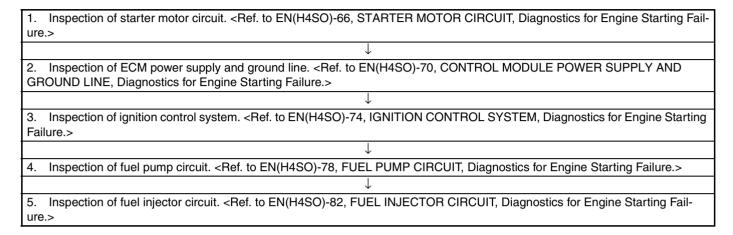
ENGINE (DIAGNOSTICS)

17. Diagnostics for Engine Starting Failure

A: Procedure



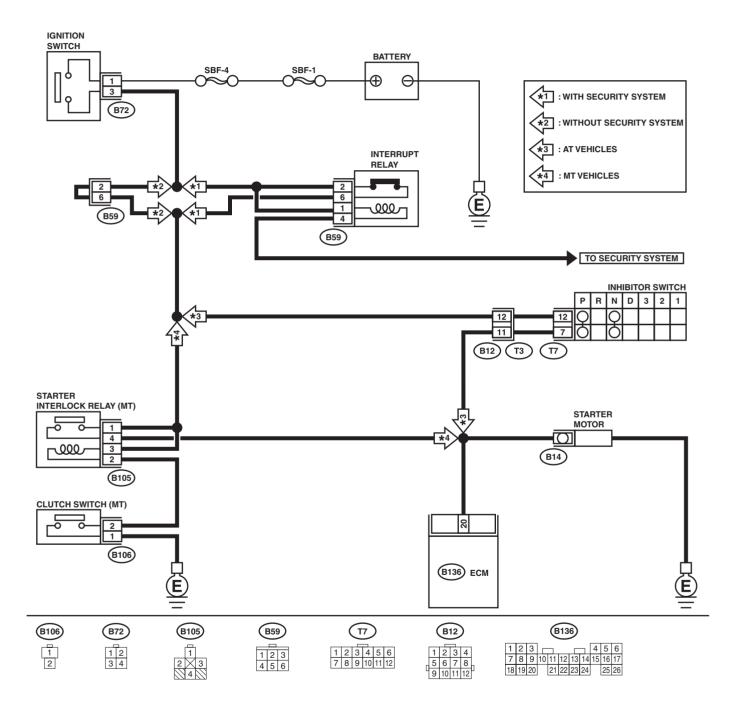
ENGINE (DIAGNOSTICS)

B: STARTER MOTOR CIRCUIT

CAUTION:

After repair or replacement of malfunctioning parts, conduct CLEAR MEMORY MODE <Ref. to EN(H4SO)-50, Clear Memory Mode.> and INSPECTION MODE <Ref. to EN(H4SO)-42, Inspection Mode.> .

• WIRING DIAGRAM:



EN-00715

	Step	Check	Yes	No
1	CHECK OPERATION OF STARTER MOTOR.		Go to step 2.	Go to step 3.
2	CHECK DTC.	Is DTC displayed?	Check DTC using "List of Diagnostic Trouble Code (DTC)". <ref. to<br="">EN(H4SO)-84, List of Diagnostic Trou- ble Code (DTC).></ref.>	Repair poor contact in ECM connector.
4	 TOR. Turn the ignition switch to OFF. Disconnect the connector from starter motor. Turn the ignition switch to ST. Measure the power supply voltage between starter motor connector terminal and engine ground. Connector & terminal (B14) No. 1 (+) — Engine ground (-): NOTE: On AT vehicles, place the selector lever in the "P" or "N" position. On MT vehicles, depress the clutch pedal. CHECK GROUND CIRCUIT OF STARTER 	Is the measured value more than 10 V?	Go to step 4. Check the starter	Go to step 5 . Repair open circuit
	MOTOR.1) Turn the ignition switch to OFF.2) Disconnect the terminal from starter motor.3) Measure the resistance of ground cable between ground cable terminal and engine ground.	than 5 Ω ?	motor. <ref. to<br="">SC(H4SO)-7, Starter.></ref.>	of ground cable.
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. Connector & terminal (B72) No. 1 (+) — Chassis ground (-): 	Is the measured value more than 10 V?	Go to step 6.	Repair open circuit in harness between ignition switch and battery, and check fuse SBF No. 4 and SBF No. 1.
6	 CHECK IGNITION SWITCH. 1) Disconnect the connector from ignition switch. 2) Measure the resistance between ignition switch terminals while turning ignition switch to the "ST" position. Terminals No. 1 — No. 3: 	Is the measured value less than 5 Ω ?	Go to step 7.	Replace the ignition switch.
7	CHECK TRANSMISSION TYPE.	Is the target AT vehicle?	Go to step 8.	Go to step 10.

	Step	Check	Yes	No
8	 CHECK INPUT VOLTAGE OF INHIBITOR SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from inhibitor switch. 3) Connect the connector to ignition switch. 4) Measure the input voltage between inhibitor switch connector terminal and engine ground while turning ignition switch to ST. Connector & terminal (B12) No. 12 (+) — Engine ground (-): 	Is the measured value more than 10 V?	Go to step 9.	Repair open or ground short circuit in harness between inhibitor switch and ignition switch. NOTE: Check security system (if equipped). <ref. inspection,="" security="" sl-24,="" system.="" to=""></ref.>
9	 CHECK INHIBITOR SWITCH. 1) Place the selector lever in the "P" or "N" position. 2) Measure the resistance between inhibitor switch terminals. Connector & terminal (T3) No. 11 — No. 12: 	Is the measured value less than 1 Ω ?	Repair open or ground short circuit in harness between inhibitor switch and starter motor.	Replace the inhibitor switch. <ref. 4at-51,="" inhibitor="" removal,="" switch.="" to=""></ref.>
10	CHECK INPUT VOLTAGE OF STARTER INTERLOCK RELAY. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter interlock relay. 3) Connect the connector to ignition switch. 4) Measure the input voltage between starter interlock relay connector and chassis ground while turning ignition switch to ST. Connector & terminal (B105) No. 1 (+) — Chassis ground (-): (B105) No. 3 (+) — Chassis ground (-):	Is the measured value more than 10 V?	Go to step 11.	Repair open or ground short circuit in harness between starter interlock relay and ignition switch. NOTE: Check security system (if equipped). <ref. in-spection,="" security="" sl-24,="" system.="" to=""></ref.>
11	 CHECK STARTER INTERLOCK RELAY. 1) Connect the battery to starter interlock relay terminals No. 3 and No. 2. 2) Measure the resistance between starter interlock relay terminals. Terminals No. 4 — No. 1: 	Is the measured value less than 1 Ω ?	Go to step 12.	Replace the starter interlock relay.
12	CHECK GROUND CIRCUIT OF CLUTCH SWITCH. 1) Disconnect the connector from clutch switch. 2) Measure the resistance between clutch switch connector and chassis ground. Connector & terminal (B106) No. 1 — Chassis ground:	Is the measured value less than 1 Ω ?	Go to step 13.	Repair open circuit of ground cable.
13	CHECK CLUTCH SWITCH. 1) Measure the resistance between clutch switch terminal while depressing the clutch pedal. Terminals No. 1 — No. 2:	Is the measured value less than 1 Ω ?	Go to step 14.	Replace the clutch switch. <ref. to<br="">CL-31, REMOVAL, Clutch Switch.></ref.>

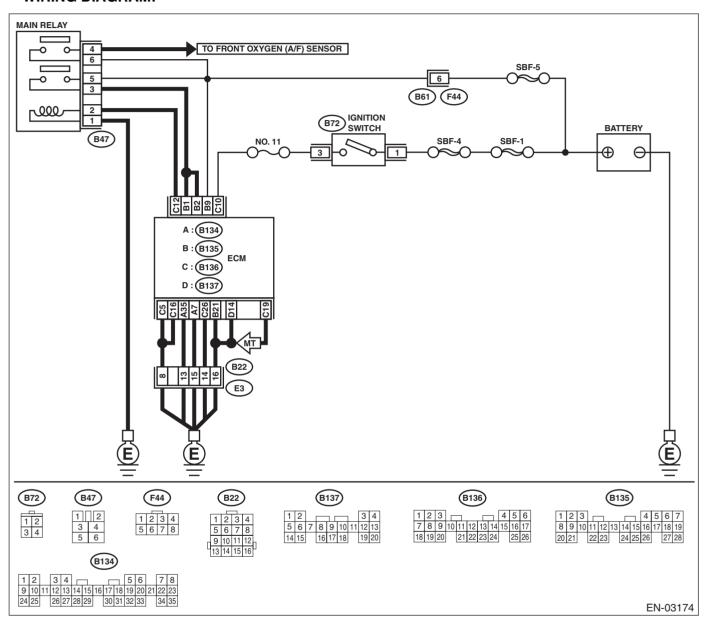
	Step	Check	Yes	No
14	CHECK CLUTCH SWITCH CIRCUIT. 1) Connect the connector to clutch switch. 2) Measure the resistance between starter interlock relay connector and chassis ground while depressing the clutch pedal. Connector & terminal (B105) No. 2 — Chassis ground:	Is the measured value less than 1 Ω ?	starter interlock	Repair open circuit in harness between starter interlock relay and clutch switch.

C: CONTROL MODULE POWER SUPPLY AND GROUND LINE

CAUTION:

After repair or replacement of malfunctioning parts, conduct Clear Memory Mode <Ref. to EN(H4SO)-50, OPERATION, Clear Memory Mode.> and Inspection Mode. <Ref. to EN(H4SO)-42, OPERATION, Inspection Mode.>

• WIRING DIAGRAM:



	Step	Check	Yes	No
1	CHECK MAIN RELAY. 1) Turn the ignition switch to OFF. 2) Remove main relay. 3) Connect battery to main relay terminals No. 1 and No. 2. 4) Measure resistance between main relay terminals. Terminals No. 3 — No. 5: No. 4 — No. 6: CHECK GROUND CIRCUIT OF ECM.	Is the measured value less than 10 Ω ?	Go to step 2.	Replace main relay.
2	 Disconnect connector from ECM. Measure resistance of harness between ECM and chassis ground. Connector & terminal (B134) No. 7 — Chassis ground: (B135) No. 35 — Chassis ground: (B136) No. 21 — Chassis ground: (B136) No. 5 — Chassis ground: (B136) No. 16 — Chassis ground: (B137) No. 14 — Chassis ground: (B137) No. 19 — Chassis ground: 	Is the measured value less than 5 Ω?	Go to step 3.	Repair open circuit in harness between ECM connector and engine grounding terminal.
3	CHECK INPUT VOLTAGE OF ECM. Measure voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 9 (+) — Chassis ground (-):	Is the measured value more than 10 V?	Go to step 4.	Repair ground short circuit of power supply cir- cuit.
4	 CHECK INPUT VOLTAGE OF ECM. 1) Turn ignition switch to ON. 2) Measure voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 10 (+) — Chassis ground (-): 	Is the measured value more than 10 V?	Go to step 5.	Repair open or ground short cir- cuit of power sup- ply circuit.
5	CHECK HARNESS BETWEEN ECM AND MAIN RELAY CONNECTOR. 1) Turn ignition switch to OFF. 2) Measure resistance between ECM and chassis ground. Connector & terminal (B136) No. 12 — Chassis ground:	Is the measured value more than 1 M Ω ?	Go to step 6.	Repair ground short circuit in har- ness between ECM connector and main relay connector.
6	 CHECK OUTPUT VOLTAGE FROM ECM. Connect connector to ECM. Turn ignition switch to ON. Measure voltage between ECM connector and chassis ground. Connector & terminal (B136) No. 12 (+) — Chassis ground (-): 	Is the measured value more than 10 V?	Go to step 7.	Replace ECM.
7	CHECK INPUT VOLTAGE OF MAIN RELAY. Check voltage between main relay connector and chassis ground. Connector & terminal (B47) No. 2 (+) — Chassis ground (-):	Is the measured value more than 10 V?	Go to step 8.	Repair open circuit in harness between ECM connector and main relay con- nector.

	Step	Check	Yes	No
8	CHECK GROUND CIRCUIT OF MAIN RE- LAY. 1) Turn ignition switch to OFF. 2) Measure resistance between main relay connector and chassis ground. Connector & terminal (B47) No. 1 — Chassis ground:	Is the measured value less than 5 Ω ?	Go to step 9.	Repair open circuit between main relay and chassis ground.
9	CHECK INPUT VOLTAGE OF MAIN RELAY. Measure voltage between main relay connector and chassis ground. Connector & terminal (B47) No. 5 (+) — Chassis ground (-): (B47) No. 6 (+) — Chassis ground (-):	Is the measured value more than 10 V?	Go to step 10.	Repair open or ground short circuit in harness of power supply circuit.
10	CHECK INPUT VOLTAGE OF ECM. 1) Connect main relay connector. 2) Turn ignition switch to ON. 3) Measure voltage between ECM connector and chassis ground. Connector & terminal (B135) No. 1 (+) — Chassis ground (-): (B135) No. 2 (+) — Chassis ground (-):	Is the measured value more than 10 V?	Check ignition control system. <ref. to<br="">EN(H4SO)-74, IGNITION CON- TROL SYSTEM, Diagnostics for Engine Starting Failure.></ref.>	Repair open or ground short circuit in harness between ECM connector and main relay connector.

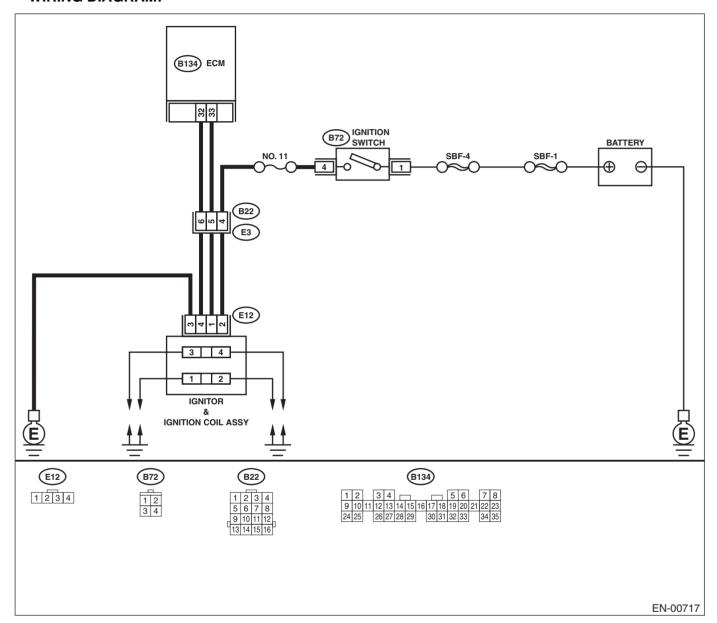
ENGINE (DIAGNOSTICS)

D: IGNITION CONTROL SYSTEM

CAUTION:

After repair or replacement of malfunctioning parts, conduct Clear Memory Mode <Ref. to EN(H4SO)-50, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO)-42, OPERATION, Inspection Mode.> .

• WIRING DIAGRAM:



	Step	Check	Yes	No
1	CHECK SPARK PLUG CONDITION.	Is the spark plug's status OK?	Go to step 2.	Replace the spark
	 Remove the spark plug. <ref. ig(h4so)-<br="" to="">4, REMOVAL, Spark Plug.></ref.> 		·	plug.
	Check the spark plug condition. <ref. to<br="">IG(H4SO)-5, INSPECTION, Spark Plug.></ref.>			

	Step	Check	Yes	No
2	CHECK IGNITION SYSTEM FOR SPARKS. 1) Remove plug cord cap from each spark plug. 2) Install new spark plug on plug cord cap. CAUTION: Do not remove spark plug from engine. 3) Contact spark plug's thread portion on engine. 4) While opening throttle valve fully, crank engine to check that spark occurs at each cylinder.	Does spark occur at each cylinder?	Check fuel pump system. <ref. to<br="">EN(H4SO)-78, FUEL PUMP CIR- CUIT, Diagnostics for Engine Start- ing Failure.></ref.>	Go to step 3.
3	 CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL & IGNITOR ASSEMBLY. 1) Turn ignition switch to OFF. 2) Disconnect connector from ignition coil & ignitor assembly. 3) Turn ignition switch to ON. 4) Measure power supply voltage between ignition coil & ignitor assembly connector and engine ground. Connector & terminal (E12) No. 2 (+) — Engine ground (-): 	Is the measured value more than 10 V?	Go to step 4.	Repair harness and connector. NOTE: In this case, repair the following: Open circuit in harness between ignition coil & ignitor assembly, and ignition switch connector Poor contact in coupling connectors
4	CHECK HARNESS OF IGNITION COIL & IGNITOR ASSEMBLY GROUND CIRCUIT. 1) Turn ignition switch to OFF. 2) Measure resistance between ignition coil & ignitor assembly connector and engine ground. Connector & terminal (E12) No. 3 — Engine ground:	Is the measured value less than 5 Ω ?	Go to step 5.	Repair harness and connector. NOTE: In this case, repair the following: Open circuit in harness between ignition coil & ignitor assembly connector and engine grounding terminal
5	CHECK IGNITION COIL & IGNITOR ASSEMBLY. 1) Remove spark plug cords. 2) Measure resistance between spark plug cord contact portions to check secondary coil. Terminals No. 1 — No. 2: No. 3 — No. 4:	Is the measured value within 10 to 15 k Ω ?	Go to step 6.	Replace ignition coil & ignitor assembly. <ref. to<br="">IG(H4SO)-7, Igni- tion Coil and Igni- tor Assembly.></ref.>
6	 CHECK INPUT SIGNAL FOR IGNITION COIL & IGNITOR ASSEMBLY. 1) Connect connector to ignition coil & ignitor assembly. 2) Check if voltage varies synchronously with engine speed when cranking, while monitoring voltage between ignition coil & ignitor assembly connector and engine ground. Connector & terminal (E12) No. 1 (+) — Engine ground (-): (E12) No. 4 (+) — Engine ground (-): 	Is the measured value more than 10 V?	Go to step 7.	Replace ignition coil & ignitor assembly. <ref. to<br="">IG(H4SO)-7, Igni- tion Coil and Igni- tor Assembly.></ref.>

	Step	Check	Yes	No
7	CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR. 1) Turn ignition switch to OFF. 2) Disconnect connector from ECM. 3) Disconnect connector from ignition coil & ignitor assembly. 4) Measure resistance of harness between ECM and ignition coil & ignitor assembly connector. Connector & terminal (B134) No. 33 — (E12) No. 1: (B134) No. 32 — (E12) No. 4:	Is the measured value less than 1 Ω?	Go to step 8.	Repair harness and connector. NOTE: In this case, repair the following: Open circuit in harness between ECM and ignition coil & ignitor assembly connector Poor contact in coupling connector
8	CHECK HARNESS BETWEEN ECM AND IGNITION COIL & IGNITOR ASSEMBLY CONNECTOR. Measure resistance of harness between ECM and engine ground. Connector & terminal: (B134) No. 32 — Engine ground: (B134) No. 33 — Engine ground:	Is the measured value more than 1 M Ω ?	Go to step 9.	Repair ground short circuit in har- ness between ECM and ignition coil & ignitor assembly connec- tor.
9	CHECK POOR CONTACT. Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Check fuel pump circuit. <ref. to<br="">EN(H4SO)-78, FUEL PUMP CIR- CUIT, Diagnostics for Engine Start- ing Failure.></ref.>

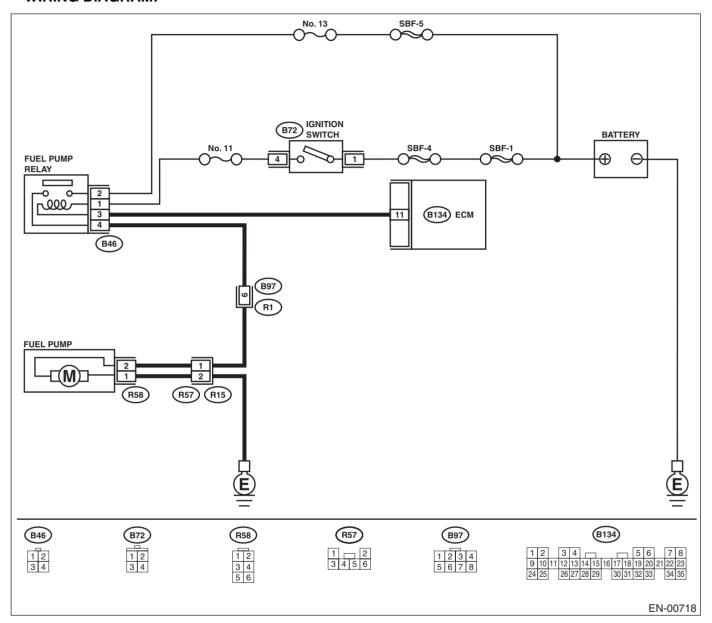
ENGINE (DIAGNOSTICS)

E: FUEL PUMP CIRCUIT

CAUTION:

After repair or replacement of malfunctioning parts, conduct Clear Memory Mode <Ref. to EN(H4SO)-50, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H4SO)-42, OPERATION, Inspection Mode.> .

• WIRING DIAGRAM:



	Step	Check	Yes	No
1	CHECK OPERATING SOUND OF FUEL PUMP. Make sure that fuel pump is in operation for two seconds when turning ignition switch to ON. NOTE: Fuel pump operation can also be executed using Subaru Select Monitor (Function mode: FD01). For the procedure, refer to "Compulsory Valve Operation Check Mode". <ref. check="" compulsory="" en(h4so)-51,="" mode.="" operation="" to="" valve=""></ref.>	Does fuel pump produce operating sound?	Check fuel injector circuit. <ref. circuit,="" diagnostics="" en(h4so)-82,="" engine="" failure.="" for="" fuel="" injector="" starting="" to=""></ref.>	Go to step 2.
2	 CHECK GROUND CIRCUIT OF FUEL PUMP. Turn ignition switch to OFF. Remove fuel pump access hole lid located on the right rear of trunk compartment floor (Sedan) or luggage compartment floor (Wagon). Disconnect connector from fuel pump. Measure resistance of harness connector between fuel pump and chassis ground. Connector & terminal (R58) No. 1 — Chassis ground: 	than 5 Ω?	Go to step 3.	Repair harness and connector. NOTE: In this case, repair the following: Open circuit in harness between fuel pump connector and chassis grounding terminal Poor contact in coupling connector
3	 CHECK POWER SUPPLY TO FUEL PUMP. Turn ignition switch to ON. Measure voltage of power supply circuit between fuel pump connector and chassis ground. Connector & terminal (R58) No. 2 (+) — Chassis ground (-): 	Is the measured value more than 10 V?	Replace fuel pump. <ref. to<br="">FU(H4SO)-66, Fuel Pump.></ref.>	Go to step 4.
4	CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR. 1) Turn ignition switch to OFF. 2) Measure resistance of harness connector between fuel pump and fuel pump relay. Connector & terminal (R58) No. 2 — (B46) No. 4:	Is the measured value less than 1 Ω ?	Go to step 5.	Repair harness and connector. NOTE: In this case, repair the following: • Open circuit in harness between fuel pump connector and chassis grounding terminal • Poor contact in coupling connectors
5	CHECK HARNESS BETWEEN FUEL PUMP AND FUEL PUMP RELAY CONNECTOR. Measure resistance of harness between fuel pump and fuel pump relay connector. Connector & terminal (R58) No. 2 — Chassis ground:	Is the measured value more than 1 M Ω ?	Go to step 6.	Repair short circuit in harness between fuel pump and fuel pump relay con- nector.

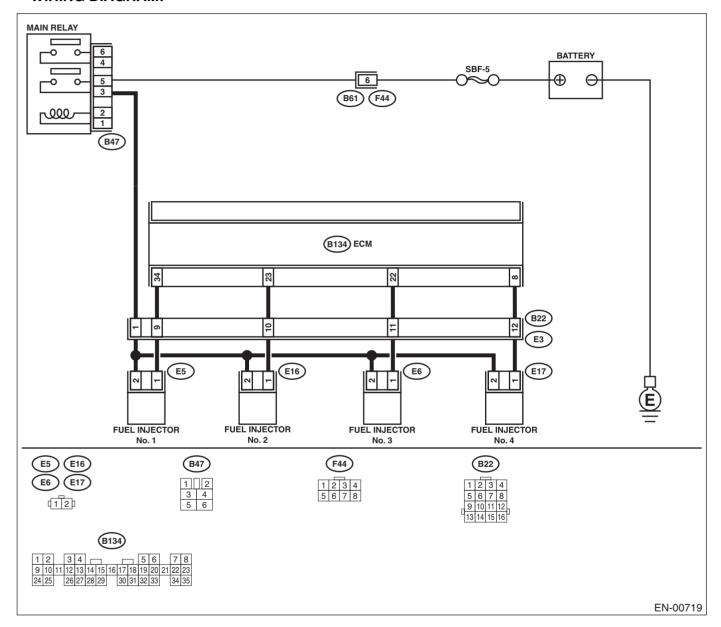
		T		
	Step	Check	Yes	No
6	 CHECK FUEL PUMP RELAY. Disconnect connectors from fuel pump relay and main relay. Remove fuel pump relay and main relay with bracket. Connect battery to fuel pump relay connector terminals No. 1 and No. 3. Measure resistance between connector terminals of fuel pump relay. Terminals No. 2 — No. 4: 	Is the measured value less than 10 Ω ?	Go to step 7.	Replace fuel pump relay. <ref. to<br="">FU(H4SO)-47, Fuel Pump Relay.></ref.>
7	CHECK HARNESS BETWEEN ECM AND FUEL PUMP RELAY CONNECTOR. 1) Disconnect connectors from ECM. 2) Measure resistance of harness between ECM and fuel pump relay connector. Connector & terminal (B134) No. 11 — (B46) No. 3:	Is the measured value less than 1 $\Omega\ensuremath{?}$	Go to step 8.	Repair open circuit in harness between ECM and fuel pump relay connector.
8	CHECK POOR CONTACT. Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Check fuel injector circuit. <ref. circuit,="" diagnostics="" en(h4so)-82,="" engine="" failure.="" for="" fuel="" injector="" starting="" to=""></ref.>

ENGINE (DIAGNOSTICS)

F: FUEL INJECTOR CIRCUIT

CAUTION:

- · Check or repair only malfunctioning parts.
- After repair or replacement of malfunctioning parts, conduct Clear Memory Mode <Ref. to EN(H4SO)-50, OPERATION, Clear Memory Mode.> and Inspection Mode. <Ref. to EN(H4SO)-42, OPERATION, Inspection Mode.>
- WIRING DIAGRAM:



	Step	Check	Yes	No
1	CHECK OPERATION OF EACH FUEL INJEC-	Does the fuel injector produce	Check fuel pres-	Go to step 2.
	TOR.	"operating" sound?	sure. <ref. th="" to<=""><th></th></ref.>	
	While cranking the engine, check that each	-	ME(H4SO)-26,	
	fuel injector emits "operating" sound. Use a		INSPECTION,	
	sound scope or attach a screwdriver to injector		Fuel Pressure.>	
	for this check.			

	Step	Check	Yes	No
2	CHECK POWER SUPPLY TO EACH FUEL INJECTOR. 1) Turn ignition switch to OFF. 2) Disconnect connector from fuel injector. 3) Turn ignition switch to ON. 4) Measure power supply voltage between the 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 measured value more than 10 V?	Go to step 3.	Repair harness and connector. NOTE: In this case, repair the following: Open circuit in harness between main relay and fuel injector connector Poor contact in main relay connector Poor contact in coupling connector Poor contact in fuel injector connector
3	CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. 1) Disconnect connector from ECM and fuel injector. 2) Measure resistance of harness between ECM and fuel injector connector. Connector & terminal (B134) No. 34 — (E5) No. 1: (B134) No. 23 — (E16) No. 1: (B134) No. 22 — (E6) No. 1: (B134) No. 8 — (E17) No. 1:	Is the measured value less than 1 Ω ?	Go to step 4.	Repair harness and connector. NOTE: In this case, repair the following: Open circuit in harness between ECM and fuel injector connector Poor contact in coupling connector
4	CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR. Measure resistance of harness between ECM and fuel injector connector. Connector & terminal (B134) No. 34 — Chassis ground: (B134) No. 23 — Chassis ground: (B134) No. 22 — Chassis ground: (B134) No. 8 — Chassis ground:	Is the measured value more than 1 M Ω ?	Go to step 5.	Repair ground short circuit in har- ness between ECM and fuel injector connector.
5	 CHECK EACH FUEL INJECTOR. 1) Turn ignition switch to OFF. 2) Measure resistance between each fuel injector terminals. Terminals No. 1 — No. 2: 	Is the measured value within 5 to 20 Ω ?	Go to step 6.	Replace faulty fuel injector.
6	CHECK POOR CONTACT. Check poor contact in ECM connector.	Is there poor contact in ECM connector?	Repair poor contact in ECM connector.	Inspection using "General Diagnostic Table". <ref. diagnostic="" en(h4so)-371,="" general="" inspection,="" table.="" to=""></ref.>