

INJECTION PUMP TEST SPECIFICATIONS

196000-2510

MANUFACTURER	TOYOTA	INJECTION PUMP		196000-251# VE4/10F2100RND251		
ENGINE TYPE	2L					
VEHICLE MODEL	HILUX/ 4 RUNNER	ROTATION	Clockwise viewed from drive side	GOVERNOR TYPE	Maximum-minimum speed	
RATED VOLTAGE	12V	INJECTION ORDER	A - B - C - D	INJECTION INTERVAL	90° ± 30'	
Dimension KF (mm)	6.50 ± 0.10		Dimension MS (mm)	0.45 ± 0.10		
Dimension K (mm)	3.30 ± 0.15		Dimension PS (mm)	0.10 ± 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

Applying 6 V to T.C.V.

	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	28.5 ± 5°	1200	—	—	54.7 ± 0.5	10.9 ± 0.1	2.0	0.4
High Speed	(Full)	2450	—	—	20.0 ± 2.5	4.0 ± 0.5	—	—

3. ADJUSTMENT OF INTERNAL PRESSURE

Applying 6 V to T.C.V.

Lever Position	Pump Speed (rpm)	Boost Pressure		Internal Pressure		Remarks
		(kPa)	(mmHg)	(kPa)	(kgf/cm ²)	
Full	500	—	—	343.5 ± 29.5	3.5 ± 0.3	By the regulating valve
	2100	—	—	676.5 ± 29.5	6.9 ± 0.3	

4. OVERFLOW QUANTITY CHECK

Applying 6 V to T.C.V.

Lever Position	Pump Speed (rpm)	Boost Pressure		Overflow Quantity		Remarks
		(kPa)	(mmHg)	(L/h)	(cc/1000st)	
Full	2200	—	—	22 - 48	167 - 364	

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

5. ADJUSTMENT OF TIMER

Applying 6 V to T.C.V.

Lever Position	Pump Speed (rpm)	Boost Pressure		Piston Travel (mm)	Remarks
		(kPa)	(mmHg)		
Full	700	—	—	0.49 ± 0.40	Max. piston travel
	1200	—	—	2.99 ± 0.40	
	1900	—	—	6.48 ± 0.40	
	2300	—	—	7.50 ± 0.24	

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

6. ADJUSTMENT OF BOOST COMPENSATOR								— : Not Applicable	
Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Max. Spread in Delivery		Remarks	
		(kPa)	(mmHg)	(mm ³ /st)	(cc/200st)	(mm ³)	(cc)		
—	—	—	—	—	—	—	—	—	

7. ADJUSTMENT OF FUEL DELIVERY								Applying 6 V to T.C.V.	
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	1200	—	—	54.7 ± 0.5	10.9 ± 0.1	2.0	0.4	By full load setting screw	
	2450	—	—	20.0 ± 2.5	4.0 ± 0.5	—	—	By max. speed setting screw	
	2200	—	—	36.9 ± 3.0	7.4 ± 0.6	—	—		
	2800	—	—	Less than 5.0	Less than 1.0	—	—		
	100	—	—	65.0 ± 10.0	13.0 ± 2.0	6.0	1.2	By governor sleeve plug	
	500	—	—	47.1 ± 2.0	9.4 ± 0.4	2.5	0.5		
	2000	—	—	48.3 ± 2.0	9.7 ± 0.4	2.5	0.5		

8. SETTING OF LOAD SENSING TIMER								— : Not Applicable	
Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Remarks			
		(kPa)	(mmHg)	(mm ³ /st)	(cc/200st)				
Start of Load Sensing	—	—	—	—	—	—			
End of Pressure Drop	—	—	—	—	—	—			
Repeat Advance Angle									
Check Points	1.	—		:	—	mm			
	2.			:		mm			
	3.	Dimension of Governor Shaft		:	L = 1.15 ± 0.85 mm				

9. SETTING OF ADJUSTING LEVER AT LOW SPEED							Applying 6 V to T.C.V.	
Lever Position (deg)	Pump Speed (rpm)	Boost Pressure (kPa)	Fuel Delivery		Max. Spread in Delivery		Remarks	
			(mm ³ /st)	(cc/500st)	(mm ³)	(cc)		
- 15.5 ± 5° (Idle)	350	—	17.4 ± 1.5 = A	8.7 ± 0.8 = A	1.7	0.9	Lever setting	
	425	—	(A - 8.5) ± 2.5	(A - 4.3) ± 1.3	—	—		

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.					Applying 6 V to T.C.V.	
Lever Position	Pump Speed (rpm)	Boost Pressure		Measuring Value	Remarks	
		(kPa)	(mmHg)			
Idle	350	—	—	0 mm	Piston Travel	
	350	—	—	0 mm ³ /st	Idle-up Quantity (0 cc/500st)	

Fuel temperature : 39 - 41°C

12. ADJUSTMENT OF T.C.V.					
Lever Position	Pump Speed (rpm)	Boost Pressure		Piston Travel (mm)	Remarks
		(kPa)	(mmHg)		
Full	1600	—	—	3.16 ± 0.50	With applying 0 (V)

13. SETTING OF DIAPHRAGM FOR HEATER & POWER STEERING						— : Not Applicable	
Pump Speed (rpm)	Vacuum Pressure		Fuel Delivery		Remarks		
	(kPa)	(mmHg)	(mm ³ /st)	(cc/500st)			
—	—	—	—	—	—		

14. ADJUSTMENT OF POWER CONTROL						— : Not Applicable	
Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Remarks	
		(kPa)	(mmHg)	(mm ³ /st)	(cc/200st)		
—	—	—	—	—	—	—	

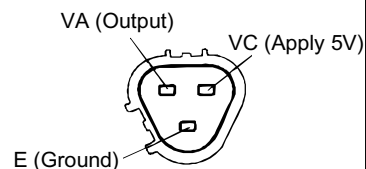
15. ADJUSTMENT OF THROTTLE POSITION SENSOR

Applying 5 ± 0.005 V to VC terminal. Applying 6 V to T.C.V.

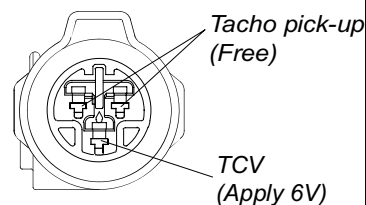
Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Sensor Output Voltage (V)	Remarks
		(kPa)	(mmHg)	(mm ³ /st)	(cc/500st)		
—	1200	—	—	30.0 ± 0.4	15.0 ± 0.2	2.275 ± 0.024	Set point
Idle	0	—	—	—	—	3.72 ± 0.56	Check point
Full	0	—	—	—	—	0.9 ± 0.7	Check point

16. FINAL CHECK AFTER ADJUSTMENT

1. Range of lever angle between idle and full lever position is $44 \pm 5^\circ$.
2. Resistance of pickup tachometer must be 810 ± 160 ohms.
3. After adjustment has been completed, delivery quantity must be 0 mm³/st (0 cc/200st) when voltage at fuel cut solenoid is reduced to zero. (Pump Speed Np = 100 rpm)



RPS Connector



TCV and Tacho Pick-up Connector