

# INJECTION PUMP TEST SPECIFICATIONS

096000-4940

MANUFACTURER	TOYOTA	INJECTION PUMP		<b>096000-494#</b>				
ENGINE TYPE	3L			VE4/10F2050RND494				
VEHICLE MODEL	HILUX SURF	ROTATION	Clockwise viewed from drive side	GOVERNOR TYPE	All speed			
RATED VOLTAGE	12V	INJECTION ORDER	A - B - C - D	INJECTION INTERVAL	90° ± 30'			
Dimension KF (mm)	5.90 ± 0.10		Dimension MS (mm)	0.40 ± 0.10				
Dimension K (mm)	3.30 ± 0.10		Dimension PS (mm)	—				
<b>1. TEST CONDITIONS</b>								
Nozzle	093400-0540 (DN12SD12A)		Feed Pressure	19.6 kPa (0.2 kgf/cm <sup>2</sup> )				
Nozzle Opening Pressure	14.7 ± 0.5 MPa (150 ± 5 kgf/cm <sup>2</sup> )		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.								
<b>2. PRE-ADJUSTMENT</b>								
	Lever Position (deg)	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Max. Spread in Delivery	
			(kPa)	(mmHg)	(mm <sup>3</sup> /st)	(cc/200st)	(mm <sup>3</sup> )	(cc)
Full Load	28.5 ± 5°	1200	—	—	58.6 ± 0.5	11.7 ± 0.1	2.0	0.4
High Speed	(Full)	2300	—	—	27.0 ± 2.5	5.4 ± 0.5	—	—
NOTE : Dimension of Governor Shaft, L = about 2.5 mm								
<b>3. ADJUSTMENT OF INTERNAL PRESSURE</b>								
Lever Position	Pump Speed (rpm)	Boost Pressure		Internal Pressure		Remarks		
		(kPa)	(mmHg)	(kPa)	(kgf/cm <sup>2</sup> )			
Full	500	—	—	343.0 ± 29.0	3.5 ± 0.3	By the regulating valve		
	2100	—	—	677.0 ± 29.0	6.9 ± 0.3			
<b>4. OVERFLOW QUANTITY CHECK</b>								
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.								
<b>5. ADJUSTMENT OF TIMER</b>								
Lever Position	Pump Speed (rpm)	Boost Pressure		Piston Travel (mm)	Remarks			
		(kPa)	(mmHg)					
Full	800	—	—	1.00 ± 0.40				
	1200	—	—	2.20 ± 0.40				
	2000	—	—	4.80 ± 0.40				
	2300	—	—	5.10 ± 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 <sup>3</sup> /st)	(cc/200st)	(mm <sup>3</sup> )	(cc)		
—	—	—	—	—	—	—	—	—	
7. ADJUSTMENT OF FUEL DELIVERY									
Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Max. Spread in Delivery		Remarks	
		(kPa)	(mmHg)	(mm <sup>3</sup> /st)	(cc/200st)	(mm <sup>3</sup> )	(cc)		
Full	1200	—	—	58.6 ± 0.5 = A	11.7 ± 0.1 = A	2.0	0.4	By full load setting screw	
	2300	—	—	27.0 ± 2.5	5.4 ± 0.5	—	—	By max. speed setting screw	
	2100	—	—	50.4 ± 4.0	10.1 ± 0.8	—	—		
	2550	—	—	Less than 5.0	Less than 1.0	—	—		
	100	—	—	70.0 ± 10.0	14.0 ± 2.0	6.0	1.2	By governor sleeve plug	
	500	—	—	54.7 ± 2.0	10.9 ± 0.4	2.5	0.5		
2000	—	—	53.2 ± 1.8	10.6 ± 0.4	2.5	0.5			
8. SETTING OF LOAD SENSING TIMER									
Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Remarks			
		(kPa)	(mmHg)	(mm <sup>3</sup> /st)	(cc/200st)				
Start of Load Sensing	1200	—	—	(A - 5.0) ± 2.0	(A - 1.0) ± 0.4	By governor shaft			
End of Pressure Drop	1200	—	—	44.6 ± 1.0	8.9 ± 0.2	Check			
Check Points	1. Change of Piston Travel : 0.82 ± 0.20 mm (Pump speed 1200 rpm) 2. Dimension of Governor Shaft : L = 1.25 ± 0.75 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 <sup>3</sup> /st)	(cc/500st)	(mm <sup>3</sup> )	(cc)	
- 15.5 ± 5° (Idle)	350	—	19.6 ± 1.5 = B	9.8 ± 0.8 = B	1.7	0.9	Lever setting
	425	—	(B - 12.5) ± 2.5	(B - 6.3) ± 1.3	—	—	
10. SETTING OF ADJUSTING LEVER AT PARTIAL RANGE							
— : Not Applicable							
Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Remarks		
	(kPa)	(mmHg)	(mm <sup>3</sup> /st)	(cc/500st)			
—	—	—	—	—	—		
11. CHARACTERISTIC OF A.C.S.D.							
— : Not Applicable							
Lever Position	Pump Speed (rpm)	Boost Pressure		Measuring Value	Remarks		
		(kPa)	(mmHg)				
—	—	—	—	—	—		
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							
— : Not Applicable							
Pump Speed (rpm)	Vacuum Pressure		Fuel Delivery		Remarks		
	(kPa)	(mmHg)	(mm <sup>3</sup> /st)	(cc/500st)			
—	—	—	—	—	—		
14. ADJUSTMENT OF POWER CONTROL							
— : Not Applicable							
Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Remarks	
		(kPa)	(mmHg)	(mm <sup>3</sup> /st)	(cc/200st)		
—	—	—	—	—	—	—	

**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 <sup>3</sup> /st)	(cc/500st)		
—	—	—	—	—	—	—	—

**16. FINAL CHECK AFTER ADJUSTMENT**

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