

should be .020-.040 in. Clutch discs are available in three thicknesses: .060-.063, .073-.076, .087-.090 in. Usually, it will be necessary to replace only the top plate to provide clearance within this range. When

proper clearance is obtained, remove tool.

Install clutch hub (G) and input shaft (C) in retainer and install snap ring (B). Install thrust washer (A) over input shaft, against flange of shaft.

SECTION X—CONSTANT LEVEL TORSION-AIRE

1. GENERAL INFORMATION

The Air Suspension System used on the 1959 Plymouth cars, Figure 1, consist of an engine driven balanced head compressor, compressor drive belt, check valve, high pressure air lines, high pressure reservoir tank, low pressure volume tank, air springs, height control valve assembly and valve (actuating) rubber linkage.

In conjunction with the Air Suspension System, conventional steel semi-elliptic leaf springs and shock absorbers are used. However, spring load and rate have been reduced approximately ten per cent.

Air suspension produces a better quality ride as well as maintaining a constant rear height. The rear height is comparable to that of a car without air suspension with a three passenger load.

The compressor, Figure 2, is located either at the front or side of the engine (depending on car engine equipment), and lubricated through oil lines from the engine oiling system. The check valve is attached to the compressor head. A high pressure line from the check valve is connected to the high pressure reservoir tank under the right front fender. A second high pressure line connects the high pressure reservoir tank with the height control valve (which is mounted on the low pressure volume tank). The low pressure volume tank is mounted between the frame side rails above the rear axle. Two air springs from the low pressure volume

tank are connected to the two air spring pistons on the rear spring plates.

The height control valve actuator arm is connected to the rear axle assembly by rubber linkage, Figure 3.

OPERATION

With the engine running, 1800-2000 rpm, the compressor maintains 220 ± 20 lbs. air pressure through the air lines and high pressure tank to height control valve end cap. (The amount of pressure is determined by the design of the balanced-head). The check valve at the compressor and the control valve maintain the high pressure when the engine is stopped.

The operating pressure in the low pressure volume tank and air springs is controlled by the height control valve. The pressure varies with the load, from approximately 20 psi when the load consists of only the driver, to 70 psi with a six passenger load and as much as approximately 90 psi with a nine passenger load. Pressures within this range vary as the car moves over chuck holes and expansion strips in the road surface, in order to maintain the constant rear height. Since these pressures are variable, it is not necessary to test them.

The height control valve contains a minimum pressure valve to maintain 8-15 psi in the air springs during a no-load operation such as when changing tires by the use of a bumper jack. This pressure prevents dam-

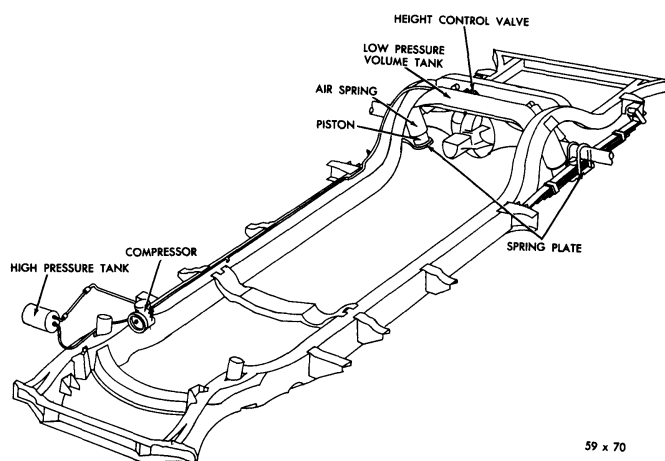


Figure 1—Air suspension system

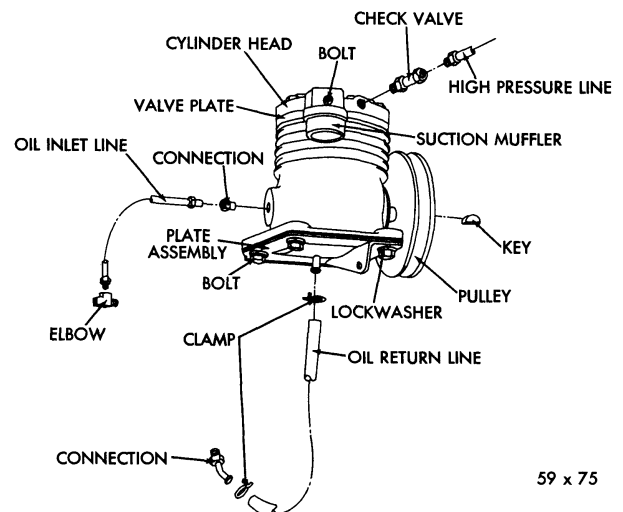


Figure 2—Air compressor

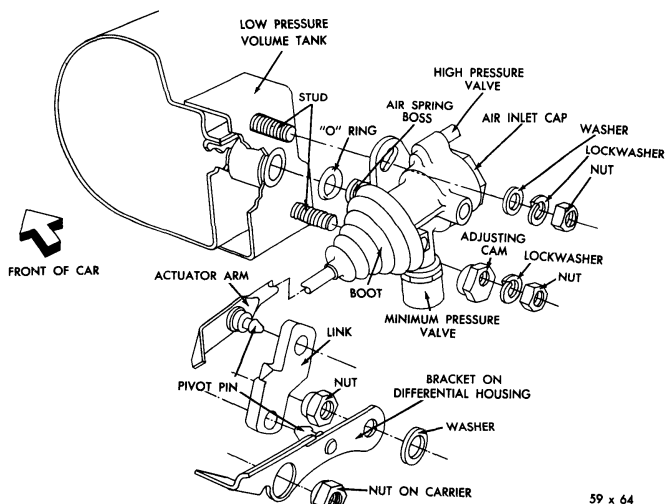


Figure 3—Height control valve

age to the air springs by preventing the springs from folding inward as the jack is lowered and a load condition restored to the system.

The height control valve also contains a high pressure relief valve (150-110 psi) to protect the low pressure system under extreme heavy load conditions.

MAINTENANCE

The high pressure air tank should be drained at least once a month. Depress the non-removable core in the drain valve. (Should it ever be necessary to remove the whole valve, remove the high pressure line at the check valve FIRST).

2. TESTING FOR LEAKS

LIQUID SOAP METHOD

With engine running, apply a solution of liquid soap diluted with water at the following locations where leaks would cause bubbles: air springs and seats, height control valve mounting, air line connections, high pressure tank, drain valve connection and outlet.

To test the check valve use the following procedure: stop the engine and remove the air line and check valve from the compressor. Reconnect the air line to the check valve and then apply air pressure through the tank drain valve. Coat check valve with soap solution. If no leak is evident, wipe off soap solution before reinstallation to the compressor.

REFRIGERANT METHOD USING AIR CONDITIONING TOOLS (ALTERNATE METHOD)

Refer to 1958 Plymouth Service Manual—Subject: Air Conditioning Preparation for Tests, Precautions in Handling Refrigerant and Testing for Leaks.

Inspect entire car fuel system for leaks and overflow. Correct leaks and wipe up spillage (gasoline fumes are sensitive to refrigerant test).

Add 150 lbs. to center of luggage compartment and raise car on hoist, with car supported by wheels or axle. Discharge the system (see paragraph 4) and reconnect actuator arm to rubber linkage. Install adaptor Tool C-3693 between compressor check valve and high pressure line. Connect manifold gauge set Tool C-3627 suction hose to the adaptor. Attach refrigerant tank to gauge set. Open refrigerant tank valve. Open suction valve on gauge set to admit 40 psi of gas to suspension system. Close the valve and the tank valve.

Operate the engine long enough for compressor to pressurize the system. Test for leaks with Tool C-3659. Refrigerant gas entering sniffer tube will change the color of the flame.

After making any necessary repairs and completing the tests; start engine and purge refrigerant from system by disconnecting the actuator arm from the rubber linkage. Operate the valve manually until all the gas has been purged from the system. Reconnect the link and stop the engine.

Drain any condensation from the high pressure tank by depressing the drain valve core. Disconnect the refrigerant gas tank, gauge set and remove the adaptor. Connect the air line to check-valve. Lower the car, start the engine, remove the weights from the luggage compartment and continue to leave the engine run for at least three minutes before removing the car from the hoist.

3. CHECKING AND ADJUSTING SUSPENSION HEIGHT

The vehicle must have recommended tire pressure and a full tank of fuel, or equivalent weight added to luggage compartment over the tank (gasoline weighs approximately 6½ lbs. per gal.). The front suspension height should be correct and equal on both sides before placing car on level floor with no passenger load.

The rear suspension height must be set to a specified vertical distance between the top of the axle housing and highest part under the axle bumper straps, to the rear of the rubber bumpers on both sides of car. Clean the bumper straps and axle housing tubes before measuring.

Rear suspension height (both sides) is measured twice, once with a load and again without a load. Proceed as follows:

Run the engine three to five minutes to be assured that there is adequate pressure in the system. With the engine running, add 150 to 200 lbs. to the center of the luggage compartment. The height control valve

should feed additional air to the low pressure system, causing the car to return to the original height.

Measure height at both sides using Tool C-3670, Figure 4, and record the figures. The difference between the two figures should not exceed $\frac{1}{2}$ in. If the difference exceeds $\frac{1}{2}$ in., the air suspension system is not at fault. Either the front suspension height is incorrect, the rear springs may be broken or some other part of the chassis may be damaged. Locate and correct existing difficulties before proceeding further with air suspension checks.

The average of the two measurements should be $4\frac{1}{4}$ in. \pm $\frac{1}{8}$ in. To adjust height control valve, loosen the attaching nuts, rotate cam on lower attaching stud. **DO NOT BOTTOM CAM TIGHTLY AGAINST VALVE BODY BECAUSE THE LOW PRESSURE VOLUME TANK COULD BE DAMAGED.**

When adjusted to correct height, tighten attaching nuts to 7 ft. lbs. Remove added weight from luggage compartment and recheck height to same specifications.

4. DISCHARGING THE SYSTEM

Discharge the high pressure system by depressing the valve core in the high pressure air tank drain

and charging valve. **DO NOT REMOVE VALVE FROM TANK BEFORE DISCONNECTING HIGH PRESSURE LINE.**

Discharge low pressure system by pulling the height control valve actuator arm off the pivot pin on the rubber linkage at the axle housing and moving the arm down.

5. AIR SPRINGS AND PISTONS

During jacking operations, the minimum pressure valve maintains pressure in air springs to prevent buckling.

REMOVAL AND DISASSEMBLY

With car on hoist, discharge the system. Remove nut holding air spring piston to spring plate then raise piston off spring plate and remove air spring from lower pressure volume tank by pulling it outward and down.

Remove piston mounting bolt and retainer assembly from piston, using a soft-end mallet. Push piston out of air spring by inserting hammer handle (or equivalent) into the air spring.

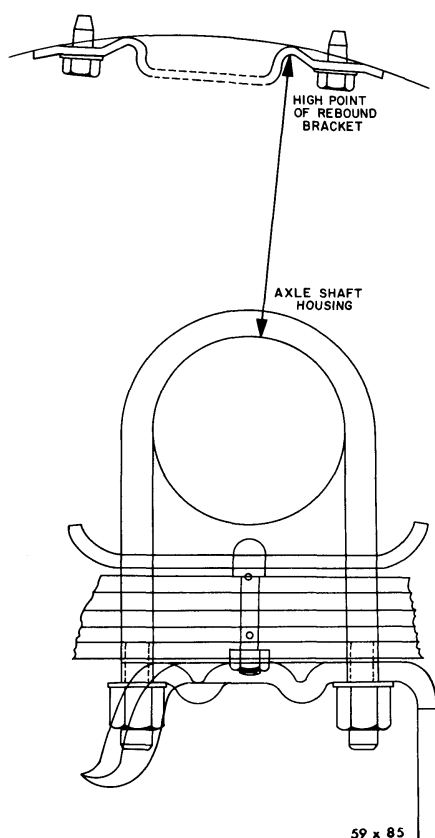


Figure 4—Measuring rear height

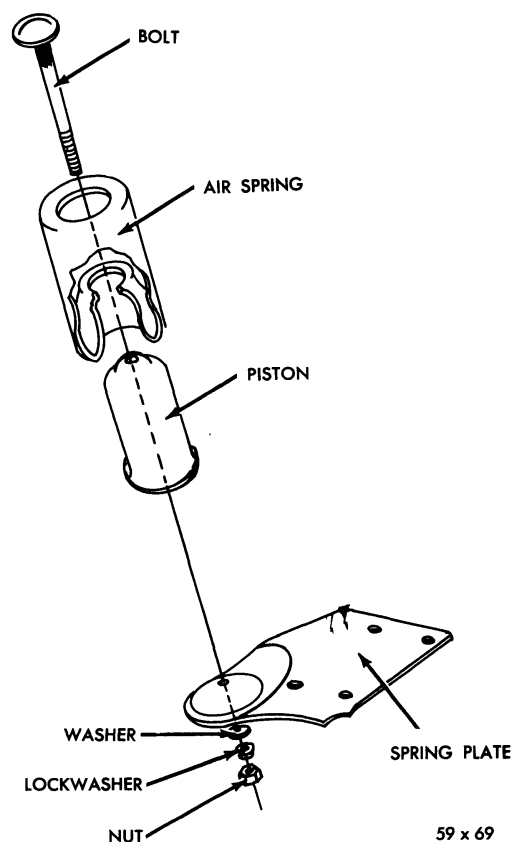


Figure 5—Air spring and piston assembly

NOTE

Under no circumstance should the small end of the air spring be pulled out to a fully extended position, as special tools are required to place it in correct position.

CLEANING AND INSPECTION

Clean all parts with clean, dry cloth. Inspect piston and mounting bolt assembly for nicks, burrs or cracks. Remove burrs with crocus cloth. Replace any pistons showing indications of having cracks.

Mounting bolt assembly must be a snug fit in the piston and retainer section must seat solidly against piston. If necessary, peen the piston around the bolt hole to obtain a snug fit.

Inspect the air spring for cuts, cracks, holes and excessive carcass wear. Small cracks in the outer rubber cover are permissible provided there is no leak.

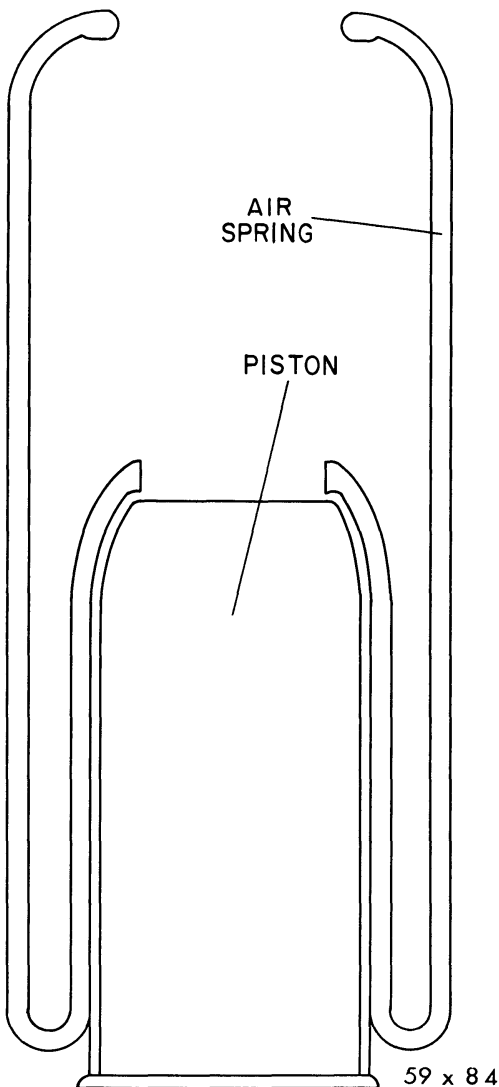


Figure 6—Installing air spring on piston

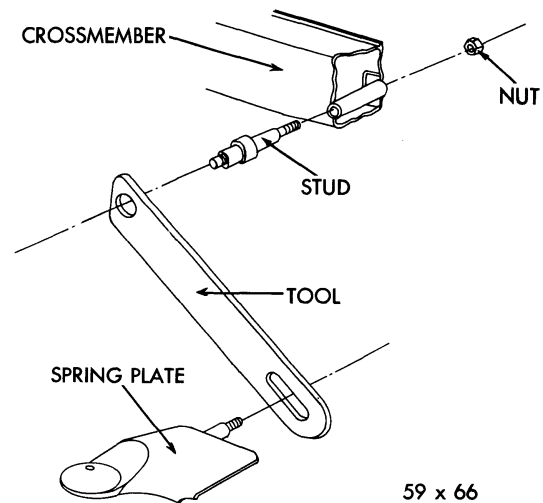


Figure 7—Body hold down straps

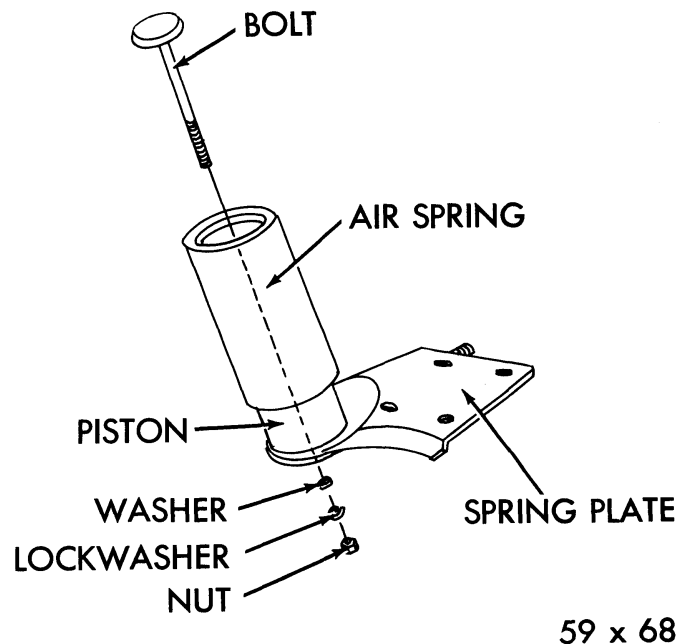


Figure 8—Installing air spring and piston assembly

REASSEMBLY AND INSTALLATION

With the piston upright on a bench, place small end of air spring over rounded end. Roll spring down to cover the piston completely. Insert retainer bolt assembly and examine for snug fit in piston, Figure 6.

Remove rear shock absorbers. Make hold down straps or use Tool C-3694 straps, Figure 7, and install them in place of shock absorbers. Strap will hold weight of body on leaf springs and assist in seating air spring.

Position piston and air spring assembly on spring plate. Install retainer bolt, washer and nut, Figure 8. Tighten to 5 ft. lbs. temporarily.

Coat mounting rim of air spring with diluted liquid soap solution. If both springs were removed from the low pressure volume tank, it will be necessary to install both simultaneously to permit pressure build-up in tank.

Start the engine. Hold air spring(s) tightly in position against tank seat(s) and operate control valve manually. Air pressure entering air spring(s) will force spring up on its seat.

Check seating of air spring on tank flange and seat of piston on spring plate. Align piston and tighten nut to 12 ft. lbs.

Remove hold down straps and install shock absorbers. Connect actuator arm to rubber linkage then check for air leaks.

6. RUBBER LINKAGE

The rubber linkage which connects the pivot pins on the valve actuator arm and the bracket on the axle housing is removed by pulling the linkage off the pivot pins.

Before installing, apply water or soap solution around pivot pin holes. Position linkage with rounded end up toward actuator arm and stop boss to the left side of car. Push linkage on pivot pin.

7. HEIGHT CONTROL VALVE

REMOVAL

Discharge the system. Remove high pressure line from valve end cap, then remove valve mounting nuts and remove valve assembly.

NOTE

Height control valves are serviced only as an assembly.

The "O" ring valve to low pressure volume tank seal is serviced separately.

INSTALLATION

Apply diluted liquid soap to "O" ring on housing boss. Install valve assembly on low pressure volume tank, inserting the boss in tank without damaging the "O" ring.

Install adjusting cam in housing at the lower mounting stud and install mounting nuts finger tight then connect air line to valve end cap.

Start the engine and check the valve for operation then tighten mounting nuts to 7 ft. lbs. Connect actuator arm to rubber linkage and check for leaks. Check car height and adjust as necessary.

8. LOW PRESSURE VOLUME TANK

REMOVAL

Discharge the system. Remove air springs from tank by pulling top of springs downward and outward.

Disconnect air line at valve end cap. Disconnect actuator arm at rubber linkage then loosen and lower right tail pipe only. Support axle and remove right rear wheel.

Remove self-tapping screws (two each side) holding tank to frame side rails. Remove tank from right side of car then remove height control valve assembly and adjust cam.

INSTALLATION

Install new "O" ring on height control valve air spring boss. Coat ring with diluted soap solution. Install valve assembly and adjust cam. Tighten nuts to 7 ft. lbs. and install tank and tighten mounting screws to 13 ft. lbs.

Connect air line to control valve. Install air spring, then position and tighten right tail pipe. Install right rear wheel, check system for leaks and adjust car rear height.

9. HIGH PRESSURE AIR TANK

REMOVAL

Discharge the system. Disconnect both air lines at tank then remove bolts holding tank cradle to the car. Remove tank and bracket assembly. Remove bracket assembly and drain valve.

INSTALLATION

Install gasket and drain valve. Tighten to 12 ft. lbs. Position tank and bracket assembly and install bolts. Tighten ¼ in. bolts to 7 ft. lbs., 5/16 in. bolts to 10 ft. lbs. Connect air lines to tank then check for leaks.

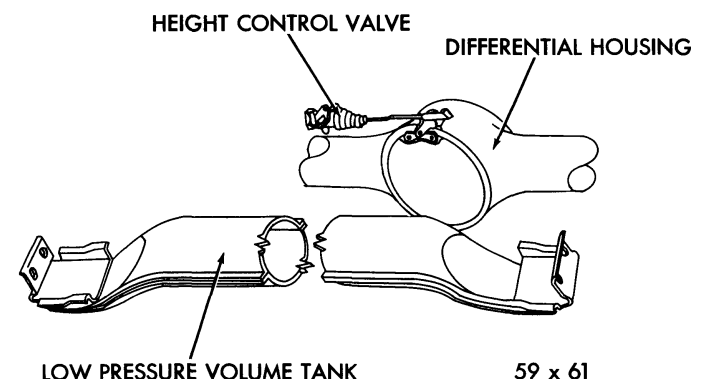


Figure 9—Low pressure volume tank

10. COMPRESSOR

REMOVAL

Remove oil pressure line at rear of compressor. Remove air line from check valve, then remove oil return line at engine end.

Loosen belt adjusting bolt, remove belt from compressor then remove compressor bracket bolt from compressor.

Remove bolts holding compressor support to engine and remove compressor assembly from car.

INSTALLATION

With compressor attached to support, attach support to engine, tighten bolts to 30 ft. lbs. and install compressor bracket. Tighten bolts to 30 ft. lbs.

Install belt, connect oil pressure line, air line and oil return line. Start engine and check lines for leak and then check air pressure.

Discharge the system. Disconnect air line from compressor check valve and then connect adapter C-3693 to check valve and to pressure gauge, Tool C-3293 to check valve (300 lbs. gauge). Attach air lines to adapter.

With engine running at 1800-2000 rpm, gauge reading should be 200 psi ± 20 psi. Remove gauge and adapter and install air line.

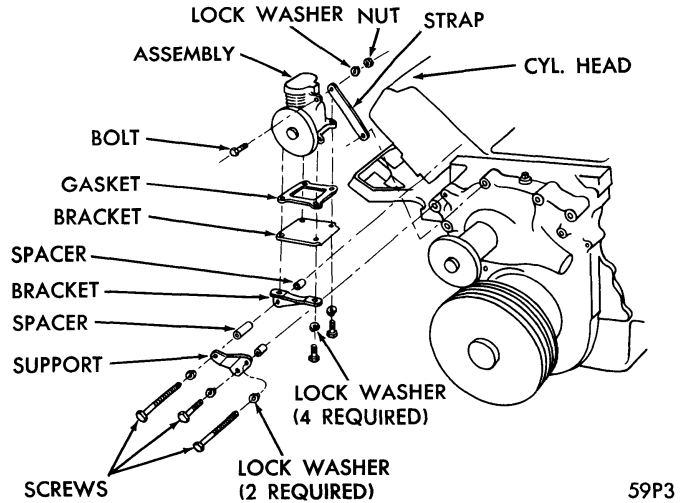


Figure 11—Air compressor disassembled (without air conditioning)

11. COMPRESSOR RECONDITIONING

The following component parts are available for service:

- (a) Cylinder head and gasket
- (b) Valve plate assembly and gasket
- (c) Pulley and key

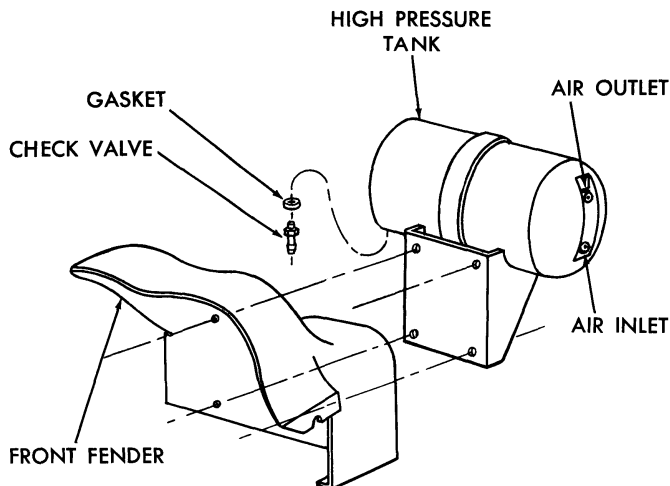


Figure 10—High pressure air tank

- (d) Bottom plate mounting plate and gasket
- (e) Front bearing, housing and oil seal assembly
- (f) Check valve assembly
- (g) The suction muffler felt.

CYLINDER HEAD AND/OR VALVE PLATE ASSEMBLY

Discharge the system. Remove air line from check valve then remove cylinder head bolts.

Remove cylinder head and valve plate assembly. If the plate does not separate from the head, tap the plate lightly with a soft mallet. Do not pry apart.

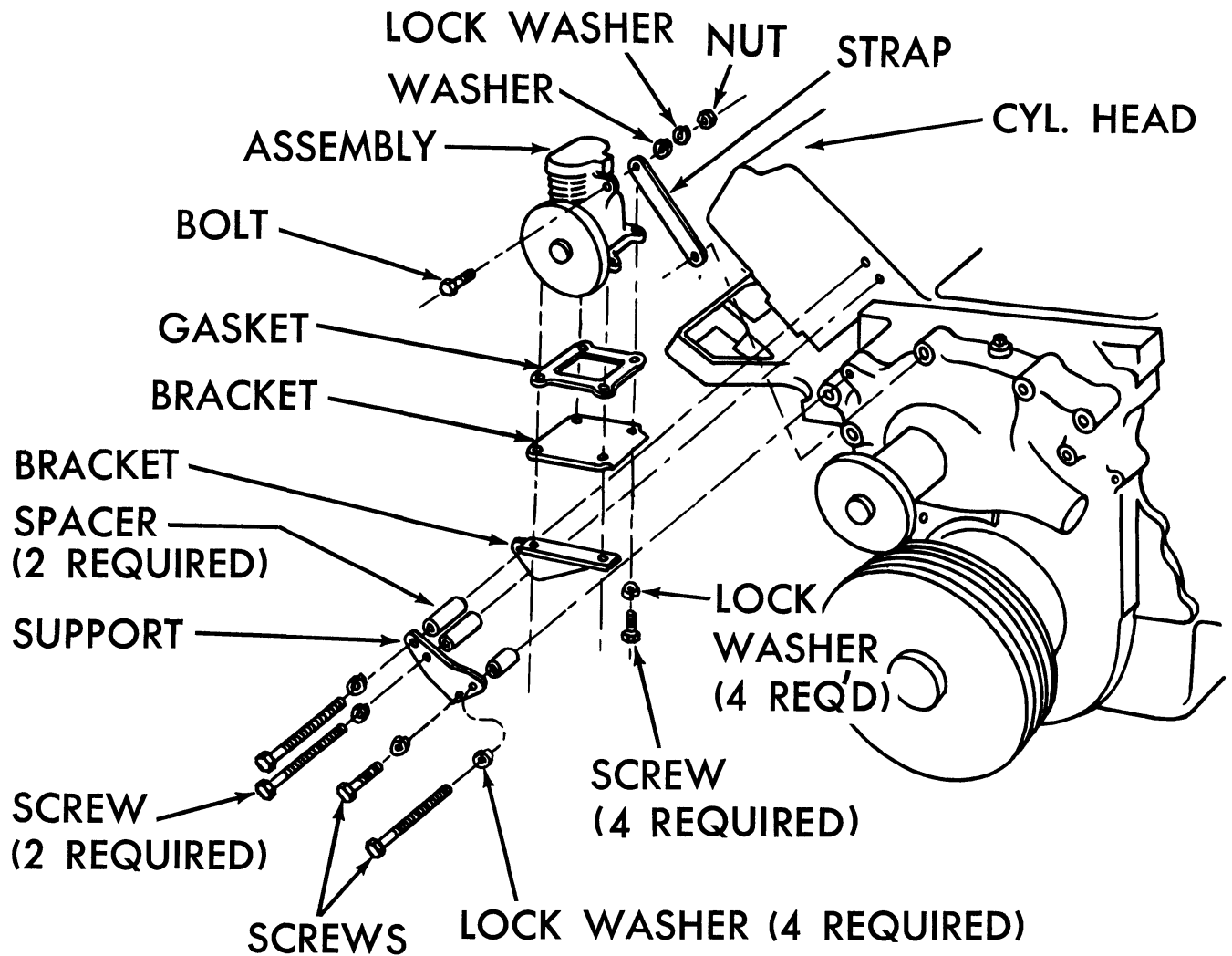
Clean piston heads, top of the cylinder block and head bolt holes, cylinder head and valve plate, using mineral spirits. Do not use scraper.

Inspect pistons and cylinder walls. If damaged, replace the compressor. If valve plate or cylinder head is damaged, replace. Remove check valve only if replacement is necessary.

Use new gaskets when installing valve plate and cylinder head. Tighten bolts to 155 in. lbs. Connect air lines to check valve and then check for leaks and test compressor.

PULLEY AND/OR FRONT BEARING, HOUSING AND OIL SEAL ASSEMBLY

Remove air compressor from the engine. The original pulleys are a .002 in. press or interference fit on the crankshaft. (If the pulley has been previously replaced check to see whether a roll pin has been installed, if so remove the pin with a suitable drift.) Remove pulley with Tool PO-11, Figure 13.



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Figure 12—Air compressor disassembled (with air conditioning)

INSTALLING COMPRESSOR PULLEY

Use arbor press to press pulley into contact with flange on crankshaft. Remove tools, install rear cover plate and tighten bolts to 35 in. lbs.

A new replacement pulley has a hole through one side of the hub. Use this hole as a guide to drill a $5/32$ in. hole in the crankshaft and the opposite side of hub of pulley. Install the roll pin then install compressor.

Remove front bearing, housing and oil seal assembly. Clean and inspect bearing and housing assembly. If any component is damaged, replace the assembly.

Install front bearing housing, using Tool C-3680 to protect seal. Tighten bolts to 35 in. lbs.

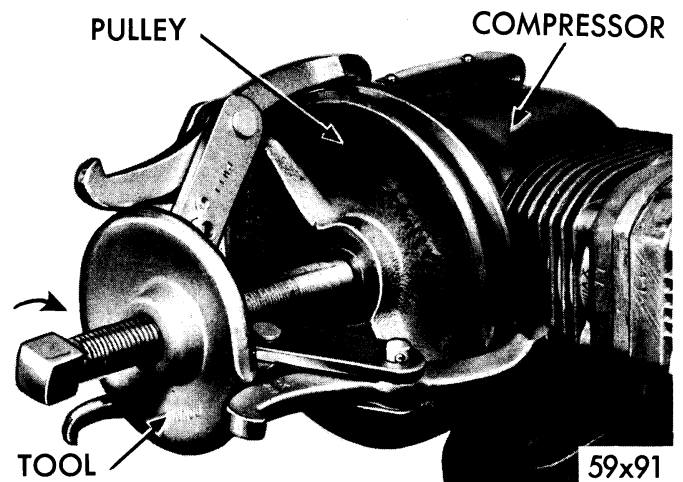


Figure 13—Removing compressor pulley

**AIR SUSPENSION
TORQUE SPECIFICATIONS**

Parts	Ft. Lbs.	In. Lbs.
Compressor Adjusting Strap Bolts	30	
Adjusting Strap to T-nut		200
Bracket to Support	30	
Bracket to A/C Compressor	30	
Cylinder Head		155
Front Bearing Housing Assembly		17
Oil Inlet Connector		130
Rear Cover Plate		17
Strap Bolt Nut	35	
Suction Muffler Retainer Screw		17
Support Bracket to Water Pump, Cylinder Block or Cylinder Head	30	
Support to Cylinder Head (7/16)	70	
Cylinder Block Drain Plug	20	
Airline Check Valve		130
Link Bracket to Rear Axle	30	
Drain and Charging Valve		140
High Pressure Tank Mounting—5/16		130
High Pressure Tank Mounting—¼		100
Height Control Valve Mounting		100
Low Pressure Tank to Frame		100
Air Spring Retainer Bolt		100
Minimum Pressure Valve		130

CONSTANT LEVEL TORSION-AIRE SERVICE DIAGNOSIS CHART

Possible Causes	Conditions				
	Car Does Not Maintain Correct Height	Unable to Adjust to Correct Height	Low Pressure in High Pressure System	Excessive Pressure in High Pressure System	Excessive Engine Oil Consumption
Compressor belt out of adjustment or broken	×	×	×		
Incorrect front height adjustment	×	×			
Rear springs broken	×	×			
Leak in high pressure system	×	×	×		
Check valve inoperative	×	×	×		
Leak in low pressure system	×	×			
Loose or broken rubber linkage or actuator arm	×	×			
Incorrect height control valve adjustment	×				
Height control valve inoperative	×	×			
Compressor cylinder head or valve plate gasket leaking			×		
Compressor reed valves worn			×		
Compressor piston rings worn			×		×
Excessive deposits on compressor pistons, valve plates			×	×	
Compressor oil seal leaking					×
Insufficient oil supply to compressor			×		

MAINTENANCE

High pressure air tank	Drain every 1000 miles
Air compressor filter	Replace every 5000 miles