

INJECTION PUMP TEST SPECIFICATIONS

096000-9760

MANUFACTURER	TOYOTA	INJECTION PUMP		096000-976# VE6/12F2000RND976	
ENGINE TYPE	1HD-FT				
VEHICLE MODEL	LAND CRUISER	ROTATION	Clockwise viewed from drive side	GOVERNOR TYPE	Maximum-minimum speed
RATED VOLTAGE	12V	INJECTION ORDER	A - B - C - D - E - F	INJECTION INTERVAL	60° ± 30'
Dimension KF (mm)	7.10 ± 0.10		Dimension MS (mm)	2.07 ± 0.05	
Dimension K (mm)	3.50 ± 0.10		Dimension PS (mm)	0.50 ± 0.02	

1. TEST CONDITIONS

Nozzle	093400-0540 (DN12SD12A)	Feed Pressure	19.6 kPa (0.2 kgf/cm ²)
Nozzle Opening Pressure	14.7 ± 0.5 MPa (150 ± 5 kgf/cm ²)	High Pressure Pipe	Ø2 X Ø6 X 840 mm
Test Oil	SAE J967 (ISO4113)	Fuel Temperature	40 - 45 °C (104 - 113°F)

NOTE : Apply 6 volts DC across the fuel cut solenoid during adjustment.

2. PRE-ADJUSTMENT

	Lever Position (deg)	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Max. Spread in Delivery	
			(kPa)	(mmHg)	(mm ³ /st)	(cc/200st)	(mm ³)	(cc)
Full Load	26 ± 5°	1080	121.0	910	78.6 ± 4.0	15.7 ± 0.8	8.0	1.6
High Speed	(Full position)	2200	121.0	910	25.0 ± 5.0	5.0 ± 1.0	—	—

3. ADJUSTMENT OF INTERNAL PRESSURE

Lever Position	Pump Speed (rpm)	Boost Pressure		Internal Pressure		Remarks
		(kPa)	(mmHg)	(kPa)	(kgf/cm ²)	
Full	1080	121.0	910	More than 402.1	More than 4.1	By the regulating valve
	1800	121.0	910	843.4 ± 29.4	8.6 ± 0.3	

4. OVERFLOW QUANTITY CHECK

Lever Position	Pump Speed (rpm)	Boost Pressure		Overflow Quantity		Remarks
		(kPa)	(mmHg)	(L/h)	(cc/1000st)	
Full	1800	121.0	910	78 - 117	718 - 1079	

NOTE : The overflow valve belonging to the pump should be used checking.

5. ADJUSTMENT OF TIMER

Lever Position	Pump Speed (rpm)	Boost Pressure		Piston Travel (mm)	Remarks
		(kPa)	(mmHg)		
Full	1080	121.0	910	0.72 ± 0.50	Max. piston travel
	1440	121.0	910	3.33 ± 0.50	
	1800	121.0	910	5.94 ± 0.50	
	—	121.0	910	8.20 ± 0.50	

NOTE : Hysteresis at each pump speed is less than 0.3 mm.

6. ADJUSTMENT OF BOOST COMPENSATOR

Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Max. Spread in Delivery		Remarks
		(kPa)	(mmHg)	(mm ³ /st)	(cc/200st)	(mm ³)	(cc)	
Full	720	121.0	910	$75.9 \pm 2.7 = A$	$15.2 \pm 0.5 = A$	—	—	
	720	0	0	39.1 ± 1.8	7.8 ± 0.4	—	—	
	720	41.3	310	43.1 ± 2.8	8.6 ± 0.6	—	—	
	720	80.0	600	67.1 ± 4.3	13.4 ± 0.9	—	—	
	720	111.0	830	More than (A – 1.5)	More than (A – 0.3)	—	—	

7. ADJUSTMENT OF FUEL DELIVERY

Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Max. Spread in Delivery		Remarks
		(kPa)	(mmHg)	(mm ³ /st)	(cc/200st)	(mm ³)	(cc)	
Full	1080	121.0	910	78.6 ± 4.0	15.7 ± 0.8	8.0	1.6	By full load setting screw
	2200	121.0	910	25.0 ± 5.0	5.0 ± 1.0	—	—	By max. speed setting screw
Idle	2100	121.0	910	approx. 69.0	approx. 13.8	—	—	
	2200	121.0	910	Less than 5.0	Less than 1.0	—	—	
Full	100	41.3	310	approx. 88.0	approx. 17.6	—	—	By governor sleeve plug
	400	41.3	310	46.5 ± 5.7	9.3 ± 1.1	—	—	
	500	41.3	310	44.8 ± 3.2	9.0 ± 0.6	—	—	
	720	80.0	600	67.1 ± 4.3	13.4 ± 0.9	—	—	
	1800	121.0	910	approx. 88.7 = B	approx. 17.7 = B	—	—	
	1440	121.0	910	C	C	—	—	C = Measurement

8. SETTING OF LOAD SENSING TIMER

Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Remarks
		(kPa)	(mmHg)	(mm ³ /st)	(cc/200st)	
Start of Load Sensing	1800	121.0	910	Less than (B – 5.0)	Less than (B – 1.0)	By governor shaft
End of Pressure Drop	1440	121.0	910	(C – 19.0) ± 5.0	(C – 3.8) ± 1.0	Check
Check Points	1. Change of Piston Travel : 1.27 ± 0.50 mm (Pump speed 1440 rpm) 2. Dimension of Governor Shaft : $L = 1.15 \pm 0.85$ mm					

9. SETTING OF ADJUSTING LEVER AT LOW SPEED

Lever Position (deg)	Pump Speed (rpm)	Boost Pressure (kPa)	Fuel Delivery		Max. Spread in Delivery		Remarks
			(mm ³ /st)	(cc/500st)	(mm ³)	(cc)	
17 ± 5° (Idle position)	350	41.3 (310 mmHg)	4.5 ± 1.0	2.3 ± 0.5	2.5	1.3	Lever setting

10. SETTING OF ADJUSTING LEVER AT PARTIAL RANGE

— : Not Applicable

Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Remarks
	(kPa)	(mmHg)	(mm ³ /st)	(cc/500st)	
—	—	—	—	—	—

11. CHARACTERISTIC OF A.C.S.D.

Lever Position	Pump Speed (rpm)	Boost Pressure		Measuring Value	Remarks
		(kPa)	(mmHg)		
Idle	350	41.3	310	1.25 ± 0.1 mm	Piston Travel
	350	41.3	310	0 mm ³ /st	Idle-up Quantity (0 cc/500st)

Fuel temperature : 39 - 41°C

12. ADJUSTMENT OF T.C.V.

— : Not Applicable

Lever Position	Pump Speed (rpm)	Boost Pressure		Piston Travel (mm)	Remarks
		(kPa)	(mmHg)		
—	—	—	—	—	—

13. SETTING OF DIAPHRAGM FOR HEATER & POWER STEERING

Boost Pressure : 41.3 kPa (310 mmHg)

Pump Speed (rpm)	Vacuum Pressure		Fuel Delivery		Remarks
	(kPa)	(mmHg)	(mm ³ /st)	(cc/500st)	
350	- 46.7	- 350	8.5 ± 1.0	4.3 ± 0.5	PS Idle up (No. 1 Actuator), Make ACSD free
410	- 46.7	- 350	6.7 ± 1.0	3.4 ± 0.5	A/C Idle up (No. 1 & No. 2 Actuator), Make ACSD free

14. ADJUSTMENT OF POWER CONTROL

Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Remarks
		(kPa)	(mmHg)	(mm ³ /st)	(cc/200st)	
Full	100	41.3	310	60.0 ± 3.5	12.0 ± 0.7	By PCS lever stopper

15. ADJUSTMENT OF THROTTLE POSITION SENSOR

— : Not Applicable

Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Sensor Output Voltage (V)	Remarks
		(kPa)	(mmHg)	(mm ³ /st)	(cc/500st)		
—	—	—	—	—	—	—	—

16. FINAL CHECK AFTER ADJUSTMENT

1. Range of lever angle between idle and full lever position is $43 \pm 5^\circ$.
2. Resistance of pick-up tachometer must be 810 ± 160 ohms.
3. A/T throttle lever setting (fig. 1)
 - (1) Set lever at low speed along the test specification.
 - (2) Idle position adjustment of A/T throttle lever without ACSD operation. Set the adjusting lever at idle position, and adjust the length of connecting rod to get specified gap (A) between A/T throttle lever and stopper of bracket. (A : 2.0 ± 0.1 mm)
 - (3) ACSD adjustment & Idle-up adjustment.
4. Power control lever should be push toward the distributor head, in order to set the system inoperative while adjustment.(fig. 2)

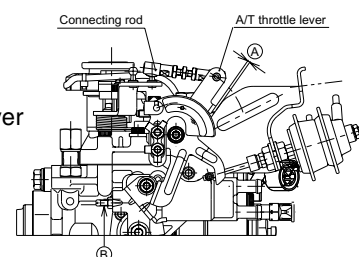


fig. 1

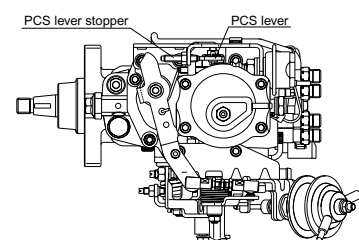


fig. 2