

SERVICE BULLETIN

FUEL INJECTION PUMP TECHNICAL HINT

TW 97-08
October, 1997

DENSO AUTHORIZED SERVICE DEALER ONLY

SUBJECT : ADJUSTMENT PROCEDURE OF PRE-STROKE (VE type pump)

Application : ALL PUMPS FOR 11Z, 12Z, 13Z, 14Z, 1HD-T, 1HD-FT, 1HZ, 1HZ-T, 1H-Z
ENGINES OF TOYOTA

1. DESCRIPTION

A6-cylinder VE type injection pump needs "PRE-STROKE" adjustment when assembling. Due to the increase in the number of cylinders from four to six, changes have been made in the design of parts such as the plunger, face cam and distributor head. An annual groove is provided in the leading edge of the plunger to improve fuel intake efficiency. Adjustment of this groove position, that is, pre-stroke adjustment, is provided (See Fig. 1)

Please refer to the attached data for each pumps and adjust pre-stroke with following procedure.

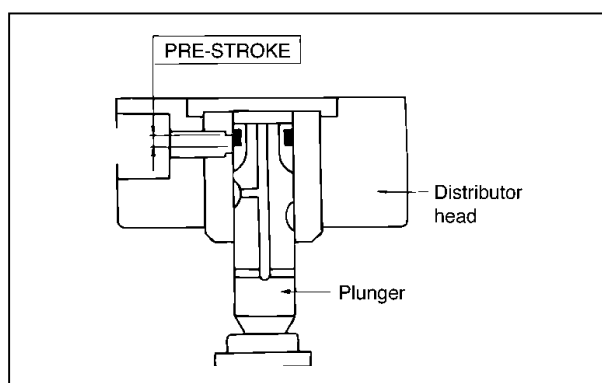


Fig.1 PRE-STROKE

2. ASSEMBLY AND DISASSEMBLY

Disassembly and assembly is carried out in the same way as for conventional VE pumps, however the pre-stroke adjustment is necessary during assembly.

3. ADJUSTMENT PROCEDURE OF PRE-STROKE

Inlet adaptor (95095-10390) is needed for adjustment of pre-stroke. In addition, plunger stroke gauge (95095-10400) and magnetically fixed stand are needed, too. (See the next page)

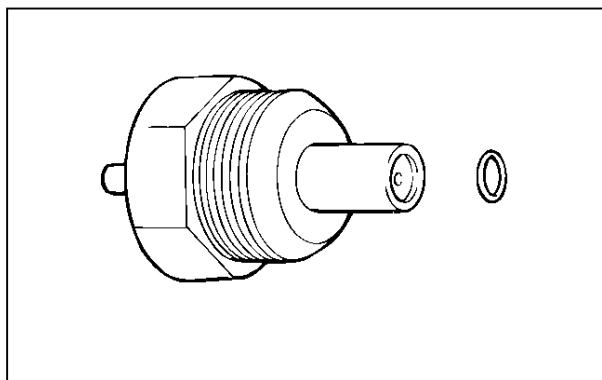


Fig.2 Inlet adaptor (STT)

NOTE

Perform pre-stroke adjustment before assembling the fuel shut-off solenoid and the head plug.

- (a) Place the STT (solenoid adaptor) on the fuel shut-off solenoid screw.
- (b) Set the magnetically fixed stand, position the dial gauge, and place the leading edge of the push rod on the top surface of the plunger.
- (c) Turn the drive shaft to set the plunger at bottom dead center, and adjust the dial gauge pointer to zero.
- (d) Apply a few drops of light oil to the leading edge of the plunger, and supply air at 0.1 atm. (76 mmHg) to the STT (inlet adaptor). Air bubbles will appear on the top surface of the plunger.
- (e) Turn the drive shaft slowly in the pump revolution direction (right), and take the dial gauge reading when the air bubbles disappear.

Reference value: Refer to "5. PUMP No. AND PRE-STROKE"

- (f) If the reading is outside the reference value, replace the shim on the lower part of the plunger.

Thicker the shim → smaller the pre-stroke

- (g) After the adjustment is completed, confirm that the K dimension is within the specified value.
- (h) Should the K dimension be outside of the specified value, replace the distributor head sub-assy.
- (i) After completing the above adjustment, assemble the fuel shut-off solenoid and head plug.

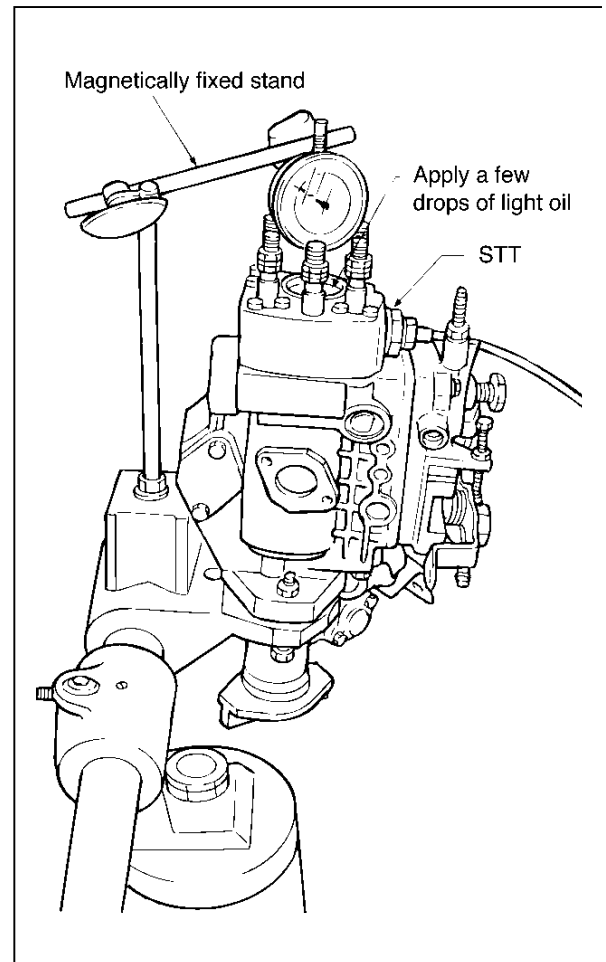


Fig. 3 Adjustment procedure of PRE-STROKE

4. ABOUT PLUNGER STROKE GAUGE

When assembling the VE pump on the engine, a conventional plunger stroke gauge (STT) cannot be installed because of the engine's 6-cylinder construction.

Use a machined plunger stroke gauge according to the following procedures, or use a newly supplied STT (95095-10400).

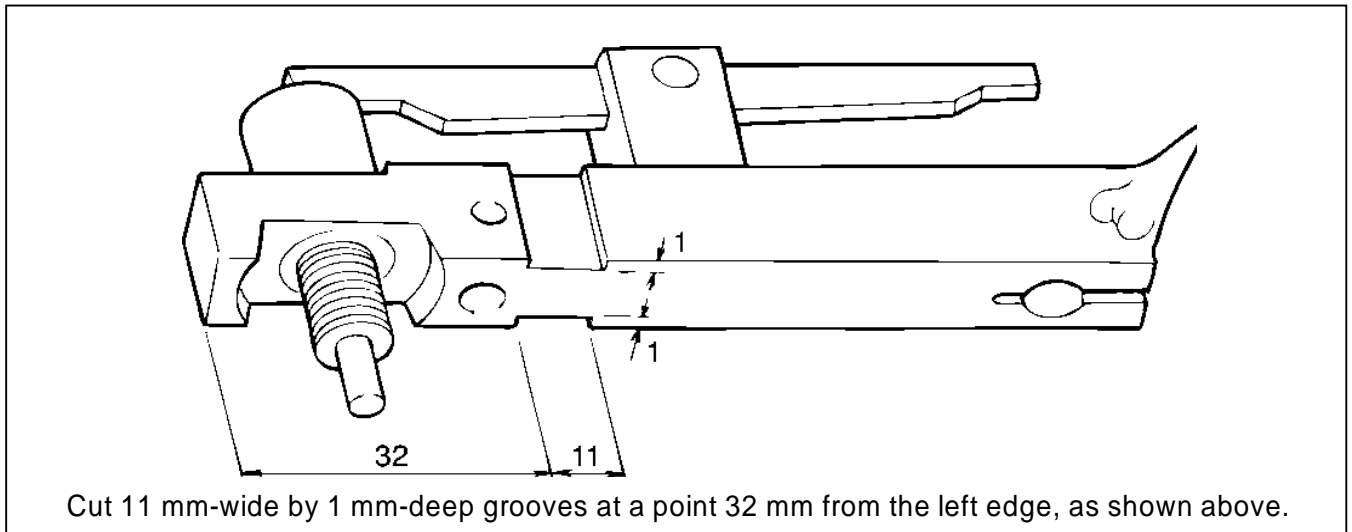


Fig. 4 Plunger stroke gauge (STT)

5. PUMP NO. AND PRE-STROKE

Pump No.	Manufacturer	Manufacturer No.	Vehicle model	Engine type	Pre-stroke (mm)
096000-479#	TOYOTA	22100-78330-71	FORK LIFT	11Z	0.17±0.05
096000-480#	TOYOTA	22100-78331-71	FORK LIFT	11Z	0.17±0.05
096000-627#	TOYOTA	22100-17020	LAND CRUISER	1H-Z	0.2±0.02
096000-629#	TOYOTA	22100-17040	COASTER	1HZ	0.2±0.02
096000-631#	TOYOTA	22100-17060	LAND CRUISER	1H-Z	0.2±0.02
096000-632#	TOYOTA	22100-17070	LAND CRUISER	1H-Z	0.2±0.02
096000-633#	TOYOTA	22100-17080	COASTER	1HZ	0.2±0.02
096000-634#	TOYOTA	22100-17090	LAND CRUISER	1H-Z	0.2±0.02
096000-635#	TOYOTA	22100-17100	COASTER	1HZ	0.2±0.02
096000-636#	TOYOTA	22100-17110	COASTER	1H-Z	0.2±0.02
096000-637#	TOYOTA	22100-17120	COASTER	1HZ	0.2±0.02
096000-638#	TOYOTA	22100-17130	COASTER	1HZ	0.2±0.02
096000-639#	TOYOTA	22100-17140	LAND CRUISER	1HD-T	0.25±0.02
096000-640#	TOYOTA	22100-17150	LAND CRUISER	1HD-T	0.25±0.02
096000-641#	TOYOTA	22100-17160	LAND CRUISER	1HD-T	0.25±0.02
096000-642#	TOYOTA	22100-17170	LAND CRUISER	1HD-T	0.25±0.02
096000-643#	TOYOTA	22100-17180	LAND CRUISER	1HD-T	0.25±0.02
096000-644#	TOYOTA	22100-17190	LAND CRUISER	1HD-T	0.25±0.02

Pump No.	Manufacturer	Manufacturer No.	Vehicle model	Engine type	Pre-stroke (mm)
096000-665#	TOYOTA	22100-17200	COASTER	1HZ	0.2±0.02
096000-667#	TOYOTA	22100-17220	COASTER	1HZ	0.2±0.02
096000-668#	TOYOTA	22100-17230	COASTER	1HZ	0.2±0.02
096000-669#	TOYOTA	22100-17240	COASTER	1HZ	0.2±0.02
096000-670#	TOYOTA	22100-17250	COASTER	1HD-T	0.25±0.02
096000-671#	TOYOTA	22100-17260	LAND CRUISER	1HD-T	0.25±0.02
096000-674#	TOYOTA	22100-17270	LAND CRUISER	1HD-T	0.25±0.02
096000-675#	TOYOTA	22100-17280	LAND CRUISER	1HD-T	0.25±0.02
096000-676#	TOYOTA	22100-17290	LAND CRUISER	1HD-T	0.25±0.02
096000-677#	TOYOTA	22100-17300	LAND CRUISER	1HD-T	0.25±0.02
096000-678#	TOYOTA	22100-17310	LAND CRUISER	1HZ	0.2±0.02
096000-679#	TOYOTA	22100-17320	LAND CRUISER	1HZ	0.2±0.02
096000-705#	TOYOTA	22300-97572-71	FORK LIFT	11Z	0.2±0.05
096000-730#	TOYOTA	22100-7836-71D	FORK LIFT	12Z	0.2±0.05
096000-778#	TOYOTA	22100-17141	LAND CRUISER	1HD-T	0.25±0.02
096000-779#	TOYOTA	22100-17151	LAND CRUISER	1HD-T	0.25±0.02
096000-780#	TOYOTA	22100-17161	LAND CRUISER	1HD-T	0.25±0.02
096000-781#	TOYOTA	22100-17281	LAND CRUISER	1HD-T	0.25±0.02
096000-782#	TOYOTA	22100-17301	LAND CRUISER	1HD-T	0.25±0.02
096000-813#	TOYOTA	22100-17420	COASTER	1HD-T	0.25±0.02
096000-814#	TOYOTA	22100-17430	COASTER	1HD-T	0.25±0.02
096000-826#	TOYOTA	22100-17440	LAND CRUISER	1HZ	0.2±0.02
096000-827#	TOYOTA	22100-17450	LAND CRUISER	1HZ	0.2±0.02
096000-828#	TOYOTA	22100-17460	LAND CRUISER	1HZ	0.2±0.02
096000-829#	TOYOTA	22100-17470	LAND CRUISER	1HZ	0.2±0.02
096000-830#	TOYOTA	22100-17480	LAND CRUISER	1HZ	0.2±0.02
096000-832#	TOYOTA	22100-17630	LAND CRUISER	1HZ	0.2±0.02
096000-833#	TOYOTA	22100-17640	LAND CRUISER	1HZ	0.2±0.02
096000-834#	TOYOTA	22100-17650	LAND CRUISER	1HZ	0.2±0.02
096000-835#	TOYOTA	22100-17500	LAND CRUISER	1HZ	0.2±0.02
096000-836#	TOYOTA	22100-17510	LAND CRUISER	1HZ	0.2±0.02
096000-837#	TOYOTA	22100-17660	LAND CRUISER	1HZ	0.2±0.02
096000-839#	TOYOTA	22100-17710	LAND CRUISER	1HZ	0.2±0.02
096000-841#	TOYOTA	22100-17350	COASTER	1HZ	0.2±0.02
096000-846#	TOYOTA	22100-17520	LAND CRUISER	1HZ	0.2±0.02
096000-847#	TOYOTA	22100-17530	LAND CRUISER	1HZ	0.2±0.02
096000-848#	TOYOTA	22100-17690	LAND CRUISER	1HZ	0.2±0.02
096000-849#	TOYOTA	22100-17700	LAND CRUISER	1HZ	0.2±0.02

Pump No.	Manufacturer	Manufacturer No.	Vehicle model	Engine type	Pre-stroke (mm)
096000-852#	TOYOTA	22100-17410	COASTER	1HZ-T	0.2±0.02
096000-853#	TOYOTA	22100-17540	LAND CRUISER	1HD-T	0.25±0.02
096000-855#	TOYOTA	22100-17560	LAND CRUISER	1HD-T	0.25±0.02
096000-856#	TOYOTA	22100-17570	LAND CRUISER	1HD-T	0.25±0.02
096000-857#	TOYOTA	22100-17580	LAND CRUISER	1HD-T	0.25±0.02
096000-858#	TOYOTA	22100-17590	LAND CRUISER	1HD-T	0.25±0.02
096000-859#	TOYOTA	22100-17600	LAND CRUISER	1HD-T	0.25±0.02
096000-860#	TOYOTA	22100-17610	LAND CRUISER	1HD-T	0.25±0.02
096000-861#	TOYOTA	22100-17620	LAND CRUISER	1HD-T	0.25±0.02
096000-871#	TOYOTA	22100-17720	LAND CRUISER	1HZ	0.2±0.02
096000-872#	TOYOTA	22100-17730	LAND CRUISER	1HZ	0.2±0.02
096000-873#	TOYOTA	22100-17740	LAND CRUISER	1HZ	0.2±0.02
096000-874#	TOYOTA	22100-17750	LAND CRUISER	1HZ	0.2±0.02
096000-880#	TOYOTA	22100-17760	LAND CRUISER	1HZ	0.2±0.02
096000-881#	TOYOTA	22100-17770	LAND CRUISER	1HZ	0.2±0.02
096000-882#	TOYOTA	22100-17091	LAND CRUISER	1HZ	0.2±0.02
096000-883#	YAMAHA	6TA12-81000	MARINE	1HD-T	0.25±0.02
096000-898#	YAMAHA	6TB-12810-00	MARINE	1HD-T	0.25±0.02
096000-899#	TOYOTA	22100-17790	LAND CRUISER	1HZ	0.2±0.02
096000-900#	TOYOTA	22100-17800	LAND CRUISER	1HZ	0.2±0.02
096000-901#	TOYOTA	22100-17680	LAND CRUISER	1HZ	0.2±0.02
096000-902#	TOYOTA	22100-17491	LAND CRUISER	1HZ	0.2±0.02
096000-903#	TOYOTA	22100-17780	LAND CRUISER	1HZ	0.2±0.02
096000-930#	YAMAHA	6TD-12810-01	MARINE	1HD-T	0.25±0.02
096000-941#	TOYOTA	22100-17810	LAND CRUISER	1HZ	0.2±0.02
096000-942#	TOYOTA	22100-17820	LAND CRUISER	1HZ	0.2±0.02
096000-943#	TOYOTA	22100-17830	LAND CRUISER	1HZ	0.2±0.02
096000-972#	TOYOTA	22100-17840	LAND CRUISER	1HD-FT	0.5±0.02
096000-973#	TOYOTA	22100-17850	LAND CRUISER	1HD-FT	0.5±0.02
096000-974#	TOYOTA	22100-17860	LAND CRUISER	1HD-FT	0.5±0.02
096000-975#	TOYOTA	22100-17870	LAND CRUISER	1HD-FT	0.5±0.02
096000-976#	TOYOTA	22100-17880	LAND CRUISER	1HD-FT	0.5±0.02
096000-977#	TOYOTA	22100-17890	LAND CRUISER	1HD-FT	0.5±0.02
096000-978#	TOYOTA	22100-1B010-A	LAND CRUISER	1HD-FT	0.5±0.02
096000-995#	TOYOTA	22100-1B020	LAND CRUISER	1HZ	0.2±0.02
096000-996#	TOYOTA	22100-1B050	LAND CRUISER	1HZ	0.2±0.02
096000-997#	TOYOTA	22100-1B110	LAND CRUISER	1HZ	0.2±0.02
196000-001#	TOYOTA	22100-1B100	FIRE ENGINE	1HZ	0.2±0.02

Pump No.	Manufacturer	Manufacturer No.	Vehicle model	Engine type	Pre-stroke (mm)
196000-029#	TOYOTA	22100-1B120	COASTER	1HD-FT	0.5±0.02
196000-030#	TOYOTA	22100-1B130	COASTER	1HD-FT	0.5±0.02
196000-034#	TOYOTA	22100-1B060	COASTER	1HZ	0.2±0.02
196000-079#	TOYOTA	22100-1C010	LAND CRUISER	1HZ	0.2±0.02
196000-106#	TOYOTA	22100-78780-71	FORK LIFT	14Z	0.2±0.05
196000-107#	TOYOTA	22100-78781-71	FORK LIFT	14Z	0.2±0.05
196000-111#	TOYOTA	22100-17881-B	LAND CRUISER	1HD-FT	0.5±0.02
196000-125#	TOYOTA	22100-1C020	LAND CRUISER	1HZ	0.2±0.02
196000-159#	TOYOTA	22100-78760-71	FORK LIFT	13Z	0.2±0.05
196000-160#	TOYOTA	22100-78761-71	FORK LIFT	13Z	0.2±0.05
196000-161#	TOYOTA	22100-78762-71	FORK LIFT	13Z	0.2±0.05
196000-162#	TOYOTA	22100-78763-71	FORK LIFT	13Z	0.2±0.05