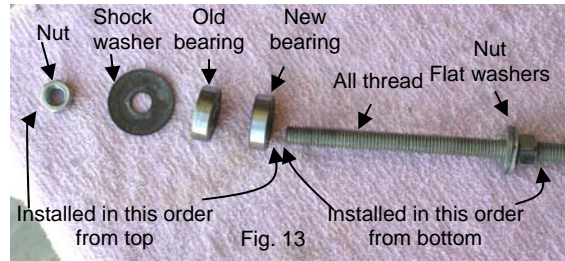


plastic milk jug. (Fig 12)

Assembly

20. Installed new ball bearing in housing.

- A. Used new bearing to select bushing driver that was smaller than the outer diameter of the bearing that would still rest on the bearing's outer race. (I used one with 55/64" OD)
- B. A puller was made using 3/8 in. "all thread" with nuts, flat washers, and one "cupped" 3/8 in. washer from a shock absorber, plus the old bearing. (Fig. 13)
- Positioned new bearing in case.
 - Installed other parts as shown. (Old bearing was used to prevent damage to new one – The shock washer was installed cup side down so it would press on old bearing's outer race only)
 - Used socket and wrench to pull new bearing part way into cavity in housing, stopping just before old bearing was about to enter cavity.
 - Removed old bearing from puller and in its place added the bushing driver selected in step "A" above.
 - Reassembled puller and completed pulling new bearing down into cavity being careful that the bushing driver did not contact/damage the distributor housing. .
- C. Removed puller assembly.
- D. Installed "C" clip to hold bearing in place.



21. Pressed shaft into bearing. (Fig 14)

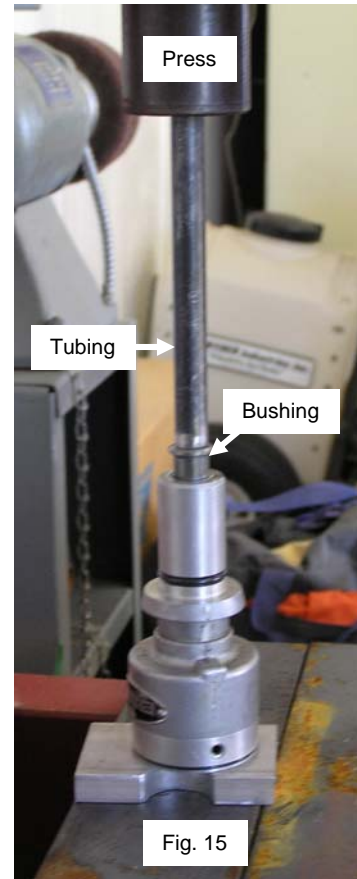
- Cut piece of 1/2 inch thin wall steel tubing (Lowe's Home Improvement) slightly longer than bottom part of shaft.
- Placed shaft into new bearing from the top and slid shaft into the bearing as far as it would go with hand pressure.
- Placed tubing over bottom of shaft in housing to the point that the tubing was against the bottom of the inner race of the new bearing.
- With a small block of aluminum protecting the upper end of shaft, a press was used to press the shaft down into the bearing.

Caution: Not wanting to remove/replace the bottom bushing, I first tried driving the shaft into the bearing with a small hammer and without having the tubing to back-up the inner race of the bearing. This resulted in a damaged bearing which cost \$17 plus another trip to the parts store.



22. Pressed bushing into bottom of case. (Fig. 15)

- A. Placed distributor upside down in the press protecting the open end of the housing with a small block of aluminum.
- B. Pre lubricated shaft with outboard motor oil.
- C. Placed bushing and steel tubing over shaft in that order.
- D. Pressed bushing into case and over shaft.

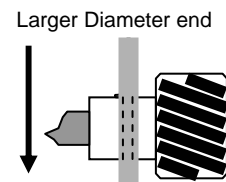


23. Installed gear on bottom of shaft.

- A. Selected new tapered pin (local hardware store) that fit shaft without side to side movement and long enough to extend on both sides of gear.
Caution: When completed, gear must be tight on shaft with no movement between gear and shaft.

- B. Determined the direction that the pin should enter the shaft and gear. (Fig 16A)

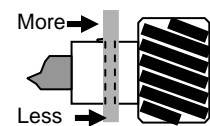
- i. Trial fitted pin into shaft from both directions, choosing the direction that accepted more of the pin's length.
- ii. Trial fitted pin into gear from both directions choosing the direction that accepted more of the pin's length.



- C. Determined how long the pin needed to be. (Fig. 16B)

- Caution: Had to leave enough of the pin extending to allow peening of both ends.**

- i. Temporally placed gear on shaft and pushed pin in solidly by hand in the appropriate direction.
- ii. Marked both ends of the pin allowing more (3/16 in. +) of the larger diameter end to extend and less (about 1/8 in.) of the small end to extend...
- iii. Removed pin and used die grinder with cut-off wheel to cut pin to length.



iv. Cleaned gear, shaft and pin making sure that there were no cuttings.

Caution: Two people were used in the following three steps. One person held the distributor so as to prevent damage.

D. Installed gear on shaft and pin into gear/shaft from appropriate direction.

E. Using a small socket resting on a solid surface as a backup, (**Fig 16C**) a ball pain hammer and pin punch was used to drive pin into shaft and gear. The socket provided support for the gear while allowing opening for pin to be driven tight into the shaft and gear. The upper end of the pin was then peened over with the hammer and punch making it larger in diameter and tight in the hole.

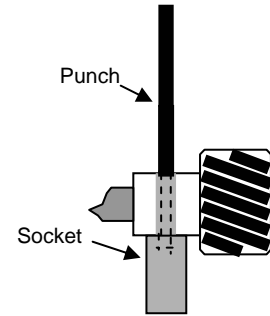


Fig. 16C

F. Using a solid surface as a support, (**Fig. 16D**) the gear was turned one-half turn and the hammer and pin punch were used to peen the opposite end of the pin, making it larger in diameter and tight in the hole.

Caution: Step “F: above was repeated on each end of the pin until satisfied that the gear was solidly connected to the shaft.

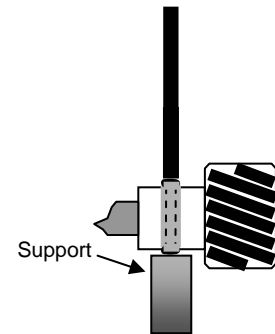


Fig. 16D

24. Installed centrifugal advance weights.

A. Lubricated the posts that the weights mount to. (CRC White Lithium Grease from local parts store – I put it in syringe) (**Fig 17**)

Caution: All grease inside distributor was applied sparingly.

B. Installed weights to post, installed “e” clips.

C. Attached springs still attached to weights to post.

Caution: Verified that springs were located in groves in post.

25. Installed cam.

A. Lubricated shaft where cam slips over it and also lubricated inside of cam.

B. Installed cam on shaft aligning slots in bottom cam over protrusions on weights. .

C. Lubricated the flat washer on the screw that holds cam in place.

D. Installed screw.

Caution: The screw should be bottomed out when tight leaving the cam free to rotate slightly on shaft. If it can't be easily rotated slightly by hand, something is wrong.



Fig. 17

26. Installed plate inside distributor.

A. Placed plate inside housing aligning the scribe marks on both the plate and on inside of housing.



Fig. 18

- B. Assembled clips as shown. **(Figure 18)** Note that part of one of the clips is made on the new condenser.
- C. Installed new “O” rings on bolts after the clips. (!/16 X 1/8 X 1/4 inch “O” rings seemed to fit ok)
- D. Installed clips on outside of housing by screwing screws into plate. **Important: The clip attached to the condenser attaches at the scribe mark on the outside of the housing.**

27. Installed terminal bolt, inner bushings, insulator, “O” ring, and outer bushing. (Fig 4)

- A. Assembled terminal bolt, inner bushing, and insulator in that order and installed from inside of case.
- B. Placed new “O” ring (1/16 X 5/32 X 9/32) on bolt and pushed it into hole in housing.
- C. Installed outer bushing and lock washer and one nut on bolt.
- D. Left nut loose.

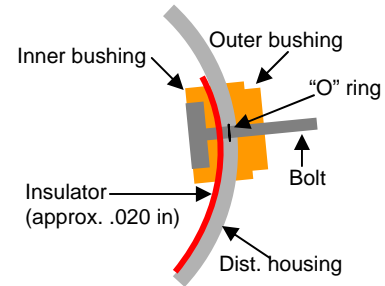


Fig. 4

Caution: Insulator needs to fit over shoulder on inner bushing. Also, outer bushing has two shoulders requiring that the proper shoulder was installed toward housing.

28. Installed points assembly (Fig. 19).

- A. Points can be installed as two separate pieces or with the two pieces assembled.

Cautions:

Insulator must insulate spring on points from housing (see location of white insulator made from milk jug in Fig 19).

The notch on the end of the spring fits over the bolt between bolt head and inner bushing.

The protrusion on bottom of points must be inserted in the proper hole in the plate.

Points must set flat on plate before screws are tightened.

- B. Tightened previously installed nut on terminal bolt.

Cautions:

Used back-up wrench on bolt.

Did not over tighten.

Made sure that spring on points was not twisted during tightening process.

- C. Used small packet of lubricant that came with points to lubricate cam lobes and rubbing block on points.

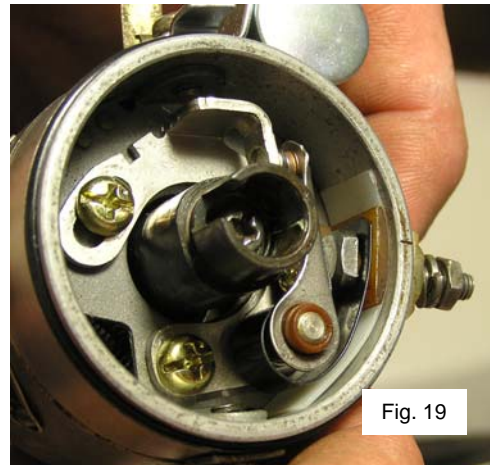


Fig. 19

29. Lubricated cam lobes.

- A. Placed small amount of lubricant on cam lobes and hand turned distributor for a few turns in direction of arrow cast into outer side of housing. This resulted in lubricating the cam and also collecting a small amount of lubricant on the rubbing block which will be applied/used over time as the block wears away.

30. Completed the following per instructions in the service manual found on this web site.

- A. Adjusted points.
- B. Greased distributor gear.
- C. Installed distributor

31. Connected the condenser wire and the wire from the coil to the terminal bolt.

A. Secured wires to bolt with the flat washer, second lock washer and the second nut.

32. Installed rotor, cap and spark plug wires into cap.

33. Set timing per instructions in service manual.