ENGINE (DIAGNOSTICS)

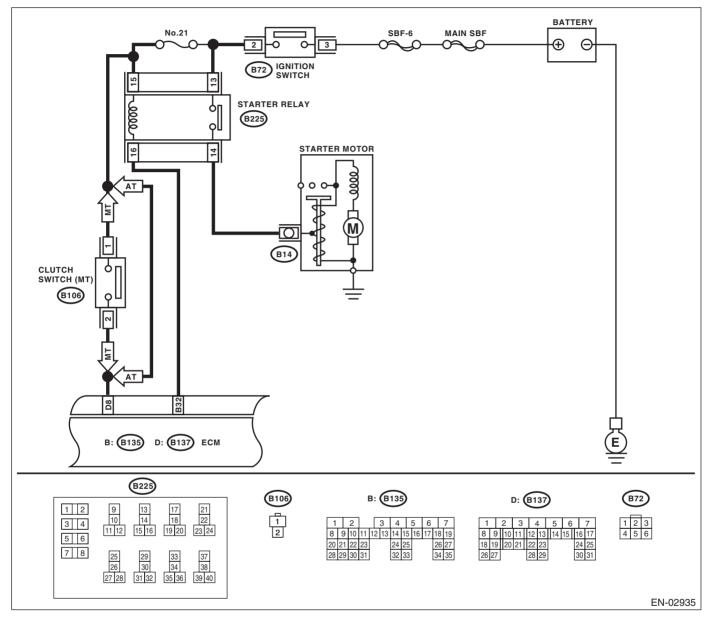
16.Diagnostics for Engine Starting Failure A: PROCEDURE

1. Check of the fuel amount
\downarrow
2. Inspection of starter motor circuit. < Ref. to EN(H4DOTC)(diag)-55, STARTER MOTOR CIRCUIT, Diagnostics for Engine Start-
ing Failure.>
\downarrow
3. Inspection of ECM power supply and ground line. <ref. (ecm),="" and="" check="" control="" diagnostics="" en(h4dotc)(diag)-59,="" engine="" failure.="" for="" ground="" line="" module="" of="" power="" starting="" supply="" to=""></ref.>
\downarrow
4. Inspection of ignition control system. <ref. control="" diagnostics="" en(h4dotc)(diag)-61,="" engine="" failure.="" for="" ignition="" starting="" system,="" to=""></ref.>
\downarrow
5. Inspection of fuel pump circuit. < Ref. to EN(H4DOTC)(diag)-64, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Fail-
ure.>
\downarrow
6. Inspection of fuel injector circuit. < Ref. to EN(H4DOTC)(diag)-66, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

B: STARTER MOTOR CIRCUIT

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4DOTC) (diag)-42, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4DOTC)(diag)-33, PROCEDURE, Inspection Mode.>.



	Step	Check	Yes	No
1	CHECK BATTERY.	Is the voltage more than 12 V?	Go to step 2.	Charge or replace
	Check the battery voltage.			the battery.
2	CHECK OPERATION OF STARTER MOTOR.	Does the starter motor oper-	Go to step 3.	Go to step 4.
		ate?		

ENGINE (DIAGNOSTICS)

	Step	Check	Yes	No
3	CHECK DTC.	Is DTC displayed? <ref. to<br="">EN(H4DOTC)(diag)-32, OPERATION, Read Diagnos- tic Trouble Code (DTC).></ref.>	Check the appro- priate DTC using the List of Diag- nostic Trouble Code (DTC). <ref. to EN(H4DOTC)(diag)-68, List of Diag- nostic Trouble Code (DTC).></ref. 	Repair the poor contact of ECM connector.
4	 CHECK INPUT SIGNAL FOR STARTER MOTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter motor. 3) Turn the ignition switch to START. 4) Measure the power supply voltage between starter motor connector terminal and engine ground. Connector & terminal (B14) No. 1 (+) — Engine ground (-): NOTE: For AT model, place the select lever in "P" or "N" range. For MT model, depress the clutch pedal. 		Check the starter motor. <ref. to<br="">SC(H4SO)-6, Starter.></ref.>	Go to step 5 .
5	 CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR. 1) Disconnect the connector from ignition switch. 2) Measure the power supply voltage between ignition switch connector and chassis ground. <i>Connector & terminal</i> (B72) No. 3 (+) — Chassis ground (-): 	Is the voltage more than 10 V?	Go to step 6 .	Check the follow- ing item and repair if necessary. • Blown out of fuse • Open circuit of harness between ignition switch and battery
6	 CHECK IGNITION SWITCH. 1) Disconnect the connector from ignition switch. 2) Measure the resistance between ignition switch terminals after turning the ignition switch to START position. Terminals No. 2 — No. 3: 	Is the resistance less than 5 Ω ?	Go to step 7.	Replace the igni- tion switch.
7	 CHECK INPUT VOLTAGE OF STARTER RE-LAY. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter relay. 3) Connect the connector to ignition switch. 4) Measure the input voltage between starter relay connector and chassis ground after turning the ignition switch to START position. <i>Connector & terminal</i> (B225) No. 14 (+) — Chassis ground (-): (B225) No. 16 (+) — Chassis ground (-): 		Go to step 8.	Repair open or short circuit to ground in harness between starter relay and ignition switch.
8	 CHECK STARTER RELAY. 1) Connect the battery to starter relay terminals No. 15 and No. 16. 2) Measure the resistance between starter relay terminals. Terminals No. 13 - No. 14: 	Is the resistance less than 1 Ω ?	Go to step 9 .	Replace the starter relay.

EN(H4DOTC)(diag)-56

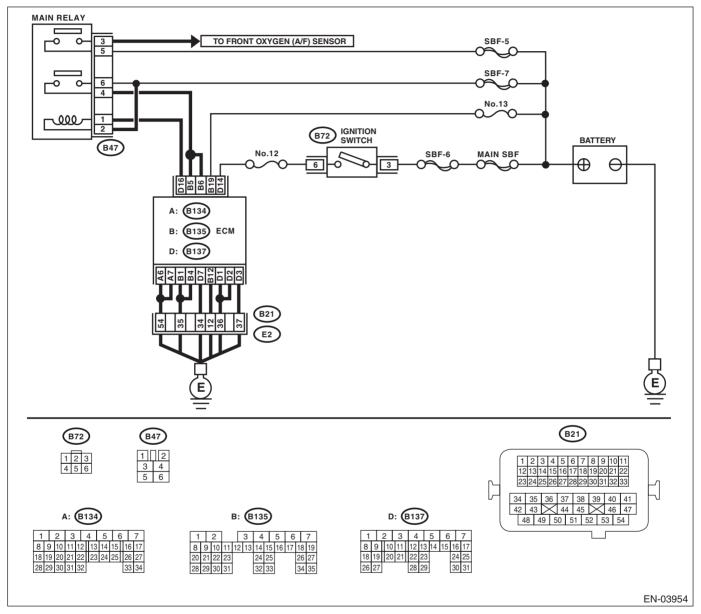
	Step	Check	Yes	No
9	CHECK INPUT VOLTAGE OF ECM.	Is the resistance less than 1	Go to step 10.	Repair the open
	 Turn the ignition switch to OFF. 	Ω?		circuit of harness
	Connect the starter relay connector.			between ECM and
	Disconnect the connectors from ECM.			starter relay.
	Measure the resistance of harness			
	between ECM and starter relay connector.			
	Connector & terminal			
	(B135) No. 32 — (B225) No. 15:			
10	CHECK INPUT VOLTAGE OF STARTER MO-	Is the voltage more than 10 V?	Go to step 15.	Repair open or
	TOR.			short circuit to
	1) Turn the ignition switch to OFF.			ground in harness
	2) Connect the connector to ECM.			between starter
	3) Turn the ignition switch to START.			relay and starter.
	4) Measure the voltage between the starter			
	motor and the engine ground.			
	Connector & terminal			
4.4	(B14) No. 1 (+) — Engine ground (–):			O
11 12	CHECK TRANSMISSION TYPE. CHECK INPUT VOLTAGE OF CLUTCH	Is the transmission type AT?	Go to step 15.	Go to step 12 .
12	SWITCH.	Is the voltage more than 10 V?	Go to step 13.	Repair the open circuit of harness
	1) Turn the ignition switch to OFF.			between clutch
	2) Disconnect the connector from clutch			switch and ignition
	switch.			switch.
	3) Turn the ignition switch to START.			ownon.
	4) Measure the voltage between the clutch			
	switch connector and chassis ground.			
	Connector & terminal			
	(B106) No. 1 (+) — Chassis ground (–):			
13	CHECK CLUTCH SWITCH.	Is the resistance less than 1	Go to step 14.	Replace the clutch
	 Turn the ignition switch to OFF. 	Ω?		switch. <ref. td="" to<=""></ref.>
	2) Measure the resistance between clutch			CL-27, Clutch
	switch terminals while depressing the clutch			Switch.>
	pedal.			
	Terminals			
	No. 1 — No. 2:			
14	CHECK HARNESS BETWEEN CLUTCH	Is the resistance less than 1	Check the engine	Repair the open
	SWITCH AND ECM.	Ω?	control module	circuit between
	1) Disconnect the connectors from ECM.		(ECM) power sup-	clutch switch and
	2) Measure the resistance of harness		ply and ground	ignition switch.
	between clutch switch and ECM connector.		line. <ref. td="" to<=""><td></td></ref.>	
	Connector & terminal		EN(H4DOTC)(diag	
	(B137) No. 8 — (B106) No. 2:)-59, CHECK	
			AND GROUND	
			CONTROL MOD-	
			ULE (ECM), Diag-	
			nostics for Engine	
			Starting Failure.>	
			otarting railure.>	

	Step	Check	Yes	No
15	 CHECK HARNESS BETWEEN IGNITION SWITCH AND ECM. 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from ignition switch and ECM. 3) Measure the resistance of harness between clutch switch and ECM connector. Connector & terminal (B137) No. 8 — (B72) No. 2: 	Is the resistance less than 1 Ω ?	Check the engine control module (ECM) power sup- ply and ground line. <ref. to<br="">EN(H4DOTC)(diag)-59, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MOD- ULE (ECM), Diag- nostics for Engine Starting Failure.></ref.>	Repair the open circuit between ignition switch and ECM.

C: CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM)

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4DOTC) (diag)-42, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4DOTC)(diag)-33, PROCEDURE, Inspection Mode.>.

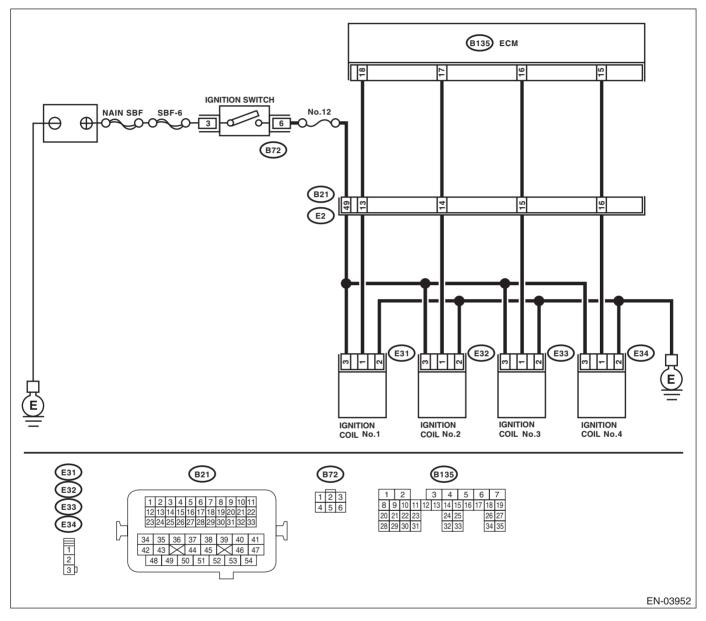


	Step	Check	Yes	No
1	CHECK MAIN RELAY.	Is the resistance less than 10	Go to step 2.	Replace the main
	 Turn the ignition switch to OFF. 	Ω?		relay.
	Remove the main relay.			
	Connect the battery to main relay terminals			
	No. 1 and No. 2.			
	4) Measure the resistance between main relay			
	terminals.			
	Terminals			
	No. 3 — No. 5:			
	No. 4 — No. 6:			
2	CHECK GROUND CIRCUIT FOR ECM.	Is the resistance less than 5	Go to step 3.	Repair the open
	1) Disconnect the connectors from ECM.	Ω?		circuit of harness
	2) Measure the resistance of harness			between ECM
	between ECM and chassis ground.			connector and
	Connector & terminal			engine grounding
	(B134) No. 6 — Chassis ground:			terminal.
	(B134) No. 7 — Chassis ground:			
	(B135) No. 1 — Chassis ground:			
	(B135) No. 4 — Chassis ground:			
	(B135) No. 12 — Chassis ground:			
	(B137) No. 1 — Chassis ground:			
	(B137) No. 2 — Chassis ground:			
	(B137) No. 3 — Chassis ground: (B137) No. 7 — Chassis ground:			
3	CHECK INPUT VOLTAGE OF ECM.	Is the voltage more than 10 V?	Co to stop 4	Donair the open or
3	Measure the voltage between ECM connector	Is the voltage more than 10 v?	Go to step 4.	Repair the open or ground short cir-
	and chassis ground.			cuit of power sup-
	Connector & terminal			ply circuit.
	(B135) No. 19 (+) — Chassis ground (–):			pry circuit.
4	CHECK INPUT VOLTAGE OF ECM.	Is the voltage more than 10 V?	Go to step 5	Repair the open or
-	1) Turn the ignition switch to ON.		00 10 step 3 .	ground short cir-
	 Measure the voltage between ECM con- 			cuit of power sup-
	nector and chassis ground.			ply circuit.
	Connector & terminal			pry onoun.
	(B137) No. 14 (+) — Chassis ground (–):			
5	CHECK INPUT VOLTAGE OF MAIN RELAY.	Is the voltage more than 10 V?	Go to step 6.	Repair the open or
•	Measure the voltage between main relay con-			ground short cir-
	nector and chassis ground.			cuit of harness of
	Connector & terminal			power supply cir-
	(B47) No. 2 (+) — Chassis ground (–):			cuit.
	(B47) No. 5 (+) — Chassis ground (–):			
	(B47) No. 6 (+) — Chassis ground (–):			
6	CHECK INPUT VOLTAGE OF ECM.	Is the voltage more than 10 V?	Check ignition	Repair the open or
	1) Connect the main relay connector.		control system.	ground short cir-
	2) Turn the ignition switch to ON.		<ref. td="" to<=""><td>cuit of harness</td></ref.>	cuit of harness
	3) Measure the voltage between ECM con-		EN(H4DOTC)(diag)	between ECM
	nector and chassis ground.		-61, IGNITION	connector and
	Connector & terminal		CONTROL SYS-	main relay connec-
	(B135) No. 5 (+) — Chassis ground (–):		TEM, Diagnostics	tor.
	(B135) No. 6 (+) — Chassis ground (–):		for Engine Start-	
1	· · · · · · · · · · · · · · · · · · ·		ing Failure.>	

D: IGNITION CONTROL SYSTEM

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4DOTC) (diag)-42, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4DOTC)(diag)-33, PROCEDURE, Inspection Mode.>.



	Step	Check	Yes	No
1	CHECK SPARK PLUG CONDITION.	Is the spark plug condition	Go to step 2.	Replace the spark
	 Remove the spark plug. <ref. li="" to<=""> </ref.>	OK?		plug.
	IG(H4DOTC)-4, REMOVAL, Spark Plug.>			
	2) Check the spark plug condition. < Ref. to			
	IG(H4DOTC)-5, INSPECTION, Spark Plug.>			
2	CHECK IGNITION SYSTEM FOR SPARKS.	Does spark occur at each cyl-	Check fuel pump	Go to step 3.
	 Connect the spark plug to ignition coil. 	inder?	system. <ref. td="" to<=""><td></td></ref.>	
	Release the fuel pressure. <ref. li="" to<=""></ref.>		EN(H4DOTC)(diag)	
	FU(H4DOTC)-43, RELEASING OF FUEL		-64, FUEL PUMP	
	PRESSURE, PROCEDURE, Fuel.>		CIRCUIT, Diag-	
	Contact the spark plug thread portion to		nostics for Engine	
	engine.		Starting Failure.>	
	4) While opening the throttle valve fully, crank			
	the engine to check that spark occurs at each			
	cylinder.			
3	CHECK POWER SUPPLY CIRCUIT FOR IG-	Is the voltage more than 10 V?	Go to step 4.	Repair the har-
	NITION COIL AND IGNITOR ASSEMBLY.			ness and connec-
	 Turn the ignition switch to OFF. 			tor.
	Disconnect the connector from ignition coil			NOTE:
	and ignitor assembly.			In this case, repai
	Turn the ignition switch to ON.			the following item:
	4) Measure the power supply voltage between			 Open circuit ir
	ignition coil and ignitor assembly connector			harness betweer
	and engine ground.			the ignition coil and
	Connector & terminal			ignitor assembly
	(E31) No. 3 (+) — Engine ground (–):			and ignition switcl
	(E32) No. 3 (+) — Engine ground (–):			connector
	(E33) No. 3 (+) — Engine ground (–):			 Poor contact ir
	(E34) No. 3 (+) — Engine ground (–):			coupling connecto
4	CHECK HARNESS OF IGNITION COIL AND	Is the resistance less than 5	Go to step 5.	Repair the har-
	IGNITOR ASSEMBLY GROUND CIRCUIT.	Ω?		ness and connec-
	1) Turn the ignition switch to OFF.			tor.
	2) Measure the resistance between the igni-			NOTE:
	tion coil and ignitor assembly connector and			In this case, repai
	engine ground.			the following item:
	Connector & terminal			Open circuit of har
	(E31) No. 2 — Engine ground:			ness between igni
	(E32) No. 2 — Engine ground:			tion coil and ignito
	(E33) No. 2 — Engine ground:			assembly connec
	(E34) No. 2 — Engine ground:			tor and engine
_				grounding termina
5	CHECK HARNESS BETWEEN ECM AND IG-		Go to step 6.	Repair the har-
		Ω?		ness and connec-
	CONNECTOR.			tor.
	1) Turn the ignition switch to OFF.			NOTE:
	 2) Disconnect the connectors from ECM. 2) Disconnect the connector from ignition coil. 			In this case, repai
	3) Disconnect the connector from ignition coil			the following item:
	and ignitor assembly.			Open circuit ir
	4) Measure the resistance of harness			harness betweer
	between ECM and ignition coil and ignitor			ECM and ignition
	assembly connector.			coil and ignitor as
	Connector & terminal			sembly connector
	(B135) No. 15 — (E34) No. 1:			 Poor contact in
	(B135) No. 16 — (E33) No. 1:			coupling connecto
	(B135) No. 17 — (E32) No. 1:			
	(B135) No. 18 — (E31) No. 1:			

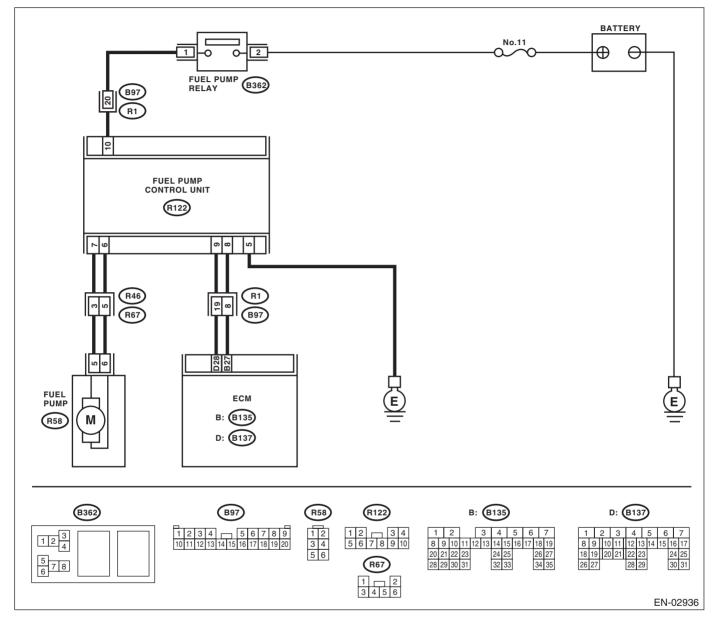
	Step	Check	Yes	No
6	CHECK HARNESS BETWEEN ECM AND IG- NITION COIL AND IGNITOR ASSEMBLY CONNECTOR. Measure the resistance of harness between ECM and engine ground. <i>Connector & terminal</i> (B135) No. 15 — Engine ground: (B135) No. 16 — Engine ground: (B135) No. 17 — Engine ground: (B135) No. 18 — Engine ground:	Is the resistance more than 1 M Ω ?	Go to step 7 .	Repair the ground short circuit of har- ness between ECM and ignition coil and ignitor assembly connec- tor.
7	CHECK POOR CONTACT. Check the poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Replace the igni- tion coil and ignitor assembly.

ENGINE (DIAGNOSTICS)

E: FUEL PUMP CIRCUIT

CAUTION:

After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4DOTC) (diag)-42, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4DOTC)(diag)-33, PROCEDURE, Inspection Mode.>.



ENGINE (DIAGNOSTICS)

Step	Check	Yes	No
CHECK OPERATING SOUND OF FUEL PUMP. Make sure that the fuel pump operates for two seconds when turning the ignition switch to ON. NOTE: Fuel pump operation can also be executed us- ing Subaru Select Monitor. Regarding the procedures, refer to "Compulso- ry Valve Operation Check Mode". <ref. to<br="">EN(H4DOTC)(diag)-43, Compulsory Valve Op- eration Check Mode.></ref.>		injector circuit. <ref. to<br="">EN(H4DOTC)(diag) -66, FUEL INJEC- TOR CIRCUIT,</ref.>	Display the DTC. <ref. to<br="">EN(H4DOTC)(diag) -32, OPERATION, Read Diagnostic Trouble Code (DTC).></ref.>

EN(H4DOTC)(diag)-65

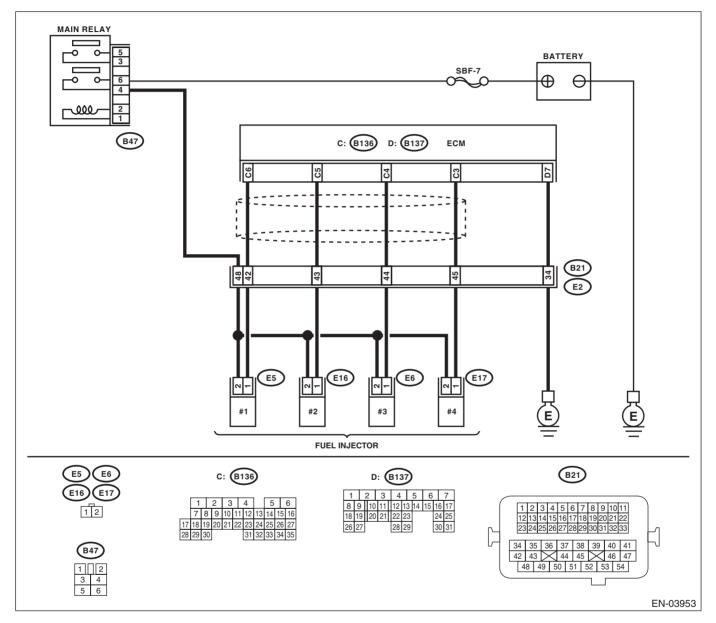
ENGINE (DIAGNOSTICS)

F: FUEL INJECTOR CIRCUIT

CAUTION:

• Check or repair only faulty parts.

• After repairing or replacing the defective part, perform the Clear Memory Mode <Ref. to EN(H4DOTC)(diag)-42, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4DOTC)(diag)-33, PROCEDURE, Inspection Mode.>. WIRING DIAGRAM:



	Step	Check	Yes	No
1	CHECK OPERATION OF EACH FUEL INJEC- TOR. While cranking the engine, check each fuel injector emits operating sound. Use a sound scope or attach a screwdriver to the injector for this check.	Does the fuel injector emit operating sound?	Check the fuel pressure. <ref. to<br="">ME(H4DOTC)-24, INSPECTION, Fuel Pressure.></ref.>	Go to step 2.
2	 CHECK POWER SUPPLY TO EACH FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from fuel injector. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between fuel injector terminal and engine ground. Connector & terminal #1 (E5) No. 2 (+) — Engine ground (-): #2 (E16) No. 2 (+) — Engine ground (-): #3 (E6) No. 2 (+) — Engine ground (-): #4 (E17) No. 2 (+) — Engine ground (-): 	Is the voltage more than 10 V?	Go to step 3.	Repair the har- ness and connec- tor. NOTE: In this case, repair the following item: • Open circuit in harness between main relay and fuel injector connector • Poor contact in main relay connec- tor • Poor contact in coupling connector • Poor contact in fuel injector con- nector
3	 CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Disconnect the connectors from ECM. 2) Measure the resistance of harness between ECM and fuel injector connector. Connector & terminal (B136) No. 6 - (E5) No. 1: (B136) No. 5 - (E16) No. 1: (B136) No. 4 - (E6) No. 1: (B136) No. 3 - (E17) No. 1: 	Is the resistance less than 1 Ω?	Go to step 4.	Repair the har- ness and connec- tor. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and fuel in- jector connector • Poor contact in coupling connector
4	CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure the resistance of harness between ECM and chassis ground. Connector & terminal (B136) No. 6 — Chassis ground: (B136) No. 5 — Chassis ground: (B136) No. 4 — Chassis ground: (B136) No. 3 — Chassis ground:	Is the resistance more than 1 MΩ?	Go to step 5.	Repair the ground short circuit of har- ness between ECM and fuel injector connector.
5	 CHECK EACH FUEL INJECTOR. 1) Turn the ignition switch to OFF. 2) Measure the resistance between each fuel injector terminals. Terminals No. 1 — No. 2: 	Is the resistance between 5 — 20 Ω?	Go to step 6 .	Replace the faulty fuel injector.
6	CHECK POOR CONTACT. Check the poor contact of ECM connector.	Is there poor contact in ECM connector?	Repair the poor contact of ECM connector.	Inspection using "General Diagnos- tic Table" <ref. to<br="">EN(H4DOTC)(diag) -320, INSPEC- TION, General Diagnostic Table.></ref.>

EN(H4DOTC)(diag)-67