



# Parts List

Compo. P/N: 096500-2011

Assy P/N: 096500-2011

S	M	Illust.No.	Part Name	DENSO P/N	Manu. P/N	QTY	I/C	Start	End	Remarks
		0	PUMP ASSY, INJECTI	096500-2011	22100-6E190	01				V3ROM-P
		1	HOUSING SUB-ASSY,	096110-1250		01				
		2	HEAD SUB-ASSY, SPI	096541-1490		01				
		2-1	HEAD SUB-ASSY, DIS	096400-1481		01				
S		2-2	FILTER, SUB-ASSY	096530-0071	22602-56350	01				
		2-3	WASHER	096064-0110	22689-56350	01				T0.2
		3	SENSOR ASSY, CRANK	029600-0231	89284-60010	01				NE SENSOR
		3-1	O-RING	029475-0080	90099-14142	01				ID20.8
		4	SHAFT SUB-ASSY, DR	096120-0140		01				
S		5	RING SUB-ASSY, ROL	096180-0240		01				
		6	COVER, GOVERNOR	096441-1680		01			9901	
		6	COVER, GOVERNOR	096441-1780		01	B	9902		
		7	VALVE ASSY, SPILL	096600-0033	23032-54020	01				SPV
		8	COVER, TIMER	096218-0040	22612-54020	01				
S		9	SENSOR, FUEL TEMPE	179730-0020	89454-60010	01				FUEL TEMP.SENSOR
S		10	PLUG, DISTRIBUTIVE	096417-0130	22176-5B302	01				
		12	NUT, CAP	949055-0300	90099-05161	01				M12
		13	BOLT, SOCKET	096449-0110	22395-56351	06				M6,L16
		14	VALVE SUB-ASSY, SN	096430-0180	22190-6A680	04				
S		15	SPRING, DELIVERY V	096427-0010	22148-54010	04				
		16	VALVE SUB-ASSY, DI	096420-0520	22104-6A640	04				
		17	GASKET, DELIVERY V	096426-0070	22149-56351	04				
		18	BOLT, SOCKET	096449-0320		01				M6,L12.5
S		19	CAMPLATE SUB-ASSY,	096230-0550		01				
S		20	PLATE, PLUNGER, LW	096245-0020	22163-54010	01				
S		21	PLATE, PLUNGER, UP	096244-0040	22162-54010	01				
		22	SPRING, COUPLING	096224-0040	22659-64150	01				
		23	COUPLING	096222-0020	22632-54010	01				
S		24	FILTER, SUB-ASSY	096530-0100	22602-54581	01				
		25	WASHER, DRIVE SHAF	096125-0010	22161-54010	01				
S		26	COVER, FEED PUMP	096147-0052	22511-58650	01				
		27	KEY, WOODRUFF	949130-0260	90099-13017	01				T3.980
		28	NUT, HEXAGON	949050-4840		01			9805	M24
		28	NUT, HEXAGON	949050-6230		01	A	9806		M24
		29	BOLT, SOCKET	096449-0320		02				M6,L12.5
S		30	SEAL, OIL	096039-0040	22544-64740	01				
		31	PISTON, TIMER	096201-1012		01				
		32	SUB-PISTON, TIMER	096213-0020	22657-54010	01				
		33	PIN, TIMER SLIDE	096205-0020	22655-54010	01				
		34	STOPPER, TIMER SLI	096216-0120	22658-17840	01			9801	L16.4
		34	STOPPER, TIMER SLI	096216-0140		01	D	9802		L16.0
		35	CLIP, TIMER	096211-0080	22656-17840	01			9801	L/ DITCH

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		35	CLIP, TIMER	096211-0090		01	D	9802		W/ DITCH
		36	COVER, TIMER	096218-0270	22612-56350	01				
		38	O-RING	096049-0400	22193-17840	02				ID27.5
S		39	PLUG, DISTRIBUTIVE	096417-0070	22176-54640	01				
		41	COLLAR, SMOKE SET	096448-0312		01				L18.6
		42	O-RING	096049-0510	22193-54772	01				ID30
S		43	SHEET, PLUNGER SPR	096247-0010	22145-54010	01				
		44	GUIDE SUB-ASSY, PL	096237-0010	22192-54010	02				
		45	SPRING, PLUNGER	096236-0040	22144-54190	02				K10
		46	SHEET, PLUNGER SPR	096246-0010	22143-54010	02				
		49	O-RING	949140-2980	90099-14053	01				ID60
		50	O-RING	096049-0220	22193-5B303	01				ID 28.2
		51	BOLT, SOCKET	096449-0020	22395-54010	04				M6,L35
		53	SCREW SUB-ASSY, OV	096020-0060	22160-54271	01				W/FILTER
		54	WASHER, AIR BLEEDE	090241-0010	22119-77020	05				T1.6
		55	O-RING	096049-0320	22193-67030	01				ID 9.8
		56	SCREW, COUNTERSUNK	949002-0420	90099-00723	02				M4,L28
		58	GASKET, GOVERNOR C	096446-0100	22774-54270	01				
		59	SCREW, HOLLOW	949180-0770	90099-18022	01				M12,L43.5
		60	NIPPLE SUB-ASSY, S	092218-0571	22548-6E150	01				
		61	BOLT, SOCKET	096449-0070	22395-58200	04				M6,L45
S		62	VALVE SUB-ASSY, RE	096160-0290		01				
		62-1	O-RING	096049-0180	22193-54561	01				ID10
		62-2	O-RING	096049-0500		01				ID7.5
		63	PUMP SUB-ASSY, FUE	096140-0030	22505-54010	01				
		64	SHIM, PLUNGER SPRI	096248-0010	22182-54010	2C				T0.5
		64	SHIM, PLUNGER SPRI	096248-0020	22183-54010	2C				T0.8
		64	SHIM, PLUNGER SPRI	096248-0030	22184-54010	2C				T1.0
		64	SHIM, PLUNGER SPRI	096248-0040	22185-54010	2C				T1.2
		64	SHIM, PLUNGER SPRI	096248-0050	22186-54010	2C				T1.5
		64	SHIM, PLUNGER SPRI	096248-0060	22187-54010	2C				T1.8
		64	SHIM, PLUNGER SPRI	096248-0070	22188-54010	2C				T2.0
		64	SHIM, PLUNGER SPRI	096248-0080	22182-17010	2C				T0.9
		64	SHIM, PLUNGER SPRI	096248-0090	22182-17011	2C				T1.1
		64	SHIM, PLUNGER SPRI	096248-0100	22182-17012	2C				T1.3
		64	SHIM, PLUNGER SPRI	096248-0110	22182-17013	2C				T1.4
		65	SHIM, PLUNGER ADJU	096406-0020	22179-54010	1C				T1.9
		65	SHIM, PLUNGER ADJU	096406-0170	22179-54013	1C				T2.2
		65	SHIM, PLUNGER ADJU	096406-0270	22179-54015	1C				T2.4
		65	SHIM, PLUNGER ADJU	096406-0420	22179-54018	1C				T2.7
		65	SHIM, PLUNGER ADJU	096406-0520	22179-54020	1C				T2.9
		66	BOLT	949046-2710		02				M5,L20

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		68	KEY, WOODRUFF	949130-0300	90099-13018	01				T4.023
		69	SPRING, TIMER, OUT	096208-1620		01				K1.3
		70	NUT	949056-2390	90099-05166	01		0403		M14,L13.5
*		71	VALVE ASSY, TIMING	096360-0300	23010-64010	01		9806		TCV
*		71	VALVE ASSY, TIMING	096360-0390	23010-64020	01	B	9807	0004	TCV
		71	VALVE ASSY, TIMING	096360-0331		01	B	0005	0204	TCV
		71	VALVE ASSY, TIMING	096360-0630	23010-67010	01	B	0205		TCV
		71-1	O-RING	096049-0530		01				ID16.7
		71-2	O-RING	096049-0520		01				ID6.8
		72	CLIP, CONNECTOR SU	096029-2041	22172-6E140	01				
		74	WASHER, TIMER SENS	096214-0030	22625-54270	C				T0.1
		74	WASHER, TIMER SENS	096214-0040	22625-54271	C				T0.2
		74	WASHER, TIMER SENS	096214-0050	22625-54272	C				T0.5
		74	WASHER, TIMER SENS	096214-0060	22625-54273	C				T0.6
		74	WASHER, TIMER SENS	096214-0070	22625-54274	C				T0.7
		74	WASHER, TIMER SENS	096214-0080	22625-54275	C				T0.8
		74	WASHER, TIMER SENS	096214-0090	22625-54276	C				T0.9
		74	WASHER, TIMER SENS	096214-0100	22625-54277	C				T1.0
S		80	FILTER, SUB-ASSY	096530-0111	22602-5B320	01				
		81	O-RING	096049-0460	22193-5B320	01				ID6.5
		82	IC, CUSTOM	131700-0011	89840-20010	01				P-ROM
		83	BOLT, SOCKET	096449-0140	22395-56350	02				M8,L16
		84	BRACKET, IDLE UP	096438-0110	22178-64010	01				
		85	O-RING	096049-0330	22193-5B302	01				ID14.4

# INJECTION PUMP TEST SPECIFICATIONS

096500-2010

INJECTION PUMP	096500-2010 (VE4/10E2300RND201)	MANUFACTURER	TOYOTA
ENGINE TYPE	3C-TE	VEHICLE MODEL	PICNIC
Governor Type	Electronic control	Timer	Electronic control
Injection Order	A - B - C - D	Injection Interval	90°
Rotation	Clockwise viewed from drive side	Rated Voltage	14 V
Dimension KF (mm)	5.40 ± 0.10	Dimension K (mm)	3.30 ± 0.10
Pump Select Switch No. (ECD Controller)	8		

## 1. TEST CONDITIONS

1) Nozzle	093400-2370 (DN12SD12A)	4) Feed Pressure	0.2 kg/cm <sup>2</sup>
2) Nozzle Opening Pressure	150 ± 2 kg/cm <sup>2</sup>	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	SPEED	Less than 50B	0	—	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	—	—	—	1.85 ± 1.15	

## 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		
50	Np	—	—	—	0.1 or more	

## 5. ADJUSTMENT OF PUMP INTERNAL PRESSURE

Pump Speed (rpm)	ECD CONTROLLER SETTING				Internal Pressure (kg/cm <sup>2</sup> )	Remarks
	Display Selector	Injection Quantity Command	Duty Ratio Command	FCV Switch		
2000	SPEED	43A	0	—	8.75 ± 0.15	By the regulating valve
100	SPEED	5B5	0	—	2.0 or more	

**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	SPEED	43A	0	—	167 - 267	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	SPEED	43A	0 50	— —	10.30 ± 0.24 5.70 ± 2.00	
800	SPEED	4F7	0 100	— —	10.30 ± 0.24 0	
200	SPEED	5B5	0	—	3.6 or more	
100	SPEED	5B5	0	—	0.4 or more	

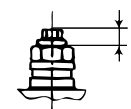
**8. SPV SCREW SETTING**

Pump Speed (rpm)	ECD CONTROLLER SETTING					Target Quantity [ND-CPS] (cc/200st)	Target Quantity AVM (cc/200st-cyl.)	Remarks
	Display Selector	Injection Quantity Command			Duty Ratio Command			
		First digit	Second digit	Third digit				
375	Adjust	0	0	0	0	2.86 ± 0.20	3.09 ± 0.20	Adjust 2nd. and 3rd. digits to get "Target Quantity"
375	Adjust	0	<input type="checkbox"/>	<input type="checkbox"/>	0	2.86 ± 0.20	3.09 ± 0.20	Record the final correction value " <input type="checkbox"/> <input type="checkbox"/> "
2000	Adjust	1	<input type="checkbox"/>	<input type="checkbox"/>	0	11.78 ± 0.20	11.70 ± 0.20	Adjust SPV screw to get "Target Quantity"

NOTE1 : Select "Record" position every time when recording the final correction value.

NOTE2 : When the correction value is raised by 1 level, the injection quantity is increased approx. 0.04 - 0.06 cc/200st.

NOTE3 : Keep the height of the SPV screw (shown in the figure) at 3.0 - 5.2 mm



**9. PRESETTING FOR CAM ANGLE ADJUSTMENT**

Pump Speed (rpm)	ECD CONTROLLER SETTING					Target Quantity [ND-CPS] (cc/200st)	Target Quantity AVM (cc/200st-cyl.)	Remarks
	Display Selector	Injection Quantity Command			Duty Ratio Command			
		First digit	Second digit	Third digit				
375	Adjust	2	0	0	100	2.86 ± 0.20	3.09 ± 0.20	Adjust 2nd. and 3rd. digits to get "Target Quantity"
375	Adjust	2	<input type="checkbox"/>	<input type="checkbox"/>	100	2.86 ± 0.20	3.09 ± 0.20	Record the final correction value " <input type="checkbox"/> <input type="checkbox"/> "

NOTE : Select "Record" position every time when recording the final correction value.

※ When the correction value is raised by 1 level, the injection quantity is increased approx. 0.04 - 0.06 cc/200st.

**10. ADJUSTMENT OF CAM ANGLE**

Pump Speed (rpm)	ECD CONTROLLER SETTING					Target Angle (°CA)	Standard	Remarks	
	Display Selector	Injection Quantity Command			Duty Ratio Command				FCV Switch
		First digit	Second digit	Third digit					
375	Adjust	3	0	0	100	—	3.3 ± 0.5	Recorded injection command	Adjust 2nd. and 3rd. digits to get "Target Angle"
375	Adjust	3	<input type="checkbox"/>	<input type="checkbox"/>	100	—	—	—	Record the final correction value " <input type="checkbox"/> <input type="checkbox"/> "

NOTE : Never forget removing pressure sensor from piping.

**11. ADJUSTMENT OF FUEL DELIVERY**

Pump Speed (rpm)	ECD CONTROLLER SETTING			Fuel Delivery [ND-CPS] (cc/200st.cyl.)	Fuel Delivery AVM (cc/200st.cyl.)	Max. Spread In Delivery (cc)	Reference	Remarks	
	Display Selector	※ First Digit	Duty Ratio Command						
100	Adjust	4	0	5.70 ± 0.24	5.41 ± 0.24	—	4B2 - 4FC	※ When the correction value is raised by 1 level, the injection quantity is increased approx. 0.04 - 0.06 cc/200st.	
100	Adjust	5	0	13.30 ± 0.40	13.19 ± 0.40	1.20	58C - 5DE		
375	Adjust	6	0	2.86 ± 0.14	3.09 ± 0.14	0.34	431 - 471		
375	Adjust	7	0	10.38 ± 0.24	11.25 ± 0.24	—	50C - 542		
800	Adjust	8	0	5.82 ± 0.16	6.65 ± 0.16	—	42A - 45C		
800	Adjust	9	0	11.98 ± 0.24	12.86 ± 0.24	0.50	4D8 - 516		
1000	Adjust	A	0	4.60 ± 0.16	5.50 ± 0.16	—	3C9 - 407		
1000	Adjust	B	0	13.46 ± 0.22	14.39 ± 0.22	0.50	4EA - 52C		
2000	Adjust	C	0	3.98 ± 0.18	4.43 ± 0.18	—	298 - 2E8		
2000	Adjust	D	0	11.92 ± 0.24	11.70 ± 0.24	0.40	421 - 453		
1700	Adjust	E	0	12.86 ± 0.30	13.34 ± 0.30	—	—		Check
2500	Adjust	F	0	5.42 ± 0.50	5.67 ± 0.50	—	—		Check

NOTE : In case of out of standard value at check points, adjust again from "SPV screw setting" procedure.

※ First Digit : First digit (The leftest of 3 digits) of "Injection Quantity Command Value" input switch.

**12. TIMING MARK RE-MARKING POSITION**

Based on cylinder : A	Cam lift distance (plunger) should be	1.32 mm
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