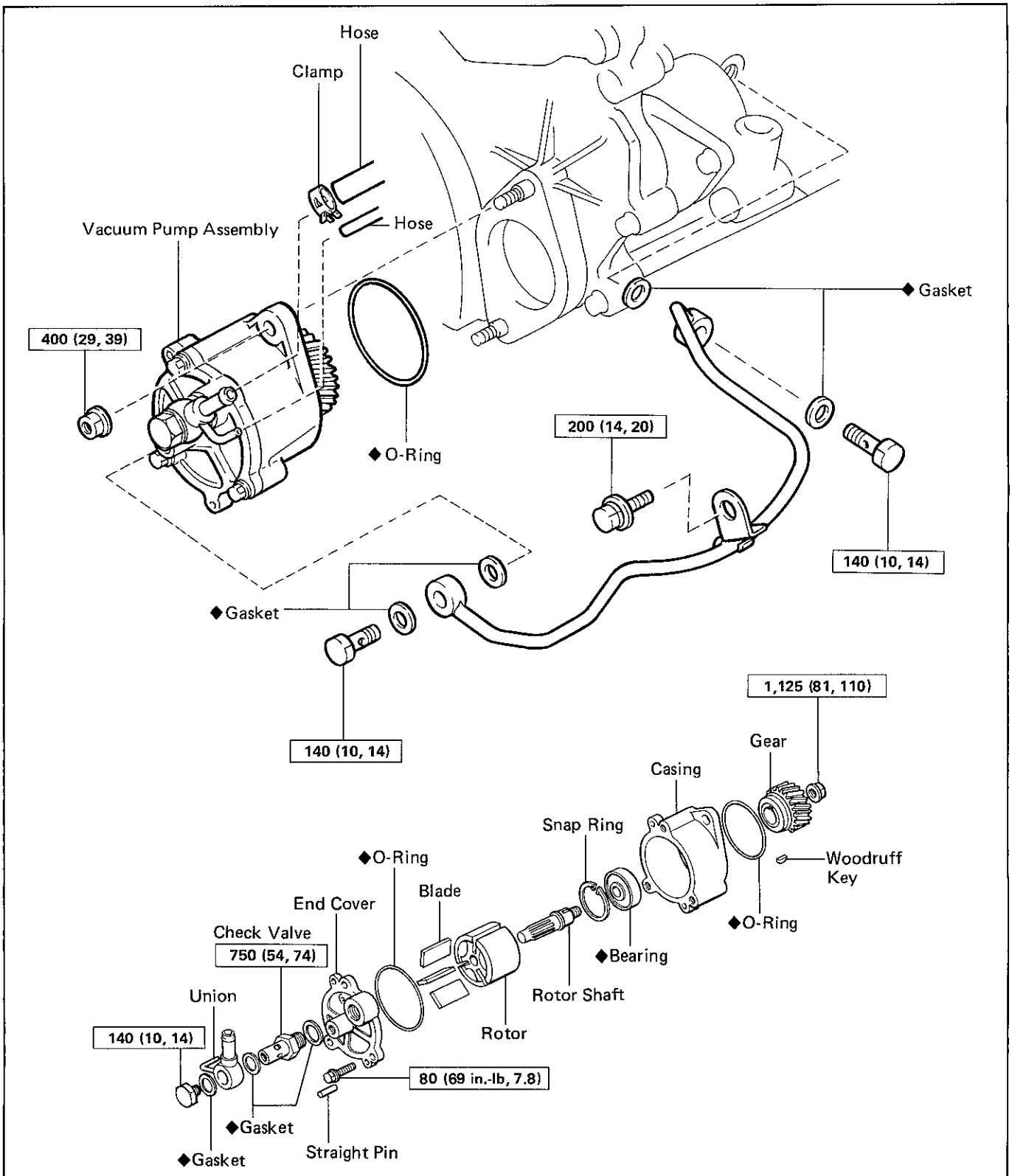
VACUUM PUMP (For 1HZ, 1PZ Engine)

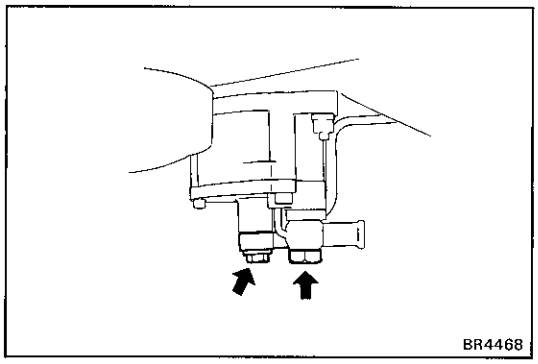
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

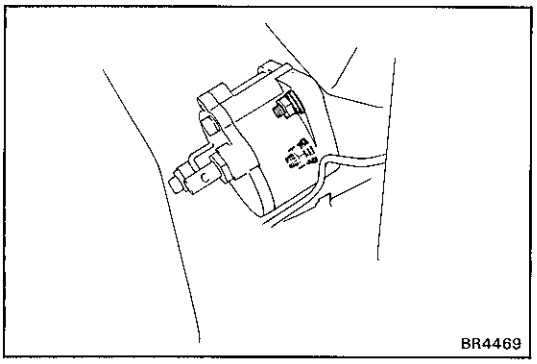
X3519
BR4507



REMOVAL OF VACUUM PUMP

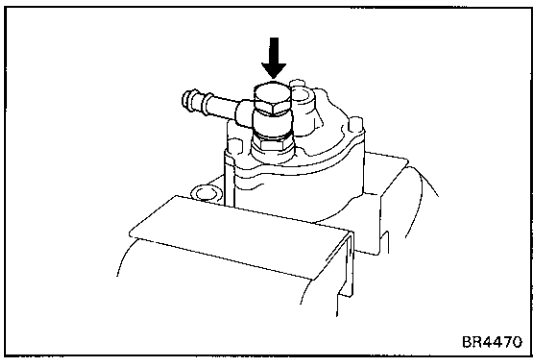
REMOVE VACUUM PUMP

(a) Remove the two union bolt and disconnect oil tube from the vacuum pump.



(b) Remove the two bolts and remove the pump from the engine.

(c) Remove the O-ring.



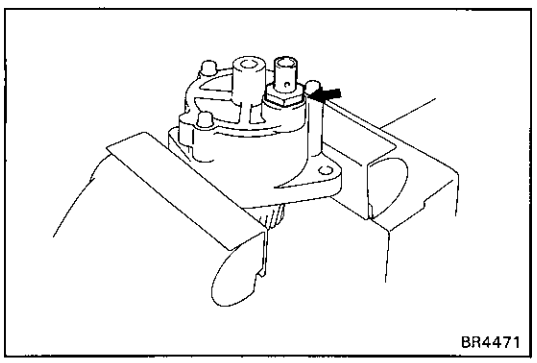
DISASSEMBLY OF VACUUM PUMP

1. REMOVE VACUUM HOSE UNION

(a) Using soft jaws on the vise, place the vacuum pump in the vise.

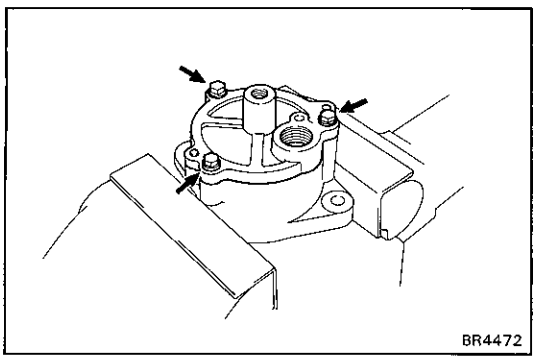
NOTICE: Do not tighten the vise too tightly.

(b) Remove the union bolt, union and two gaskets.



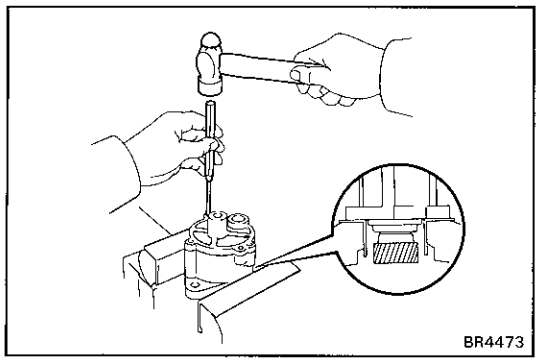
2. REMOVE CHECK VALVE

Remove the check valve and gasket.



3. REMOVE END COVER

(a) Remove the three bolts.

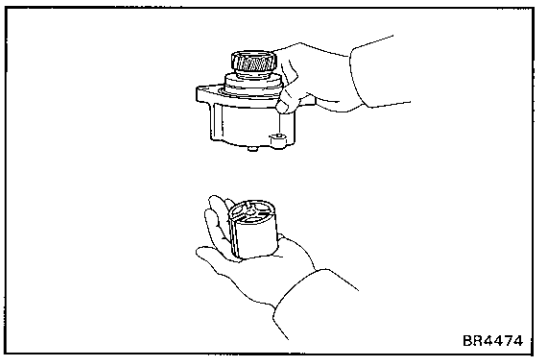


(b) Place the vacuum pump on vise as shown in the illustration.

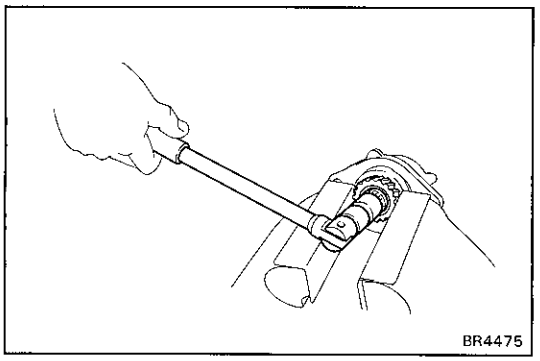
NOTICE: Do not tighten the vise.

(c) Using a pin punch and a hammer, drive out the two straight pins.

(d) Remove the end cover and O-ring.



4. REMOVE ROTOR AND THREE BLADES

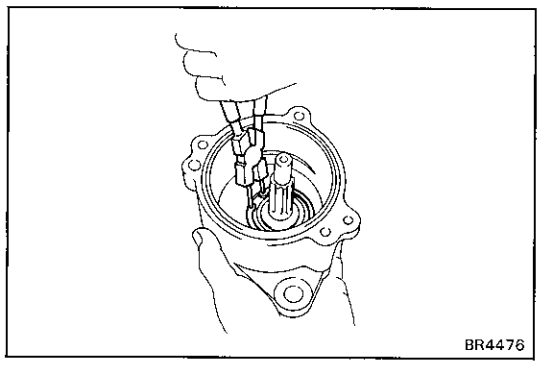


5. REMOVE GEAR

(a) Using soft jaws on the vise, clamp the gear in the vise.

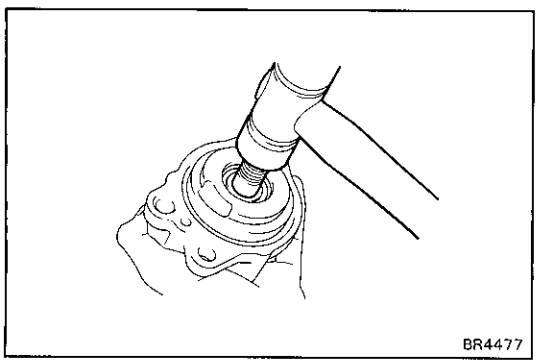
(b) Remove the gear lock nut.

(c) Remove the gear and woodruff key.



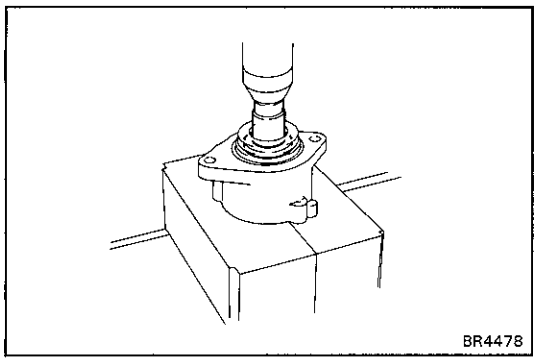
6. REMOVE SNAP RING

Using snap ring pliers, remove the snap ring.



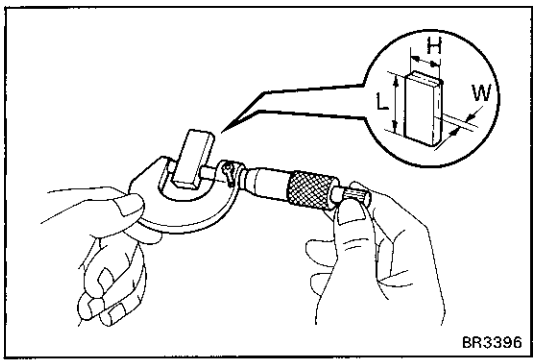
7. REMOVE ROTOR SHAFT

Using a plastic hammer, tap out the rotor shaft.



8. **REMOVE BEARING**

Using a press and 17 mm socket wrench, press out the bearing.



INSPECTION OF VACUUM PUMP

1. **INSPECT BLADES**

(a) Check the blades for wear or damage.

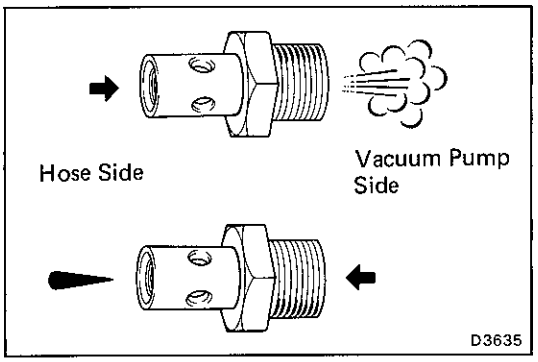
(b) Using calipers, measure the height, width and length of the blades.

Minimum height: 16.50 mm (0.6496 in.)

Minimum width: 4.95 mm (0.1949 in.)

Minimum length: 44.96 mm (1.7701 in.)

If necessary, replace the blades.

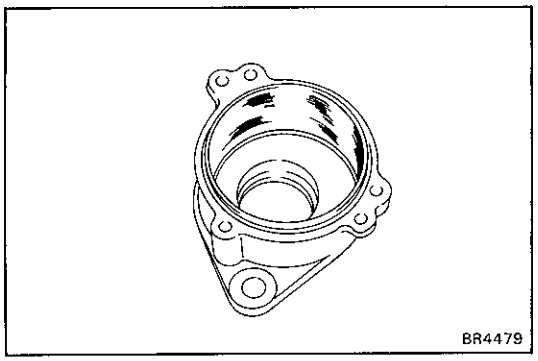


2. **INSPECT CHECK VALVE OPERATION**

(a) Check that air flows the hose side to the pump side.

(b) Check that air does not flow from the pump side to the hose side.

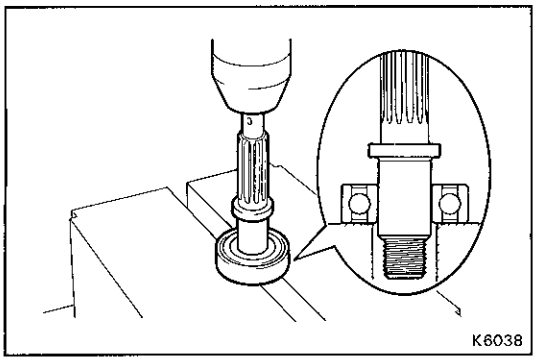
If necessary, replace the check valve.



3. **INSPECT INSIDE SURFACE OF CASING**

Inspect the inside surface of the casing for scoring.

If necessary, replace the vacuum pump assembly.

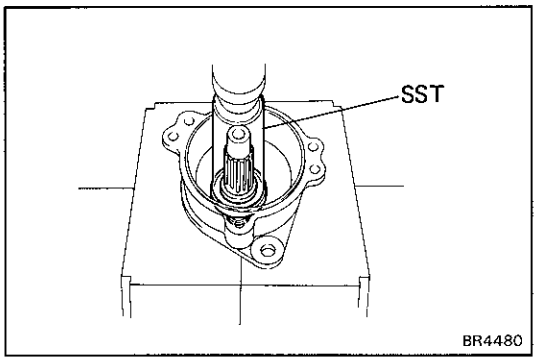


ASSEMBLY OF VACUUM PUMP

(See page BR-49)

1. INSTALL BEARING TO ROTOR SHAFT

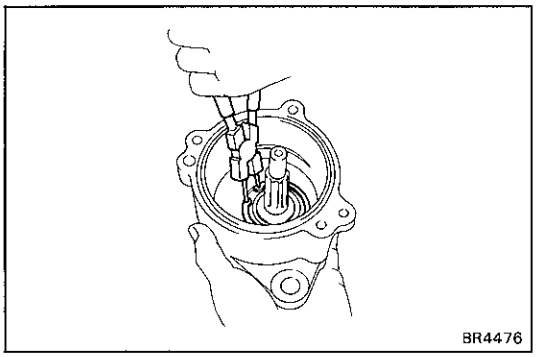
Using a press, install the bearing to the rotor shaft.



2. INSTALL ROTOR SHAFT

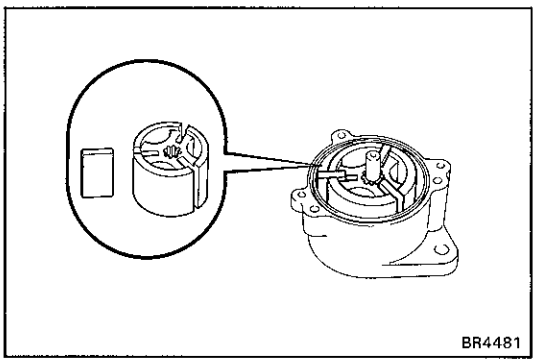
Using SST and press, install the rotor shaft to the casing.

SST 09608-30012 (09608-04030)



3. INSTALL SNAP RING

Using snap ring pliers, install the snap ring.



4. INSTALL ROTOR INTO CASING

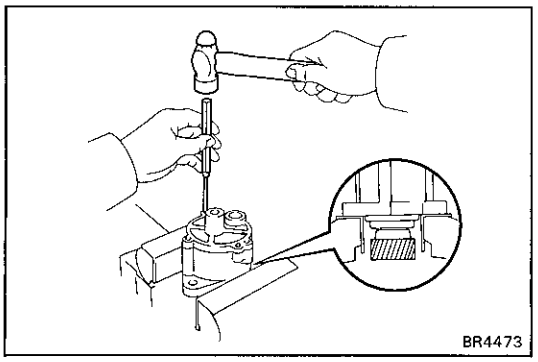
Apply engine oil to the rotor and install it to the rotor shaft.

5. INSTALL THREE BLADES

(a) Apply engine oil to the blades.

(b) Install the three blades with the round end facing outward.

(c) Be sure that the blades and rotor surfaces are even.



6. INSTALL END COVER

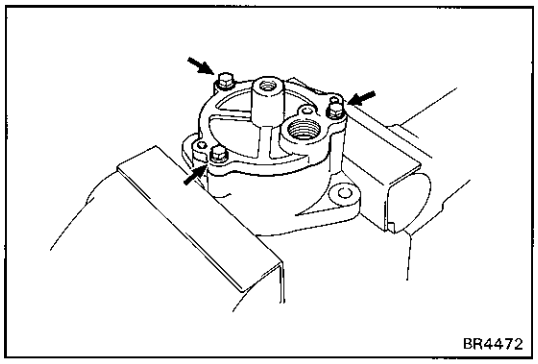
(a) Place the vacuum pump on vise as shown in the illustration.

NOTICE: Do not tighten the vise.

(b) Install the new O-ring.

(c) Install the end cover in place and temporarily install the three bolts.

(d) Using a pin punch and a hammer, drive in the two straight pins.

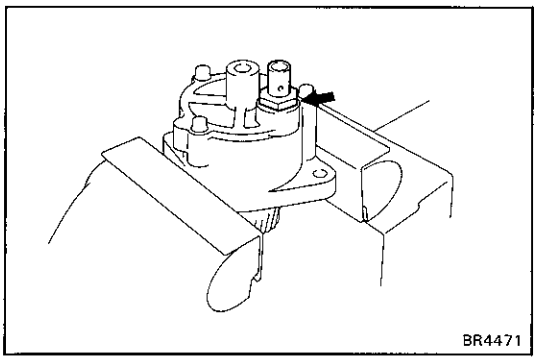


(e) Using soft jaws on the vise, place the vacuum pump in the vise.

NOTICE: Do not tighten the vise too tightly.

(f) Tighten the three bolts.

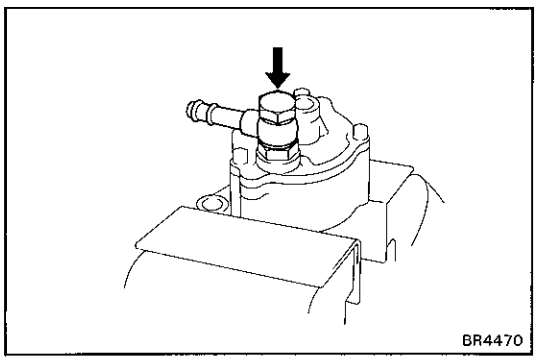
Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)



7. INSTALL CHECK VALVE

Install a new gasket and install the check valve.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)

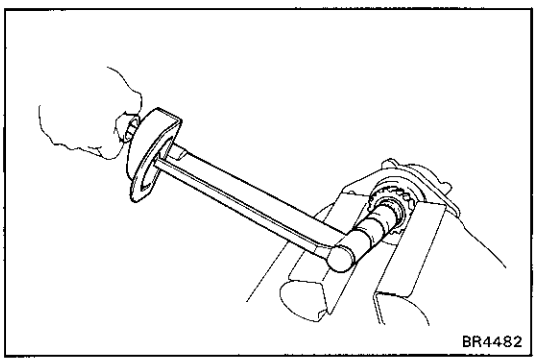


8. INSTALL VACUUM HOSE UNION

Install the vacuum hose union with the two new gaskets and, install and torque the union bolt.

Torque: 140 kg-cm (10 ft-lb, 14 N·m)

HINT: Align and insert the union pin into the matching portion of the casing.



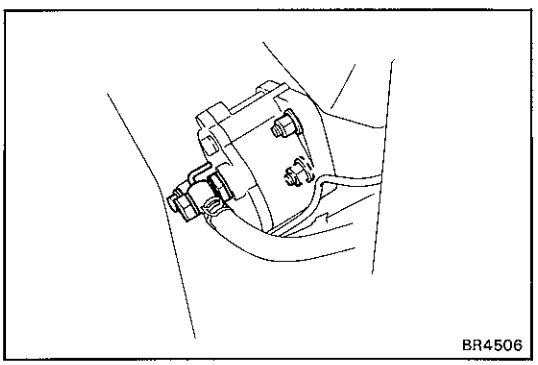
9. INSTALL GEAR

(a) Temporarily install the woodruff key, gear and lock nut to the pump.

(b) Using soft jaws on the vise, clamp the gear in the vise.

(c) Tighten the gear lock nut.

Torque: 1,125 kg-cm (81 ft-lb, 110 N·m)



INSTALLATION OF VACUUM PUMP

INSTALL VACUUM PUMP

(a) Install the new O-ring to the vacuum pump.

(b) Install the vacuum pump in place and, install and tighten the two bolts.

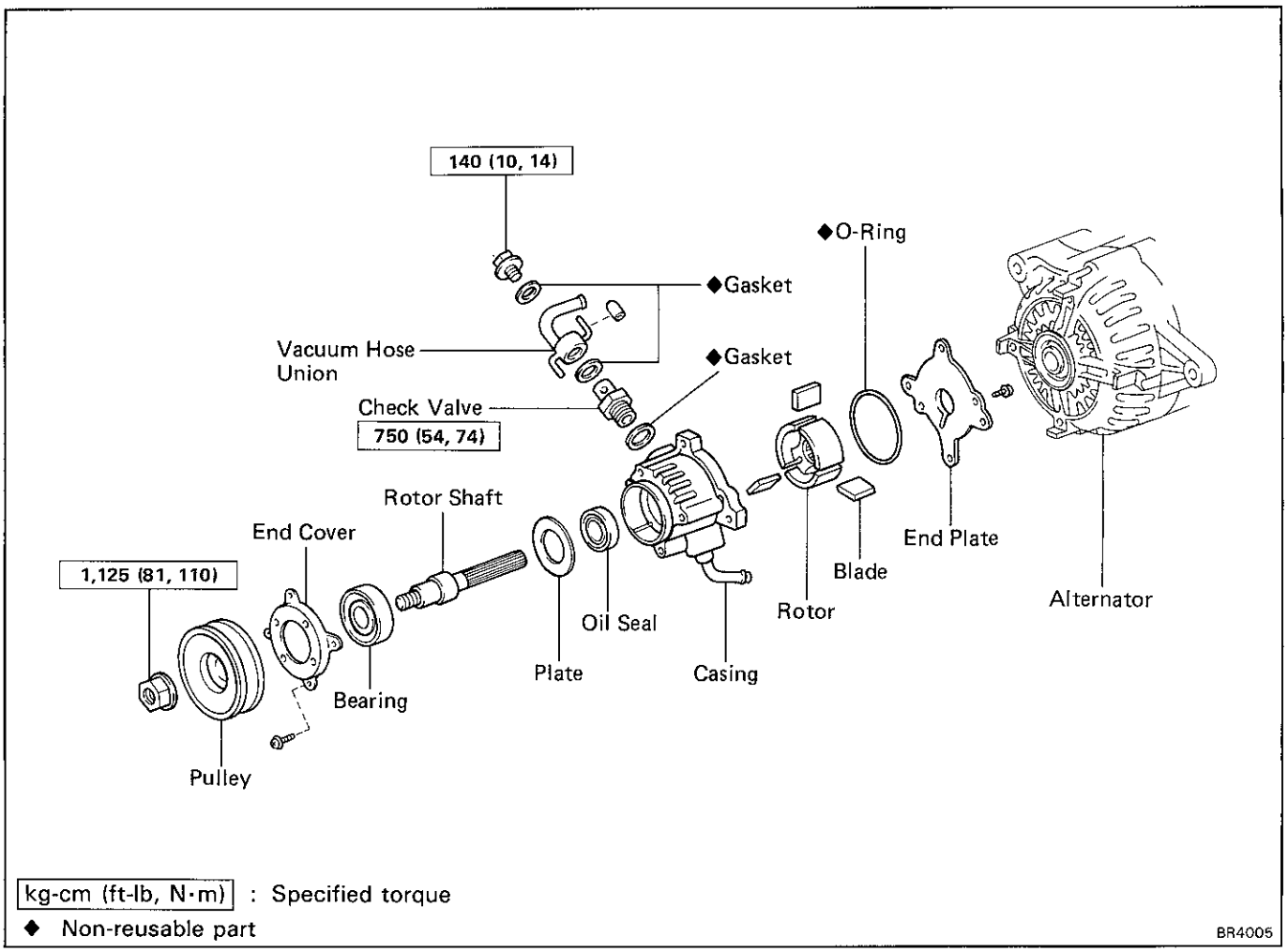
Torque: 400 kg-cm (29 ft-lb, 39 N·m)

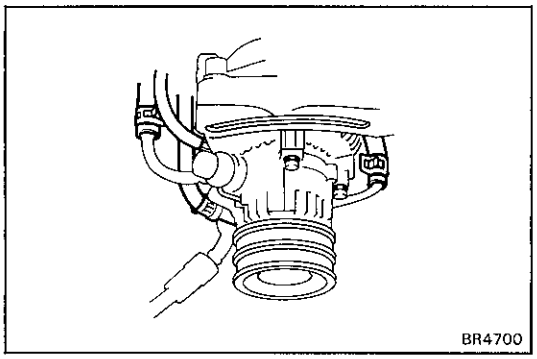
(c) Set the oil tube and new gaskets in place and install the union bolt.

(d) Set the vacuum hose and new gaskets in place and install the union bolt.

(For L Series Engine)

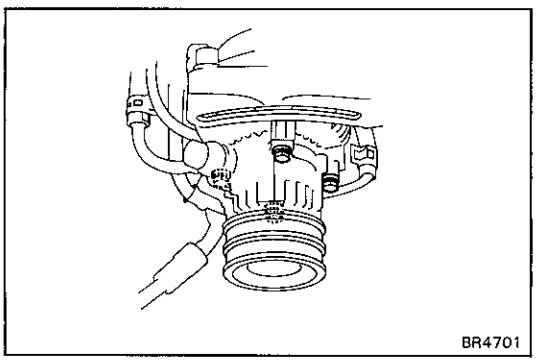
COMPONENTS



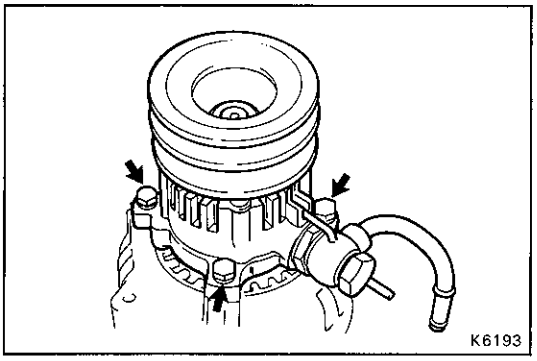


REMOVAL OF VACUUM PUMP

1. DISCONNECT TWO VACUUM HOSES
2. DISCONNECT OIL OUTLET HOSE
3. DISCONNECT INLET TUBE



4. REMOVE ALTERNATOR WITH VACUUM PUMP

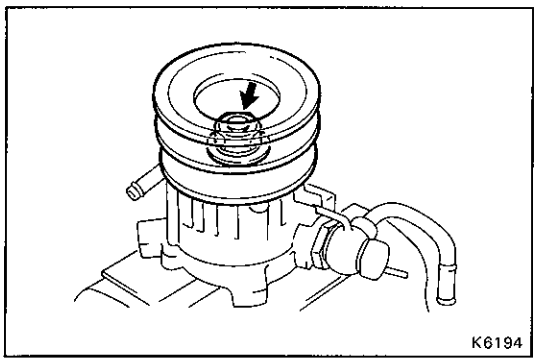


DISASSEMBLY OF VACUUM PUMP

(See page BR-55)

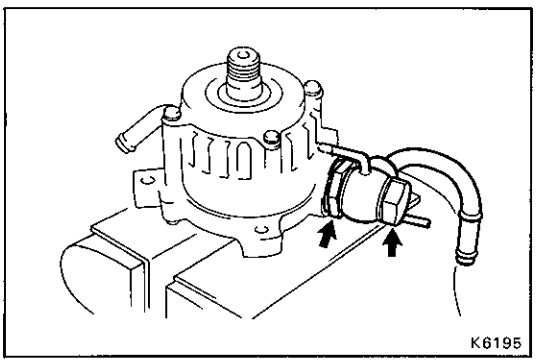
1. REMOVE VACUUM PUMP FROM ALTERNATOR

Remove the four bolts and remove the vacuum pump from the alternator.



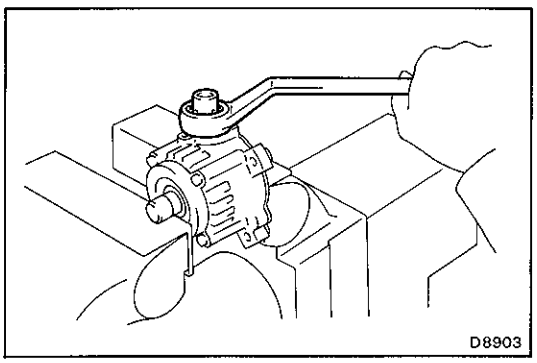
2. REMOVE PULLEY

Using soft jaws on the vise, remove the pulley nut and pulley.



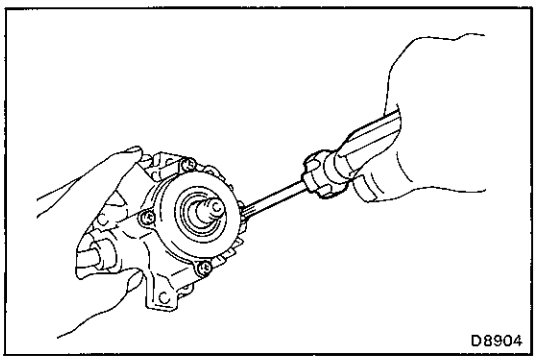
3. REMOVE VACUUM HOSE UNION

Remove the union bolt, union and two gaskets.



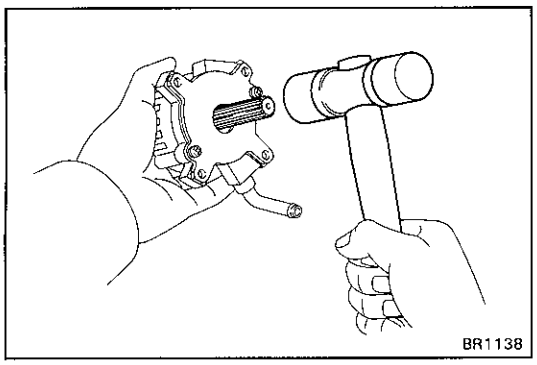
4. REMOVE CHECK VALVE

Remove the check valve and gasket.



5. REMOVE END COVER

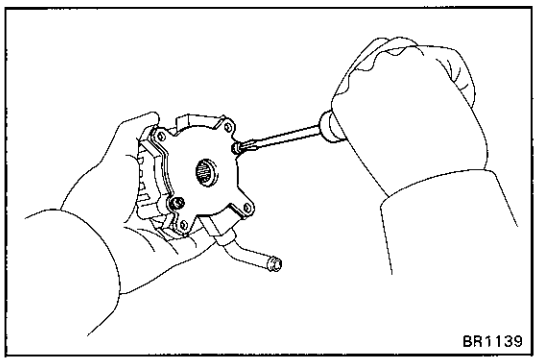
Remove the four screws and end cover.



6. REMOVE ROTOR SHAFT WITH BEARING

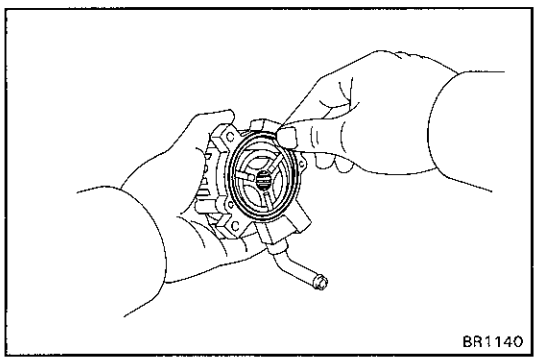
Using a plastic hammer, tap out the rotor shaft with bearing.

7. REMOVE PLATE

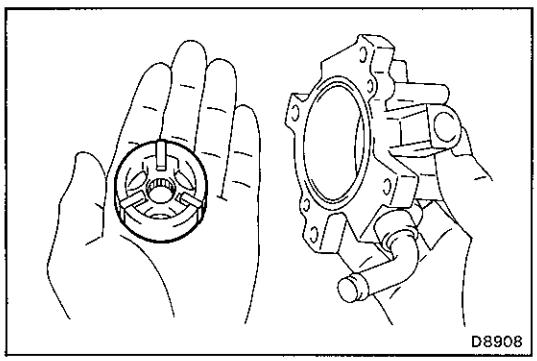


8. REMOVE END PLATE

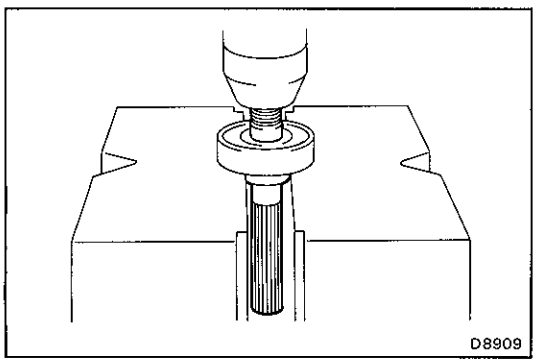
Remove the two screws and end plate.



9. REMOVE O-RING

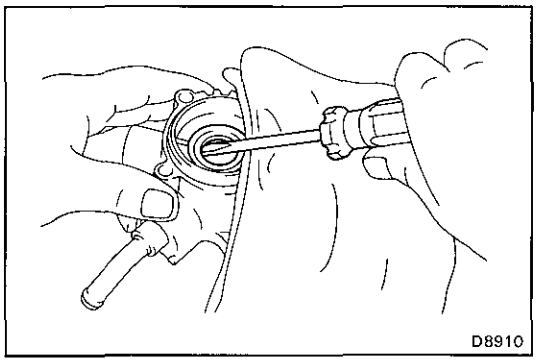


10. REMOVE ROTOR AND BLADES



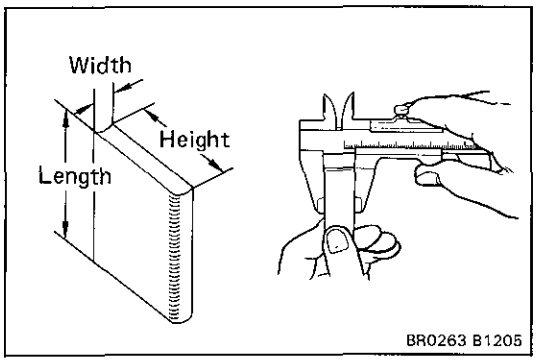
11. IF NECESSARY, REMOVE BEARING

Using a press, remove the bearing from the rotor shaft.



12. REMOVE OIL SEAL

Using a screwdriver, remove the oil seal.



INSPECTION OF VACUUM PUMP

1. INSPECT BLADE

(a) Check the blades for wear or damage.

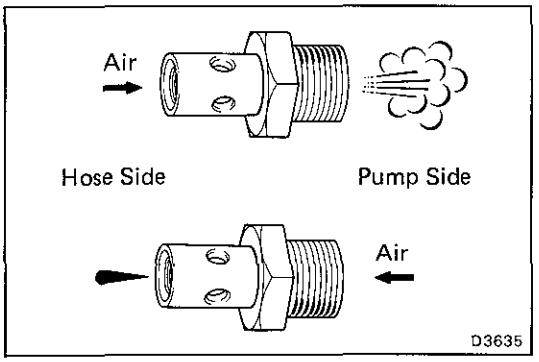
(b) Using calipers, measure the height, width and length of the blades.

Minimum height: 12.2 mm (0.480 in.)

Minimum width: 3.96 mm (0.1559 in.)

Minimum length: 22.98 mm (0.4047 in.)

If necessary, replace the blade.

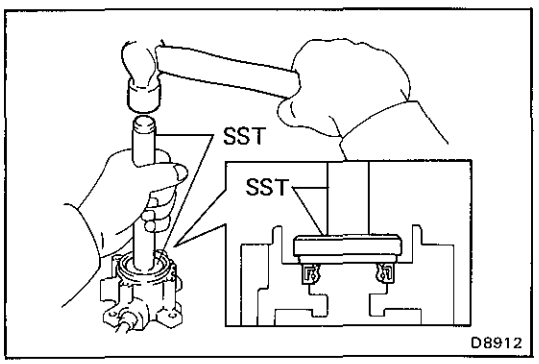


2. INSPECT CHECK VALVE OPERATION

(a) Check that air flows from the hose side to the pump side.

(b) Check that air does not flow from the pump side to the hose side.

If necessary, replace the check valve.



ASSEMBLY OF VACUUM PUMP

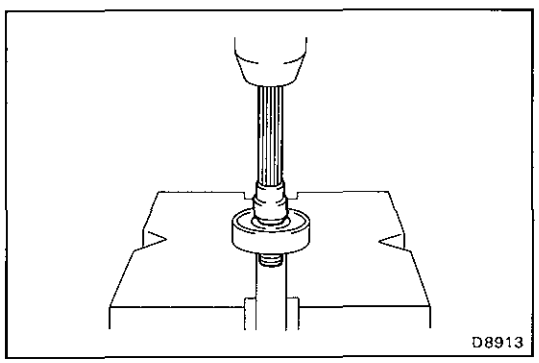
(See page BR-55)

1. INSTALL OIL SEAL

Using SST, tap in the oil seal.

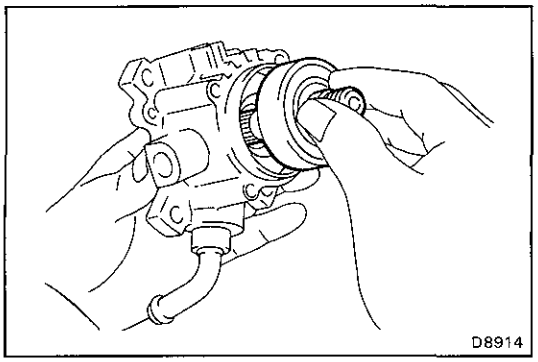
SST 09608-20012 (09608-00040, 09608-03020)

2. INSTALL PLATE



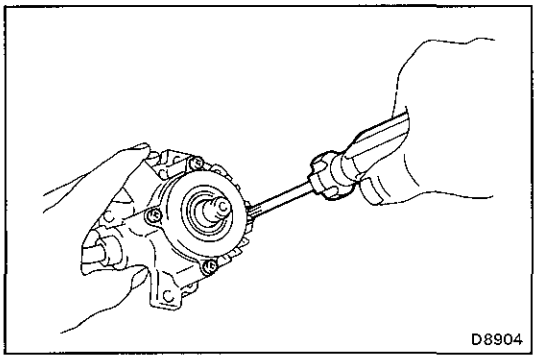
3. INSTALL BEARING

Using a press, install the bearing to the rotor shaft.



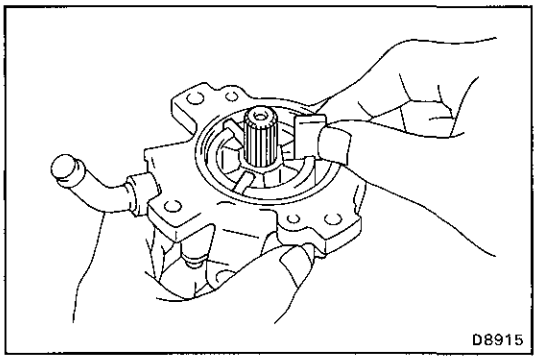
4. INSTALL ROTOR SHAFT WITH BEARING

Install the rotor shaft with the bearing to the casing.



5. INSTALL END COVER

Install the end cover with the four screws.

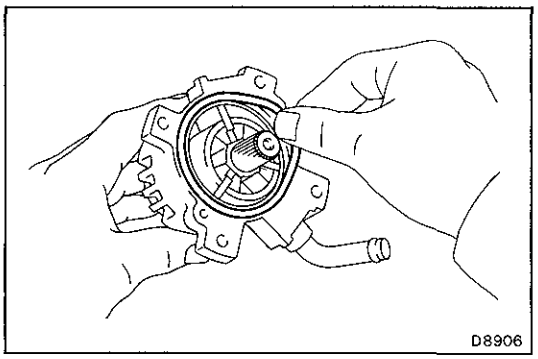


6. INSTALL ROTOR AND BLADES INTO CASING

(a) Install the rotor into the casing.

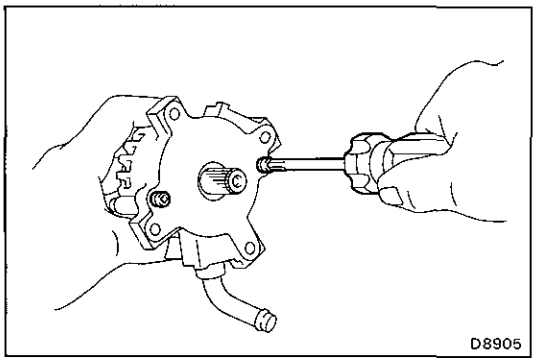
(b) Install the blades with the round end facing outward.

(c) Be sure that the blades and rotor surfaces are even.



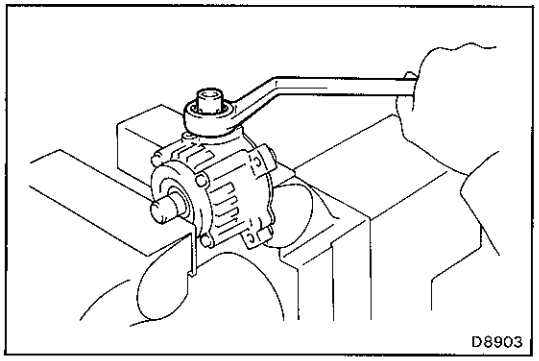
7. *INSTALL NEW O-RING*

Install a new O-ring into the groove of the casing.



8. INSTALL END PLATE

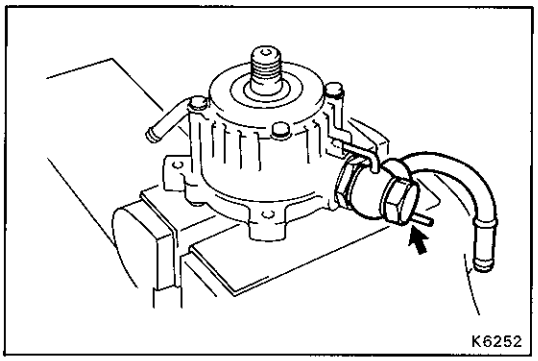
Install the end plate with the two screws.



9. INSTALL CHECK VALVE

Install the check valve with a new gasket.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)

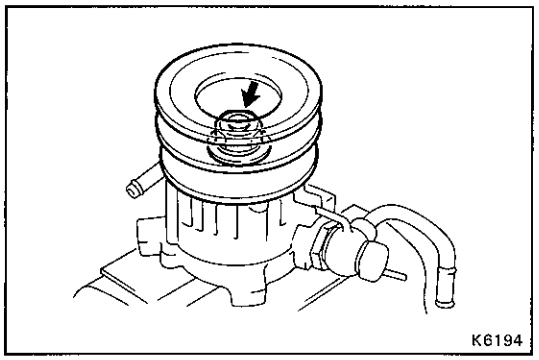


10. INSTALL VACUUM HOSE UNION

Install the vacuum hose union with the two new gaskets, and install and torque the union bolt.

Torque: 140 kg-cm (10 ft-lb, 14 N·m)

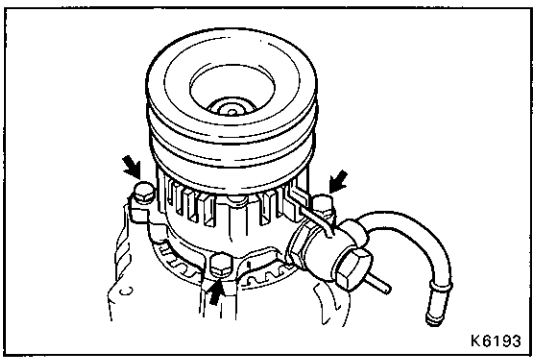
HINT: Align and insert the union pin into the matching hole of the casing.



11. INSTALL PULLEY

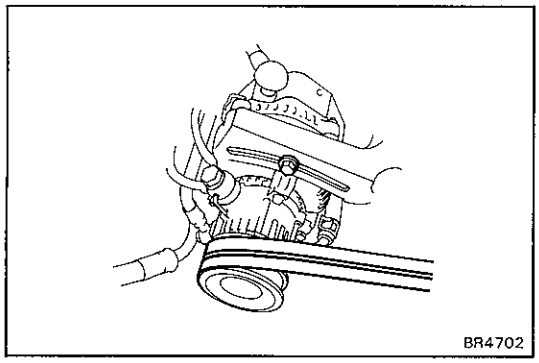
Using soft jaws on the vise, install the pulley to the vacuum pump and torque the lock nut.

Torque: 1,125 kg-cm (81 ft-lb, 110 N·m)



12. INSTALL VACUUM PUMP TO ALTERNATOR

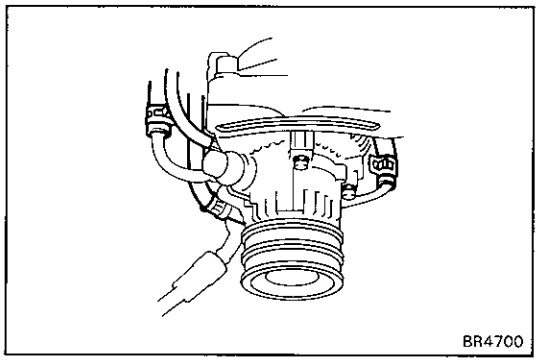
Install the vacuum pump to the alternator with the four bolts.


BR4702

INSTALLATION OF VACUUM PUMP

1. **INSTALL ALTERNATOR WITH VACUUM PUMP**

   Install the alternator with the vacuum pump in place and adjust the belt tension.


BR4700

2. **CONNECT OIL INLET TUBE**
3. **CONNECT OIL OUTLET HOSE**
4. **CONNECT TWO VACUUM HOSES**