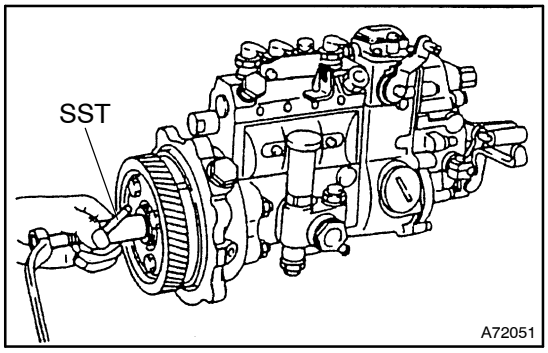
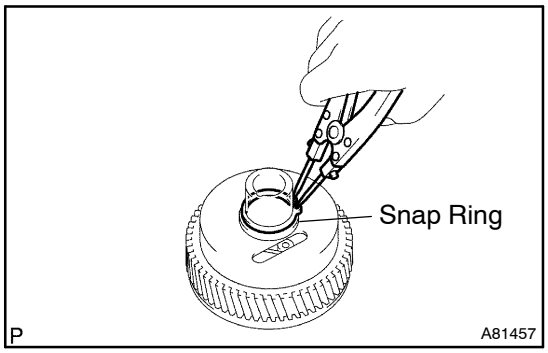
110QV–01

OVERHAUL

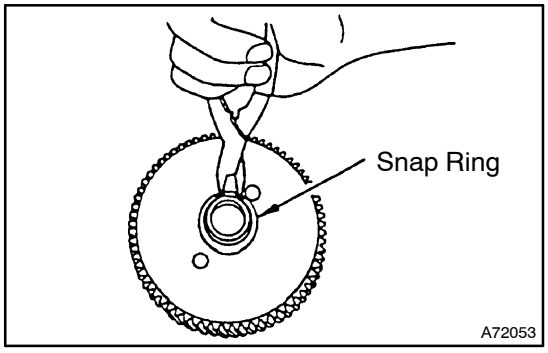


1. REMOVE TIMER ASSY

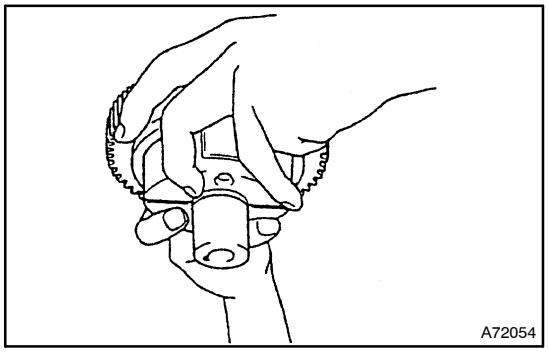
(a) Using SST, remove the timer assy.
SST 09950–40011



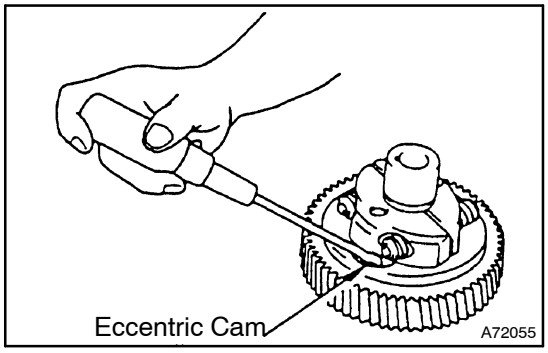
(b) Remove the snap ring on the timer cover side, and then remove the washer.
(c) Remove the timer cover.
(d) Remove the fix bolts and gear.



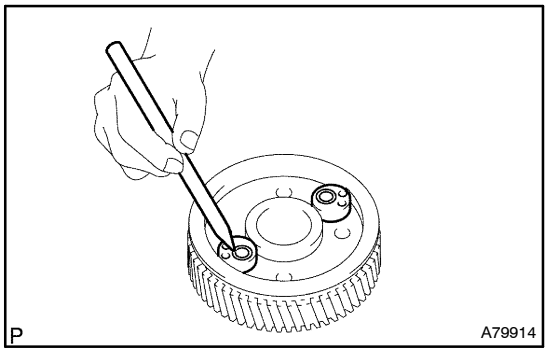
(e) With the flange side up, remove the snap ring and washer.



(f) Hold the weight in place so that the flange and hub do not come out, and carefully turn over.



(g) Press the large eccentric cam and small eccentric cam toward the flange

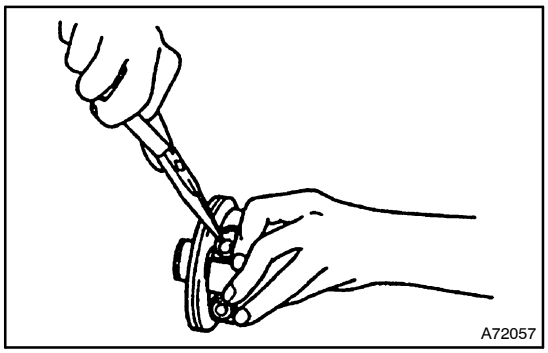


(h) Take precautions not to allow the large eccentric cam and small eccentric cam to slip out of place, and pull the hub straight out with the weight still assembled.

(i) Place alignment marks on the large eccentric cam, small eccentric cam and drive pin, then remove the eccentric cams.

NOTICE:

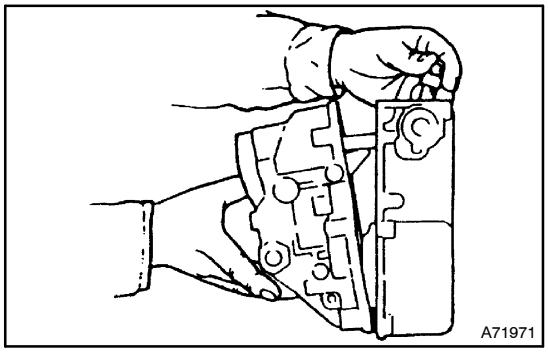
- **Be sure the alignment marks are clearly visible.**
- **Write down the way the cam is assembled.**



(j) Compress the timer spring and remove the circlip. Then take out the spring seat, washer, timer spring, spring seat and spring support.

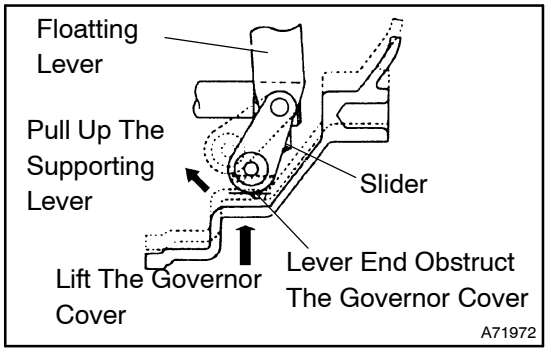
NOTICE:

- **Breaking of the lead seals or crimp caps by anyone other than or pump manufacture authorized service stations to make these adjustment will void the warranty.**
- **If fuel pump or governor difficulties are suspected, consult only or pump manufacture authorized service stations, where the problem can be corrected and the injection pump lead seals and crimp caps can be reinstalled as required.**

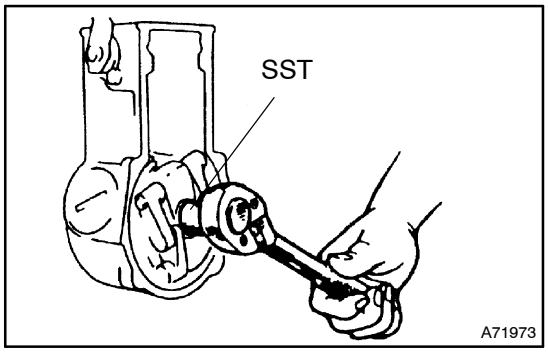


2. REMOVE GOVERNOR COVER

(a) With the adjusting lever held in its ”idling” position, detach the governor cover by lifting it up in such as way that the sliding block can slide out of the slit in the floating lever.



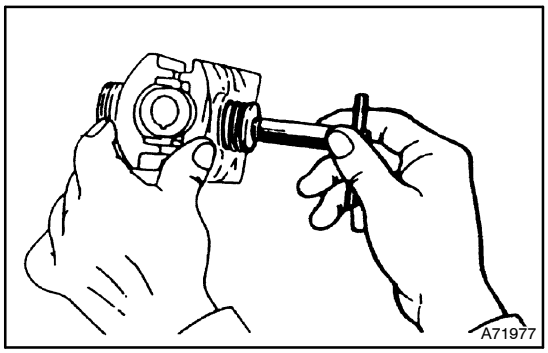
NOTICE:
Before lifting the governor cove, be sure to pull up the supporting lever as shown by dotted lines in the figure, so that its lower end may not obstruct the lifting of the governor cover.



3. REMOVE FLYWEIGHT ROUND NUT

(a) Using SST, remove the flyweight round nut.
SST 09269–54050

NOTICE:
Use the holding spanning to keep the camshaft from rotating.

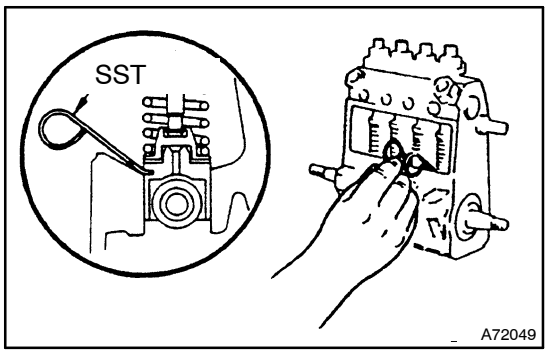


4. REMOVE FLYWEIGHT SUB–ASSY

(a) Remove the adjusting nut with weight spring nut wrench, and disassemble the inner parts of the flyweight subassembly.

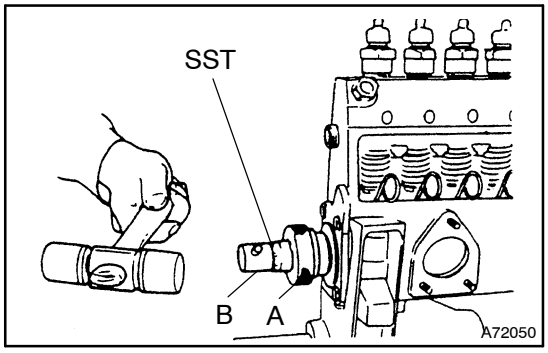
NOTICE:

- **Breaking of the lead seals or crimp caps by anyone other than pump manufacture authorized service stations to make these adjustment will void the warranty.**
- **If fuel pump or governor difficulties are suspected, consult only or pump manufacture authorized service stations, where the problem can be corrected and the injection pump lead seals and crimp caps can be reinstalled as required.**
- **Measure and record the fuel delivery characteristics of the pump before disassembling it.**
- **Keep the parts for each cylinder in separate groups and in an orderly arrangement. Parts to be replaced and parts to be used again must be kept separately.**



5. INSERT TAPPET INSERTER IN TAPPET HOLE

(a) Turn the camshaft and insert SST each tappet hole when their tappet is at the highest position.
SST 09274–46011

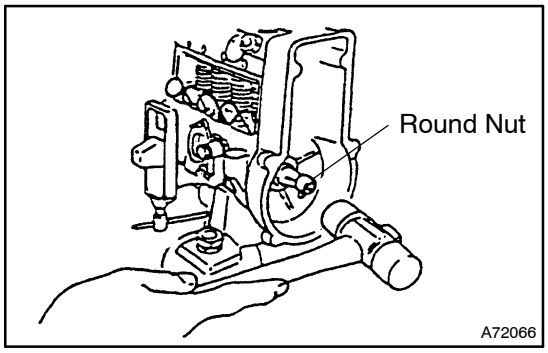


6. MEASURE CAMSHAFT END PLAY

(a) Mount SST on the camshaft drive end and be sure tighten "B".
SST S0951–21150

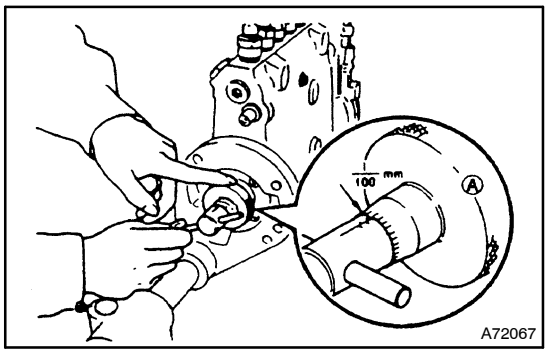
(b) By turning "A", create a clearance of about 1 mm (0.04 in.) between "A" and the bearing cover.

(c) Lightly strike the end "B" 3 or 4 times with a plastic hammer.

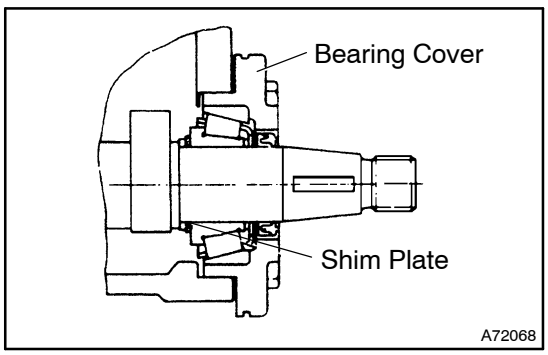


(d) Lightly tighten "A" until it cames into contact with the bearing cover.

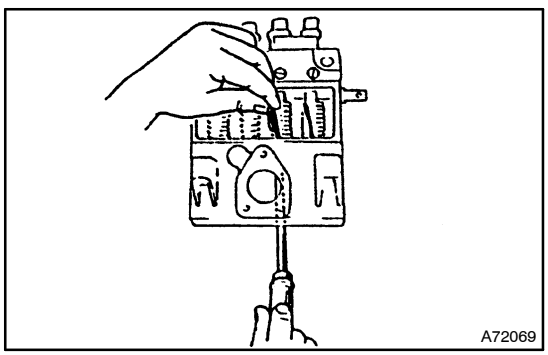
(e) Lightly strike the camshaft governor end 3 or 4 times a plastic hammer.



(f) Lightly turn "A" until it comes into contact with the bearing cover, then read the clearance.
Assembly standard:
0.03 – 0.05 mm (0.0012 – 0.0019 in.)
Service limit: 0.10 mm (0.0039 in.)

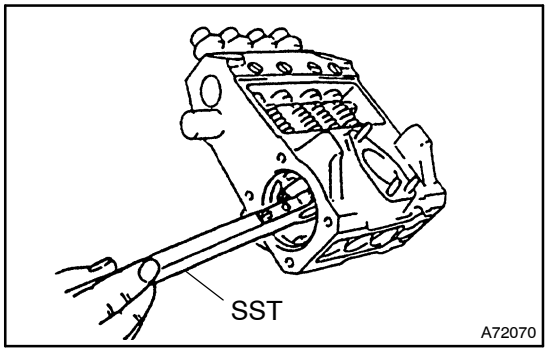


(g) If the specification is not met, use appropriate shim plates at the drive end of camshaft.

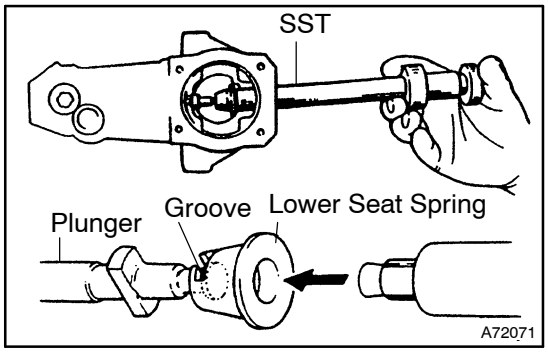


7. REMOVE TAPPET ASSEMBLY

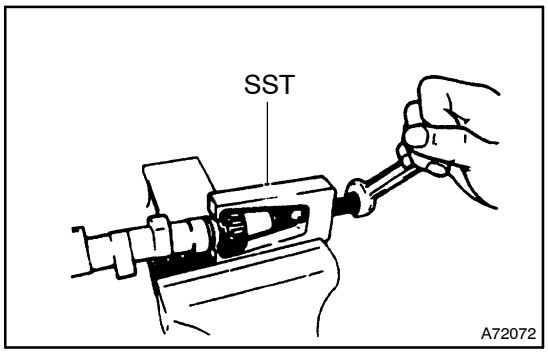
(a) Push the tappet with the tappet roller clamp and remove the tappet inspector.
SST 09272–76011



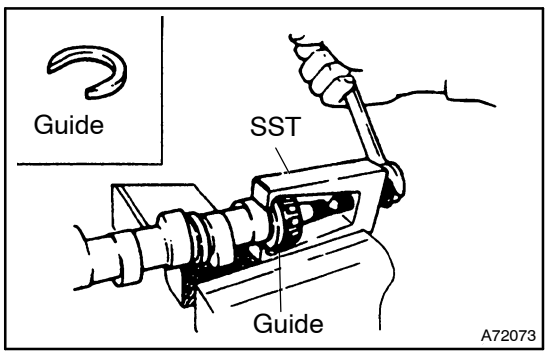
(b) Using SST, remove the tappet through the camshaft bearing hole.
SST 09272–76011



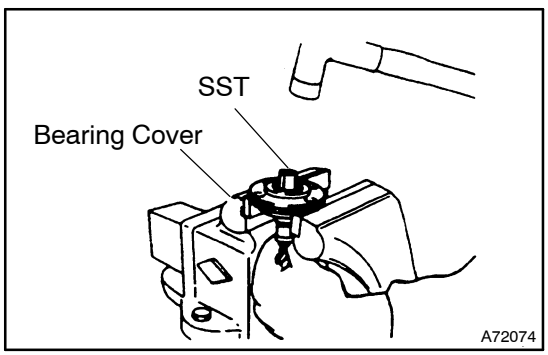
8. REMOVE PLUNGERS, SPRINGS AND CONTROL SLEEVE
SST 09275–46010



9. REMOVE TAPER BEARING FROM CAMSHAFT
(a) Using SST, remove the taper bearing from the drive end of the camshaft.
SST 09287–58010



(b) Use the guide to remove the bearing at the governor side.



(c) Using SST, to tap out the outer race in the bearing cover.
SST S0951–21430

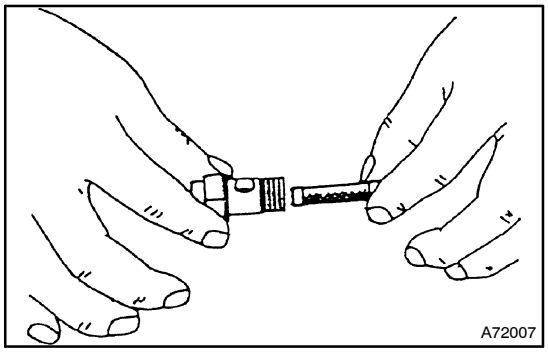
10. REMOVE PRIMING PUMP AND CHECK VALVES

(a) Unscrew the priming pump and remove the spring and inlet check valve.

(b) Remove the outlet check valve and spring.

11. REMOVE TAPPET

(a) Remove the retainer ring and pull out the tappet.



12. REMOVE FILTER FROM INLET PIPE JOINT

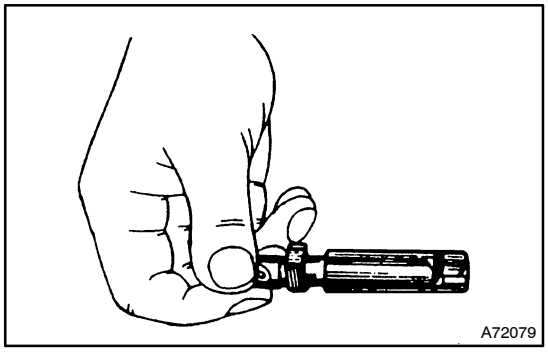
(a) Clean the filter with clean diesel fuel.

13. INSTALL TAPPET

14. INSTALL RETAINER RING

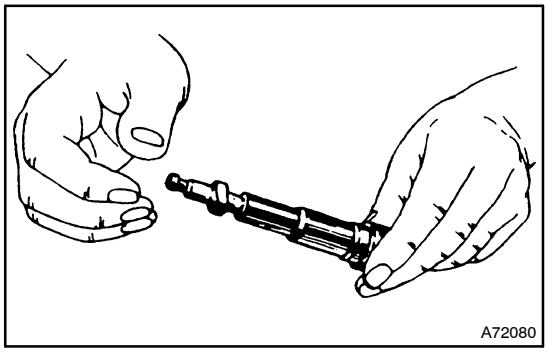
NOTICE:

- **Wash all parts with clean diesel fuel before installing them, and any defective or damaged parts must be replaced.**
- **Do not allow dust or other foreign matter to enter the pump during assembly.**
- **Apply grease to O–rings and oil seals before installing them.**
- **Assemble the parts in correct order and to correct tightening torques, assembled dimensions etc.**
- **Assembly takes place in the reverse order of disassembly.**

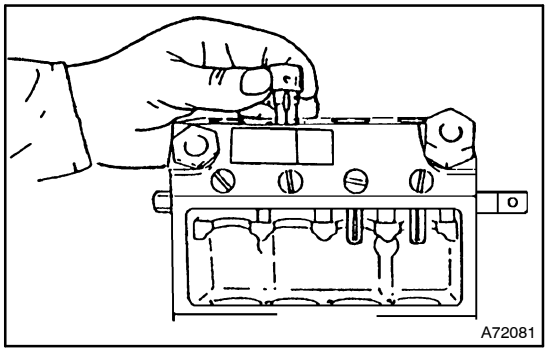


15. INSTALL PLUNGER BARRELS

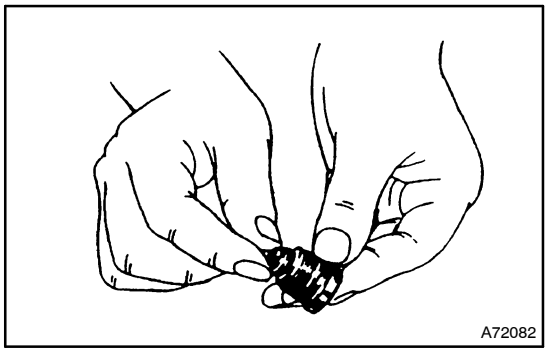
(a) Before install the plunger barrels should be inspect the plunger barrels and plungers for wear, scratches, or discoloration.



(b) Tilt the plunger to about 60° pull the plunger out approximately 10 to 15 mm (0.39 to 0.59 in.) and release it to see if it slides down smoothly from its own weight.

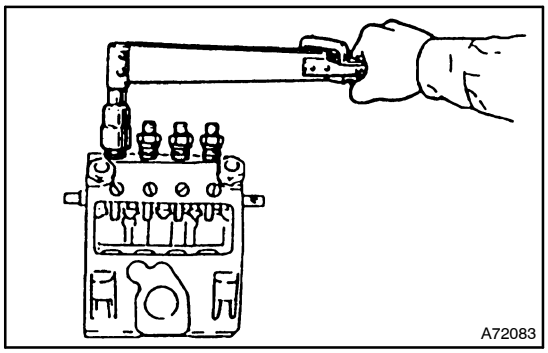


(c) Match the plunger notch with the injection pump housing knock pin.



16. INSTALL DELIVERY VALVES, SPRINGS AND HOLDERS

(a) Before install the delivery valves, inspect the delivery valves for scratches on the valve seat or the piston sections.

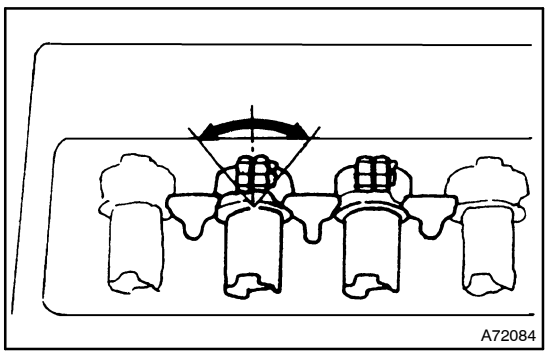


(b) Install the gasket, spring, shim and stopper on the delivery valve.

(c) Provisionally tighten the delivery valve holder with a new O–ring by hand.

NOTICE:

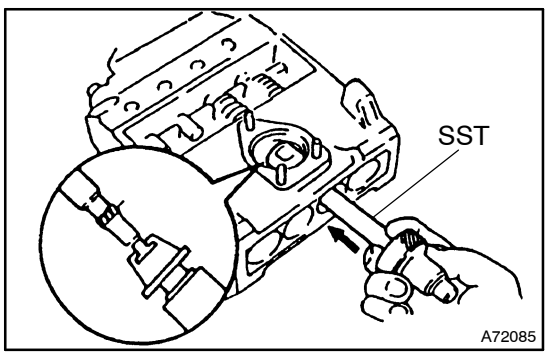
Tighten the delivery valve holder after installing the plunger.



17. INSTALL CONTROL SLEEVES ON BARRELS

NOTICE:

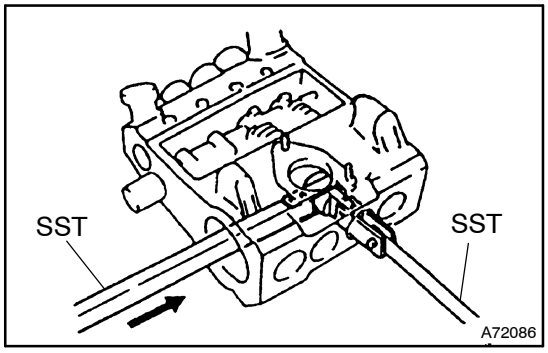
Make sure that the control sleeve swings evenly right and left when the control rack is moved to the right and left.



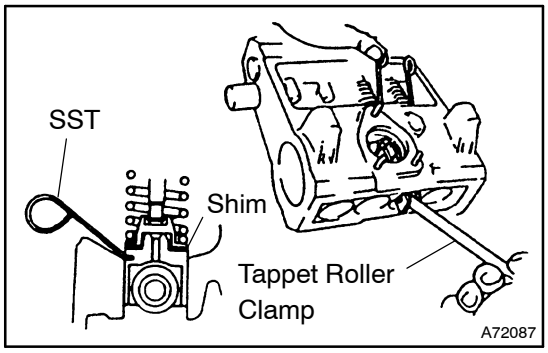
18. INSTALL PLUNGER AND TAPPET

(a) Using SST, assembly the plunger and spring lower seat, inserting the driving face marked with a number and the lower seat notch part upward (cove plate side).

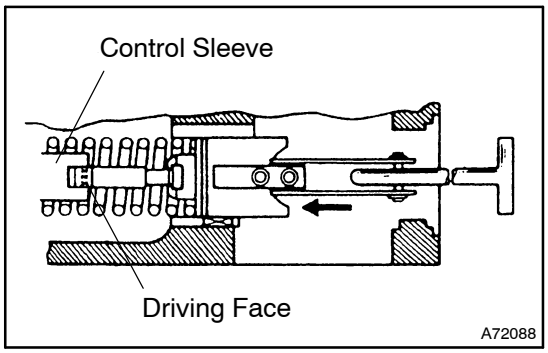
SST 09275–46010



(b) Using SST, install the tappet to the pump housing with the adjusting shim.
SST 09272–76011, 09273–76011

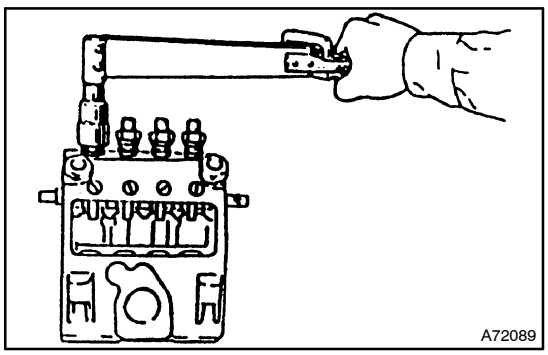


(c) Using the tappet roller clamp to press in the tappet and hold it in with the SST.
SST 09274–46011



NOTICE:

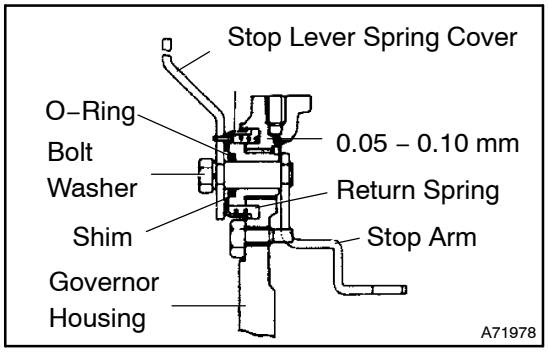
- **Check that the driving face of the plunger fits to the groove of the control sleeve before inserting the tappet.**
- **When inserting the tappet, check that the control rack slides smoothly and without catching.**



(d) When one delivery valve holder is tightened, move the control rack to the right and left and inspect the tightness of the rack.
Torque:
36.8 N·m (375 kgf·cm, 27 ft·lbf)

NOTICE:

- **Wash all parts with clean diesel fuel before installing them and any defective or damaged parts must be replaced.**
- **Do not allow dust or other foreign matter to enter the pump during assembly.**
- **Apply grease to O–rings and oil seals before installing them.**
- **assemble the parts in correct order and to correct tightening torques, assembled dimensions etc.**
- **Assembly takes place in the reverse order of disassembly.**



19. INSTALL STOP LEVER

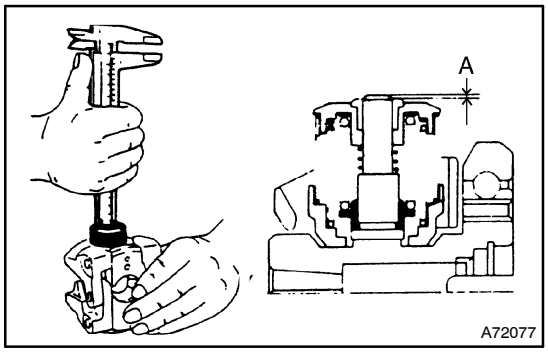
(a) Install the stop lever as shown.

(b) Measure the thrust clearance of the stop arm.

Thrust clearance: 0.05 – 0.10 mm (0.0020 – 0.0039 in.)

NOTICE:

The O–ring should be coated with grease before being fitted.



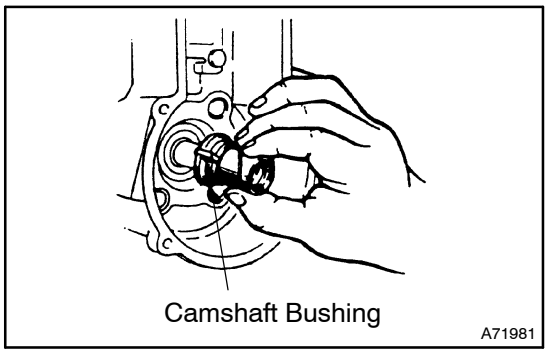
20. INSTALL FLYWEIGHT

NOTICE:

Be sure to install the spring inner seat in correctly, its "LAPPED" surface should face downwards.

(a) Tighten the adjusting nut with a spring nut wrench.

Protrusion of adjusting nut:
–0.4 mm to 0.2 mm (–0.015 in. to 0.007 in.)



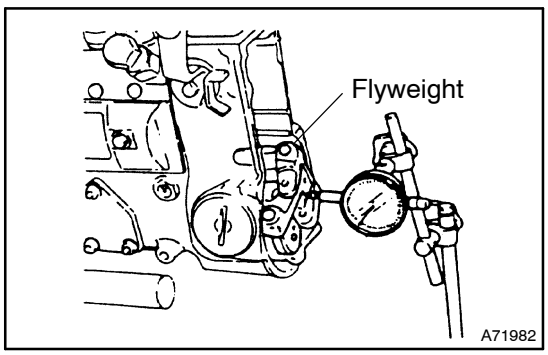
21. IF EQUIPPED WITH DAMPER, ADJUST DAMPER THRUST CLEARANCE

(a) This provides a clearance between the flyweight and the camshaft bushing.

(1) Temporarily install the camshaft bushing on the camshaft.

(2) Install the flyweight without the dampers.

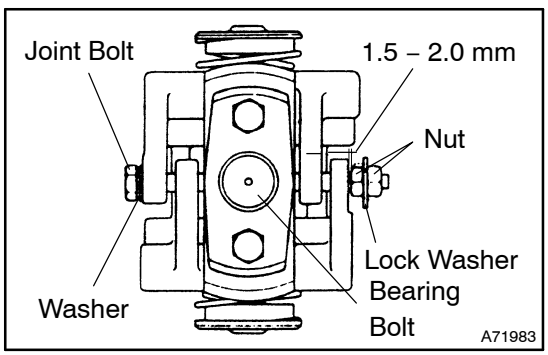
(3) Temporarily fit the governor round nut.



(4) Apply a dial gauge to the end face of the flyweight, and measure the thrust clearance.

Thrust clearance: 0.02 – 0.10 mm (0.0008 – 0.0039 in.)

If not within specification, adjust the clearance by inserting shims between the camshaft bushing and the governor round nut.



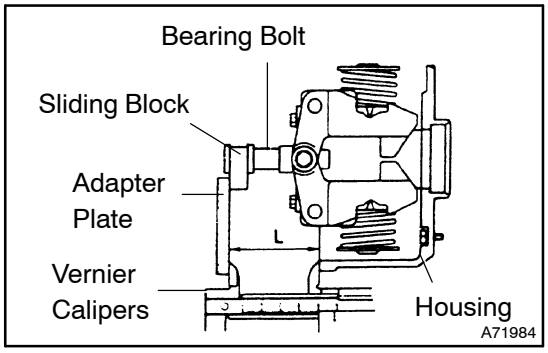
22. INSTALL BEARING BOLT

(a) Measure the free play of the jointing bolt alone its axis.

Standard free play: 1.5 – 2.0 mm (0.059 – 0.079 in.)

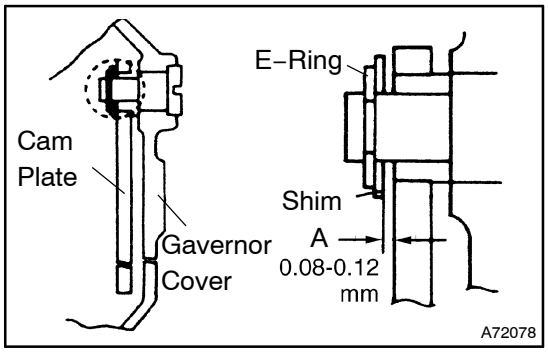
NOTICE:

Make sure the bearing bolt can be moved smoothly through the guide bushing.



(b) Measure the fitting dimension of the bearing bolt.
(1) While pulling on the bearing bolt, measure the dimension ”L” with calipers.

Fitting dimension: 49.7 – 50.1 mm (1.957 – 1.972 in.)



23. INSTALL GOVERNOR COVER

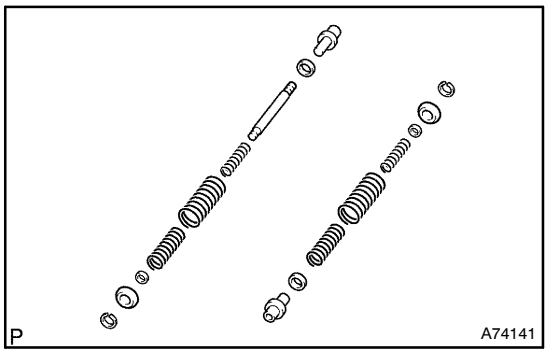
(a) Install the cam plate on the governor cover and shim with E–ring.

NOTICE:

Shim A about of 0.5 mm (0.02 in.) in thickness should be installed with the E–ring.

(b) Measure the cam plate thrust clearance.

Thrust clearance: 0.08 – 0.12 mm (0.0032 – 0.0047 in.)

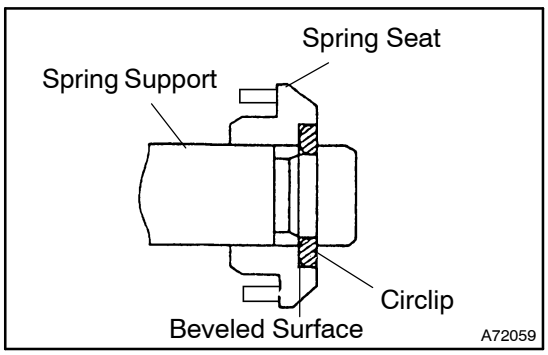


24. INSTALL TIMER HUB AND WEIGHT

(a) Reassemble the parts by reversion the order of disassembly, taking special care regarding the following points.

NOTICE:

Apply SAE #30 oil to all sliding surface.

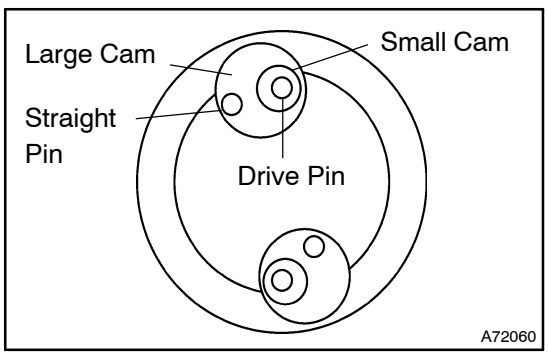


25. INSTALL HUB AND TIMER WEIGHT ASSEMBLY

(a) Install the spring to the weight.

NOTICE:

- **When assembling the weight to the hub be sure to note the spring seat’s correct facing direction.**
- **Insert the circlip so that the beveled surface is toward the spring seat.**

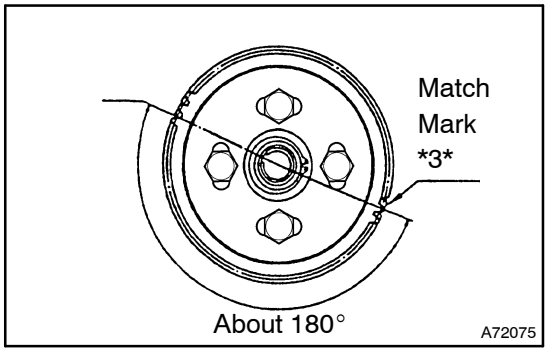


26. INSTALL HUB AND DRIVE GEAR

(a) Carefully watch the alignment marks on the large eccentric cam, small eccentric cam and drive pin, then reassemble them to that they are in the same positions as that which you wrote down at the time of disassembly.

NOTICE:

The large and small eccentric cams come in right and left turning types, and differ depending on the advance angle characteristics.



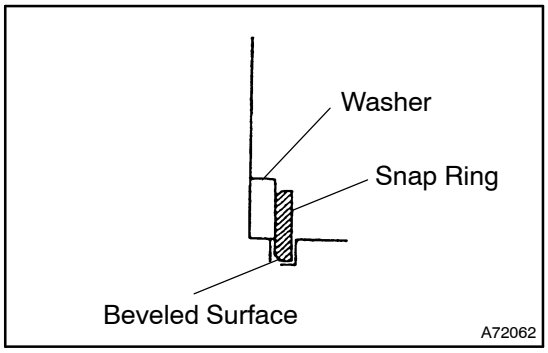
(b) When assembling align the hole in the large eccentric cam and align the hub hole in the small eccentric cam with the weights straight pin.

NOTICE:

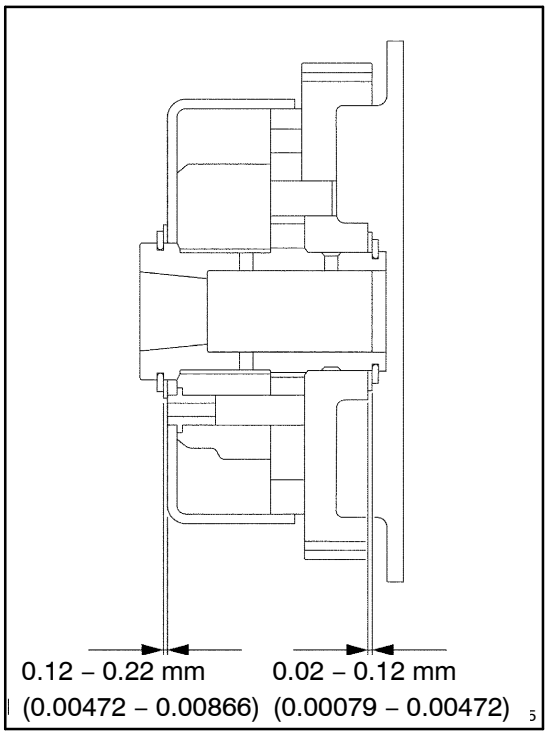
- **Do not attempt to force the parts in unreasonably.**
- **Confirm that the hub's key groove and the drive gears alignment mark are offset by about 180°.**

  Torque:

  0.23 N·m (2.3 kgf·cm, 0.17 in.·lbf)



(c) Turn over the drive gear while holding the weight in place, then insert the snap ring, taking care that the beveled surface does toward the washer side.



27. INSTALL TIMER COVER

NOTICE:

- **Align the protrusion on the timer roller with the groove on the timer cover.**
- **Assemble the snapring so that the beveled surface goes toward the washer side.**
- **Since a new timer cover is coated with adhesive, it is unnecessary to apply fresh adhesive to a new timer cover when replacing.**
- **If reusing the timer cover, apply 4 to 6 dots of adhesive to 2 or 3 threads of the screw of the flange.**

  Adhesive:

  Part No. 08833–00070, THREE BOND 1342 or equivalent
- **Since the timer cover is attached with adhesive, a torque of approximately 70 kgf·m is necessary when removing it.**
- **Fully remove the adhesive on the threads of the screw when overhauling. If too much adhesive is applied, excessive will stick to the O–ring, resulting in oil leakage.**

  Thrust clearance:

Cover side	0.12 – 0.22 mm (0.00472 – 0.00866 in.)
Gear side	0.02 – 0.12 mm (0.00079 – 0.00472 in.)