INJECTION PUMP TEST SPECIFICATIONS

ECD

096500-0130

INJECTION PUMP	096500-013# (VE4/12E2100RND013)	Governor	Electronical control
		Timer	Electronical control
MANUFACTURER	TOYOTA	Rated Voltage	14V
ENGINE TYPE	1KZ-TE	Rotation	Clockwise viewed from drive side
VEHICLE MODEL	LAND CRUISER	Injection Order	A - B - C - D
Pump Select Switch No. (ECD Controller)	1	Injection Interval	90°

1. TEST CONDITIONS

1) Nozzle	093400-0540 (DN12SD12A)	4) Feed Pressure	0.2 kgf/cm^2
2) Nozzle Opening Pressure	150 ± 1 kgf/cm^2	5) High Pressure Pipe	Ø2 × Ø6 × 840 mm
3) Test Oil	SAE J967 (ISO4113)	6) Fuel Temperature	40 - 43 °C (104 - 109.4 °F)

2. BREAK-IN DRIVE

Pump Speed (rpm)	ECD CONTROLLER SETTING				Condition	Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch		
1200	—	9E5	—	—	No fuel leaks, no abnormal noise, and no abnormal temperature rising.	Drive more than 5 minutes.

3. INSPECTION OF FUEL TEMPERATURE SENSOR

Pump Speed (rpm)	ECD CONTROLLER SETTING				Sensor Resistance (kΩ)	Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch		
—	FUEL TEMPERATURE	—	—	—	1.15 ± 0.7	

4. INSPECTION OF Ne SENSOR

Pump Speed (rpm)	ECD CONTROLLER SETTING				Sensor Output Voltage (V)	Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch		
100	Np	—	—	—	0.1 or more	

5. ADJUSTMENT OF PUMP INTERNAL PRESSURE

Pump Speed (rpm)	ECD CONTROLLER SETTING				Internal Pressure (kgf/cm^2)	Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch		
2000	—	8F0	0	—	9.1 - 9.4	By the regulating valve
500	—	9C8	0	—	6.6 - 8.8	

6. OVERFLOW QUANTITY CHECK

Pump Speed (rpm)	ECD CONTROLLER SETTING				Overflow Quantity (cc/1000st)	Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch		
2000	—	8F0	0	—	375 - 583	The overflow valve belonging to the pump should be used for checking.

7. ADJUSTMENT OF TIMER

Pump Speed (rpm)	ECD CONTROLLER SETTING				Timer Stroke (mm)	Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch		
2000	—	8F0	0	—	10.3 ± 0.24	Select shim
500	—	9C8	0 50 100	— — —	10.3 ± 0.24 7.0 ± 3.5 0	
200	—	A88	0	—	3.60 or more	
100	—	A88	0	—	0.40 or more	

8. ADJUSTMENT OF CAM ANGLE

Pump Speed (rpm)	ECD CONTROLLER SETTING				Cam Angle (°)	Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch		
350	CAM ANGLE	96C	100	—	Shown in display	Q = 3.5 ± 0.4 cc/200st

Adjustment :
Select the cam angle correction resistor (τ) so that the difference between the cam angle shown on display and CA in the table below is -0.5 to 0.5.

CA (°)	τ Correction Resistor Parts No.	Resistance Value (kΩ)	CA (°)	τ Correction Resistor Parts No.	Resistance Value (kΩ)
12.78	096525-0230	0.068	15.87	096525-0081	0.453
12.99	096525-0240	0.085	16.04	096525-0091	0.487
13.18	096525-0250	0.100	16.20	096525-0101	0.523
13.41	096525-0260	0.121	16.43	096525-0111	0.576
13.53	096525-0270	0.133	16.60	096525-0121	0.619
13.75	096525-0280	0.154	16.83	096525-0131	0.681
13.94	096525-0290	0.174	17.00	096525-0141	0.732
14.14	096525-0300	0.196	17.17	096525-0151	0.787
14.35	096525-0310	0.221	17.40	096525-0161	0.866
14.53	096525-0011	0.243	17.55	096525-0171	0.931
14.72	096525-0021	0.267	17.76	096525-0181	1.020
14.91	096525-0031	0.294	17.93	096525-0191	1.100
15.06	096525-0041	0.316	18.14	096525-0201	1.210
15.27	096525-0051	0.348	18.33	096525-0211	1.330
15.49	096525-0061	0.383	18.48	096525-0221	1.430
15.65	096525-0071	0.412			

9. INSPECTION OF FUEL CUT SOLENOID

— : Not Applicable

Pump Speed (rpm)	ECD CONTROLLER SETTING				Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch	
—	—	—	—	—	—

10. ADJUSTMENT OF FUEL DELIVERY

Pump Speed (rpm)	ECD CONTROLLER SETTING				Fuel Delivery (cc/200st·cyl.)	Max. Spread In Delivery (cc)	Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch			
100	—	A88	0	—	17.7 - 20.1	1.2	
350	—	96C	0	—	3.1 - 3.5	0.5	By replacing θ correction resistor
500	—	9C8	0	—	11.1 - 11.8	0.5	
900	—	955	0	—	10.1 - 11.1	—	
1000	—	9E5	0	—	20.0 - 20.7	0.5	
1800	—	8CC	0	—	11.4 - 12.0	0.5	By adjusting screw
2300	—	777	0	—	4.5 - 7.5	—	
2350	—	4E0	0	—	2.0 or less	—	

θ Correction Resistor

Resistance Value (kΩ)	Mark (Last 3 Digits)	Parts No.	Resistance Value (kΩ)	Mark (Last 3 Digits)	Parts No.
0.154	001	096526-0012	0.681	017	096526-0172
0.174	002	096526-0022	0.732	018	096526-0182
0.196	003	096526-0032	0.782	019	096526-0192
0.221	004	096526-0042	0.866	020	096526-0202
0.243	005	096526-0052	0.931	021	096526-0212
0.267	006	096526-0062	1.020	022	096526-0222
0.294	007	096526-0072	1.100	023	096526-0232
0.316	008	096526-0082	1.210	024	096526-0242
0.348	009	096526-0092	1.330	025	096526-0252
0.383	010	096526-0102	1.430	026	096526-0262
0.412	011	096526-0112	1.580	027	096526-0272
0.453	012	096526-0122	1.780	028	096526-0282
0.487	013	096526-0132	1.960	029	096526-0292
0.523	014	096526-0142	2.210	030	096526-0302
0.576	015	096526-0152	2.490	031	096526-0312
0.619	016	096526-0162			

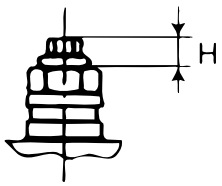
NOTE :
When the resistance value of θ correction resistor is raised by 1 level, the injection quantity is increased as follows,
0.08 cc/200st (pump speed at 350 rpm), 0.12 cc/200st (pump speed at 1000 rpm).

11. SERVICE STANDARD

Dimension KF (mm)	:	6.3 ± 0.1	Drive Shaft Diameter (mm)	:	Ø20
Dimension K (mm)	:	3.3 ± 0.1	Delivery Valve Holder Installation Torque (kgf•m)	:	6.0 ± 0.5

Timing mark re-marking position : Based on cylinder A, cam lift distance (plunger) should be 2.44 mm

12. NOTES FOR ADJUSTMENT



Keep the height of the SPV screw (shown in the figure) at 3.0 - 5.2 mm.