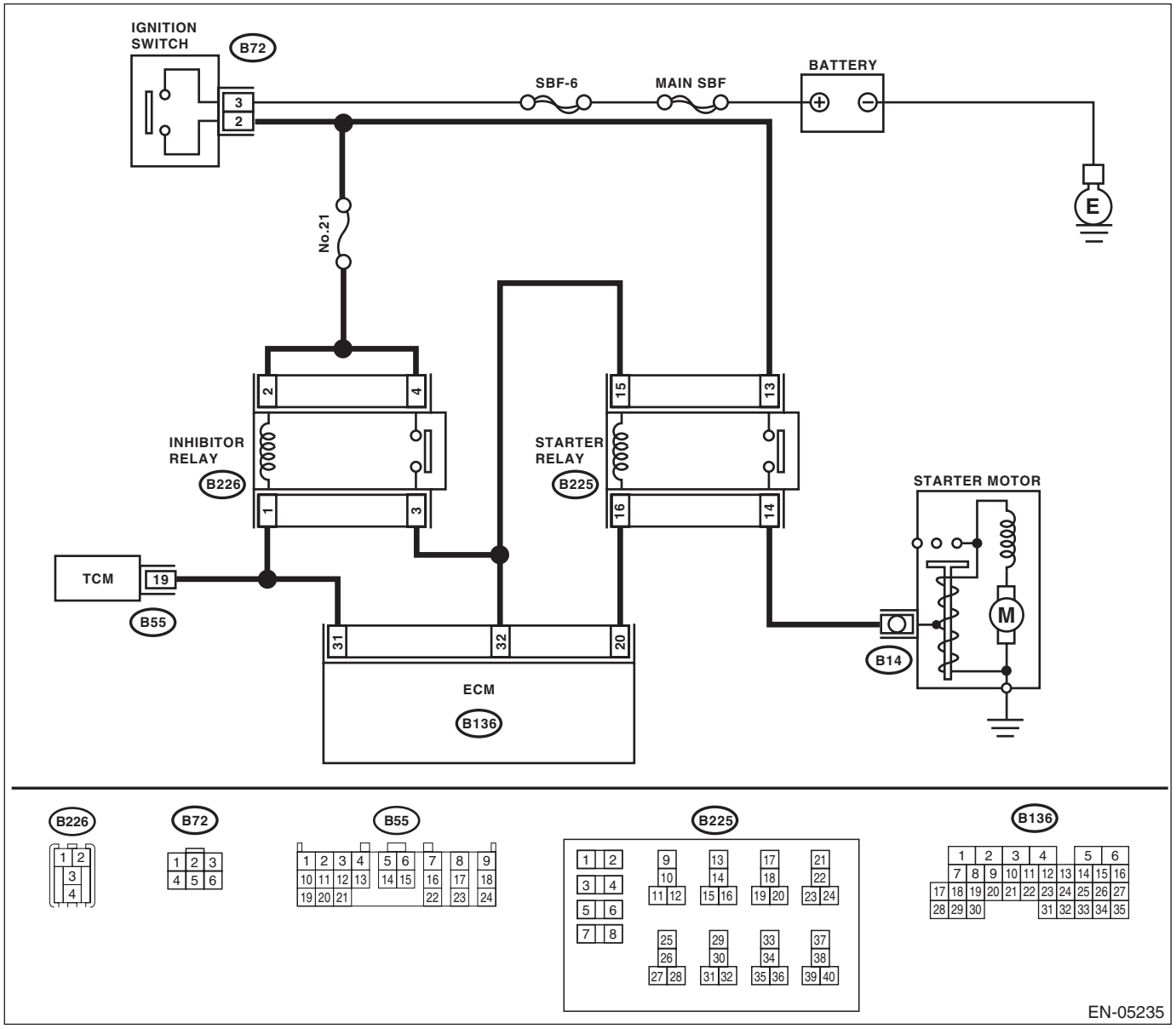
17.Diagnostics for Engine Starting Failure

A: PROCEDURE

1. Check of the fuel amount
↓
2. Inspection of starter motor circuit. <Ref. to EN(H6DO)(diag)-68, STARTER MOTOR CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
3. Inspection of ECM power supply and ground line. <Ref. to EN(H6DO)(diag)-72, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>
↓
4. Inspection of ignition control system. <Ref. to EN(H6DO)(diag)-74, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>
↓
5. Inspection of fuel pump circuit <Ref. to EN(H6DO)(diag)-77, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>
↓
6. Inspection of fuel indicator circuit <Ref. to EN(H6DO)(diag)-78, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>

B: STARTER MOTOR CIRCUIT

CAUTION:
After repair or replacement of faulty parts, perform Clear Memory Mode <Ref. to EN(H6DO)(diag)-54, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H6DO)(diag)-43, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:



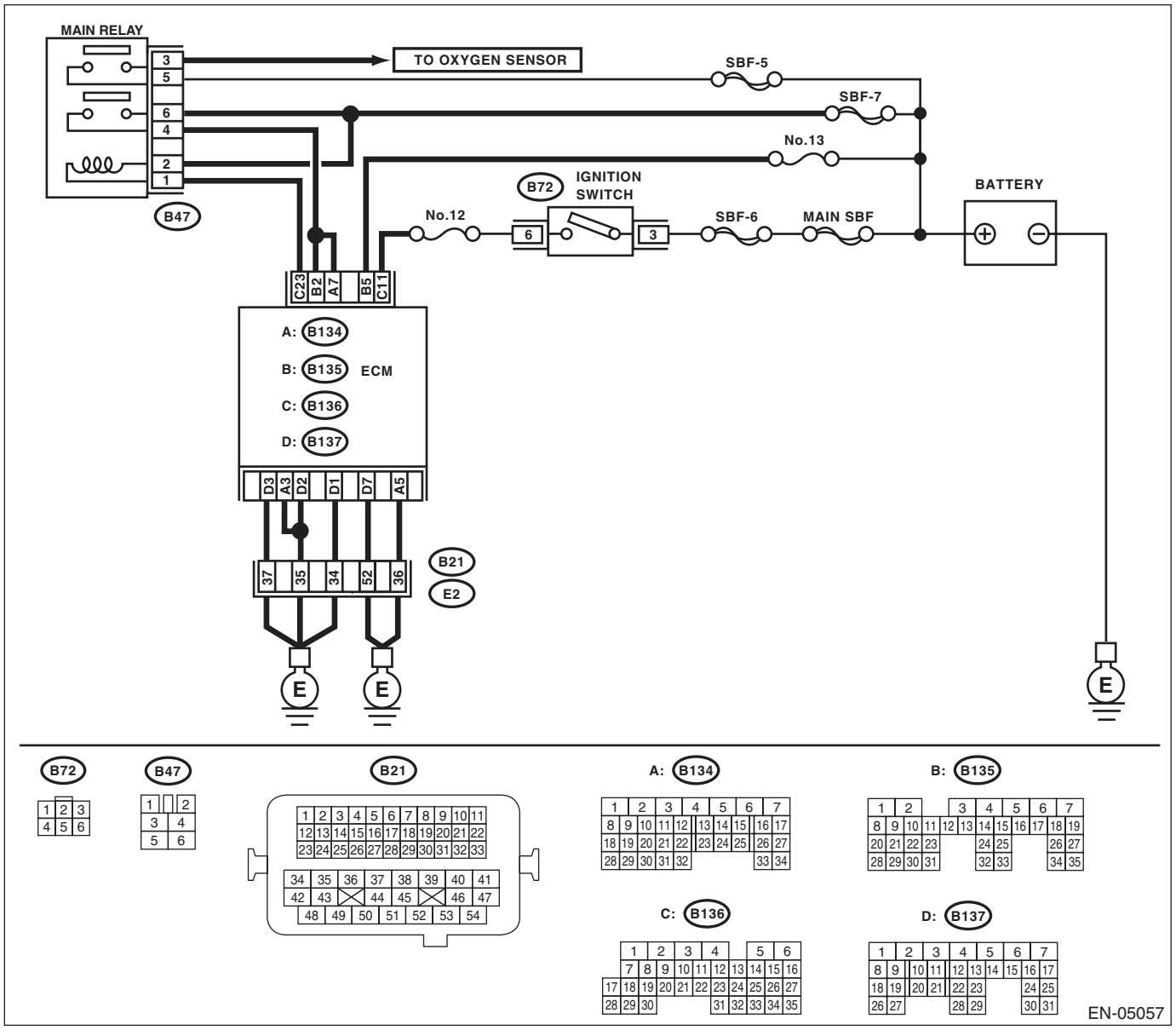
	Step	Check	Yes	No
1	**CHECK BATTERY.** Check the battery voltage.	Is the voltage 12 V or more?	Go to step **2**.	Charge or replace the battery.
2	**CHECK OPERATION OF STARTER MOTOR.**	Does the starter motor operate?	Go to step **3**.	Go to step **4**.
3	**CHECK DTC.**	Is DTC displayed? <Ref. to EN(H6DO)(diag)-42, OPERATION, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the List of Diagnostic Trouble Code (DTC). <Ref. to EN(H6DO)(diag)-80, List of Diagnostic Trouble Code (DTC).>	The circuit has returned to a normal condition at this time. Reproduce the fault condition, and reperform the check. NOTE: In this case, there may be a temporary connector contact failure.
4	**CHECK INPUT SIGNAL FOR STARTER MOTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from starter motor. 3) Place the select lever in “P” or “N” range. 4) Turn the ignition switch to START. 5) Measure the voltage between the starter motor connector and the engine ground. ***Connector & terminal*** ***(B14) No. 1 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Check the starter motor. <Ref. to SC(H4SO)-6, Starter.>	Go to step **5**.
5	**CHECK INPUT SIGNAL FOR STARTER MOTOR.** 1) Place the select lever in “P” or “N” range. 2) Turn the ignition switch to START. 3) Measure the voltage between starter relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 14 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Repair the open circuit of the harness between starter relay connector and starter motor.	Go to step **6**.
6	**CHECK HARNESS BETWEEN BATTERY AND IGNITION SWITCH CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from ignition switch. 3) Measure the voltage between ignition switch connector and chassis ground. ***Connector & terminal*** ***(B72) No. 3 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **7**.	Check the following item and repair if necessary. • Blown out of fuse • Open or ground short circuit of harness between ignition switch connector and battery
7	**CHECK IGNITION SWITCH.** 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 1 Ω?	Go to step **8**.	Replace the ignition switch. <Ref. to SL-47, REPLACEMENT, Ignition Key Lock.>

	Step	Check	Yes	No
8	**CHECK INPUT VOLTAGE OF STARTER RELAY.** 1) Remove the starter relay. 2) Connect the connector to ignition switch. 3) Turn the ignition switch to START. 4) Measure the voltage between starter relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 13 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **9**.	Repair the open circuit of harness between starter relay connector and ignition switch connector.
9	**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 **10**.	Replace the starter relay. <Ref. to EN(H6DO)(diag)-8, Electrical Component Location.>
10	**CHECK HARNESS BETWEEN ECM AND STARTER RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM. 3) Measure the resistance of harness between ECM and starter relay connector. ***Connector & terminal*** ***(B136) No. 20 — (B225) No. 16:***	Is the resistance less than 1 Ω?	Go to step **11**.	Repair the open circuit of harness between ECM and starter relay connector.
11	**CHECK INPUT VOLTAGE OF STARTER RELAY.** 1) Place the select lever in “P” or “N” range. 2) Turn the ignition switch to START. 3) Measure the voltage between starter relay connector and chassis ground. ***Connector & terminal*** ***(B225) No. 15 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **12**.	Go to step **13**.
12	**CHECK HARNESS BETWEEN ECM AND INHIBITOR RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the inhibitor relay connector. 3) Measure the resistance of harness between ECM and inhibitor relay connector. ***Connector & terminal*** ***(B136) No. 31 — (B226) No. 1:*** ***(B136) No. 32 — (B226) No. 3:***	Is the resistance less than 1 Ω?	Check the ECM power supply and ground line. <Ref. to EN(H6DO)(diag)-72, CHECK POWER SUPPLY AND GROUND LINE OF ENGINE CONTROL MODULE (ECM), Diagnostics for Engine Starting Failure.>	Repair the open circuit of harness between ECM and inhibitor relay connector.
13	**CHECK INPUT VOLTAGE OF INHIBITOR RELAY.** 1) Turn the ignition switch to OFF. 2) Disconnect the inhibitor relay connector. 3) Turn the ignition switch to START. 4) Measure the voltage between inhibitor relay connector and chassis ground. ***Connector & terminal*** ***(B226) No. 2 (+) — Chassis ground (–):*** ***(B226) No. 4 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **14**.	Check the following item and repair if necessary. • Blown out of fuse • Open or ground short circuit of harness between ignition switch connector and inhibitor relay connector

	Step	Check	Yes	No
14	**CHECK INHIBITOR RELAY.** 1) Connect the battery to inhibitor relay terminals No. 1 and No. 2. 2) Measure the resistance between inhibitor relay terminals. ***Terminals*** ***No. 3 — No. 4:***	Is the resistance less than 1 Ω?	Go to step **15**.	Replace the inhibitor relay.
15	**CHECK HARNESS BETWEEN INHIBITOR RELAY CONNECTOR AND STARTER RELAY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Measure the resistance of harness between inhibitor relay connector and starter relay connector. ***Connector & terminal*** ***(B226) No. 3 — (B225) No. 15:***	Is the resistance less than 1 Ω?	Repair the open circuit of harness between TCM and inhibitor relay connector.	Repair the open circuit of harness between inhibitor relay connector and starter relay connector.

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

CAUTION:
After repair or replacement of faulty parts, perform Clear Memory Mode <Ref. to EN(H6DO)(diag)-54, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H6DO)(diag)-43, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:

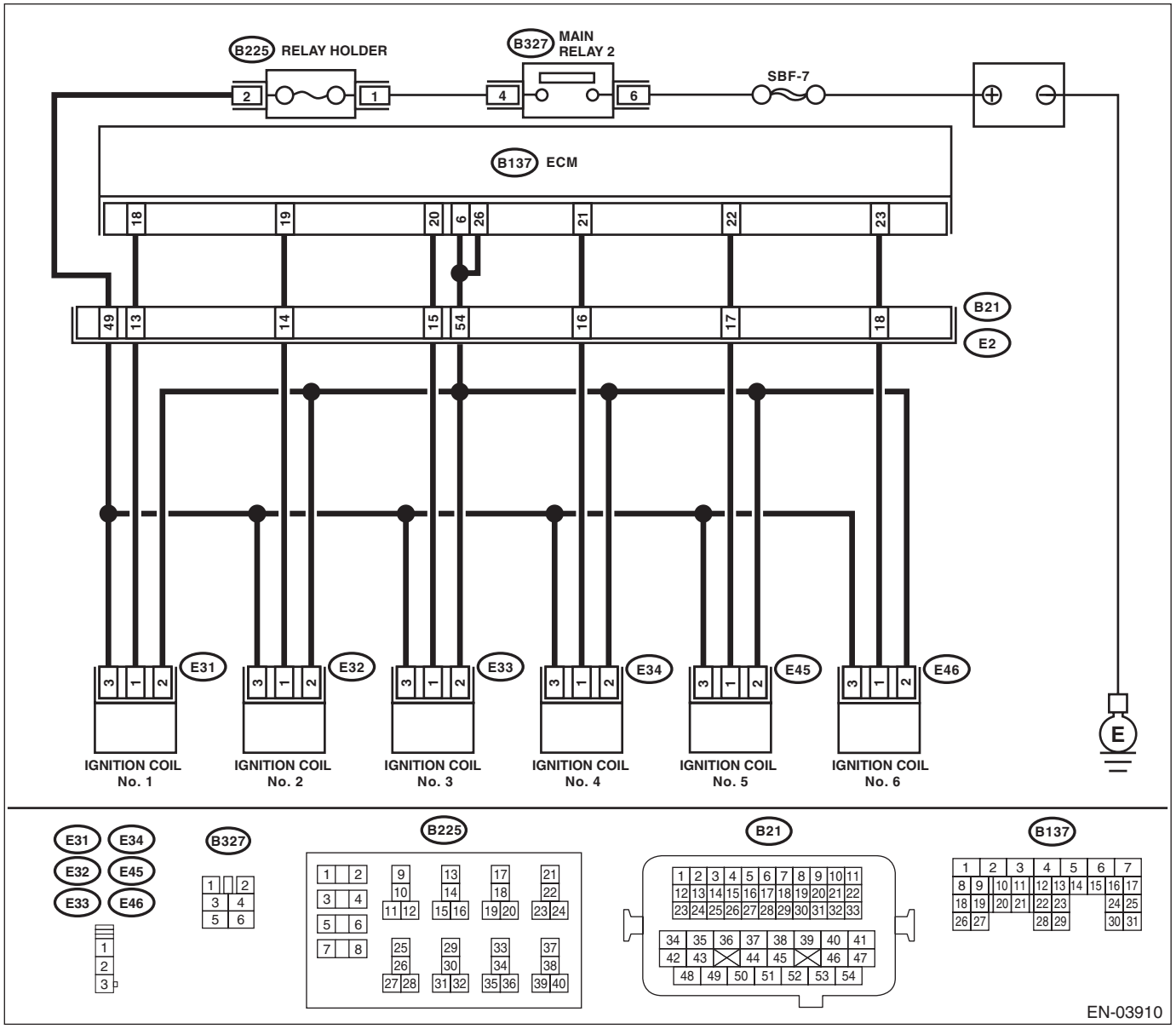


Step		Check	Yes	No
1	**CHECK MAIN RELAY.** 1) Turn the ignition switch to OFF. 2) Remove the main relay. 3) Connect the battery to main relay terminals No. 1 and No. 2. 4) Measure the resistance between main relay terminals. ***Terminals*** ***No. 3 — No. 5:*** ***No. 4 — No. 6:***	Is the resistance less than 10 Ω?	Go to step **2**.	Replace the main relay.

	Step	Check	Yes	No
2	**CHECK GROUND CIRCUIT FOR ECM.** 1) Disconnect the connectors from the ECM. 2) Measure the resistance of harness between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 3 — Chassis ground:*** ***(B134) No. 5 — Chassis ground:*** ***(B137) No. 1 — Chassis ground:*** ***(B137) No. 2 — Chassis ground:*** ***(B137) No. 3 — Chassis ground:*** ***(B137) No. 7 — Chassis ground:***	Is the resistance less than 5 Ω?	Go to step **3**.	Repair the open circuit of harness between ECM connector and engine grounding terminal.
3	**CHECK INPUT VOLTAGE OF ECM.** Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B135) No. 5 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the open or ground short circuit of power supply circuit.
4	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 11 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **5**.	Repair the open or ground short circuit of power supply circuit.
5	**CHECK INPUT VOLTAGE OF MAIN RELAY.** Measure the voltage between main relay connector and chassis ground. ***Connector & terminal*** ***(B47) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **6**.	Repair the open circuit of harness between ECM connector and main relay connector.
6	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to OFF. 2) Connect the connectors to ECM and main relay. 3) Turn the ignition switch to ON. 4) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 23 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **7**.	Repair the open or ground short circuit of harness between ECM connector and main relay connector.
7	**CHECK INPUT VOLTAGE OF MAIN RELAY.** Measure the voltage between main relay connector and chassis ground. ***Connector & terminal*** ***(B47) No. 5 (+) — Chassis ground (–):*** ***(B47) No. 6 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Go to step **8**.	Repair the open or ground short circuit of harness of power supply circuit.
8	**CHECK INPUT VOLTAGE OF ECM.** 1) Turn the ignition switch to ON. 2) Measure the voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B134) No. 7 (+) — Chassis ground (–):*** ***(B135) No. 2 (+) — Chassis ground (–):***	Is the voltage 10 V or more?	Check ignition control system. <Ref. to EN(H6DO)(diag)-74, IGNITION CONTROL SYSTEM, Diagnostics for Engine Starting Failure.>	Repair the open or ground short circuit of harness between ECM connector and main relay connector.

D: IGNITION CONTROL SYSTEM

CAUTION:
After repair or replacement of faulty parts, perform Clear Memory Mode <Ref. to EN(H6DO)(diag)-54, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H6DO)(diag)-43, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:

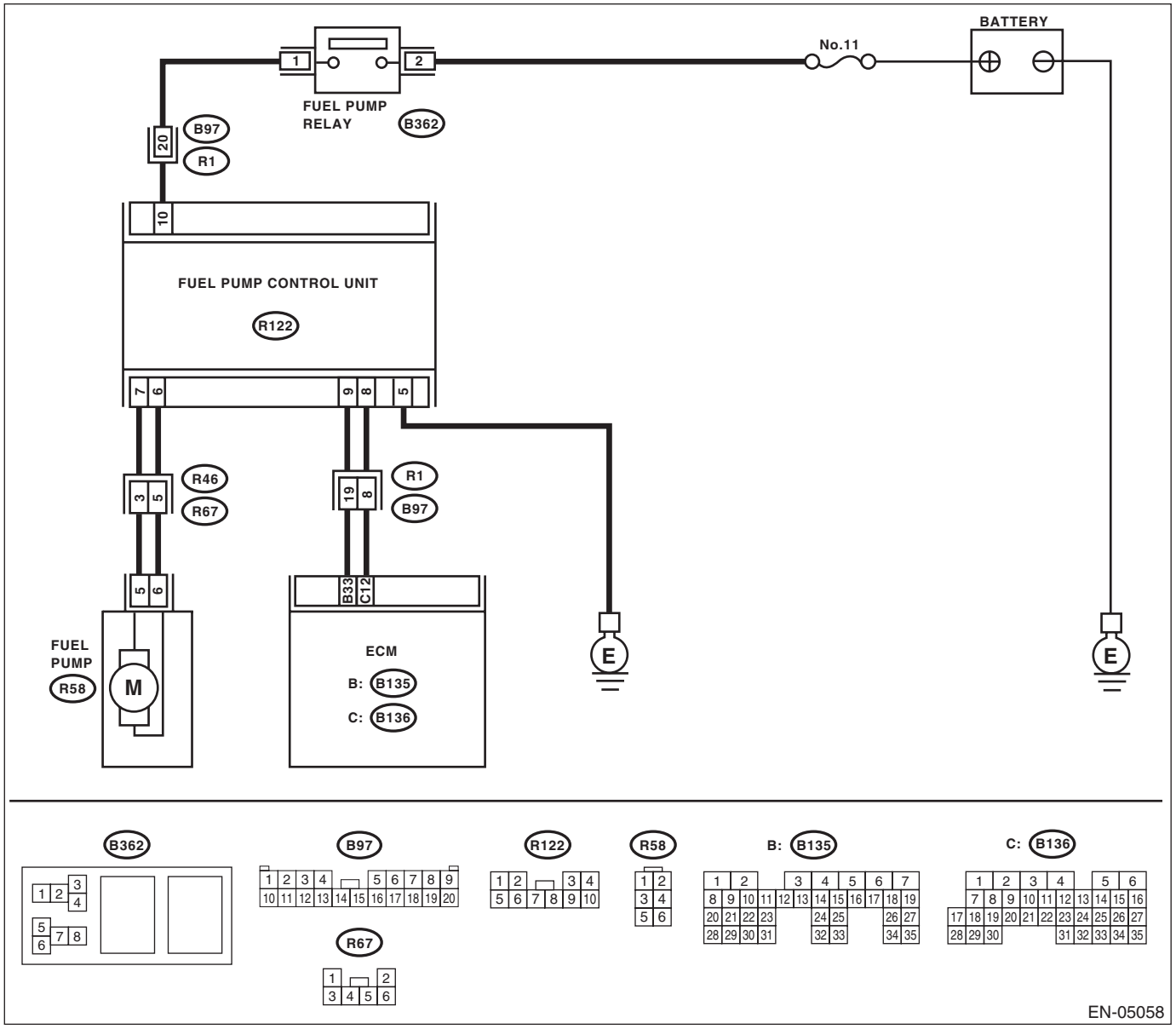


	Step	Check	Yes	No
1	**CHECK SPARK PLUG CONDITION.** 1) Remove the spark plug. <Ref. to IG(H6DO)-4, REMOVAL, Spark Plug.> 2) Check the spark plug condition. <Ref. to IG(H6DO)-5, INSPECTION, Spark Plug.>	Is the spark plug condition notmal?	Go to step **2**.	Replace the spark plug.
2	**CHECK IGNITION SYSTEM FOR SPARKS.** 1) Connect the spark plug to ignition coil. 2) Release the fuel pressure. 3) Contact the spark plug thread portion to engine. 4) While opening the throttle valve fully, start the engine to check if spark occurs at each cylinder.	Does spark occur at each cylinder?	Check fuel pump system. <Ref. to EN(H6DO)(diag)-77, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>	Go to step **3**.
3	**CHECK POWER SUPPLY CIRCUIT FOR IGNITION COIL AND IGNITOR ASSEMBLY.** 1) Turn the ignition switch to OFF. 2) Disconnect the connector from the ignition coil & ignitor assembly. 3) Turn the ignition switch to ON. 4) Measure the power supply voltage between ignition coil and ignitor assembly connector and engine ground. ***Connector & terminal*** ***(E31) No. 3 (+) — Engine ground (–):*** ***(E32) No. 3 (+) — Engine ground (–):*** ***(E33) No. 3 (+) — Engine ground (–):*** ***(E34) No. 3 (+) — Engine ground (–):*** ***(E45) No. 3 (+) — Engine ground (–):*** ***(E46) No. 3 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between the ignition coil and ignitor assembly and ignition switch connector • Poor contact of coupling connector
4	**CHECK HARNESS OF IGNITION COIL AND IGNITOR ASSEMBLY GROUND CIRCUIT.** 1) Turn the ignition switch to OFF. 2) Measure the resistance between the ignition coil and ignitor assembly connector and engine ground. ***Connector & terminal*** ***(E31) No. 2 — (B137) No. 6:*** ***(E32) No. 2 — (B137) No. 6:*** ***(E33) No. 2 — (B137) No. 6:*** ***(E34) No. 2 — (B137) No. 6:*** ***(E45) No. 2 — (B137) No. 6:*** ***(E46) No. 2 — (B137) No. 6:*** ***(E31) No. 2 — (B137) No. 26:*** ***(E32) No. 2 — (B137) No. 26:*** ***(E33) No. 2 — (B137) No. 26:*** ***(E34) No. 2 — (B137) No. 26:*** ***(E45) No. 2 — (B137) No. 26:*** ***(E46) No. 2 — (B137) No. 26:***	Is the resistance less than 5 Ω?	Go to step **5**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ignition coil and ignitor assembly connector and engine grounding terminal

	Step	Check	Yes	No
5	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL AND IGNITOR ASSEMBLY CONNECTOR.** 1) Turn the ignition switch to OFF. 2) Disconnect the connectors from the ECM. 3) Disconnect the connector from the ignition coil & ignitor assembly. 4) Measure the resistance of harness between ECM and ignition coil and ignitor assembly connector. ***Connector & terminal*** ***(B137) No. 18 — (E31) No. 1:*** ***(B137) No. 19 — (E32) No. 1:*** ***(B137) No. 20 — (E33) No. 1:*** ***(B137) No. 21 — (E34) No. 1:*** ***(B137) No. 22 — (E45) No. 1:*** ***(B137) No. 23 — (E46) No. 1:***	Is the resistance less than 1 Ω?	Go to step **6**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit in harness between ECM and ignition coil and ignitor assembly connector • Poor contact of coupling connector
6	**CHECK HARNESS BETWEEN ECM AND IGNITION COIL AND IGNITOR ASSEMBLY CONNECTOR.** Measure the resistance of harness between ECM connector and engine ground. ***Connector & terminal:*** ***(B137) No. 18 — Engine ground:*** ***(B137) No. 19 — Engine ground:*** ***(B137) No. 20 — Engine ground:*** ***(B137) No. 21 — Engine ground:*** ***(B137) No. 22 — Engine ground:*** ***(B137) No. 23 — Engine ground:***	Is the resistance 1 MΩ or more?	Go to step **7**.	Repair the ground short circuit of harness between ECM and ignition coil and ignitor assembly connector.
7	**CHECK POOR CONTACT.** Check for poor contact of the ECM connector.	Is there poor contact in ECM connector?	Repair poor contact of the ECM connector.	Check the fuel pump circuit. <Ref. to EN(H6DO)(diag)-77, FUEL PUMP CIRCUIT, Diagnostics for Engine Starting Failure.>

E: FUEL PUMP CIRCUIT

CAUTION:
After repair or replacement of faulty parts, perform Clear Memory Mode <Ref. to EN(H6DO)(diag)-54, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H6DO)(diag)-43, PROCEDURE, Inspection Mode.>.
WIRING DIAGRAM:

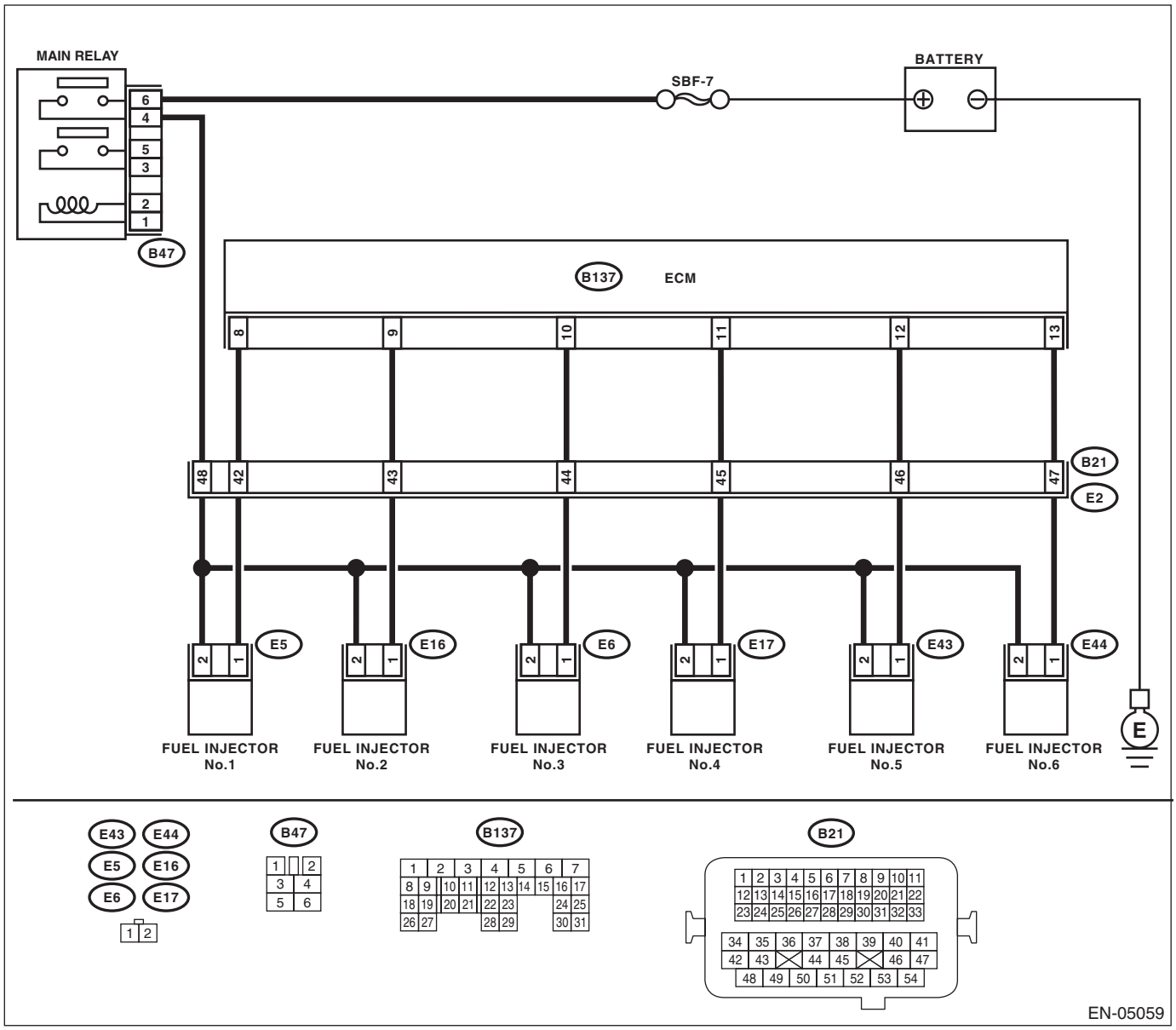


Step		Check	Yes	No
1	**CHECK OPERATING SOUND OF FUEL PUMP.** Make sure that the fuel pump operates for two seconds when turning the ignition switch to ON. NOTE: Fuel pump operation can also be executed using Subaru Select Monitor. Regarding the procedures, refer to “Compulsory Valve Operation Check Mode”. <Ref. to EN(H6DO)(diag)-55, Compulsory Valve Operation Check Mode.>	Does the fuel pump emit operating sound?	Check the fuel injector circuit. <Ref. to EN(H6DO)(diag)-78, FUEL INJECTOR CIRCUIT, Diagnostics for Engine Starting Failure.>	Display the DTC. <Ref. to EN(H6DO)(diag)-42, OPERATION, Read Diagnostic Trouble Code (DTC).>

F: FUEL INJECTOR CIRCUIT

CAUTION:
- **Check or repair only faulty parts.**
- **After repair or replacement of faulty parts, perform Clear Memory Mode <Ref. to EN(H6DO)(diag)-54, OPERATION, Clear Memory Mode.> and Inspection Mode <Ref. to EN(H6DO)(diag)-43, PROCEDURE, Inspection Mode.>.**

WIRING DIAGRAM:



Step		Check	Yes	No
1	**CHECK OPERATION OF EACH FUEL INJECTOR.** 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 pump emit operating sound?	Check the fuel pressure. <Ref. to ME(H6DO)-26, INSPECTION, Fuel Pressure.>	Go to step **2**.

	Step	Check	Yes	No
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 (–):*** ***#5 (E43) No. 2 (+) — Engine ground (–):*** ***#6 (E44) No. 2 (+) — Engine ground (–):***	Is the voltage 10 V or more?	Go to step **3**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between main relay and fuel injector connector • Poor contact of main relay connector • Poor contact of coupling connector • Poor contact of fuel injector connector
3	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** 1) Disconnect the connectors from the ECM. 2) Measure the resistance of harness between ECM and fuel injector connector. ***Connector & terminal*** ***#1 (B137) No. 8 — (E5) No. 1:*** ***#2 (B137) No. 9 — (E16) No. 1:*** ***#3 (B137) No. 10 — (E6) No. 1:*** ***#4 (B137) No. 11 — (E17) No. 1:*** ***#5 (B137) No. 12 — (E43) No. 1:*** ***#6 (B137) No. 13 — (E44) No. 1:***	Is the resistance less than 1 Ω?	Go to step **4**.	Repair the harness and connector. NOTE: In this case, repair the following item: • Open circuit of harness between ECM and fuel injector connector • Poor contact of coupling connector
4	**CHECK HARNESS BETWEEN ECM AND FUEL INJECTOR CONNECTOR.** Measure the resistance of harness between ECM and fuel injector connector. ***Connector & terminal*** ***#1 (B137) No. 8 — Chassis ground:*** ***#2 (B137) No. 9 — Chassis ground:*** ***#3 (B137) No. 10 — Chassis ground:*** ***#4 (B137) No. 11 — Chassis ground:*** ***#5 (B137) No. 12 — Chassis ground:*** ***#6 (B137) No. 13 — Chassis ground:***	Is the resistance 1 MΩ or more?	Go to step **5**.	Repair the ground short circuit of harness 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 for poor contact of the ECM connector.	Is there poor contact in ECM connector?	Repair poor contact of the ECM connector.	Inspection using “General Diagnostic Table”. <Ref. to EN(H6DO)(diag)-344, INSPECTION, General Diagnostic Table.>