

# INJECTION PUMP TEST SPECIFICATIONS

196000-4960

MANUFACTURER	TOYOTA	INJECTION PUMP		<b>196000-496#</b> VE6/12F1100RND496				
ENGINE TYPE	14Z							
VEHICLE MODEL	FORK LIFT	ROTATION	Clockwise viewed from drive side	GOVERNOR TYPE	All speed			
RATED VOLTAGE	24V	INJECTION ORDER	A - B - C - D - E - F	INJECTION INTERVAL	60° ± 30'			
Dimension KF (mm)	5.80 ± 0.10		Dimension MS (mm)	0.63 ± 0.10				
Dimension K (mm)	3.00 ± 0.15		Dimension PS (mm)	0.20 ± 0.05				
1. TEST CONDITIONS								
Nozzle	093400-0540 (DN12SD12)		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 × Ø6 × 840 mm				
Test Oil	SAE J967 (ISO4113)		Fuel Temperature	40 - 45 °C (104 - 113°F)				
NOTE : Apply 14 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 <sup>3</sup> /st)	(cc/200st)	(mm <sup>3</sup> )	(cc)
Full Load	13 ± 5°	800	—	—	59.6 ± 0.5	11.9 ± 0.1	3.0	0.6
High Speed	(Full position)	1180	—	—	19.0 ± 3.5	3.8 ± 0.7	—	—
3. ADJUSTMENT OF INTERNAL PRESSURE								
Lever Position	Pump Speed (rpm)	Boost Pressure		Internal Pressure		Remarks		
		(kPa)	(mmHg)	(kPa)	(kgf/cm <sup>2</sup> )			
Full	600	—	—	225.5 ± 29.5	2.3 ± 0.3	By the regulating valve		
	1100	—	—	529.5 ± 29.5	5.4 ± 0.3			
4. OVERFLOW QUANTITY CHECK								
Lever Position	Pump Speed (rpm)	Boost Pressure		Overflow Quantity		Remarks		
		(kPa)	(mmHg)	(L/h)	(cc/1000st)			
Full	400	—	—	32 - 58	1330 - 2420			
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	1000	—	—	0.47 ± 0.40				
	1100	—	—	1.56 ± 0.40				
	1200	—	—	3.06 ± 0.40				
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	800	—	—	59.6 ± 0.5	11.9 ± 0.1	3.0	0.6	By full load setting screw
	1180	—	—	19.0 ± 3.5	3.8 ± 0.7	—	—	By max. speed setting screw
	1150	—	—	38.3 ± 5.5	7.7 ± 1.1	—	—	
	1300	—	—	Less than 1.5	Less than 0.3	—	—	
	100	—	—	72.0 ± 10.0	14.4 ± 2.0	—	—	By governor sleeve plug
	275	—	—	44.1 ± 4.5	8.8 ± 0.9	—	—	End of fuel quantity increase
	500	—	—	44.0 ± 2.0	8.8 ± 0.4	3.5	0.7	
	1100	—	—	59.9 ± 2.7	12.0 ± 0.5	5.0	1.0	

**8. SETTING OF LOAD SENSING TIMER**

— : Not Applicable

Lever Position	Pump Speed (rpm)	Boost Pressure		Fuel Delivery		Remarks
		(kPa)	(mmHg)	(mm <sup>3</sup> /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**

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 position)	400	—	3.7 ± 2.0	1.9 ± 1.0	3.0	1.5	Lever setting
	275	—	21.9 ± 4.0	11.0 ± 2.0	—	—	
	535	—	Less than 3.0	Less than 1.5	—	—	

**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.**

Lever Position	Pump Speed (rpm)	Boost Pressure		Measuring Value	Remarks
		(kPa)	(mmHg)		
Idle	400	—	—	1.62 ± 0.1 mm	Piston Travel

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. Lever position at idle is  $-15.5 \pm 5^\circ$  and  $13 \pm 5^\circ$  at full.
2. After adjustment has been completed, delivery quantity must be 4.5 mm<sup>3</sup>/st (0.9 cc/200st) when voltage at fuel cut solenoid is reduced to zero. (Pump Speed Np = 200 rpm)