

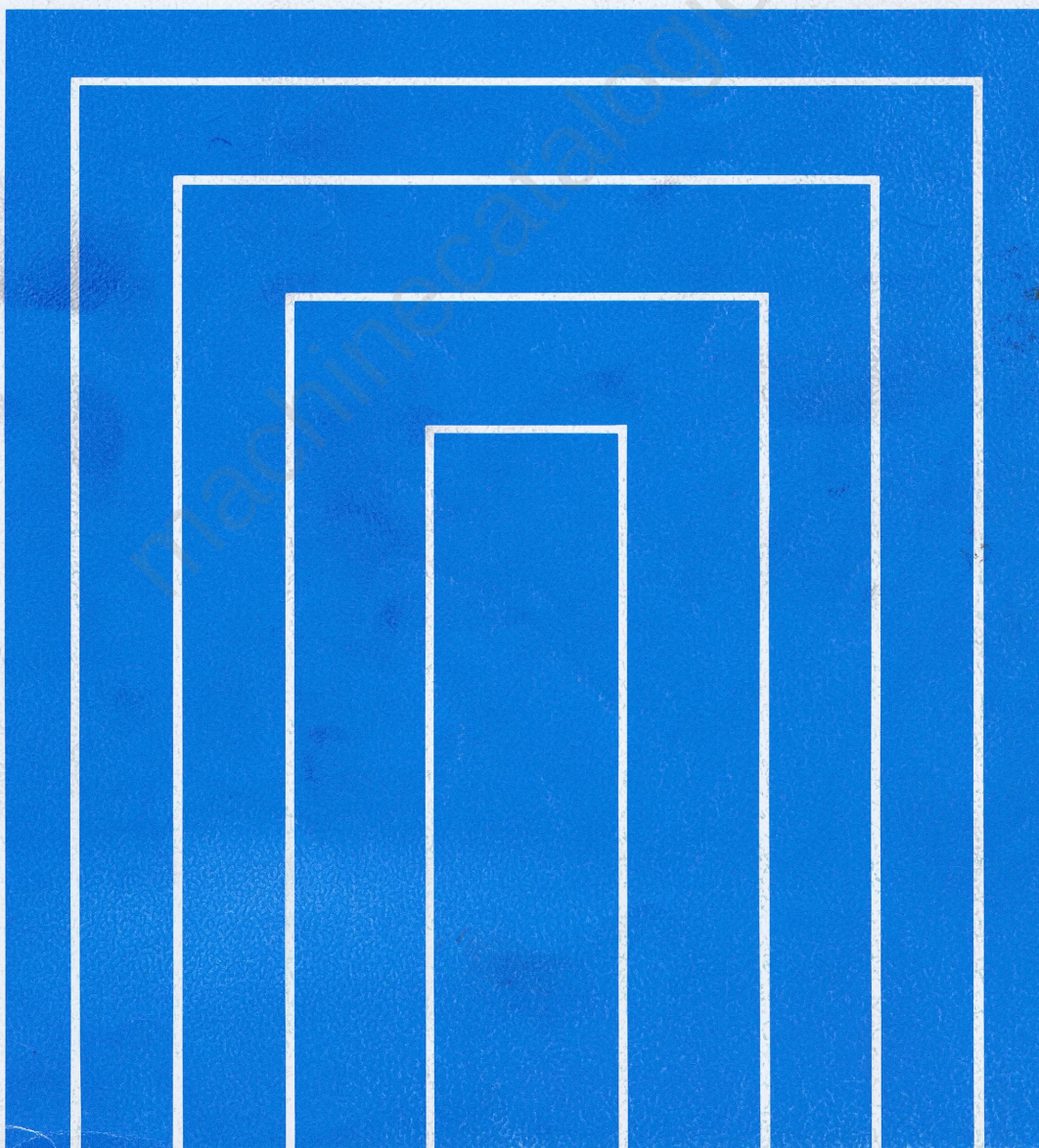


**1HZ, 1HD-T, 1HD-FTE**

**ENGINE**

**REPAIR MANUAL**

Jan., 1998



Pub. No. RM617E

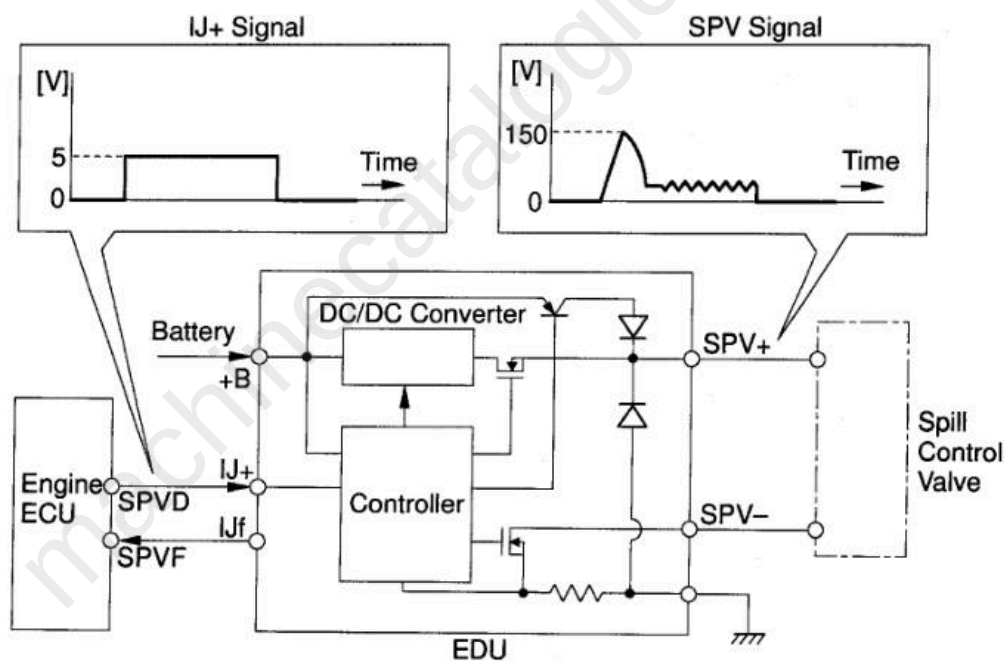
|                           |    |
|---------------------------|----|
| INTRODUCTION              | IN |
| PREPARATION               | PP |
| SERVICE SPECIFICATIONS    | SS |
| DIAGNOSTICS               | DI |
| ENGINE MECHANICAL         | EM |
| TURBOCHARGER              | TC |
| EMISSION CONTROL          | EC |
| ELECTRONIC CONTROL DIESEL | ED |
| ENGINE FUEL               | FU |
| COOLING                   | CO |
| LUBRICATION               | LU |
| STARTING                  | ST |
| CHARGING                  | CH |
| ALPHABETICAL INDEX        | ID |

**DTC****97****EDU Circuit Malfunction****CIRCUIT DESCRIPTION**

The EDU has been adopted to drive the spill control valve at high speeds. The EDU has realized high-speed driving under high fuel pressure conditions through the use of a DC/DC converter that provides a high-voltage, quick-charging system.

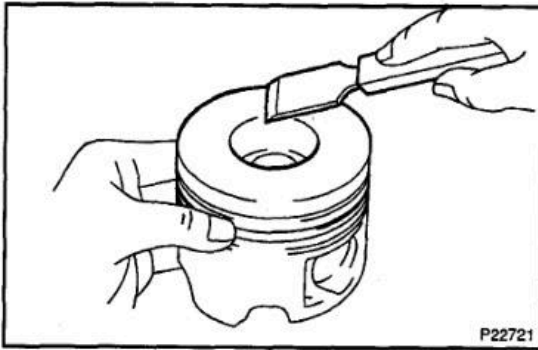
The engine ECU constantly monitors the EDU and stops the engine in case an abnormal condition is detected.

The battery voltage is increased by the DC/DC converter. A voltage of approximately 150 V is applied to the spill control valve in accordance with the IJ+ signal received from the engine ECU. Also at this time, the injection verification signal (IJf) is sent to the engine ECU.



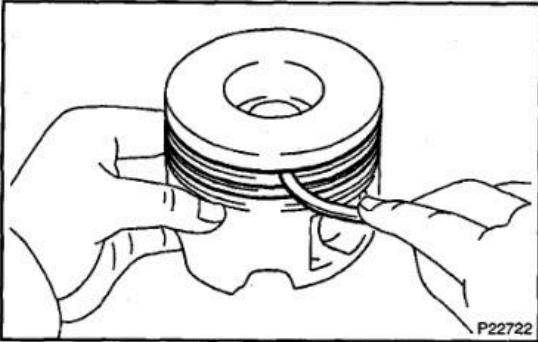
A05973

| DTC No. | DTC Detecting condition                                                                                                         | Trouble Area                                                                                                                   |
|---------|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| 97      | Although the SPVD is output to EDU with the engine speed at 500 rpm or more, the SPVF is not input continuously 5 times or more | <ul style="list-style-type: none"> <li>• Open or short in EDU circuit</li> <li>• EDU</li> <li>• Spill control valve</li> </ul> |

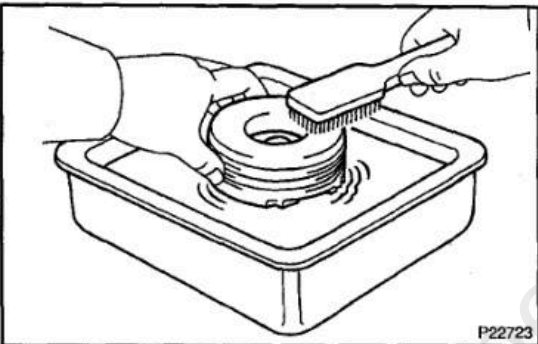


## 7. CLEAN PISTON

- (a) Using a gasket scraper, remove the carbon from the piston top.



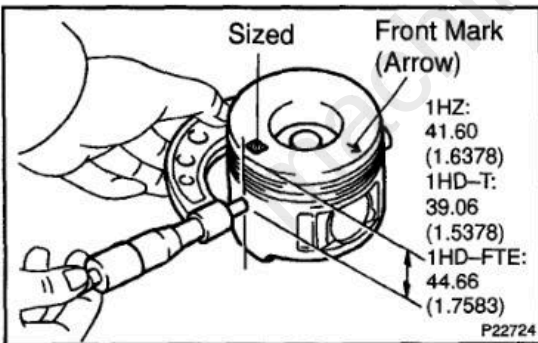
- (b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



- (c) Using solvent and a brush, thoroughly clean the piston.

### NOTICE:

**Do not use a wire brush.**



## 8. INSPECT PISTON AND PISTON RING

- (a) Inspect piston diameter and oil clearance

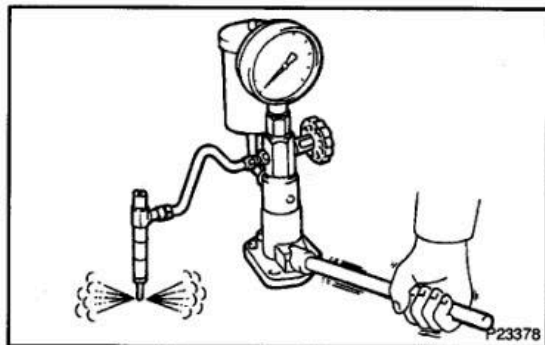
### HINT:

There are 3 sizes of the standard piston diameter, marked "1", "2" and "3" accordingly. The mark is stamped on the piston top.

- (1) Using a micrometer, measure the piston diameter at right angles to the piston pin center line from the piston head.

### Piston diameter:

|          | 1HZ                                         | 1HD-T                                     | 1HD-FTE                                   |
|----------|---------------------------------------------|-------------------------------------------|-------------------------------------------|
| Mark1    | 93.885 – 93.895 mm<br>(3.69625–3.69665 in.) | 93.950–93.960 mm<br>(3.69881–3.69921 in.) | 93.850–93.860 mm<br>(3.69487–3.69527 in.) |
| Mark2    | 93.896–93.905 mm<br>(3.69669–3.69704 in.)   | 93.961–93.970 mm<br>(3.69924–3.69959 in.) | 93.861–93.870 mm<br>(3.69531–3.69566 in.) |
| Mark3    | 93.906–93.915 mm<br>(3.69708–3.69743 in.)   | 93.971–93.980 mm<br>(3.69963–3.69999 in.) | 93.871–93.880 mm<br>(3.69570–3.69606 in.) |
| O/S 0.50 | 94.385–94.415 mm<br>(3.71594–3.71712 in.)   | 94.450–94.471 mm<br>(3.71850–3.71932 in.) | 94.370–94.100 mm<br>(3.71535–3.71653 in.) |



- (e) Pump the tester handle slowly and observe the pressure gauge.
- (f) Read the pressure gauge just as the injection pressure begins to drop.

**No.2 opening pressure (Inspection pressure):**

**33,539 – 35,500 kPa**

**(342 – 362 kgf/cm<sup>2</sup>, 4,864 – 5,149 psi)**

**HINT:**

- Proper nozzle operation can be determined by a swishing sound.
- With the SST installation, the inspection adjusting valve of No.2 opening pressure has become higher than 27,459 kPa (280 kgf/cm<sup>2</sup>, 3,982 psi).

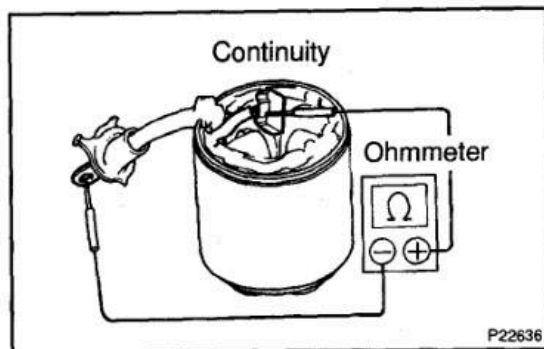
If the opening pressure is not as specified, disassemble the nozzle and change the No.1 pressure spring washer (adjusting shim).

**No.1 pressure spring washer (adjusting shim) thickness:**

| mm (in.)       | mm (in.)       | mm (in.)       |
|----------------|----------------|----------------|
| 0.700 (0.0276) | 1.225 (0.0482) | 1.625 (0.0640) |
| 0.750 (0.0295) | 1.250 (0.0492) | 1.650 (0.0650) |
| 0.800 (0.0315) | 1.275 (0.0502) | 1.675 (0.0659) |
| 0.850 (0.0335) | 1.300 (0.0512) | 1.700 (0.0669) |
| 0.900 (0.0354) | 1.325 (0.0521) | 1.725 (0.0679) |
| 0.950 (0.0374) | 1.350 (0.0531) | 1.750 (0.0689) |
| 0.975 (0.0384) | 1.375 (0.0541) | 1.775 (0.0699) |
| 1.000 (0.0394) | 1.400 (0.0551) | 1.800 (0.0709) |
| 1.025 (0.0404) | 1.425 (0.0561) | 1.850 (0.0728) |
| 1.050 (0.0413) | 1.450 (0.0571) | 1.900 (0.0748) |
| 1.075 (0.0423) | 1.475 (0.0581) | 1.950 (0.0768) |
| 1.100 (0.0433) | 1.500 (0.0591) | 2.000 (0.0787) |
| 1.125 (0.0443) | 1.525 (0.0600) | 2.050 (0.0807) |
| 1.150 (0.0453) | 1.550 (0.0610) | 2.100 (0.0827) |
| 1.175 (0.0463) | 1.575 (0.0620) | 2.150 (0.0846) |
| 1.200 (0.0472) | 1.600 (0.0630) | —              |

**HINT:**

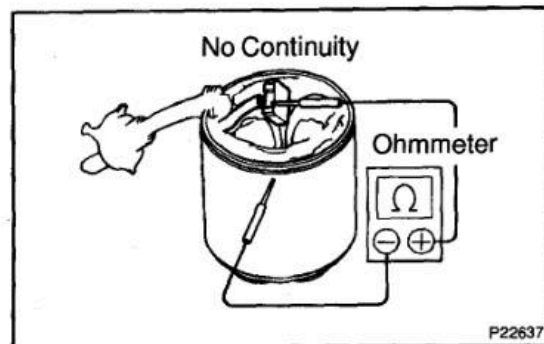
- Varying the adjusting shim thickness by 0.025 mm (0.0010 in.) changes the injection pressure by about 373 kPa (3.8 kgf/cm<sup>2</sup>, 54 psi).
- Only one adjusting shim should be used.



### 7. INSPECT FIELD COIL FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

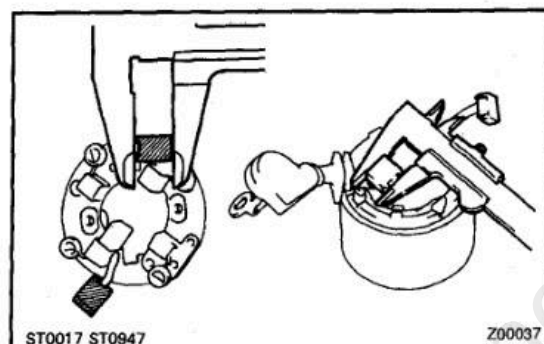
If there is no continuity, replace the field frame.



### 8. INSPECT FIELD COIL FOR GROUND

Using an ohmmeter, check that there is no continuity between the field coil end and field frame.

If there is continuity, repair or replace the field frame.



### 9. INSPECT BRUSH LENGTH

Using vernier calipers, measure the brush length.

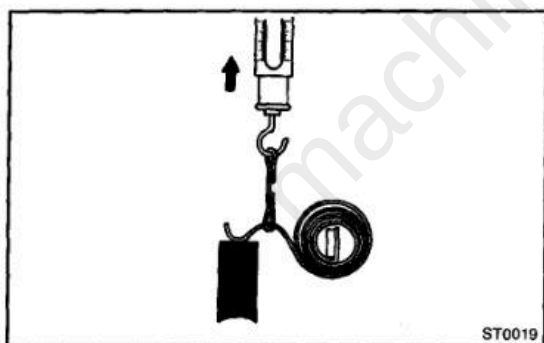
**Standard length:**

**20.5 mm (0.807 in.)**

**Minimum length:**

**11.0 mm (0.433 in.)**

If the length is less than minimum, replace the brush holder and field frame.



### 10. INSPECT BRUSH SPRING LOAD

Take the pull scale reading the instant the brush spring separates from the brush.

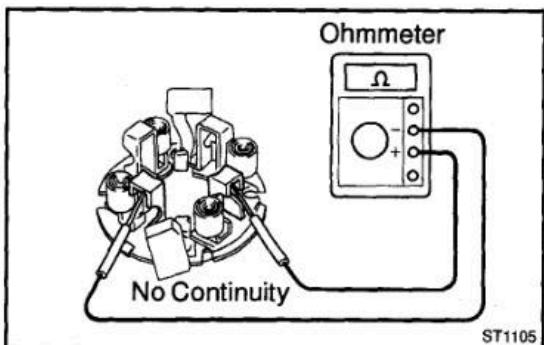
**Standard spring installed load:**

**34.3 – 42.1 N (3.4 – 4.1 kgf, 7.7 – 9.5 lbf)**

**Minimum spring installed load:**

**18.6 N (1.8 kgf, 2.7 lbf)**

If the installed load is less than minimum, replace the brush springs.



### 11. INSPECT BRUSH HOLDER INSULATION

Using an ohmmeter, check that there is no continuity between the positive (+) and negative (-) brush holders.

If there is continuity, repair or replace the brush holder.

### 12. INSPECT GEAR TEETH

Check the gear teeth on the pinion gear, idle gear and the clutch assembly for wear or damage.

If damaged, replace the gear or clutch assembly.

If damaged, also check the drive plate ring gear for wear or damage.

## Full Version Available

### Toyota 1HD-FTE, 1HD-T and 1HZ Engine Service Manual

Toyota 1HD-FTE, 1HD-T, 1HZ engine service manual with repair procedures, adjustments and troubleshooting. 644-page PDF. Instant PDF download.

**VIEW THE FULL MANUAL**

<https://machinecatalogic.com/toyota-1hd-fte-1hd-t-and-1hz-engine-service-manual/>

Book No: RM617E · File Pages: 644 · File Count: 1 · File Language: English