

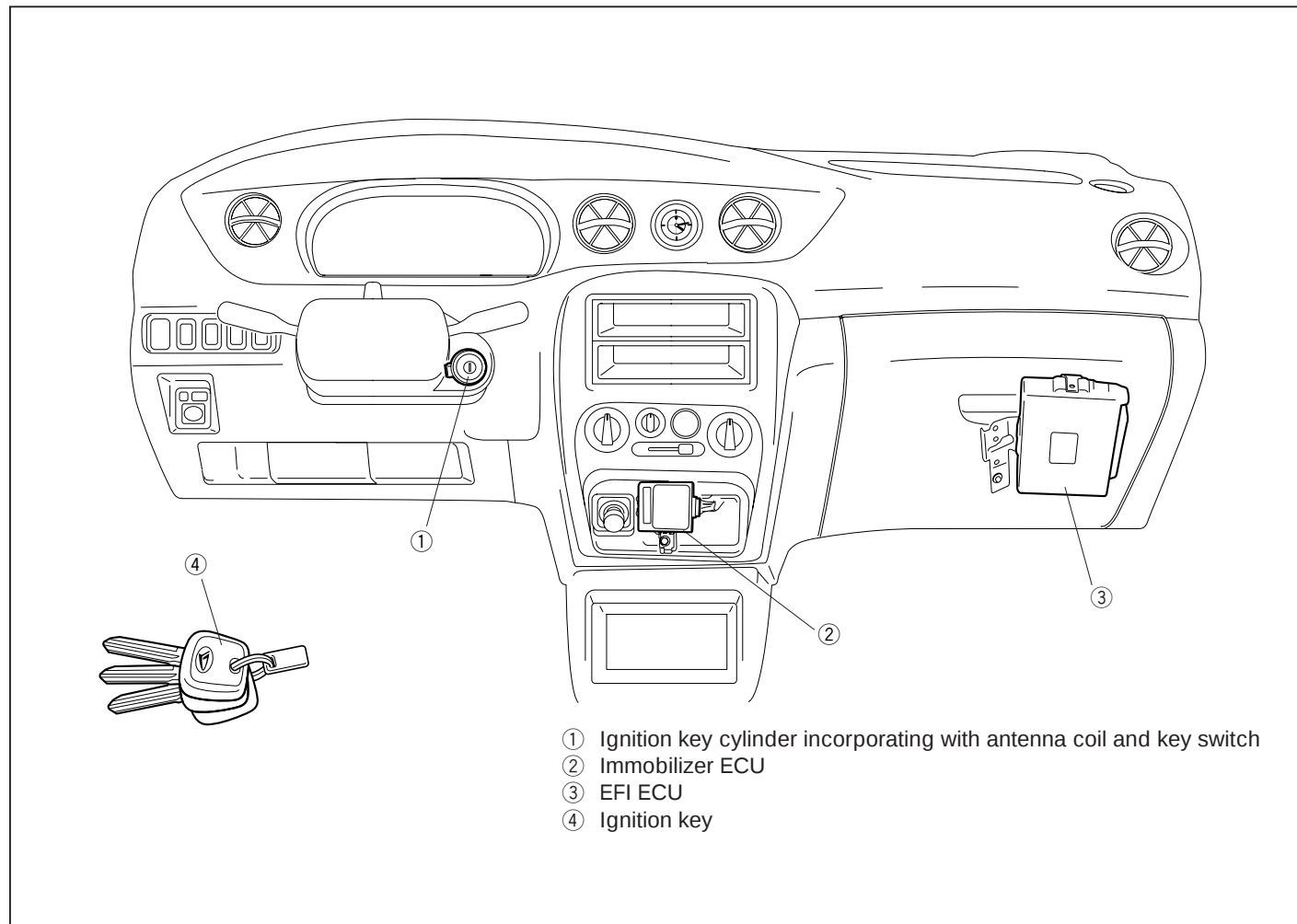
TO INDEX

IMMOBILIZER SYSTEM

IMMOBILIZER SYSTEM	IMB-2
COMPONENTS LAYOUT	IMB-2
OUTLINE	IMB-2
WIRING DIAGRAM	IMB-3
COMPONENTS	IMB-3
TROUBLE-SHOOTING.....	IMB-5
SECURITY ACCESS.....	IMB-9
FUNCTION CHECK OF	
IMMOBILIZER SYSTEM	IMB-14
INSPECTION OF KEY SWITCH.....	IMB-15
REPLACEMENT AND	
INSTALLATION OF	
ANTENNA COIL	IMB-15
REGISTRATION OF	
IDENTIFICATION CODE	IMB-16

IMB

IMMOBILIZER SYSTEM COMPONENTS LAYOUT



YIMB00001

OUTLINE

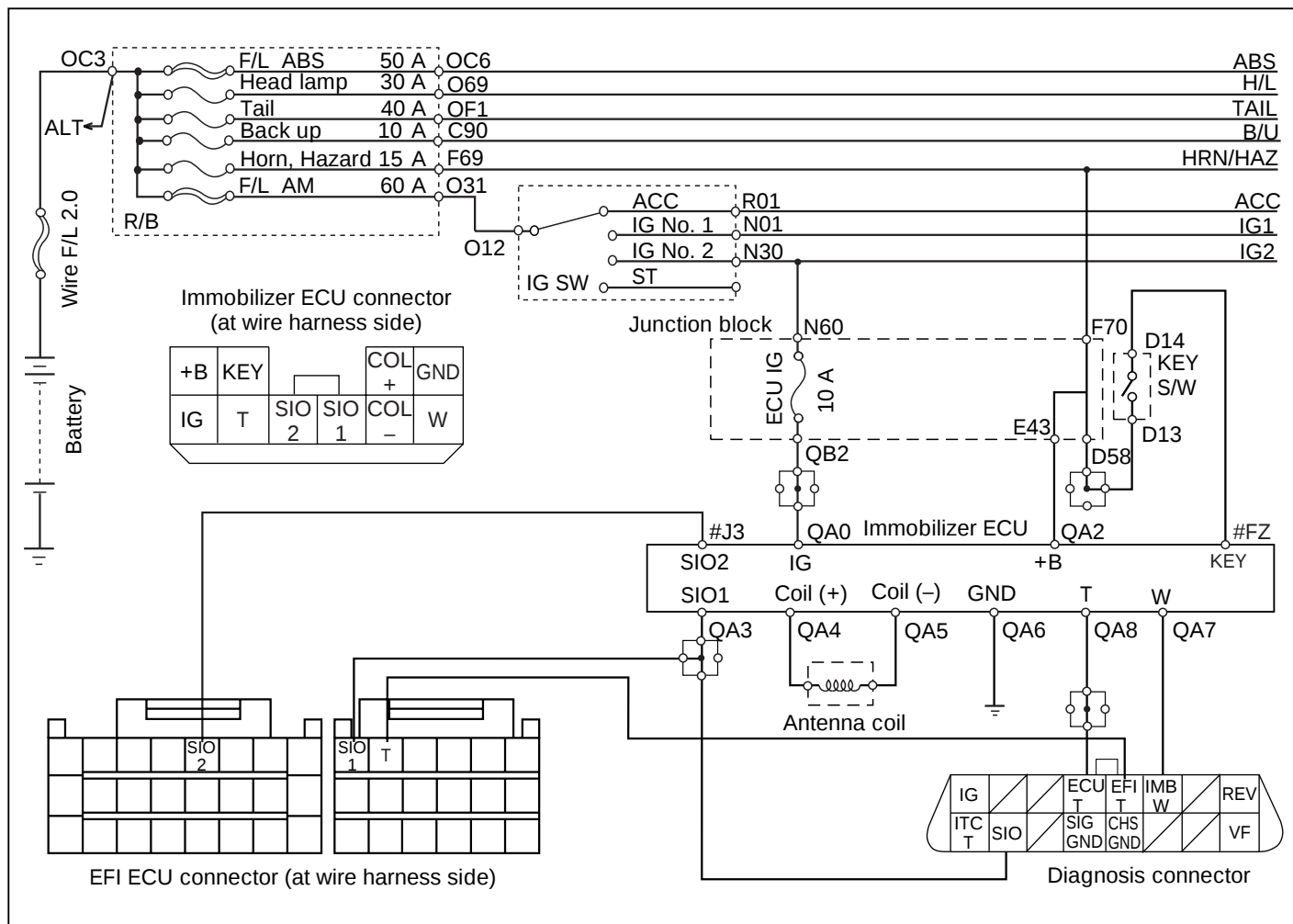
This system consists of a transponder-built-in key, an antenna coil, an immobilizer ECU and EFI ECU. In this immobilizer system, when the key is inserted into the ignition key cylinder, the key switch is turned ON, thus starting the system. Then, comparison is made between the code memorized in the immobilizer ECU and the code memorized in the key. When both codes match with each other, the immobilizer ECU sends to the EFI ECU the permission signals for ignition and fuel injection. The key ID code is a transponder intrinsic code, whereas the rolling code takes a different value every time the engine is started. This code is renewed and memorized in the EFI ECU and immobilizer ECU as the rolling code for the next starting.

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WIRING DIAGRAM

This figure applies to K3 engine and EJ-VE engine.

As for other models, refer to the Service Manual No. 9721.



YIMB00002

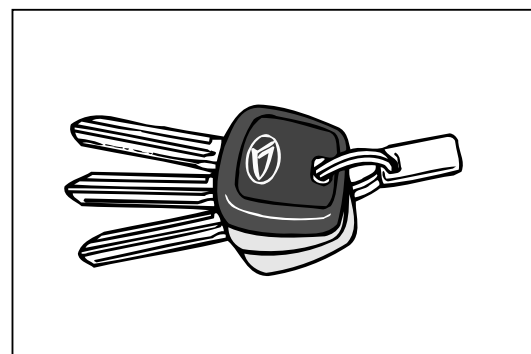
COMPONENTS

<Ignition key>

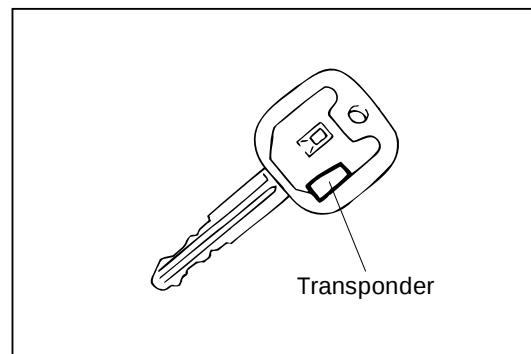
The vehicle is provided with three ignition keys.

1. A black-covered master key
2. Two gray-covered sub keys

The transponder is built in the cover of each of the three keys. Each key has a different recorded ID code. In this system, the operation/releasing of the system can be performed by comparing and collating the ID code with the data memorized in the immobilizer ECU. Although two sub keys are provided for the vehicle, up to three keys can be registered, as required, by means of the sub key registration function of the master key.



YIMB00003



YIMB00004

IMB-4

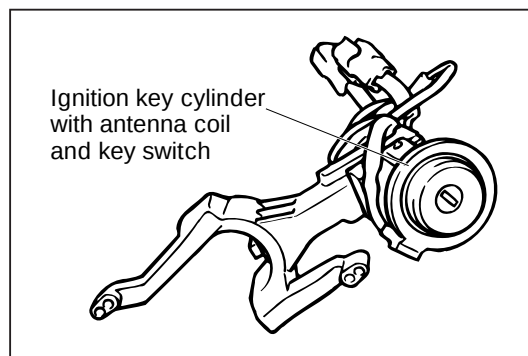
CAUTION:

- The master key has the following functions. Utmost care must be paid as to its handling.
 - (1) Using the master key (black cover), it is possible to perform the new registration and renewal of the sub keys.
 - (2) The black covered key is memorized as the master key at the time of factory shipment. However, if the immobilizer ECU memory has been cleared at time of repairs, etc., the key used first to start the engine will be registered as the master key in the immobilizer ECU. This point should be kept in mind.

<Ignition key cylinder>

The ignition key cylinder has incorporated the key switch and antenna coil. The key switch is turned ON when the key is inserted into the key cylinder, thus starting the immobilizer system.

The antenna coil is provided at the ignition key cylinder. The antenna coil energizes the transponder built in the ignition key. Also, the antenna coil receives the ID code that is sent from the transponder and will send it to the immobilizer ECU. If any metal shielding, such as a key holder ring, exists between the ignition key and the antenna coil, or if there is open wire in the antenna coil or its circuit, it becomes impossible to read the ID code of the ignition key, thus being unable to start the engine.



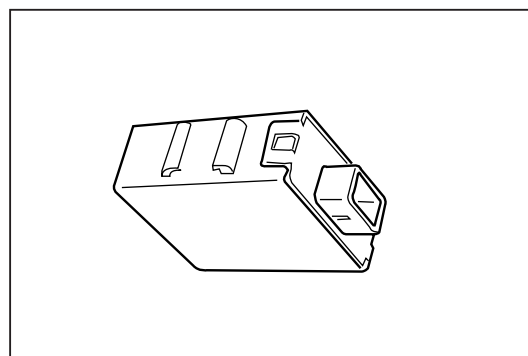
YIMB00005

<Immobilizer ECU>

The immobilizer ECU collates the ID code sent from the key transponder with the ID code recorded in the immobilizer ECU. Only when the ID codes are matched with each other, the immobilizer ECU sends the signal of continuation of engine operation to the EFI ECU.

In order to memorize the ID code, the immobilizer ECU employs a non-volatile ROM that retains the memorized data even when the battery or backup fuse is disconnected.

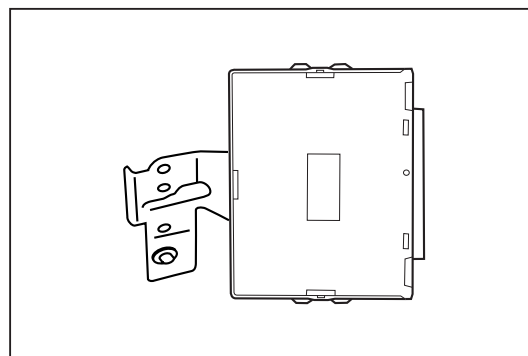
Therefore, when you erase the ECU memory and register the master key ID code newly, you have to erase the memory, using the diagnosis system (DS-21).



YIMB00006

<EFI ECU>

In addition to the hitherto-employed functions as the conventional engine control unit, the EFI ECU has the functions as the immobilizer function whereby the ignition and fuel injection are stopped if the ID codes can not be collated in the immobilizer ECU or in instances where the rolling codes can not be collated between the immobilizer ECU and the EFI ECU.



YIMB00007

TROUBLE-SHOOTING

TROUBLE-SHOOTING HINTS

Before checking the immobilizer system, check the diagnosis code of the EFI system to determine whether the malfunction is caused by the immobilizer system or by the EFI system.

CAUTION:

- In the immobilizer system, the system is composed with the same rolling code shared in common among the ignition key, immobilizer ECU and EFI ECU. Hence, if the immobilizer ECU and/or EFI ECU are replaced with that of another vehicle during the checking of the immobilizer ECU or EFI system, the immobilizer system will be regarded as malfunctioning. Therefore, do not replace the immobilizer ECU and/or EFI ECU with that of another vehicle unnecessarily.
- If you have to replace the immobilizer ECU and/or EFI ECU, erase the rolling codes memorized in the immobilizer ECU and EFI ECU. Then, register the ID code of the ignition key to the immobilizer ECU.

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DESCRIPTION

1. A self-diagnosis system is built in the ECU. If any abnormality should occur in the immobilizer system, the self-diagnosis system memorizes the malfunction phenomenon in the ECU in the form of malfunction code number.
2. When the test terminal of the check connector is connected with the ground terminal, the malfunction code number that has been memorized in the ECU will be indicated in a form of blinking of the check lamp in the SST.
3. This memorized malfunction code number is erased when the battery ground cable is disconnected from the negative (–) terminal of the battery or when the backup fuse in the relay block assembly is disconnected with the ignition key switch turned off.

READ OUT OF DIAGNOSIS CODE

Method using check lamp

In the method using the check lamp, a two-digit code number will be indicated.

1. Connect the test terminal of the diagnosis connector with the ground terminal, using a jump wire.
2. Connect a check lamp between the terminals as illustration.

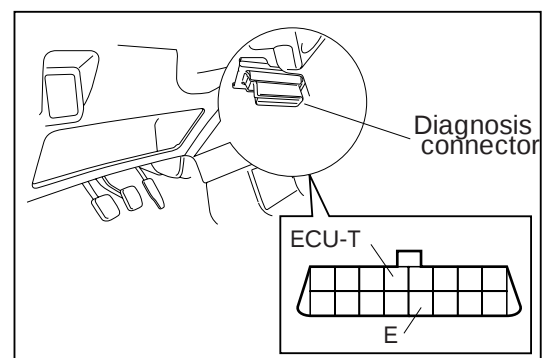
NOTE:

- Prepare the following SST.
SST: 09991-97201-000

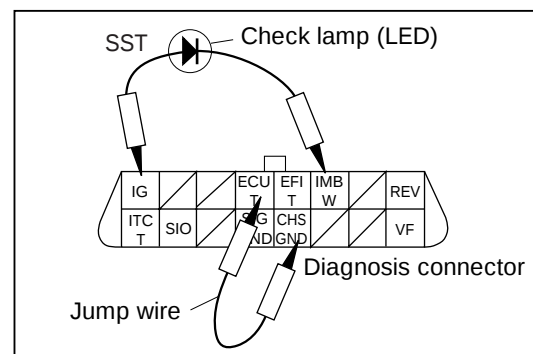
CAUTION:

- As for the check lamp, make sure to use a LED (light emitting diode) type. Bulb type check lamp is not suitable for this system.
3. Set the ignition switch to the ON position.
 4. Read the diagnosis code by observing the number of blinking of the indicator lamp.

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YMBE00008

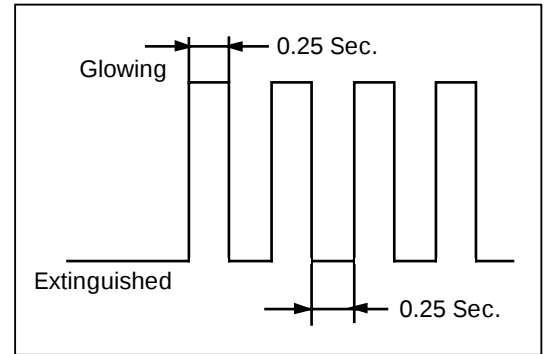


YIMB00009

EXPLANATION OF DIAGNOSIS CODE

1. Indication of normal code

The check lamp glows for 0.25 second, 0.25 second later after the ignition switch has been turned ON. After a lapse of 0.25 second, the check lamp again glows for 0.25 second. Then, this pattern will be repeated.



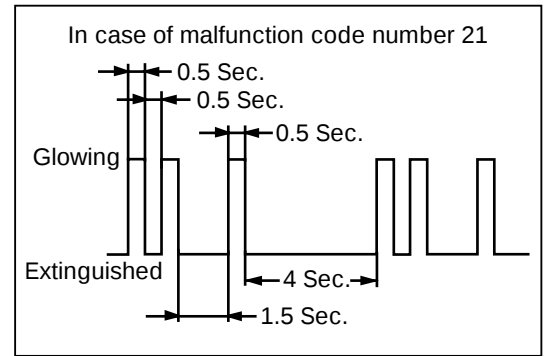
YIMB00010

2. Indication of malfunction code

• When a single malfunction code is indicated:

The diagnosis malfunction code is composed of two digits. Those two numbers are indicated by blinking of the check lamp. Four seconds later after the ignition switch has been turned on, the check lamp indicates first the number of the tens digit of the diagnosis code by blowing the same times as the number. The lamp glows for 0.5 second each time and then it is extinguished for 0.5 second. After a pause of 1.5 seconds, the check lamp indicates the number of the units digit of the diagnosis code by glowing the same times as the number.

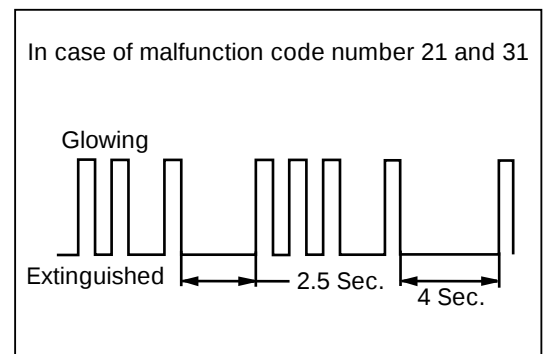
The lamp glows for 0.5 second each time and then it is extinguished for 0.5 second. Then, this pattern will be repeated after a pause of 4.0 seconds.



YIMB00011

• When plural malfunction codes are indicated:

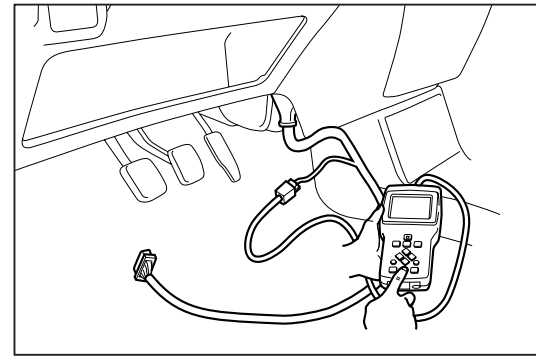
In cases where plural malfunction codes have been detected, the two-digit diagnosis codes are indicated in the sequence of the code number, starting from a smaller number. Each diagnosis code is indicated in above described pattern. A pause of 2.5 seconds occurs between the outputs of respective diagnosis codes, thus separating one from the others. After all of the plural diagnosis codes that have been detected are indicated, the check lamp is extinguished for four seconds. Then, the detected plural diagnosis codes will be indicated again.



YIMB00012

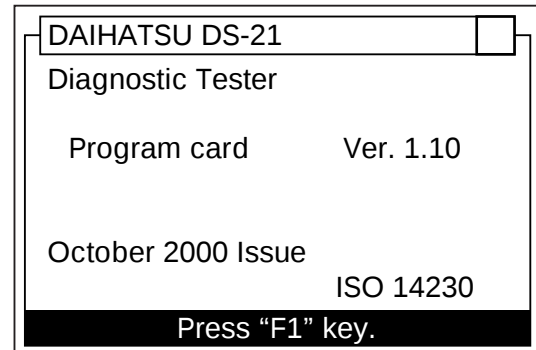
Method Using Diagnostic Tester (DS-21)

1. Connect the diagnostic tester (DS-21) to the diagnosis check connector.



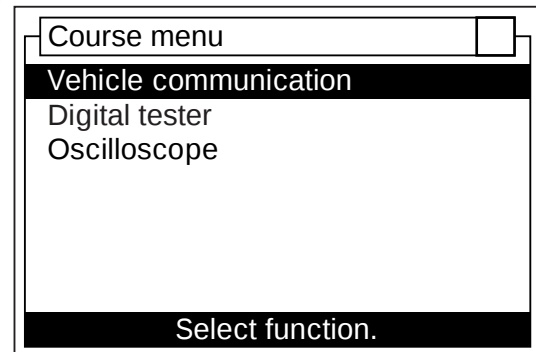
YIMB00013

2. Turn ON the ignition key.
3. Turn ON the power supply of the tester. Then, the display indicates the screen of the figure on the right. Press the "F1" key to proceed.



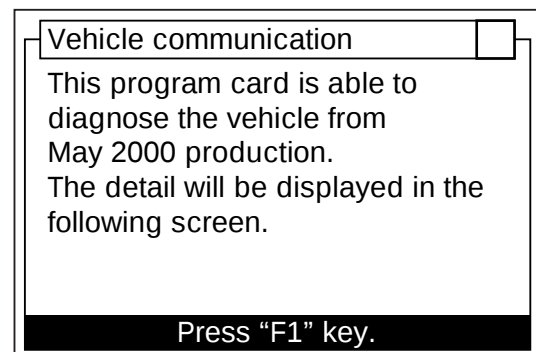
YIMB00014

4. The display indicates a screen in which a course menu is selected. Move the cursor, using the "▲" and "▼" keys, to select the "Vehicle communication." Press the "F1" key to proceed.



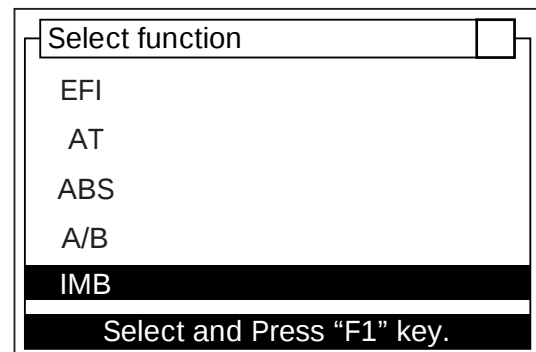
YIMB00015

5. The display indicates the comment screen. Press the "F1" key to proceed.



YIMB00016

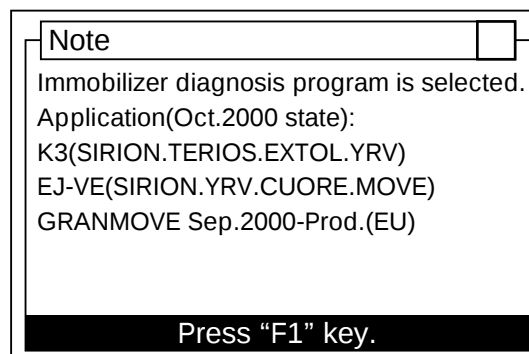
6. The display indicates a screen in which the system is selected. Move the cursor, using the "▲" and "▼" keys, to select the "IMB." Press the "F1" key to proceed.



YIMB00017

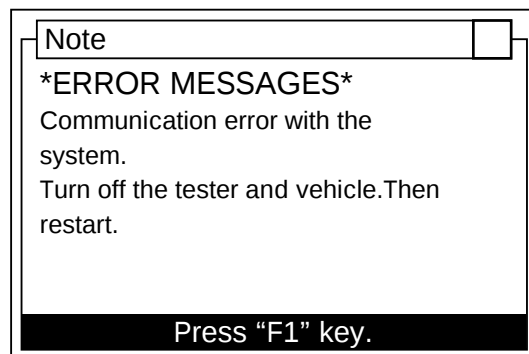
IMB-8

- The display indicates the comment screen.
Press the "F1" key to proceed.

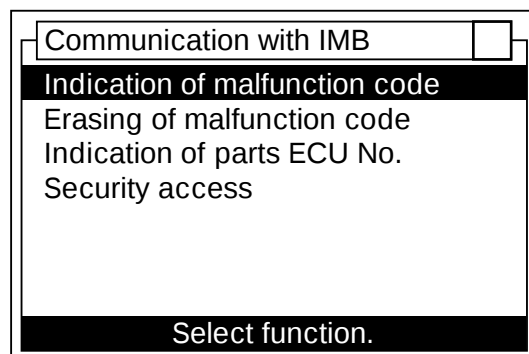


REFERENCE:

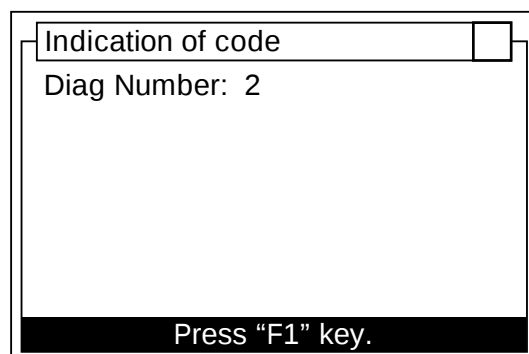
- If there is vehicle communication error, the message in the figure on the right is indicated.



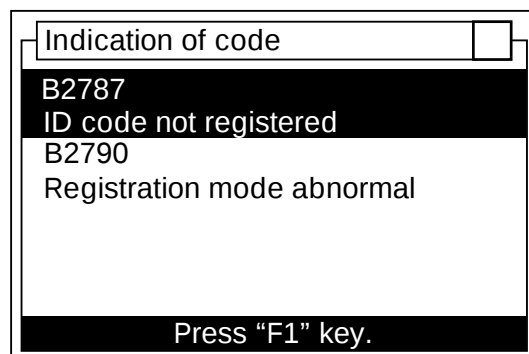
- The display indicates a screen in which the vehicle communication item of the IMB is selected.
Move the cursor, using the "▲" and "▼" keys, to select the "Indication of malfunction code."
Press the "F1" key to proceed.



- The number of all malfunction codes memorized in the computer is indicated on the screen.

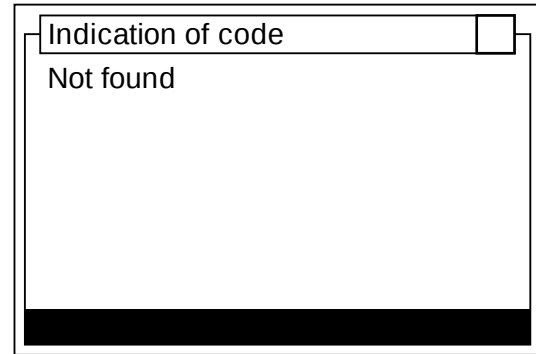


- Press the "F1" key to indicate the malfunction code numbers.



REFERENCE:

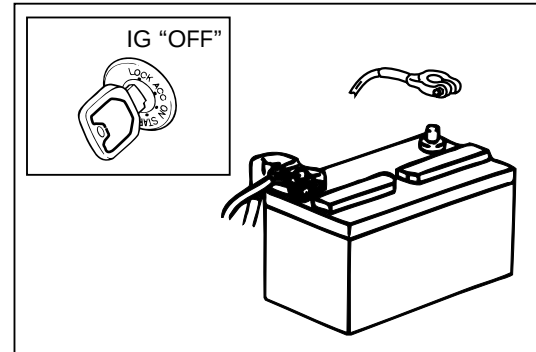
- If there is no malfunction code, the message in the figure on the right is indicated.



YIMB00023

ERASING METHOD OF DIAGNOSIS CODES

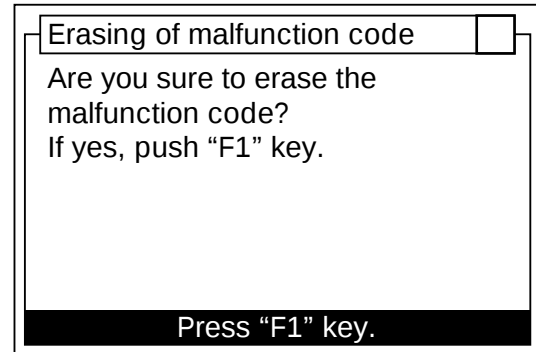
To erase the diagnosis codes memorized in the ECU after malfunctions have been repaired, disconnect the battery ground cable from the negative (-) terminal of the battery for at least 10 seconds with the ignition switch turned off.



YIMB00024

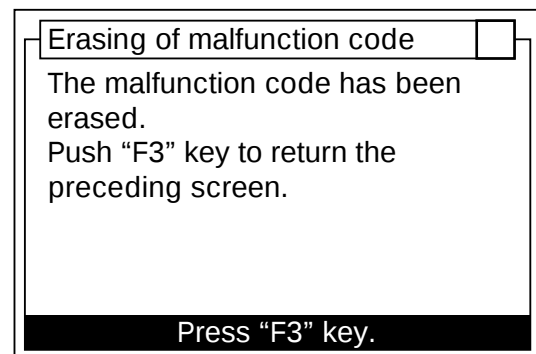
Method Using Diagnostic Tester (DS-21)

- On the screen in Step 9 on the preceding page, select the "Erasing of malfunction code." Press the "F1" key to proceed.



YIMB00025

- Press the "F1" key to erase the malfunction codes.



YIMB00026

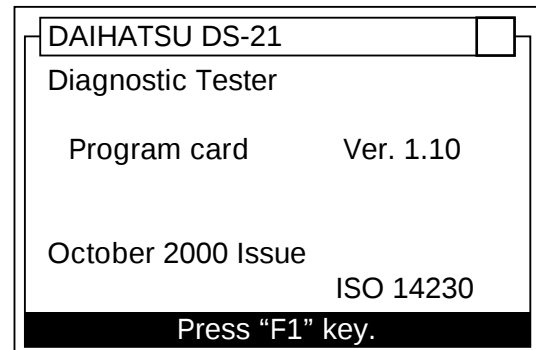
SECURITY ACCESS

Releasing method

- Insert the trouble shooting program into the DS-21 and turn it ON.
- With the screen of the right figure indicated, input the keys in the sequence of "▲", "▼", "F2", "F2" and "F1". Then, the security is released.
- After gaining access, it becomes possible to execute the items Initializing of EEPROM.

NOTE:

- When this function is executed, the ID code stored in the immobilizer ECU will be erased.



YIMB00027

TABLE OF DIAGNOSIS CODE

DTC Code No.	Code No.	Number of glowing of check lamp	Diagnosis item	Diagnosis contents
B2796	12		Malfunction of transponder	When there is no reply from key transponder after the coil has energized key transponder. (This diagnosis code is cleared if ID code can be read normally next time.)
B2795	21		Unmatching of ID codes	When immobilizer ECU determines that an attempt was made to start engine, using an unregistered key:
B2787	23		Unregistered ID codes	When transponder code to immobilizer ECU is unregistered: (Code to backup RAM is not memorized.)
B2790	31		Abnormality of registration mode	At time of registration of sub key, terminal T is not connected to ground, or an attempt is made to make registration, using a sub key. (Code to backup RAM is not memorized.)
B2788	41		Faulty communication between immobilizer ECU and EFI ECU • Non-matching of codes	When a signal of non-matching of code is received at time of communication with EFI ECU:
B2789	42		Faulty communication between immobilizer ECU and EFI ECU • When there is no reply of code:	When reply of code has not been received within specified time from EFI ECU at time of communication with EFI ECU:

DTC: Diagnostic Trouble Code

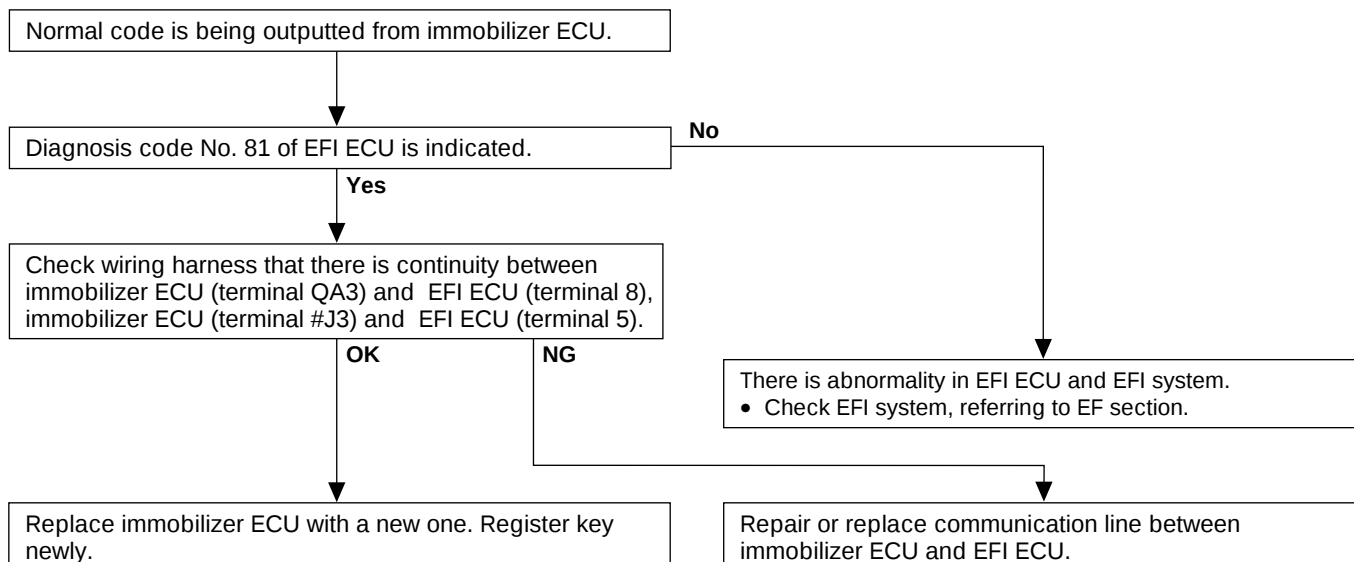
YIMB00028

TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

1	DS-21 on screen	Check lamp indication
	_____	Normal

NOTE:

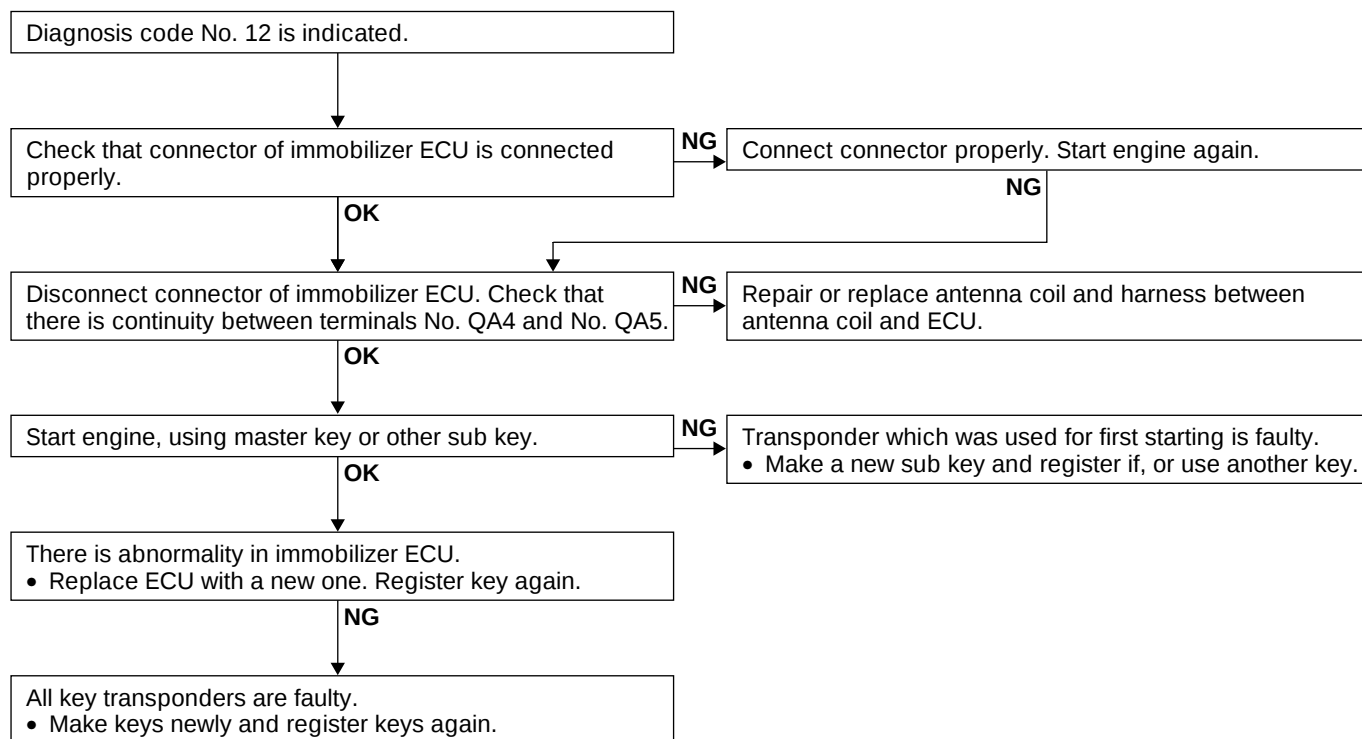
- In this case, the followings are possible causes.
 - Open wire or short between immobilizer ECU and EFI ECU
 - Immobilizer ECU malfunctioning
 - EFI system malfunctioning



2	DS-21 on screen	Check lamp indication
	DTC No. B2796	Code No. 12

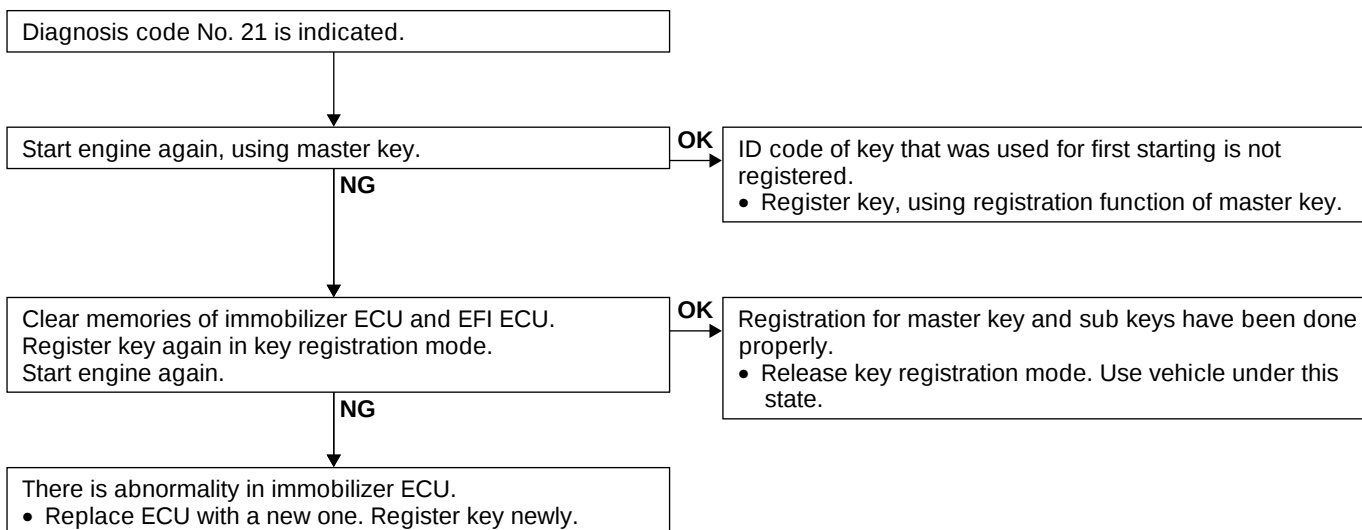
NOTE:

- In this case, the followings are possible causes.
 - ① Poor contacts in ECU connector or terminal
 - ② Open wire or short in antenna coil or harness
 - ③ Key transponder malfunctioning



YIMB00091-00000

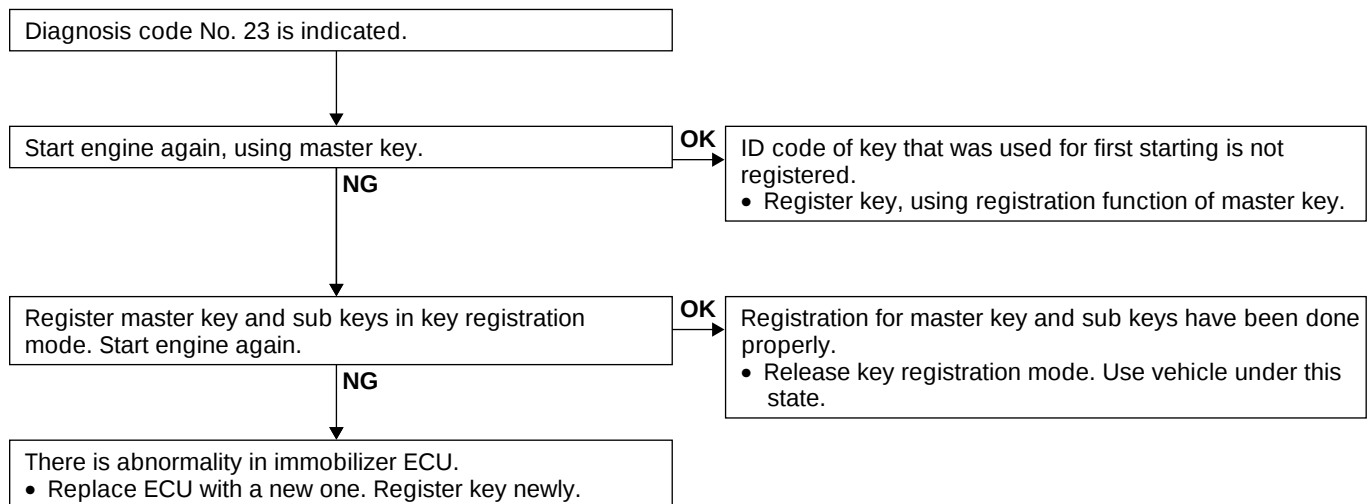
3	DS-21 on screen	Check lamp indication
	DTC No. B2795	Code No. 21



YIMB00092-00000

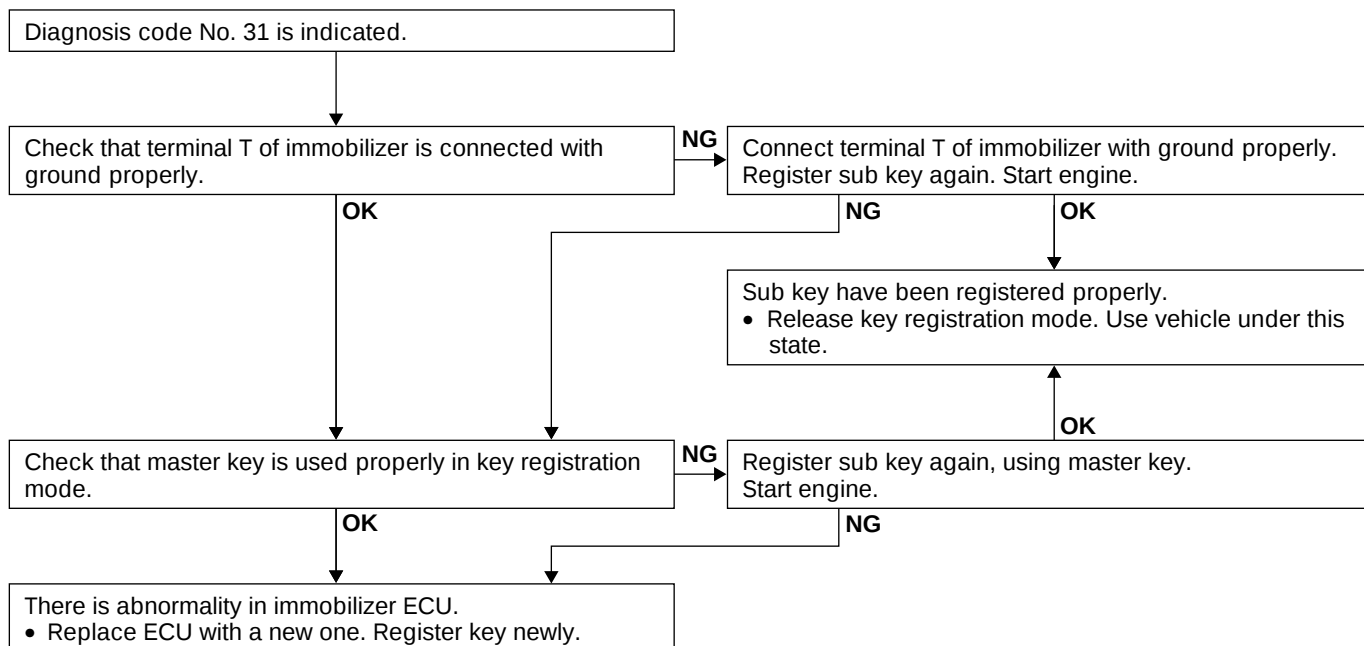
IMB-12

4	DS-21 on screen	Check lamp indication
	DTC No. B2787	Code No. 23



YIMB00093-00000

5	DS-21 on screen	Check lamp indication
	DTC No. B2790	Code No. 31

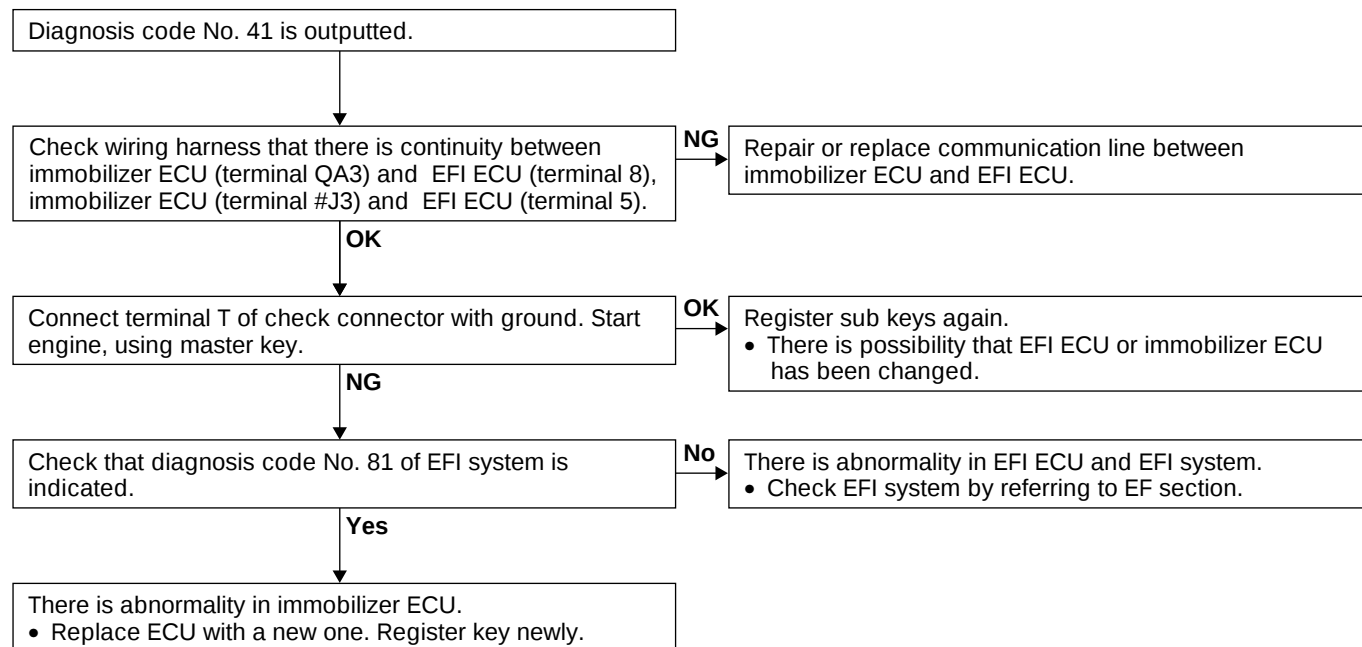


YIMB00094-00000

6	DS-21 on screen	Check lamp indication
	DTC No. B2788	Code No. 41

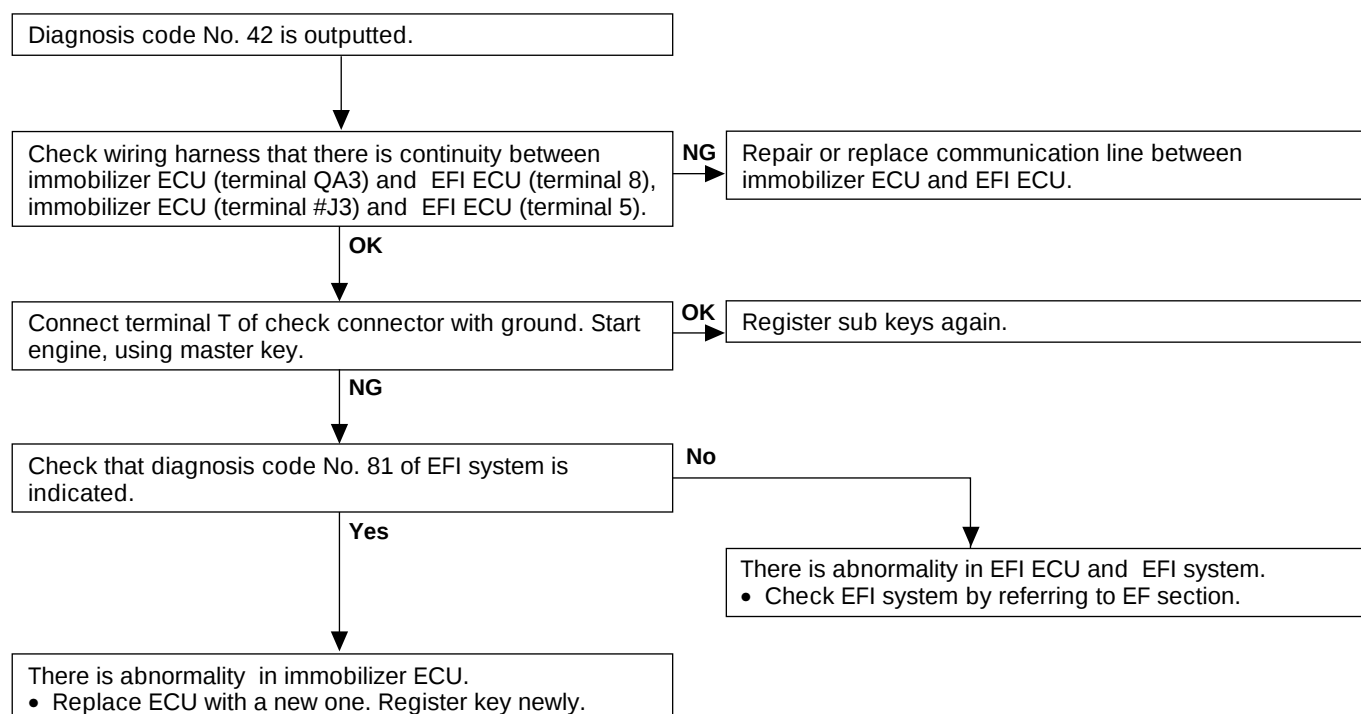
NOTE:

- There are cases that this code is outputted when the EFI ECU or immobilizer ECU is borrowed from other vehicles.



YIMB00095-00000

7	DS-21 on screen	Check lamp indication
	DTC No. B2789	Code No. 42



YIMB00096-00000

IMB-14

FUNCTION CHECK OF IMMOBILIZER SYSTEM

The function check of the immobilizer system can be performed by doing the following two checks.

1. Ensure that the engine starts by using the master key and sub key.
2. Ensure that the engine will not start with a key without the transponder.

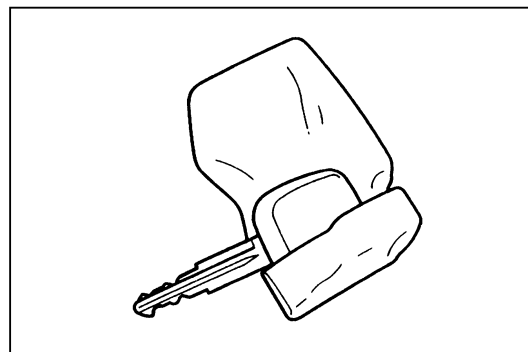
In the check 1, the system can be checked easily by using the master key and sub key.

Now we explain that the check can be made in the following method as one of the check method of 2.

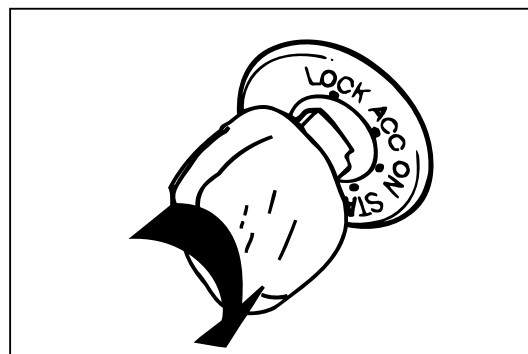
Checking procedure

1. Wind a piece of aluminum foil or the like at around the resin section of the key of the vehicle concerned.
(The aluminum foil shuts off the magnetic field, thus preventing the transponder from being energized.)
2. Start the engine with the key wound up with the aluminum foil. Check that the engine will not start.
3. Install the check lamp to the diagnosis connector.
Connect the jump wire between Test terminal and earth terminal. Ensure that the diagnosis code No. 12 is outputted by the indicator lamp.
4. After confirming the diagnosis code of immobilizer system and EFI system, erase the diagnosis code No. 81 memorized in the EFI ECU by removing the terminal (-) of the battery.

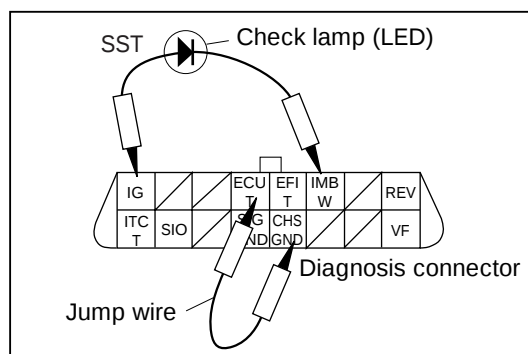
YIMB00097-00000



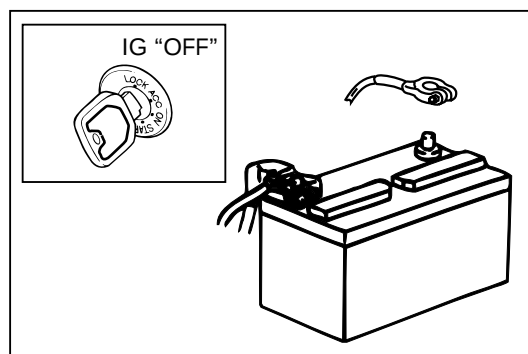
YIMB00029



YIMB00030

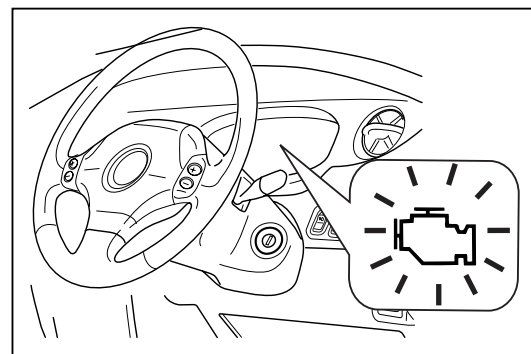


YIMB00031



YIMB00032

5. Ensure that the diagnosis code No. 81 has been erased and that the normal code is being outputted. Remove the check lamp and jump wire from the diagnosis connector.



YIMB00033

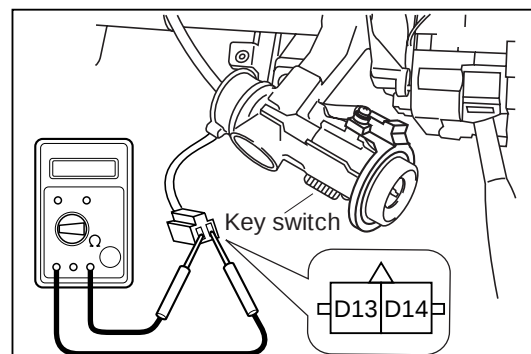
INSPECTION OF KEY SWITCH

1. Disconnect the connector of the wire harness.
2. Confirm the continuity of the key switch connector at the time when the key is inserted into or pulled out from the key cylinder.

Specification:

With the Key Inserted: Continuity exists.

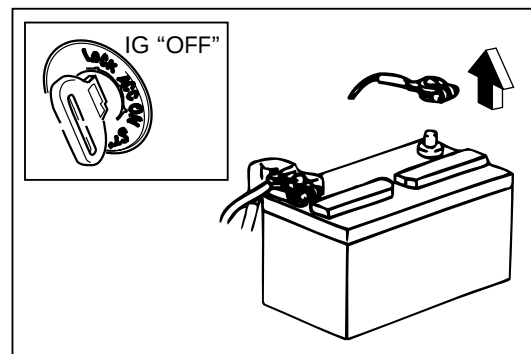
With the Key Not Inserted: No continuity exists.



YIMB00034

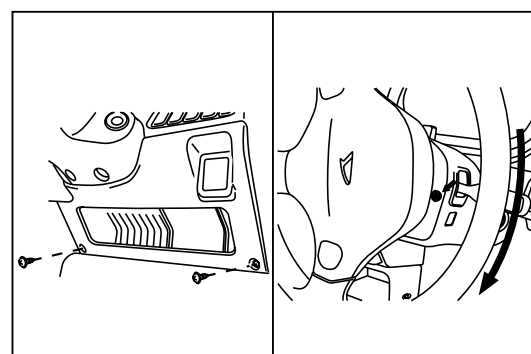
REPLACEMENT AND INSTALLATION OF ANTENNA COIL

1. Disconnect the battery ground cable from the negative (-) terminal of the battery.



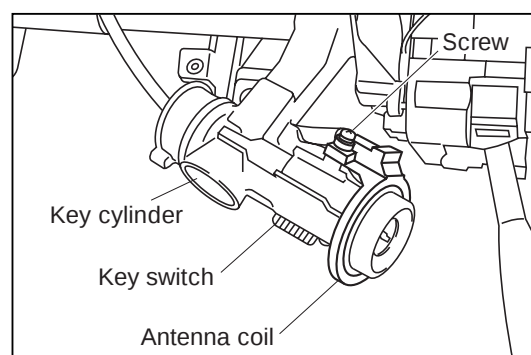
YIMB00035

2. Remove the instrument lower finish panel and steering column lower cover by loosening the attaching screws.
3. Remove the steering column upper cover.
4. Disconnect the connector of the antenna coil and remove the wire band.
5. Removal of antenna coil.
 - (1) Loosen the antenna coil attaching screw.
 - (2) Remove the antenna coil from the ignition key cylinder.



YIMB00036

6. Attach a new antenna coil to the ignition key cylinder and tighten the attaching screw.
7. Attach a new wire band.
8. Connect the connector of the antenna coil.
9. Install the steering column upper cover.
10. Install the steering column lower cover and instrument lower finish panel with attaching screws.
11. Connect the battery ground cable to the negative (-) terminal of the battery.



YIMB00037

IMB-16

REGISTRATION OF IDENTIFICATION CODE

DESCRIPTION

- It is essential to register the identification code at the time when the transmitter is lost or added and when the ECU is replaced.
- When a new identification code is registered, the old identification code will be erased.
- Even when the battery is removed, the identification code memory will not be lost.
- It is possible to register an identification code for one master key and three sub keys at the maximum.

YIMB00107-00000

REGISTRATION METHOD OF IDENTIFICATION CODE

When replacing the parts bearing a [\$] mark in the following table or changing the identification code, follow the relevant flow chart to register the identification code.

NOTE:

- We have described the procedure on the assumption that the immobilizer ECU is a new part and has no identification code registered. Therefore, as regards the immobilizer ECU already memorizing registration codes, be sure to perform initializing, using the DS-21. (Refer to IMB-9 page)

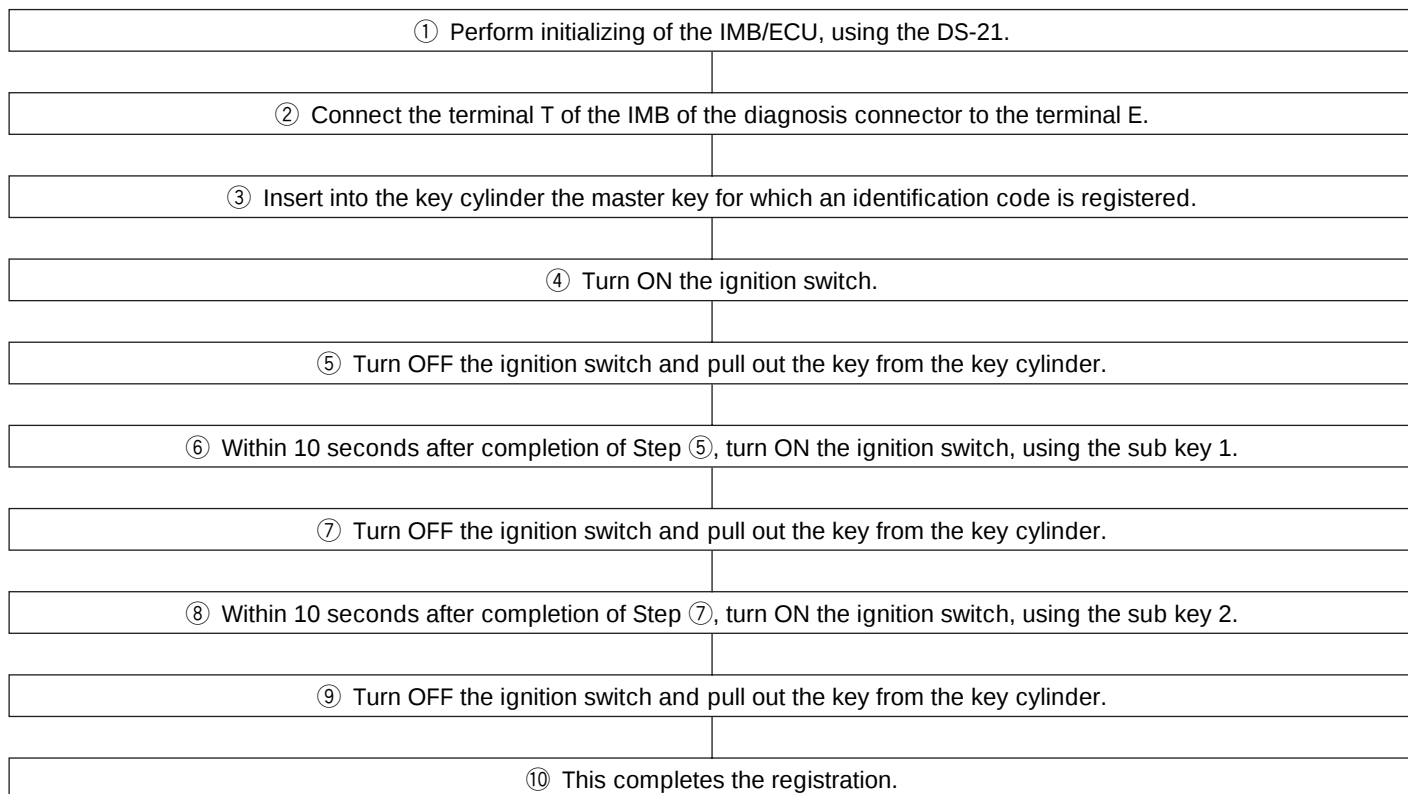
YIMB00108-00000

TABLE SHOWING LIST OF REPLACEMENT PARTS

	Replacement parts					Relevant flow chart No.
	Master key	Sub key 1	Sub key 2	Immobilizer ECU	EFI ECU	
1	●					A
2		●				B
3			●			B
4				●		C
5					●	C
6	●	●				D
7	●		●			D
8	●			●		E
9	●				●	A
10		●	●			F
11		●		●		G
12		●			●	G
13			●	●		G
14			●		●	G
15				●	●	C
16	●	●	●			H
17	●	●		●		I
18	●	●			●	I
19	●		●	●		I
20	●		●		●	I
21	●			●	●	A
22		●	●	●		J
23		●	●		●	J
24		●		●	●	G
25			●	●	●	G
26	●	●	●	●		K
27	●	●	●		●	K
28	●	●		●	●	L
29	●		●	●	●	L
30		●	●	●	●	J
31	●	●	●	●	●	K

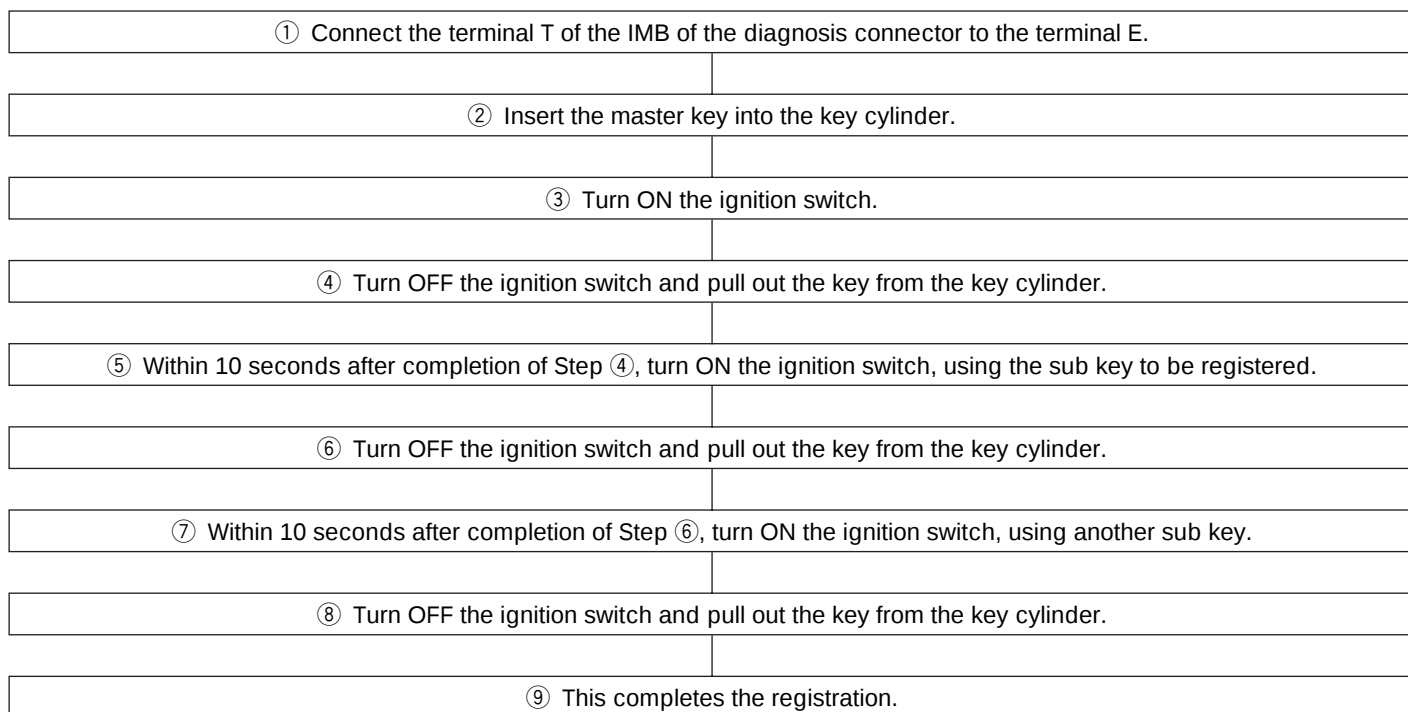
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Flow chart No. [A]



YIMB00110-00000

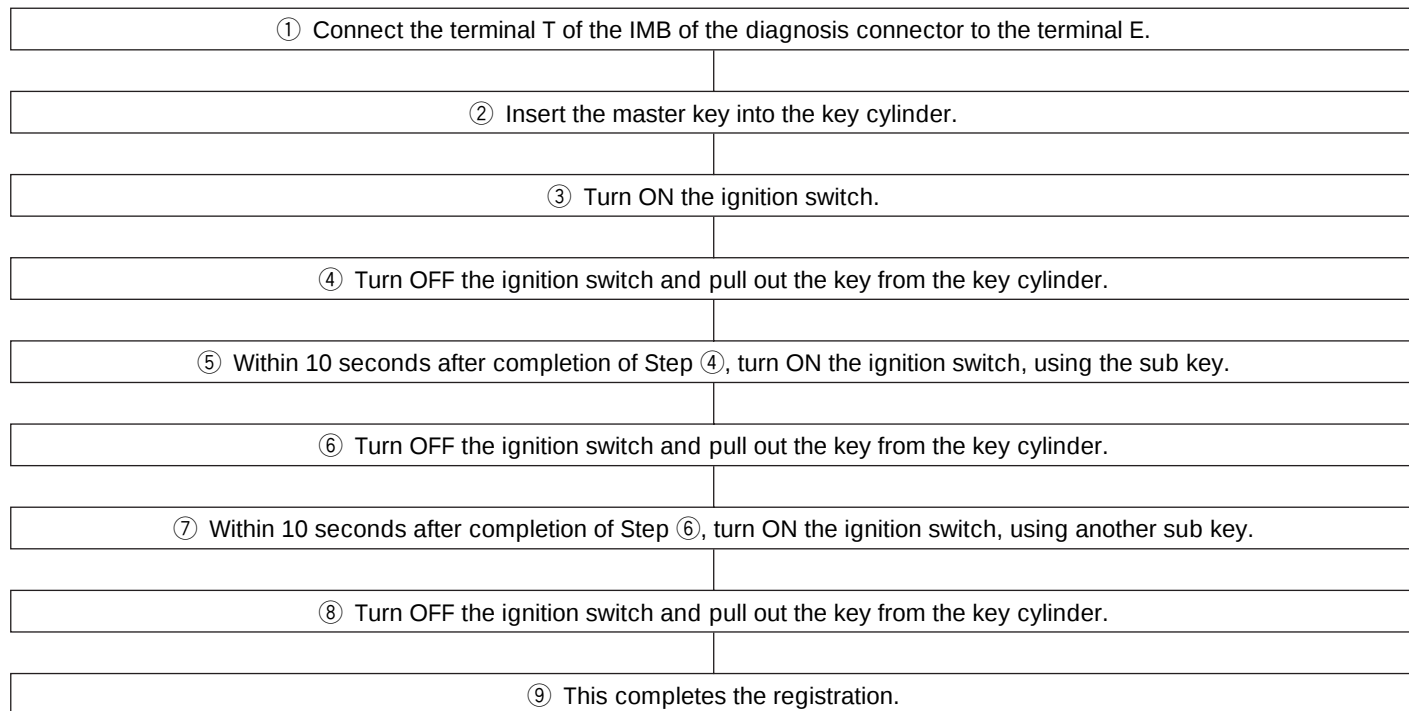
Flow chart No. [B]



YIMB00111-00000

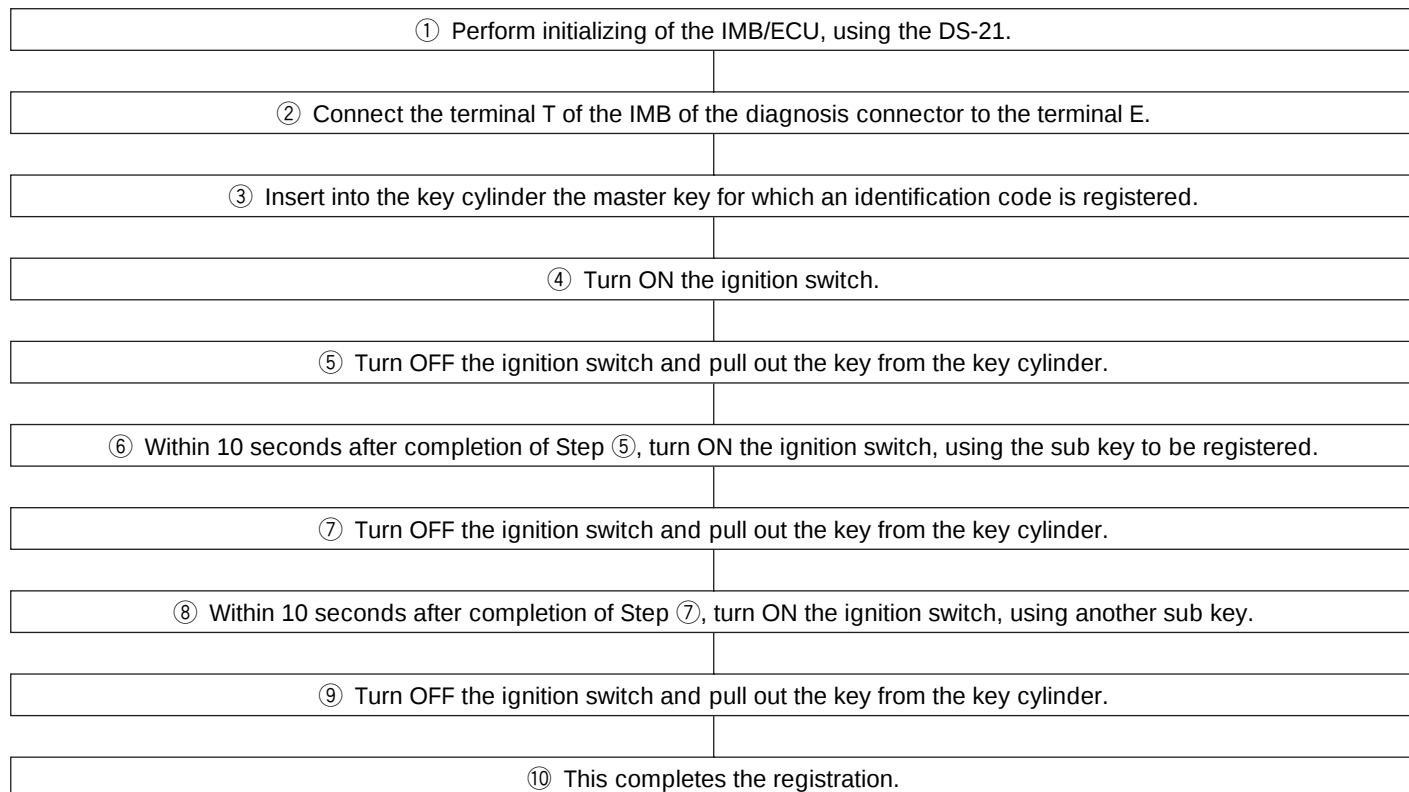
IMB-18

Flow chart No. [C]



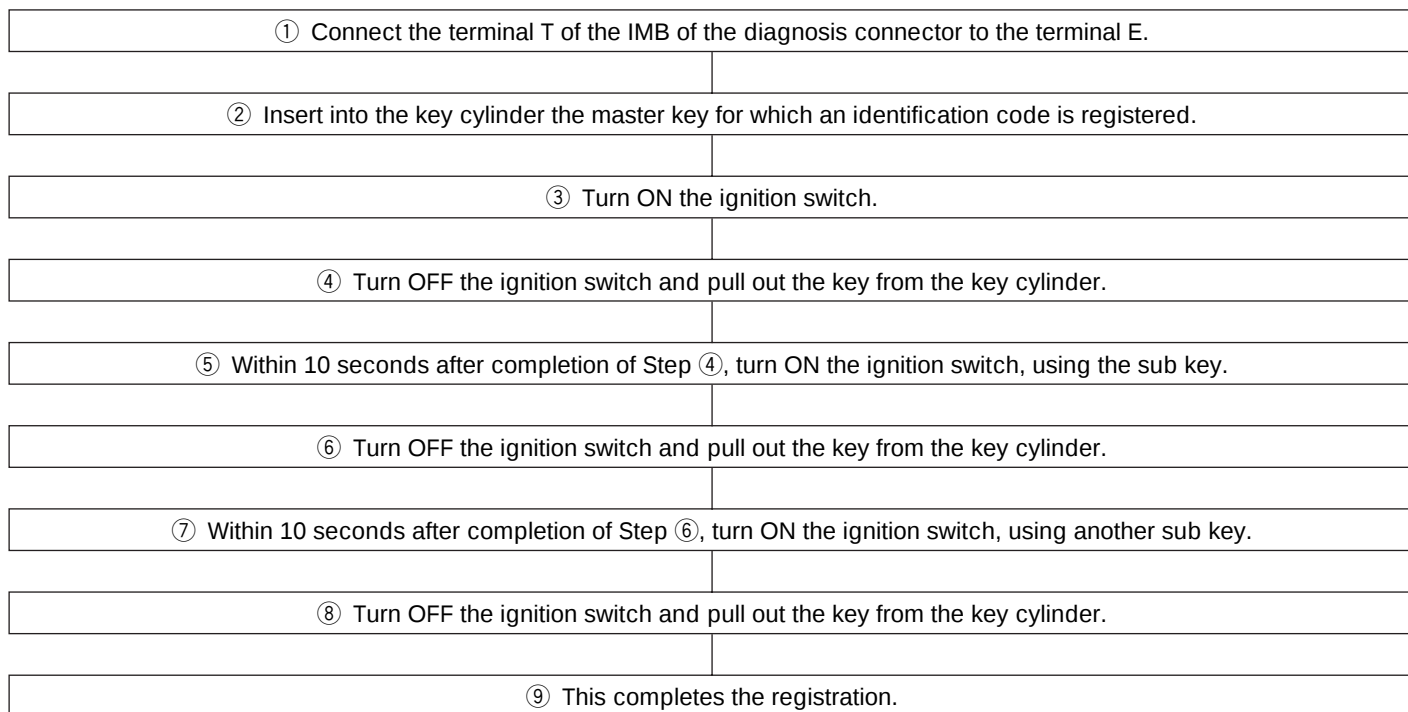
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Flow chart No. [D]



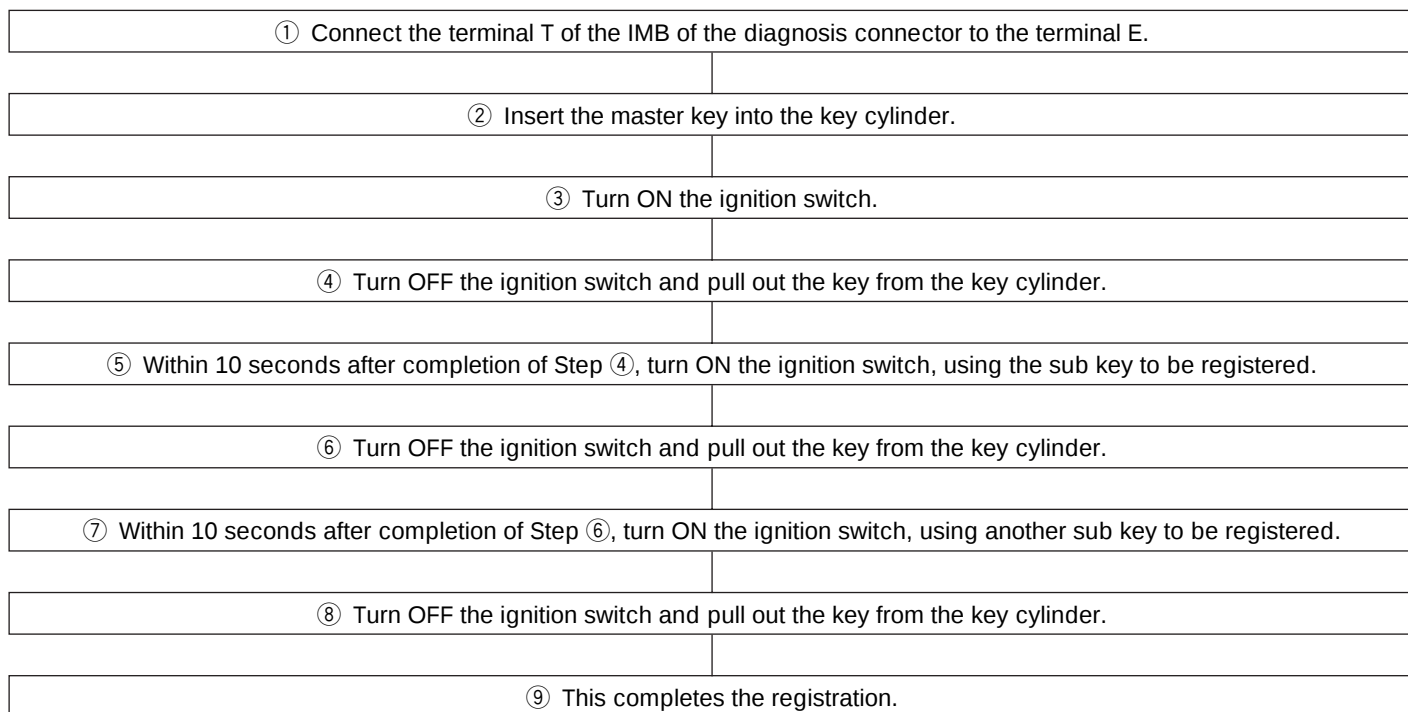
YIMB00113-00000

Flow chart No. [E]



YIMB00114-00000

Flow chart No. [F]



YIMB00115-00000

IMB-20

Flow chart No. [G]

① Connect the terminal T of the IMB of the diagnosis connector to the terminal E.	
② Insert the master key into the key cylinder.	
③ Turn ON the ignition switch.	
④ Turn OFF the ignition switch and pull out the key from the key cylinder.	
⑤ Within 10 seconds after completion of Step ④, turn ON the ignition switch, using the sub key to be registered.	
⑥ Turn OFF the ignition switch and pull out the key from the key cylinder.	
⑦ Within 10 seconds after completion of Step ⑥, turn ON the ignition switch, using another sub key.	
⑧ Turn OFF the ignition switch and pull out the key from the key cylinder.	
⑨ This completes the registration.	

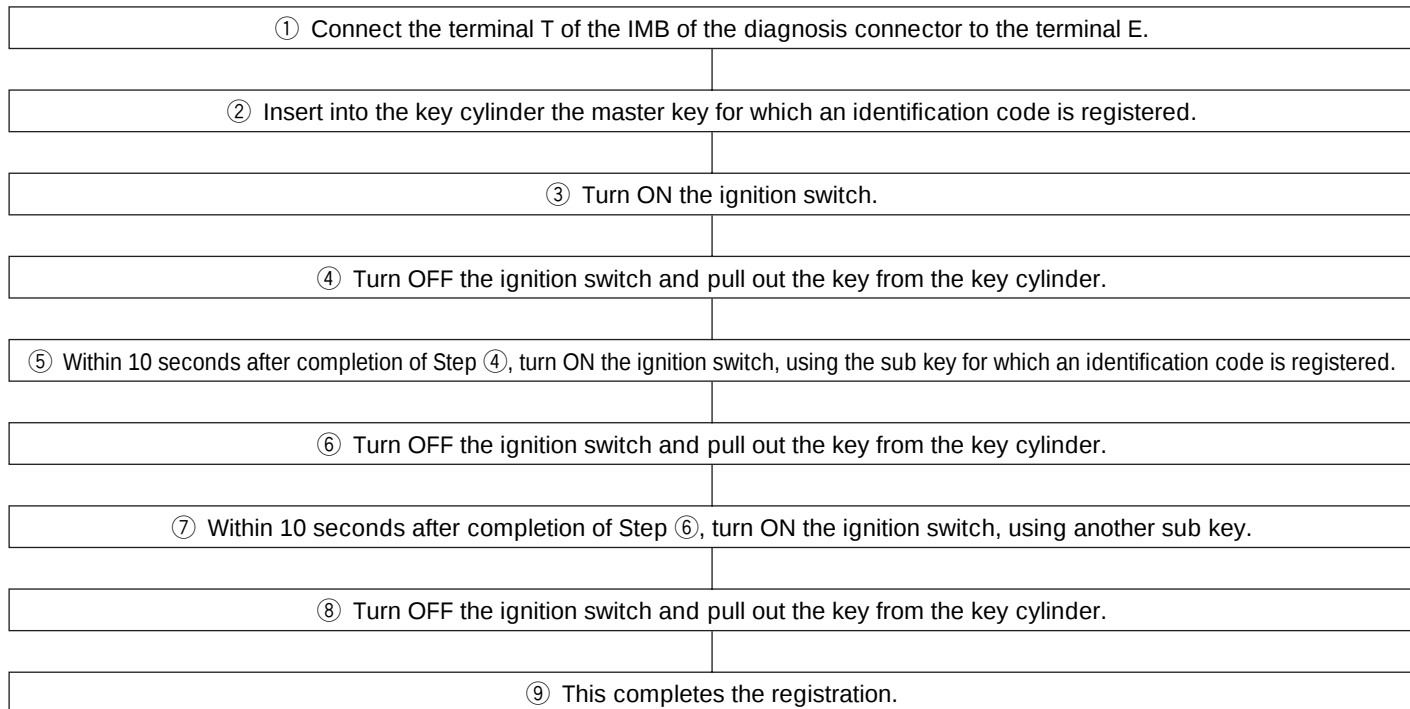
YIMB00116-00000

Flow chart No. [H]

① Perform initializing of the IMB/ECU, using the DS-21.	
② Connect the terminal T of the IMB of the diagnosis connector to the terminal E.	
③ Insert into the key cylinder the master key for which an identification code is registered.	
④ Turn ON the ignition switch.	
⑤ Turn OFF the ignition switch and pull out the key from the key cylinder.	
⑥ Within 10 seconds after completion of Step ⑤, turn ON the ignition switch, using the sub key 1 for which an identification code is registered.	
⑦ Turn OFF the ignition switch and pull out the key from the key cylinder.	
⑧ Within 10 seconds after completion of Step ⑦, turn ON the ignition switch, using the sub key 2 for which an identification code is registered.	
⑨ Turn OFF the ignition switch and pull out the key from the key cylinder.	
⑩ This completes the registration.	

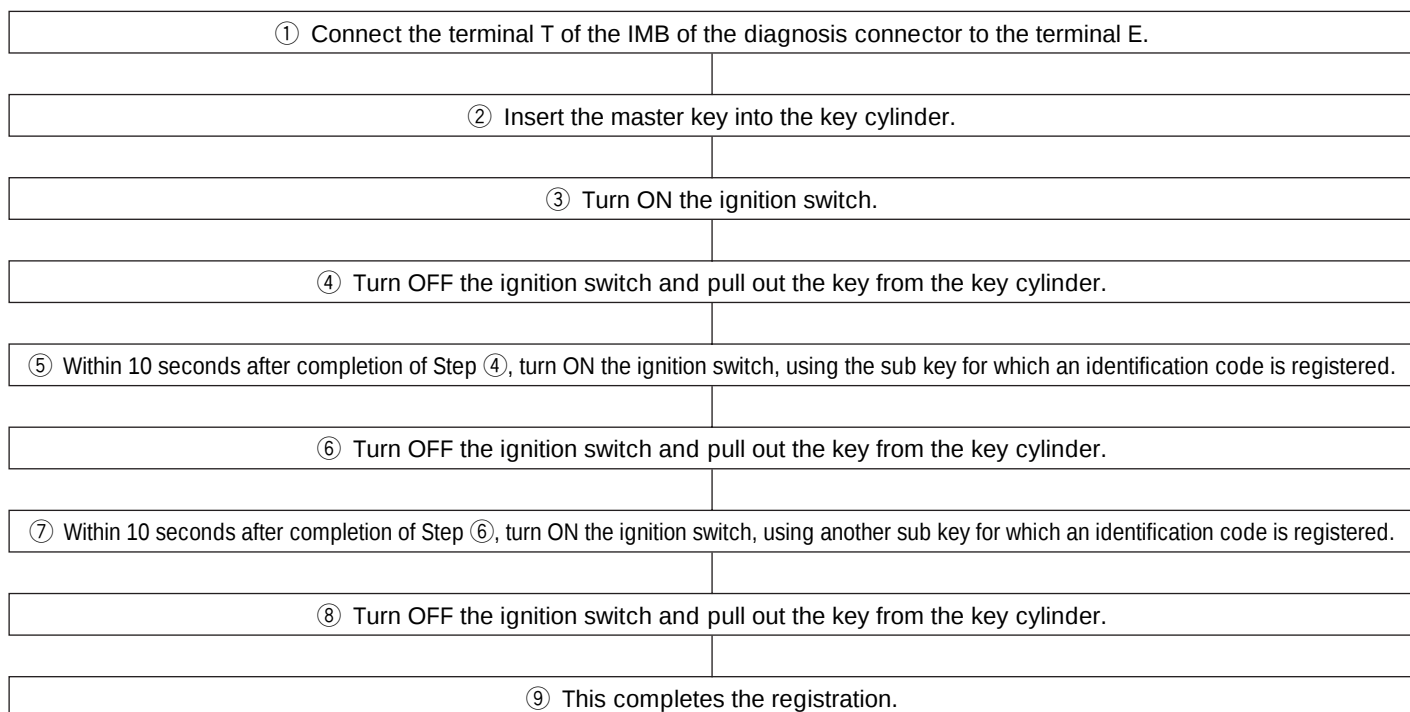
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Flow chart No. [I]



YIMB00118-00000

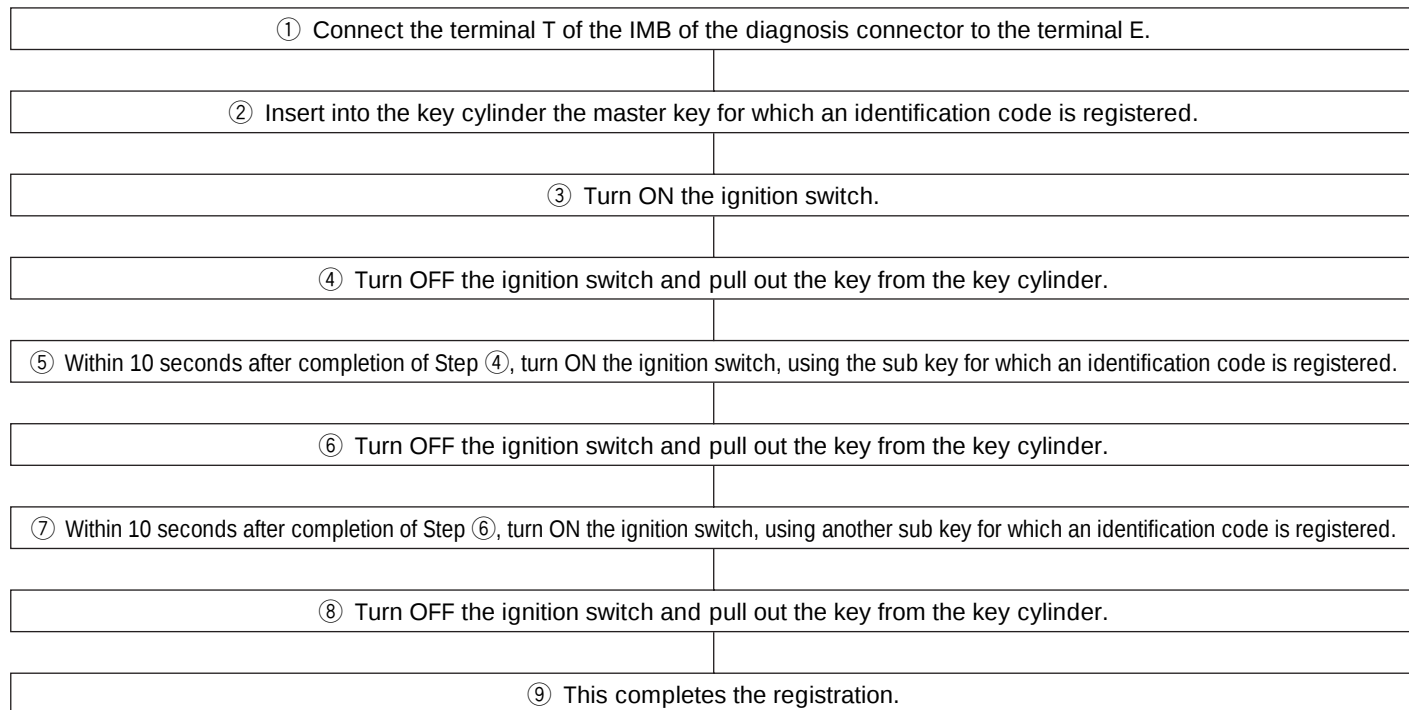
Flow chart No. [J]



YIMB00119-00000

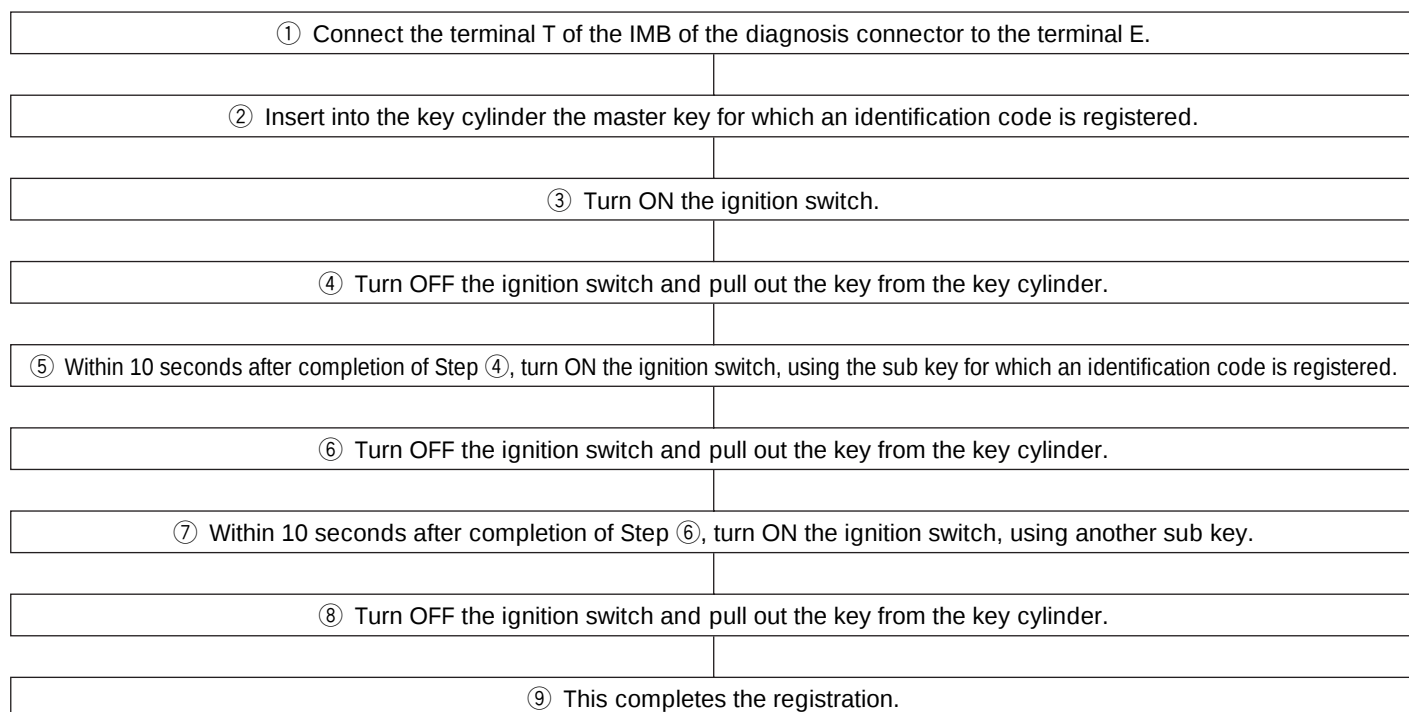
IMB-22

Flow chart No. [K]



YIMB00120-00000

Flow chart No. [L]



YIMB00121-00000

TO INDEX

TO NEXT SECTION