

SERVICE BULLETIN

FUEL INJECTION PUMP TECHNICAL HINT

TW 98-03
June, 1998

DENSO AUTHORIZED SERVICE DEALER ONLY

SUBJECT: ADJUSTMENT OF TWO-SPRING NOZZLES FOR THE ECD-V4

This service bulletin describes the procedure for adjusting the two-spring nozzles of the ECD-V4 injection pump installed to the Land Cruiser 100 released in January, 1998.

1. APPLICABLE VEHICLE TYPE AND PART NUMBERS

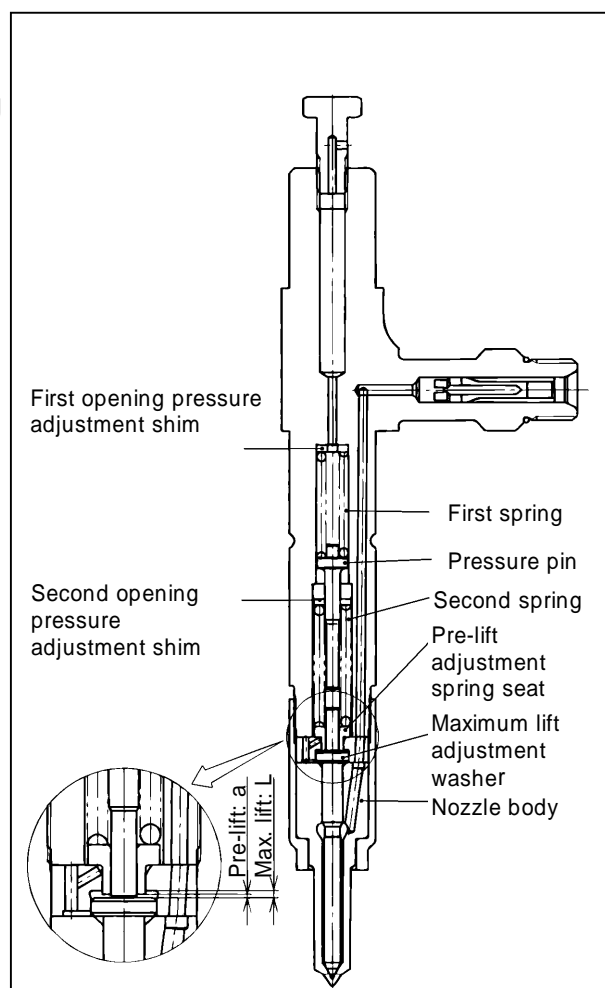
Vehicle Type: Land Cruiser 100, HDJ101K (1HD-FTE engine)

No.	Part Name	DENSO P/N	Customer P/N	Remarks
•	VE type injection pump ASSY	098000-0010	22100-1C170	New product
•	Nozzle and nozzle holder ASSY	093500-6740	23600-17080	New product
1	Nozzle holder ASSY	093100-6740	23610-17080	New product
2	Nozzle ASSY	Not available as service part	-	New product*

* The nozzle ASSY alone is not available as service part; it is supplied only as part of a service kit. The part number of the service kit is described later.

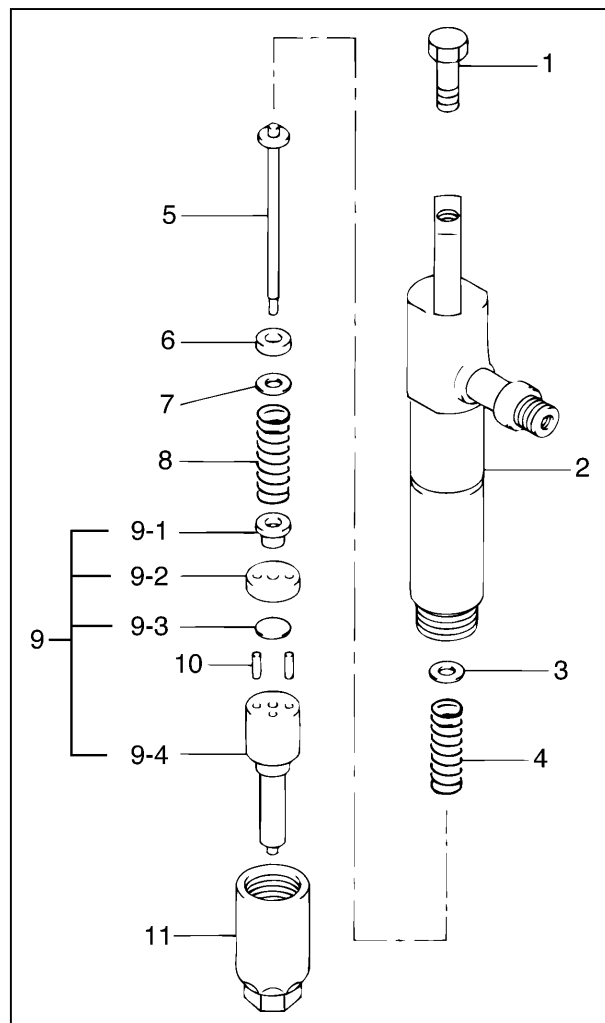
2. MECHANISM

Like any other two-spring nozzle holder, the two-spring nozzle holder for the ECD-V4 contains two springs that allow the nozzle needle to lift in two steps as the pressure inside the injection pipe increases. The mechanism of this new nozzle holder is not very different from other nozzle holders of similar design.



3. COMPONENT PARTS

Item No.	Part Name
1	Hollow screw
2	Nozzle holder body
3	First opening pressure adjustment shim
4	First spring
5	Pressure pin
6	Spring seat
7	Second opening pressure adjustment shim
8	Second spring
9	Four-item service kit
9-1	Pre-lift adjustment washer
9-2	Tip packing
9-3	Maximum lift adjustment washer
9-4	Nozzle
10	Straight pin
11	Retaining nut



The two-spring nozzle holder for the ECD-V4 does not allow pre-lift adjustment.

To adjust its valve opening pressures, therefore, use the four-item service kit (Item 9 above). Each four-item service kit is subjected to a flow rate check before delivery.

4. PROCEDURE FOR ADJUSTING VALVE OPENING PRESSURES

The two-spring nozzle holder for the ECD-V4 does not allow pre-lift adjustment.

To adjust its first and second opening pressures, therefore, use the four-item service kit. Each four-item service kit is subjected to a flow rate check before delivery.

4-1. Service Kit Part Number

Part Name	DENSO P/N	Customer P/N	Remarks
Four-item service kit	093400-7180	23602-17080	Standard flow rate

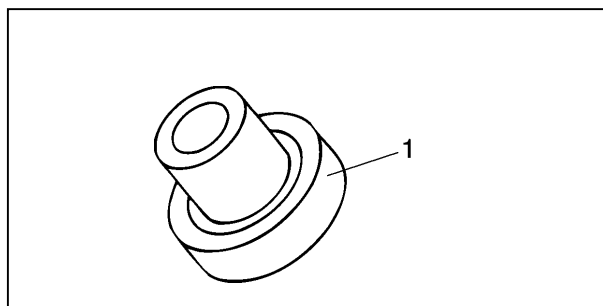
The four-item service kit includes the following parts that have been subjected to a flow rate check before delivery: a pre-lift adjustment spring seat, a tip packing, a maximum lift adjustment washer, and a nozzle.

When any of these four items needs to be replaced, make sure you replace them all. Since these four items are subjected to a flow rate check together, you should not replace only a part of the set but replace all of them as a set.

4-2. Required Tools (Standard Tool and STT)

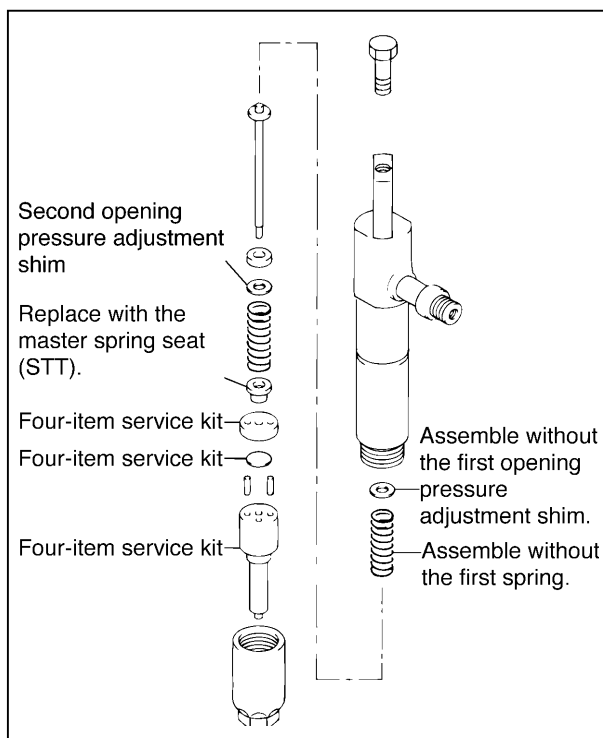
The following special service tool (STT) and standard tools are required for adjusting the valve opening pressures of the two-spring nozzles for the ECD-V4.

Item No.	Part Name	DENSO P/N
1	Master spring seat	95093-10330
—	Torque wrench	—



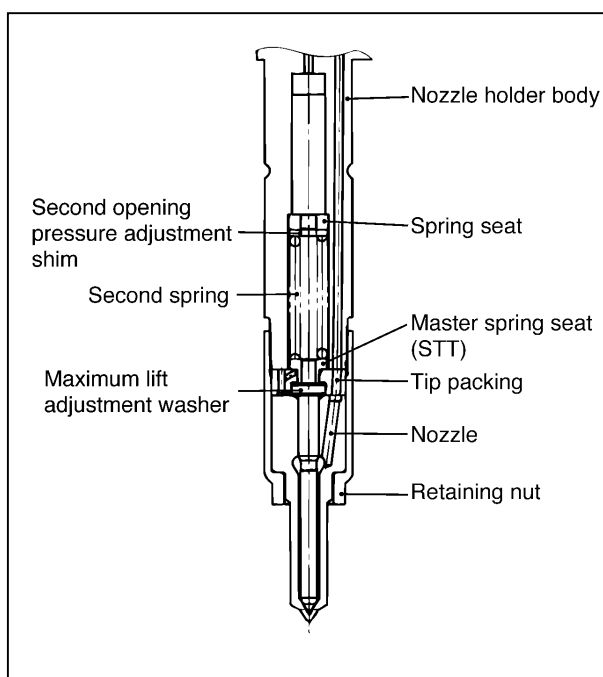
4-3. Adjusting the Second Opening Pressure

- (1) Replace the pre-lift adjustment spring seat, included in the four-item service kit, with the master spring seat (95093-10330), to set the pre-lift to 0 mm.
- (2) Assemble the parts without the first spring and the first opening pressure adjustment shim.
Retaining nut tightening torque: 2.5 – 3.5 kgf·m
- (3) Install the assembled nozzle holder into a handy type nozzle tester to measure the second opening pressure.
Standard: 348 – 357 kgf/cm²



- (4) If the measured pressure is beyond the standard range, adjust the opening pressure by changing the second opening pressure adjustment shim.

NOTE: Increasing the shim thickness by 0.01 mm raises the opening pressure by approximately 1.5 kgf/cm². (Refer to the part catalogue for part numbers and thickness of different shims.)



4-4. Adjusting the First Opening Pressure

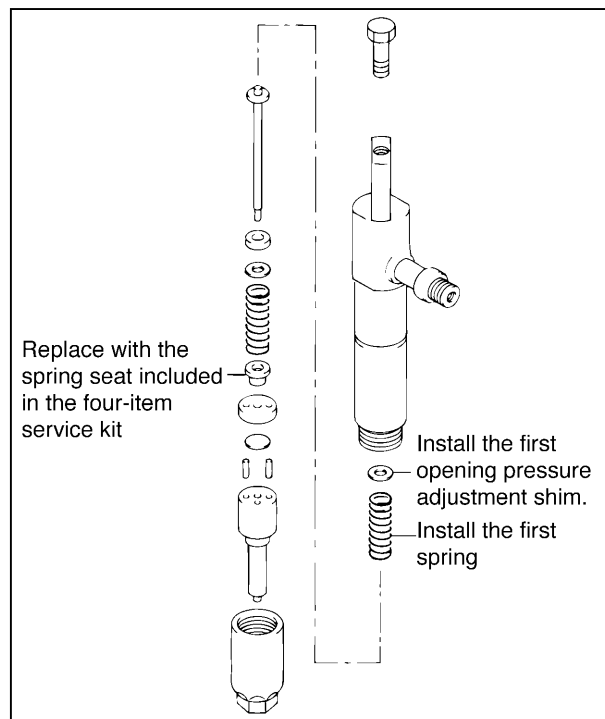
(1) Replace the master spring seat with the pre-lift adjustment spring seat included in the four-item service kit.

(2) Install the first spring and the first opening pressure adjustment shim.

Retaining nut tightening torque: 2.5 – 3.5 kgf·m

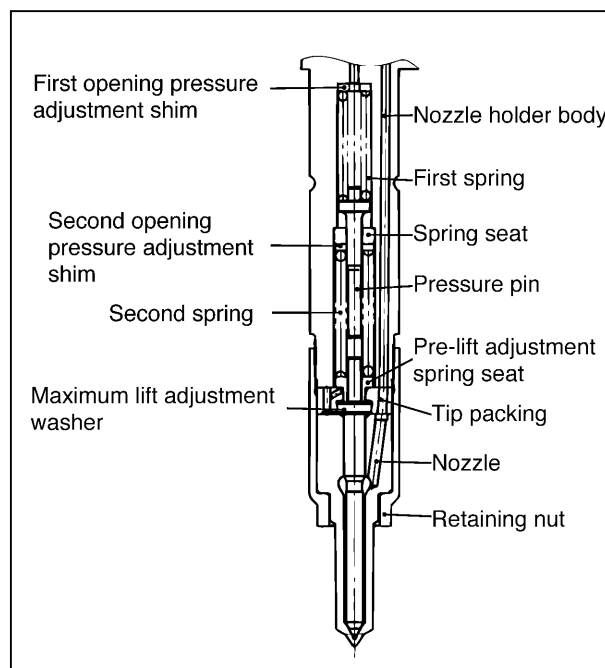
(3) Install the nozzle holder into a handy type nozzle tester to measure the first opening pressure.

Standard: 180 – 190 kgf/cm²



(4) If the measured pressure is beyond the standard range, adjust the opening pressure by changing the first opening pressure adjustment shim.

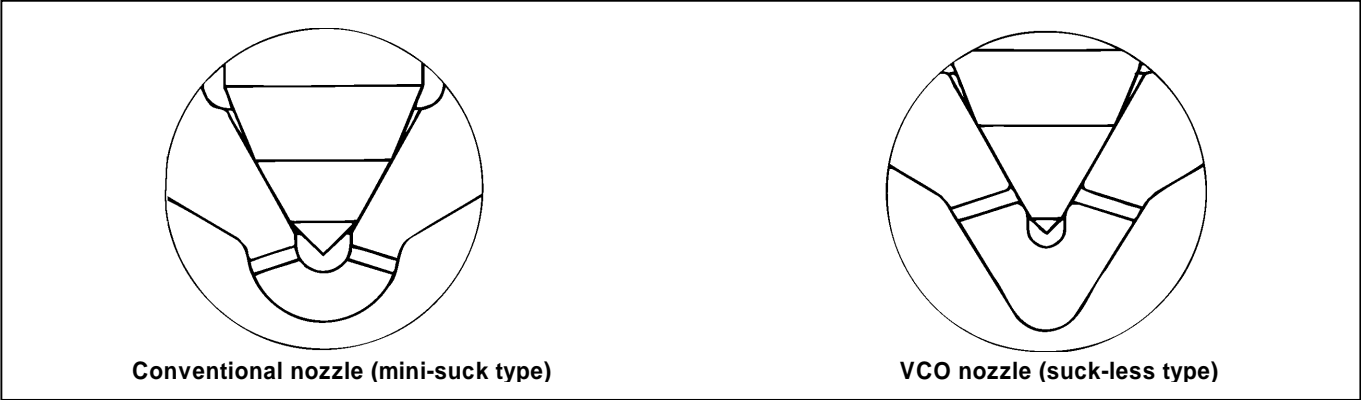
NOTE: Increasing the shim thickness by 0.01 mm raises the opening pressure by approximately 1.5 kgf/cm². (Refer to the part catalogue for part numbers and thickness of different shims.)



4-5. Spray Patterns as Observed with Handy Type Nozzle Tester

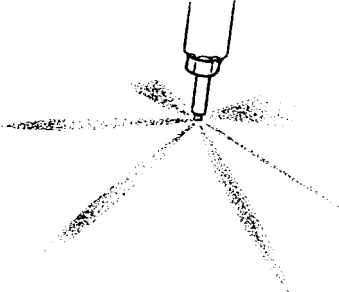
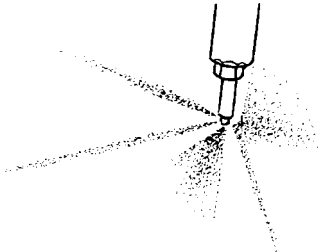
(1) Particularity with nozzles for the ECD-V4

The VCO (suck-less) nozzles with small pre-lift installed in the ECD-V4 injection pump will produce spray patterns that are different from those produced by conventional nozzles. With this particular type of nozzle, even a normal, brand-new nozzle may produce a wide-spread spray pattern, or a pattern that apparently seems to indicate a blocked nozzle hole, which should not be associated with abnormality.



(2) Spray patterns produced by a nozzle for ECD-V4

(all patterns to be associated with a normally working nozzle)

Spray Description	Spray Pattern with Handy Type Nozzle Tester
Even spray	
Wide-spread spray	
Pattern apparently (but not actually) indicates a blocked nozzle hole	