

## GROUP 42B

# KEYLESS OPERATION SYSTEM (KOS)

## CONTENTS

<b>GENERAL INFORMATION</b> .....	<b>42B-2</b>	WARNING AND WARNING INDICATOR LIST <VEHICLES WITHOUT COLOR LIQUID CRYSTAL DISPLAY> .....	<b>42B-22</b>
<b>SYSTEM OPERATION</b> .....	<b>42B-8</b>	WARNING AND WARNING INDICATOR LIST <VEHICLES WITH COLOR LIQUID CRYSTAL DISPLAY> .....	<b>42B-28</b>
DOOR ENTRY FUNCTION .....	42B-8		
KEYLESS ENTRY FUNCTION .....	42B-13		
ENGINE STARTING FUNCTION .....	42B-16		
TIRE PRESSURE MONITORING SYSTEM (TPMS) FUNCTION .....	42B-20	<b>CUSTOMIZATION FUNCTION</b> .....	<b>42B-35</b>

## GENERAL INFORMATION

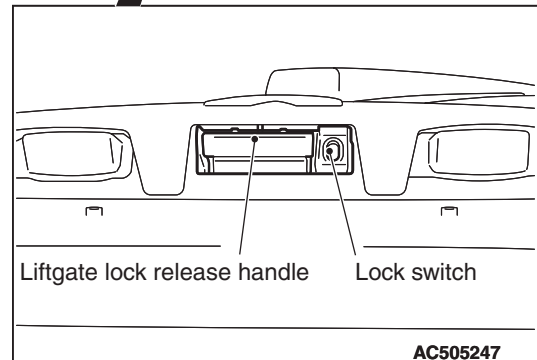
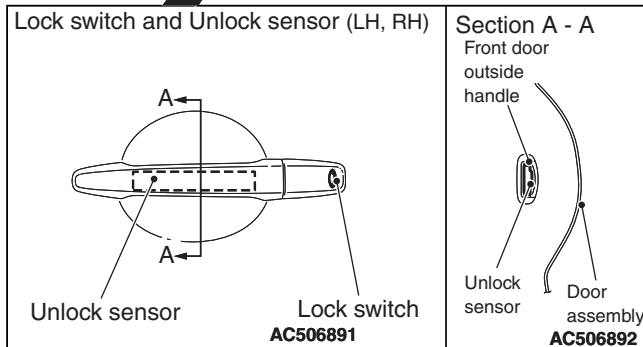
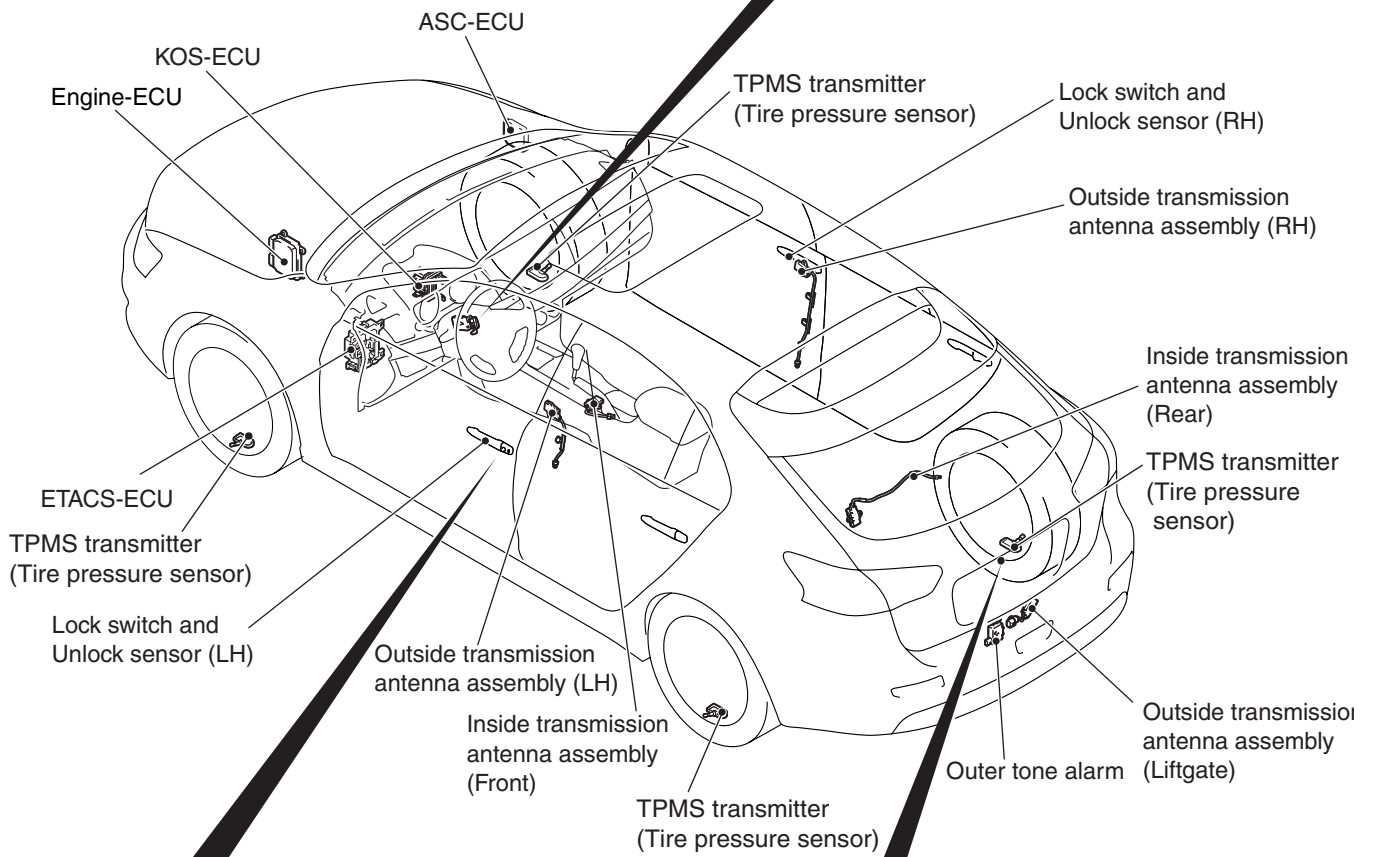
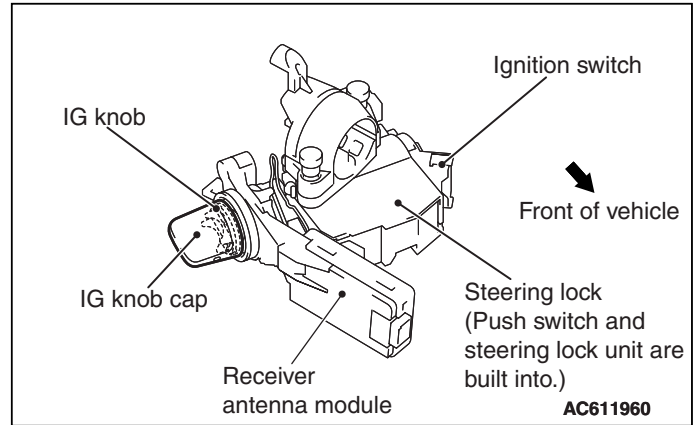
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*NOTE: In this manual, F.A.S.T.-key (Free-hand Advanced Security Transmitter) is described as Keyless Operation System (KOS). (KOS is indicated as F.A.S.T. in the scan tool display.)*

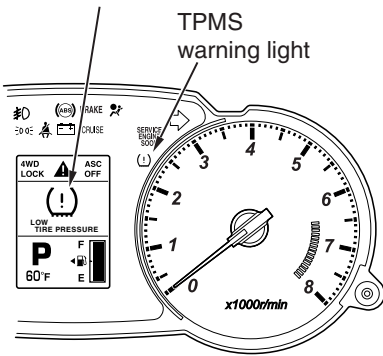
The keyless operation system (KOS) is an integrated system of the following functions: the door entry function which enables the driver to unlock the door (only the driver's door when the driver's door outside handle is operated, and all the doors, the liftgate when the front passenger's door outside handle is operated) by gripping the front door outside handle or operating the liftgate lock release handle, without taking the key out from his/her pocket or bag when he/she is carrying a keyless operation key which has been registered in the vehicle's KOS-ECU. It also allows the driver to lock all the doors and the liftgate by pressing the lock switch on the front door outside handle; the engine start function which starts the engine without using the conventional mechanical key; and the tire pressure monitoring system (TPMS) which warns the driver of low tire pressure by illuminating the warning light. The KOS has the following features:

- The keyless operation key incorporates a lock/unlock button and panic button, and can be operated by remote control in the same manner as the conventional keyless entry system. The keyless operation key also incorporates an indicator light that enables the driver to check if the signal is transmitted correctly or if the battery in the key is discharged. (Refer to [P.42B-13](#).)
- The keyless operation key incorporates the immobilizer function that inhibits the engine start-up by using an unauthorized key.
- Two keyless operation keys are provided for each vehicle, and up to four keyless operation keys can be registered.
- The keyless operation key incorporates an emergency key to lock/unlock the doors and start the engine when the battery in the keyless operation key is discharged or the keyless operation system malfunction occurs.
- The driver can customize KOS; enabling the door entry/engine start function, disabling the door entry/engine start function, enabling the door locking/unlocking function only, or enabling the engine starting function only. (Refer to [P.42B-35](#).)

CONSTRUCTION DIAGRAM

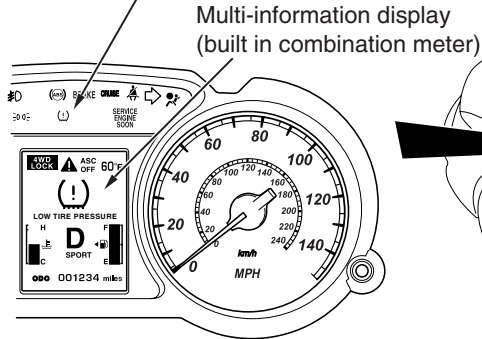


Multi-information display  
(built in combination meter)

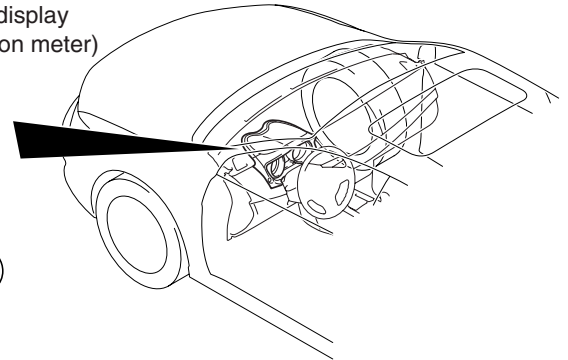


<Vehicles without color  
liquid crystal display>

TPMS  
warning light

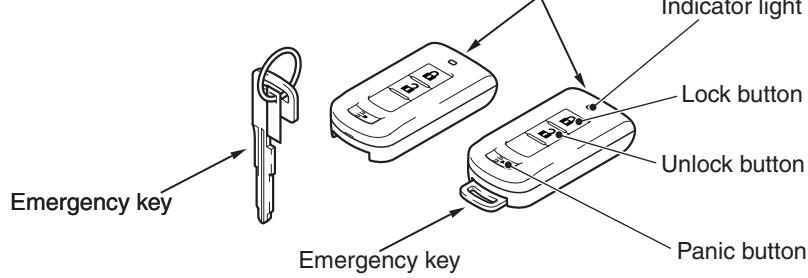


<Vehicles with color  
liquid crystal display>



AC901690 AB

Keyless operation key



AC709981AB

**Main components and functions**

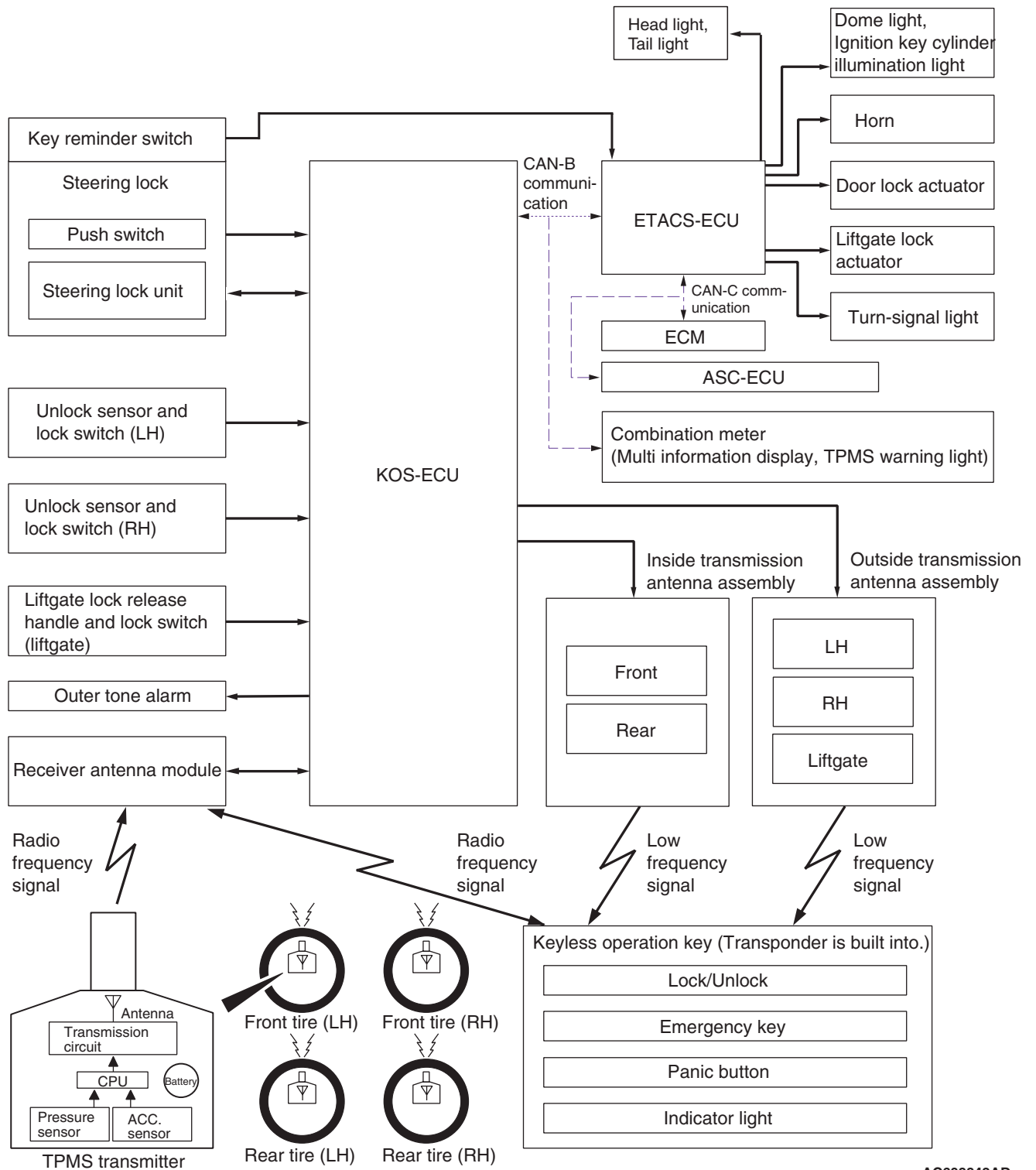
Parts name		Functional description
KOS-ECU		<p>Controls KOS by using the following inputs/outputs and communications.</p> <ul style="list-style-type: none"> <li>• Input from the unlock sensor and lock switch on each door, input from the push switch on the IG knob</li> <li>• Communications with ETACS-ECU, ECM, ASC-ECU and combination meter via CAN</li> <li>• Wire communication with the steering lock unit</li> <li>• Wireless communication with the keyless operation key via the receiver antenna module and inside/outside transmission antennas</li> <li>• Wireless communication with the TPMS transmitter</li> <li>• Output to the outer tone alarm</li> </ul>
Steering lock (incorporates push switch and steering lock unit)		<p>The steering lock has two unlocking mechanisms; a mechanical mechanism that uses an emergency key and an electrical mechanism. In the electrical unlocking mechanism, the steering lock communicates with KOS-ECU via wire, and when requested by KOS-ECU, the steering lock unlocks for two seconds.</p>
Keyless operation key (incorporates emergency key)		<ul style="list-style-type: none"> <li>• The keyless operation key receives signals sent from each inside/outside transmission antenna, certifies the keyless operation key ID code, calculates the key ID, and sends the reply data signal to KOS-ECU via the receiver antenna module. The lock button and unlock button operations of keyless operation key transmit signals to KOS-ECU via the receiver antenna module.</li> <li>• If two or more keyless operation keys registered in KOS-ECU respond at the same time, their signals would interfere. To avoid this interference, each signal from KOS-ECU is given the priority<sup>*1</sup> data, and the keyless operation keys respond in accordance with this priority.</li> </ul>
Lock switch	LH	<p>Locks all the doors and the liftgate when a driver carrying the keyless operation key presses the lock switch on the front door outside handle or on the liftgate lock release handle.</p>
	RH	
	Liftgate	
Unlock sensor	LH	<p>The unlock sensors incorporated in the LH front door outside handles unlock LH the door when a driver carrying the keyless operation key pulls the LH door outside handle.</p>
	RH	<p>The unlock sensors incorporated in the RH front door outside handles unlock all the doors and the liftgate when a driver carrying the keyless operation key pulls the front door outside handle.</p>
Liftgate lock release handle		<p>When the liftgate lock release handle is operated while the driver is carrying the keyless operation key, all the doors and the liftgate are unlocked.</p>
Outside transmission antenna assembly	LH	<p>Converts the data output from KOS-ECU via wire into a signal, and sends it to the keyless operation key. (For the transmission area, refer to System Operation –Door Entry Function <a href="#">P.42B-8.</a>)</p>
	RH	
	Liftgate	

Parts name		Functional description
Inside transmission antenna assembly	Front	Converts the data output from KOS-ECU via wire into a signal, and sends it to the keyless operation key. (For the transmission area, refer to System Operation –Engine Start Function P.42B-16.)
	Rear	
Outer tone alarm		<p>The outer tone alarm sounds when:</p> <ul style="list-style-type: none"> <li>• The doors are locked or unlocked by the door entry function.</li> <li>• The keyless operation key is carried out of the vehicle when the IG knob is in the position other than the LOCK position, and the door is closed.</li> <li>• The lock switch of the front door outside handle is pressed when the IG knob is in the position other than the LOCK position.</li> <li>• The lock switch of the front door outside handle is pressed when the keyless operation key is inside the vehicle.</li> <li>• The lock switch of the front door outside handle is pressed when the door is not properly closed.</li> </ul>
Receiver antenna module		Receives the operation signals from the lock/unlock switches and panic alarm switch on the keyless operation key, and the air pressure signals from the TPMS transmitters, and then converts them into data and sends them to KOS-ECU.
TPMS transmitter		Measure tire pressure directly, then send radio frequency signal to receiver antenna module.
Combination meter (Multi information display, TPMS warning light)		Communicates with KOS-ECU via CAN. Receives the warning request or warning information from KOS-ECU, activates <sup>*2</sup> the warning light. Warning symbol and message is additionally displayed on the multi information display
ETACS-ECU		Communicates with KOS-ECU via CAN. Receives the door lock/unlock request from KOS-ECU, outputs the lock/unlock signal, and flashes the turn signal light to inform the driver that the doors are locked/unlocked.
ECM		Communicates with KOS-ECU via CAN. Permits/inhibits the engine starting and controls the engine operation. Sends atmospheric pressure data. Sends the vehicle speed data .
ASC-ECU		Communicates with KOS-ECU via CAN. Sends the vehicle speed data .

**NOTE:** <sup>\*1</sup>: When registering the keyless operation keys, KOS-ECU numbers each key (1 to 4) in the order they are registered (initial priority). This priority is renewed each time the doors are locked/unlocked and the IG knob is pressed. For example, when only keys 1 and 3 have responded to the signal sent from KOS-ECU, the new priority of the keys would be 1-3-2-4. When keys 3 and 4 have responded, then the priority of the keys becomes 3-4-1-2.

**NOTE:** <sup>\*2</sup>: Illuminates for tire pressure warning. Flashes for about 1 minute and then continuously illuminated for TPMS malfunction warning.

System configuration



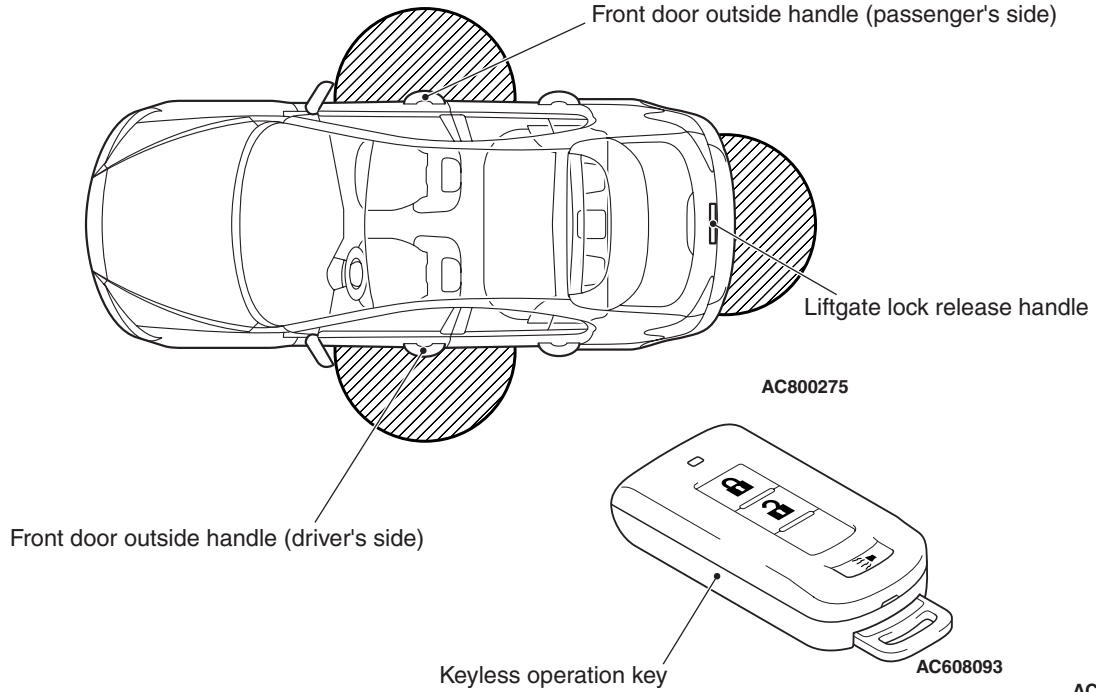
# SYSTEM OPERATION

## DOOR ENTRY FUNCTION

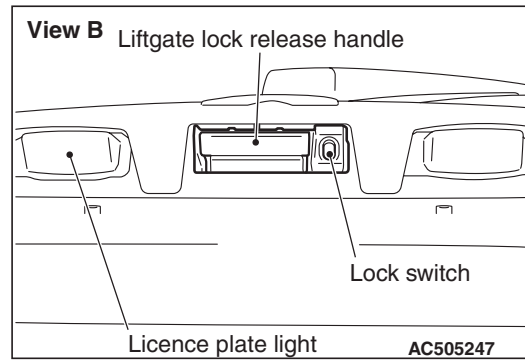
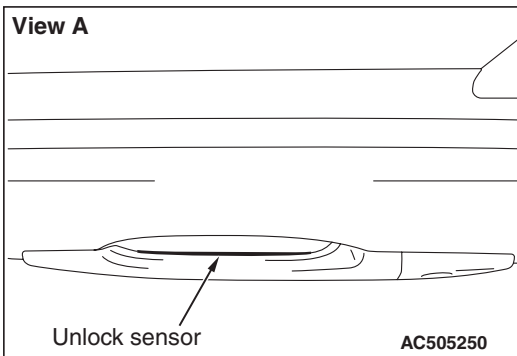
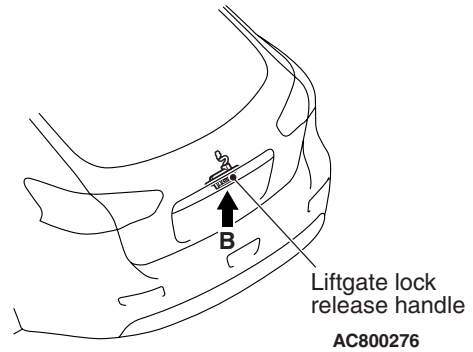
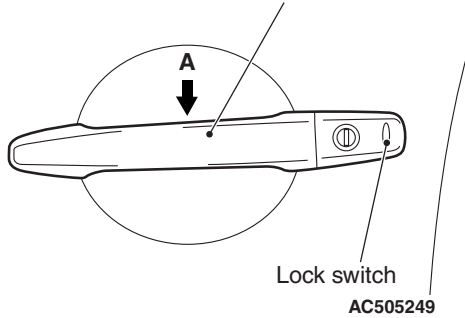
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### DESCRIPTION OF CONSTRUCTION AND OPERATION

<Vehicles outside area>



Front door outside handle (driver's side, passenger's side)



AC800602AC



When a driver carrying a keyless operation key presses the lock switch and the unlock sensor (door outside handle) on the driver's/passenger's door outside handle or the liftgate lock release handle (switch) (Refer to GROUP 42A –Door and Liftgate Lock P.42A-14), the keyless operation key and KOS-ECU communicate to certify\* the keyless operation key. When KOS-ECU certifies the registered keyless operation key within 70 cm (28 inches) in radius from the outer side of the vehicle, it requests ETACS-ECU to lock/unlock the doors (Even within this range, the key may not be certified when it is positioned too high or too low).

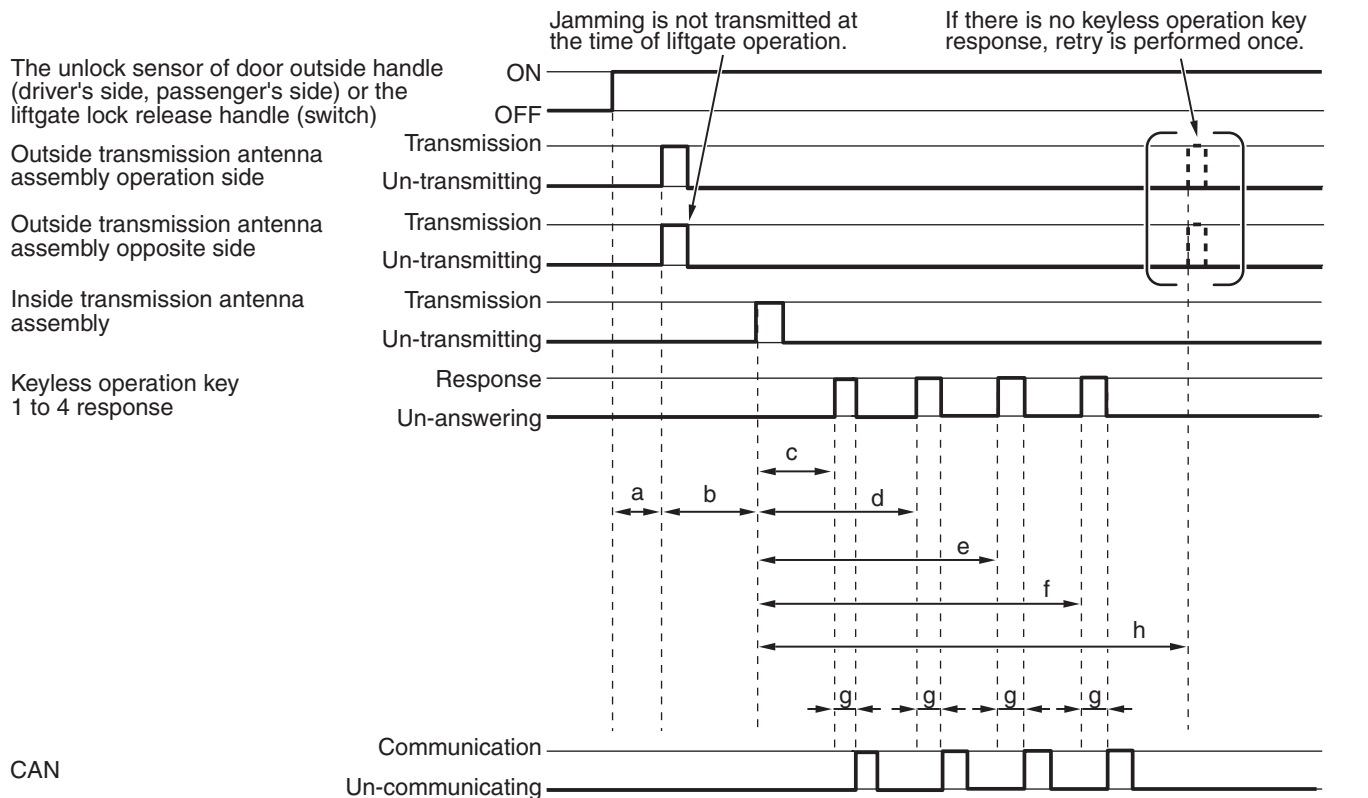
**NOTE:** \*: In the communication for certification of the keyless operation key, KOS-ECU judges if the keyless operation key ID (specified to keyless operation key) contained in the response data from the keyless operation key coincides with the ID that has been stored in ECU by registration operation. The keyless operation key sends the response to KOS-ECU only when the KOS ID (specific to KOS-ECU) contained in the received data coincided with the stored ID. In

the beginning of the communication for certification, KOS-ECU creates an encrypted code calculation factor in random number, and sends it to the keyless operation key together with the transmit data. The keyless operation key calculates the code by using the received factor, and sends the result to KOS-ECU together with the response data. KOS-ECU determines that the communication is established only when the code calculation results of both parties coincided.

## UNLOCKING OPERATION OF DOOR ENTRY FUNCTION

The keyless operation key and KOS-ECU communicate to certify the keyless operation key when the unlock sensor on the driver-side/front passenger-side door outside handle or the liftgate lock release handle (switch) is turned ON. When KOS-ECU certifies the registered keyless operation key on the outer side of the vehicle, it requests ETACS-ECU to unlock the doors.

## CONTROL OF UNLOCKING OPERATION



1. When KOS-ECU detects that the unlock sensor on the driver-side/front passenger-side door outside handle or the liftgate lock release handle (switch) is turned ON, it transmits the exterior data from the outside transmission antenna assembly on the operation side. At the same time, KOS-ECU transmits the interfering radio wave\* (reversal code) from the outside transmission antenna assembly on the other side [The interfering radio wave will be transmitted from the front passenger-side antenna assembly when the driver-side door outside handle is operated, and vice versa. It will not be transmitted when the liftgate lock release handle (switch) is operated].

*NOTE: \*: The interfering radio wave is transmitted to disable the door lock operation by a person without the keyless operation key while a user with the keyless operation key is operating the door lock from the opposite side of the vehicle.*

2. After the exterior data is transmitted from the outside transmission antenna assembly, the interior data is transmitted from the inside transmission antenna assembly (front, rear).
3. For the specified time period (varies with the number of the keyless operation keys registered in KOS-ECU), KOS-ECU monitors the response from the keyless operation key that meets the unlock conditions.
  - When the keyless operation key receives the exterior data only, KOS-ECU transmits the unlock request (request to unlock the applicable position) to ETACS-ECU.
  - When KOS-ECU received no response that enables the unlocking after the specified time period has passed, it performs the retry cycle once (When no response after the retry, KOS-ECU terminates the unlocking operation).

## UNLOCKING OPERATION INHIBITION TIME

Considering the customer pulls the door outer handle to make sure the doors are locked, unlocking operation is inhibited for three seconds after the doors are locked by the lock switches on the driver-side/front passenger-side door outside handle or on the liftgate lock release handle. This duration can be selected from zero, three seconds, and five seconds, and can be switched using a customization function (Refer to [P.42B-35](#)). The initial setting at factory is three seconds.

## UNLOCKING OPERATION INHIBITION CONDITIONS

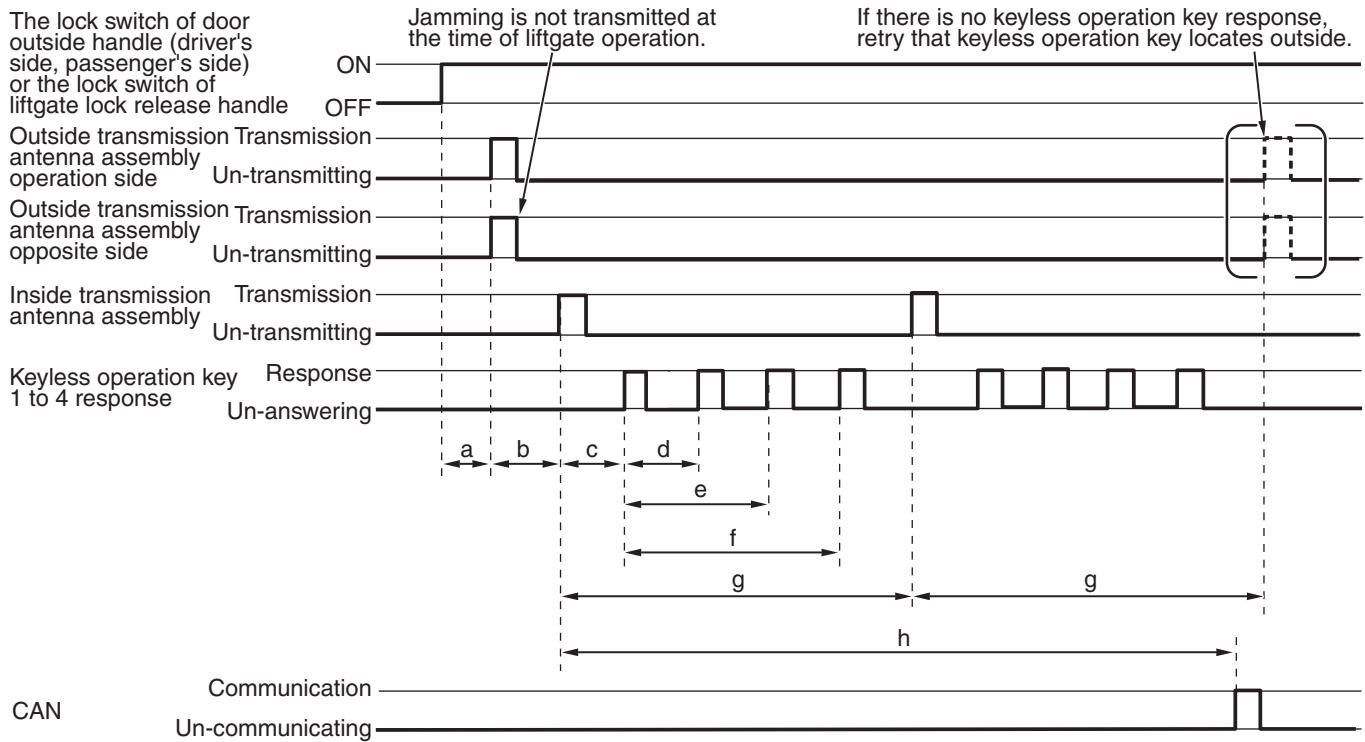
The door unlocking operation is inhibited when:

- The emergency key is in the ignition switch.
- The push switch in the steering lock is ON.
- The IG knob is in other than LOCK (OFF) position.
- During the unlocking operation inhibition time.
- One or more of the doors or liftgate is open (door switch is ON) (including door ajar).
- Inside handles of driver's side and front passenger's side are unlocked.
- The door entry function is prohibited by the customization function (refer to [P.42B-35](#)).

## LOCKING OPERATION OF DOOR ENTRY FUNCTION

The keyless operation key and KOS-ECU communicate to certify the keyless operation key when the lock switch on the driver-side/front passenger-side door outside handle or on the liftgate lock release handle is turned ON. When KOS-ECU certifies the registered keyless operation key only on the outer side of the vehicle, it requests ETACS-ECU to lock all the doors (including the liftgate).

CONTROL OF LOCKING OPERATION



AC607100AL

- When KOS-ECU detects that the lock switch on the driver-side/front passenger-side door outside handle or on the liftgate lock release handle is turned ON, it transmits the exterior data from the outside transmission antenna assembly on the operation side. At the same time, KOS-ECU transmits the interfering radio wave (reversal code) from the outside transmission antenna assembly on the other side (The interfering radio wave will be transmitted from the front passenger-side antenna assembly when the driver-side door outside handle is operated, and vice versa. It will not be transmitted when the liftgate lock release handle is operated.).
- After the exterior data is transmitted from the outside transmission antenna assembly, the interior data is transmitted from the inside transmission antenna assembly (front, rear).
- After the specified time period (varies with the number of the keyless operation keys registered in KOS-ECU) has passed, confirm that there is no keyless operation key in the interior.
  - When KOS-ECU receives the response from the keyless operation keys that received the interior data, KOS-ECU cancels the locking operation.
- KOS-ECU transmits the interior data from the inside transmission antenna assembly (front).
- After the specified time period (varies with the number of the keyless operation keys registered in KOS-ECU) has passed, confirm that the lock conditions are met.
  - When KOS-ECU receives the response from the keyless operation keys that received the interior data, KOS-ECU cancels the locking operation.
  - When all the responding keyless operation keys receive the exterior data only, KOS-ECU transmits the lock request to ETACS-ECU.
  - If there is no response from the keyless operation keys, perform step 6 once.

6. KOS-ECU transmits the exterior data from the outside transmission antenna assembly on the operation side. At the same time, KOS-ECU transmits the interfering radio wave (reversal code) from the outside transmission antenna assembly on the other side (The interfering radio wave will be transmitted from the front passenger-side antenna assembly when the driver-side door outside handle is operated, and vice versa. It will not be transmitted when the liftgate lock release handle is operated.).
7. After the specified time period (varies with the number of the keyless operation keys registered in KOS-ECU) has passed, confirm that the lock conditions are met.
  - When the responded keyless operation keys after the retry receives the exterior data only, KOS-ECU transmits the lock request (request to lock the actuated position) to ETACS-ECU.

## LOCKING OPERATION INHIBITION CONDITIONS

In the following cases, the door locking operation is inhibited.

- One or more of the doors or liftgate is open/ajar (door switch is ON). (including door ajar)
- The emergency key is in the ignition switch.
- The push switch in the steering lock is ON.
- The IG knob is in other than LOCK (OFF) position.
- The door entry function is prohibited by the customization function (refer to [P.42B-35](#)).

## ANSWERBACK FUNCTIONS

When KOS-ECU sends a signal to ETACS-ECU, ETACS-ECU outputs the lock/unlock signal and activates the hazard warning light and the outer buzzer to notify the driver that the doors are locked/unlocked.

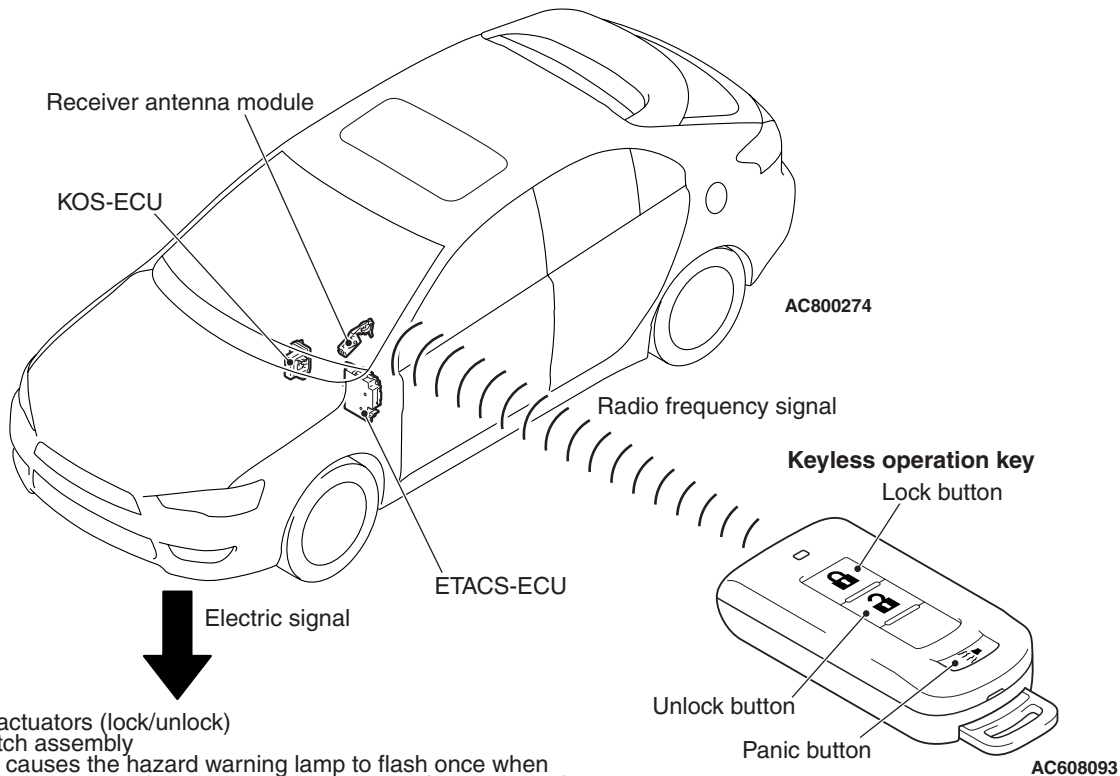
	Lock signal received	Unlock signal received
ETACS-ECU	Lock signal output	Unlock signal output
Hazard warning light	Flashes once	Flashes twice
Outer buzzer	Sounds once (initial setting) or none	Sounds twice (initial setting) or none

## KOS TIMER LOCK FUNCTION

When none of the doors are opened within 30 seconds after the doors are unlocked by KOS, ETACS-ECU automatically outputs the door lock signal to lock the doors. This function prevents the doors from being unlocked accidentally.

KEYLESS ENTRY FUNCTION

M2421000400448



Door lock actuators (lock/unlock)  
Tailgate latch assembly  
The signal causes the hazard warning lamp to flash once when the doors are locked, or flash twice when unlocked (Initial setting).  
The signal causes the room lamp to extinguish when the doors are locked, or come on for 15 seconds when unlocked.

AC800603AC

This keyless entry function has the following features: A keyless entry system enables locking and unlocking of all doors and the liftgate from 12 m (39.4 feet) away from the vehicle. The following features are also available.

- A three-knob type keyless operation key with lock, unlock and panic buttons.
- The receiver antenna module incorporates a receiver and a receiving antenna.
- Up to four encrypted codes can be registered using scan tool MB991958 (M.U.T.-III sub-assembly).
- Answerback functions

*NOTE: The answerback function can be changed using a customization function (Refer to P.42B-35).*

- Keyless entry timer lock

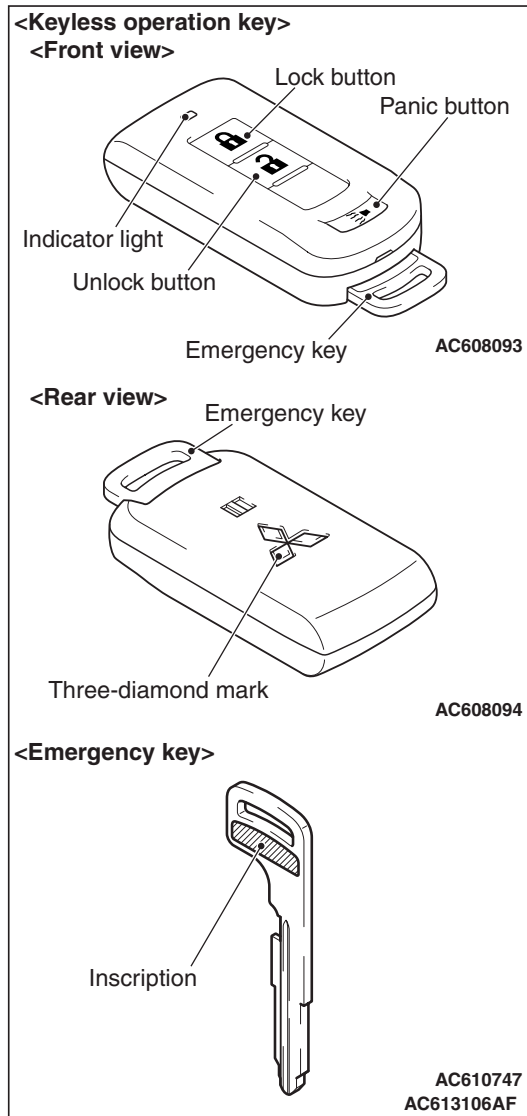
*NOTE: Timer of the keyless entry timer lock can be changed using a customization function (Refer to P.42B-35).*

- Due to adoption of the power door locks with selective unlocking to keyless entry function, the anti-theft feature is improved.

*NOTE: Using a customization function, the operation of power door locks with selective unlocking can be enabled or disabled.(Refer to P.42B-35.)*

**DESCRIPTION OF CONSTRUCTION AND OPERATION**

**KEYLESS OPERATION KEY**

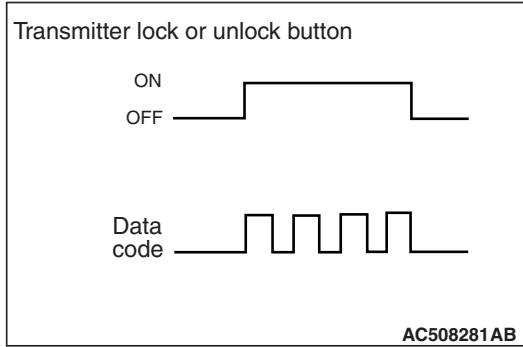


- The keyless operation key is integrated into the master key. The three-knob button is adopted, and the specific encrypted code is transmitted as radio wave signal.
- A brilliant silver three-diamond mark is stamped on the back side of the key grip to improve appearance.
- Matt-plating is adopted for switches to improve appearance.
- Simple operation procedures are marked on the emergency key so that users can easily understand how to start the engine at the emergency in case such as the discharged keyless operation key.
- An indicator light, which illuminates when signals are sent, is added on the key grip. This indicator light informs you of the signal transmission status and warns you of flat battery.
- A signal transmission circuit (printed circuit) and a battery are housed in one case. The case is housed in the key grip, thus improving resistance to water ingress.
- A coin type battery, CR2032 is used in the keyless operation key.
- Using a customization feature, the keyless operation key operation can be changed (Refer to [P.42B-35](#)).
- The keyless operation key button operation allows the system to operate as follows:

**KEYLESS OPERATION SYSTEM OPERATION TABLE (DEFAULT)**

OPERATION OF KEYLESS OPERATION KEY			SYSTEM OPERATION
Lock button		Press once	Lock all doors (including the liftgate)
Power door locks with selective unlocking. <i>NOTE: Using a customization function, the power door locks with selective unlocking can be enabled or disabled.</i>			Press the unlock button once to unlock the driver's door, and within 2 seconds, press the unlock button again to unlock the front passenger's door, rear doors and liftgate.
Panic alarm system	Panic button	Press once (press and hold for 1 second).	Starts the panic alarm (headlights flash and horn honks for three minutes)
	Lock button, unlock button or panic button	Press again	Stops the panic alarm in progress

## ENCRYPTED CODE



Four data codes are transmitted when a switch is operated once. The encrypted code for user identification is a combination of 0 and 1, and more than 1 million different combinations are available. To prevent theft by copying signal codes, the data code includes a rolling code with the encrypted code. The rolling code changes each time a signal is sent.

## RECEIVER

The receiver is incorporated into the receiver antenna module together with the receiving antenna. It sends the signal the antenna received from the keyless operation key to KOS-ECU. KOS-ECU compares this signal with the ID code registered in it, and

when they coincided, a signal is output from ETACS-ECU. By connecting scan tool MB991958 (M.U.T.-III sub-assembly) to the data link connector, up to four encrypted codes of keyless operation keys can be registered.

*NOTE: 1A keyless operation key can be added without using the scan tool. <USA only>*

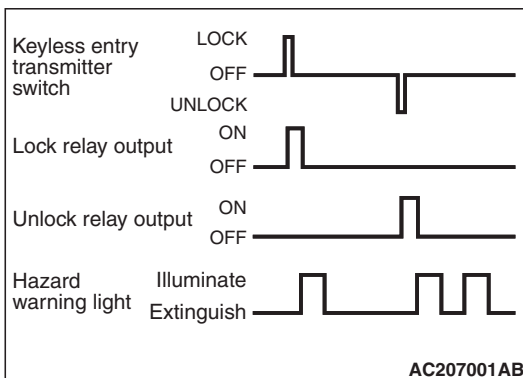
## FUNCTION FOR CONFIRMING RECEIVER ANTENNA MODULE OUTPUT AND OPERATION

When the KOS-ECU receives an electric wave signal of the identification code stored in the receiver antenna module, the KOS-ECU outputs LOCK/UNLOCK signal to the ETACS-ECU and informs the driver of the keyless entry system operation by flashing the light and blowing horn (Answerback). The initial setting at factory for the answerback function is as the following table. Using a customization feature, the answerback function can be changed (Refer to P.42B-35).

### FUNCTION TABLE FOR CONFIRMING KEYLESS ENTRY OPERATION (DEFAULT)

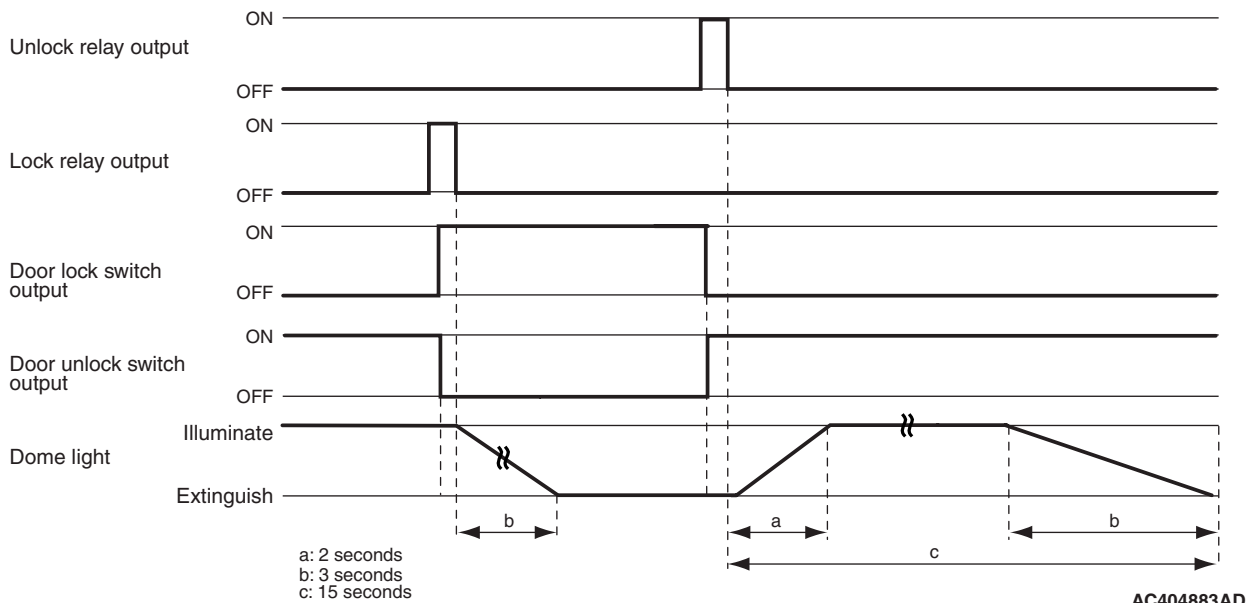
ITEM	OPERATION	
	DOORS AND LIFTGATE LOCKED	DOORS AND LIFTGATE UNLOCKED
ETACS-ECU (receiver antenna module)	Sends lock signal	Sends unlock signal
Dome light	Flashes once	Illuminates for 15 seconds
Turn-signal lights (RH and LH)	Flashes once	Flashes twice
Horn	Sounds once if doors are already locked	—

## KEYLESS ENTRY HAZARD LIGHT ANSWERBACK FUNCTION



The hazard answerback function that allows checking the lock/unlock state of the door easily even in the daytime is installed. When the LOCK signal from the keyless operation key is input to ETACS-ECU, all doors (including the liftgate) are locked and the hazard warning light flashes once. When UNLOCK signal is input, all doors (including the liftgate) are unlocked and the hazard warning light flashes twice.

## KEYLESS ENTRY DOME LIGHT ANSWERBACK FUNCTION



When LOCK signal from the keyless operation key is input to the ETACS-ECU via receiver antenna module, all doors (including the liftgate) are locked and the dome light will extinguish\*. When UNLOCK signal is input, all doors (including the liftgate) are unlocked and the dome light illuminates for 15 seconds. The dome light fades in, keeps on, and fades out in 15 seconds after the door unlock relay is operated.

**NOTE:** \*: If doors (including the liftgate) are locked with the keyless operation key when the dome light is ON while doors (including the liftgate) are opened, the dome light is switched off in 1.2 seconds. In addition, if doors (including the liftgate) are locked with the keyless operation key when the dome light is OFF, the dome light does not work.

## KEYLESS ENTRY HORN ANSWERBACK FUNCTION

When the LOCK signal from the keyless operation key is received into ETACS-ECU via receiver antenna module, all doors (including the liftgate) are locked and the horn sounds. If the driver's door cannot be locked even when the keyless operation key is operated, the horn does not sound.

## ENGINE STARTING FUNCTION

When carrying the keyless operation key, a driver can start/stop the engine by operating the IG knob, not using the ignition key.

## WELCOME LIGHT FUNCTION <VEHICLES WITH COLOR LIQUID CRYSTAL METER>

Refer to GROUP 54A, Lighting P.54A-9.

## KEYLESS ENTRY TIMER LOCK TIME

When none of the doors (including the liftgate) are opened within 30 seconds after the doors (including the liftgate) are unlocked by the keyless entry function, ETACS-ECU automatically outputs the door lock signal to lock the doors (including the liftgate). This function prevents the doors (including the liftgate) from being unlocked unexpectedly by operation errors. Using a customization function, the timer lock period can be changed (Refer to P.42B-35).

## OPERATION INHIBITION CONDITIONS

The operation of the system is inhibited when:

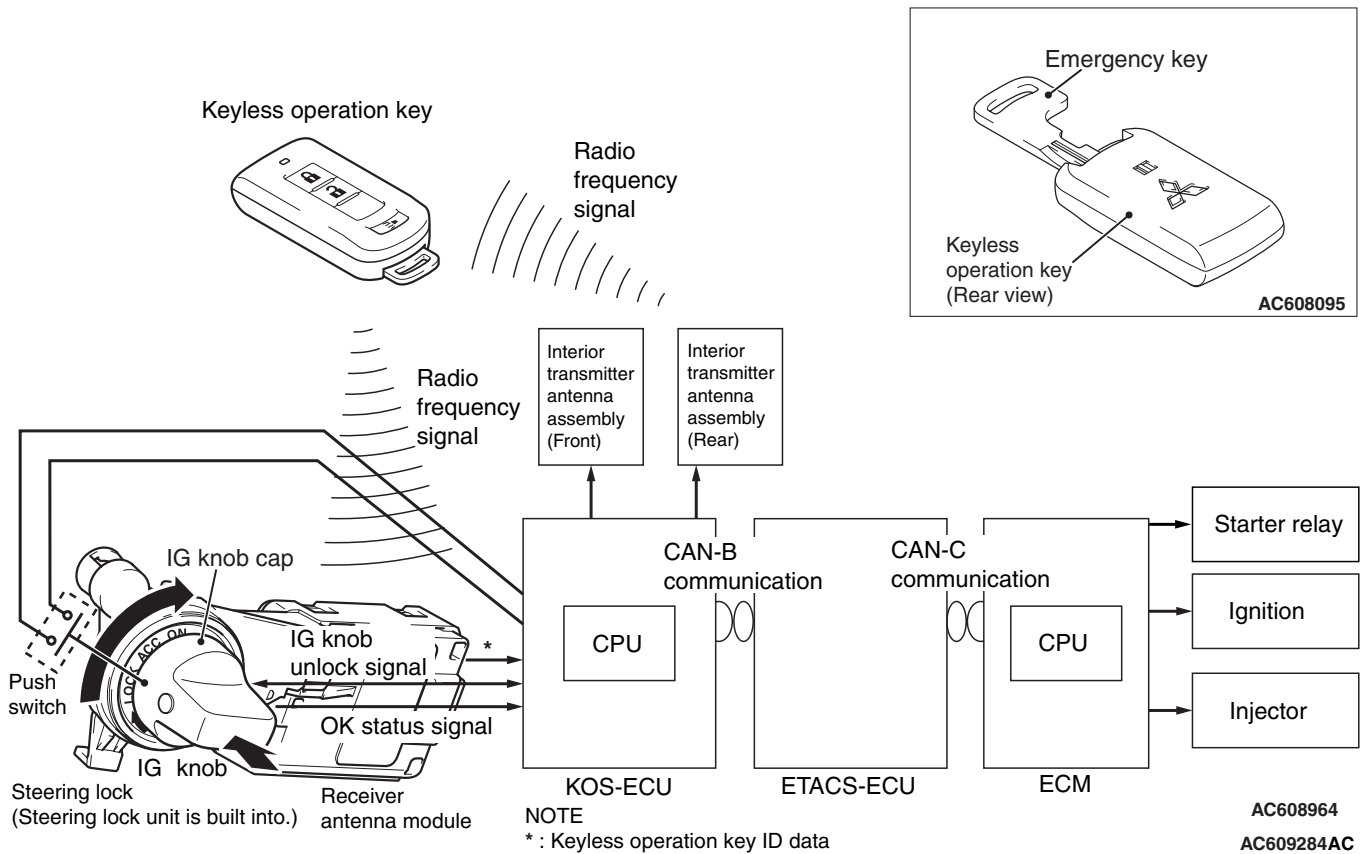
- The emergency key is in the IG knob.
- Any door or the liftgate is open (door switch is ON). (including door ajar)

## THEFT-ALARM SYSTEM

Refer to GROUP 54A, Theft-alarm system P.54A-47.



CONSTRUCTION DIAGRAM



OPERATION

WHEN THE USER IS CARRYING THE KEYLESS OPERATION KEY

1. Press the IG knob on the steering lock, and the push switch inside the steering lock is turned ON.
2. When the push switch inside the steering lock is turned ON, KOS-ECU activates the inside transmission antenna assembly to send the transmitter signal to the keyless operation key.
3. On receiving the transmitter signal from KOS-ECU, the keyless operation key performs the keyless operation key certification and the key ID calculation, and sends the keyless operation key ID data to KOS-ECU. (The keyless operation key cannot receive the transmitter signal from KOS-ECU when it is not located within the engine starting function valid area .)
4. The receiver antenna receives the signal from the keyless operation key, and then KOS-ECU compares the keyless operation key ID data sent from the key with the one registered in it.
5. When this data coincides, KOS-ECU sends the IG knob unlock signal to the steering lock unit inside the steering lock.

6. On receiving the IG knob unlock signal, the steering lock unit performs processing (verification of the KOS ID, etc.) based on the received data. When no problem is found during the processing, the unit sends the OK status signal to KOS-ECU, and at the same time, electrically disengages the steering lock mechanism to make the IG knob rotatable.
7. When a keyless operation key certification agreement memory "exists" \*1 in KOS-ECU when it received the OK status signal from the steering lock unit, the engine start permission communication (CAN communication) is performed between KOS-ECU and the ECM by turning the IG knob from the "ACC" position to the "ON"/"START" position, and the engine starts. If the keyless operation key certification agreement memory "does not exist" \*2, the engine does not start.

NOTE:

\*1: The keyless operation key certification agreement memory "exists" means that a registered keyless operation key has been recognized during the keyless operation key certification communication.

<sup>\*2</sup>: When the keyless operation key certification agreement memory "does not exist," the "keyless operation key take out monitoring function" and the "keyless operation key bringing-in monitoring function" (keyless operation key monitoring controls) have judged

### KEYLESS OPERATION KEY TAKE OUT MONITORING FUNCTION

To inform the driver that the keyless operation key is brought out of the car while the IG knob is in other than the LOCK (OFF) position, KOS-ECU performs the certification communication with the keyless operation key inside the car when all the doors are closed and monitors it being brought out of the car. When none of the registered keyless operation keys (up to four) respond during the communication, KOS-ECU determines that the key has been carried out of the car, and sets the keyless operation key certification agreement memory to "does not exist," and does not permit starting of the engine.

### KEYLESS OPERATION KEY BRINGING-IN MONITORING FUNCTION

If the keyless operation key carrying-out monitoring function detects that the key has been carried out of the car with the IG knob in other than LOCK (OFF) position, KOS-ECU performs the certification communication with the keyless operation key inside the car every 5 seconds to monitor the replacement of the keyless operation key. When any of the registered keyless operation keys sends a respond, KOS-ECU determines that the key has been brought into the car (replaced), and sets the keyless operation key certification agreement memory to "exist," and permits starting of the engine.

### ENGINE STARTING FUNCTION VALID AREA

The engine can be started only when the keyless operation key is within the interior antenna receiving area.

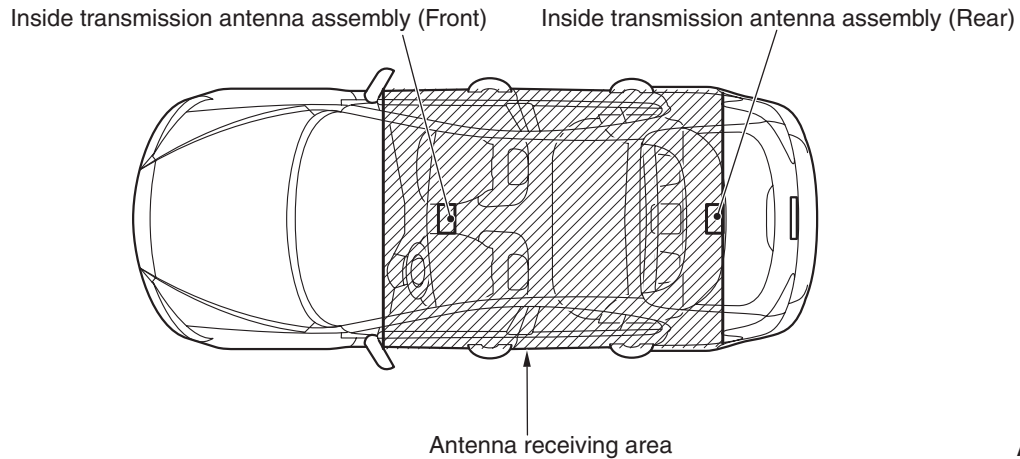
that the keyless operation key has been take out of the vehicle with the IG knob in the LOCK "(OFF)" position while turning ON the push switch or in the ACC, ON, or START position.

NOTE: The monitoring function is inhibited when:

- The keyless operation key certification agreement memory "does not exist" from the start.
- The emergency key is in the IG knob.
- The IG knob is in LOCK "(OFF)" position and the push switch is OFF.
- The vehicle is judged running (the shift lever position is other than "P" or "N" <except for M/T>, or vehicle speed is 6 km/h or higher).
- KOS-ECU does not output the IG knob unlock request by communication of keyless operation key certification.

NOTE: The monitoring function is inhibited when:

- The keyless operation key certification agreement memory "exists" from the start.
- The emergency key is in the IG knob.
- The IG knob is in LOCK (OFF) position and the push switch is OFF.
- The IG knob is in LOCK (OFF) position and the push switch is OFF.
- KOS-ECU does not output the IG knob unlock request by communication of keyless operation key certification.

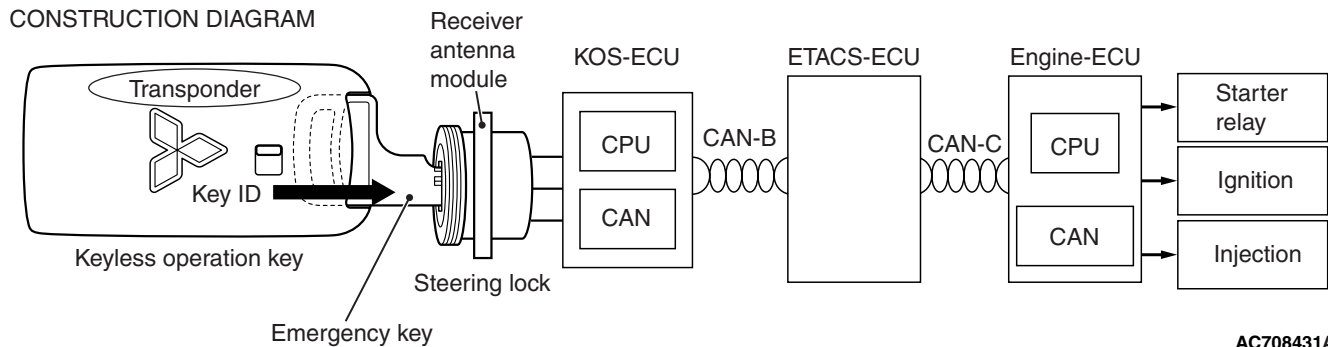


AC807653 AC

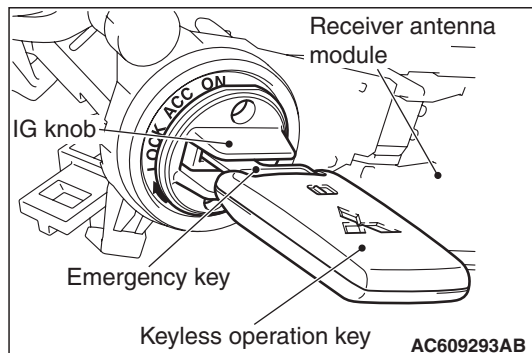
## EMERGENCY FUNCTION

The emergency function is adopted, which starts the engine by combination of the emergency key and the keyless operation key when the IG knob operation is unavailable in case such as discharged battery. Also the engine can be started using the conventional ignition key (transponder).

## CONSTRUCTION DIAGRAM



## OPERATION



The engine can be started by removing the IG knob cap and inserting the emergency key in KOS steering lock. In this case, the system operates as follows:

1. Inversely insert the emergency key in the keyless operation key, insert that in KOS steering lock, and then press and turn the emergency key using the keyless operation key.
2. When the emergency key is turned to the ON position, the transponder (a small transmitter) incorporated in the keyless operation key transmits a key-specific ID code (key ID) to the receiver antenna module by radio wave.
3. The KOS-ECU compares the ID code that was sent with pre-registered ID codes, and only when the code matches, the KOS-ECU controls the ECM.
4. Since the power to the transponder incorporated in the keyless operation key is supplied from the receiver antenna module, the keyless operation key can be used even when its battery is discharged. Two keyless operation keys are pro-

vided for each vehicle, and up to four keys can be registered as needed. In addition, the emergency keys can be registered as many as the keyless operation keys. There are one trillion possible combination for the registered ID codes which improves security by preventing theft using a copied ID code.

*NOTE: If KOS-ECU is replaced, or if the keyless operation key is lost or the additional key is added, all the keyless operation key ID codes must be re-registered using the scan tool. (A key can be added without using the scan tool. <USA only>)*

## TIRE PRESSURE MONITORING SYSTEM (TPMS) FUNCTION

M2421000600033

When the tire pressure becomes under the specified value, the TPMS function warns the driver of that state by illuminating the TPMS warning light.

### OPERATION

- The signals from the TPMS transmitter are received by the KOS-ECU.
- KOS-ECU processes input signals from each TPMS transmitter as well as vehicle speed signals from the ASC-ECU. It receives the atmospheric pressure signal from ECM, and when the atmospheric pressure is low (such as at high altitude), it calibrates the tire pressure received from TPMS transmitter and makes a judgment of warning. When the road tire pressure is low, it sends a warning signal causing the TPMS warning light to be illuminated. When the TPMS has problems, it sends a warning signal causing the TPMS warning light to be flashed\*.

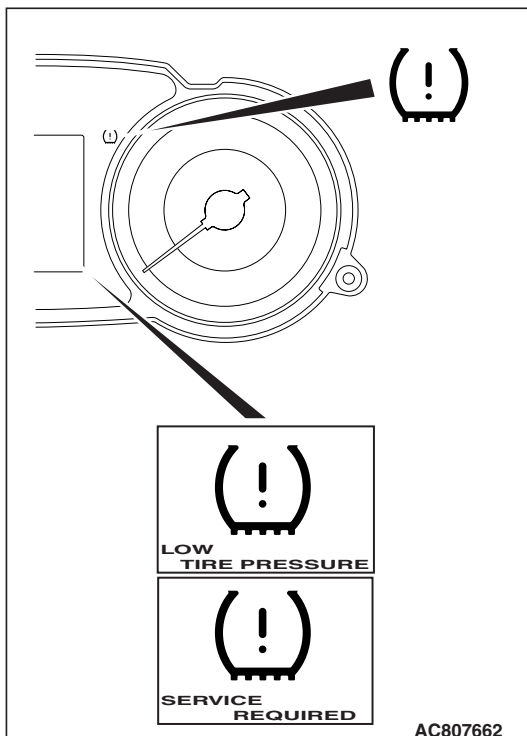
*NOTE: \*: Change to continuous illumination after flashing for about 1 minute.*

- For 3 seconds after the ignition switch is turned to the "ON" position, KOS-ECU illuminates the TPMS warning light to check any breaks in the TPMS warning light circuit.
- By connecting the scan tool to the data link connector, data stored in KOS-ECU (data of tire pressure and TPMS transmitter ID, the alarm status and warning history, etc.) can be displayed and TPMS transmitter ID can be registered.

*NOTE: If the TPMS transmitter is replaced, register the ID codes of all the TPMS transmitters again using the scan tool.*

### TPMS WARNING LIGHT AND DISPLAY

The TPMS warning light on the combination meter illuminates or flashes\* to alert the driver by request from KOS-ECU. When the tire pressure warning or the fault warning is activated, a warning symbol and a message are displayed on the multi information display.



**WARNING DISPLAY PATTERN OF TPMS WARNING LIGHT  
AND MULTI INFORMATION DISPLAY**

Circumstance	Warning light	Multi information display
For 3 seconds after the ignition switch is turned to the "ON" position (warning light circuit self-check)	Illuminates	No indication
TPMS problems	Flashes*	Symbol and "SERVICE REQUIRED" is displayed
Low tire pressure	Illuminates	Symbol and "LOW TIRE PRESSURE" is displayed

*NOTE: \*: Change to continuous illumination after flashing for about 1 minute.*

**TIRE PRESSURE THRESHOLD VALUES**

Item	Tire pressure kPa (psi)
Standard pressure at cold (reference)	220 (32)
Alarm ON pressure	174 (25.2) or less
Alarm OFF pressure	189 (27.4) or more

**TPMS TRANSMITTER (TIRE PRESSURE SENSOR)**

The TPMS transmitter combines the valve and tire pressure sensor in a single unit. The TPMS transmitters are mounted inside the tires. The TPMS transmitter measures tire pressure directly with its tire pressure sensor and sends radio frequency signals to KOS-ECU. The TPMS transmitter includes acceleration sensor that senses tire rotation, and change tire pressure sampling and data transmission timing when vehicle is running.

*NOTE: Use only genuine wheels. The use of non-genuine wheels may cause the improper installation of the TPMS transmitters, possibly resulting in air leakage and damage to the TPMS transmitter.*

**TIRE PRESSURE SAMPLING TIMING**

Vehicle status	Sampling timing
At vehicle moving	once every 5 seconds
At vehicle stationary	once every 1 minute

*NOTE: Vehicle moving = vehicle speed: approximately 25 km/h (15 mph) or more*

**DATA TRANSMISSION TIMING**

Vehicle status	Transmission timing
At vehicle moving	once every 1 minute*
At vehicle stationary	once every 13 hours

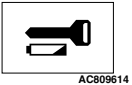

**If a sampled pressure varies by  $\pm 10$  kPa (1.5psi) from the last transmitted pressure value, an additional transmission will occur.**


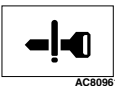
*NOTE: \*: Once every 15 seconds for first 30 transmission after vehicle starts moving.*


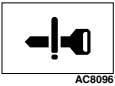
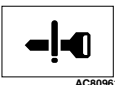
**WARNING AND WARNING INDICATOR LIST <VEHICLES WITHOUT COLOR LIQUID CRYSTAL DISPLAY>**

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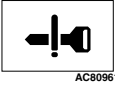
If the KOS failed, operated improperly, KOS-ECU warns the driver of this by setting off the outer tone alarm and the keyless operation warning indicator, on the multi information display in the combination meter. If the TPMS fails or the tire pressure is low, KOS-ECU warns the driver of that state by the TPMS warning light and the multi information display in the combination meter.



Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
 AC809614	KEY BATTERY LOW	Low keyless operation key battery voltage warning	The keyless operation key with low battery voltage is detected when the IG knob is pressed.	—	<ul style="list-style-type: none"> <li>Warning indicator illuminates for 30 seconds.</li> <li>The outer tone alarm will not sound.</li> </ul>	<ul style="list-style-type: none"> <li>IG knob in "LOCK" (OFF) position and push switch OFF are detected.</li> <li>30 seconds have passed after the warning output started.</li> </ul>
 AC809615	KEY MISSING	No keyless operation key detected inside the car	No keyless operation key is detected inside the car when the IG knob is pressed.	—	<ul style="list-style-type: none"> <li>The warning indicator illuminates for 5 minutes.</li> <li>The outer tone alarm will not sound.</li> </ul>	<ul style="list-style-type: none"> <li>IG knob in "LOCK" (OFF) position and push switch OFF are detected.</li> <li>5 minutes have passed after the warning output started.</li> </ul>

Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
 AC809613	STEERING WHEEL LOCK	IG knob is not returned properly.	Opening of the driver's door is detected when the IG knob is in ACC or LOCK position and the push switch is ON.	—	<ul style="list-style-type: none"> <li>The warning indicator illuminates for 5 minutes.</li> <li>The outer tone alarm will not sound.</li> <li>Key reminder warning tone alarm sounds until closing of the driver's door is detected.</li> </ul>	<ul style="list-style-type: none"> <li>The IG knob in the "RUN" or "START" position, or the IG knob in the "LOCK" (OFF) position, and the push switch OFF are detected.</li> <li>The driver's door is detected closed from the open position.</li> <li>5 minutes have passed after the warning output started.</li> </ul>
 AC809615	CONFIRM KEY LOCATION	Keyless operation key take out warning	The keyless operation key is taken out of the car when the IG knob is in other than the LOCK position, and all the doors are closed.	—	<ul style="list-style-type: none"> <li>The warning indicator illuminates for 5 minutes.</li> <li>Outer tone alarm sounds for 5.69 seconds in pattern 2.</li> </ul>	<ul style="list-style-type: none"> <li>IG knob in "LOCK" (OFF) position and push switch OFF are detected.</li> <li>KOS-ECU has detected a keyless operation key inside the vehicle.</li> <li>5 minutes have passed after the warning output started.</li> </ul>

Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
 AC809613	STEERING WHEEL LOCK	Door lock does not operate.	When the front door outside handle lock switch is turned ON position while the IG knob is in other than the LOCK position and push switch OFF.	—	<ul style="list-style-type: none"> <li>Warning indicator illuminates for 5 seconds.</li> <li>Outer tone alarm sounds for 2.96 seconds in pattern 1.</li> </ul>	<ul style="list-style-type: none"> <li>IG knob in "LOCK" (OFF) position and push switch OFF are detected.</li> <li>5 seconds have passed after the warning output started.</li> </ul>
 AC809615	CONFIRM KEY LOCATION		When the front door outside handle lock switch is turned ON position while the keyless operation key is left in the vehicles.			<ul style="list-style-type: none"> <li>Lock switch on the keyless operation switch is pressed again.</li> <li>5 seconds have passed after the warning output started.</li> </ul>
 AC809615	CHECK DOORS		When the front door outside handle lock switch is turned ON position while the door is ajar.			<ul style="list-style-type: none"> <li>All doors are closed.</li> <li>5 seconds have passed after the warning output started.</li> </ul>



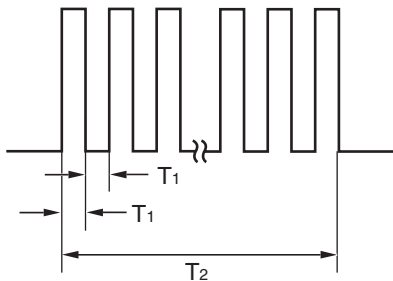
Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
 <small>AC809615</small>	SERVICE REQUIRED	System error	Push switch is pressed ON from OFF when an error has been detected in EEPROM in KOS-ECU.	-	<ul style="list-style-type: none"> <li>The warning indicator illuminates for 5 minutes.</li> <li>The outer tone alarm will not sound.</li> </ul>	5 minutes have passed after the push switch was pressed ON and IG knob is in "LOCK" (OFF) position.
			Push switch is pressed ON from OFF while open circuit in the transmitter antennas are being detected.			
			The push switch is pressed ON from OFF while short circuit in the power supply output (steering lock, transmitter antennas, receiver antenna module, etc.) is detected.			
			Steering lock communication error has been detected when the push switch was pressed ON.			
			The IG knob is in other than the LOCK position while some error is being detected.			
Not displayed	-	TPMS warning light bulb open circuit check	The ignition switch is turned from "LOCK" (OFF) to "ON."	Illuminates for 3 seconds.	-	3 seconds have passed after the TPMS warning light is lit.

Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)																					
				TPMS warning light	Multi information display																						
 <small>AC809643</small>	LOW TIRE PRESSURE	Tire pressure alarm	The received tire pressure value is under the alarm ON threshold value.	Illuminates.	Symbol and "LOW TIRE PRESSURE" is displayed.	The received tire pressure value is over the alarm OFF threshold value.																					
 <small>AC809643</small>	SERVICE REQUIRED	TPMS failure warning	<table border="1"> <tr> <td>ID not stored</td> <td>The TPMS transmitter ID is not registered in the KOS-ECU.</td> </tr> <tr> <td>Defective EEPROM</td> <td>Abnormality of data in the EEPROM of the KOS-ECU is detected.</td> </tr> <tr> <td>Problem in signal reception</td> <td>The signals from TPMS transmitters cannot be received while driving for about 20 minutes.</td> </tr> <tr> <td>Defective sensor</td> <td>The sensor failure signal is received from the TPMS transmitter.</td> </tr> <tr> <td>The battery voltage of the TPMS transmitter is low.</td> <td>The reception problem warning is activated because of the low battery voltage of the TPMS transmitter.</td> </tr> <tr> <td>Vehicle speed input problem</td> <td>The vehicle speed is not input.</td> </tr> <tr> <td>Abnormal vehicle speed value</td> <td>The vehicle speed value is abnormal.</td> </tr> </table>	ID not stored	The TPMS transmitter ID is not registered in the KOS-ECU.	Defective EEPROM	Abnormality of data in the EEPROM of the KOS-ECU is detected.	Problem in signal reception	The signals from TPMS transmitters cannot be received while driving for about 20 minutes.	Defective sensor	The sensor failure signal is received from the TPMS transmitter.	The battery voltage of the TPMS transmitter is low.	The reception problem warning is activated because of the low battery voltage of the TPMS transmitter.	Vehicle speed input problem	The vehicle speed is not input.	Abnormal vehicle speed value	The vehicle speed value is abnormal.	Flashes *	Symbol and "SERVICE REQUIRED" is displayed.	<table border="1"> <tr> <td>ID is registered normally.</td> </tr> <tr> <td>Data in the EEPROM of the KOS-ECU is checked to be normal.</td> </tr> <tr> <td>The signal from the TPMS transmitter that was warned is received.</td> </tr> <tr> <td>A normal signal is received from the TPMS transmitter that was warned.</td> </tr> <tr> <td>The signal of normal battery voltage is received from the TPMS transmitter that was warned.</td> </tr> <tr> <td>The vehicle speed is input.</td> </tr> <tr> <td>The normal vehicle speed value is received.</td> </tr> </table>	ID is registered normally.	Data in the EEPROM of the KOS-ECU is checked to be normal.	The signal from the TPMS transmitter that was warned is received.	A normal signal is received from the TPMS transmitter that was warned.	The signal of normal battery voltage is received from the TPMS transmitter that was warned.	The vehicle speed is input.	The normal vehicle speed value is received.
ID not stored	The TPMS transmitter ID is not registered in the KOS-ECU.																										
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NOTE:

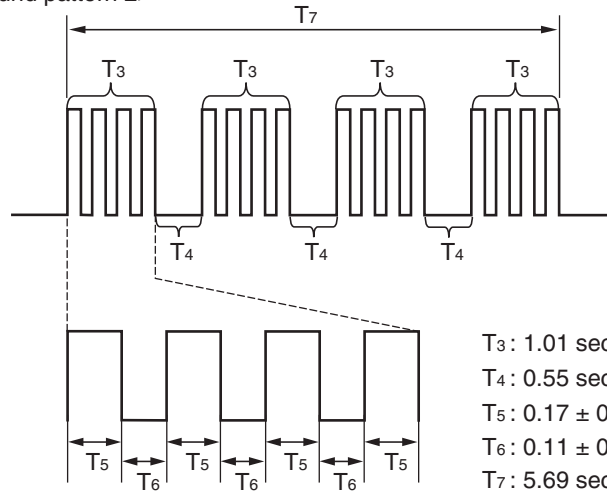
- \*: Change to continuous illumination after flashing for about 1 minute.
- When the vehicle speed exceeds 30 km/h (18.6 mph) for more than 35 seconds, the signals received from the TPMS transmitter shall be checked for 15 minutes. During that 15 minutes of reception check, when the specified value of a tire is normally received, the tire is judged as the road wheel. After the 15 minutes of measurement, if four tires are judged as the road wheels, the remaining wheel is judged as the spare tire. After the 15 minutes of measurement, if three or less tires are judged as the road wheels, the result of last measurement will be applied for the unjudged tire(s).

<Sound pattern 1>



T<sub>1</sub> : 0.08 ± 0.01 seconds  
T<sub>2</sub> : 2.96 seconds

<Sound pattern 2>

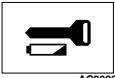




T<sub>3</sub> : 1.01 seconds  
T<sub>4</sub> : 0.55 seconds  
T<sub>5</sub> : 0.17 ± 0.01 seconds  
T<sub>6</sub> : 0.11 ± 0.01 seconds  
T<sub>7</sub> : 5.69 seconds

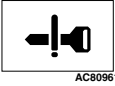
**WARNING AND WARNING INDICATOR LIST <VEHICLES WITH COLOR LIQUID CRYSTAL DISPLAY>**


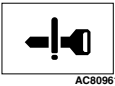
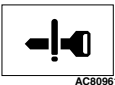
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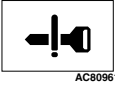
If the KOS failed, operated improperly, KOS-ECU warns the driver of this by setting off the outer tone alarm and the keyless operation warning indicator, on the multi information display in the combination meter. If the TPMS fails or the tire pressure is low, KOS-ECU warns the driver of that state by the TPMS warning light and the multi information display in the combination meter.

Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
 AC809614	KEY BATTERY LOW	Low keyless operation key battery voltage warning	The keyless operation key with low battery voltage is detected when the IG knob is pressed.	–	<ul style="list-style-type: none"> <li>Warning indicator illuminates for 30 seconds.</li> <li>The outer tone alarm will not sound.</li> </ul>	<ul style="list-style-type: none"> <li>IG knob in "LOCK" (OFF) position and push switch OFF are detected.</li> <li>30 seconds have passed after the warning output started.</li> </ul>
 AC809615	KEY NOT DETECTED	No keyless operation key detected inside the car	No keyless operation key is detected inside the car when the IG knob is pressed.	–	<ul style="list-style-type: none"> <li>The warning indicator illuminates for 5 minutes.</li> <li>The outer tone alarm will not sound.</li> </ul>	<ul style="list-style-type: none"> <li>IG knob in "LOCK" (OFF) position and push switch OFF are detected.</li> <li>5 minutes have passed after the warning output started.</li> </ul>


Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
	—	IG knob is not returned properly.	Opening of the driver's door is detected when the IG knob is in ACC or LOCK position and the push switch is ON.	—	<ul style="list-style-type: none"> <li>• The warning indicator illuminates for 5 minutes.</li> <li>• The outer tone alarm will not sound.</li> <li>• Key reminder warning tone alarm sounds until closing of the driver's door is detected.</li> </ul>	<ul style="list-style-type: none"> <li>• The IG knob in the "RUN" or "START" position, or the IG knob in the "LOCK" (OFF) position, and the push switch OFF are detected.</li> <li>• The driver's door is detected closed from the open position.</li> <li>• 5 minutes have passed after the warning output started.</li> </ul>


Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
 <small>AC809615</small>	KEY NOT DETECTED	Keyless operation key take out warning	The keyless operation key is taken out of the car when the IG knob is in other than the LOCK position, and all the doors are closed.	–	<ul style="list-style-type: none"> <li>• The warning indicator illuminates for 5 minutes.</li> <li>• Outer tone alarm sounds for 5.69 seconds in pattern 2.</li> </ul>	<ul style="list-style-type: none"> <li>• IG knob in "LOCK" (OFF) position and push switch OFF are detected.</li> <li>• KOS-ECU has detected a keyless operation key inside the vehicle.</li> <li>• 5 minutes have passed after the warning output started.</li> </ul>

Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
 AC800961	—	Door lock does not operate.	When the front door outside handle lock switch is turned to ON position while the IG knob is in other than the LOCK position and push switch OFF.	—	<ul style="list-style-type: none"> <li>Warning indicator illuminates for 5 seconds.</li> <li>Outer tone alarm sounds for 2.96 seconds in pattern 1.</li> </ul>	<ul style="list-style-type: none"> <li>IG knob in "LOCK" (OFF) position and push switch OFF are detected.</li> <li>5 seconds have passed after the warning output started.</li> </ul>
 AC809615	KEY STILL IN VEHICLE		When the front door outside handle lock switch is turned to ON position while the keyless operation key is left in the vehicles.			<ul style="list-style-type: none"> <li>Lock switch on the keyless operation switch is pressed again.</li> <li>5 seconds have passed after the warning output started.</li> </ul>
 AC809615	CHECK DOORS		When the front door outside handle lock switch is turned to ON position while the door is ajar.			<ul style="list-style-type: none"> <li>All doors are closed.</li> <li>5 seconds have passed after the warning output started.</li> </ul>

Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
 <small>AC809615</small>	KEYLESS OPERATION SYSTEM SERVICE REQUIRED	System error	Push switch is pressed ON from OFF when an error has been detected in EEPROM in KOS-ECU.	-	<ul style="list-style-type: none"> <li>The warning indicator illuminates for 5 minutes.</li> <li>The outer tone alarm will not sound.</li> </ul>	5 minutes have passed after the push switch was pressed ON and IG knob is in "LOCK" (OFF) position.
			Push switch is pressed ON from OFF while open circuit in the transmitter antennas are being detected.			
			The push switch is pressed ON from OFF while short circuit in the power supply output (steering lock, transmitter antennas, receiver antenna module, etc.) is detected.			
			Steering lock communication error has been detected when the push switch was pressed ON.			
			The IG knob is in other than the LOCK position while some error is being detected.			



Display contents	Message	Item	State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
				TPMS warning light	Multi information display	
Not displayed	–	TPMS warning light bulb open circuit check	The ignition switch is turned from "LOCK" (OFF) to "ON."	Illuminates for 3 seconds.	–	3 seconds have passed after the TPMS warning light is lit.
 <small>AC809643</small>	LOW TIRE PRESSURE	Tire pressure alarm	The received tire pressure value is under the alarm ON threshold value.	Illuminates.	Symbol and "LOW TIRE PRESSURE" is displayed.	The received tire pressure value is over the alarm OFF threshold value.

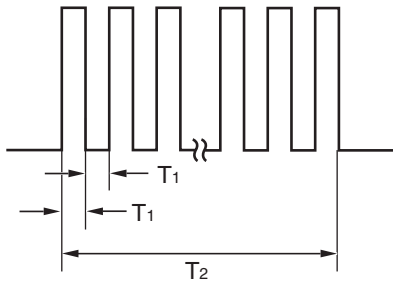
Display contents	Message	Item		State	Warning operations		Warning cancellation conditions (Cancels warning operations when one of the conditions met)
					TPMS warning light	Multi information display	
 <small>AC809643</small>	TPMS SERVICE REQUIRED	TPMS failure warning	ID not stored	The TPMS transmitter ID is not registered in the KOS-ECU.	Flashes *	Symbol and "SERVICE REQUIRED" is displayed.	ID is registered normally.
			Defective EEPROM	Abnormality of data in the EEPROM of the KOS-ECU is detected.			Data in the EEPROM of the KOS-ECU is checked to be normal.
			Problem in signal reception	The signals from TPMS transmitters cannot be received while driving for about 20 minutes.			The signal from the TPMS transmitter that was warned is received.
			Defective sensor	The sensor failure signal is received from the TPMS transmitter.			A normal signal is received from the TPMS transmitter that was warned.
			The battery voltage of the TPMS transmitter is low.	The reception problem warning is activated because of the low battery voltage of the TPMS transmitter.			The signal of normal battery voltage is received from the TPMS transmitter that was warned.
			Vehicle speed input problem	The vehicle speed is not input.			The vehicle speed is input.
			Abnormal vehicle speed value	The vehicle speed value is abnormal.			The normal vehicle speed value is received.

## NOTE:

- \*: Change to continuous illumination after flashing for about 1 minute.

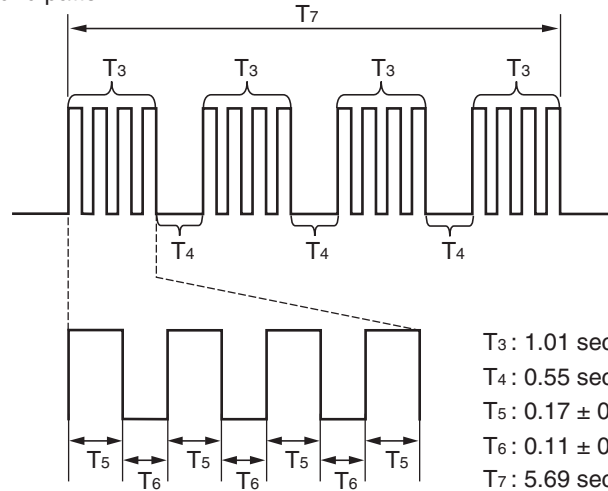
- When the vehicle speed exceeds 30 km/h (18.6 mph) for more than 35 seconds, the signals received from the TPMS transmitter shall be checked for 15 minutes. During that 15 minutes of reception check, when the specified value of a tire is normally received, the tire is judged as the road wheel. After the 15 minutes of measurement, if four tires are judged as the road wheels, the remaining wheel is judged as the spare tire. After the 15 minutes of measurement, if three or less tires are judged as the road wheels, the result of last measurement will be applied for the unjudged tire(s).

<Sound pattern 1>



T<sub>1</sub> : 0.08 ± 0.01 seconds  
T<sub>2</sub> : 2.96 seconds

<Sound pattern 2>



T<sub>3</sub> : 1.01 seconds  
T<sub>4</sub> : 0.55 seconds  
T<sub>5</sub> : 0.17 ± 0.01 seconds  
T<sub>6</sub> : 0.11 ± 0.01 seconds  
T<sub>7</sub> : 5.69 seconds

AC501053AC

## CUSTOMIZATION FUNCTION

M2421000300474

By operating the ETACS system or MMCS of scan tool MB991958, the following functions can be programmed. The programmed information is held even when the battery is disconnected.

Adjustment item (scan tool display)	Adjustment item	Adjusting contents (scan tool display)	Adjusting contents
Hazard answer back	Adjustment of the number of keyless hazard warning light answer back flashes	Lock:1, Unlock:2	LOCK: Flashes once, UNLOCK: Flashes twice (initial condition)
		Lock:1, Unlock:0	LOCK: Flashes once, UNLOCK: No flash
		Lock:0, Unlock:2	LOCK: No flash, UNLOCK: Flash twice
		Lock:2, Unlock:1	LOCK: Flash twice, UNLOCK: Flash once
		Lock:2, Unlock:0	LOCK: Flash twice, UNLOCK: No flash
		Lock:0, Unlock:1	LOCK: No flash, UNLOCK: Flash once
		Lock:0, Unlock:0	No function
Dome light delay timer with door	Adjustment of interior light delay shutdown time	0sec	0 second
		7.5sec	7.5 seconds
		15sec	15 seconds
		30sec	30 seconds (initial condition)
		60sec	60 seconds
		120sec	120 seconds
		180sec	180 seconds

Adjustment item (scan tool display)	Adjustment item	Adjusting contents (scan tool display)	Adjusting contents
Door unlock mode	Adjustment of power door locks with selective unlocking	All doors unlock	Without function: The first operation of keyless entry system or unlock operation by KOS unlocks all doors.
		Dr door unlock	With function: The first operation of keyless entry system or unlock operation by KOS unlocks the driver's door only, and the second unlock operation within 2 seconds after that unlocks all doors. (initial condition)
Auto door unlock	Adjustment of the auto door unlock function	Disabled	Without function (initial condition) <M/T, CVT, TC-SST>
		Always (P pos)	With function: Operates when the shift lever or the selector lever is moved to the P position. <CVT, TC-SST>
		P/W unlock (P)	With function: Operates when the shift lever or the selector lever is moved to the P position with the power window lock switch in the OFF position. <CVT, TC-SST>
		Always(Lock pos)	With function: Operates when the ignition switch is moved to the LOCK (OFF) position. <M/T, CVT, TC-SST>
		P/W unlock(Lock)	With function: Operates when the ignition switch is turned to the LOCK (OFF) position with the power window lock switch in the OFF position. <M/T, CVT, TC-SST>
Duration of horn chirp	Horn sounding time during horn answer back	Short	0.01 second (initial condition)
		Long	0.02 second
Horn chirp by keyless	Horn chirp by keyless entry system <vehicles without auto light>	Not sound horn	No horn answerback function
		Lock any time	The horn sounds when the lock button of keyless entry transmitter is pressed once.
		W lock any time	The horn sounds when the lock button of keyless entry transmitter is pressed twice. (initial condition)
		Not sound horn	No horn answerback function
	Horn chirp by keyless entry system <vehicles with auto light>	Lock any time	The horn sounds when the lock button of keyless entry transmitter is pressed once.
		Lock/auto ON	During daytime, while the lighting switch is in the AUTO position, the horn sounds once when the lock is pressed once.
		W lock any time	The horn sounds when the lock button of keyless entry transmitter is pressed twice. (initial condition)
		W lock any time	The horn sounds when the lock button of keyless entry transmitter is pressed twice. (initial condition)

<b>Adjustment item (scan tool display)</b>	<b>Adjustment item</b>	<b>Adjusting contents (scan tool display)</b>	<b>Adjusting contents</b>
Buzzer answer back <Vehicles with KOS>	Adjusts the tone alarm answer back function	Not sound buzzer	No function
		At keyless	Sounds when the keyless entry system is activated.
		At F.A.S.T.*	Sounds when KOS is activated (initial condition).
		At Both	Sounds when the keyless entry system or KOS is activated.
Timer lock timer	Timer lock period adjustment	30sec	30 seconds (initial condition)
		60sec	60 seconds
		120sec	120 seconds
		180sec	180 seconds
Panic alarm switch	With/without panic alarm function	Disable	No function
		Enable	With function (initial condition)
F.A.S.T.* key detect out fm window	With/without KOS key exterior detection function	Disable	No function (initial condition)
		Enable	With function
F.A.S.T.* feature	KOS function adjustment	Both enable	All KOS functions are enabled (initial condition)
		DoorEntry enable	Only door entry function is enabled.
		ENG strt enable	Only engine starting function is enabled.
		Both disabled	All KOS functions are disabled.
F.A.S.T.* unlock disable time	Adjusts the door unlock inhibition period after door lock is activated	0sec	0 seconds
		3sec	3 seconds (initial condition)
		5sec	5 seconds

**NOTE:** \*: F.A.S.T. (Free-hand Advanced Security Transmitter)

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## NOTES