

INJECTION PUMP TEST SPECIFICATIONS

196000-3220

MANUFACTURER	TOYOTA	INJECTION PUMP		196000-322#			
ENGINE TYPE	13Z			VE6/12F1000RND322			
VEHICLE MODEL	FORK LIFT	ROTATION	Clockwise viewed from drive side	GOVERNOR TYPE	All speed		
RATED VOLTAGE	12V	INJECTION ORDER	A - B - C - D - E - F	INJECTION INTERVAL	60° ± 30'		
Dimension KF (mm)		5.8 ± 0.1		Dimension MS (mm)		0.65 ± 0.05	
Dimension K (mm)		3.0 ± 0.15		Dimension PS (mm)		0.17 ± 0.05	
1. TEST CONDITIONS							
Nozzle		093400-0540 (DN12SD12A)		Feed Pressure		0.2 kg/cm ²	
Nozzle Opening Pressure		150 ± 5 kg/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)	Positive Pressure (mmHg)	Fuel Delivery (cc/200st)	Max. Spread in Delivery (cc)	Remarks	
Full Load	8 ± 5° (Full)	800	---	8.6 ± 0.1	0.6		
High Speed		1100	---	1.3 ± 0.5	---		
NOTE : Dimension of Governor Shaft, L = about 2.5 mm							
3. ADJUSTMENT OF INTERNAL PRESSURE							
Lever Position	Pump Speed (rpm)	Positive Pressure (mmHg)	Internal Pressure (kg/cm ²)	Remarks			
Full	400	---	4.0 ± 0.3	By the regulating valve			
	1100	---	5.9 ± 0.3				
4. OVERFLOW QUANTITY CHECK							
Lever Position	Pump Speed (rpm)	Positive Pressure (mmHg)	Overflow Quantity (cc/1000st)	Remarks			
Full	400	---	1330 -2420				
NOTE : The overflow valve belonging to the pump should be used checking.							
5. ADJUSTMENT OF TIMER							
Lever Position	Pump Speed (rpm)	Positive Pressure (mmHg)	Piston Travel (mm)	Remarks			
Full	750	---	Less than 0.20				
	900	---	0.50 ± 0.40				
	1000	---	0.90 ± 0.40				
	1200	---	1.23 ± 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)	Positive Pressure (mmHg)	Fuel Delivery (cc/200st)	Max. Spread in Delivery (cc/200,cyl)	Remarks
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7. ADJUSTMENT OF FUEL DELIVERY

Lever Position (deg)	Pump Speed (rpm)	Positive Pressure (mmHg)	Fuel Delivery (cc/200st)	Max. Spread in Delivery (cc)	Remarks
8 ± 5° (Full)	800	---	8.6 ± 0.1	0.6	By full load setting screw
	1100	---	1.3 ± 0.5	---	By max. speed setting screw
	1200	---	Less than 0.3	---	
	1050	---	6.8 ± 0.8	---	
	100	---	12.8 ± 1.8	---	By governor sleeve plug
	275	---	11.3 ± 0.7	---	
	380	---	7.3 ± 0.7	---	
	500	---	7.8 ± 0.4	0.7	
	1000	---	9.3 ± 0.4	1.0	
	650	---	8.4 ± 0.5	---	

8. SETTING OF LOAD SENSING TIMER
-- : Not Applicable

Lever Position (deg)	Pump Speed (rpm)	Positive Pressure (mmHg)	Fuel Delivery (cc/200st)	Remarks
Start of Load Sensing	---	---	---	---
End of Pressure Drop	---	---	---	---
Check Points	1. --- : --- mm 2. Dimension of Governor Shaft : L = 1.15 ± 0.85 mm			

9. SETTING OF ADJUSTING LEVER AT LOW SPEED					
Lever Position (deg)	Pump Speed (rpm)	Positive Pressure (mmHg)	Fuel Delivery (cc/500st)	Max. Spread in Delivery (cc)	Remarks
- 15.5 ± 5° (Idle)	380	---	3.3 ± 1.0	1.5	Lever setting
	275	---	20.5 ± 2.0	---	
	535	---	Less than 1.5	---	
10. SETTING OF ADJUSTING LEVER AT PARTIAL RANGE -- : Not Applicable					
Pump Speed (rpm)		Positive Pressure (mmHg)	Fuel Delivery (cc/500st)	Remarks	
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11. CHARACTERISTIC OF A.C.S.D. -- : Not Applicable					
Lever Position (deg)	Pump Speed (rpm)	Positive Pressure (mmHg)	Measuring Value	Remarks	
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Fuel temperature : 39 - 41°C					
12. ADJUSTMENT OF T.C.V. -- : Not Applicable					
Lever Position (deg)	Pump Speed (rpm)	Positive Pressure (mmHg)	Piston Travel (mm)	Remarks	
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13. SETTING OF DIAPHRAGM FOR HEATER & POWER STEERING -- : Not Applicable					
Pump Speed (rpm)	Vacuum Pressure (mmHg)	Fuel Delivery (cc/500st)	Remarks		
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14. ADJUSTMENT OF POWER CONTROL -- : Not Applicable					
Lever Position (deg)	Pump Speed (rpm)	Boost Pressure (mmHg)	Fuel Delivery (cc/200st)	Remarks	
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15. ADJUSTMENT OF THROTTLE POSITION SENSOR					
--- : Not Applicable					
Lever Position (deg)	Pump Speed (rpm)	Positive Pressure (mmHg)	Fuel Delivery (cc/500st)	Sensor Output Voltage (V)	Remarks
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16. FINAL CHECK AFTER ADJUSTMENT
1. Range of lever angle between idle and full lever position is $23.5 \pm 5^\circ$. 2. Resistance of pick-up tachometer must be 810 ± 160 ohm. 3. After adjustment has been completed, delivery quantity must be 0.9 cc/200st when voltage at fuel cut solenoid is reduced to zero. (Pump Speed $N_p = 100$ rpm)