

# INJECTION PUMP TEST SPECIFICATIONS

096000-5160

INJECTION PUMP	096000-516# (VE4/10F2400RND516)	MANU-FACTURER	TOYOTA	
Governor Type	All speed	ENGINE TYPE	2C-T	
Rated Voltage	12V	VEHICLE MODEL	CAMRY	
Rotation	Clockwise viewed from drive side	Dimension (mm) MS	: 0.70 – 0.90	
Injection Order	A – B – C – D	Dimension (mm) K	: 3.20 – 3.40	
Injection Interval	90° ±30'	Dimension (mm) KF	: 5.20 – 5.40	
<b>1. TEST CONDITIONS</b>				
1) Nozzle	: 093400-0540 (DN12SD12A)	4) Feed Pressure	: 0.2 kgf/cm <sup>2</sup>	
2) Nozzle Opening Pressure	: 145 – 155 kgf/cm <sup>2</sup>	5) High Pressure Pipe	: ø2 x ø6 x 840 mm	
3) Test Oil	: SAE J967 (ISO4113)	6) Fuel Temperature	: 40 – 45°C (104 – 113°F)	
<b>NOTE:</b> Apply 6 volts DC across the fuel cut solenoid during adjustment.				
<b>2. PRE-ADJUSTMENT</b> (at full lever position, boost pressure 450 mmHg)				
	<b>Pump Speed (rpm)</b>	<b>Fuel Delivery (cc/200st- 1cyl.)</b>	<b>Remarks</b>	
Full Load	1500	11.0 – 11.8	By full load setting screw	
High Speed	2600	3.2 – 4.8	By max. speed setting screw	
Load Sensing Timer: Adjust the governor shaft so that the dimension "L" between the housing flange and the end of the governor shaft is about 2.5 mm.				
<b>3. ADJUSTMENT OF PUMP INTERNAL PRESSURE</b> (at full lever position, boost pressure 0 mmHg)				
	<b>Pump Speed (rpm)</b>	<b>Internal Pressure (kgf/cm<sup>2</sup>)</b>	<b>Remarks</b>	
	700	3.0 – 3.6	By the regulating valve	
	2250	6.9 – 7.5		
<b>4. OVERFLOW QUANTITY CHECK</b> (at full lever position, boost pressure 0 mmHg)				
	<b>Pump Speed (rpm)</b>	<b>Overflow Quantity (cc/1000st)</b>	<b>Remarks</b>	
	2250	167 – 364	The overflow valve belonging to the pump should be used for checking.	
<b>5. ADJUSTMENT OF TIMER</b> (at full lever position, boost pressure 450 mmHg)				
<b>Pump Speed (rpm)</b>	700	1500	1800	About 2250
<b>Piston Travel (mm)</b>	1.1 – 2.1	5.0 – 6.0	6.4 – 7.4	7.5 – 8.3
<b>NOTE:</b> Hysteresis at each pump speed is less than 0.3 mm.				

6. ADJUSTMENT OF FUEL DELIVERY					
Lever Position	Pump speed (rpm)	Fuel Delivery (cc/200st, 1cyl)	Max. Spread In Delivery (cc)	Boost Pressure Absolute Pressure (mmHg)	Remarks
FULL	1500	11.2 – 11.6	0.4	450	By full load setting screw
	2600	3.4 – 4.6	—	450	By max. speed setting screw
	2500	6.8 – 9.2	—	450	
	2900	Less than 0.7	—	450	
	100	9.6 – 14.4	1.2	0	By governor sleeve plug
	2250	10.0 – 10.9	0.5	450	
	2350	9.7 – 11.0	0.5	450	
700	7.6 – 8.2	0.5	0		
—	—	—	—	—	—
7. SETTING OF LOAD SENSING TIMER (at full lever position, boost pressure 0 mmHg) <span style="float: right;">N.A. : Not Applicable</span>					
	Pump Speed (rpm)	Fuel Delivery (cc/200st, 1cyl)	Remarks		
Start of Load Sensing	1800	Full-load delivery – (0.7 – 1.3)	By governor shaft		
End of Pressure Drop	1800	Full-load delivery – (1.7 – 2.3)	Check		
<b>CHECK POINTS</b> 1. Change of Piston Travel : 1.0 – 1.4 mm (pump speed 1800 rpm) 2. Dimension of Governor Shaft : L = 0.5 – 2.0 mm					
8. SETTING OF ADJUSTING LEVER AT LOW SPEED					
Lever Position	Pump Speed (rpm)	Fuel Delivery (cc/500st, 1cyl)	Max. Spread In Delivery (cc)	Remarks	
IDLE	400	A = 10.25 – 11.0	—	Presetting	
	375	More than (A + 1.25)	—		
	475	A - (7.5 to 10.0)	—		
	700	B = 2.5 – 3.0	—	Presetting	
	700	B + (0.25 to 0.75)	—	Dash pot adjustment	
	400	6.0 – 6.5	0.85	Lever setting	
	1300	Less than 0.5	—	Lever position : Idle	
<b>NOTE:</b> Do the adjustment in the order from above.					
9. ADJUSTMENT OF BOOST COMPENSATOR <span style="float: right;">N.A. : Not Applicable</span>					
Pump Speed (rpm)	Boost Pressure (mmHg)	Fuel Delivery (cc/200st, 1cyl)	Remarks		
700	300	48.5 – 52.5			
700	200	43.5 – 47.5			
700	0	38.0 – 41.0			
1500	450	56.2 – 57.9			
1500	500	55.5 – 58.5			
1500	700	45.0 – 53.5			
10. ADJUSTMENT OF T.C.V. (with no power supply to T.C.V.) <span style="float: right;">N.A. : Not Applicable</span>					
Pump Speed (rpm)	Boost Pressure (mmHg)	Piston Stroke (mm)			
N.A.	N.A.	N.A.			

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11. ADJUSTMENT OF THROTTLE POSITION SENSOR. (Applying 5.0 ±0.005V to sensor.)				N.A. : Not Applicable
	Pump Speed (rpm)	Condition		Sensor Output Voltage
Set point	N.A.	N.A.		N.A.
Check point	N.A.	N.A.		N.A.
12. CHARACTERISTIC OF A.C.S.D.				
Lever Position	Pump Speed (rpm)	Fuel Temperature (°C)	Measuring Value	Remarks
IDLE	400	24 – 26	Piston Travel (mm) : 0.72 – 0.92	
	400	24 – 26	Idle-up Quantity (cc/500st) : A + (2 to 2.5)	
13. ADJUSTMENT OF POWER CONTROL.(Adjustment should be done while the power control lever is in contact with the stopper.)				N.A. : Not Applicable
Lever Position	Pump Speed (rpm)	Boost Pressure (mmHg)	Fuel Delivery (cc/200st. 1cyl)	Remarks
FULL	N.A.	N.A.	N.A.	
14. SETTING OF DIAPHRAGM FOR HEATER				N.A. : Not Applicable
Lever Position	Pump Speed (rpm)	Fuel Delivery (cc/200st. 1cyl)	Boost Pressure To Diaphragm (mmHg)	Remarks
IDLE	N.A.	N.A.	N.A.	
15. FINAL CHECK AFTER ADJUSTMENT				
<p>(1) Range of lever angle between idle and full lever position is 47° ±5°.</p> <p>(2) After adjustment has been completed, confirm that there is no injection when voltage at fuel cut solenoid is reduced to zero. (pump speed <math>N_p = 100</math> rpm, at full lever position.)</p> <p>(3) Resistance of pick-up tachometer must be 800 – 800 ohms.</p> <p>(4) Heater Idle Up Absolute pressure: less than 300 mmHg, Pump Speed: 450 rpm, Fuel Delivery: 4.0 – 7.0 cc/1000 st.</p>				