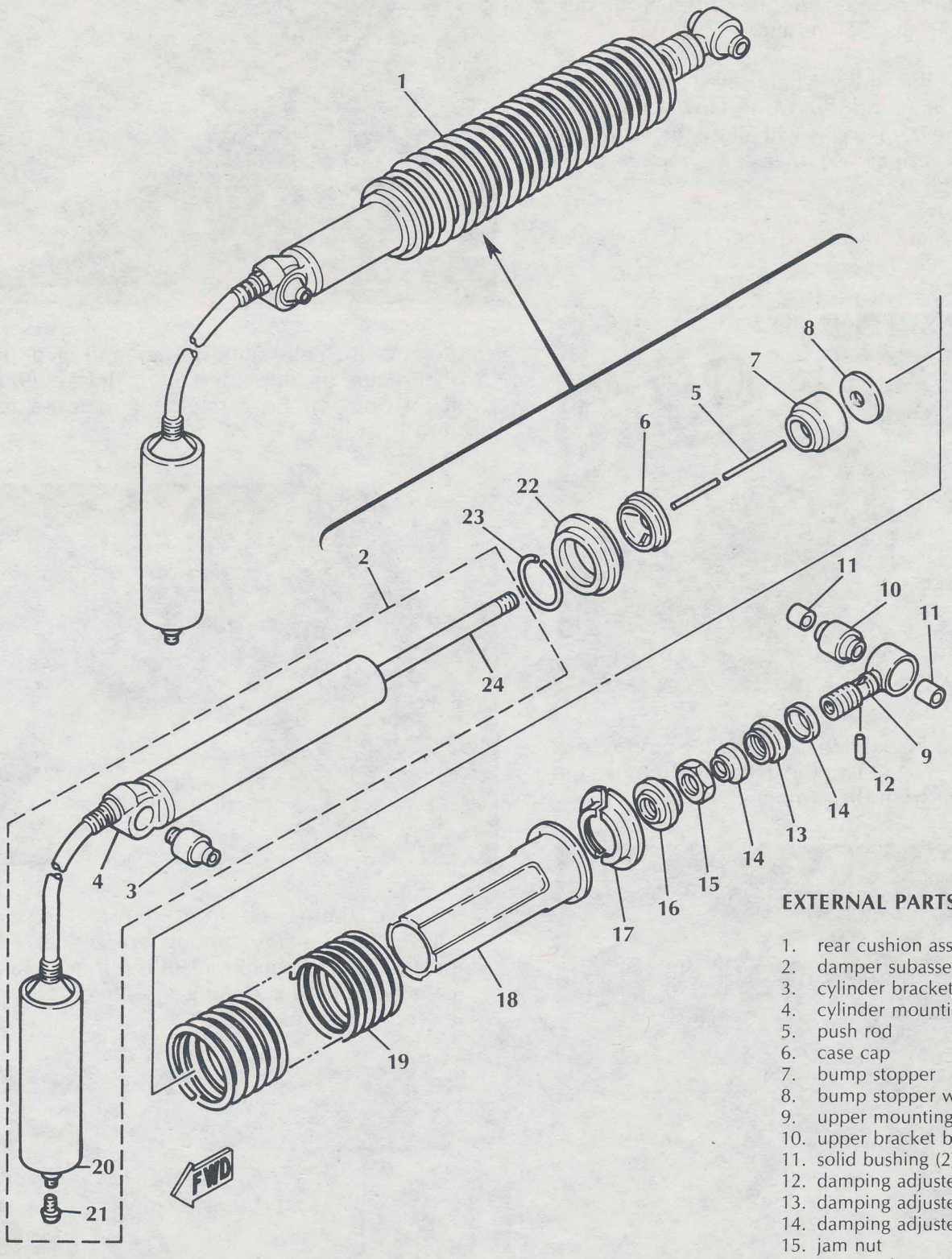
CHAPTER 5. THE R MONOSHOCK



EXTERNAL PARTS

1. rear cushion assembly
2. damper subassembly
3. cylinder bracket bushing
4. cylinder mounting bracket
5. push rod
6. case cap
7. bump stopper
8. bump stopper washer
9. upper mounting bracket
10. upper bracket bushing
11. solid bushing (2)
12. damping adjuster pin
13. damping adjuster
14. damping adjuster cover (2)
15. jam nut
16. spring adjuster
17. spring retainer (2)
18. spring guide
19. spring
20. gas reservoir
21. panhead screw
22. spring seat
23. circlip
24. shock rod

REMOVAL FROM THE MOTORCYCLE

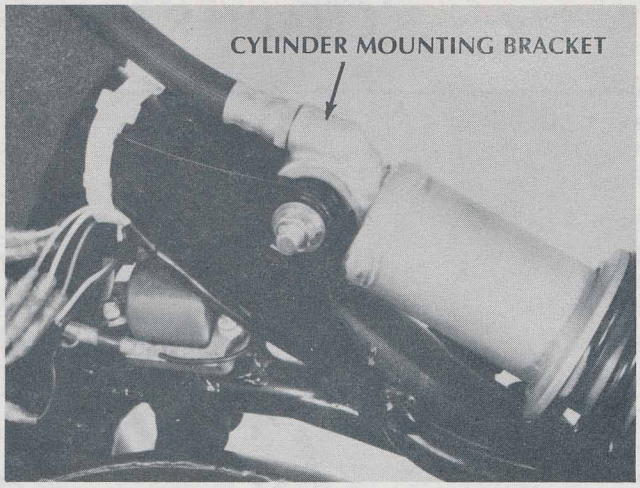
1. Elevate the rear wheel by placing a suitable stand under the engine. Be sure that the petcock is in the OFF position.

2. Loosen the drive chain by removing the master link, and remove the lower tensioner from the frame. This will allow the swingarm to move freely so that the shock can be removed.

3. Remove the seat and fuel tank from the motorcycle.

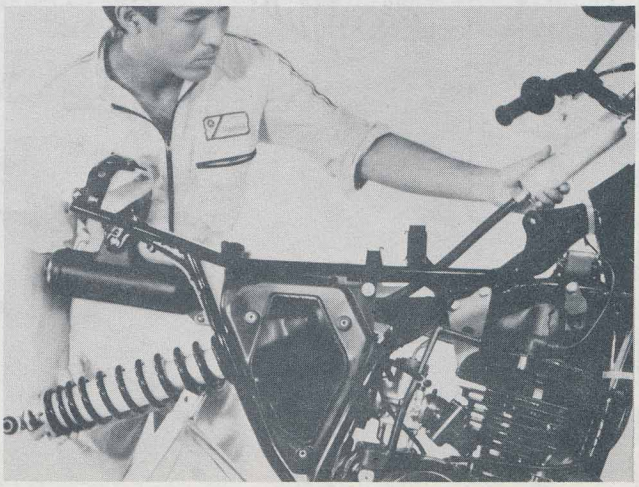
4. Remove the band that secures the monoshock gas reservoir (20) to the frame and remove the reservoir from the grommet.

5. Remove the cotter pin, nut, and bolt that secure the cylinder mounting bracket (4) to the upper part of the frame.



6. Remove the cotter pin, washer, and pivot pin that secure the upper mounting bracket (9) to the swingarm. Be careful not to loose the thrust washers.

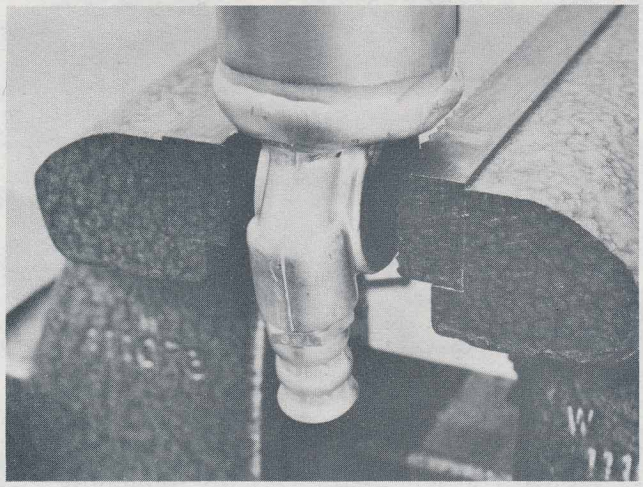
7. Remove the shock from the motorcycle. Grasp the upper mounting bracket (9) and gently pull the shock out of the frame. Take care not to damage the gas reservoir (20) or the rubber hose.



REMOVING THE EXTERNAL PARTS

Before removing any components, clean all the dirt and oil from the monoshock. Measure the set length of the spring, and note the position of the damping adjuster (13). You will need this information when reassembling the monoshock.

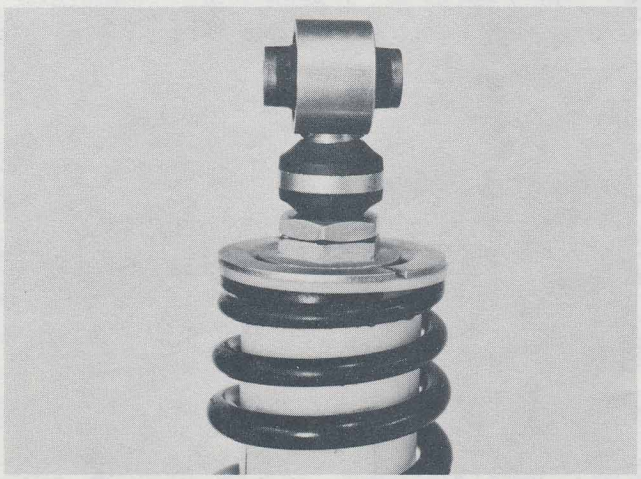
1. Secure the monoshock in a vise with soft jaws. Grip the cylinder mounting bracket (4) as shown in the photograph.



2. Loosen the damping adjuster (13) until it contacts the upper mounting bracket (9).

3. Loosen the jam nut (15) and thread it up against the damping adjuster (13).

4. Loosen the spring adjuster (16) and thread it up against the jam nut (15).



5. Compress the spring (19) and remove both spring retainers (17).

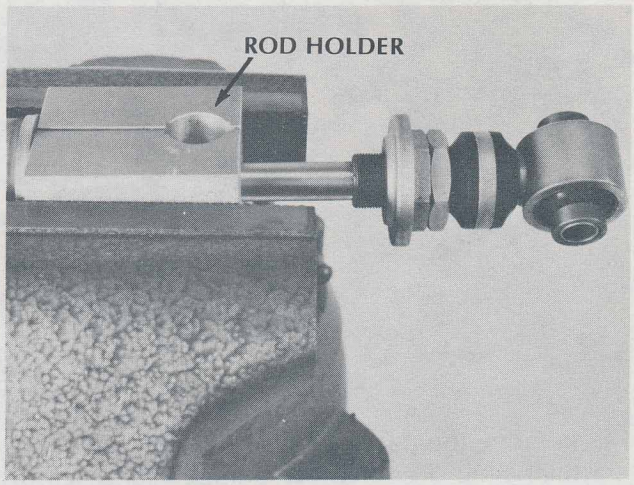
6. Remove the spring (19), spring guide (18), and the spring seat (22).

7. Remove the damper subassembly from the vise. Clean all dirt and oil from the rod holder.

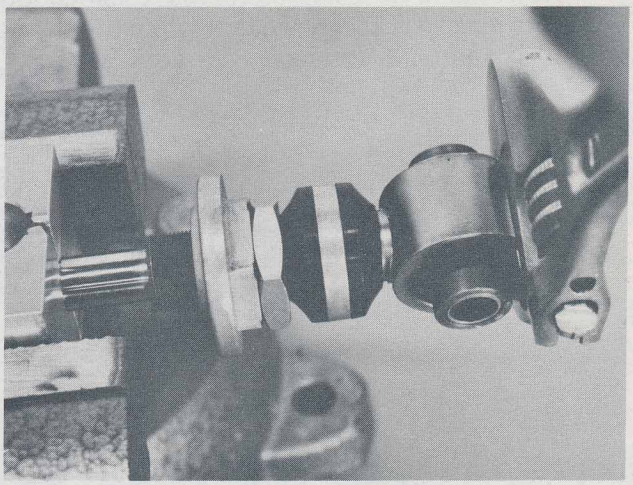
8. Place the shock rod (24) in the rod holder and secure the rod holder in the vise. The rod holder must firmly grip the rod.

CAUTION: Do not slide the rod holder over the shock rod. The rod must not be scratched, nicked, or damaged in any way. Any damage to the rod could lead to a seal leak.

Lee Waldie Craig Scott Chris Koira



9. Place a crescent wrench on the upper mounting bracket (9) as shown in the photograph. The flats of the wrench must rest against the eye of the bracket.



10. Steady the wrench with your free hand and remove the upper mounting bracket (9) from the shock rod (24).

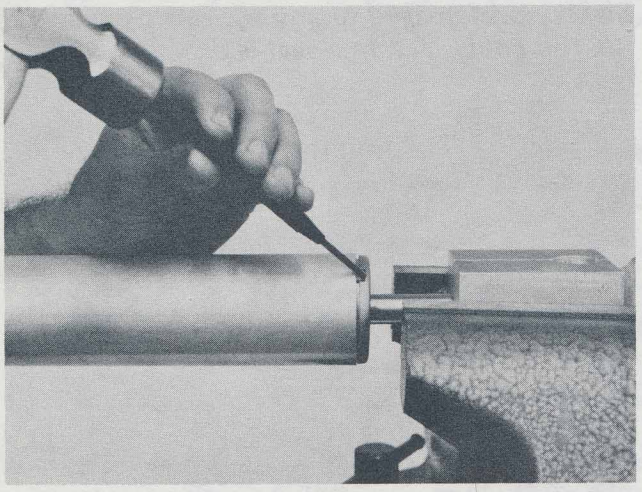
CAUTION: The bracket is secured to the shock rod with Loctite. Be sure the rod does not rotate in the rod holder.

11. Remove the bump stopper washer (8) and the bump stopper (7).

12. Remove the push rod (5) from the shock rod and place it on the bench.

CAUTION: Do not bend the push rod.

13. Carefully remove the case cap (6) with a drift punch. Be sure to drift around the entire circumference of the cap.

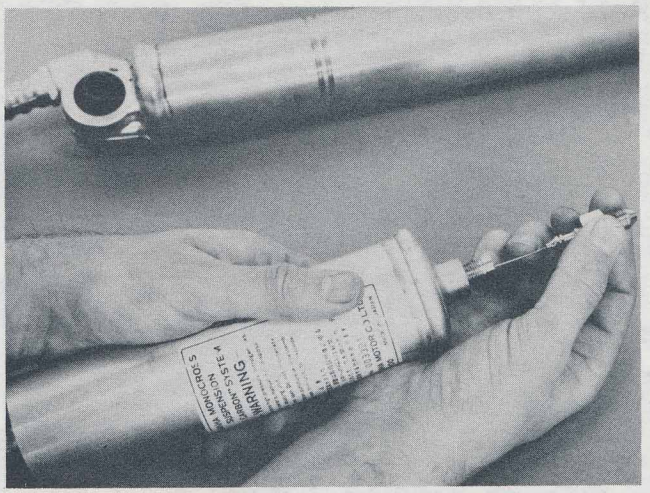


14. Remove the panhead screw (21) from the gas filler plug. Remove the damper subassembly from the vise.

15. Lubricate the needle of the check gauge and check the gas pressure in the gas reservoir. If the pressure is low, check for a gas leak. Repressurize the system and immerse the reservoir and hose in water. Note the location of the leak so you can repair it when the shock is disassembled. Proceed with your work.

16. Lubricate the monoshock needle and insert it in the gas filler plug. Bleed **all** the gas from the monoshock.

CAUTION: Direct the gas reservoir and the cylinder away from you whenever checking or bleeding the gas.

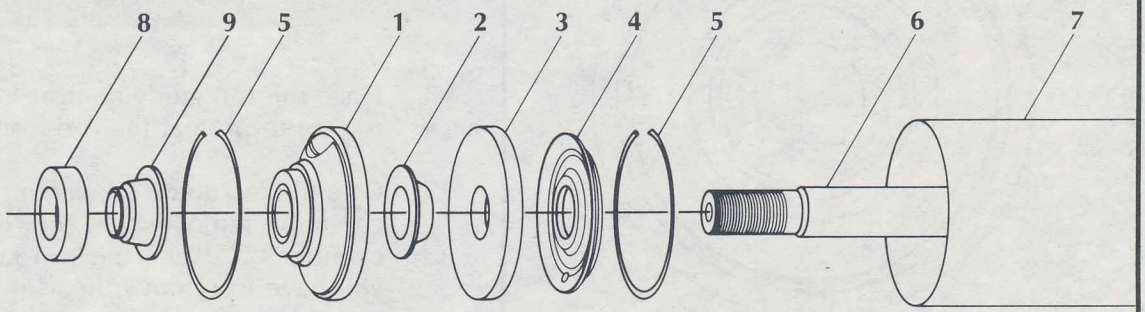


17. When the gas has been bled, gently push the shock rod (24) into the cylinder until it bottoms. This will help bleed any remaining gas. Keep the needle in the plug until instructed to remove it.

REMOVING THE ROD GUIDE AND RELATED PARTS

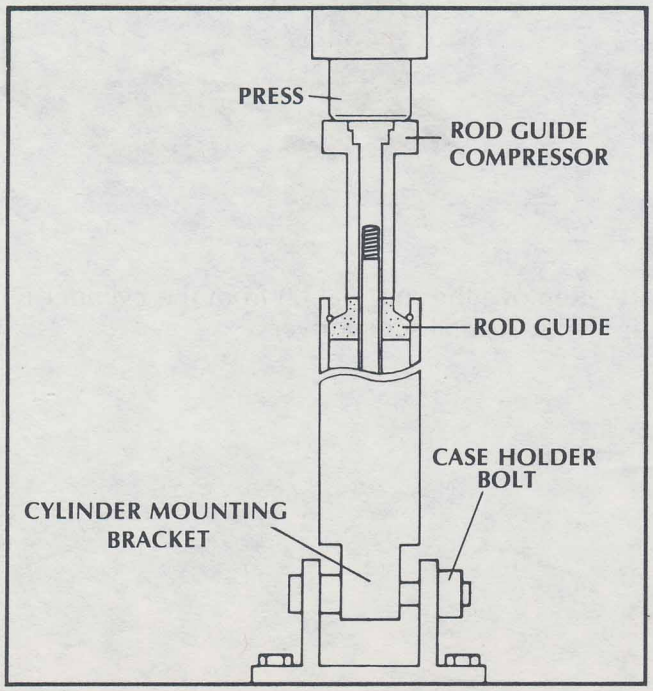
ROD GUIDE AND RELATED PARTS

1. rod guide
2. rod seal
3. static seal
4. seal retainer
5. circlip (2)
6. shock rod
7. cylinder
8. seal ring housing
9. dust seal



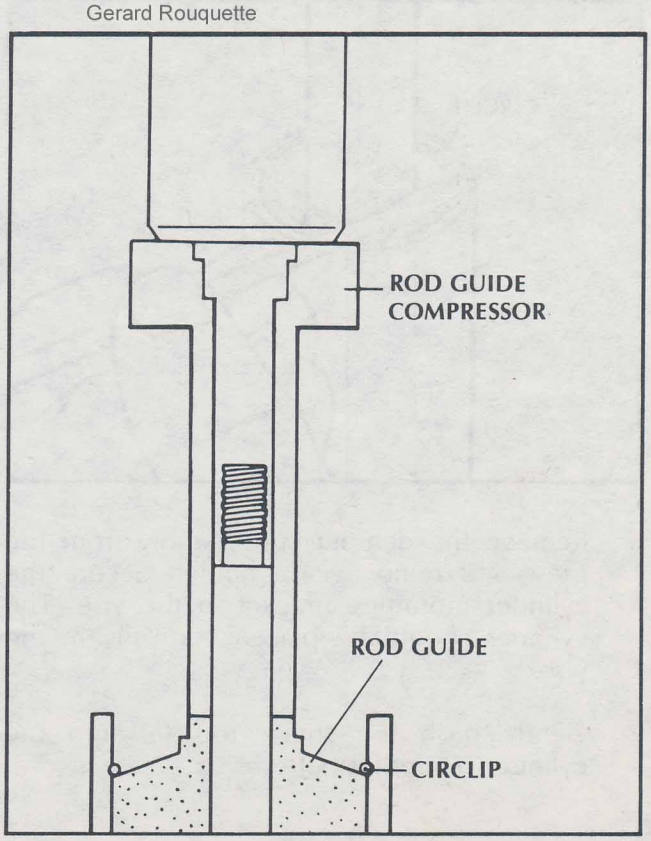
1. Place the case holder in the press.

2. Install the rod guide compressor on the damper subassembly, and secure the subassembly in the case holder. The case holder bolt must pass through the cylinder mounting bracket as shown in the illustration. Carefully align the damper subassembly in the press.



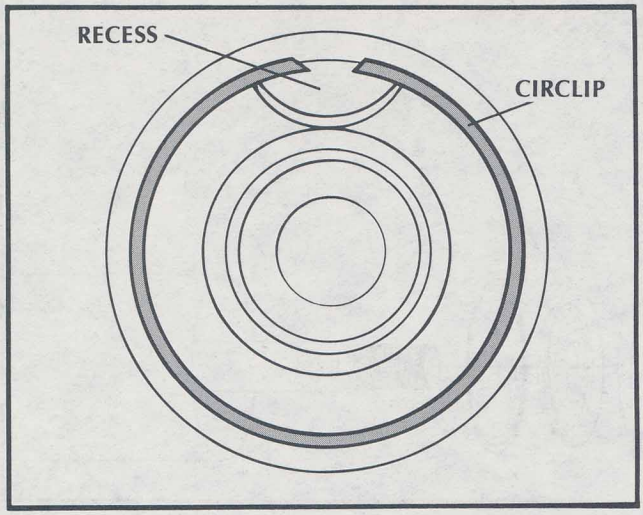
3. Slowly apply pressure to the rod guide compressor. Compress the rod guide (1) until the upper circlip (5) is exposed. Use a minimal amount of pressure. Excessive pressure could damage some of the internal parts.

Gerard Rouquette

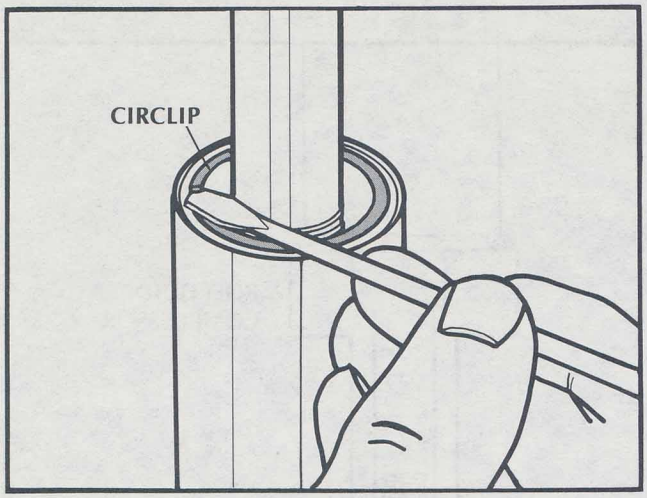


4. Rotate the circlip in the circlip groove until the circlip ends are in the recess of the rod guide; see the illustration below.

CAUTION: If the circlip cannot be rotated within the groove, the damper subassembly may be off center. Remove the damper subassembly from the press and carefully realign it.

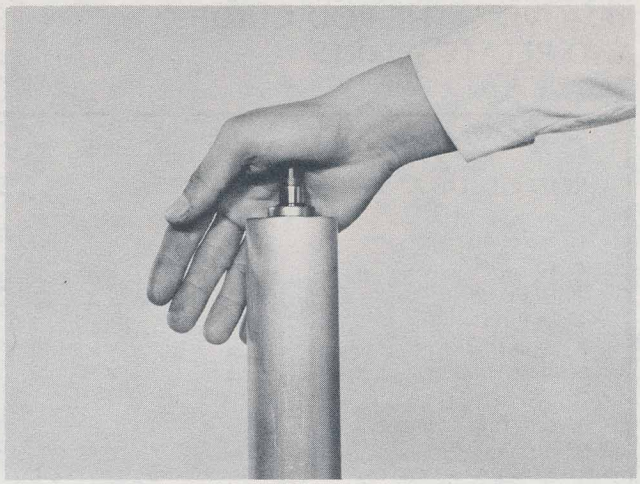


5. Using a scribe or two small screwdrivers, carefully remove the upper circlip (5) from the cylinder. Be careful not to scratch the cylinder walls.



6. Remove the damper subassembly from the press and remove case holder. Secure the cylinder mounting bracket in the vise. The cylinder should be placed vertically in the vise.

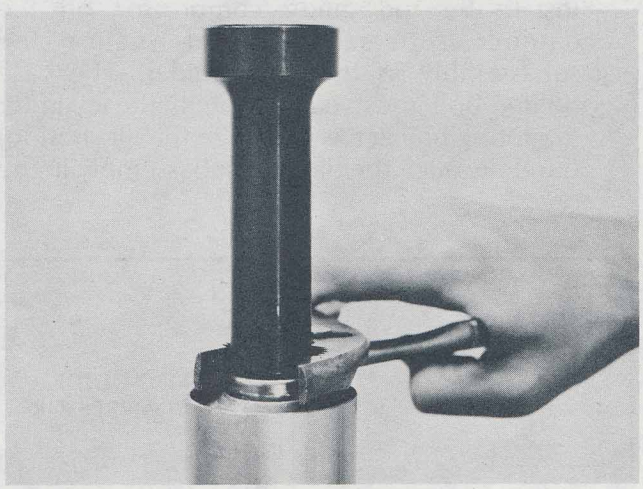
7. Gently push the shock rod (6) into the cylinder (7) until it bottoms.



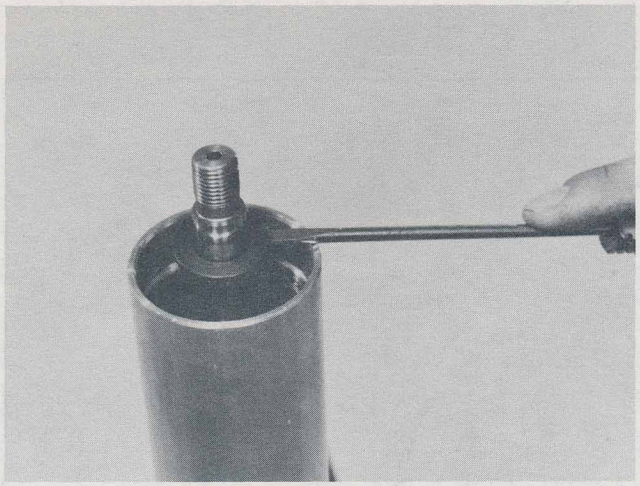
8. Place the rod guide compressor on the shock rod (6) to protect the rod from scratches.

9. Grip the rod guide (1) with a pair of pliers and carefully remove the rod guide from the cylinder (7). Place the rod guide aside. You will have to remove the seal ring housing (8) and the dust seal (9) later.

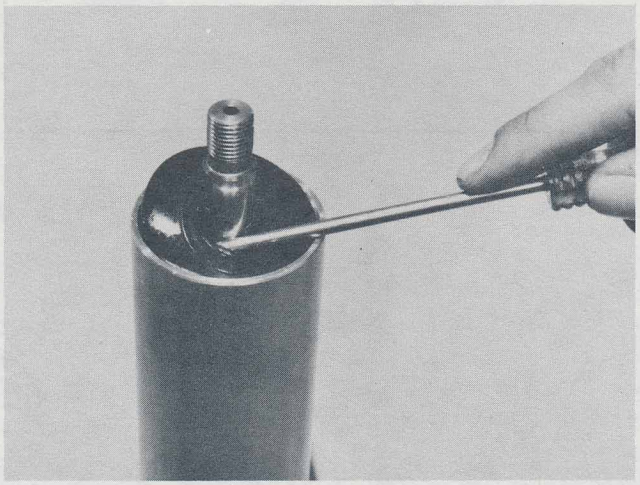
NOTE: Oil the cylinder walls if you have difficulty removing the rod guide.



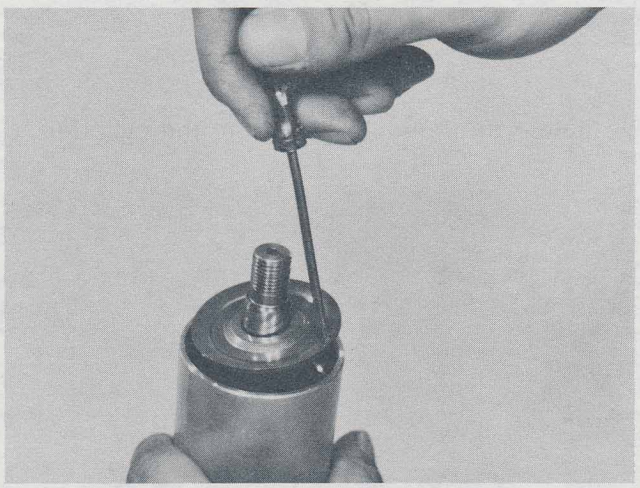
10. Remove the rod seal (2) from the cylinder (7) with a small screwdriver.



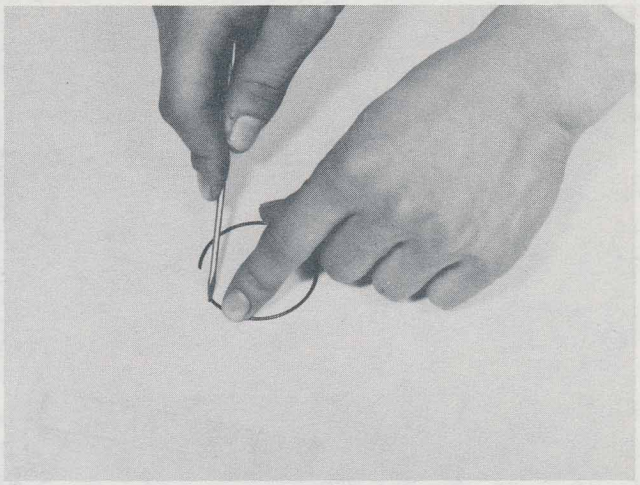
11. Remove the static seal (3) from the cylinder with a small screwdriver.



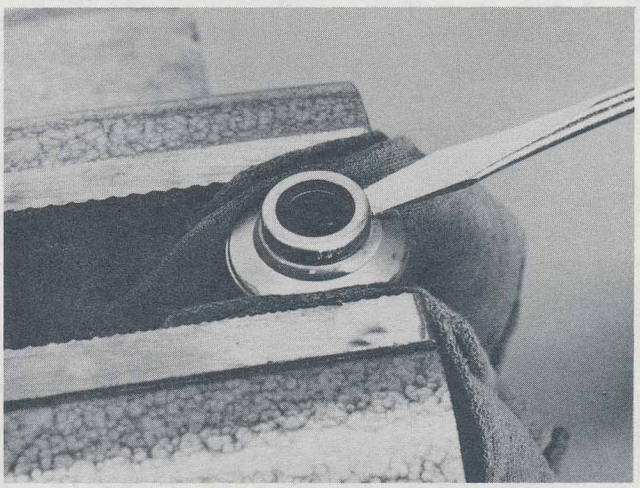
12. Remove the seal retainer (4) from the cylinder.



13. Remove the lower circlip (5) from the cylinder. Use a screwdriver and your forefinger as shown in the photograph.



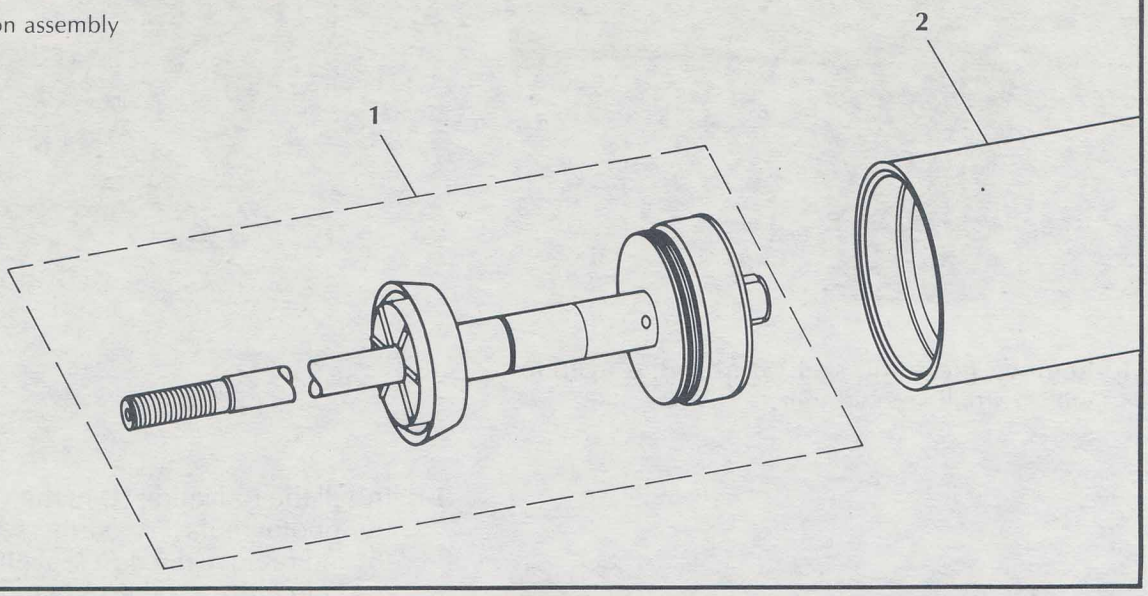
14. Install the rod guide (1) in the vise as shown in the photograph. Pry off the seal ring housing (8) and remove the dust seal (9). Be careful not to scratch or mar the rod guide.



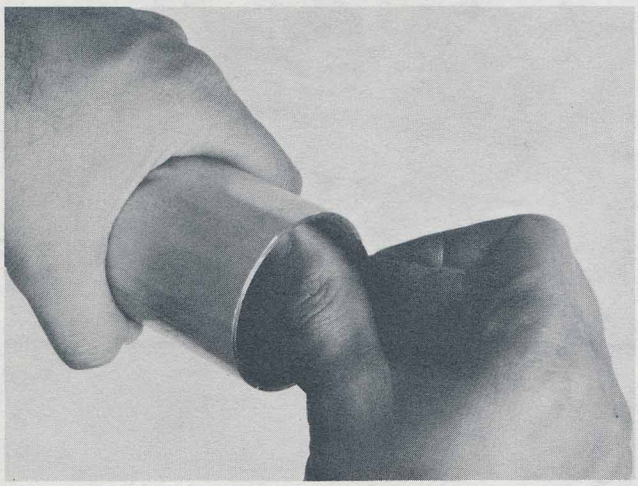
REMOVING THE ROD-PISTON ASSEMBLY

CYLINDER

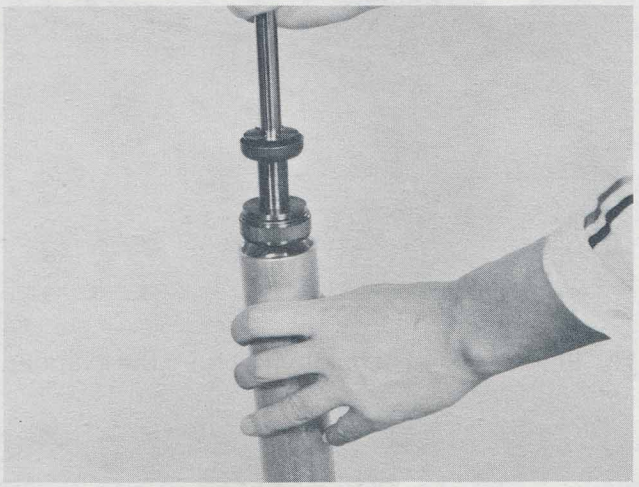
1. rod-piston assembly
2. cylinder



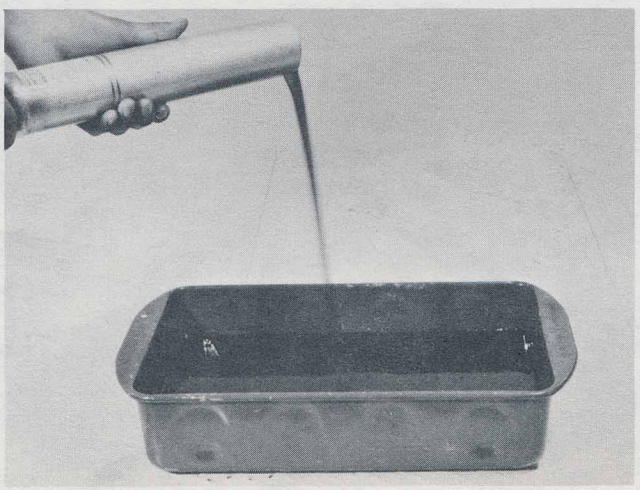
1. Drain some oil from the cylinder. Deburr the circlip grooves in the cylinder (2) with 1200 grit sandpaper. This will prevent damage to the rod-piston assembly (1) when it is removed from the cylinder.



2. Slowly pull the rod-piston assembly (1) from the cylinder (2) and place it aside.



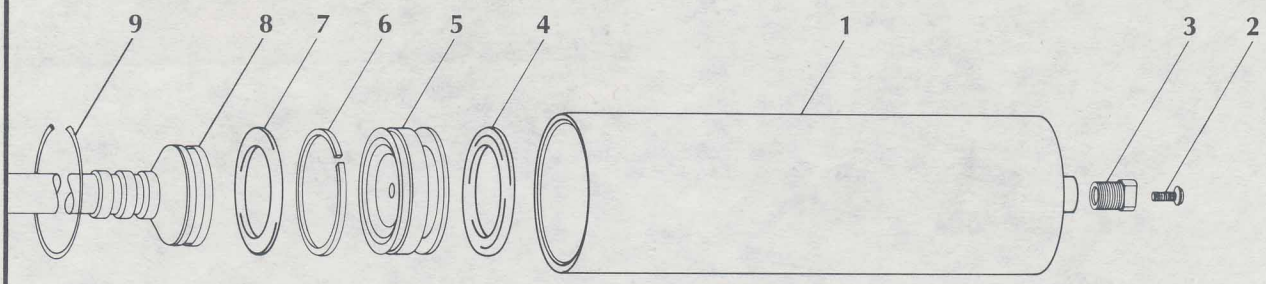
3. Drain the remaining oil from the cylinder.



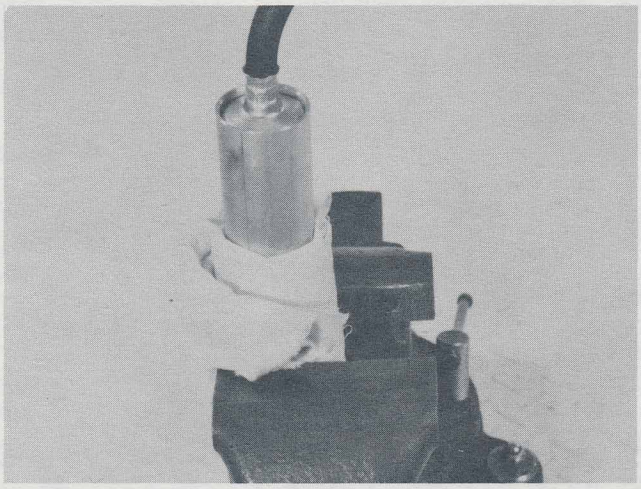
DISASSEMBLING THE RESERVOIR

GAS RESERVOIR

1. gas reservoir
2. panhead screw
3. gas filler plug
4. o-ring
5. free piston
6. piston ring 2
7. o-ring
8. hose cap
9. circlip

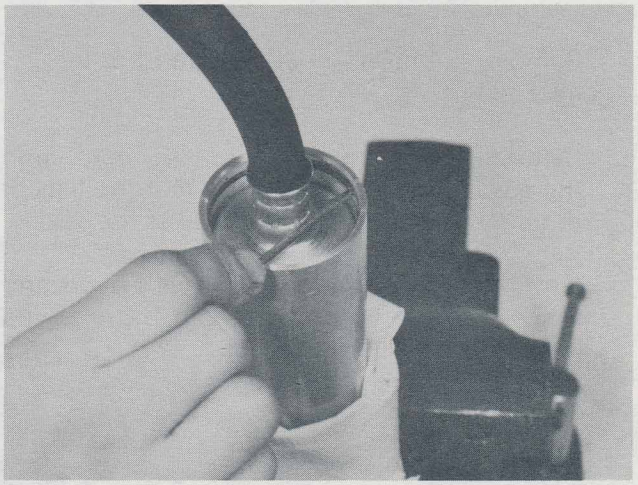


1. Wrap the gas reservoir (1) in a cloth, and secure the reservoir in the vise. Use a minimal amount of force so the reservoir will not be damaged or distorted.

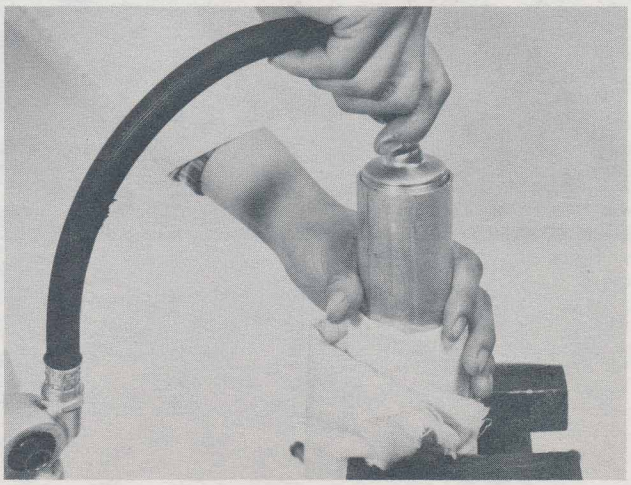


2. Press the hose cap into the reservoir and carefully remove the circlip (9) with a scribe or small screwdriver. Do not mar the reservoir walls.

Lee Waldie Craig Scott Chris Koira



3. Slowly remove the hose cap (8) from the reservoir (1). Drain any remaining oil from the reservoir.



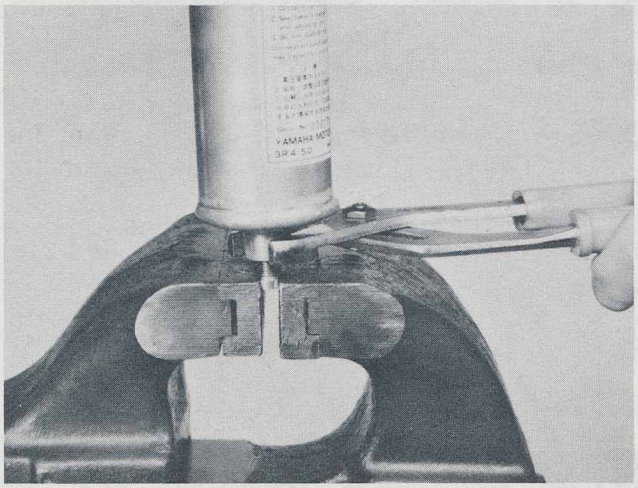
4. Use 1200 grit sandpaper and deburr the circlip groove in the reservoir. Thoroughly wash the gas reservoir with a light solvent like kerosene or Stoddard Solvent. Do not use gasoline. Gasoline will damage the O-ring.

CAUTION: Any burrs on the edges of the circlip groove will damage the O-ring when the free piston is removed.

5. Remove the monoshock needle from the gas filler plug.

6. Reinstall the reservoir in the vise, but clamp the gas filler plug (3). Be sure that the flats of the plug are caught by the flats of the vise.

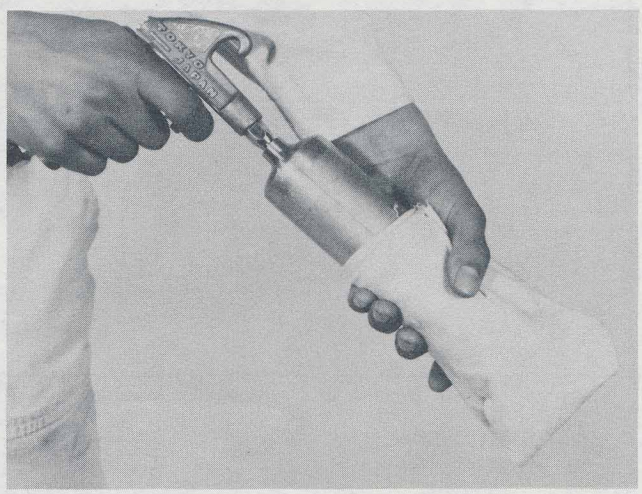
7. Grip the neck of the reservoir with pliers and rotate the reservoir until it can be removed from the gas filler plug.



8. Cover the opening of the reservoir with a cloth, and direct the opening down, towards the floor. Remove the free piston (5) by blowing a few short bursts of compressed air into reservoir neck. The cloth will catch the free piston and prevent piston damage.

Mark Boddy

WARNING: Do not use nitrogen or any other highly compressed gas to perform this procedure. Compressed air will be sufficient. Be sure to follow the instructions to the letter.



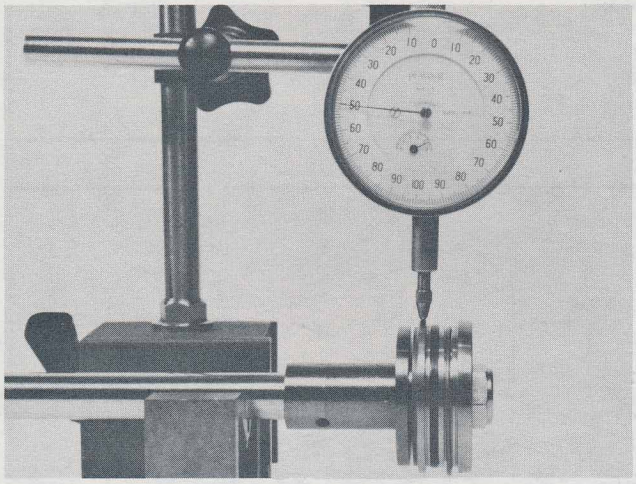
9. Remove the O-ring (4) and piston ring 2 (6) from the free piston (5).

DISASSEMBLING THE ROD-PISTON ASSEMBLY

1. Measure the piston runout at the location shown in the photograph. Support both ends of the rod in V-blocks placed on a surface plate. Place the dial gauge at the piston and rotate the rod. If piston runout exceeds the maximum specification, replace the rod.

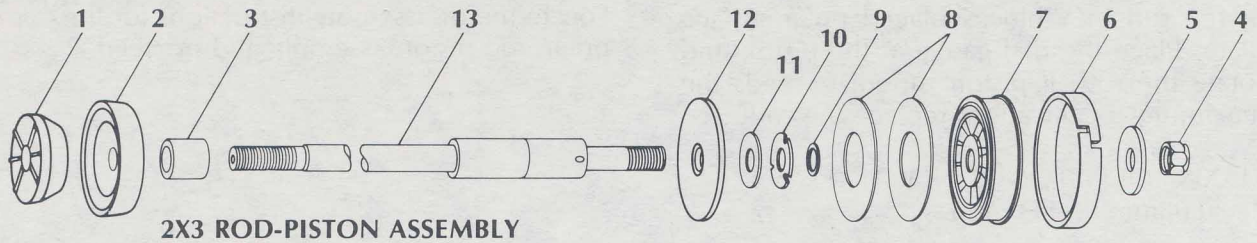
   MAXIMUM PISTON RUNOUT:
   0.08mm (0.0031 in.)

CAUTION: Be careful not to scratch or mar the rod.



There are two types of rod-piston assemblies used on the R monoshock: the 2X3 assembly and the 3R4 assembly. Before disassembling the rod-piston assembly, use the chart on page 1-3 to identify the type of rod-piston assembly you are working on. Locate the disassembly instructions for the appropriate rod-piston assembly and proceed.

A. Disassembling the 2X3 Rod-Piston Assembly

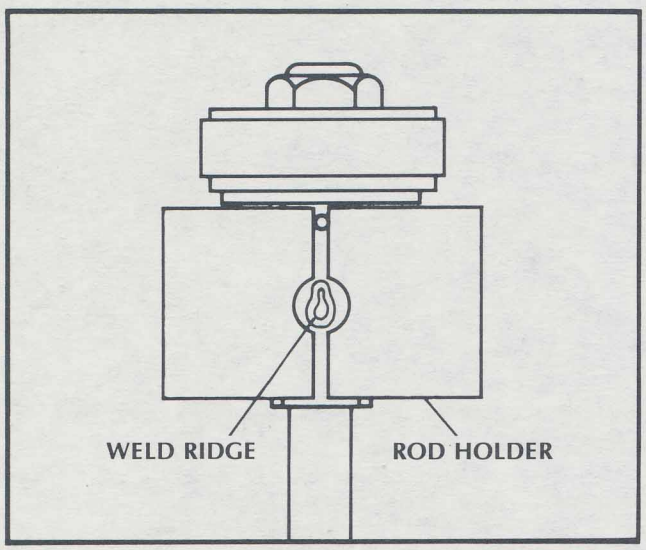


2X3 ROD-PISTON ASSEMBLY

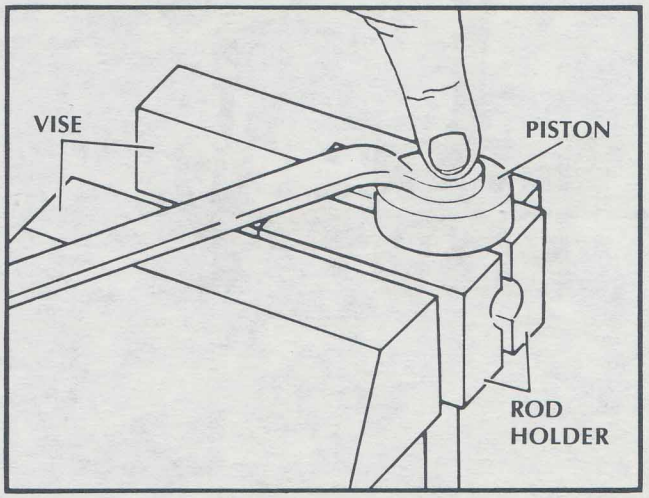
1. rebound stopper
2. rebound stopper support
3. collar
4. u-nut
5. piston baffle
6. piston ring
7. piston
8. valve plate 1
9. valve set shim
10. center plate
11. control washer
12. seat washer
13. shock rod

1. Remove the rebound stopper (1), the rebound stopper support (2), and the collar (3) from the shock rod (13).

2. Carefully place the stepped portion of the shock rod in the rod holder. The weld ridges of the rod must **not** contact the holder; see the illustration below. Secure the holder in the vise.

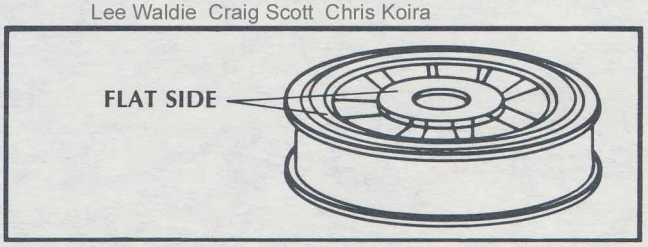


3. Remove the piston ring (6) from the piston (7),and remove the U-nut (4).



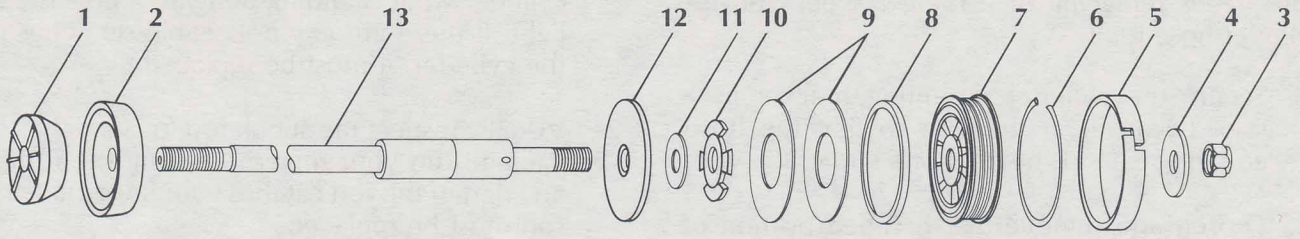
4. Remove the piston baffle (5) and the piston (7) from the rod. When placing the piston on the bench, be sure that the flat side faces upward.

Lee Waldie Craig Scott Chris Koira



5. Remove both pieces of valve plate 1 (8), the valve set shim (9), the center plate (10), the control washer (11), and the seat washer (12).

B. Disassembling the 3R4 Rod-Piston Assembly

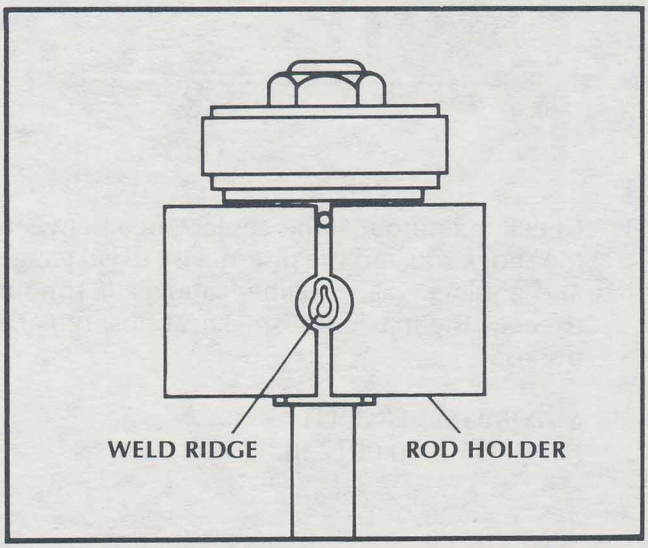


3R4 ROD-PISTON ASSEMBLY

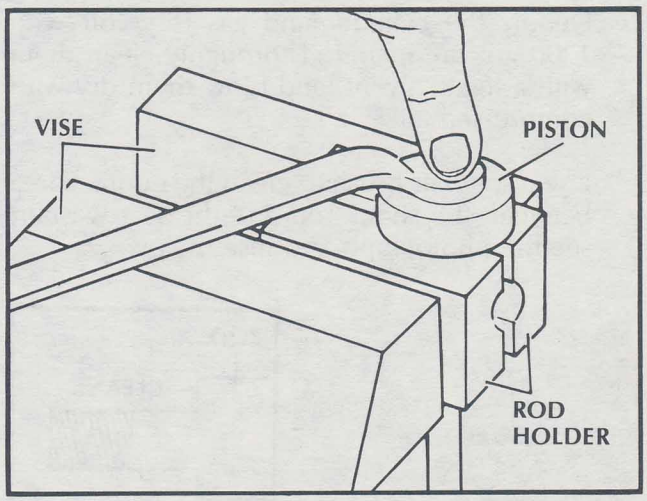
1. rebound stopper
2. rebound stopper support
3. u-nut
4. piston baffle
5. piston ring
6. ring seal
7. piston
8. expansion clip
9. valve plate 1
10. center plate
11. control washer
12. seat washer
13. shock rod

1. Remove the rebound stopper (1) and the rebound stopper support (2) from the shock rod (13).

2. Carefully place the stepped portion of the shock rod in the rod holder. The weld ridges of the rod must **not** contact the rod holder; see the illustration below. Secure the holder in the vise.

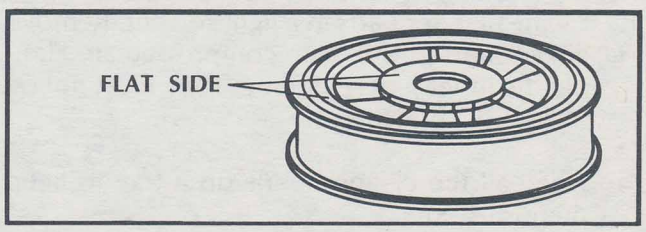


3. Remove the piston ring (5) from the piston (7), and remove the U-nut (3).



4. Remove the piston baffle (4) and the piston (7) from the rod. Remove the ring seal (6) and the expansion clip (8). When placing the piston on the bench, be sure that the flat side faces upward.

NOTE: Do not confuse the expansion clip (8) with a circlip. They are not interchangeable.



5. Remove both pieces of valve plate 1 (9), the center plate (10), the control washer (11), and the seat washer (12).

REMOVING THE HOSE ASSEMBLY

This operation must be performed only when the hose needs replacing or if there is a leak at the cylinder-hose joint.

1. Secure the cylinder mounting bracket in a vise. Locate it in the vise so that the hose coupling extends beyond one end of the vise.

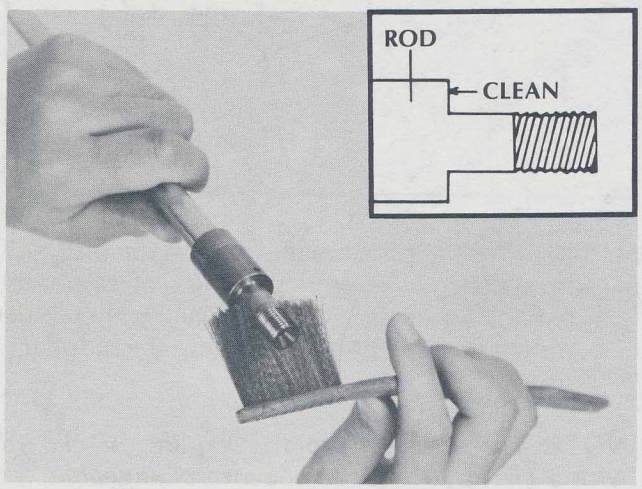
2. Loosen and remove the threaded portion of the hose from the cylinder. Be careful not to scratch the outer surface of the cap that fits into the reservoir.

CLEANING

1. Carefully clean all components with a light solvent such as kerosene or Stoddard Solvent. Do not use gasoline. Gasoline will attack the rubber seals and O-rings.

2. Deburr the cylinder and gas reservoir with 1200 grit sandpaper. Thoroughly clean them with a light solvent, and blow them dry with compressed air.

3. Use a soft hair brush to clean the contact area between the shock rod and the seat washer; see the photograph and inset below.



4. Clean all inner parts in a light solvent. Remove all dust and solvent with compressed air. Handle the inner parts carefully. They must not be nicked or scratched.

5. Place all the cleaned parts on a tray to keep them dust free.

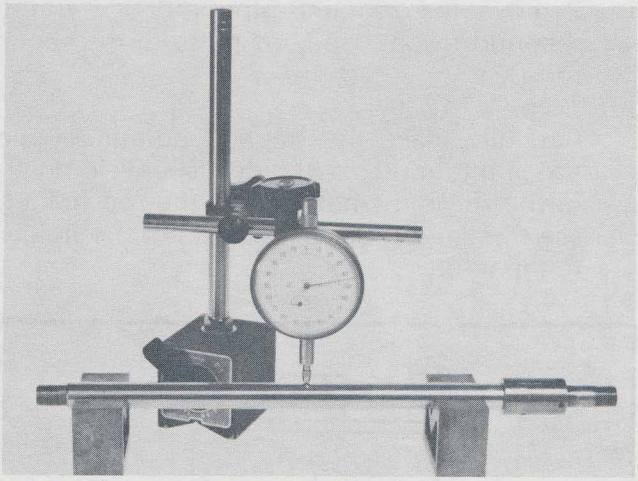
INSPECTION

1. Visually inspect the cylinder. Sight down the cylinder while standing beneath an overhead light. If there are any noticeable scratches in the cylinder, it must be replaced.

2. Visually inspect the shock rod for scratches or flaking. Run your fingernail along the rod. If any part of the rod catches your fingernail, the rod must be replaced.

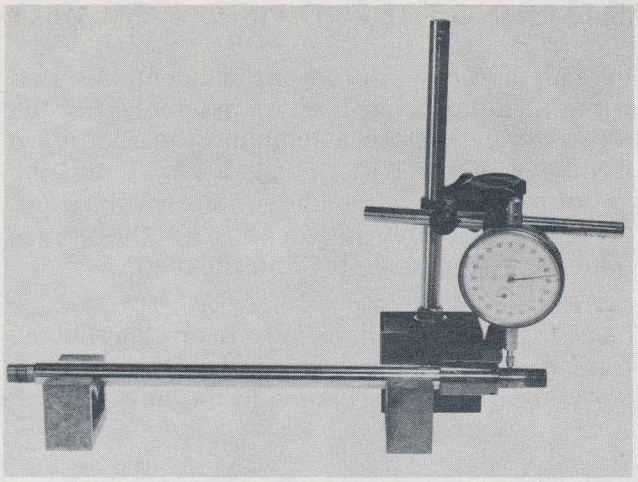
3. Check the runout at the contact area between the shock rod and rod seal. Support both ends of the rod in V-blocks placed on a surface plate. Place a dial gauge at the contact area and rotate the rod. If runout exceeds the maximum specification, replace the rod.

   MAXIMUM RUNOUT:
   0.04mm (0.0016 in.)

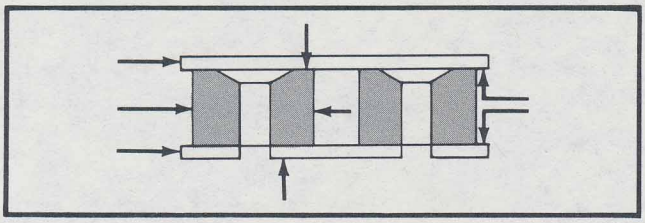


4. Check the runout at the contact area between the shock rod and the piston. Use a dial gauge and V-blocks as explained above. If runout exceeds the maximum specifications, replace the rod.

   MAXIMUM RUNOUT:
   0.03mm (0.0012 in.)



5. Inspect the piston. Pay particular attention to the outer surfaces and to the piston-to-valve-plate-1 contact area (the flat side). If the piston has any scratches that can catch your fingernail, replace the piston and all the valve parts.

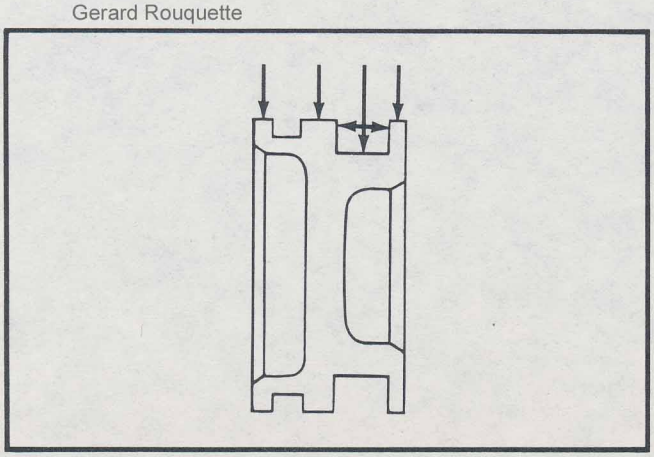


6. Inspect the valve parts. If there are any high spots or scratches that can catch your fingernail, replace the piston and all the valve parts.

CAUTION: If any valve parts must be replaced or if the piston must be replaced, replace ALL the valve parts AND the piston. The piston and valve parts must be replaced as an assembly.

7. Inspect the free piston. Pay particular attention to the O-ring groove and to the outer surfaces of the free piston. If the free piston has any scratches that can catch your fingernail, replace the free piston.

Gerard Rouquette



8. Inspect the gas reservoir. Sight down the gas reservoir while standing beneath an overhead light. If it has any serious scratches or dents in the walls, replace the reservoir.

9. Inspect the hose assembly. If there is a scratch or crack in the hose, replace it.

ASSEMBLY

Before installing any part on the monoshock, be sure that it is clean and free of all dust. Always blow the part clean with compressed air prior to installation.

Whenever reassembling a monoshock, always replace these parts with new ones.

ROD GUIDE
- Dust Seal
- Static Seal
- Rod Seal
- Rebound Stopper

PISTON
- Piston Ring
- Ring Seal
- U-nut

FREE PISTON
- O-ring

RESERVOIR
- O-ring
- Gas Filler Plug

REPLACE ALL CIRCLIPS

ASSEMBLING THE HOSE TO THE CYLINDER

1. Thoroughly remove all the Loctite from the threaded portion of the cylinder-hose joint. Use a die if necessary.

   DIE THREAD DIAMETER:
   M12 x 1.25

2. Carefully wash the cylinder with a light solvent, and blow it dry with compressed air.

3. With an appropriately sized tap, remove all remaining Loctite from the threaded portion of the hose.

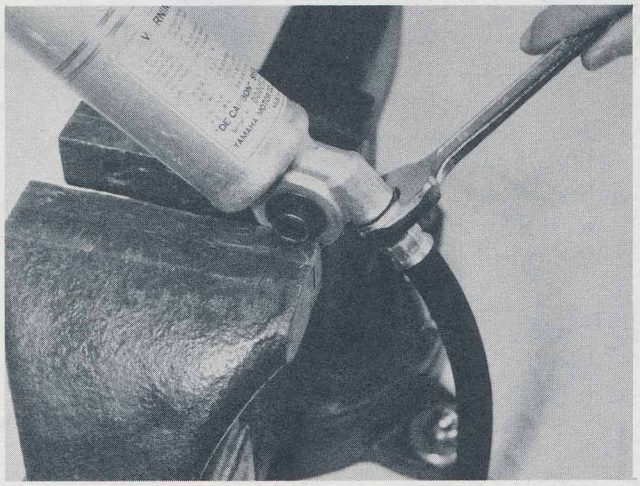
   TAP THREAD DIAMETER:
   M12 x 1.25

4. Thoroughly clean the threads with solvent. Remove all solvent with compressed air.

CAUTION: Solvent could harm the hose if left on it for a period of time. Be sure to dry the hose with compressed air.

5. Grip the cylinder in a vise, and connect the hose to the cylinder. Use a sufficient amount of Loctite. Torque the nut to specification.

   TIGHTENING TORQUE:
   400 kg-cm (29 ft-lbs.)

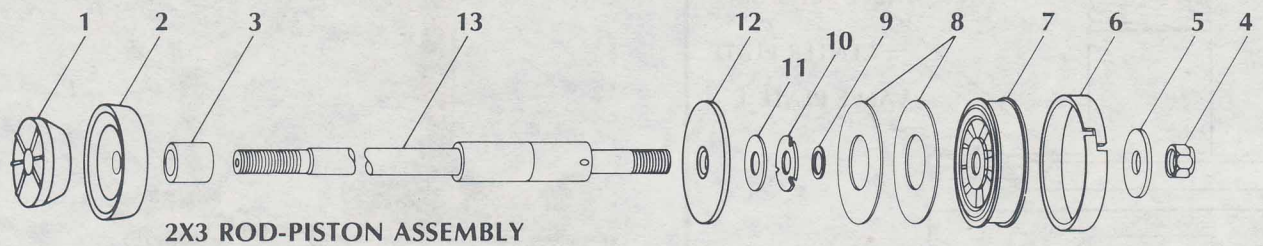


ASSEMBLING THE ROD-PISTON ASSEMBLY

There are two types of rod-piston assemblies used on the R monoshock: the 2X3 assembly and the 3R4 assembly. Before assembling the rod-piston assembly, use the chart on page 1-3 to identify the type of rod-piston assembly you are working on. Locate the assembly instructions for the appropriate rod-piston assembly and proceed.

The piston and valve parts must be installed in the proper order. Proceed slowly and carefully. Check your work before proceeding to the next step.

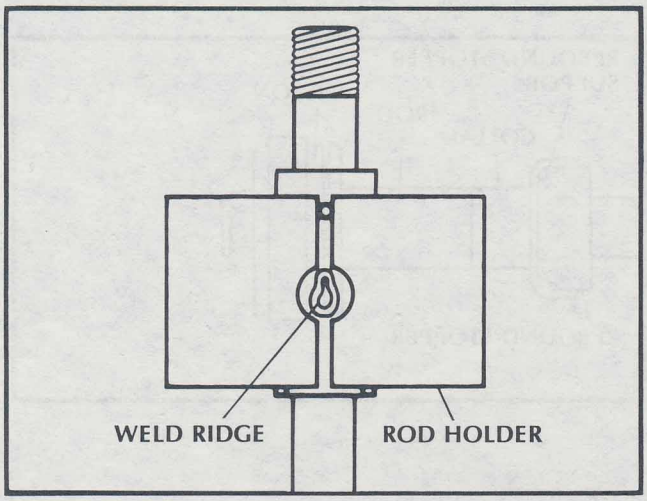
A. Assembling the 2X3 Rod-Piston Assembly

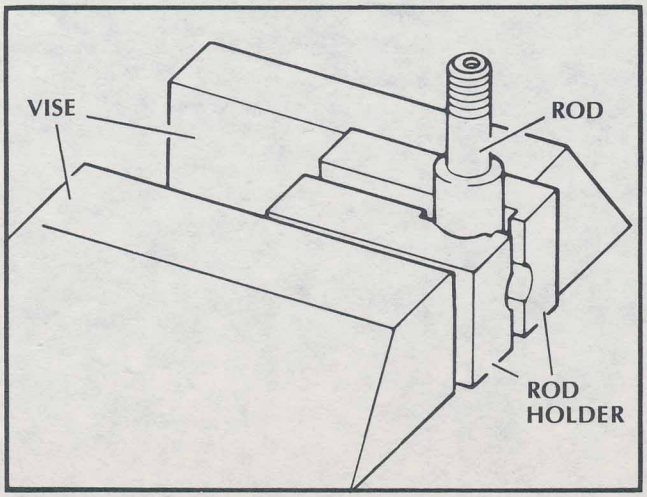


2X3 ROD-PISTON ASSEMBLY

1. rebound stopper
2. rebound stopper support
3. collar
4. u-nut
5. piston baffle
6. piston ring
7. piston
8. valve plate 1
9. valve set shim
10. center plate
11. control washer
12. seat washer
13. shock rod

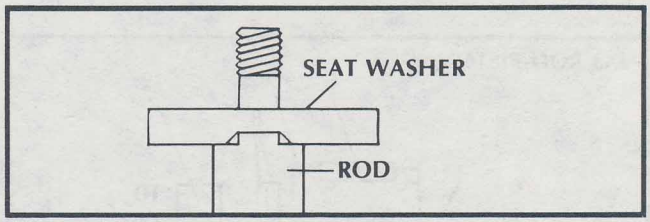
1. Place the stepped portion of the shock rod (13) in the rod holder, and secure the holder in the vise. Carefully locate the shock rod in the rod holder so that the weld ridges of the rod do not contact the holder.





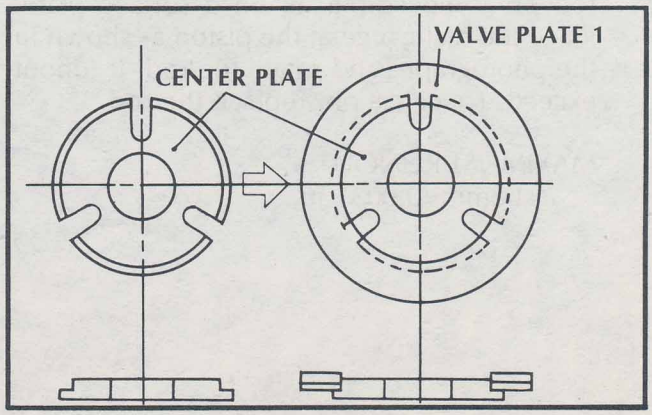
2. Carefully clean the entire rod with compressed air.

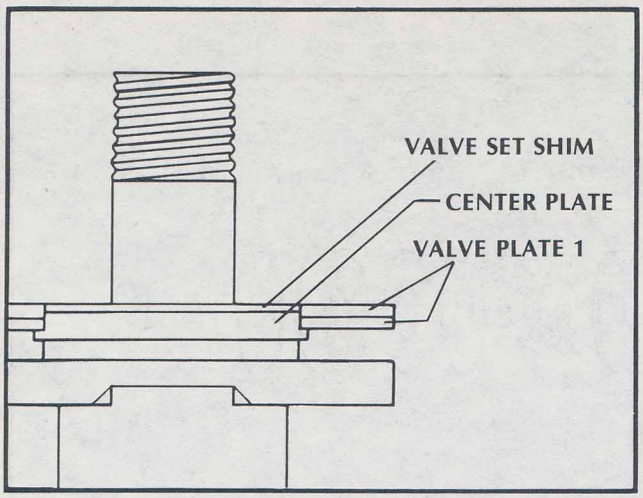
3. Install the seat washer (12) on the shock rod (13). The chamfered side of the seat washer (12) must face the stepped portion of the rod as shown in the illustration.



4. Install the control washer (11); then install the center plate (10). The flat side of the center plate must face down and rest against the control washer (11).

5. Install valve plate 1 (8) and center both pieces on the center plate (10). Install the valve set shim (9).



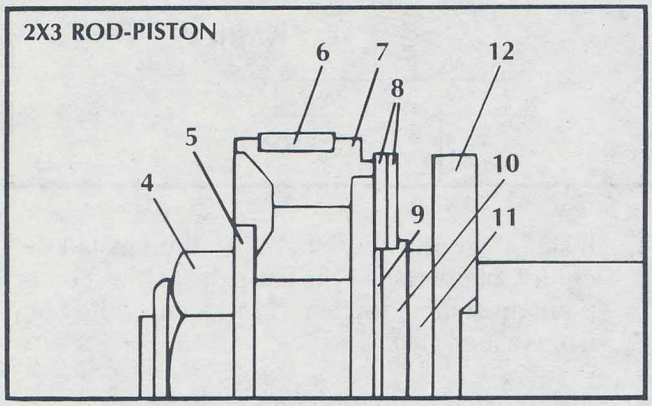


6. Clean the piston (7), and install it on the shock rod. The flat side of the piston must face down and rest on valve plate 1 (8).

7. Install the piston baffle (5).

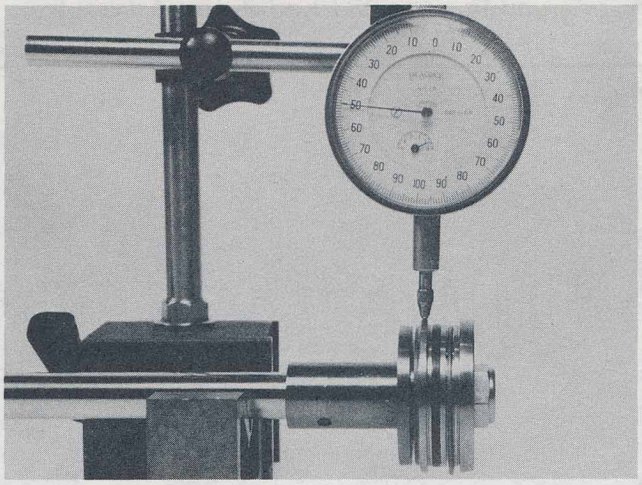
8. Check valve plate 1 (8). When both pieces are centered, install a new U-nut (4). Use a small amount of Loctite, and torque the U-nut to specification.

   TIGHTENING TORQUE:
   375 kg-cm (27 ft-lbs)



9. Remove the rod-piston assembly from the vise, and check for piston runout. Support the rod on V-blocks placed on a surface plate. Place the dial gauge at the piston as shown in the photograph, and rotate the rod. If runout exceeds specification, replace the rod.

   MAXIMUM RUNOUT:
   0.08mm (0.0031 in.)

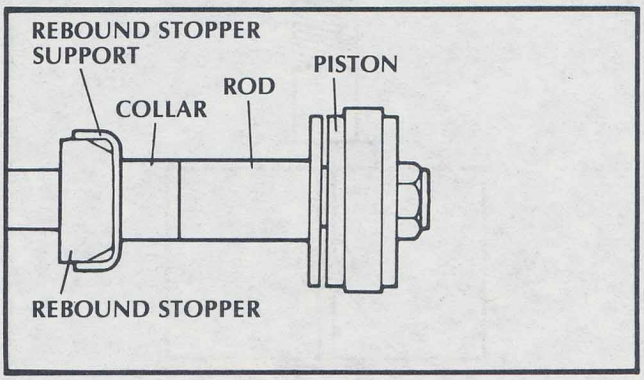


10. Grease a new piston ring (6) and install it on the piston.

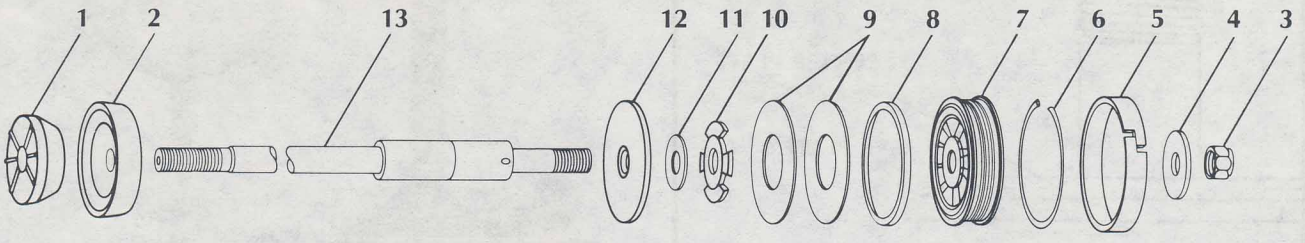
11. Fit the collar (3) in place against the stepped portion of the rod.

12. Install the rebound stopper support (2) and seat it against the collar (3).

13. Install a new rebound stopper (1) and seat it against the rebound stopper support (2).



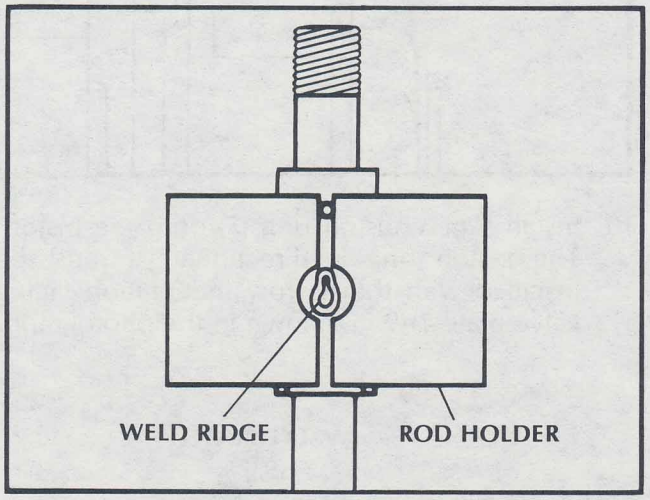
B. Assembling the 3R4 Rod-Piston Assembly

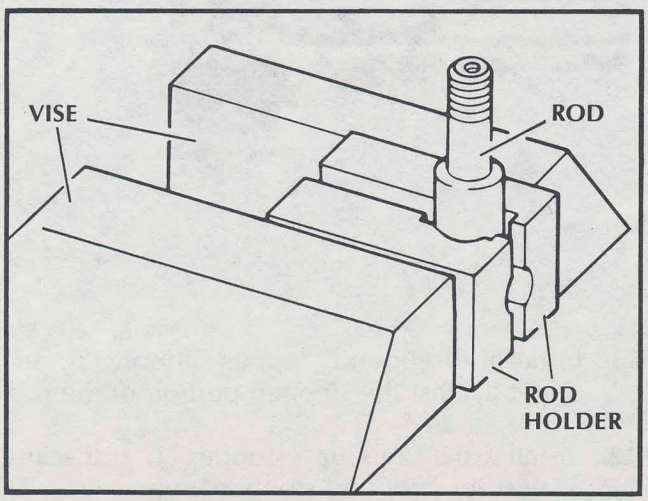


3R4 ROD-PISTON ASSEMBLY

1. rebound stopper
2. rebound stopper support
3. u-nut
4. piston baffle
5. piston ring
6. ring seal
7. piston
8. expansion clip
9. valve plate 1
10. center plate
11. control washer
12. seat washer
13. shock rod

1. Place the stepped portion of the shock rod (13) in the rod holder and secure the holder in the vise. Carefully locate the shock rod in the rod holder so that the weld ridges of the rod do not contact the holder.

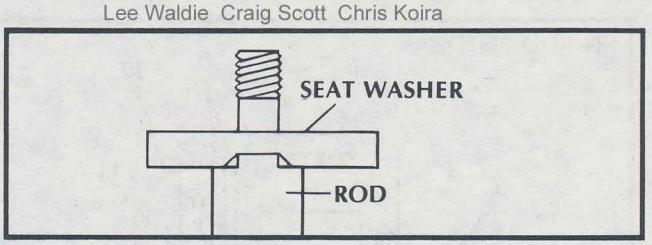




2. Clean the entire rod with compressed air.

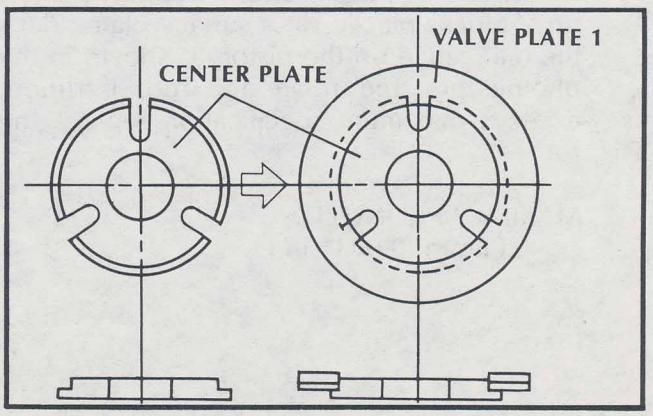
3. Install the seat washer (12) on the shock rod (13). The chamfered side of the seat washer (12) must face the stepped portion of the rod as shown in the illustration.

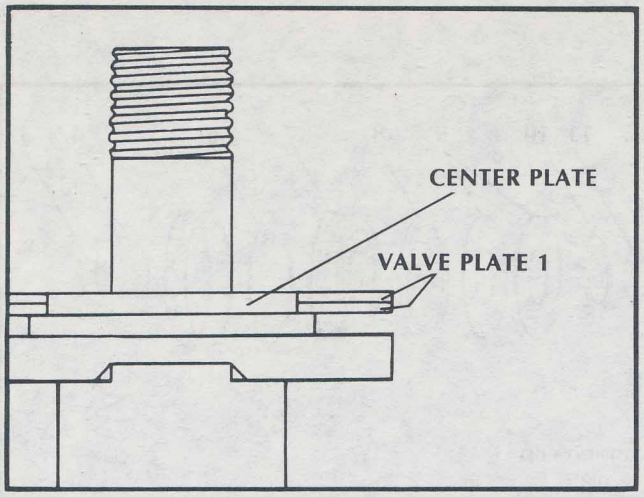
Lee Waldie Craig Scott Chris Koira



4. Install the control washer (11) and the center plate (10). The flat side of the center plate (10) must face the control washer (11).

5. Install valve plate 1 (9) onto the rod. Center both pieces on the center plate (10).

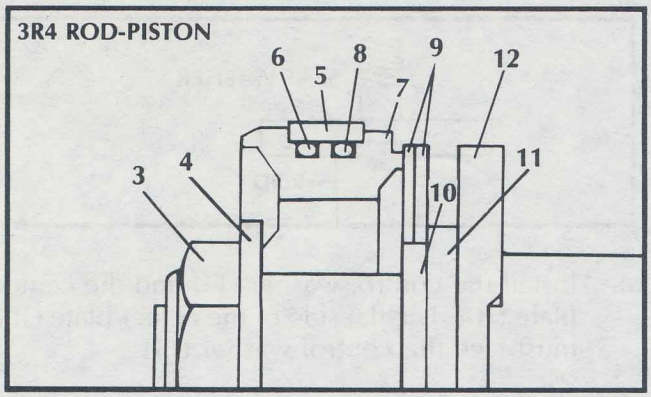




6. Install the piston (7) on the rod. The flat side of the piston must face down and rest on valve plate 1 (9).

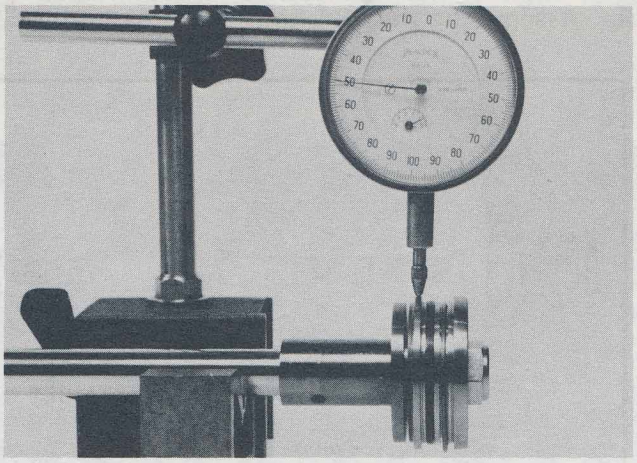
7. Install the piston baffle (4) and a new U-nut (3). When both pieces of valve plate 1 (9) are properly centered, torque the U-nut to specification. Use a small amount of Loctite.

   TIGHTENING TORQUE:
   375 kg-cm (27 ft-lbs)

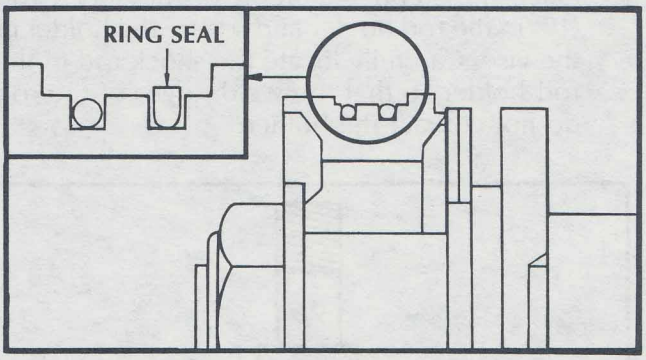


8. Remove the rod-piston assembly from the vise and check for piston runout. Support the rod on V-blocks placed on a surface plate. Place the dial gauge on the piston as shown in the photograph, and rotate the rod. If runout exceeds maximum specification replace the rod.

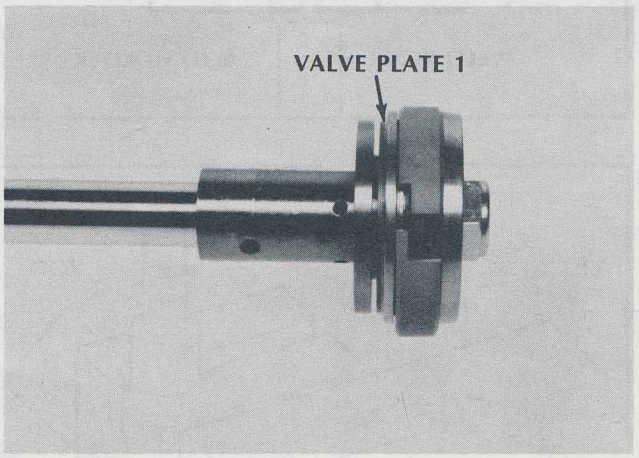
   MAXIMUM RUNOUT:
   0.08mm (0.0031 in.)



9. Install a new ring seal (6) on the piston, then install the expansion clip (8). The ring seal is directional. Be sure it is properly seated in the groove as shown in the illustration. The curved side of the ring seal must contact the piston.



10. Install a new piston ring (5) onto the piston. The piston ring is directional. It must be installed with the narrow indentation facing valve plate 1 (9) as shown in the photograph.



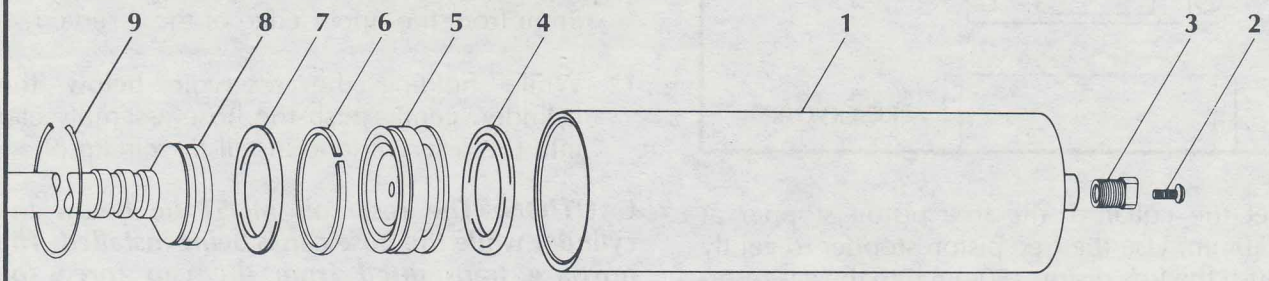
11. Install the rebound stopper support (2), and seat it against the stepped portion of the rod.

12. Install a new rebound stopper (1) and seat it against the rebound stopper support (2).

ASSEMBLING THE GAS RESERVOIR

GAS RESERVOIR

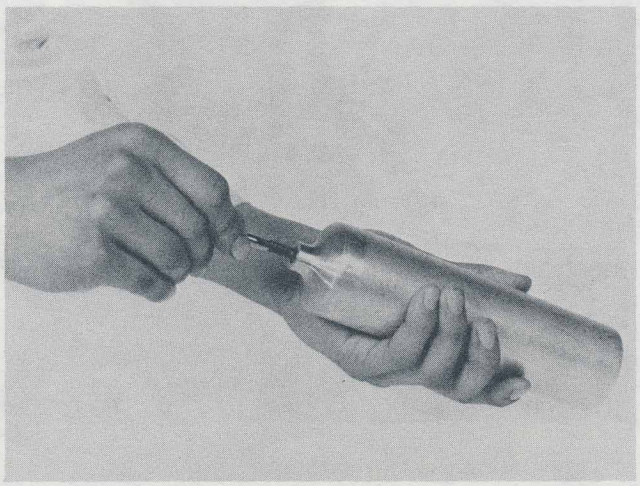
1. gas reservoir
2. panhead screw
3. gas filler plug
4. o-ring
5. free piston
6. piston ring 2
7. o-ring
8. hose cap
9. circlip



Lee Waldie Craig Scott Chris Koira

1. Remove all the remaining Loctite from the threads in the gas reservoir neck. Use a tap if necessary.

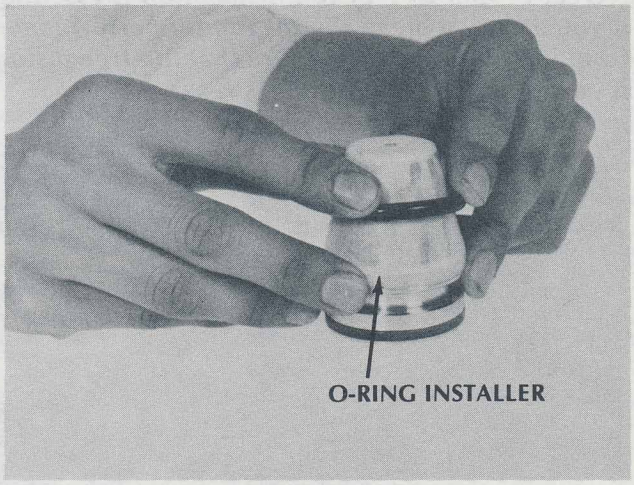
   TAP THREAD DIAMETER:
   1/8 inches PT



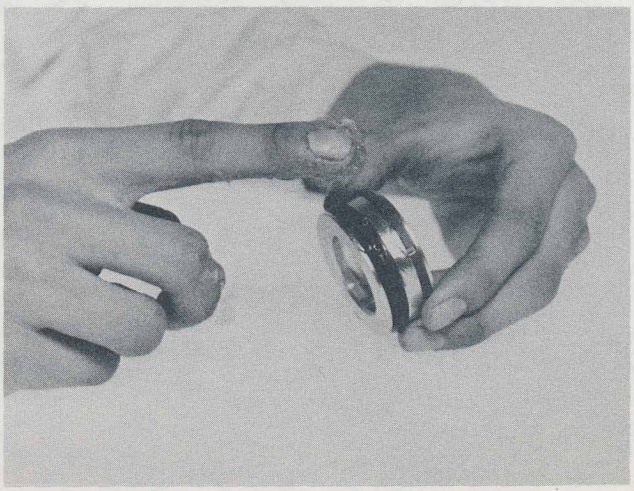
2. Wash the reservoir with light solvent and dry with compressed air.
3. Wrap the gas reservoir (1) in a cloth and secure the reservoir in the vise.

4. Grease the O-ring groove in the free piston (5), and grease the O-ring installer.

5. Using the lubricated installer, carefully fit a new O-ring (4) into the O-ring groove of the free piston (5). The O-ring must not be nicked or damaged in any way.

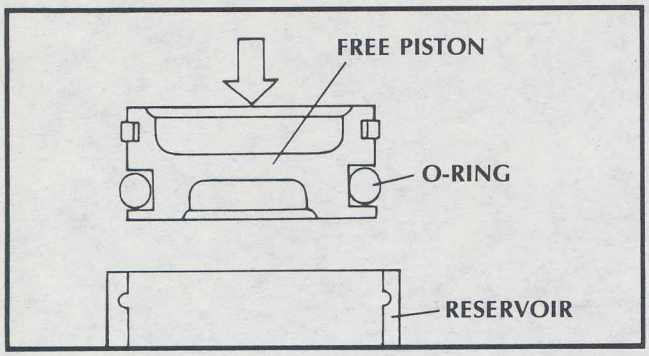


6. Fit piston ring 2 (6) onto the free piston (5). Apply grease to the entire free piston.



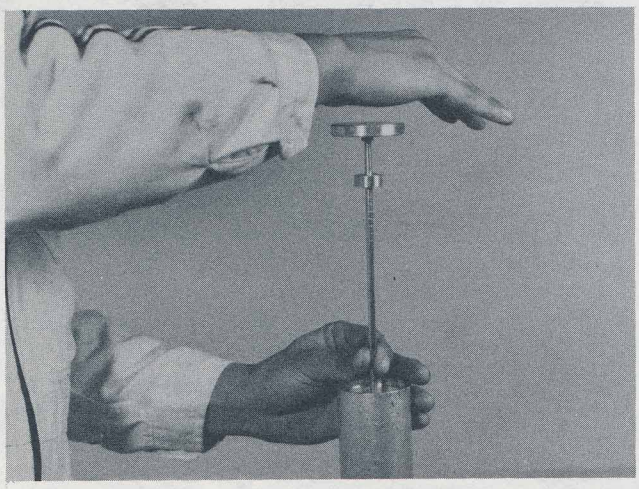
7. Oil the reservoir walls.

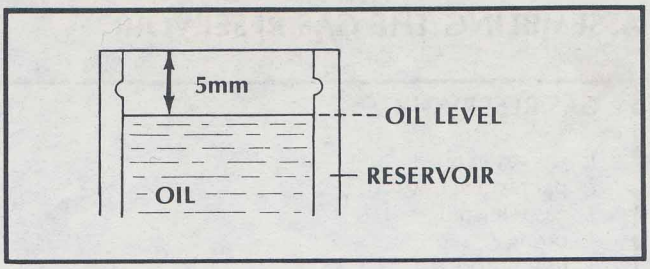
8. Gently push the free piston (5) into the reservoir (1). The free piston must be installed with the O-ring side facing down into the gas reservoir.



9. Set the collar of the free piston stopper at 150mm. Use the free piston stopper to gently push the free piston 150mm into the gas reservoir.

NOTE: Proper free piston installation is essential if you are to achieve the maximum performance from the monoshock. Be sure that the free piston is correctly located in the gas reservoir.





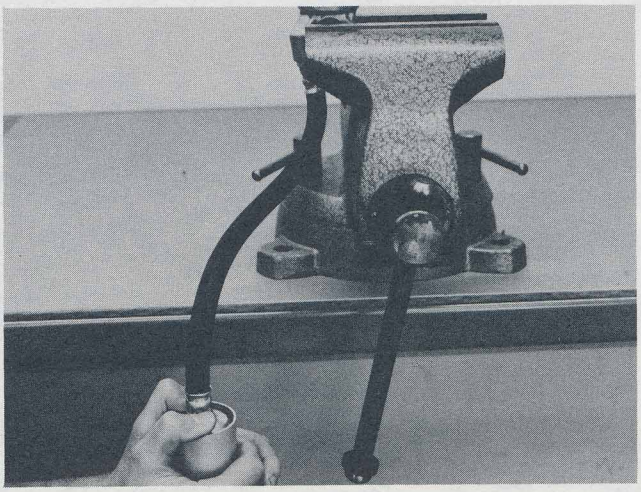
10. Fit the O-ring (7) onto the hose cap (8), and grease the O-ring and the adjacent area.

11. Add oil to the reservoir (1) until the oil level is 5mm from the upper edge of the reservoir.

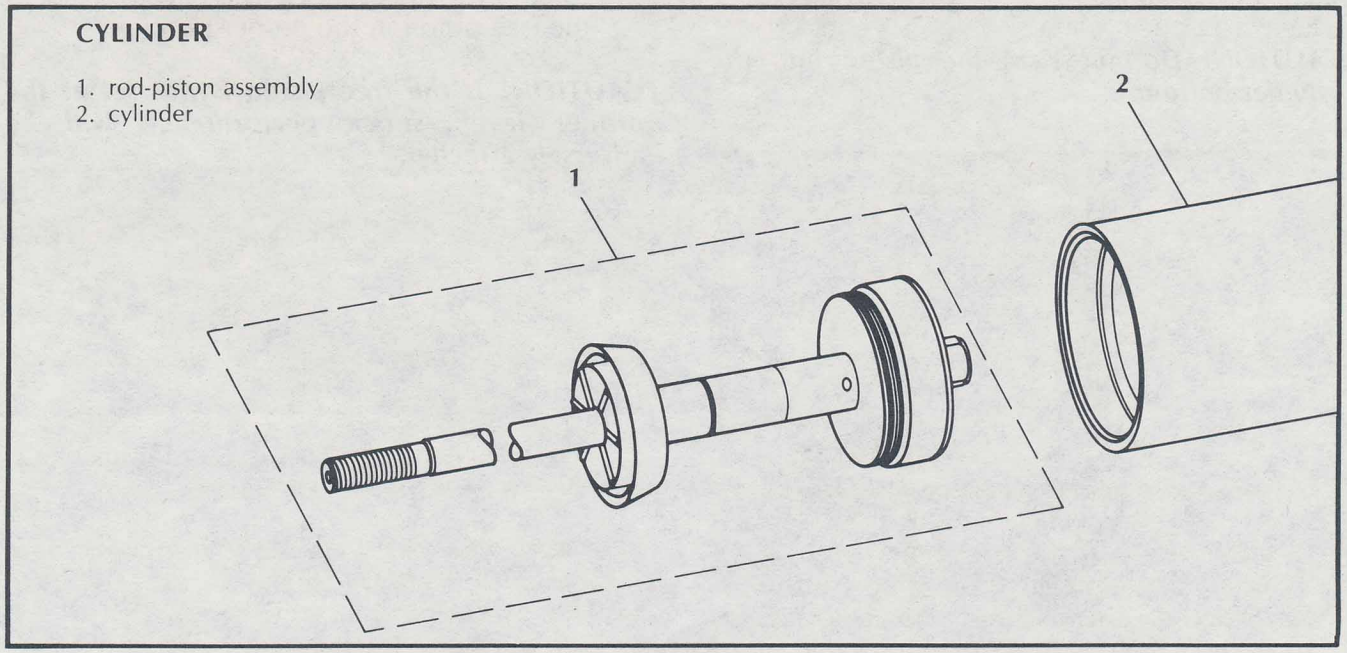
12. While holding the reservoir **below** the cylinder, gently push the hose assembly cap into the reservoir and install the circlip (9).

CAUTION: The reservoir MUST be below the cylinder while the hose cap is being installed. The pressure transmitted from the cap forces oil through the hose and into the cylinder. If the reservoir is held below the cylinder, air will be bled from the system instead of becoming trapped in the oil.

WARNING: Be sure that the circlip is properly seated in the circlip groove.

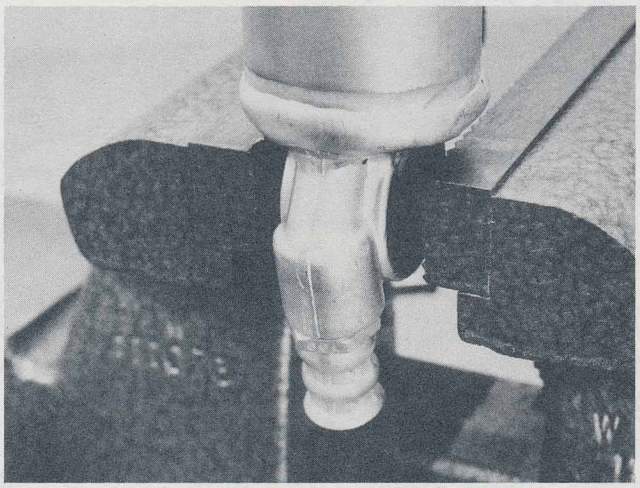


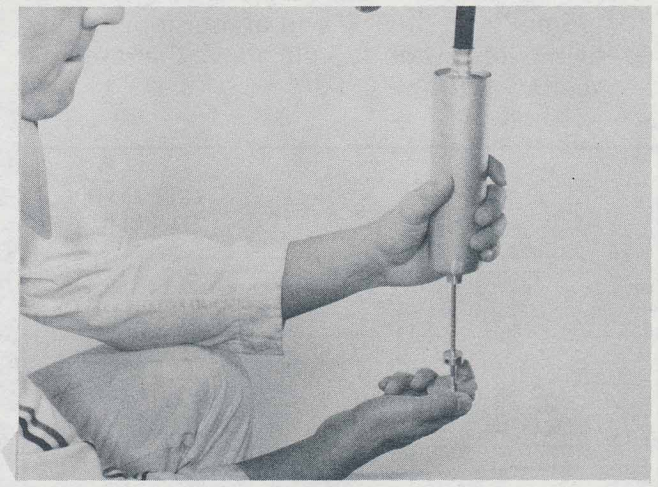
INSTALLING THE ROD-PISTON



The gas reservoir must be held below the cylinder during the installation of the rod-piston assembly. The relative position of these two components is important so that air will bleed from the system instead of becoming trapped in the oil.

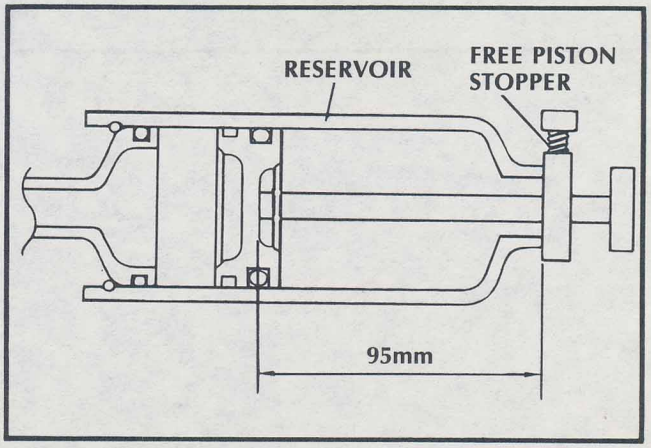
1. Install the cylinder mounting bracket in the vise.





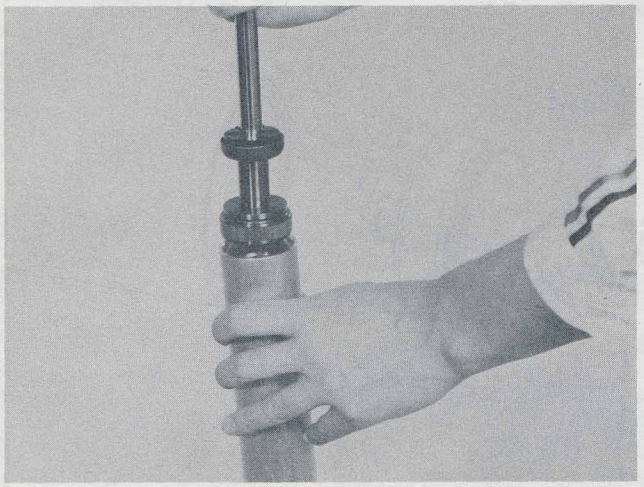
2. Set the collar of the free piston stopper at 95mm from the end of the rod. Use vernier calipers.

3. Insert the free piston stopper into the reservoir neck. Gently push the free piston stopper into the reservoir until the collar bottoms against the neck. This sets the free piston 95mm above the reservoir neck, and forces air out of the system.

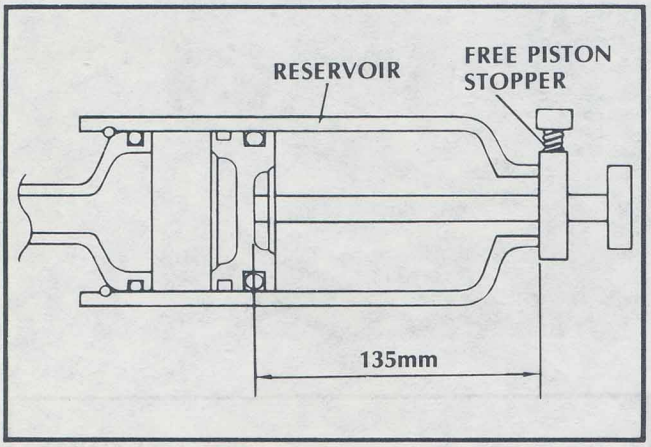


4. Oil the cylinder walls, and gently push the rod-piston assembly into the cylinder until it lightly bottoms.

CAUTION: Do not slam the piston into the cylinder bottom.



5. Set the collar of the free piston stopper at 135mm from the rod end of the stopper, and set the free piston 135mm above the reservoir neck.



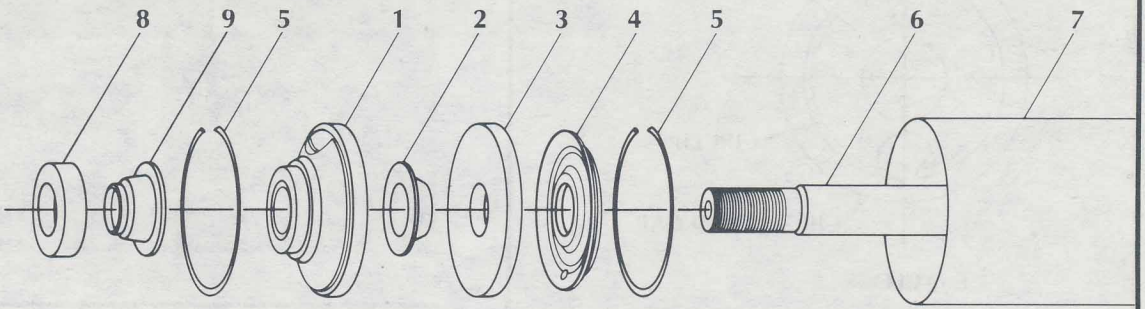
6. While holding the free piston in position with the free piston stopper, gently bottom the rod assembly in the cylinder. This effectively locks the free piston in the proper position.

CAUTION: If the free piston is not set at the proper level, shock performance will be adversely affected.

INSTALLING THE ROD GUIDE AND RELATED PARTS

ROD GUIDE AND RELATED PARTS

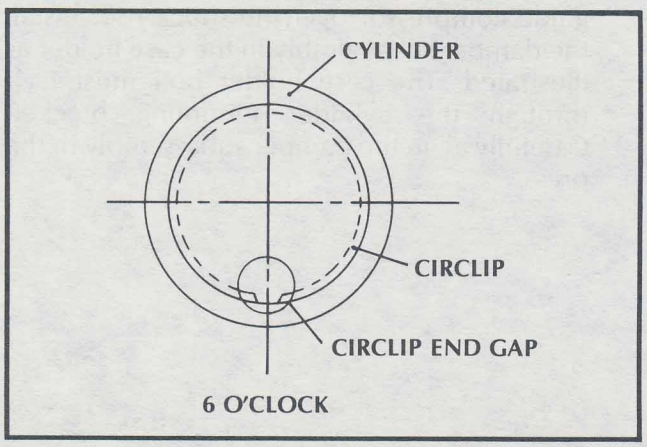
1. rod guide
2. rod seal
3. static seal
4. seal retainer
5. circlip (2)
6. shock rod
7. cylinder
8. seal ring housing
9. dust seal



The free piston must be locked in place until the rod guide has been installed. Use the free piston stopper to prevent movement of the free piston within the gas reservoir. Insert the stopper in the gas neck as you did earlier. Hold it in place while installing the rod guide and related parts.

Be sure to hold the reservoir beneath the cylinder until the rod guide has been installed.

1. Install a new circlip (5) in the lower (inner) groove in the cylinder. Position the end gap at 6 o'clock as you face the cylinder.



2. Slowly add oil to the cylinder until the oil level is between the two circlip grooves. Pour the oil down the side of the cylinder wall so air will not get trapped in the oil. Wait a few minutes before proceeding so air in the oil can rise to the surface.

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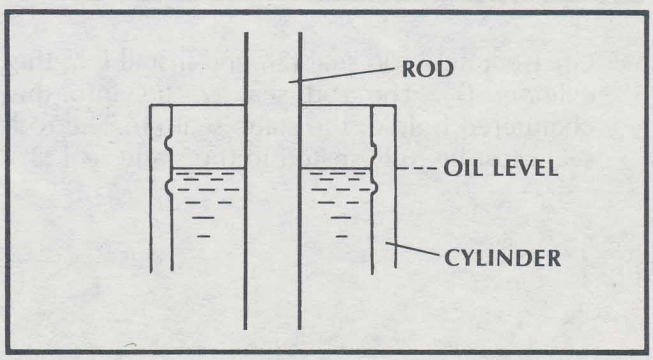
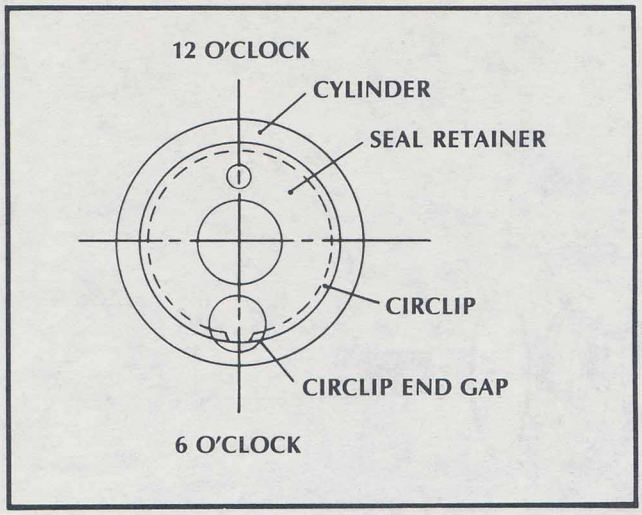
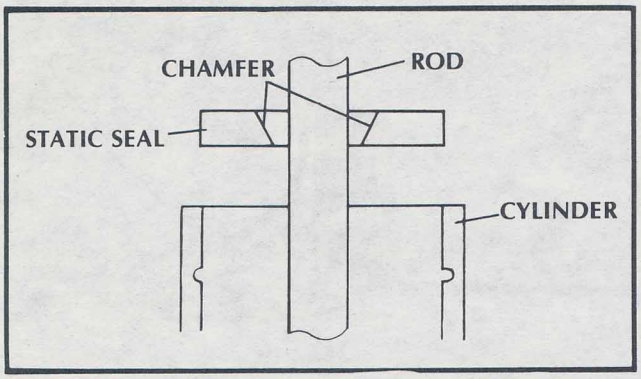


3. Place the dust seal guide on the shock rod. This will protect the seals during installation.

4. Slip the seal retainer (4) over the rod (6) and into the cylinder. The circlip land on the seal retainer (4) must face down into the cylinder, and the seal retainer must be properly seated on the inner circlip. The small hole on the seal retainer must be at 12 o'clock. It is very important that this hole be diametrically opposite the end gap of the inner circlip.

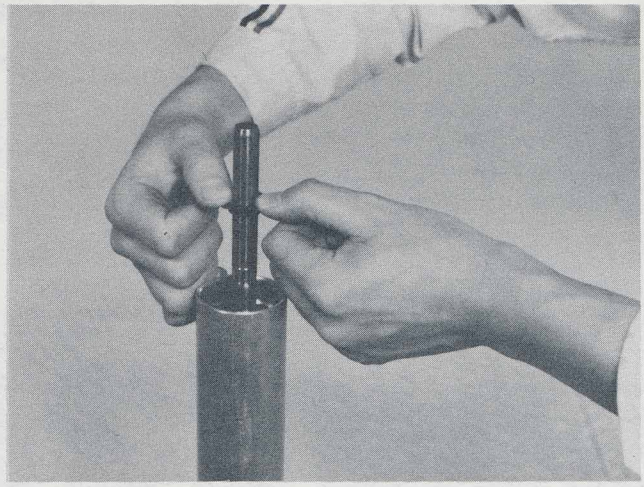


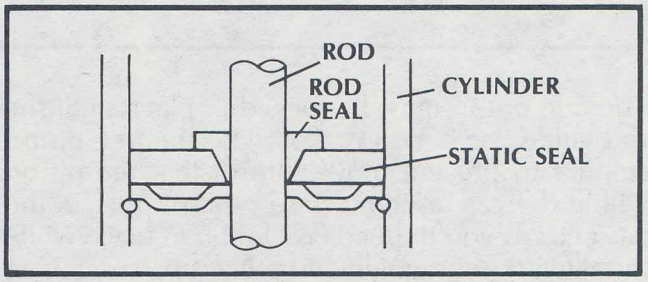
5. Grease a new static seal (3), slip it over the rod (6), and install it in the cylinder (7). The chamfered side of the static seal (3) must face upward, towards the opening of the cylinder (the i.d. markings should be facing down into the cylinder). The static seal (3) must be completely seated on the seal retainer (4).



6. Grease a new rod seal (2), and install it in the cylinder (7). The rod seal (2) fits into the chamfered hole of the static seal (3). The rod seal must be fully seated in the static seal (3).

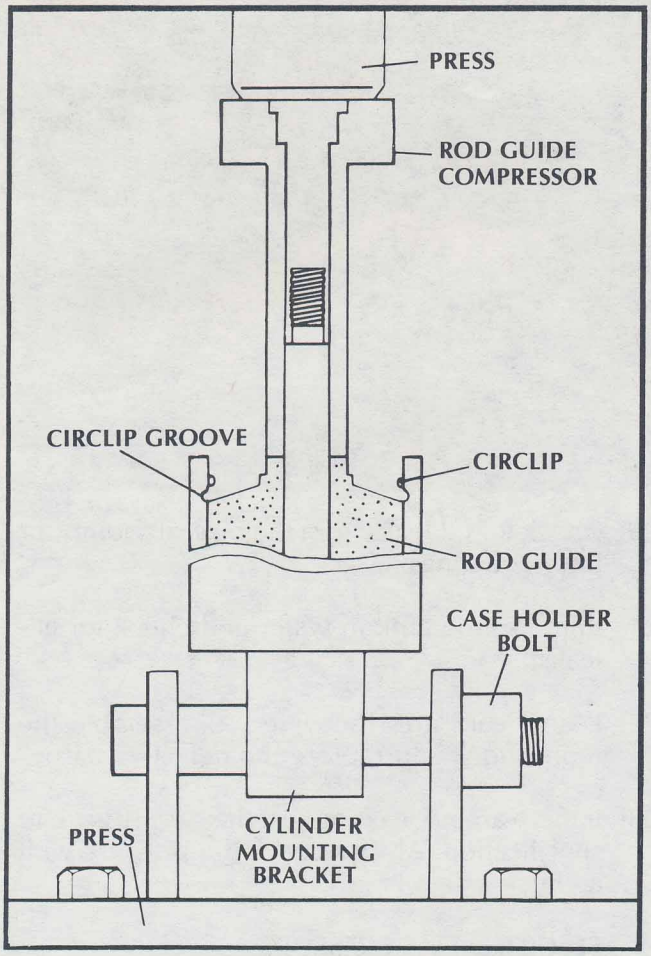
NOTE: If the rod seal (2) cannot be fully seated in the static seal (3), the static seal (3) or the seal retainer (4) may not be properly installed. Remove and reinstall both of them. Take care to assure that both the seal retainer (4) and static seal (3) are correctly installed in the cylinder (7).





7. Place the rod guide (1) in the cylinder (7) and place a new circlip (5) around the rod guide. The circlip end gap must be in the recessed portion of the rod guide.

8. Place the case holder in the press. Remove the dust seal guide from the rod and place the rod guide compressor over the shock rod. Install the damper subassembly in the case holder as illustrated. The case holder bolt must pass through the cylinder mounting bracket. Carefully align the damper subassembly in the press.



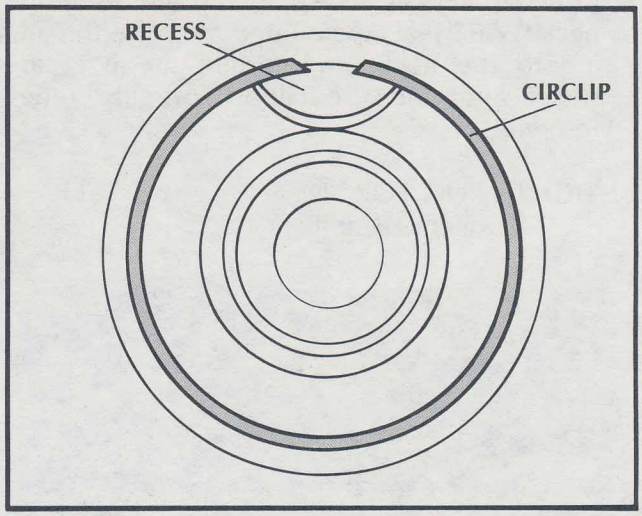
You will require assistance at this point. The free piston must be manually locked in the proper position until the upper circlip has been installed.

9. Lock the free piston in place with the free piston stopper. Hold the free piston in this locked position until the upper circlip is installed.

10. Slowly apply pressure to the rod guide compressor. Compress the rod guide (1) into the cylinder (7) until the upper circlip groove is exposed, as illustrated above, but no further. Apply a **minimal** amount of force.

11. Push the circlip (5) in the upper circlip groove. The circlip must be completely seated in the groove, and the end gap must be in the recess of the rod guide.

WARNING: When you hear the circlip click into place, blow the cylinder clean with compressed air and check the circlip. It holds the internal parts in the cylinder when the shock is fully pressurized. Some internal parts could be ejected from the monoshock if this circlip is NOT correctly seated in its groove.



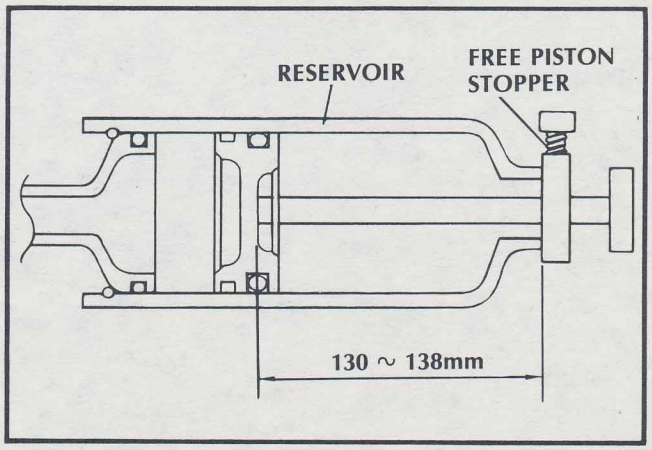
12. Remove the damper subassembly from the case holder and secure it in the vise.

13. Place the dust seal guide on the rod, and install the dust seal (9) over the shock rod and into the cylinder.

14. Carefully fit the seal ring housing (8) on the rod and fit it over the dust seal.

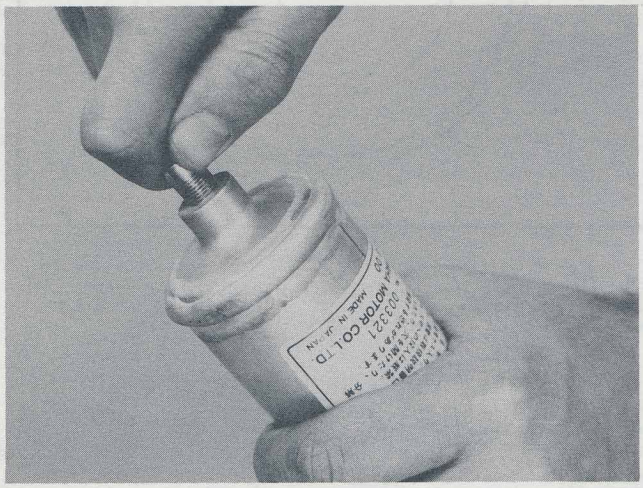
15. Remove the dust seal guide and place the rod guide compressor on the rod. Gently tap the seal ring housing (8) until it is seated in place on the rod guide (1).

16. Check the position of the free piston with the free piston stopper. The free piston must be 130 ~ 138mm from the reservoir neck as illustrated. If the free piston is not at the specified level, disassemble the monoshock and reassemble it correctly. Shock performance will be adversely affected if the free piston is set incorrectly.



17. Install a new gas filler plug into the reservoir neck. Wind seal tape around the plug, thread it into the neck, and torque the plug to specification. Be sure that no dust gets in the reservoir.

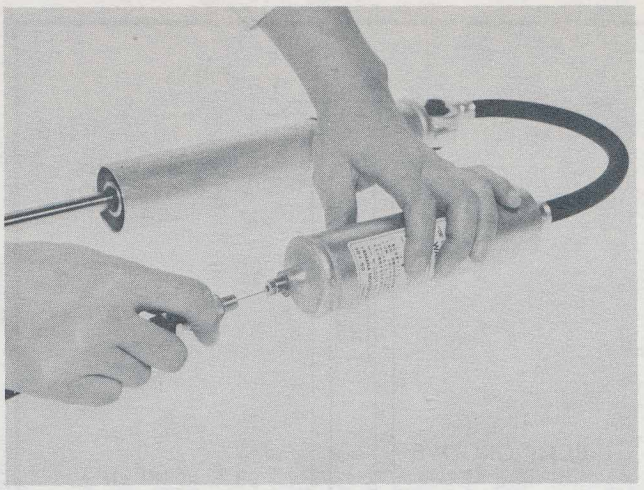
    TIGHTENING TORQUE:
    140 kg-cm (10 ft-lbs.)



18. Wipe any excess oil from the shock.

19. Slowly add nitrogen through the gas filler plug until the rod begins to emerge from the cylinder. Be sure to lubricate the needle before inserting it in the gas filler plug.

WARNING: Always direct the rod and gas filler plug away from you or others when pressurizing the gas reservoir. If the circlip has been incorrectly installed, some parts could be ejected from the damper subassembly.



20. Check for oil leaks from the oil seals, joints, or hose couplings.

21. Immerse the tank in water and check for gas leaks.

22. If any leaks are discovered, disassemble the monoshock and replace the defective part.

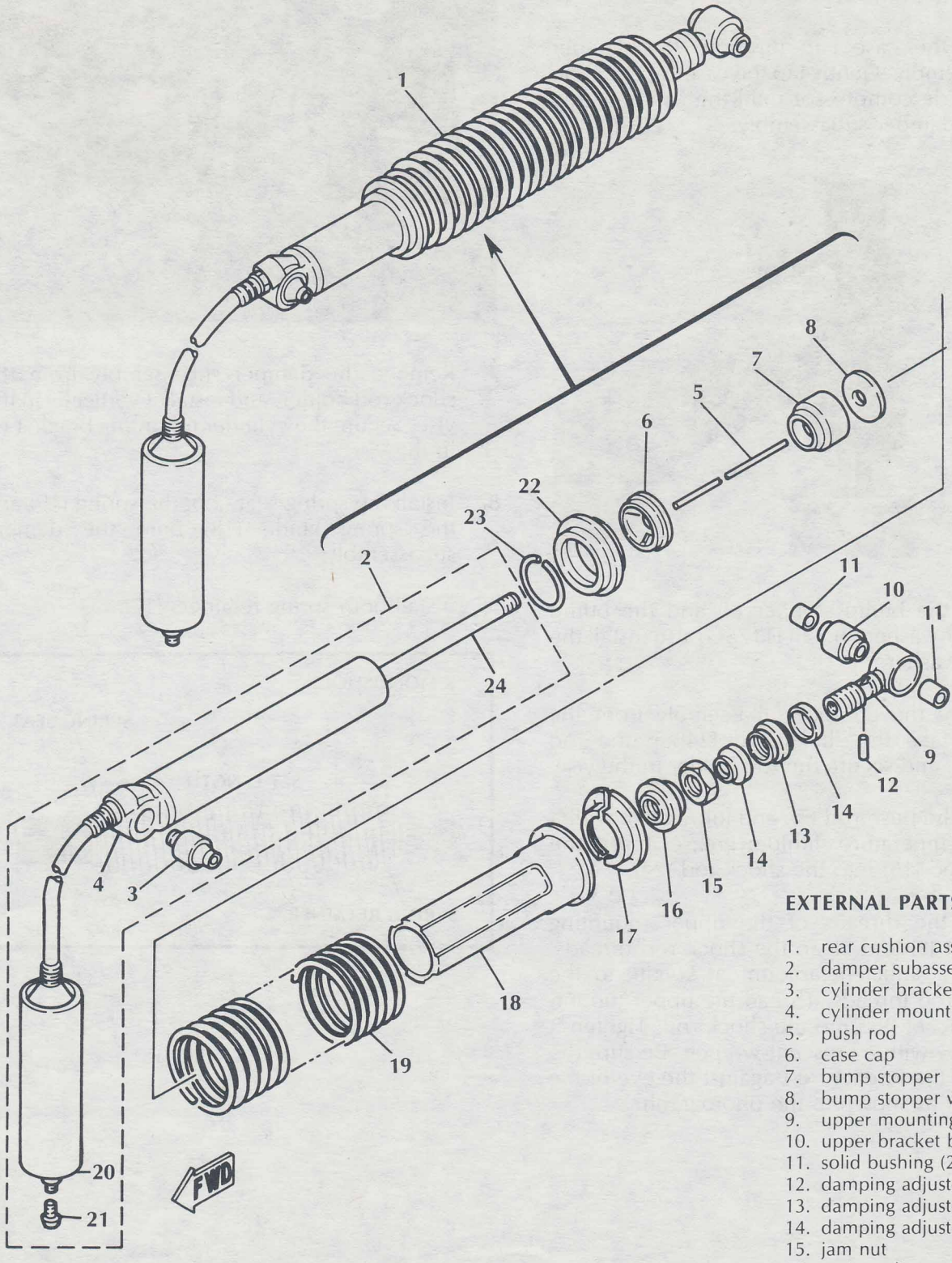
23. If there are no leaks, adjust the gas pressure to specification. Always check the pressure with a check gauge.

    SPECIFIED GAS PRESSURE:
    3R4: 15 kg/cm² (213 psi)
    3R6: 15 kg/cm² (213 psi)

24. Install the panhead screw in the plug. Torque it to specification.

    TIGHTENING TORQUE:
    20 kg-cm (1.4 ft-lbs.)

INSTALLING THE EXTERNAL PARTS

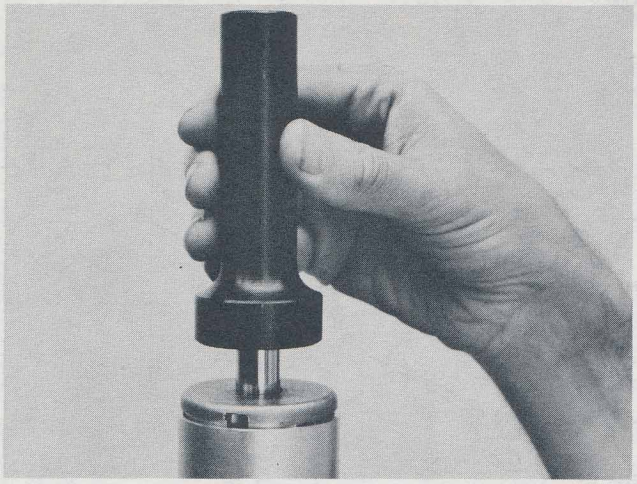


EXTERNAL PARTS

1. rear cushion assembly
2. damper subassembly
3. cylinder bracket bushing
4. cylinder mounting bracket
5. push rod
6. case cap
7. bump stopper
8. bump stopper washer
9. upper mounting bracket
10. upper bracket bushing
11. solid bushing (2)
12. damping adjuster pin
13. damping adjuster
14. damping adjuster cover (2)
15. jam nut
16. spring adjuster
17. spring retainer (2)
18. spring guide
19. spring
20. gas reservoir
21. panhead screw
22. spring seat
23. circlip
24. shock rod

1. Secure the cylinder mounting bracket in the vise. The damper subassembly should be held vertically in the vise.

2. Install the case cap (6) onto the damper subassembly. Gently tap the case cap with the rod guide compressor until the cap is seated in the damper subassembly.

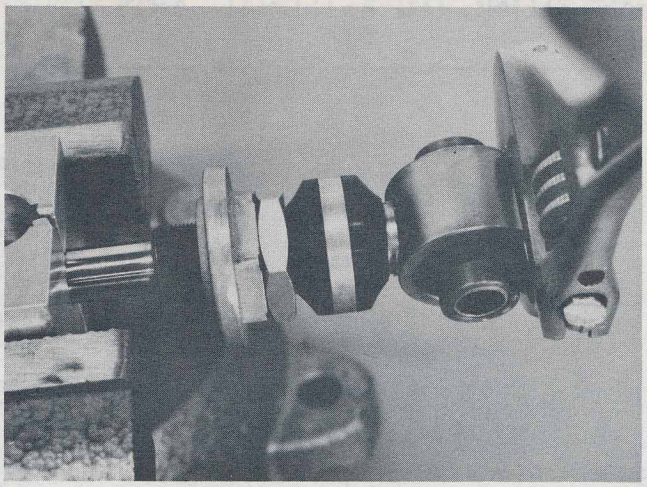


3. Install the bump stopper (7) and the bump stopper washer (9). On IT175G, also install the wave washer.

4. Remove the damper subassembly from the vise. Place the shock rod (24) in the rod holder, and secure the rod holder in the vise.

5. Clean the push rod (5), and lubricate it with a high temperature, lithium grease. Insert the push rod (15) into the shock rod (24).

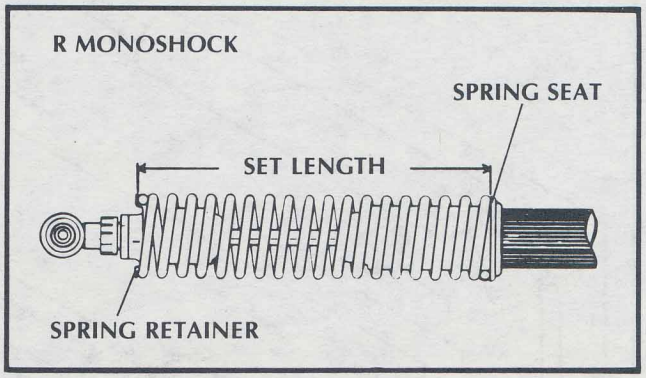
6. Clean the threads of the upper mounting bracket (9) and clean the shock rod threads. Apply a sufficient amount of Loctite to the shock rod threads. Thread the upper mounting bracket (9) onto the shock rod. Tighten it securely with a crescent wrench. Be sure the flats of the wrench rest against the eye of the bracket as shown in the photograph.



7. Remove the damper subassembly from the shock rod holder, and install it vertically in the vise. Secure the cylinder mounting bracket (4) in the vise.

8. Install the spring seat (22), the spring (19) and the spring guide (18) onto the damper subassembly.

9. Install both spring retainers (17).



10. Adjust the set length of the spring to specification or to the length you measured before disassembly. Adjust the spring length by turning the spring adjuster (16). When the set length is at the desired specification, tighten the jam nut (15) against the spring adjuster (16).

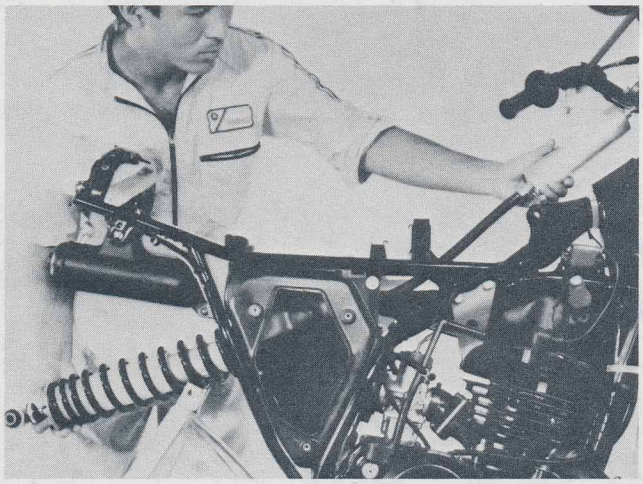
    SET LENGTH:
    3R4 Shock: 356mm (14 in.)
    3R6 Shock: 335mm (13.2 in.)

11. Thread the damping adjuster (13) all the way down until it stops (do not force it). Back the damping adjuster out to the standard adjuster setting or to the setting you noted before disassembly.

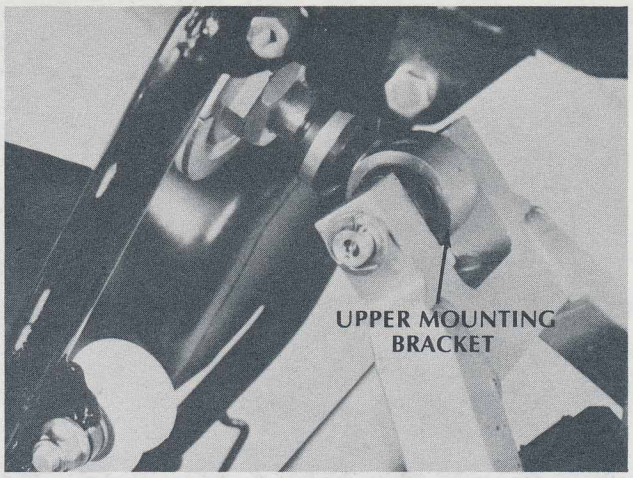
    STANDARD ADJUSTER SETTING:
    3R4: 11 Click Out
    3R6: 15 Clicks Out

INSTALLING THE MONOSHOCK ON THE MOTORCYCLE

1. Carefully insert the monoshock in the motorcycle frame. Place the reservoir towards the front of the motorcycle. Be careful not to damage the reservoir (20) or the rubber hose.



2. Reinstall the pivot bolt through the swingarm and through the upper mounting bracket (9). Be sure that a washer is between each bushing and the swingarm pivot. Always use a new cotter pin.



3. Reinstall the cylinder mounting bracket (4) to the upper part of the frame. Use a new cotter pin when securing the nut.

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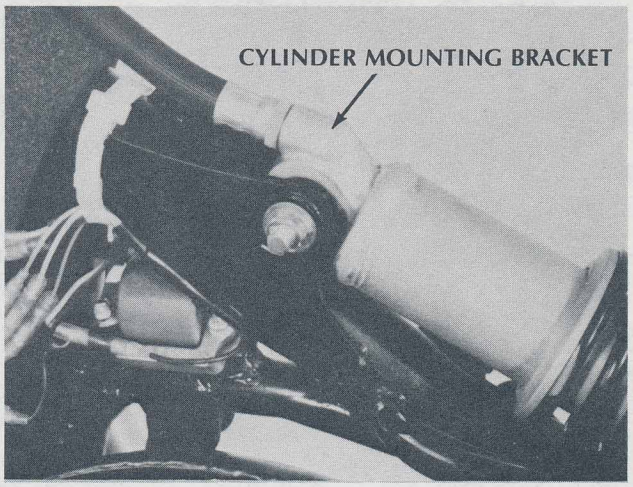

4. Install the gas reservoir (20) in the grommet on the frame, and secure the reservoir to the frame with the steel band.

5. Reinstall the fuel tank and the seat.

6. Reinstall the lower tensioner to the frame, and reinstall the master link on the chain.