I4 DOOR LOCK & THEFT DETERRENT

DOOR LOCK SYSTEM

1 OUTLINE

1.The power door lock is provided on all the models.
Refer to Page I4-1.

2.The LIN communication system is employed in a part of the door lock system circuit.
3.The body integrated controller (ITC) is directly attached to the fuse block.
4.The radio wave type keyless entry system is provided on some specifications. The "LOCK" and "UNLOCK" operations for the front doors, rear doors and back door can be performed by the remote control operation.
Refer to Page I4-6.

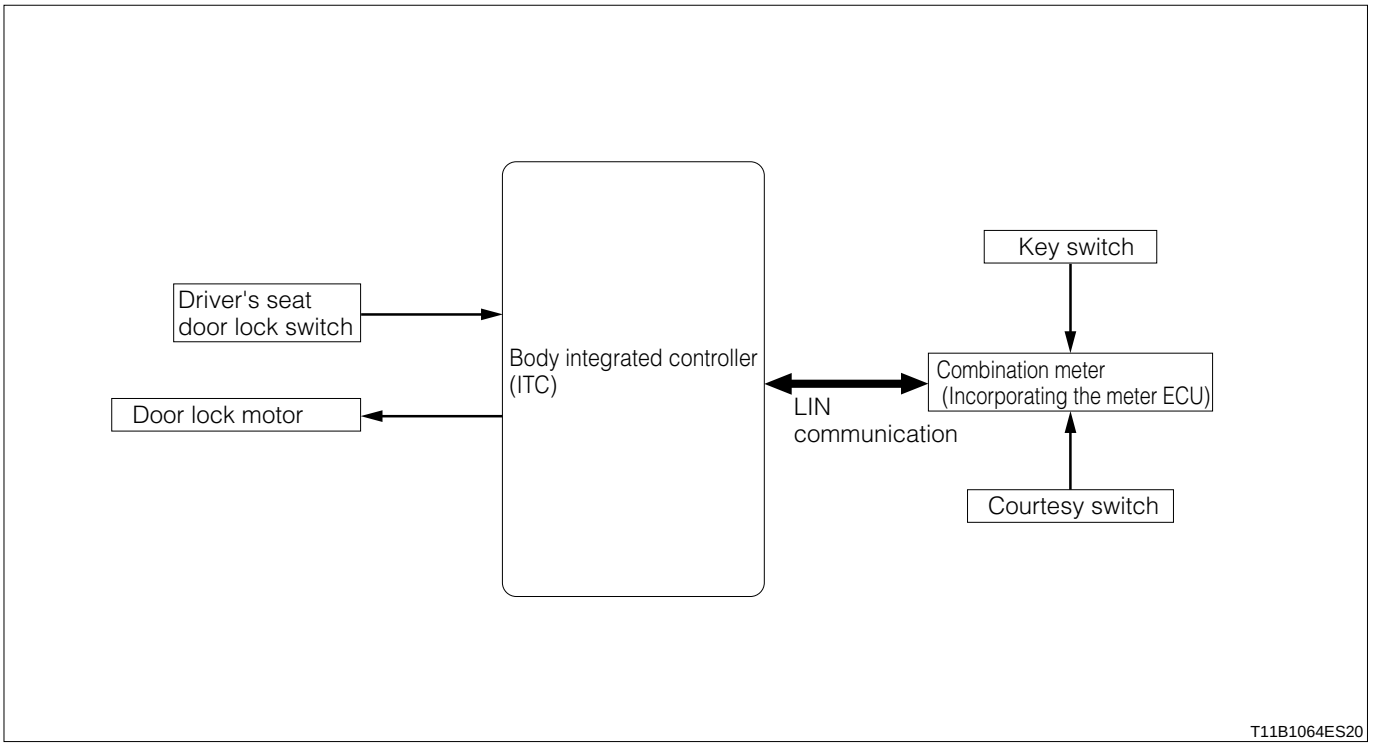
POWER DOOR LOCK SYSTEM

1 OUTLINE

1-1 DESCRIPTION

1.The power door lock is fitted to all vehicles as standard. The front passenger seat door, right and left rear doors and back door can be locked and unlocked interlocking with the lock lever at the driver's seat door or the key cylinder operation.
2.The LIN communication system is employed in a part of the system circuit.

1-2 SYSTEM DRAWING

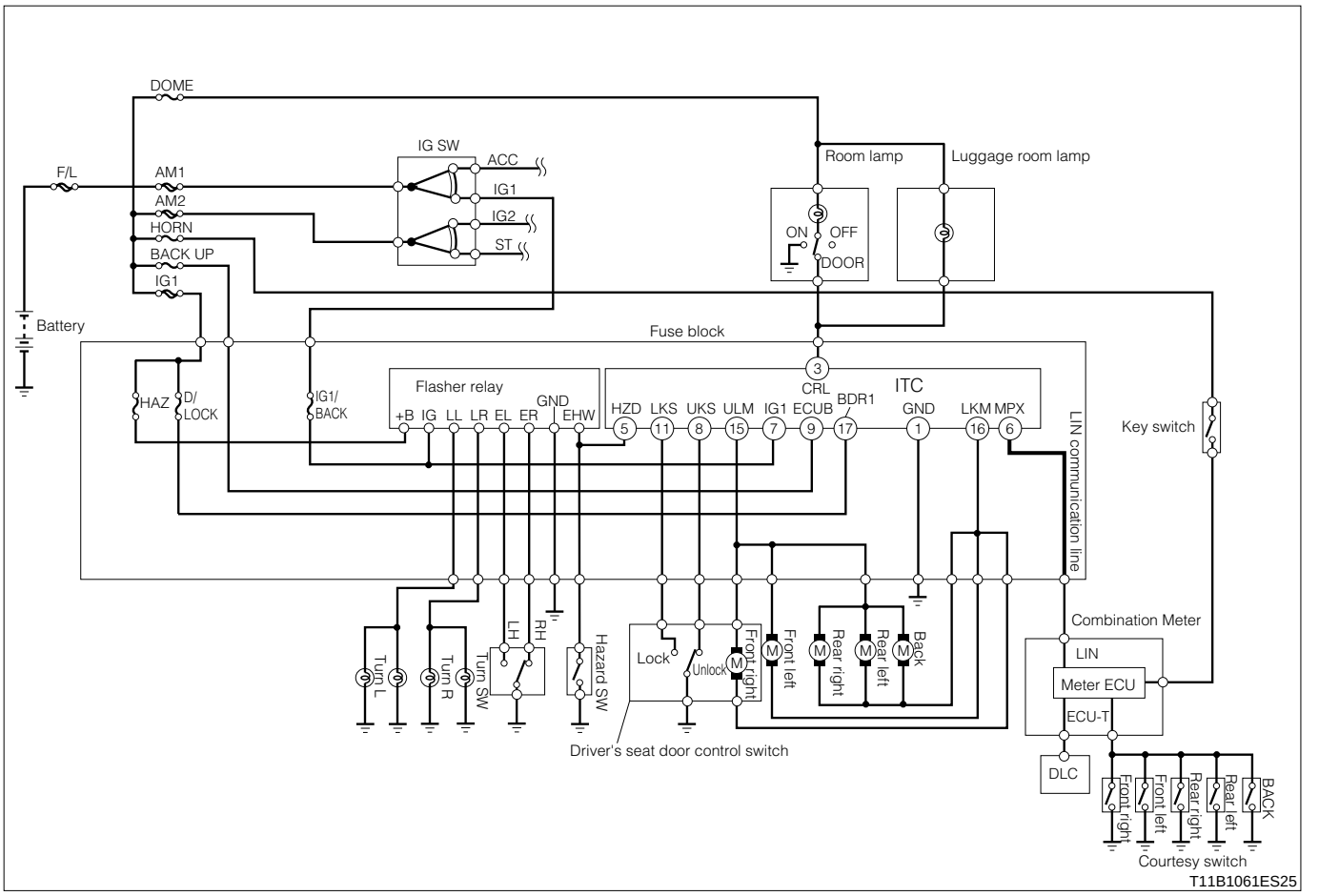


Contents of multiplex communication control

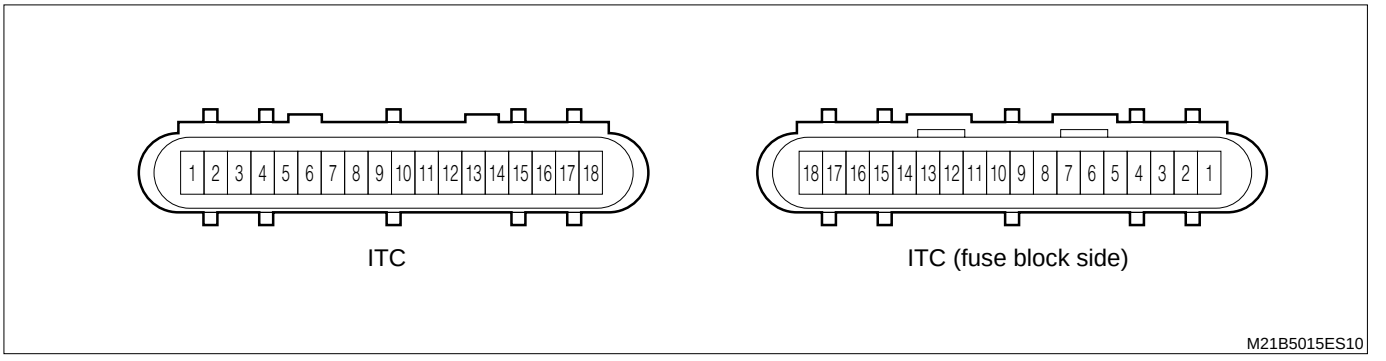
Sending	Receiving	Nomenclature of signals	Contents of control
Meter ECU	ITC	Signal of terminal ECU-T	ECU-T terminal check control
ITC	Meter ECU	Sleep non-permission signal	Sleep (low current mode) transfer prohibition *1

*1
Refer to Page I4-5.

1-3 SYSTEM WIRING DIAGRAM



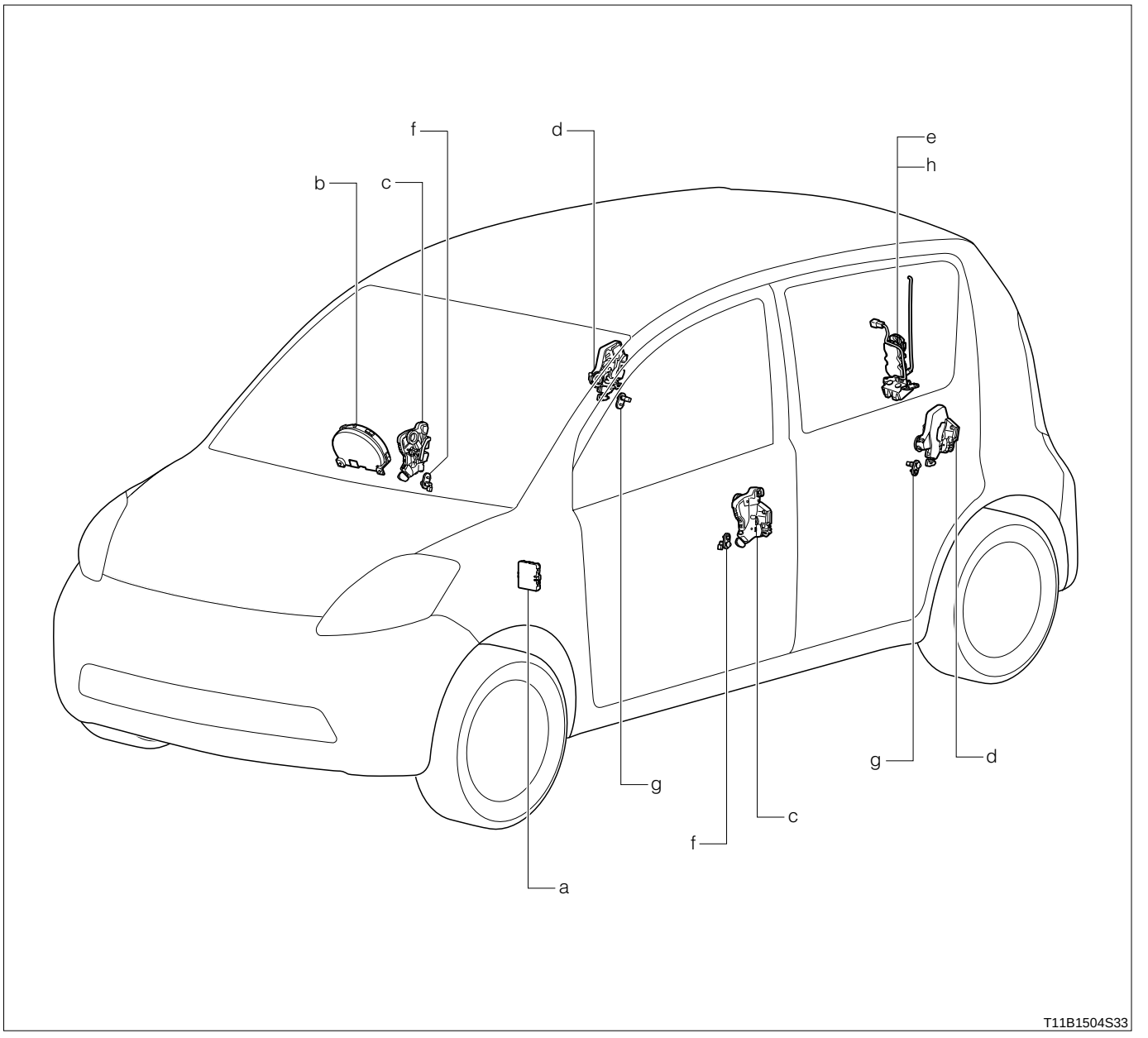
Computer connector terminal arrangement diagram



Body integrated controller (ITC) terminal name

Terminal No.	Terminal code	Terminal name
1	GND	Earth
2	–	–
3	CRL	Room lamp driving output
4	–	–
5	HZD	Hazard lamp driving output
6	MPX	LIN communication input/output
7	IG1	ECU power supply
8	UKS	Door control unlock side switch input
9	ECU B	ECU power supply
10	–	–
11	LKS	Door control lock side switch input
12	–	–
13	–	–
14	–	–
15	ULM	Door lock motor unlock side output
16	LKM	Door lock motor lock side output
17	BDR1	Power supply
18	–	–

1-4 LOCATION OF COMPONENTS



a	Body integrated controller (ITC)
b	Meter ECU
c	Front door lock motor
d	Rear door lock motor
e	Back door lock motor
f	Front door courtesy switch
g	Rear door courtesy switch
h	Back door courtesy switch

2 CONTROL

2-1 KEY LOCKING PREVENTION SYSTEM

1.When all of the following conditions are met, after the door locking procedure has been completed, the door locks are immediately unlocked, thus preventing the key from being locked in.
(1) The key is inserted into the ignition key cylinder. (Key switch is "ON".)
(2) Any of the doors are open. (Courtesy switch is "ON".)
(3) When the driver's seat door lock knob is switched from "UNLOCK" to "LOCK". (Driver's seat door control switch is switched from "UNLOCK" to "LOCK".)

2.When all of the following conditions are met and 1 second has elapsed, the door locks are unlocked thus preventing the key from being locked in.
(1) The key is inserted into the ignition key cylinder. (Key switch is "ON".)
(2) The ignition switch is set to "ACC" or "LOCK".
(3) The driver's seat door lock knob is at the "LOCK". (Driver's seat door control switch is set to "LOCK".)
(4) Any door is open. →All doors are closed. (Courtesy switch is switched from "ON" to "OFF".)

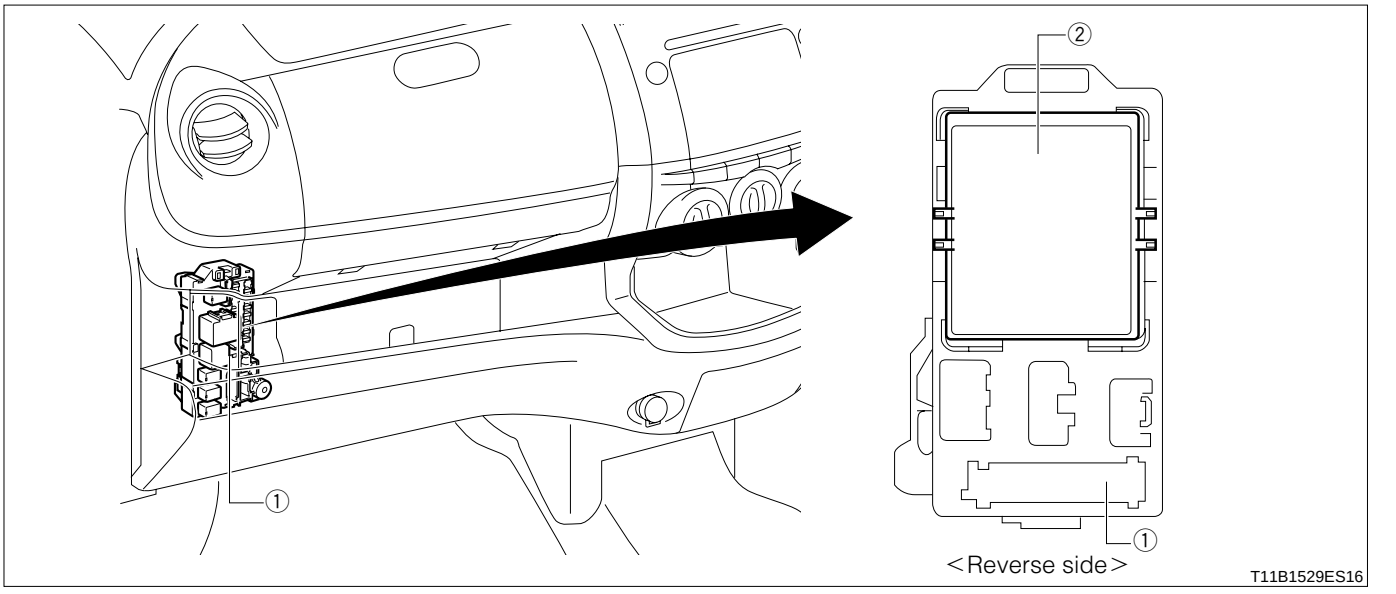
2-2 WAKE-UP/SLEEP FUNCTION

The body integrated controller has a wake-up/sleep function in order to reduce the current used when the ignition is switched to "ACC" or "LOCK".

3 COMPONENTS

3-1 BODY INTEGRATED CONTROLLER (ITC)

1.It is attached to the reverse side of the fuse block on the lower left hand side of the instrument panel.
2.The ITC receives a signal from the driver's seat door lock switch and controls the power door lock motor.



①	Fuse block
②	Body integrated controller (ITC)

3-2 COMBINATION METER

Signals, such as the ECU-T terminal signal, are sent over the LIN communication line to the ITC from the meter ECU in the combination meter.

KEY-LESS ENTRY SYSTEM

1 OUTLINE

1-1 DESCRIPTION

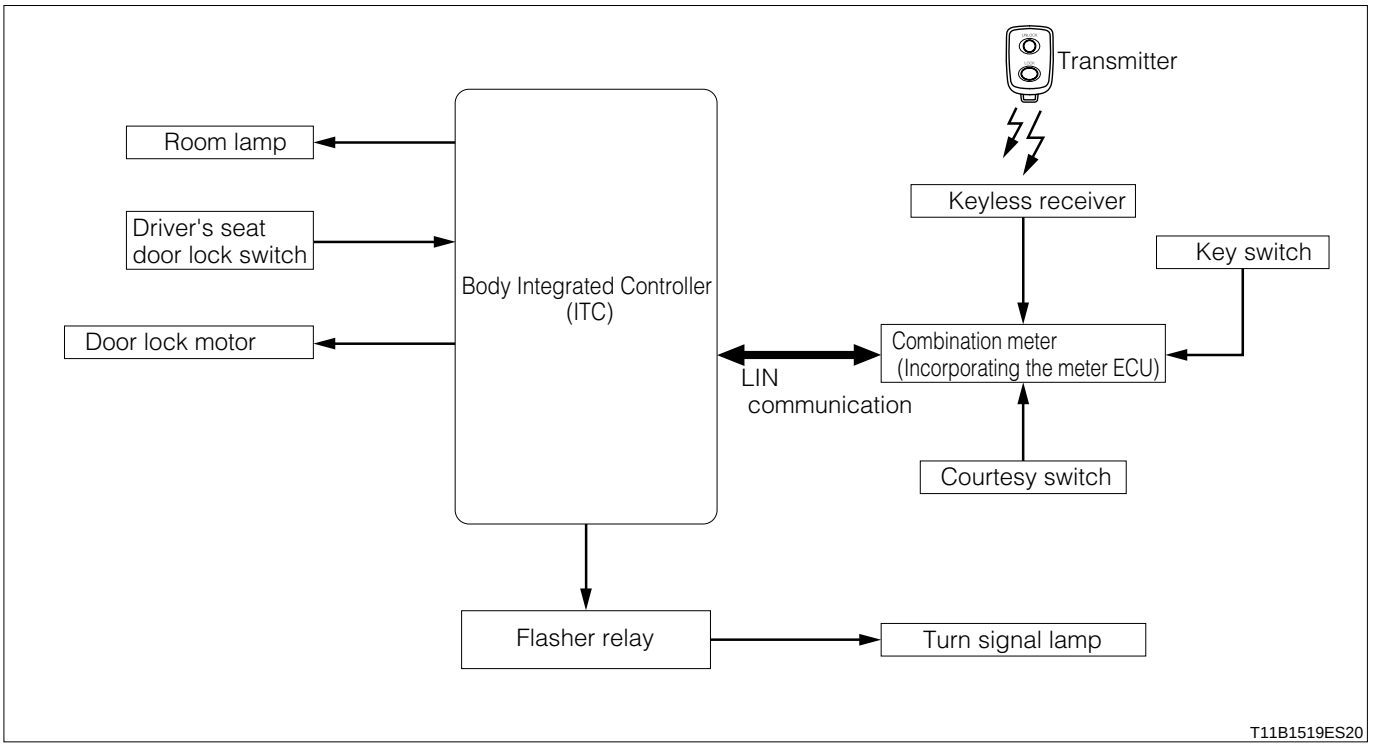
1.The radio wave type keyless entry system is provided on some specifications. The "LOCK" and "UNLOCK" operations for the front doors, rear doors and back door can be performed by the remote control operation.

2.The remote control of locking all the doors is possible by pushing the switch of the transmitter which is apart from the key, thus sending weak waves.

3.The operation range of remote control is approx. 3 meters in radius from the center of the vehicle. However, the range might be reduced or the function could be disabled due to the battery drain, strong radio wave or noise. Also the operation range might be affected by the shape of the vehicle.

4.The LIN communication system is employed in a part of the system circuit.

1-2 SYSTEM DRAWING



Contents of LIN communication control

Sending	Receiving	Signal Nomenclature	Contents of control
Meter ECU	ITC	Keyless door lock signal	Door lock, answer back control
		Keyless door unlock signal	Door unlock, answer back control
		Key switch signal	Key locked in prevention control
		Door courtesy switch signal	Room lamp control *1
ITC	Meter ECU	Sleep non-permission signal	Sleep (low current mode) transfer prohibition *2

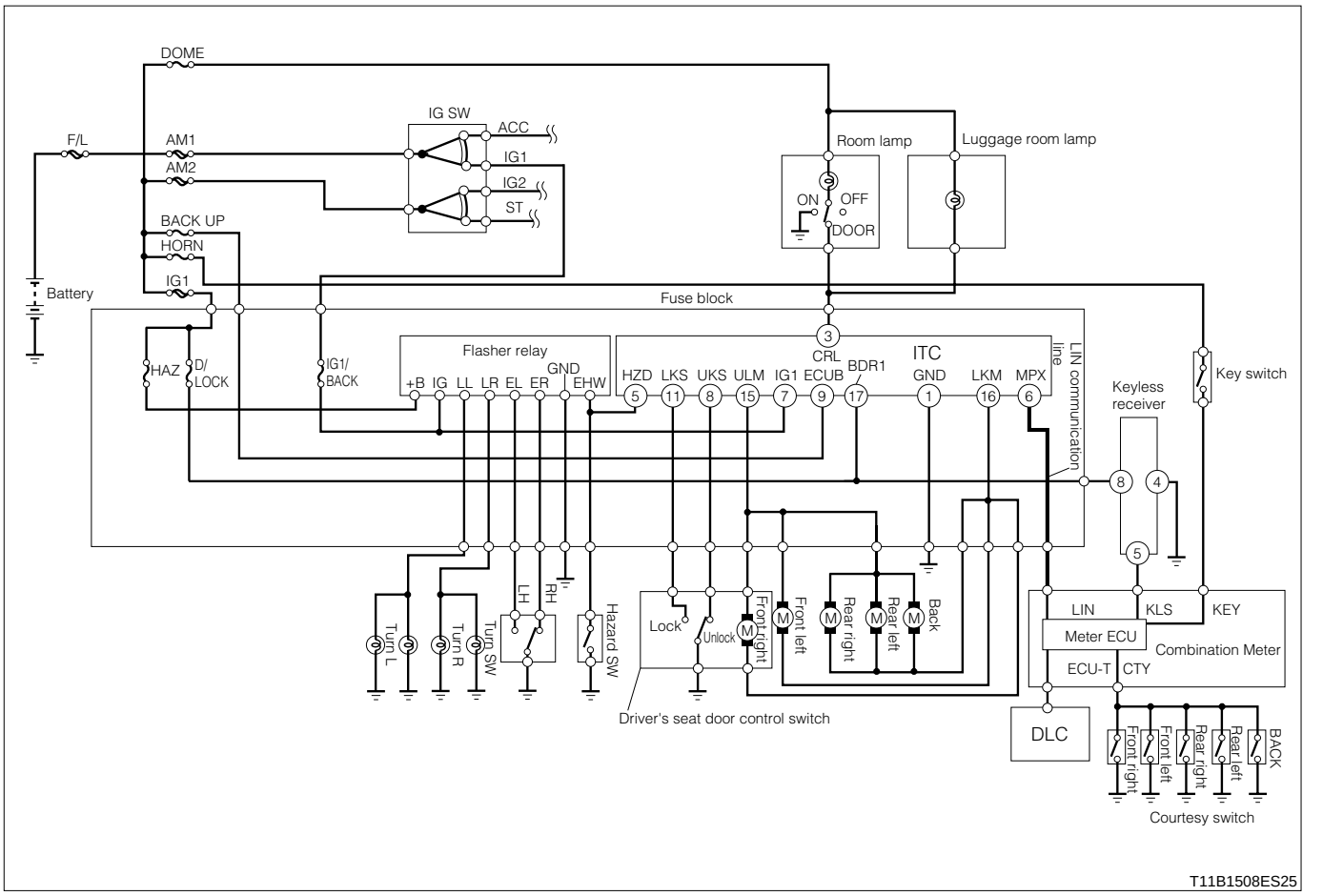
*1

Refer to Page J1-10.

*2

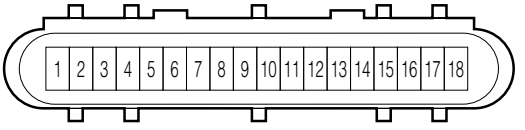
Refer to Page I4-5.

1-3 SYSTEM WIRING DIAGRAM

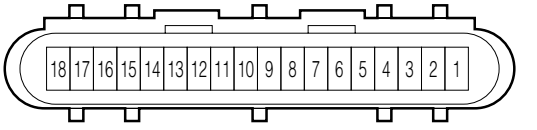


T11B1508ES25

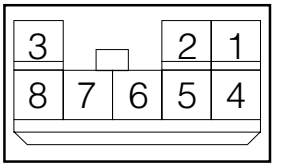
Computer connector terminal arrangement diagram



ITC



ITC fuse block side



Keyless reciever

T11B8511ES16

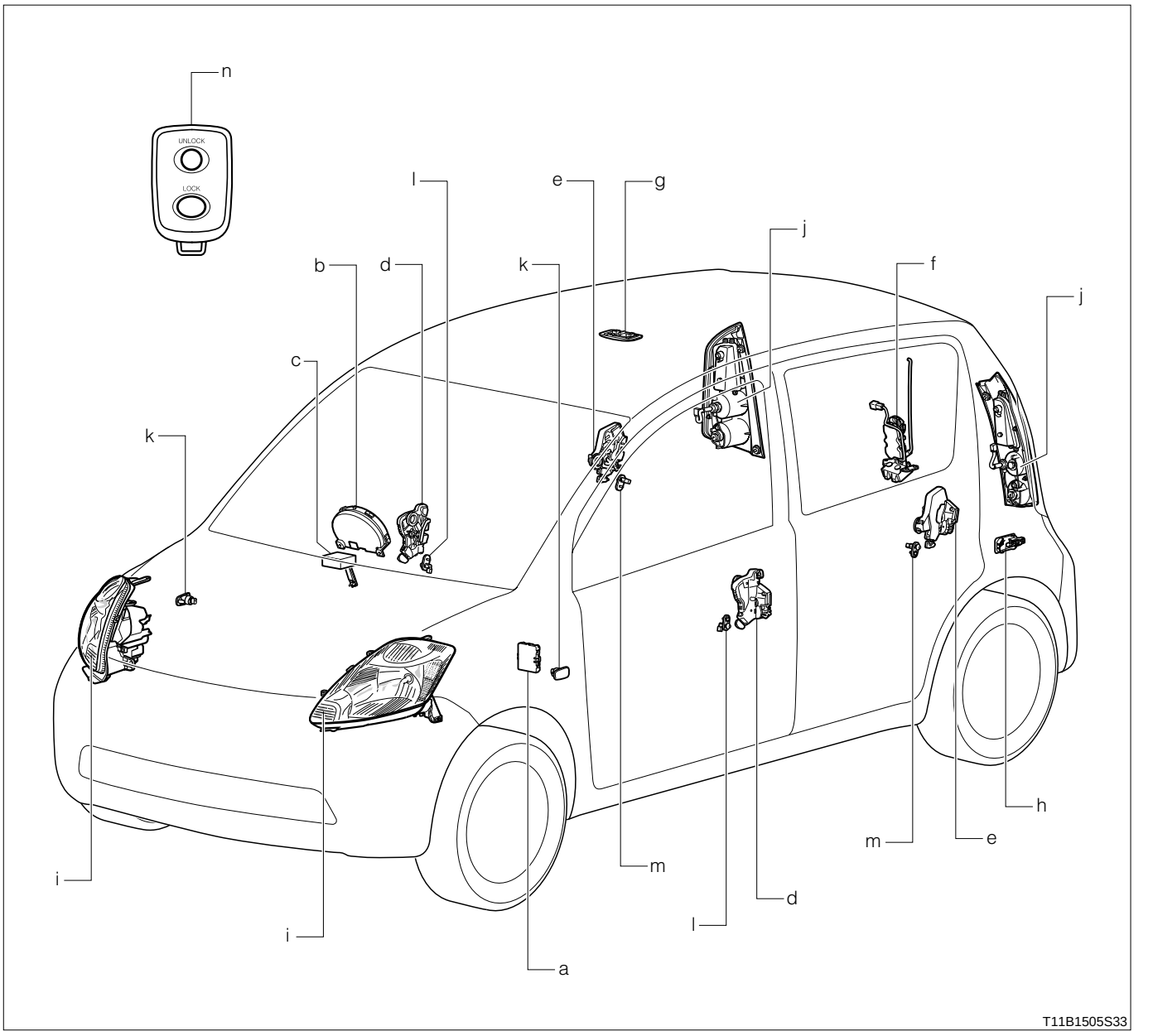
Body integrated controller (ITC) terminal name

Terminal No.	Terminal code	Terminal name
1	GND	Earth
2	—	—
3	CRL	Room lamp driving output
4	—	—
5	HZD	Hazard lamp driving output
6	MPX	LIN communication input / output
7	IG1	ECU power supply
8	UKS	Door control unlock side switch input
9	ECU B	ECU power supply
10	—	—
11	LKS	Door control lock side switch input
12	—	—
13	—	—
14	—	—
15	ULM	Door lock motor unlock side output
16	LKM	Door lock motor lock side output
17	BDR1	Power supply
18	—	—

Receiver connector terminal name

Terminal No.	Terminal code	Terminal name
1	—	—
2	—	—
3	—	—
4	GND	Earth
5	SIG	Keyless signal output
6	—	—
7	—	—
8	+B	Receiver power supply

1-4 LOCATION OF COMPONENTS



a	Body integrated controller (ITC)
b	Meter ECU
c	Keyless receiver
d	Front door lock motor
e	Rear door lock motor
f	Back door lock motor
g	Room lamp
h	Luggage room lamp
i	Front turn signal lamp
j	Rear turn signal lamp
k	Side turn signal lamp
l	Front door courtesy switch
m	Rear door courtesy switch
n	Transmitter

2 CONTROL

2-1 BASIC FUNCTION

1.When the electric wave sent from the transmitter is received, all the doors either unlock or lock.

(1) The receiver picks up the identity code (faint electrical wave) sent from the transmitter.

(2) The receiver checks the incoming identity code against the registered identity code and if they are in agreement it sends an "LOCK" or "UNLOCK" activation request signal.

(3) The activation request signal from the receiver is sent from the meter ECU over the LIN communication line to the ITC.

(4) The ITC receives an activation request from the meter ECU and controls the door locks, hazard lamps and the room lamp.

2-2 AUTOMATIC LOCKING FUNCTION

If all the doors have been unlocked by the remote control by the transmitter, but none of them are physically opened within 30 seconds, all the doors will automatically lock.

2-3 AJAR DOOR PREVENTING FUNCTION

Remote control is disabled if any of the doors is open or ajar. (when courtesy switch is "ON".)

2-4 KEY REMAINING REMINDER FUNCTION

If the key is in the ignition key cylinder, the remote control will not have any effect.

2-5 ANSWER BACK FUNCTION

When door locks are remotely operated by the transmitter, the hazard lamps and room lamp answer back. The room lamp answers back only when the switch is set to the door interlocking position.

Answer back function

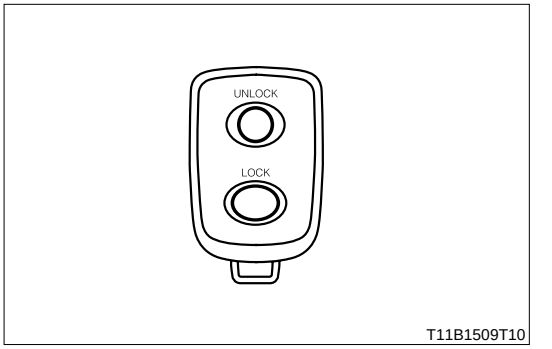
Operating conditions	Section	Answer back
At time of locking	Room lamp	Illuminates after about 3 seconds of dimming
	Luggage room lamp	
	Hazard lamp	Flashing one time
At time of unlocking	Room lamp	Illuminates for approx. 15 seconds
	Luggage room lamp	
	Hazard lamp	Flashing twice

2-6 WAKE-UP/SLEEP FUNCTION

The body integrated controller has a wake-up/sleep function in order to reduce the current used when the ignition is switched to "ACC" or "LOCK".

3 COMPONENTS

3-1 TRANSMITTER

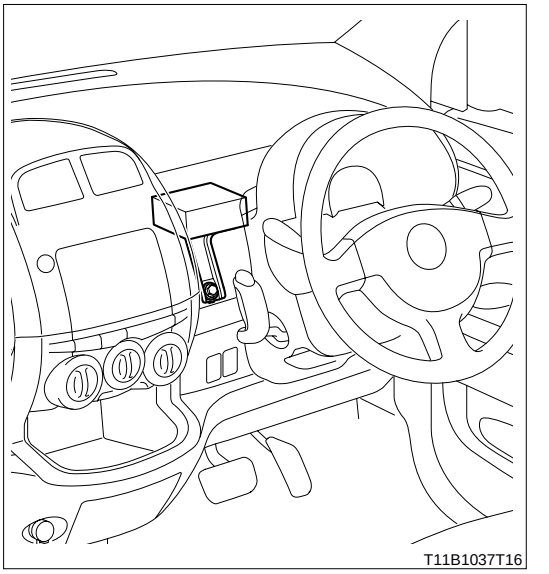


1.The transmitter is a key holder type with a "LOCK" switch and an "UNLOCK" switch.
2.When the signal sending switch is operated, the identifying code by weak radio waves is sent. There are 2^{40} kinds of identifying codes, which differ from transmitter to transmitter.
3.Expected life of the imbedded button battery should be 2 years when used ten times a day (one time refers to one unlock and one lock operations).The button battery can be replaced.

NOTE

- Button battery type: CR1616 3V

3-2 KEYLESS RECEIVER

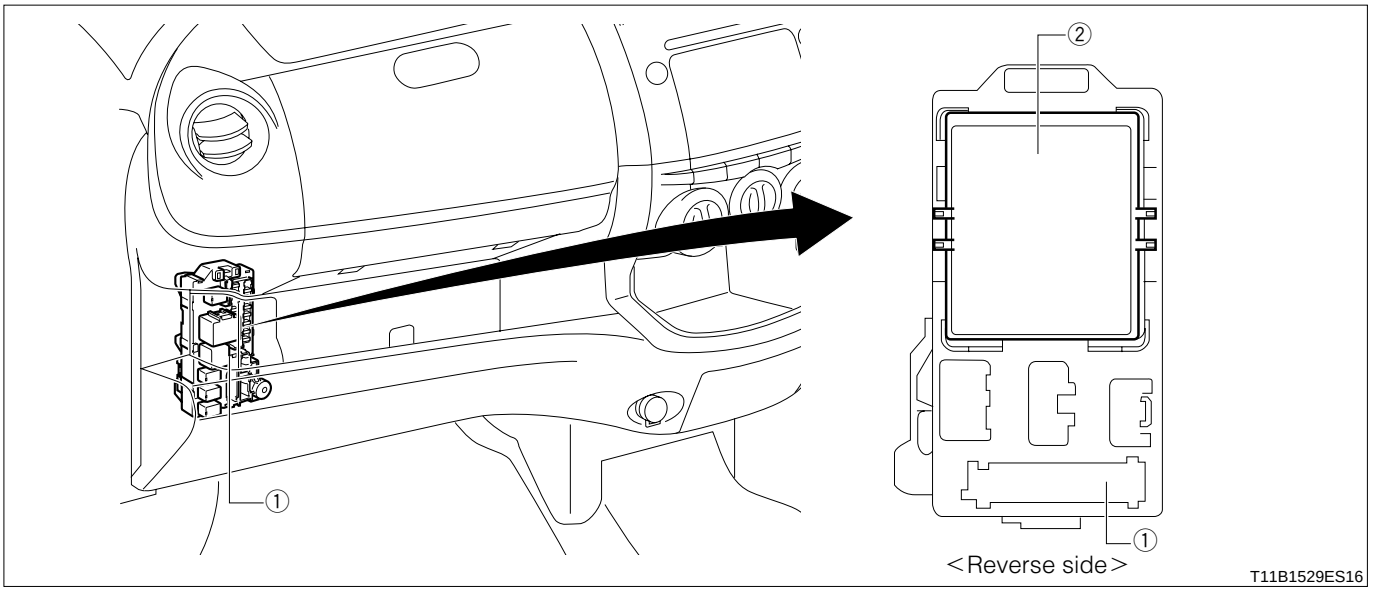


1.When the incoming identity code (faint electrical wave) from the transmitter is received, if it is in agreement with the registered identity code in the receiver, an "LOCK" or "UNLOCK" activation request signal is sent to the meter ECU.
2.Up to two identification codes can be stored, which means two transmitters can be used.
3.When the new transmitter is registered, any previously registered identification codes stored in the receiver will be completely cleared, therefore the codes need to be re-registered.
4.Even if the battery is removed, stored identification codes are not cleared.

3-3 BODY INTEGRATED CONTROLLER(ITC)

1.It is fitted to the reverse-side of the fuse block which is located on the lower left-hand side of the instrument panel.

2.Upon receiving the "LOCK"/"UNLOCK" activation request signals from the meter ECU over the LIN communication line, all the doors are locked or unlocked and other functions are performed.



①	Fuse block
②	Body integrated controller (ITC)

3-4 COMBINATION METER

The meter ECU is built-in and it communicates with the ITC over the LIN communication line.

3-5 COURTESY SWITCH

The open/close status signal of each door is sent via the meter ECU to the ITC.

3-6 ROOM LAMP

Refer to Page J1-10.

3-7 TURN SIGNAL LAMP

Refer to Page J1-7.

IMMOBILIZER SYSTEM

1 OUTLINE

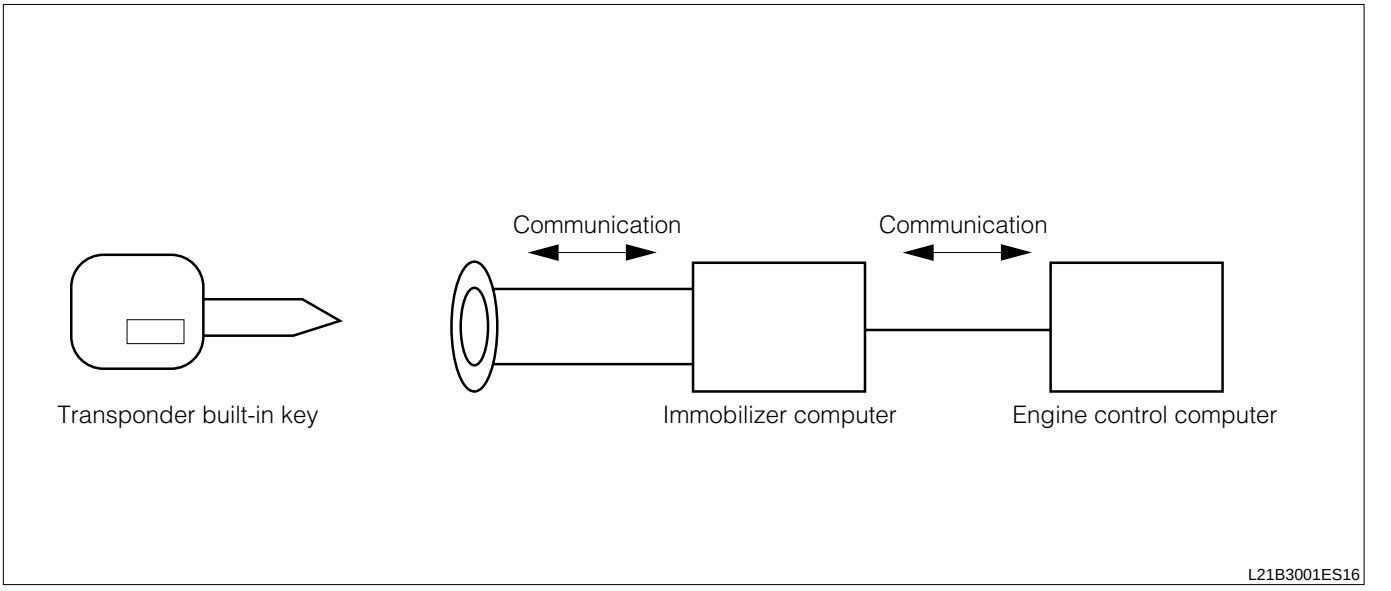
1-1 DESCRIPTION

1.The immobilizer system is provided on some specifications.
2.The immobilizer system prohibits the unauthorized start of the engine, thus enhancing the security.
3.It becomes possible to start the engine when the ID code registered in the immobilizer ECU is matched with the ID code memorized in the key.
4.When the immobilizer system is in the operating condition, the indicator in the combination meter flashes.

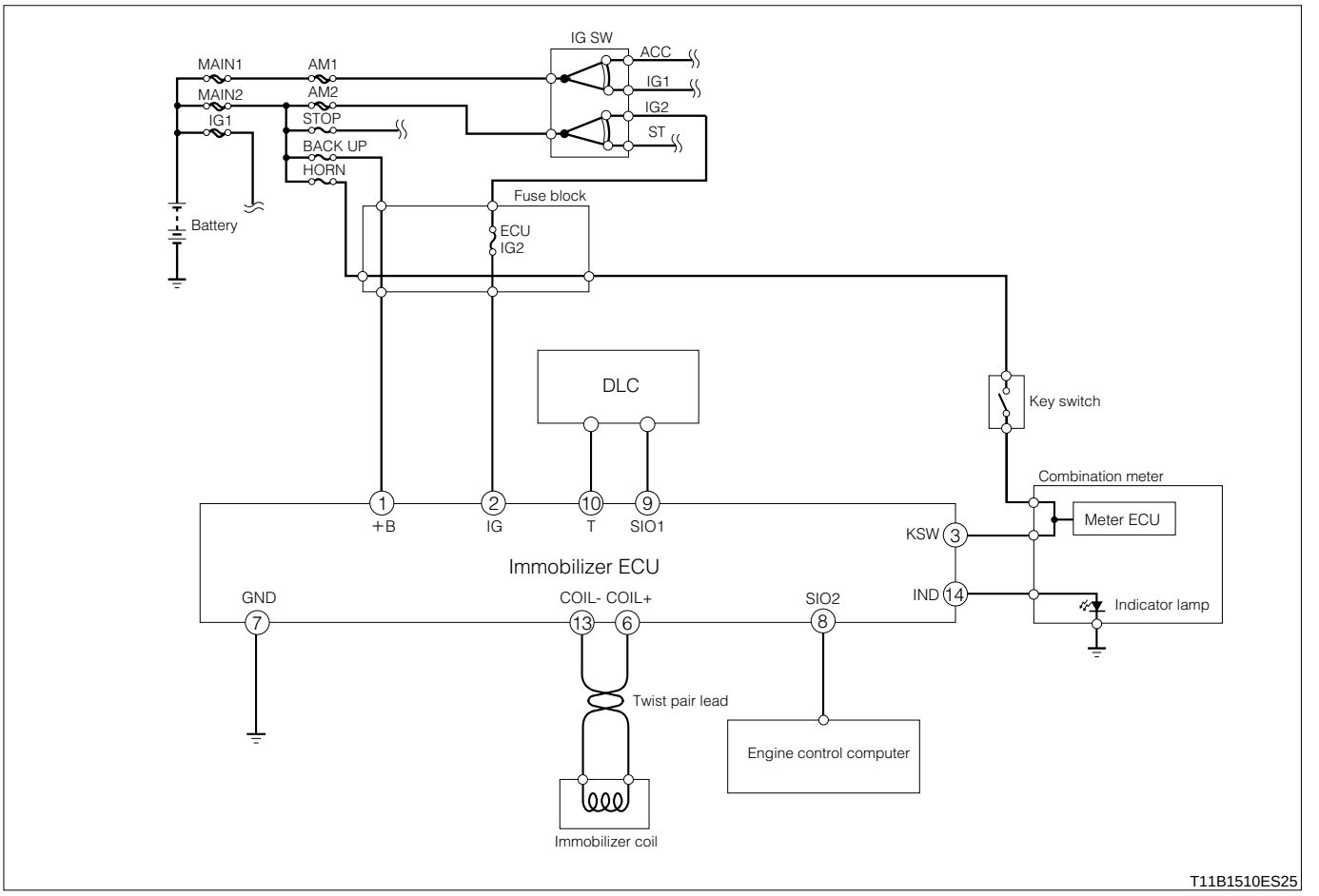
1-2 NOTES ON IMMOBILIZER SYSTEM

1.In the case of the ignition key for the immobilizer equipped vehicles, there are cases where correct communication with the immobilizer ECU is impossible, thus not allowing the engine to start.
(1) When the grip section of the key is in contact with a metal object.
(2) When the key is close to or in contact with the key (Which incorporates a signal transmitter) for the immobilizer system of another vehicle.
2.Do not put the ignition key in ultrasonic cleaners, etc.

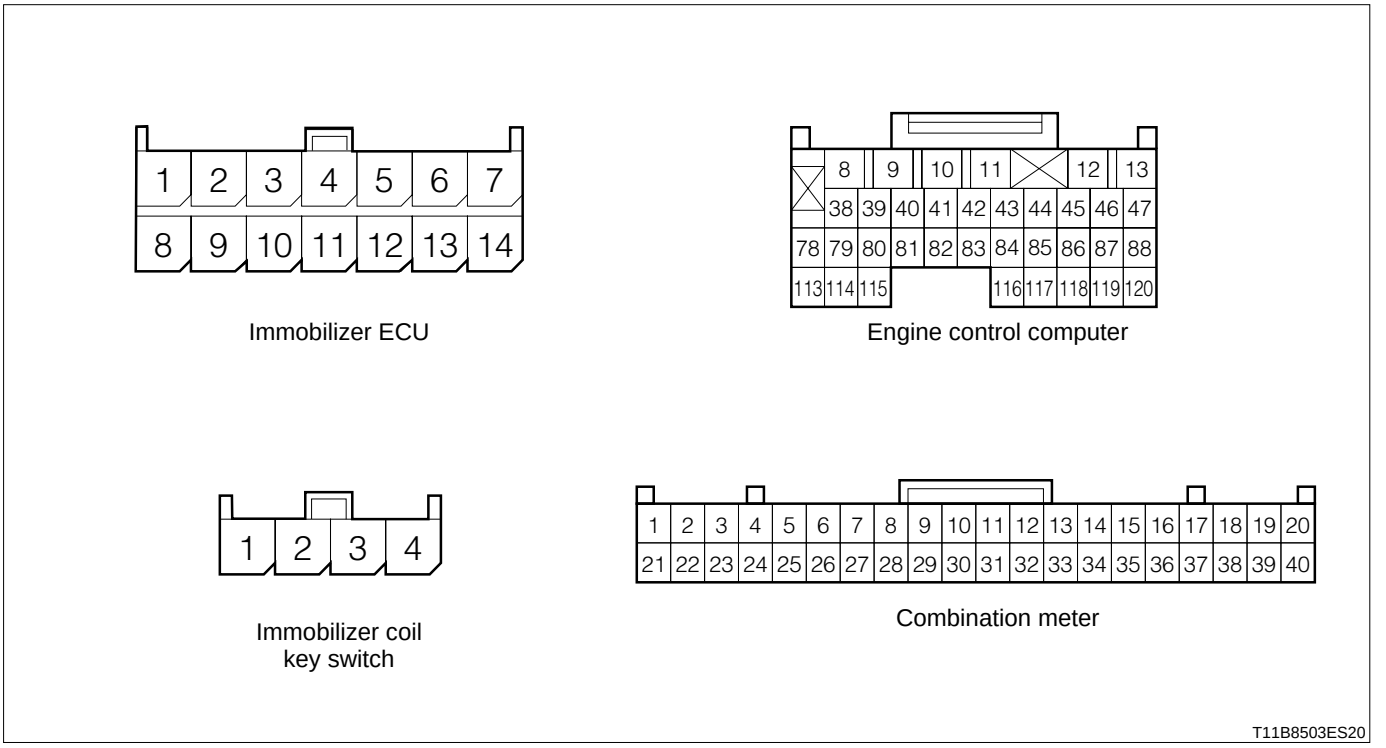
1-3 SYSTEM DRAWING



1-4 SYSTEM WIRING DIAGRAM



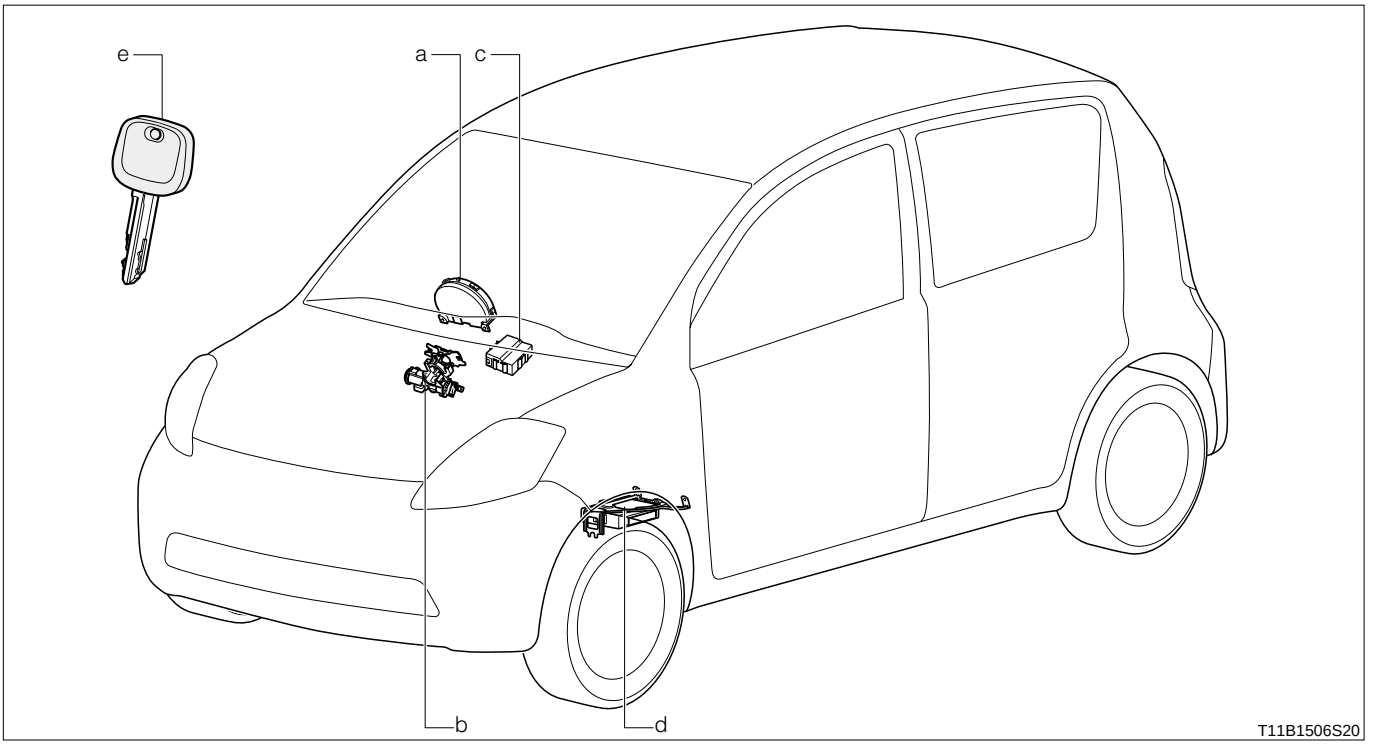
Computer connector terminal arrangement diagram



Immobilizer ECU terminal name

Terminal No.	Terminal code	Terminal name
1	+B	ECU power supply
2	IG	Ignition switch power supply
3	KSW	Key switch
4	–	–
5	–	–
6	COIL+	Transponder communication
7	GND	Earth
8	SIO2	Immobilizer communication
9	SIO1	Diagnostic tester communication
10	T	Diagnostic tester communication
11	–	–
12	–	–
13	COIL–	Transponder communication
14	IND	Security indicator

1-5 LOCATION OF COMPONENTS

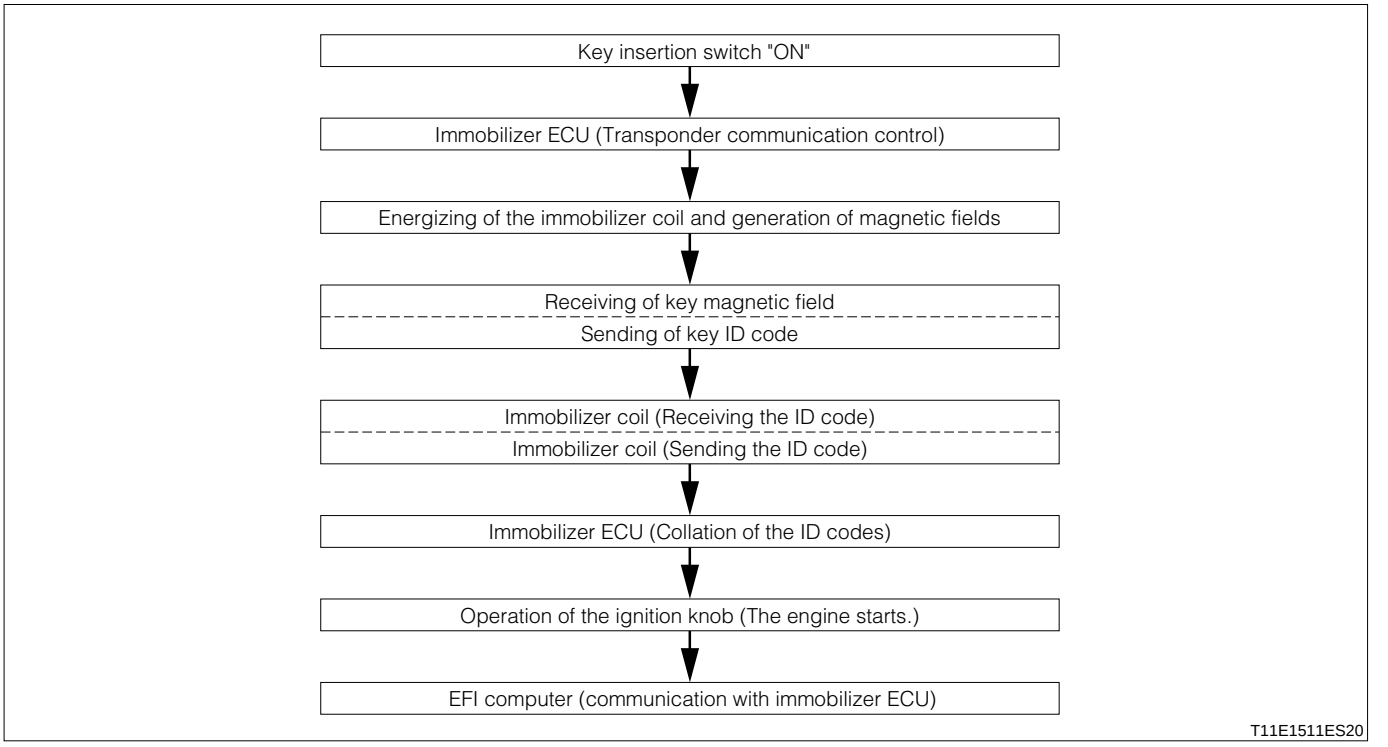


a	Combination meter
b	Steering column upper W/switch bracket
c	Immobilizer ECU
d	EFI ECU
e	Transponder

2 CONTROL

2-1 BRIEF DESCRIPTION OF OPERATION

1.The key switch is turned "ON", when the key is inserted into the ignition cylinder.
2.The immobilizer ECU energizes the immobilizer coil. As a result, a magnetic field is generated in the coil.
3.When the transponder (chip) incorporated in the key receives the magnetic field of the coil, the ID code memorized in the chip is transmitted.
4.The ID code is received by the immobilizer coil and sent to the immobilizer ECU.
5.The immobilizer ECU performs the collation of the transmitted ID code and the registered ID code. When the codes are matched, the communication with the EFI ECU is permitted. ("UNSET" condition.) (In cases where the collation of the codes is not performed correctly, the communication with the EFI ECU remains prohibited. ("SET" condition.) (Therefore, even if the ignition switch is turned "ON", the communication with the EFI ECU will not be started.)
6.When the ignition switch is turned "ON" by turning the ignition knob, the collation of the code with the EFI ECU is carried out.
7.If the collation of the codes is correct, the engine is started by turning the ignition knob to the "START" position.



2-2 IMMOBILIZER SYSTEM CONTROL

2-2-1 IMMOBILIZER SYSTEM OPERATING CONDITION

When the following conditions are satisfied, the immobilizer system is set to the operating condition (communication with the EFI ECU prohibited).

(1) The key switch is "OFF" as well as the ignition switch is at "LOCK" or "ACC" position.
(2) Thirty seconds have passed after the key switch is "ON", and the ignition switch is changed from "ON"→"LOCK" or "ACC" position.

2-2-2 IMMOBILIZER SYSTEM RELEASED CONDITION

When the following conditions are satisfied, the immobilizer system is set to the released condition (communication with the EFI ECU allowed).

(1) When the ID code stored in the key and the ID code stored in the immobilizer ECU match.

2-3 TRANSPONDER COMMUNICATION CONTROL

2-3-1 TRANSPONDER COMMUNICATION STARTING CONDITION

If any of the following conditions is met, the transponder communication (Check of the ID code of the key) starts.

(1) In the immobilizer system "SET" condition, the key switch is "OFF"→"ON".
(2) In the immobilizer system "SET" condition, the ignition switch is changed from "LOCK" or "ACC" position→"ON".
(3) In the immobilizer system "SET" condition, the key switch is "ON" and the ignition switch is changed from "ON"→"LOCK" or "ACC" position.
(4) In the immobilizer system "SET" condition, the key switch is turned "ON" or the ignition switch is turned "ON" after the ECU power "ON" reset is released.

2-3-2 TRANSPONDER COMMUNICATION FINISHING CONDITION

When any of the following conditions is satisfied, the transponder communication (key ID code verification) is finished.

(1) The key switch is "OFF" as well as the ignition switch is at "LOCK" or "ACC" position.
(2) Three seconds has passed after the key switch is turned from "OFF"→"ON"
(3) Three seconds has passed after the ignition switch is turned from "OFF"→"ON"
(4) Three seconds has passed after the key switch is turned "ON" and the ignition switch is turned from "OFF"→"ON"
(5) The ID code registered in the immobilizer ECU matches the ID code memorized in the key.
(6) After an ID code not registered in the immobilizer ECU has been received three times and the key ID has been read properly

2-4 EFI ECU COMMUNICATION CONTROL

2-4-1 EFI ECU COMMUNICATION STARTING CONDITION

When the immobilizer system has been released and the ignition switch is set to "LOCK", or set from "ACC"→"ON", the immobilizer ECU communicates with the EFI ECU.

2-4-2 EFI ECU COMMUNICATION FINISHING CONDITION

If any of the following conditions is met, the immobilizer ECU will inhibit communication with the EFI ECU.

(1) During communicating with the EFI ECU, the ignition switch is changed from "ON"→"LOCK" or "ACC" position.
(2) Immobilizer system "SET" status
(3) Communication with the EFI ECU is complete.

2-5 DIAGNOSIS

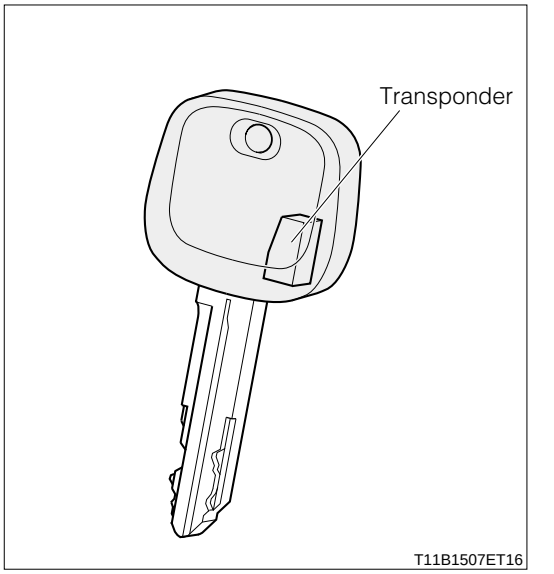
2-5-1 DESCRIPTION

The diagnosis means "Trouble diagnosis". In cases where an abnormality exists in the input/output system, the computer inside the sensor unit informs the check operator of the abnormal items.
For the details of the diagnosis, refer to the repair manual.

3 COMPONENTS

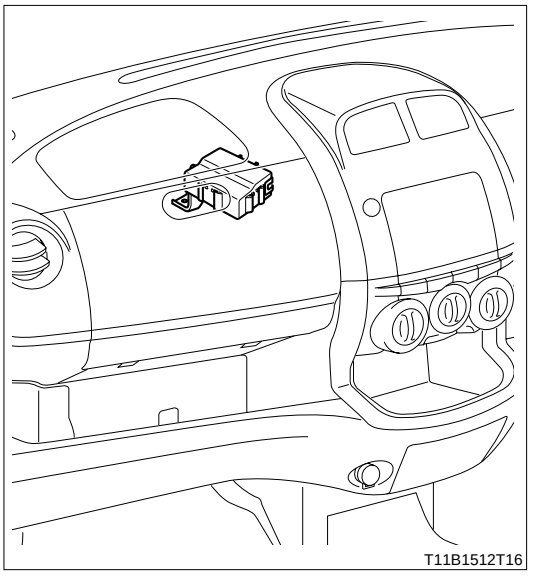
3-1 IGNITION KEY

A transponder (Chip) is incorporated in the grip section of the ignition key. Upon receiving the magnetic field generated by the immobilizer coil, this chip sends the ID code. Moreover, the ID code differs, depending on the ignition key.



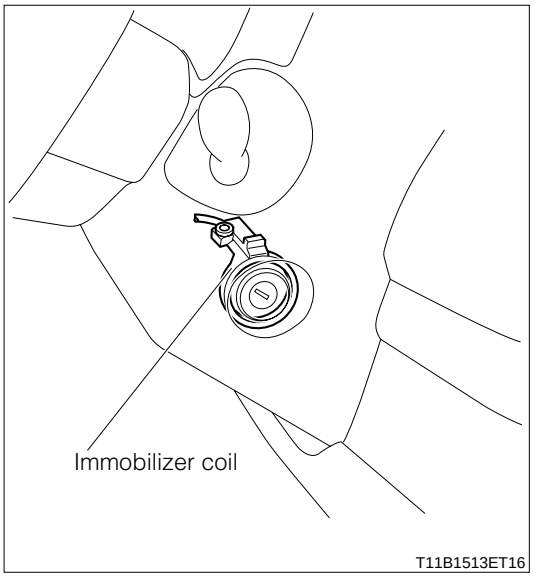
3-2 IMMOBILIZER ECU

1. The immobilizer coil is energized and the transponder communication is performed. Furthermore, the collation of ID codes is carried out with the EFI ECU.
2. It is possible to register up to four keys. Even when the battery is disconnected, the memory of ID codes of the registered key will not be lost



3-3 IMMOBILIZER COIL

When electric current flows into the immobilizer coil due to the immobilizer ECU control, a magnetic field is generated and the ID code is received from the key.

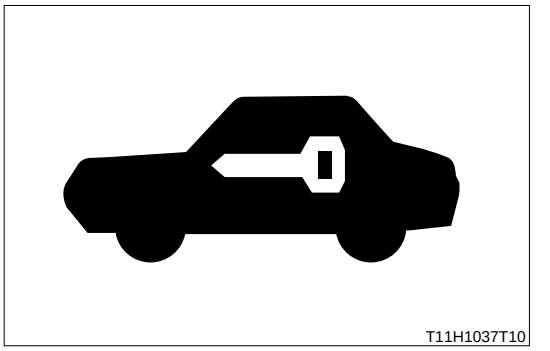


3-4 EFI ECU

The ID code is collated by the signal from the immobilizer ECU, thus controlling the injection of fuel.

3-5 COMBINATION METER

When the immobilizer system is in the operating condition, the indicator in the combination meter flashes.


T11H1037T10