GROUP 1

BRAKING EQUIPMENT

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1.1. Mechanical condition and operation

1.1.1. Service brake pedal/hand lever pivot

M6101010100027

"Not Applicable"

1.1.2. Pedal/hand lever condition and travel of the brake operating device

M6101010200024

"Not Applicable"

1.1.3. Vacuum pump or compressor and reservoirs

M6101010300021

"Not Applicable"

1.1.4. Low pressure warning gauge or indicator

M6101010400028

"Not Applicable"

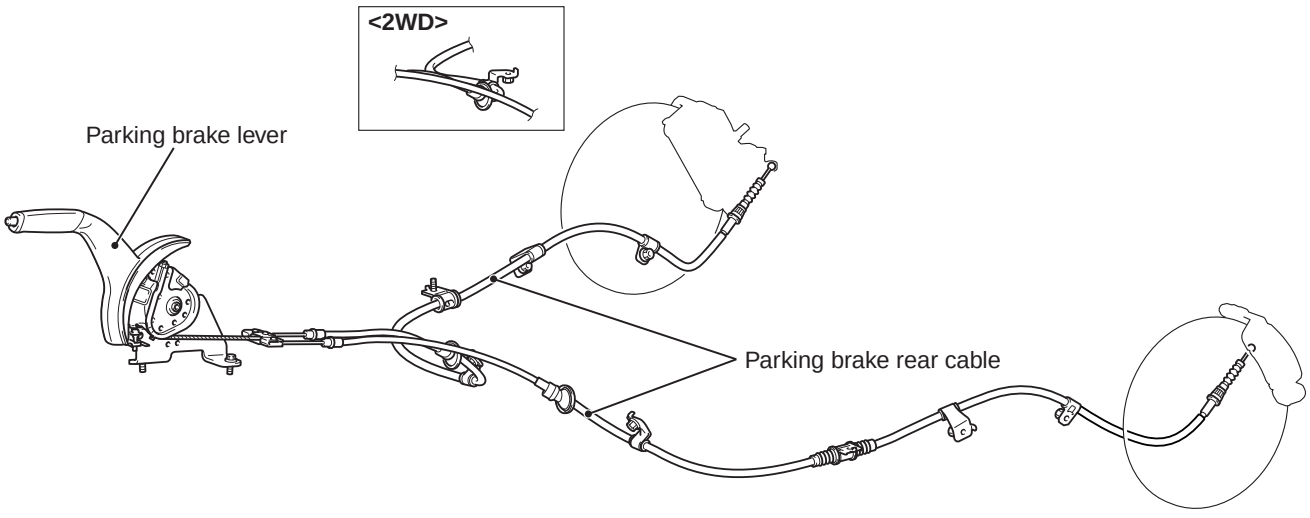
1.1.6. Parking brake activator, lever control, parking brake ratchet, electronic parking brake

M6101000100026

LEVER TYPE PARKING BRAKE

A parking brake lever is used to operate the mechanical rear-wheel acting type parking brake.

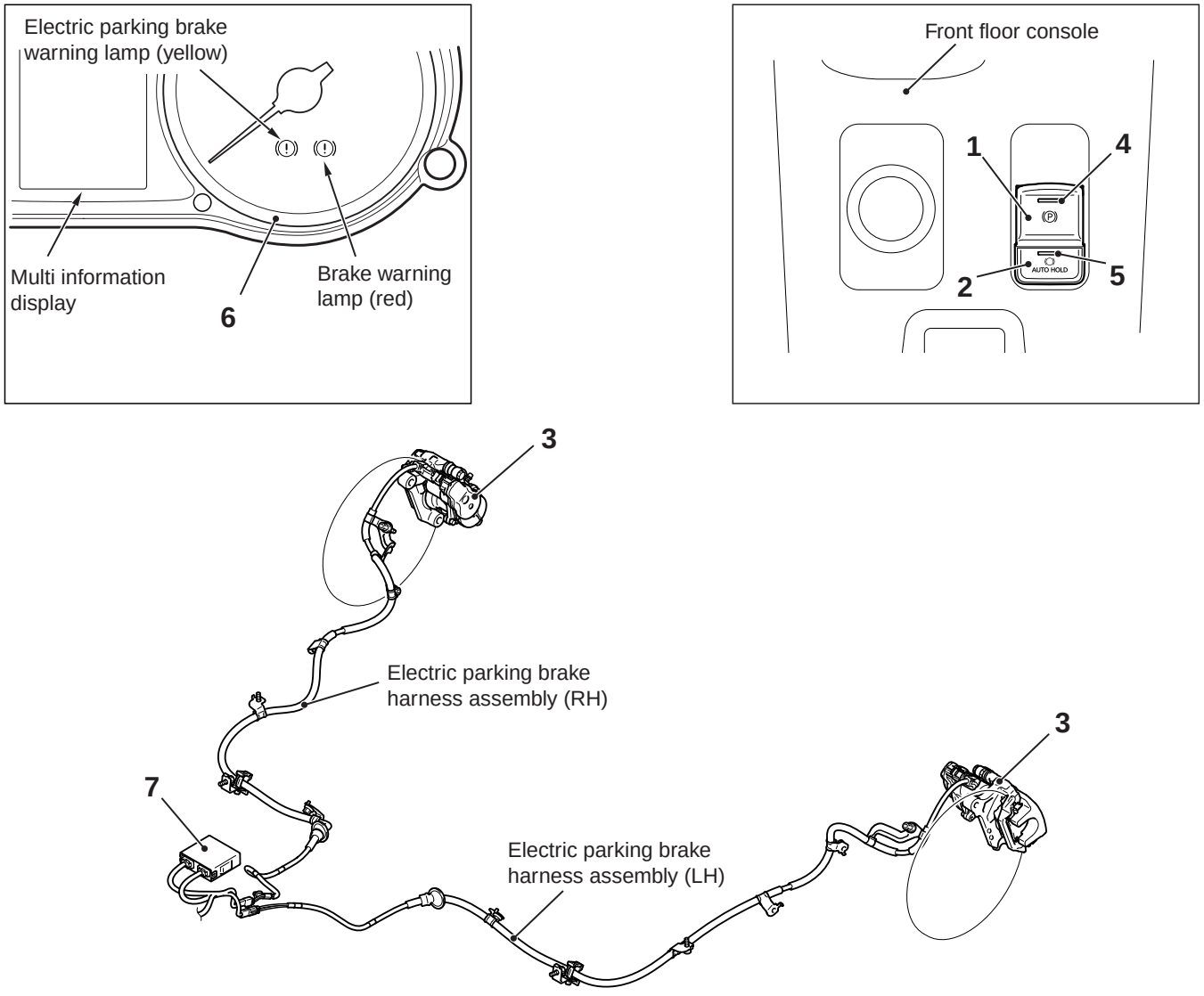
CONSTRUCTION DIAGRAM



ACB04927AB

ELECTRIC PARKING BRAKE

CONSTRUCTION DIAGRAM



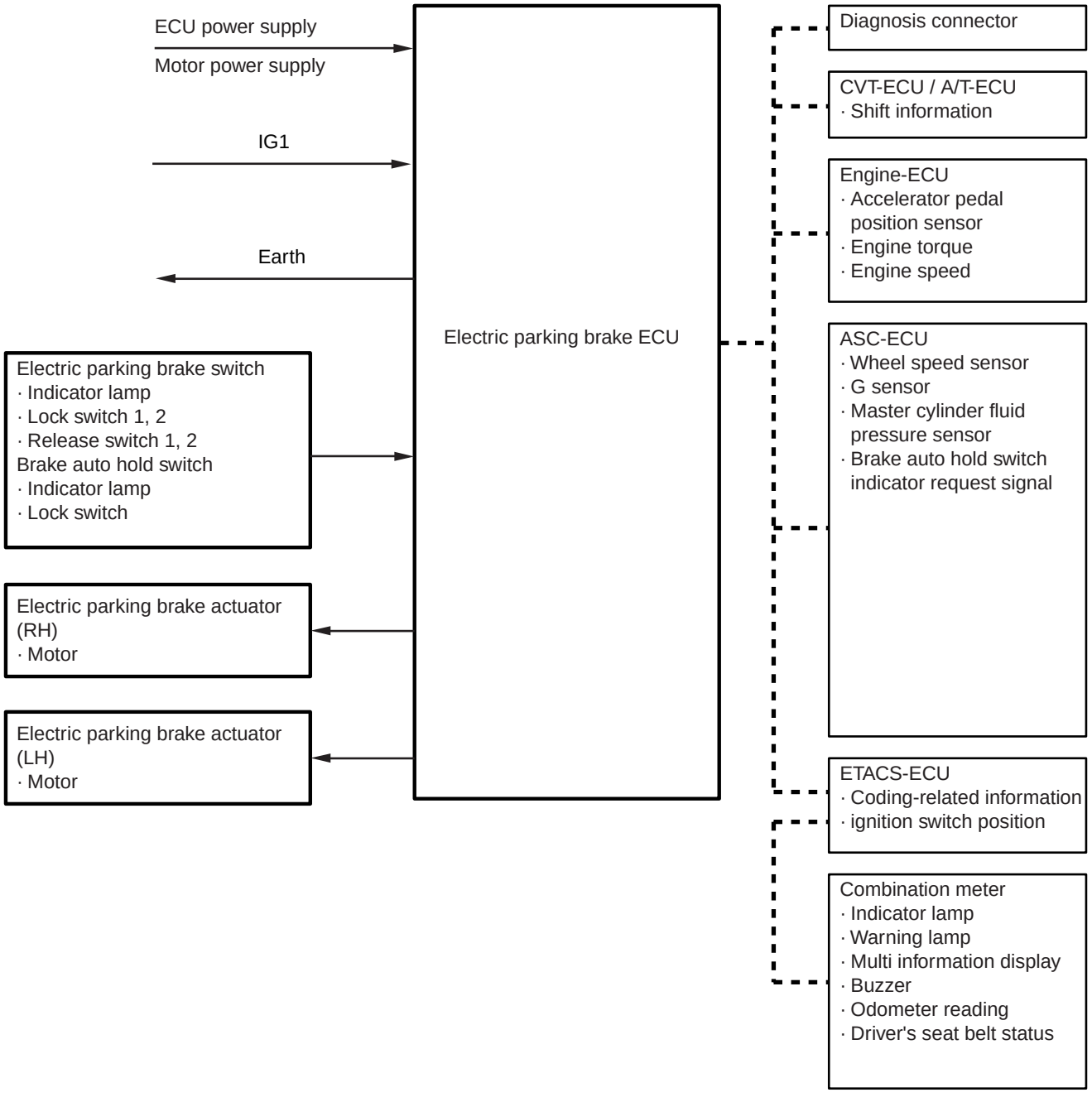
ACG01397AB

Item		Number	Outline of function
Sensor	Electric parking brake switch	1	Sends a signal to the electric parking brake ECU to apply and release the electric parking brake.
	Brake auto hold switch	2	The electric parking brake ECU provides the ASC-ECU with the brake auto hold switch ON/OFF information.

Item		Number	Outline of function
CAN bus signal	Shift information	–	Detects which range the selector lever is in, and sends a signal to the electric parking brake ECU via CAN bus lines.
	Accelerator pedal position sensor	–	Detects how deeply the accelerator pedal is depressed, and sends a signal to the electric parking brake ECU via CAN bus lines.
	Engine torque	–	Is provided to the electric parking brake ECU via the CAN bus lines.
	Engine speed	–	Is provided to the electric parking brake ECU via the CAN bus lines.
	Wheel speed sensor	–	Detects the speed of road wheels, and sends a signal to the electric parking brake ECU via CAN bus lines.
	G sensor	–	Is incorporated in the ASC-ECU, detects longitudinal acceleration, and sends a signal to the electric parking brake ECU via CAN bus lines.
	Master cylinder fluid pressure sensor	–	Sends a signal to the electric parking brake ECU via the CAN bus lines. The system determines whether the brake pedal is depressed or not by using the signal.
	Brake auto hold switch indicator illumination request signal	–	Is provided to the electric parking brake ECU via the CAN bus lines.
	Coding information	–	Is sent to the electric parking brake ECU via the CAN bus lines.
	Ignition switch status	–	Is provided to the electric parking brake ECU via the CAN bus lines.
	Odometer reading	–	Is sent to the electric parking brake ECU via the CAN bus lines.
	Driver's seat belt fastened or unfastened	–	Is sent to the electric parking brake ECU via the CAN bus lines.
Actuator	Electric parking brake actuator	3	Activates the electric motor in accordance with the command from the electric parking brake ECU to regulate the parking brake.
	Electric parking brake switch indicator lamp	4	Informs the driver of the system status by flash, illuminating or turning off the indicator lamp according to the signal from electric parking brake ECU.
	Brake auto hold switch indicator lamp	5	The electric parking brake ECU activates or deactivates the brake auto hold switch indicator lamp according to the request sent by the ASC-ECU.
	Combination meter	6	Receives a signal from the electric parking brake ECU, and triggers the warning lamp, the multi-information display or the buzzer to alert the driver of the system status.
Diagnosis connector		–	Outputs the diagnosis codes and allows communication with the M.U.T.-III.

Item	Number	Outline of function
Electric parking brake ECU	7	Controls actuators (described above) based on the signals coming from each sensor.
		Controls the self-diagnostics and fail-safe functions.
		Controls the diagnostic function (M.U.T.-III compatible).

SYSTEM CONFIGURATION DIAGRAM



ACG01310AB

NOTE: Dashed lines indicate the CAN bus communication lines.

SENSORS

ELECTRIC PARKING BRAKE SWITCH

The electric parking brake switch is located on the front floor console panel. When the electric parking brake switch is operated regardless of the ignition switch, the electric parking brake is activated.

To apply (lock) the electric parking brake

1. Pull up the electric parking brake switch with the brake pedal depressed.
2. When the parking brake is applied, the brake warning lamp and the indicator lamp on the electric parking brake switch will illuminate.

   NOTE:
   - *When the ignition switch is other than ON, if the parking brake is applied, the electric parking brake switch indicator lamp comes on for a while.*
   - *When parking on sharp grades, pull up the electric parking brake switch twice (once more after the operation is completed once). The maximum effect of the parking brake will be obtained.*

To apply the electric parking brake during driving (Emergency brake)

⚠ CAUTION

Use the emergency brake only in emergency. By the excessive use of the brake, the brake parts are possibly worn early and the brake is disabled by the overheat.

1. When you cannot avoid collision by depressing the brake pedal, you can allow the ASC-ECU to activate an emergency braking (brake all four wheels) by pulling the electric parking brake switch

   NOTE: Just in case the ASC-ECU fails, the electric parking brake ECU will brake the rear wheels only instead.
2. While holding it, the brake is applied. At this time, the warning display appears with a buzzer sound, but you should continue to pull and hold the electric parking brake switch.

To release the electric parking brake

1. Turn ON the ignition switch, and press the electric parking brake switch with the brake pedal depressed.

   NOTE: When you depress the accelerator pedal, the electric parking brake will be disengaged automatically. For details, refer to "Automatic operation".
2. When the parking brake is released, the brake warning lamp and the indicator lamp on the electric parking brake switch will go out.

   NOTE: When the ignition switch is other than ON, the parking brake cannot be released.

BRAKE AUTO HOLD SWITCH

The brake auto hold switch (indicator) is located on the front floor console panel.

1. The electric parking brake ECU provides the ASC-ECU with the brake auto hold switch ON/OFF information. The ASC-ECU controls the brake auto hold function according to the ON/OFF information.
2. The electric parking brake ECU activates or deactivates the brake auto hold switch indicator lamp according to the request sent by the ASC-ECU.

ACTUATORS

ELECTRIC PARKING BRAKE ACTUATOR

- The electric parking brake actuator, which incorporates an electric motor, regulates the parking brake by actuating the electric motor.
- If the electric parking brake fails due to a flat battery or any other reason, it can be released by operating the electric parking brake actuator manually.

ELECTRIC PARKING BRAKE SWITCH INDICATOR LAMP AND COMBINATION METER

- The electric parking brake ECU illuminates the indicator lamp on the electric parking brake switch as described in the table below.
- The electric parking brake ECU illuminates the warning lamp on the combination meter as described in the table below. In addition, the ECU displays a warning notice on the multi-information display in the combination meter.

Warning lamp, indicator lamp and multi information display illumination pattern

State	Brake warning lamp	Electric parking brake warning lamp	Multi information display	Electric parking brake switch indicator lamp
For approximately 3 seconds after the ignition switch is turned ON (Initial check for the warning lamp).	Illuminates	Illuminates	–	–
The electric parking brake is applied	Illuminates*1	–	–	Illuminates*1
The electric parking brake is applied during driving (Emergency brake) *2	Illuminates	–	RELEASE PARKING BRAKE	Illuminates
The vehicle is held stationary by the electric parking brake instead of the ASC-ECU (brake auto hold mode).	Illuminates	–	PARKING BRAKE ENGAGED	Illuminates
The electric parking brake is released	–	–	–	–
The driver attempted to release the electric parking brake without depressing the brake pedal when the selector lever is not in P range.	Illuminates	–	PRESS BRAKE PEDAL TO RELEASE	Illuminates
The vehicle starts off when the seat belt is not worn and the electric parking brake is not released.	Illuminates	–	RELEASE PARKING BRAKE	Illuminates
The overheat protection mode for electric motor is triggered.	Flash (1 Hz)	–	PARKING BRAKE TEMPORARILY NOT AVAILABLE	Flash (1 Hz)
You make the system enter the maintenance mode (by using the scan tool (M.U.T.-IIISE).	Flash (1 Hz)	–	–	Flash (1 Hz)
You make the system enter the maintenance mode (by using the switch).	Flash (1 Hz)	Illuminates	PARKING BRAKE SERVICE REQUIRED	Flash (1 Hz)

NOTE:

- **1: When the ignition switch is other than ON, if the parking brake is applied, the electric parking brake switch indicator lamp comes on for a while. The brake warning lamp does not come on.*
- **2: The buzzer (incorporated in the combination meter) sounds.*
- *: For how the warning lamp, the indicator lamp and the multi-information display work when a malfunction occurs, refer to the relevant Workshop Manual.*

ELECTRIC PARKING BRAKE ECU

- The electric parking brake ECU determines the vehicle status according to the electric parking brake switch signal and CAN communication, and regulates the parking brake by actuating the electric parking brake actuator.
- The electric parking brake ECU supports self-diagnosis and memory functions. If the self-diagnosis finds a malfunction, the ECU will activate the indicator lamp, the warning lamp or the multi-information display to alert the driver of the system status.

Automatic operation
When you depress the accelerator pedal with all of the conditions below satisfied, the electric parking brake ECU will determine that the driver is starting the vehicle, and release the parking brake automatically.

Vehicle condition
- The vehicle stationary
- The engine is running.
- Selector lever: D or R position
- Seat belt (driver's side): Fastened
- Electric parking brake: apply

NOTE: The automatic operation works only when the driver's seat belt is fastened. If you start the vehicle without fastening the seat belt, the multi-information display should show "RELEASE PARKING BRAKE".

Overheat protection mode for electric motor
When the electric parking brake switch is operated repeatedly within a short time, the system will take the measures below for 60 seconds to protect the electric parking brake actuator (electric motor) from overheating. In 60 seconds, the system will reset the switch operation counter, and then resume to the normal operation.

Measures
- The system does not accept any operations of the electric parking brake switch for 60 seconds. However, the system enables the driver to operate the switch once to release the parking brake when the electric motor is locked with the overheat protection mode triggered (the system does not enable the driver to operate the switch to apply the parking brake).
- When the ASC-ECU requests the system to apply the parking brake, the system accepts the request.
- The system perform the followings while the electric motor is disabled to run:
  - Electric parking brake switch indicator lamp: Flashes for 60 seconds
  - Parking brake warning lamp: Flashes for 60 seconds
  - Multi-information display: "PARKING BRAKE TEMPORARILY NOT AVAILABLE" is displayed

Maintenance mode
The electric parking brake ECU will enter the maintenance mode when the switch is operated in certain ways. When the system enters the maintenance mode, the electric parking brake will be released to facilitate replacement of the rear brake pad or the rear disc brake rotor.

1.1.8. Couplings for trailer brakes (electrical & pneumatic)

M6101010800026

"Not Applicable"

1.1.9. Energy storage reservoir pressure tank

M6101010900023

"Not Applicable"

1.1.11. Rigid brake pipes

M6101011100020

"Not Applicable"

1.1.12. Flexible brake hoses

M6101011200027

"Not Applicable"

1.1.13. Brake linings and pads

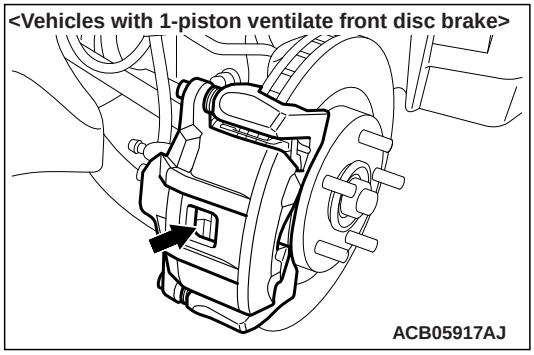
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BRAKE PAD CHECK <FRONT>

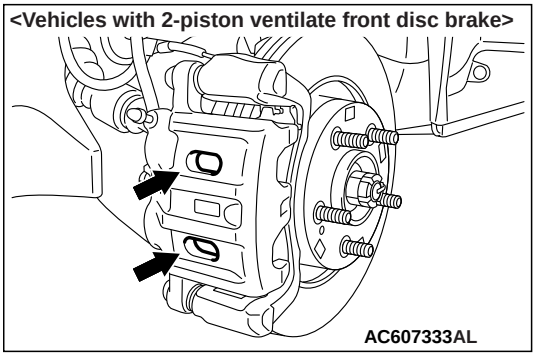
⚠ CAUTION

If there is a significant difference in thickness between the brake pads at right and left, check the sliding area and the run-out of the brake disc.

<Vehicles with 1-piston ventilate front disc brake>



<Vehicles with 2-piston ventilate front disc brake>



1. Visually check the thickness of brake pad from the inspection hole of the caliper body.

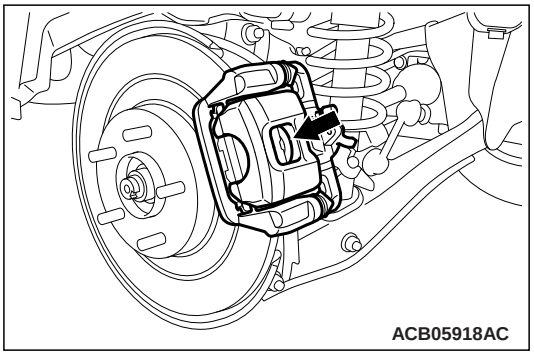
   Standard value: 10.0 mm
   Limit: 2.0 mm

2. If the brake pad thickness is less than the limit value, replace the brake pad.

<REAR>

⚠ CAUTION

If there is a significant difference in thickness between the brake pads at right and left, check the sliding area and the run-out of the brake disc.



1. Visually check the thickness of brake pad from the inspection hole of the caliper body.

   Standard value: 9.0 mm
   Limit: 1.5 mm <Vehicles without electric parking brake>, 2.0 mm <Vehicles with electric parking brake>

2. If the brake pad thickness is less than the limit value, replace the brake pad.

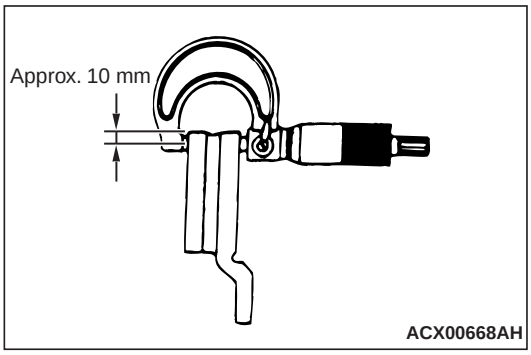
1.1.14. Brake drums, brake discs

M6101000300020

BRAKE DISC CHECK

BRAKE DISC THICKNESS CHECK

1. Remove contaminants or corrosion from the brake disc surface.



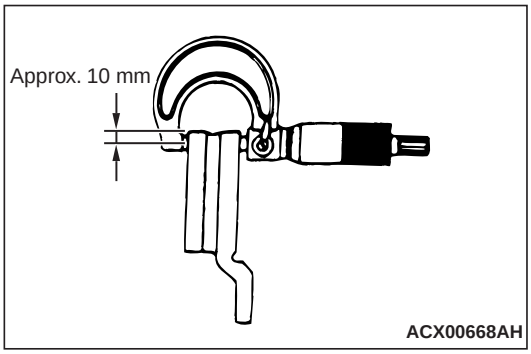
2. Use a micrometer to measure the brake disc thickness at minimum eight points which are 10 mm inward from its circumference.

   <Front (Vehicles with 1-piston ventilate front disc brake)>
   Standard value: 26.0 mm
   Limit: 24.4 mm
   <Front (Vehicles with 2-piston ventilate front disc brake)>
   Standard value: 24.0 mm
   Limit: 22.4 mm
   <Rear>
   Standard value: 10.0 mm
   Limit: 8.4 mm

3. If the brake disc thickness is worn beyond the limit value at more than one point, replace the brake disc and check its run-out.

BRAKE DISC THICKNESS UNEVENNESS CHECK AND CORRECTION

1. Remove contaminants or corrosion from the brake disc surface.

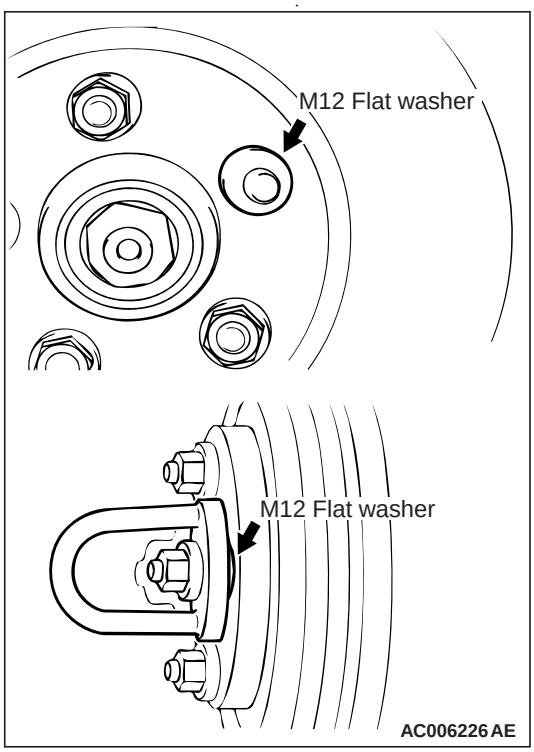


2. Use a micrometer to measure the brake disc thickness at minimum eight points which are 10 mm inward from its circumference. Then record the measurements.
3. If the brake disc thickness unevenness (the difference between the maximum and minimum values measured above) is 0.015 mm or less, it is within the standard value.
4. If the brake disc thickness unevenness exceeds the standard value, grind it according to the procedure below while it is mounted on the vehicle.

   NOTE: If it is suspected that the brake disc thickness will become less than the limit value after the grinding, replace the brake disc and check its run-out.

   (1) Check for wheel bearing looseness in the axial direction.

⚠ CAUTION



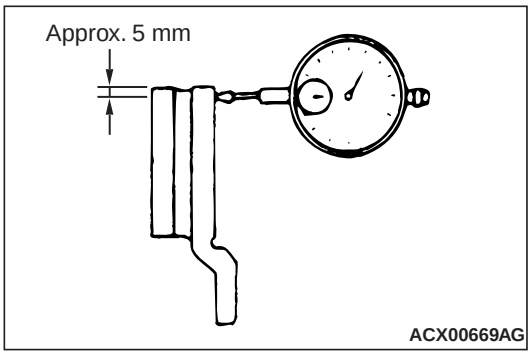
Insert M12 plain washer and then install the adapter as shown before grinding. Failure to use the M12 plain washer will cause the brake disc to be deformed and earth incorrectly.

- **To grind the brake disc, ensure that all the nuts (M12 X 1.5) are tightened evenly and in a diagonal sequence to the specified torque (100 N·m). Failure to use all the nuts (M12×1.5), excessive or uneven tightening torque will cause the brake disc to deform or judder.**

   (2) Correct the brake disc uneven thickness by grinding it while in place on the vehicle.

BRAKE DISC RUN-OUT CHECK AND CORRECTION

1. Check for wheel bearing looseness in the axial direction.
2. If the axial play is within the limit value, secure the brake disc by tightening the nut (M12×1.5) evenly to the specified torque (100 N·m).If the axial play still exceeds the limit value, replace the wheel bearing. Then secure the brake disc by tightening the nut (M12×1.5) evenly to the specified torque (100 N·m).

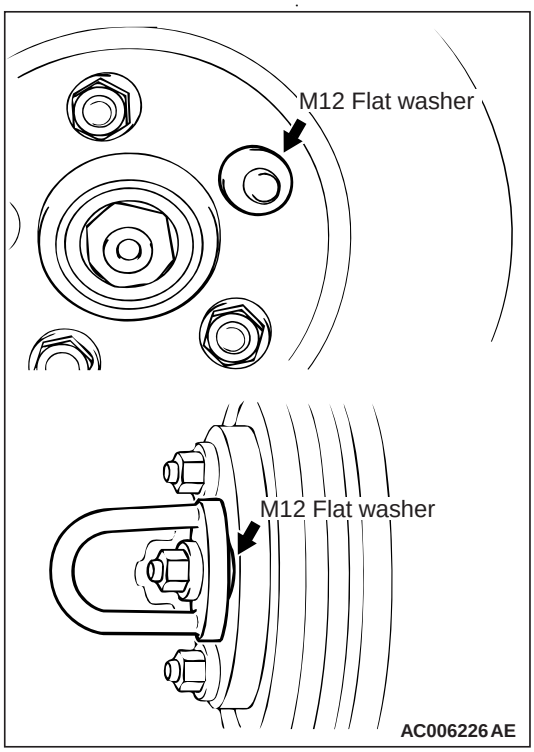


3. Place a dial gauge ca. 5 mm inward from the circumference of the brake disc to measure its run-out.

   Limit:
   0.06 mm <Front>
   0.08 mm <Rear>

4. If the brake disc run-out exceeds the limit value, rephase the brake disc to the hub so that the minimum brake disc run-out is obtained.

⚠ CAUTION



Insert M12 plain washer and then install the adapter as shown before grinding. Failure to use the M12 plain washer will cause the brake disc to be deformed and earth incorrectly.

- **To grind the brake disc, ensure that all the nuts (M12 X 1.5) are tightened evenly and in a diagonal sequence to the specified torque (100 N·m). Failure to use all the nuts (M12×1.5), excessive or uneven tightening torque will cause the brake disc to deform or judder.**

5. If the brake disc run-out exceeds the limit value after rephasing, grind the disc while in place on the vehicle so that the brake disc run-out is within the limit value.

   NOTE: If it is suspected that the brake disc thickness will be below the limit value, replace the brake disc. Then rephase the brake disc so that the minimum brake disc run-out is obtained, or grind the disc while in place on the vehicle so that its run-out is below the limit value.

1.1.15. Brake cables, rods, levers, linkages

M6101011500028

"Not Applicable"

1.1.16. Brake actuators (including spring brakes or hydraulic cylinders)

M6101011600025

"Not Applicable"

1.1.17. Load sensing valve

M6101011700022

"Not Applicable"

1.1.18. Slack adjusters and indicators

M6101011800029

"Not Applicable"

1.1.19. Endurance braking system (where fitted or required)

M6101011900026

"Not Applicable"

1.1.20. Automatic operation of trailer brakes

M6101012000026

"Not Applicable"

1.1.22. Test connections (where fitted or required)

M6101012200020

"Not Applicable"

1.1.23. Overrun brake

M6101012300027

"Not Applicable"

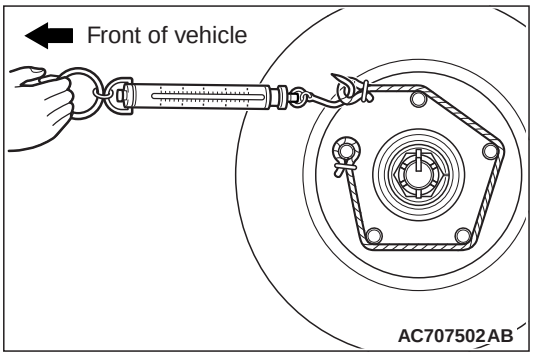
1.2 Service braking performance and efficiency

1.2.1. Performance

M6102000100029

BRAKE DRAG FORCE CHECK

1. Remove the brake pad, shim and clip.



2. Using a spring scale, measure the hub sliding torque in the forward direction with the brake pad, shim and clip removed.
3. Install the brake pad, shim and clip.
4. Start the engine, and depress the brake pedal lightly two or three times. Then stop the engine. (Depressing force: approximately 50 – 100 N)
5. Turn the brake disc 10 times in the forward direction.
6. Using a spring scale, measure the hub sliding torque in the forward direction with the brake pad, shim and clip installed.
7. Obtain the disc brake drag force (difference between measured values of item 2 and item 6).

   Standard value: 68 N or less
8. If the brake drag force exceeds the standard value, disassemble the brake caliper assembly to check for fouling/rust on the piston sliding section and piston seal deterioration, and confirm whether the guide pin and lock pin slide properly.

1.2.2. Efficiency

M6102010200027

"Not Applicable"

1.3. Secondary (emergency) braking performance and efficiency (if met by separate system)

1.3.1. Performance

M6103000100022

The FCM has the same system as the basic brake.
(Refer to 1.2.1. Performance P.1-12)

1.3.2. Efficiency

M6103010100023

"Not Applicable"

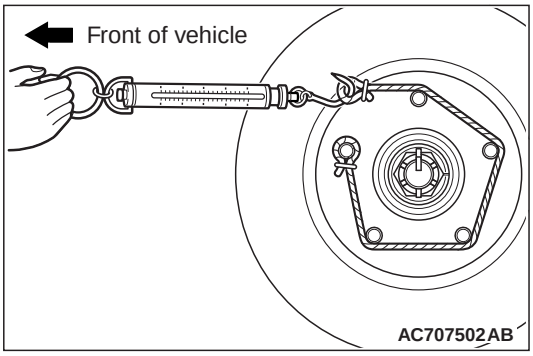
1.4. Parking braking performance and efficiency

1.4.1. Performance

M6104000100036

BRAKE DRAG FORCE CHECK

1. Remove the brake pad, shim and clip.



2. Using a spring scale, measure the hub sliding torque in the forward direction with the brake pad, shim and clip removed.
3. Install the brake pad, shim and clip.
4. Start the engine, and depress the brake pedal lightly two or three times. Then stop the engine. (Depressing force: approximately 50 – 100 N)
5. Turn the brake disc 10 times in the forward direction.
6. Using a spring scale, measure the hub sliding torque in the forward direction with the brake pad, shim and clip installed.
7. Obtain the disc brake drag force (difference between measured values of item 2 and item 6).

   Standard value: 68 N or less
8. If the brake drag force exceeds the standard value, disassemble the brake caliper assembly to check for fouling/rust on the piston sliding section and piston seal deterioration, and confirm whether the guide pin and lock pin slide properly.

1.4.2. Efficiency

M6104010200023

"Not Applicable"

1.5. Endurance braking system performance

M6104500000023

"Not Applicable"

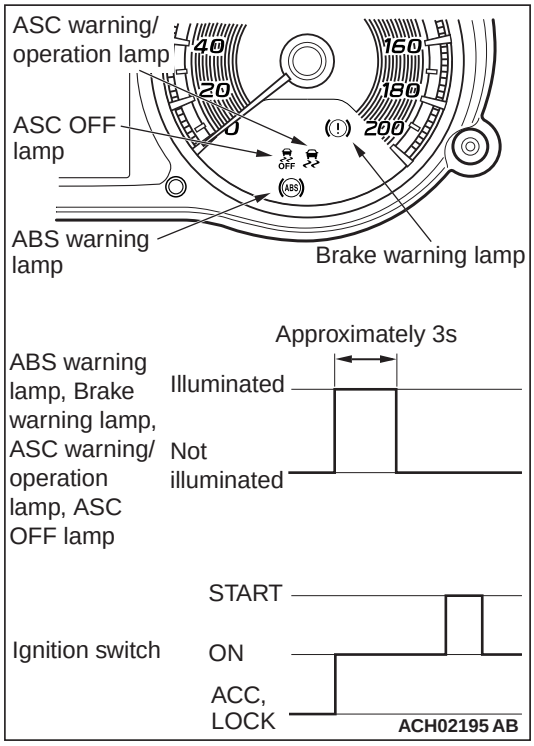
1.6. Anti-lock braking system (ABS)

M6105000000021

ABS WARNING LAMP, ASC WARNING/ OPERATION LAMP, BRAKE WARNING LAMP AND BRAKE AUTO HOLD INDICATOR CHECK

Check that ABS and brake warning lamps, ASC warning/operation lamp, brake auto hold indicator illuminate as follows.

NOTE: The brake warning lamp is used as a warning lamp for parking brake, brake fluid level, and EBD control.



1. When the ignition switch is turned to the ON position, ABS and brake warning lamps, ASC warning/operation lamp, ASC OFF lamp illuminate.
2. The ABS and brake warning lamps, ASC warning/ operation lamp, ASC OFF lamp illuminate for three seconds[*1] and then turn OFF[*2].
3. Otherwise, check the diagnosis code.

NOTE:

- *[*1]: The ABS warning lamp, ASC warning/operation lamp, ASC OFF lamp may stay ON until the vehicle speed reaches 10 km/h. As far as ASC-ECU sets any diagnosis code related to the wheel speed sensor malfunction or the motor malfunction as past trouble, ASC-ECU continues illuminating the ABS warning lamp until it verifies that the malfunction for that code is resolved (startup check).*

If the steering wheel sensor or the G and yaw rate sensor system was detected to be defective during ignition switch being ON at the last time, the ASC warning/operation lamp and the ASC OFF lamp will illuminate until the vehicle speed reaches approx. 10 km/h, then the steering wheel is turned to either right or left and then the ECU determines that the system is normal.

- *[*2]: The brake warning lamp does not turn OFF when the parking brake is applied or the brake fluid level is lowered.*

1.7 Electronic brake system (EBS)

M6106000000024

"Query raised for this content"

1.8 Brake fluid

M6107000000027

"Not Applicable"

GROUP 2

STEERING

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2.2.2. Steering column/yokes and forks and steering dampers 2-2

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2.1. Mechanical condition

2.1.1. Steering gear condition

M6111000100027

"Not Applicable"

2.1.2. Steering gear casing attachment

M6111010200025

"Not Applicable"

2.1.3. Steering linkage condition

M6111010300022

"Not Applicable"

2.1.4. Steering linkage operation

M6111010400029

"Not Applicable"

2.1.5. Power steering

M6111010500026

"Not Applicable"

2.2. Steering wheel, column and handle bar

2.2.1. Steering wheel/handle bar condition

M6110110100022

"Not Applicable"

2.2.2. Steering column/yokes and forks and steering dampers

M6110110200029

"Not Applicable"

2.3. Steering play

M6110300000028

"Not Applicable"

2.4. Wheel alignment (X)2

M6110400000025

"Not Applicable"

2.5. Trailer steered axle turntable

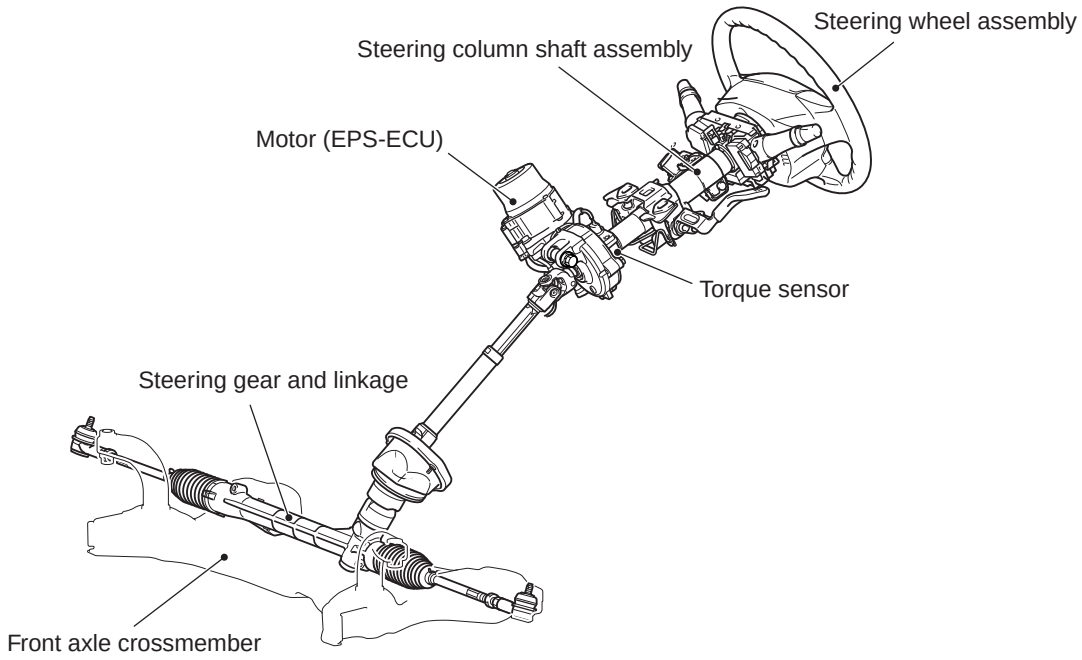
M6110500000022

"Not Applicable"

2.6. Electronic Power Steering (EPS)

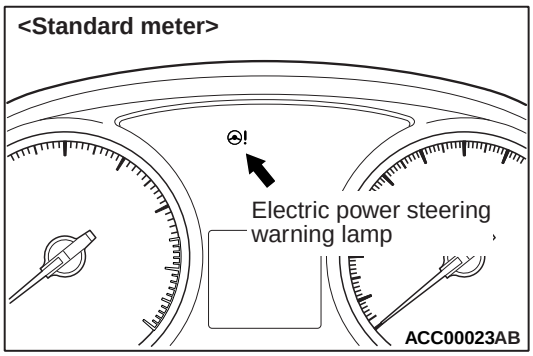
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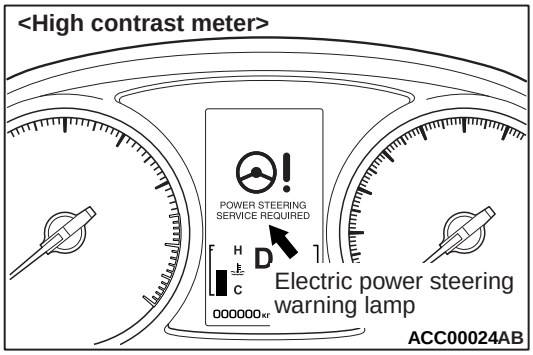
CONSTRUCTION DIAGRAM



ACI01943 AB

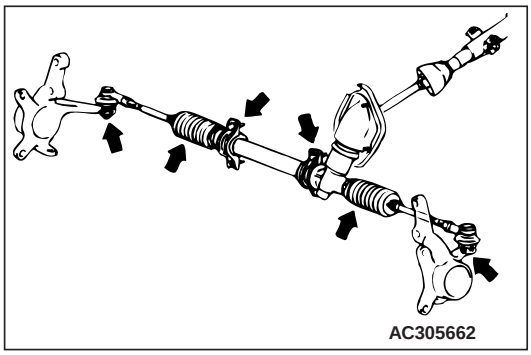
CHECK OF ELECTRIC POWER STEERING WARNING LAMP



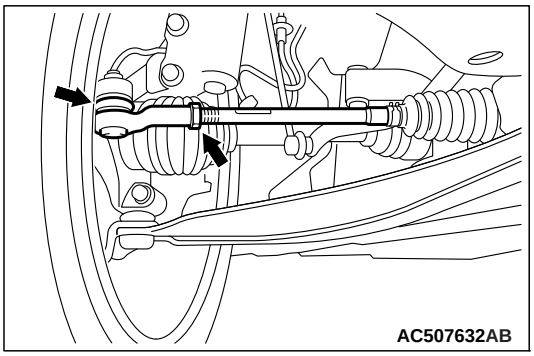


1. If the electric power steering warning lamp does not operate, the electric power steering system or the combination meter may be defective. Check for diagnosis code, and carry out diagnosis. If no diagnosis codes are stored, carry out diagnosis by referring to the electric power steering warning lamp-related inspection items on the trouble symptom chart.

CHECK STEERING LINKAGE FOR DAMAGE AND LOOSE CONNECTIONS (INCLUDING SEALS AND BOOTS)



1. Move the steering wheel bit by bit to the left or right, and check to be sure that there is no play or looseness in the linkage coupling, that the installation is not loose, and that the rod or arm is not bent or damaged.



2. Check to be sure that the seal and boot of the ball joint are correctly installed (in the correct position), and that they are not damaged.
3. Check tie-rod end lock nut for looseness. If lock nut is loose, adjust toe-in and then tighten lock nut to the specified torque.

Tightening torque: 52 ± 2 N·m

GROUP 3

VISIBILITY

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M6121100000028

"Not Applicable"

3.2. Condition of glass

M6121200000025

"Not Applicable"

3.3. Rear-view mirrors or devices

M6121300000022

"Not Applicable"

3.4. Windscreen wipers

M6121400000029

"Not Applicable"

3.5. Windscreen washers

M6121500000026

"Not Applicable"

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M6121600000023

"Not Applicable"

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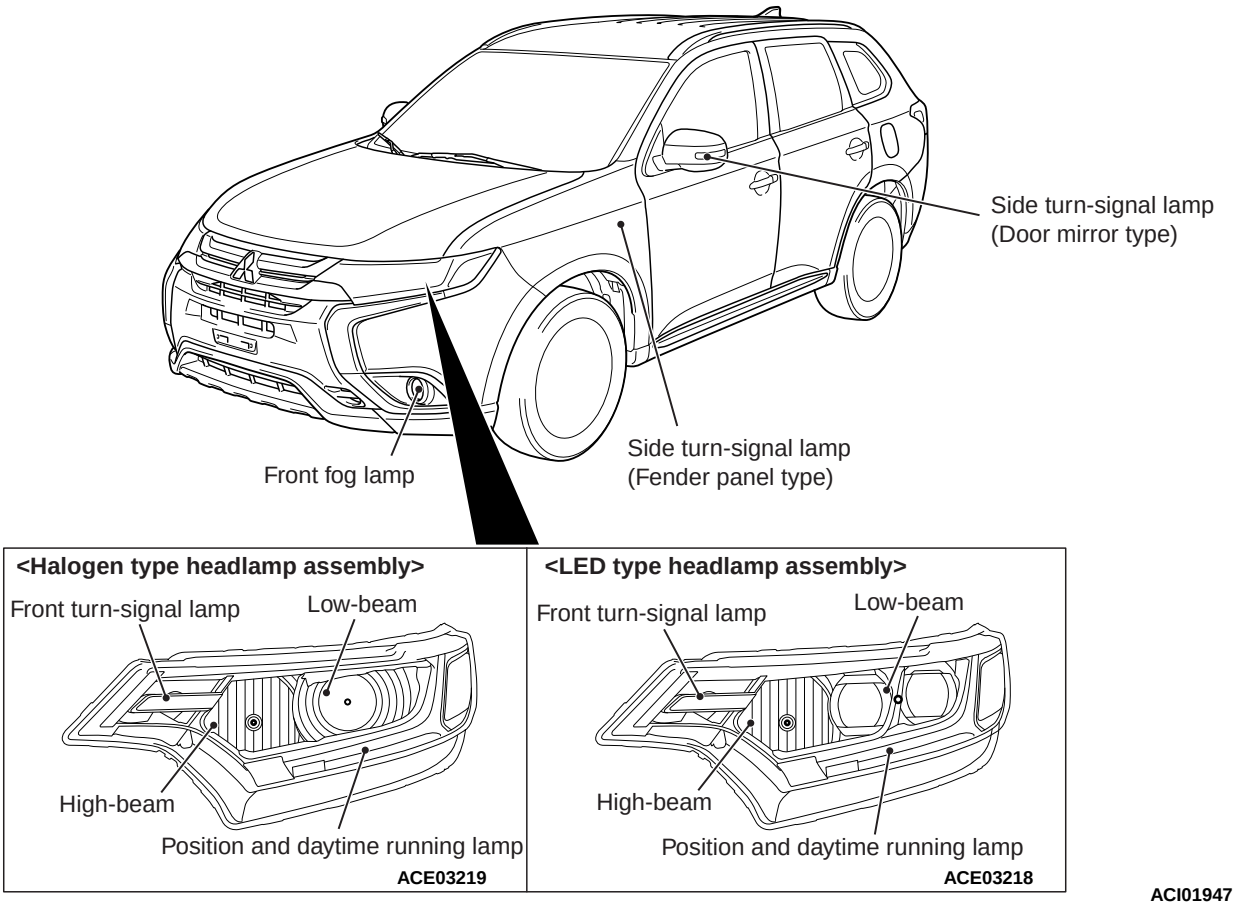
4.13. BATTERY(IES) 4-22

4.1. Headlamps

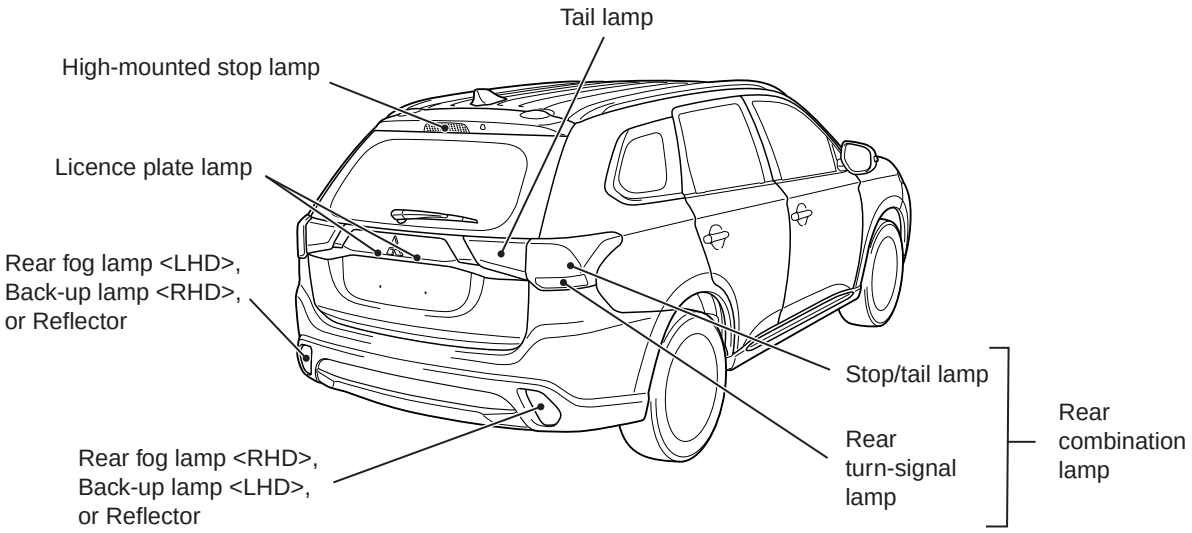
4.1.1. Condition and operation

M6131000100029

Construction diagram



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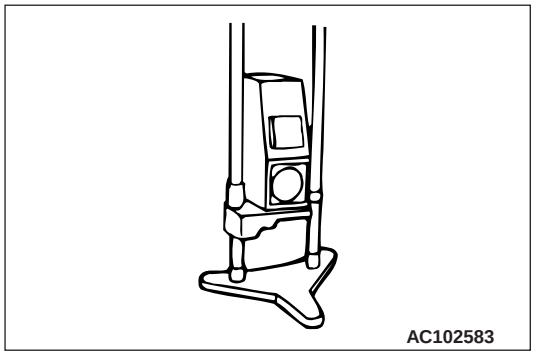


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4.1.2. Alignment

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<USING A BEAM SETTING EQUIPMENT>

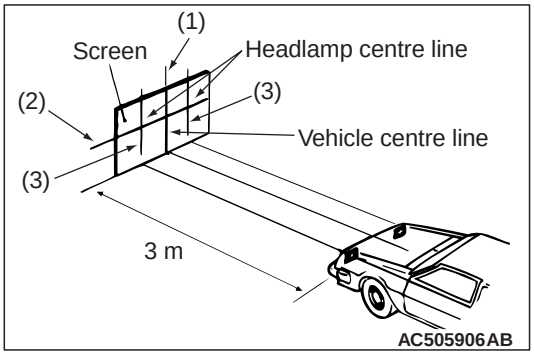

AC102583

1. The headlamps should be aimed with the proper beam setting equipment, and in accordance with the equipment manufacture's instructions.
2. Alternately turn the adjusting screw to adjust the headlamp aiming.

<USING A SCREEN> (LOW-BEAM)

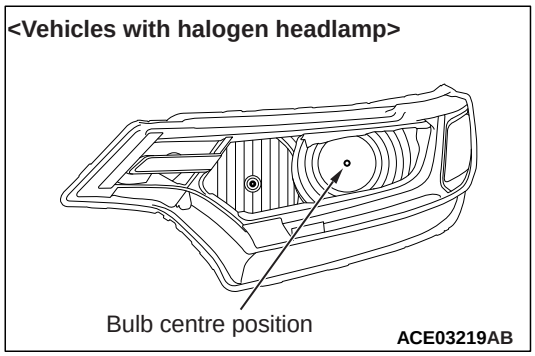
PRE-AIMING INSTRUCTION

1. Inspect for badly rusted or faulty headlamp assemblies.
2. These conditions must be corrected before a satisfactory adjustment can be made.
3. Inspect tyre inflation, and adjust if it is necessary.
4. If the fuel tank is not filled up, put weight in the luggage compartment to make up for the fuel shortage so that the weight will become 90% of full-state weight or heavier. (0.8 kg per litter)
5. There should be no other load in the vehicle other than driver or substituted weight of approximately 75 kg placed in driver's position.
6. Turn the headlamp levelling switch to the switch position "0." <Vehicles with headlamp manual levelling system>
7. Change the vehicle posture, and then operate the actuator of headlamp levelling unit once. <Vehicles with headlamp automatic levelling system>
8. Thoroughly clean the headlamp lenses.



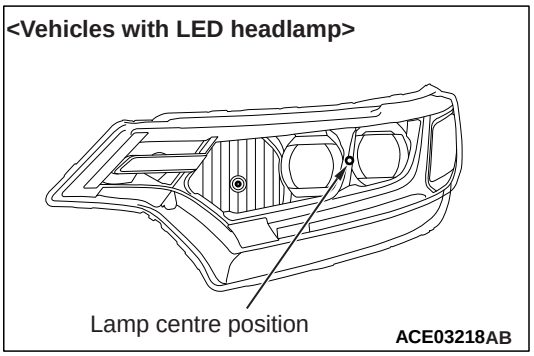
AC505906AB

<Vehicles with halogen headlamp>



ACE03219AB

<Vehicles with LED headlamp>



ACE03218AB

9. Place the vehicle on a level floor, perpendicular to a flat screen 3 m away from the bulb centre position of the low-beam.
10. Rock vehicle sideways to allow vehicle to assume its normal position.
11. To correct for distortion of the suspension, rock the bumpers on the front/rear side of the vehicle up and down three times alternately.
12. Run the engine at a speed of 2,000 r/min to charge the battery.
13. Four lines of adhesive tape (or equivalent markings) are required on screen or wall:
    (1) Position a vertical tape or mark so that it is aligned with the vehicle centre line.

(2) Measure the distance from the bulb centre position to the floor. Transfer the measurement to the screen. Horizontal tape or mark on the screen is for reference of vertical adjustment.
(3) Measure the distance from the centre line of the vehicle to the centre of each headlamp. Transfer the measurement to the screen. Vertical tape or mark on the screen with reference to the centre line of each headlamp bulb.

HEADLAMP ADJUSTMENT

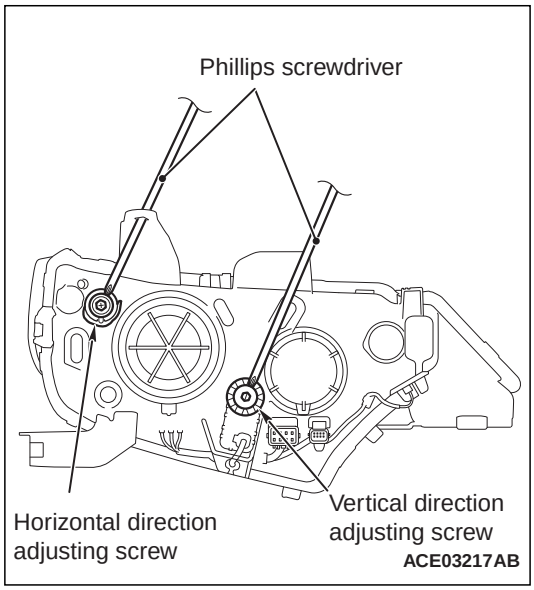
⚠ CAUTION

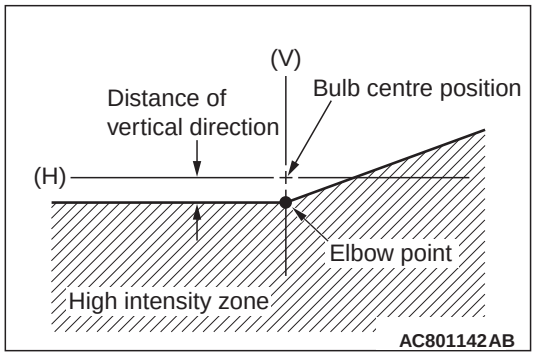
Do not cover a headlamp for more than three minutes to prevent the plastic headlamp lens deformation.

1. The low-beam headlamp should project on the screen upper edge of the beam (cut-off).

⚠ CAUTION

Be sure to adjust the aiming adjustment screw in the tightening direction.





2. If not the case, turn the adjusting screws to achieve the specified low-beam cut-off location on the aiming screen.

   Standard value:
   Vertical direction; 36 mm (0.69°) below horizontal (H)
   Horizontal direction; Elbow point intersects the vertical line (V)

   Limit:
   Vertical direction; ±15 mm (±0.29°) from the horizontal cut-off line
   Horizontal direction; ± 26 mm (± 0.5°) from the vertical line (V)

   NOTE: The illustration shows LH drive vehicles. For RH drive vehicles, it is symmetrical.

4.1.3. Switching

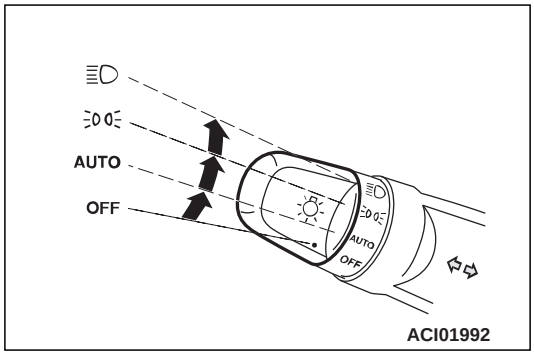
M6131000300023

Headlamps

NOTE:

- *When entering a country in which vehicles are driven on the opposite side of the road to the country in which your vehicles is supplied, necessary measures have to be taken to avoid dazzling oncoming traffic. However, headlamps on this vehicle do not need any adjustment.*
- *Do not leave the lights on for a long time while the engine is stationary (not running). A run-down battery could result.*
- *When it rains, or when the vehicle has been washed, the inside of the lens sometimes becomes foggy, but this does not indicate a functional problem. When the lamp is switched on, the heat will remove the fog. However, if water athers inside the lamp, we recommend you to have checked.*

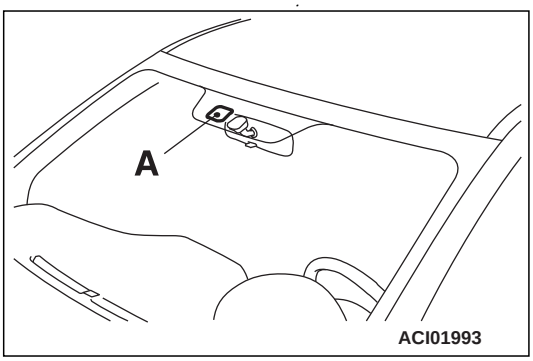
Rotate the switch to turn on the lamps.



OFF	All lamps off {except for daytime running lamps}
AUTO	With the ignition switch or the operation mode is in ON, headlamps, position, tail, licence plate, instrument panel lamps and downlight turn on and off automatically in accordance with outside light level. {Daytime running lamps will go on while the tail lamps are off.} All lamps turn off automatically when the ignition switch is turned to "OFF" position or the operation mode is put in OFF.
	Position, tail, licence plate, instrument panel lamps and downlight on
	Headlamps and other lamps go on

NOTE:

- *The sensitivity of the automatic on/off control can be adjusted. For further information, contact a MITSUBISHI MOTORS Authorised Service Point. On vehicles equipped with the Smartphone Link Display Audio or the Mitsubishi Multi- Communication System (MMCS), screen operations can be used to make the adjustment. Refer to the separate owner's manual for details.*
- *When the headlamps are turned off by the automatic on/off control with the ignition switch in the "ON" position or the operation mode in ON, the front fog lamps (if so equipped) and rear fog lamps also go off. When the headlamps are subsequently turned back on by the automatic on/off control, the front fog lamps also come on but the rear fog lamp stay off. If you wish to turn the rear fog lamp back on, perate the switch again.*



Do not cover the sensor (A) for the automatic on/off control by affixing a sticker or label to the windscreen.

- *If the lamps do not turn on or off with the switch in the "AUTO" position, manually operate the switch and we recommend you to have your vehicle checked.*

4.1.4. Compliance with requirements1.

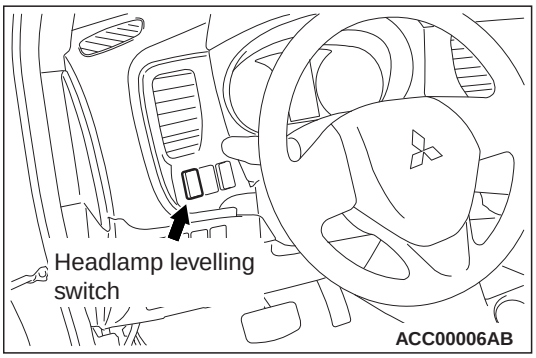
M6131000400020

"Not Applicable"

4.1.5. Levelling devices (where mandatory)

M6131000500027

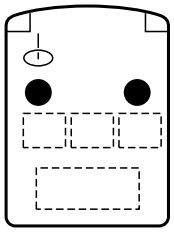
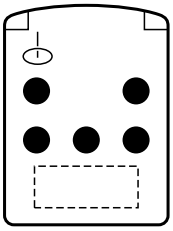
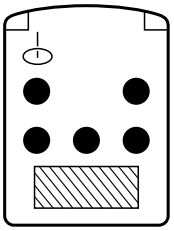
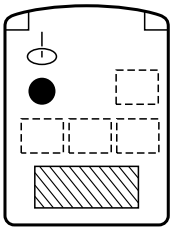
Headlamp manual levelling system



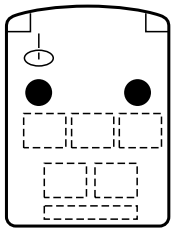
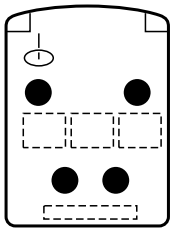
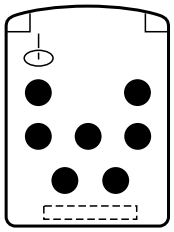
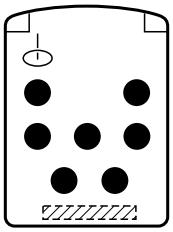
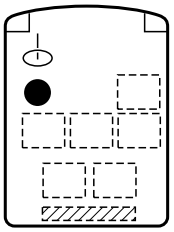
The beam direction of the headlamps changes according to the number of passengers and the amount of load. The headlamp manual levelling function is a system that allows the driver to change the direction of headlamp beam so that the drivers of oncoming cars are not dazzled by the headlamps. The headlamp levelling switch allows changing the direction in five steps: 0 to 4.

Relationship between the switch positions and the number of passengers/loads

<5-seating>

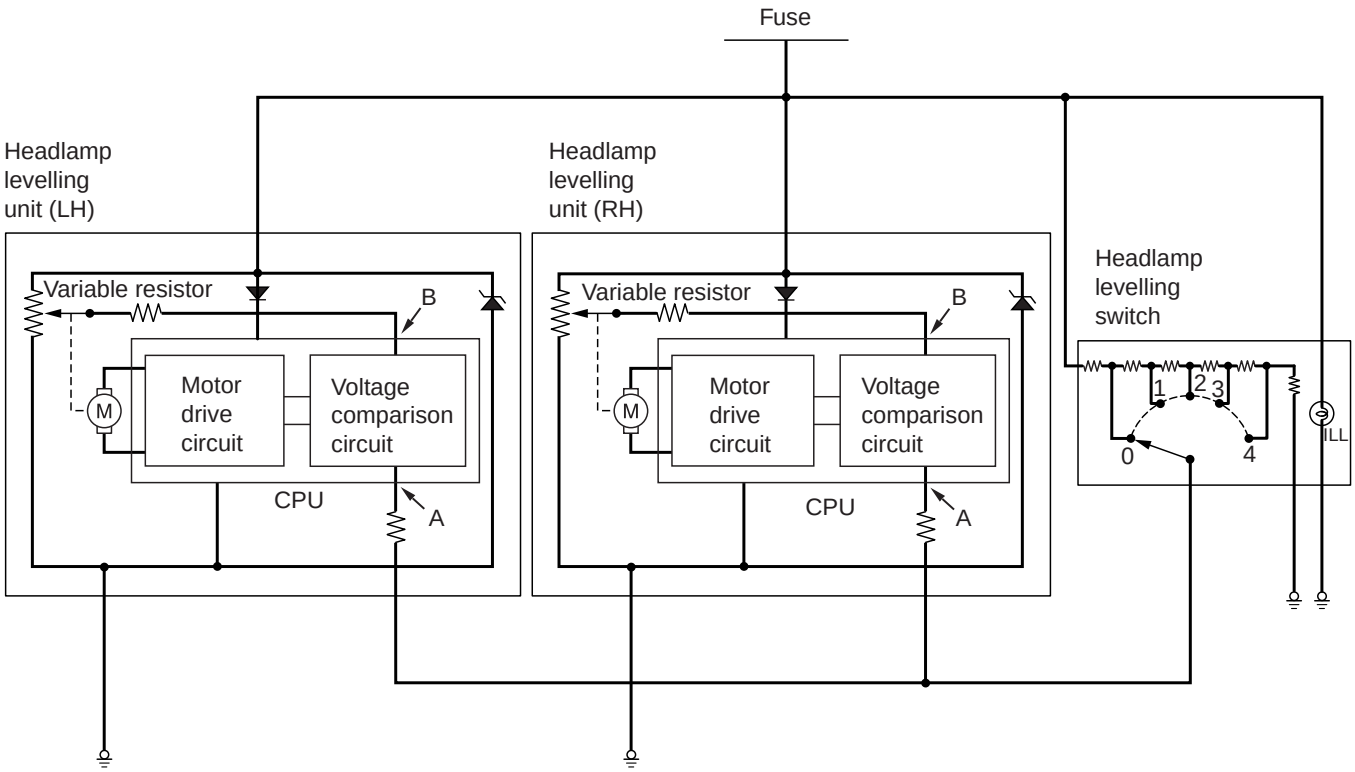
Passenger and load	 AC607611	 AC607612	 AC607613	 AC607614
	One or two passengers	Five passengers	Five passengers and heavy loads	Driver and heavy loads
Switch position	0	1	2 or 3	4

<7-seating>

Passenger and load	 AC607615	 AC607616	 AC607617	 AC607618	 AC704413
	One or two passengers	Four passengers (front seat and third seat)	Seven passengers	Seven passengers and heavy loads	Driver and heavy loads
Switch position	0	1	2	3	4

NOTE: Each switch position is for reference. In each switch position, when the headlamp beam is too high, turn the switch to one-level higher position.

Operation



AC314086AB

1. The headlamp levelling switch increases the resistance as it is turned from 0 to 4. Turning the headlamp levelling switch changes the voltage at point A. When the headlamp levelling switch is turned from 0 to 4, the voltage at point A decreases. Upon detection of this voltage change, the headlamp levelling unit turns the motor to lower the beam direction. At this time, the resistance of the variable resistor in the headlamp assembly changes, and the voltage at point B decreases gradually. When the voltages at points A and B become equal, the headlamp levelling unit stops the motor.
2. Turning the headlamp levelling switch from 4 to 0 increases the voltage at point A, and then the headlamp levelling unit turns the motor in the direction opposite to that mentioned in Item 1, increasing the voltage at point B. When the voltages at points A and B become equal, the headlamp levelling unit stops the motor.
3. The headlamp levelling unit detects voltage changes caused by headlamp levelling switch operation, and turns the motor to change the directions of the headlamp reflectors for the adjustment of the headlamp beam direction.

Headlamp automatic levelling system

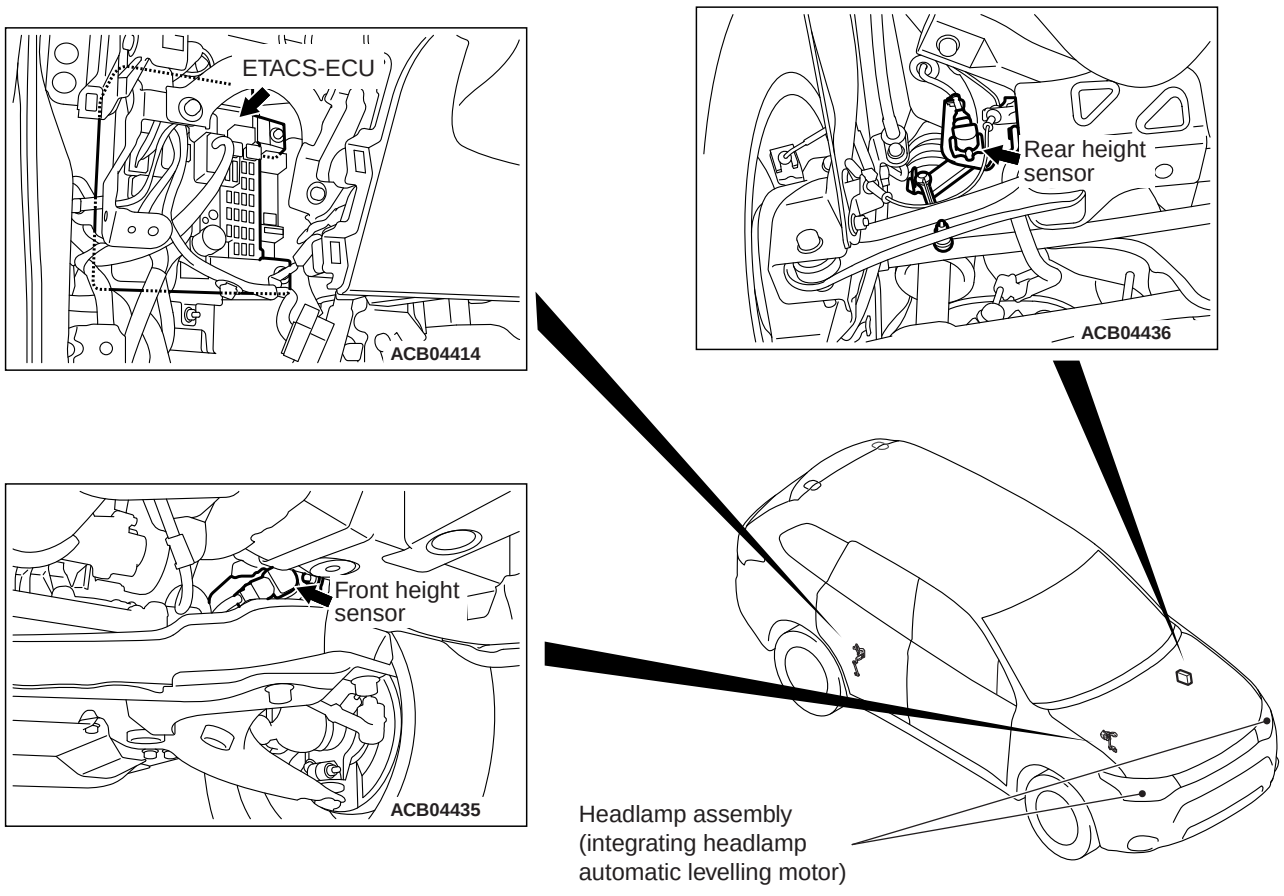
The beam direction of the headlamps (vertical angle) changes according to the number of passengers and the amount of load. The headlamp automatic levelling system is a system that automatically controls the beam direction of headlamps (up and down angle) when parking or travelling with stable vehicle attitude so that the drivers of oncoming cars and of cars driving in front are not dazzled by the headlamp beam that is directed upwards.

Operational Description

The beam direction of headlamps is automatically controlled according to driving conditions as described in the table below.

Vehicle condition	Control content
When parking	When the engine is stopped with the headlamp (low-beam) ON or when the vehicle is stopped with the headlamp (low-beam) ON and the accelerator pedal is released, the ETACS-ECU controls the beam direction according to the height sensor values of the change in load resulting from getting on/off of passengers or loading/unloading of loads.
When driving at a constant speed	When a vehicle starts on curb, the travelling vehicle posture changes from the posture during parking, so that the beam direction changes. To control the improper beam direction caused by such vehicle attitude change, the ETACS-ECU controls the beam direction while travelling with stable vehicle attitude. This beam direction control while travelling with stable vehicle attitude is performed only once between a vehicle stop and the next stop. When driving is started on a gravel or rough road, the beam direction control is activated after the vehicle attitude becomes stable on a paved road.

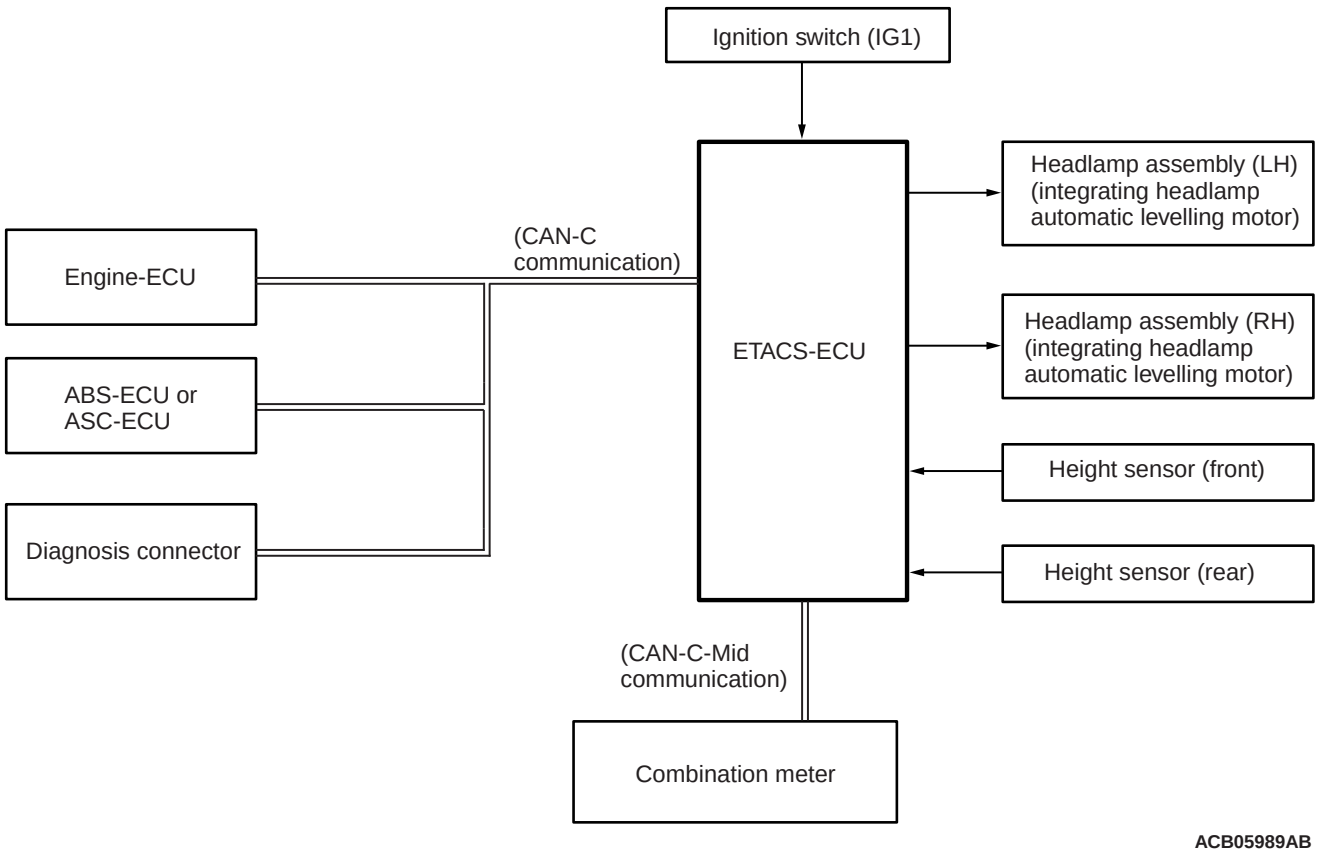
System component and function



Parts name	Functional description
Ignition switch	Supplies power to the ETACS-ECU when the ignition switch is in the ON position.
Height sensor (front)	Detects the elongation/contraction of the front suspension and transmits the signal to the ETACS-ECU.

Parts name	Functional description
Height sensor (rear)	Detects the elongation/contraction of the rear suspension and transmits the signal to the ETACS-ECU.
Headlamp assembly (integrating headlamp automatic levelling motor)	Drives the headlamp reflector by receiving signals from the ETACS-ECU.
Combination meter	Send an odometer indication value to the ETACS-ECU.
ABS-ECU or ASC-ECU	Transfers the vehicle travel distance information to the ETACS-ECU.
Engine-ECU	Transfers engine speed signals and accelerator pedal position signals to the ETACS-ECU.
ETACS-ECU	• Transfers lighting switch position signals, all door switch ON/OFF signals, tailgate latch switch ON/OFF signals, hazard warning lamp switch ON/OFF signals, headlamp (low-beam) ON/OFF status signals. • Controls the headlamp automatic levelling motor integrated in the headlamp assembly based on the signals form switches and sensors to control the beam direction according to the vehicle posture.
Diagnosis connector	Outputs diagnosis codes.

System block diagram



OPERATION CHECK OF HEADLAMP AUTOMATIC LEVELLING

With this inspection, it is simply checked that the headlamp automatic levelling motor incorporated in the headlamp assembly moves in accordance with the vehicle posture.

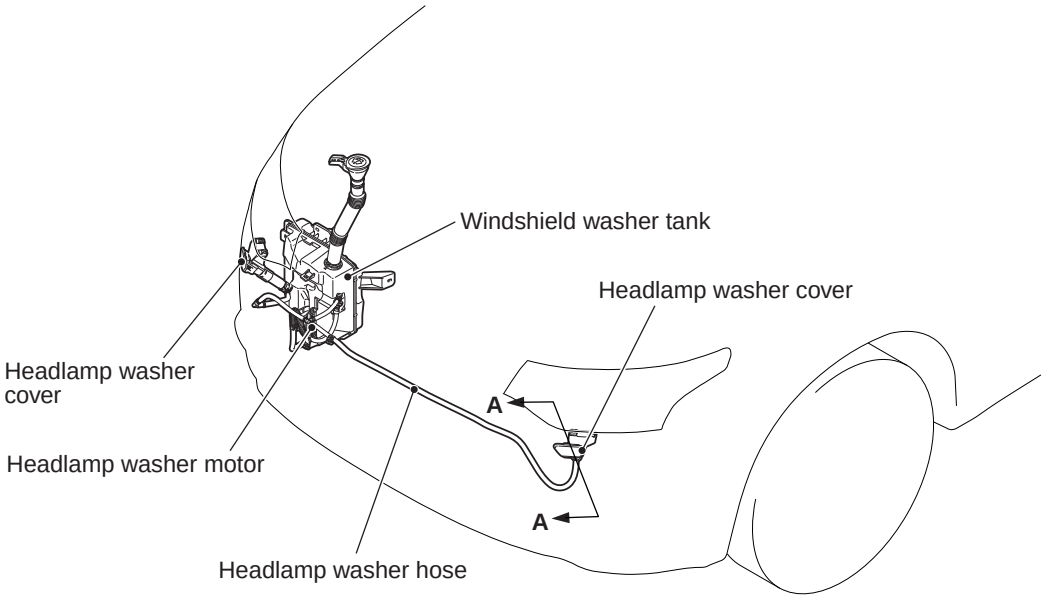
INSPECTION PROCEDURE

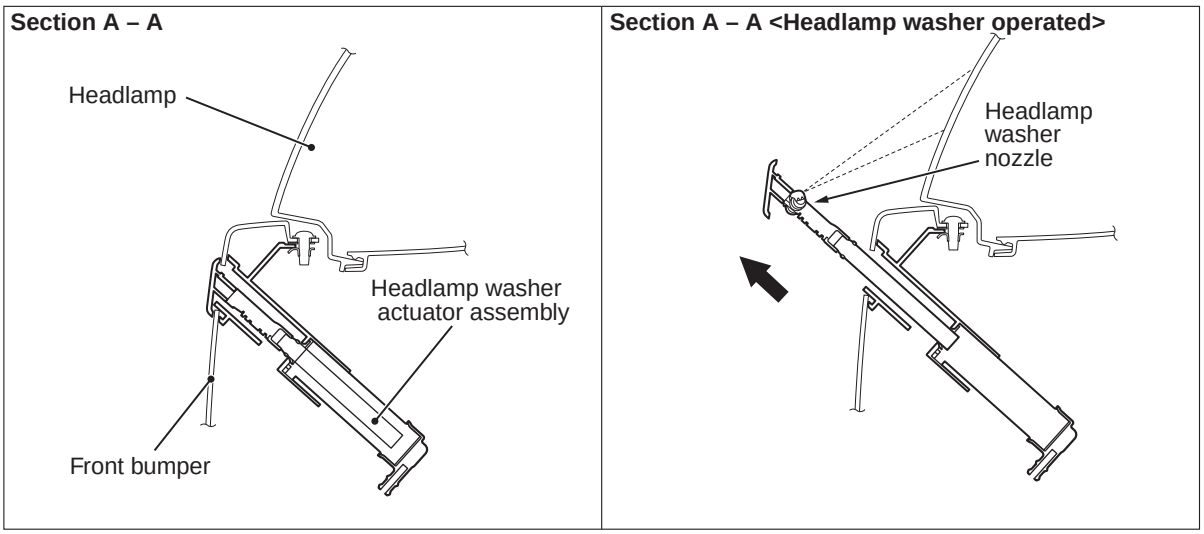
1. Park the vehicle on a level surface.
2. Turn the ignition switch to "ON" position. (Do not start up the engine.)
3. At the front or rear jack up point, raise the front wheels or rear wheels off the earth.
4. Turn ON the headlamp switch.
5. When the front wheels are raised, the upward headlamp beam is controlled with the control value applicable to the present vehicle posture, and the headlamp beam moves downward.
6. When the rear wheels are raised, the downward headlamp beam is controlled with the control value applicable to the present vehicle posture, and the headlamp beam moves upward.

4.1.6. Headlamp cleaning device (where mandatory)

M6131000600024

CONSTRUCTION DIAGRAM





ACC00343 AC

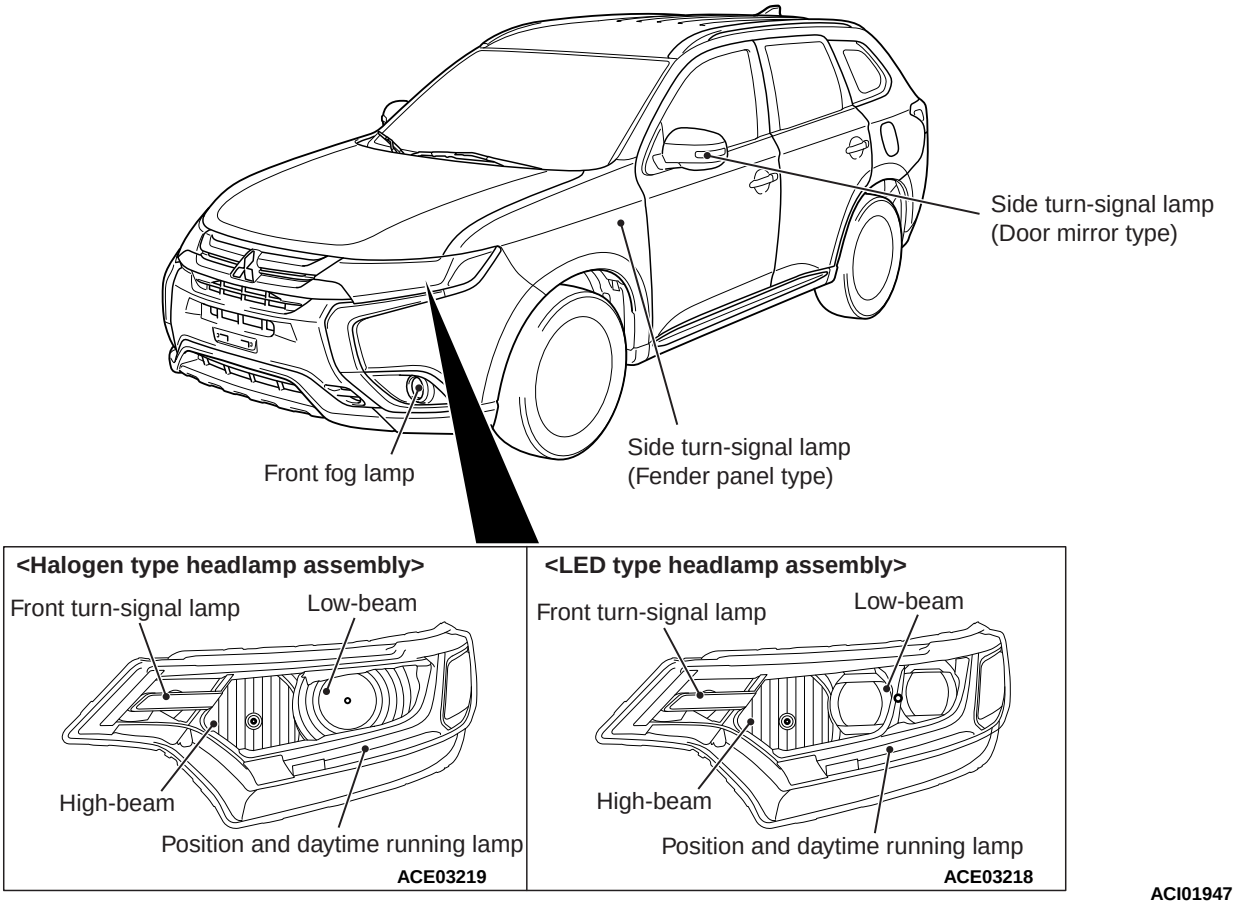
- The headlamp washer can be operated with the ignition switch at the ON or ACC position and the headlamp switch at the ON position. Push the headlamp washer button located at the end of the lighting lever once and the washer will be sprayed onto the headlamps.
- A headlamp washer mechanism that thrusts out and retracts nozzles, utilizing the water pressure produced by motors has been adopted as an option. This mechanism contributes to better appearances of vehicles when their washer nozzles are not in use.
- The headlamp washer tank used for this mechanism is also used for the windshield and rear window washers.

4.2. Front and rear position lamps, side marker lamps, end outline marker lamps and daytime running lamps

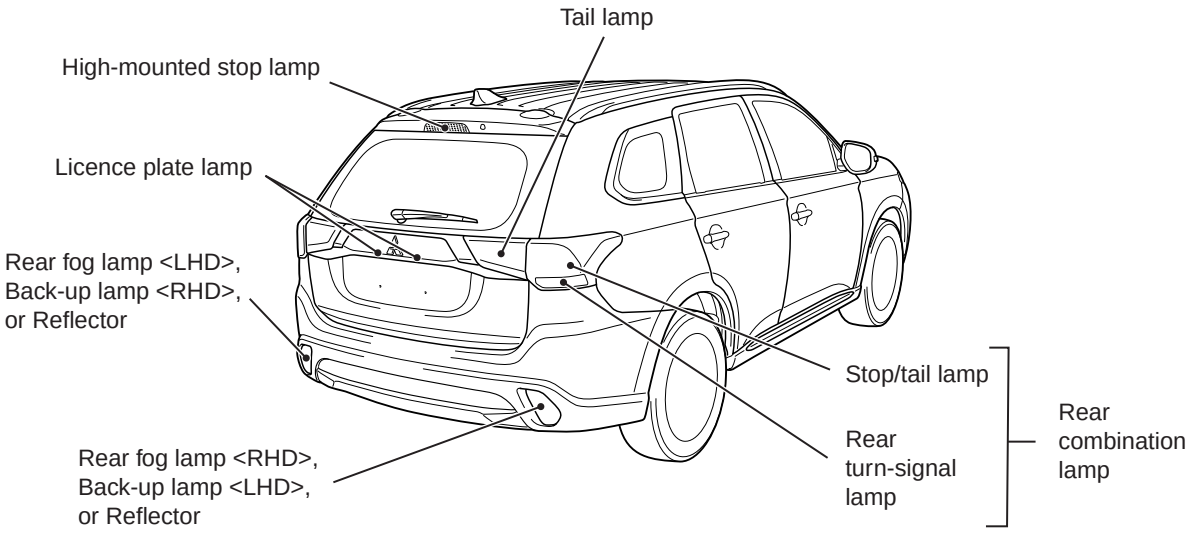
4.2.1. Condition and operation

M6132000100022

Construction diagram



ACI01947 AB



ACI01948 AB

4.2.2. Switching

M6132000200029

"Not Applicable"

4.2.3. Compliance with requirements1

M6132000300026

"Not Applicable"

4.3. Stop Lamps

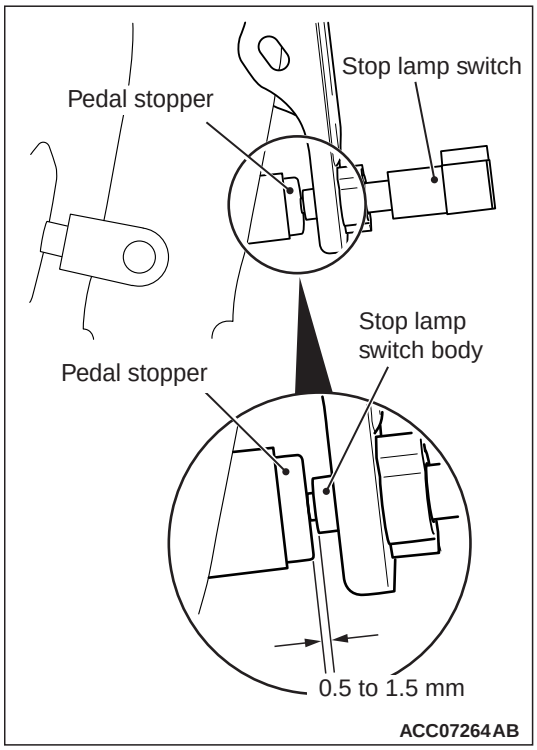
4.3.1. Condition and operation

M6133000100025

"Not Applicable"

4.3.2. Switching

M6133000200022



1. Check that the clearance between the stop lamp switch and the pedal stopper is as shown in the figure.

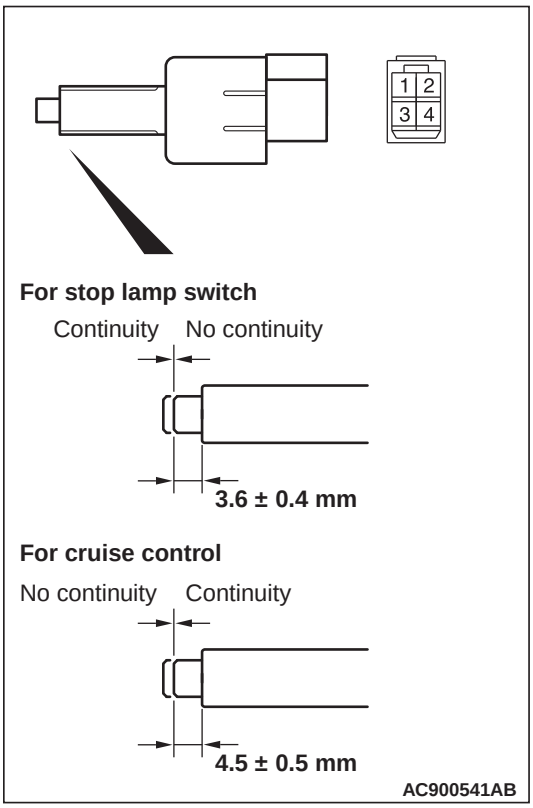
⚠ CAUTION

Make sure that the stop lamp is not illuminated when the brake pedal is not depressed.

STOP LAMP SWITCH CHECK

⚠ CAUTION

Do not apply lubricant (grease or silicon system sprayer etc.) to the switch and the switch installation section to avoid malfunction of the switch. In addition, do not use gloves which have lubricant (grease or silicon system sprayer etc.) on them.

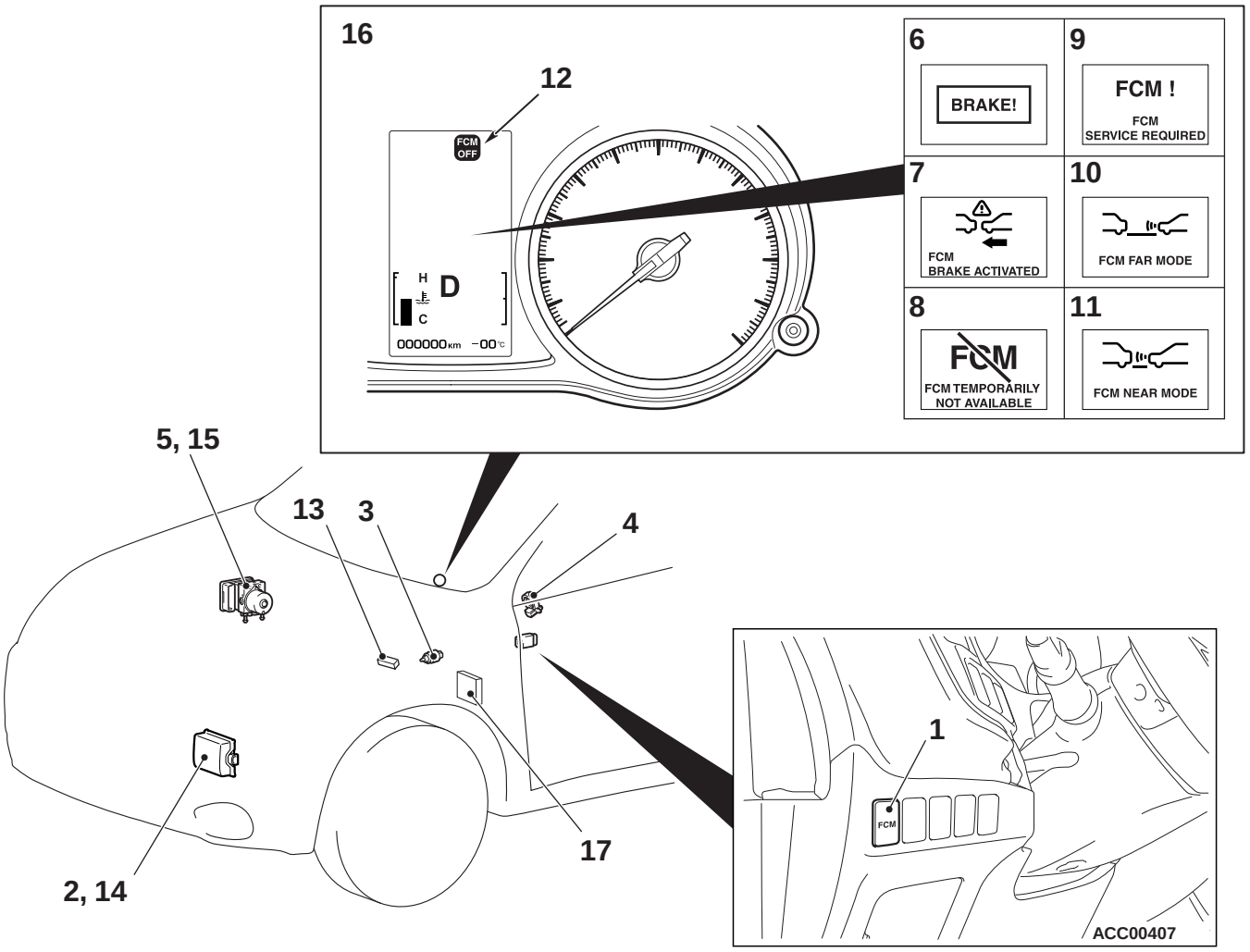


Check for continuity between the terminals of the switch.

Check condition	Terminal connector of tester	Normal condition
At free position	1 – 2 (for stop lamp switch)	Continuity exists (2 Ω or less)
	3 – 4 (for cruise control)	No continuity
Press the plunger from the edge of the outer case by the dimension shown in the figure.	1 – 2 (for stop lamp switch)	No continuity
	3 – 4 (for cruise control)	Continuity exists (2 Ω or less)

FORWARD COLLISION MITIGATION (FCM)

CONSTRUCTION DIAGRAM



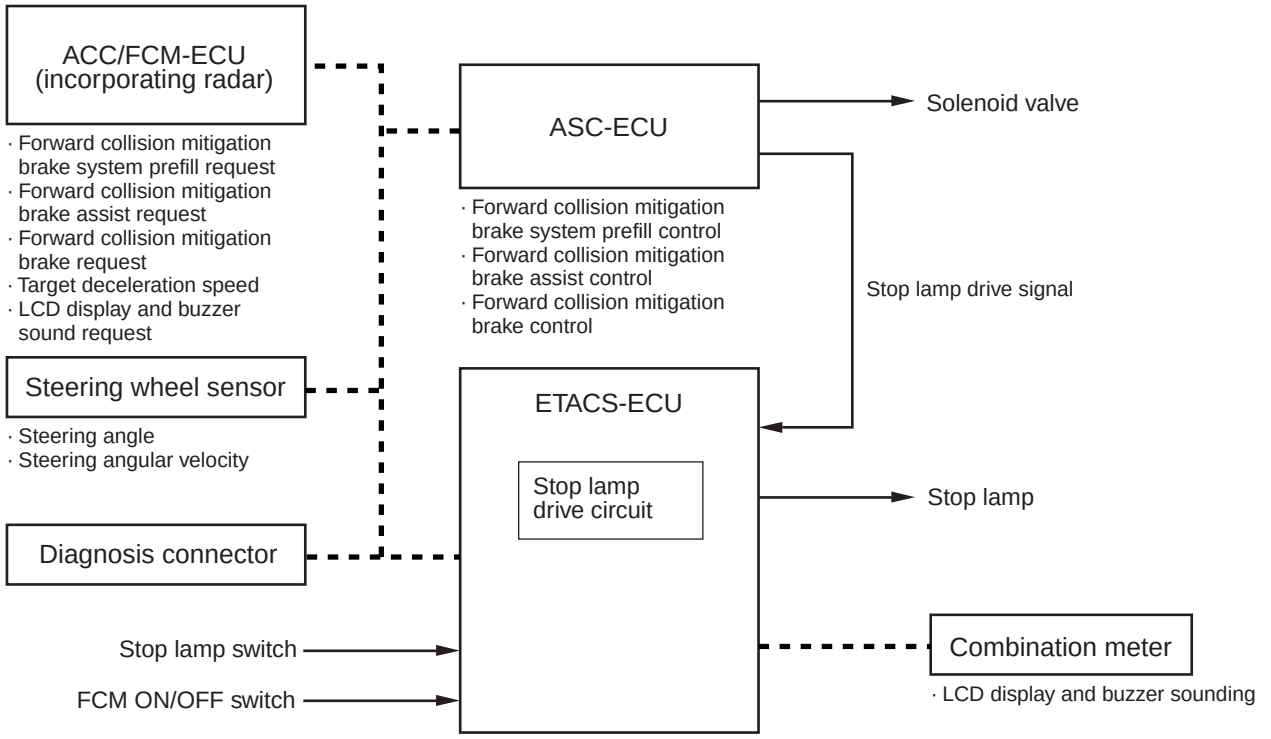
ACC00406AB

MAIN COMPONENTS AND FUNCTIONS

Name of part		Number	Functional description
Switch/ sensor	FCM ON/OFF switch	1	• Switches on and off the FCM. • Switches the warning timing of the FCM between "FAR" and "NEAR".
	Radar	2	Detects the distance from the vehicle travelling ahead, the position, relationship and the speed difference between the vehicle travelling ahead and your vehicle by using a radar wave.
	Stop lamp switch	3	Sends the signal indicating whether the brake pedal is depressed or not to ETACS-ECU.
	Steering wheel sensor	4	Detects a steering angle and a steering angular velocity, and send them to the ACC/FCM-ECU via the CAN communication.
Actuator	Hydraulic unit	5	Drives the solenoid valve using the signal from ASC-ECU, and controls the brake fluid pressure for each wheel.
	FCM warning display	6	Is displayed to request the driver to depress the brake pedal when a head-on collision is imminent.
	FCM auto brake activation display	7	Is displayed after the FCM turns off.
	FCM temporary failure display	8	Is displayed when the FCM is inactive temporarily.
	FCM failure display	9	Is displayed when the FCM is defective.
	FCM FAR display	10	Is displayed when the the FCM warning timing is switched to "FAR."
	FCM NEAR display	11	Is displayed when the the FCM warning timing is switched to "NEAR."
	FCM OFF display	12	Is displayed when the FCM is turned off.
Diagnosis connector		13	Sets the diagnosis code and establishes the communication with M.U.T.-III.
ACC/FCM-ECU		14	• Switches the FCM and/or the warning timing in accordance with the FCM ON/OFF switch status, which is received from the ETACS-ECU via CAN communication. • Determines whether the FCM should be activated in accordance with the radar detection (distance or relative velocity) or the other vehicle information, which is received via CAN communication. • Sends a forward collision mitigation brake system prefill request, a forward collision mitigation brake assist request, a forward collision mitigation brake request and/ or the target deceleration during the automatic braking via CAN communication to the ACS-ECU. • Sends FCM status information and a visible and audible warning request to the combination meter via CAN communication.

Name of part	Number	Functional description
ASC-ECU	15	• Controls the brake fluid pressure according to the brake control request and the target deceleration speed, which is received from the ACC/FCM-ECU via CAN communication. • Activate the stop lamp illumination circuit when the automatic braking is in progress. • Performs a forward collision mitigation brake system prefill control according to the request, which is received from the ACC/FCM-ECU. • Alleviate a threshold value and performs a forward collision mitigation brake assist control according to the request, which is received from the ACC/FCM-ECU.
Combination meter	16	Switches a display mode and sounds the buzzer according to the FCM status and/or the warning request (visible and audible), which is received from the ACC/FCM-ECU via CAN communication.
ETACS-ECU	17	• Contains the stop lamp activation circuit when the FCM automatic braking is in progress. • Sends a signal, which indicates FCM ON/OFF switch status and stop lamp switch status via hardwires, to the CAN bus lines.

SCHEMATIC DIAGRAM



ACC00415 AB

NOTE: Dashed lines indicate the CAN bus line.

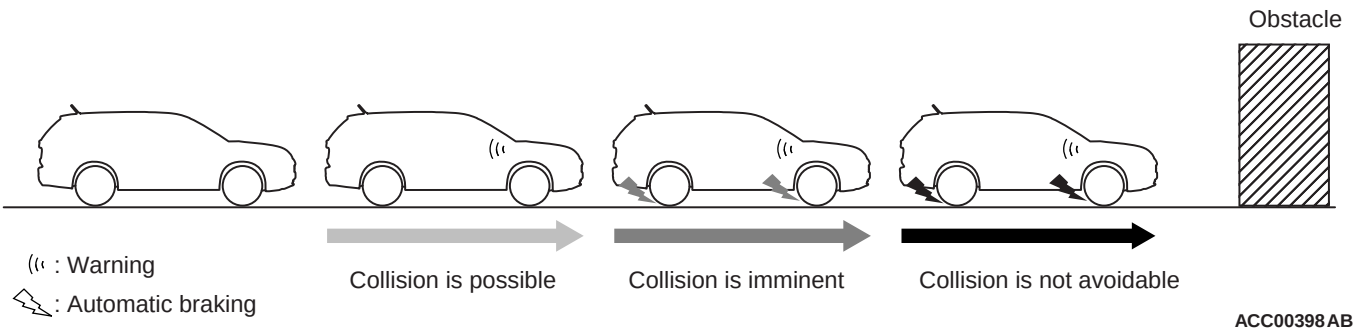
Function

The FCM has the following functions:

Function	General
Forward collision warning function	Activate the visible warning on the combination meter and audible warning when the system determines that a forward collision is imminent.
Forward collision mitigation brake system prefill	Increases the brake fluid pressure in advance to enhance the response during the driver's braking operation when the system determines that a forward collision is imminent.
Forward collision mitigation brake assist	Advances the brake assist timing when the system determines that a forward collision is imminent.
Forward collision mitigation brake	Activates the automatic emergency braking to reduce the vehicle speed when the system determines that a forward collision is not avoidable.
Forward collision mitigation brake for low speed driving	Activates the automatic emergency braking to reduce the vehicle speed when the system determines that a forward collision is imminent when the vehicle is being driven at 30 km/h or less. Stops the vehicle to avoid the collision under certain circumstances.

Operation

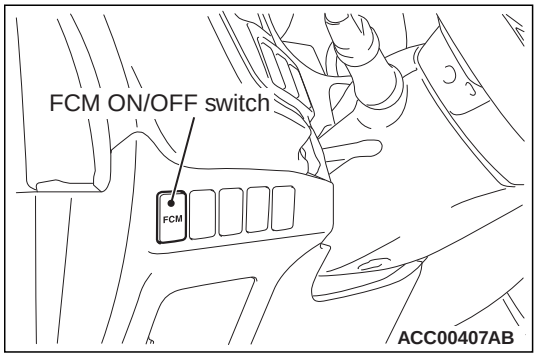
The system calculates the distance and the relative velocity between the vehicle travelling ahead and your vehicle by using a radar. If the system determines that a straightforward collision is imminent, it will avoid or reduce the injury or damage due to the collision by performing the controls shown in the table below:



Control		Collision is possible	Collision is imminent	Collision is not avoidable
Forward collision warning function	Warning indicator	 ACC00401	 ACC00401	 ACC00401
	Buzzer	Sounds	Sounds	Sounds
Forward collision mitigation brake system prefill		Increase the brake fluid pressure.	–	–
Forward collision mitigation brake assist		Assists the braking force in accordance with the driver's brake operation.	Assists the braking force in accordance with the driver's brake operation.	Assists the braking force in accordance with the driver's brake operation.
Forward collision mitigation brake*		–	Weak automatic-braking	Strong automatic-braking

*NOTE: *: If two seconds elapse after the forward collision mitigation brake stops the vehicle, it can be deactivated automatically.*

FCM ON/OFF SWITCH



The FCM ON/OFF switch is installed at the instrument panel left lower side. You can switch the FCM (on and off) and the warning timing ("FAR" and "NEAR") by operating this switch.

How to switch on and off the FCM

The FCM is toggled between on and off when the FCM ON/OFF switch is pressed for 1.5 seconds or more. When the FCM is toggled, the system will inform the driver of it by the combination meter LCD display * and the buzzer.

*NOTE: *: If the FCM is toggled off, "FCM OFF display" will be shown on the combination meter LCD screen. If the FCM is toggled on, a current warning timing will be shown on the combination meter LCD screen.*

How to switch the FCM warning timing

The FCM warning timing is toggled when the FCM ON/OFF switch is pressed for less than 1.5 seconds with the FCM activated. When the FCM is toggled, the system will inform the driver of it by the combination meter LCD display and the buzzer.

Fail-safe and self-diagnosis functions

The ACC/FCM-ECU constantly monitors the input and output signals. If the system detects a malfunction, it will send a failure signal to the combination meter and prohibit the FCM control under circumstances. The combination meter will provide a visual and audible warning to inform the driver of it. The ACC/FCM-ECU has the following functions for easier system checks.

- Diagnosis code set
- Service data output
- Freeze frame data output

All the above items can be diagnosed using M.U.T.-III.

Radar adjustment

If the ACC/FCM-ECU is replaced or removed and installed, adjust the radar by using the M.U.T.-III.

NOTE: For how to adjust the radar, refer to the WORKSHOP MANUAL.

4.3.3. Compliance with requirements1.

M6133000300029

"Not Applicable"

4.4. Direction indicator and hazard warning lamps

4.4.1. Condition and operation

M6134000100028

"Not Applicable"

4.4.2. Switching

M6134000200025

"Not Applicable"

4.4.3. Compliance with requirements1.

M6134000300022

"Not Applicable"

4.4.4. Flashing frequency

M6134000400029

"Not Applicable"

4.5. Front and rear fog lamps

4.5.1. Condition and operation

M6135000100021

"Not Applicable"

4.5.2. Alignment (X)2

M6135000200028

"Not Applicable"

4.5.3. Switching

M6135000300025

"Not Applicable"

4.5.4. Compliance with requirements1.

M6135000400022

"Not Applicable"

4.6. Reversing lamps

4.6.1. Condition and operation

M6136000100024

"Not Applicable"

4.6.2. Compliance with requirements1

M6136000200021

"Not Applicable"

4.6.3. Switching

M6136000300028

"Not Applicable"

4.7. Rear registration plate lamp

4.7.1. Condition and operation

M6137000100027

"Not Applicable"

4.7.2. Compliance with requirements1

M6137000200024

"Not Applicable"

4.8. Retro-reflectors, conspicuity (retro reflecting) markings and rear marking plates

4.8.1. Condition

M6138000100020

"Not Applicable"

4.8.2. Compliance with requirements1

M6138000200027

"Not Applicable"

4.9. Tell-tales mandatory for lighting equipment

4.9.1. Condition and operation

M6139000100023

"Not Applicable"

4.9.2. Compliance with requirements1

M6139000200020

"Not Applicable"

4.10. Electrical connections between towing vehicle and trailer or semi-trailer

M6130100000026

"Not Applicable"

4.11.Electrical wiring

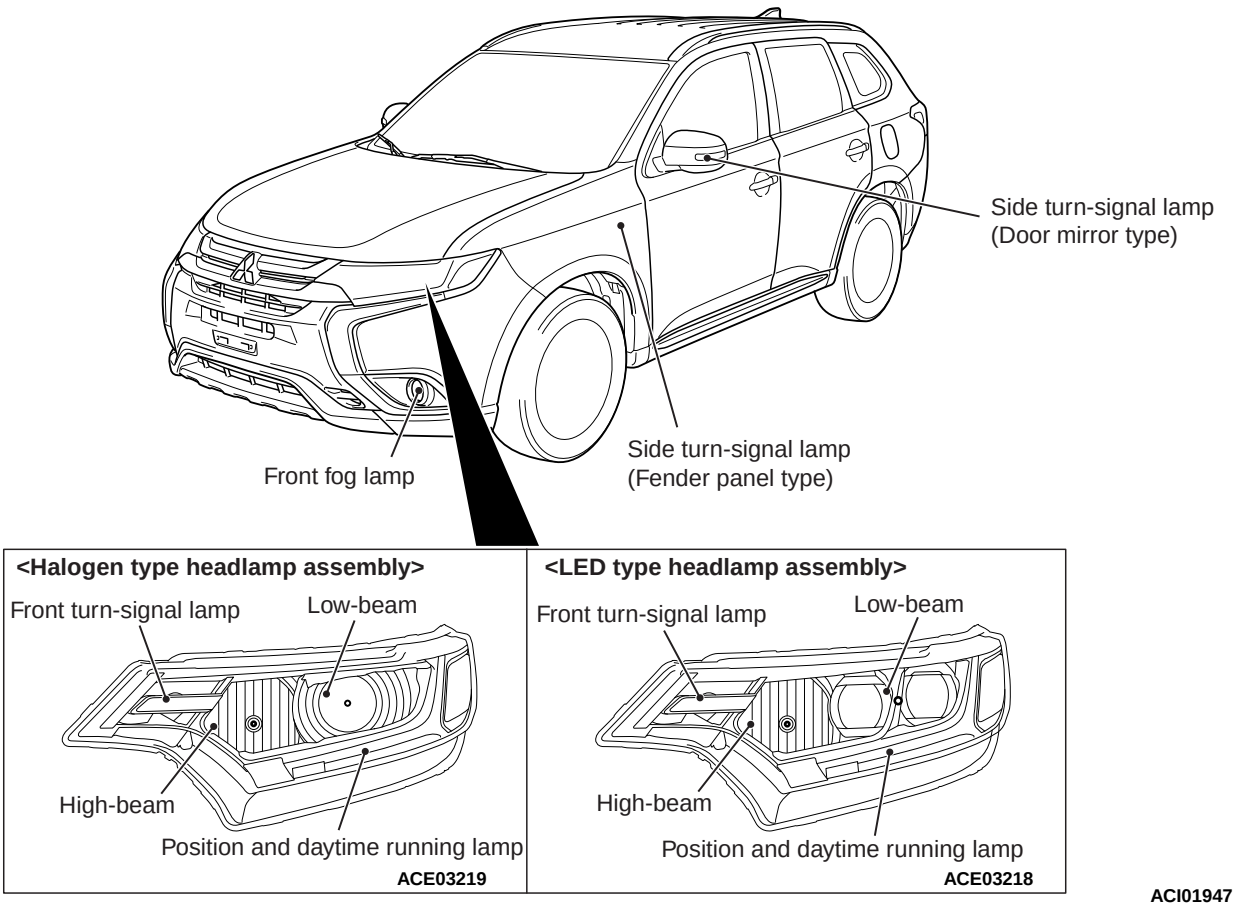
M6131100000029

“Query raised for this content”

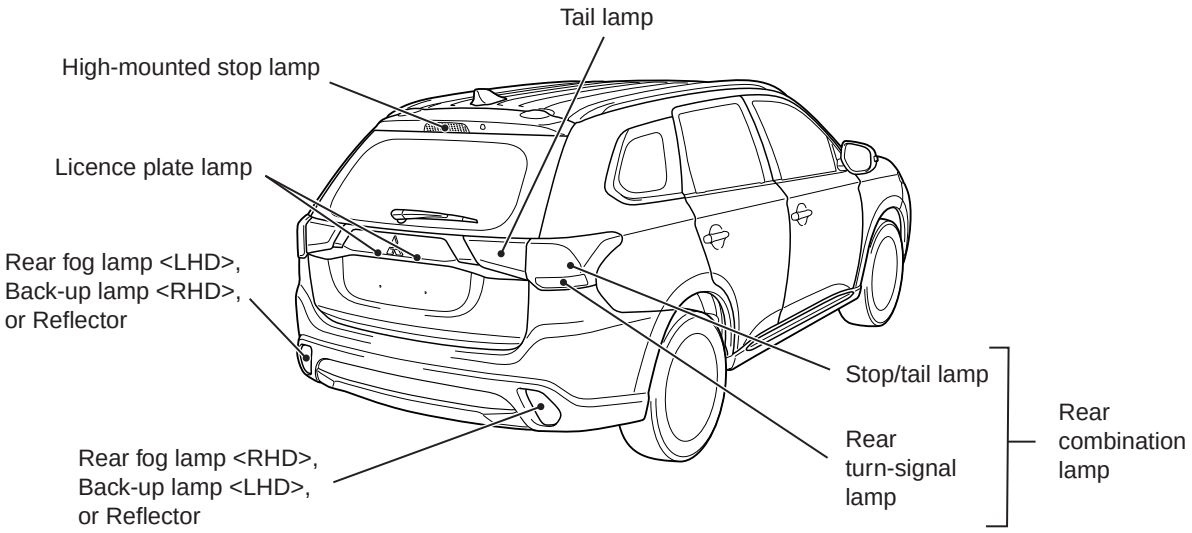
4.12. Non obligatory lamps and retro-reflectors (X)2

M6131200000026

Construction diagram



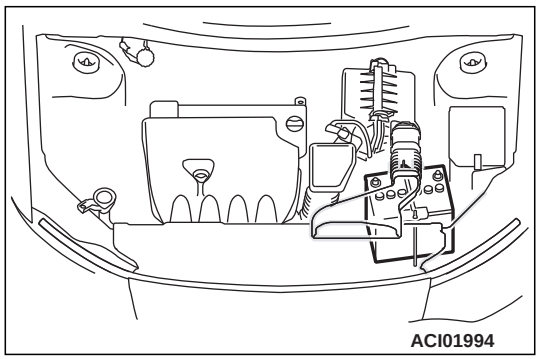
ACI01947 AB



ACI01948 AB

4.13. Battery(ies)

M6131300000023



ACI01994

Item	75D23L	95D31L	Q-85	T-105
Voltage V	12	12	12	12
Capacity (5-hour rate) Ah	52	64	52	64
Electrolytic fluid specific gravity (fully charged state at 20°C)	1.220 – 1.290		1.250 – 1.290	

GROUP 5

AXLES, WHEELS, TYRES AND SUSPENSION

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5.1. Axles

5.1.1. Axles

M6140100100024

For the front axle, the multi-line angular contact ball bearing with an integral oil seal is adopted as a wheel bearing, and EBJ-PTJ type constant velocity joint as a driveshaft.
It has the following features:

- The lightweight and compact EBJ-type constant velocity joint is installed on the wheel side of the driveshaft, and the vibration reduced PTJ-type constant velocity joint is installed on the differential side.
- For the driveshaft (RH), instead of the conventional output shaft, the long stem integrated with the differential side constant velocity joint is adopted to streamline the structure. <4WD>
- Dynamic damper is mounted on driveshaft (RH) to reduce differential booming noise. <2000>
- Lead-free grease for the constant velocity joint is adopted.
- Hexavalent chromium is eliminated from the dust cover material.
- The number of parts is reduced by integrating the magnetic encoder for ABS wheel speed detection into the wheel bearing.

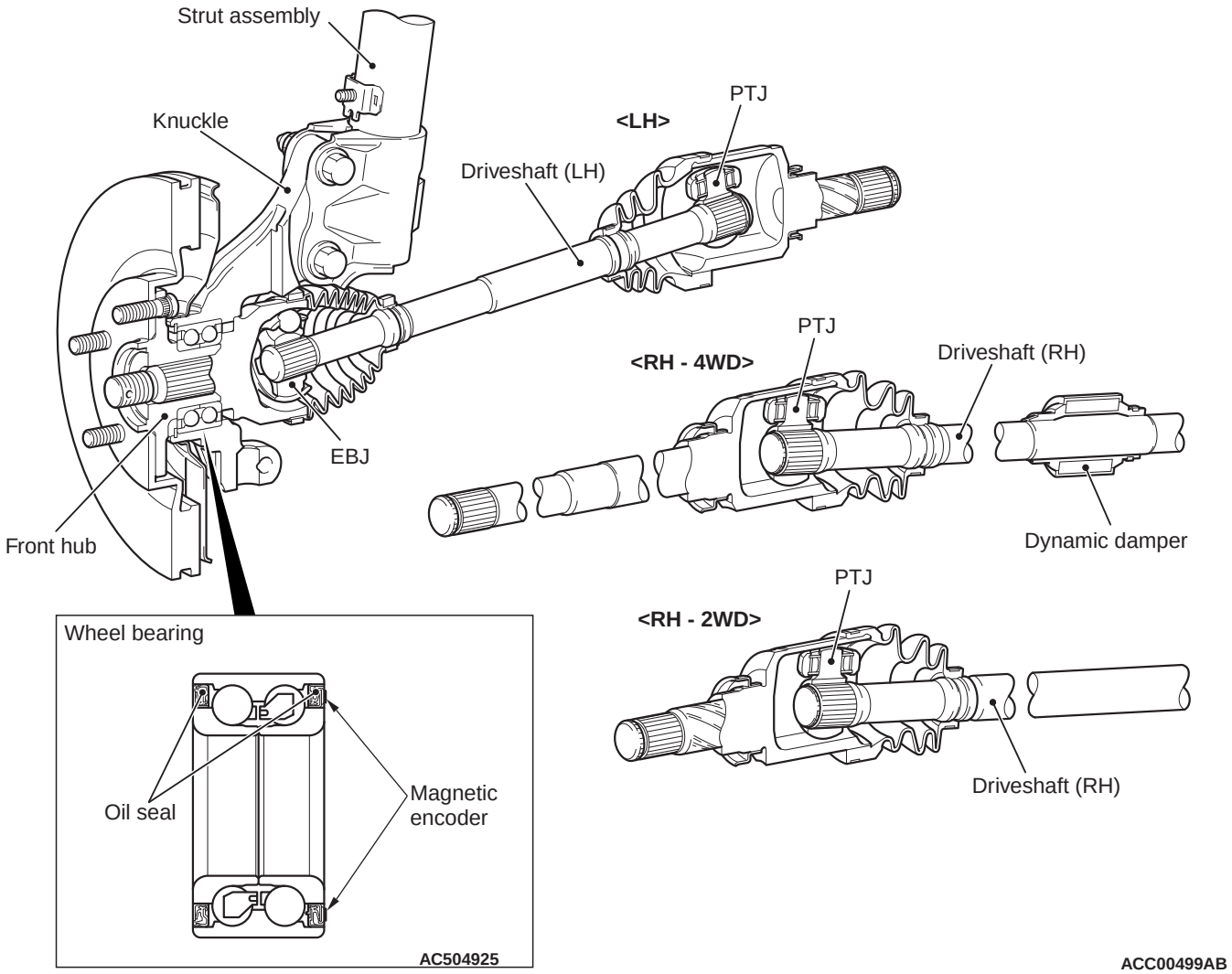
NOTE:
EBJ (High Efficiency Compact Undercut Joint): the lighter and smaller constant velocity joint compared with the conventional BJ has been achieved by adopting the eight small balls.
PTJ (Pillow Tripod Joint)

SPECIFICATIONS

Item			Specifications
Wheel bearing	Bearing type		Unit bearing (Double-row angular contact ball bearing)
	Bearing (Outer diameter × inside diameter) (mm)		80 × 43
Drive shaft	Joint type	Outside	EBJ
		Inside	PTJ
	Shaft length* × shaft diameter (mm)	LH	392.5 × 25.4
		RH	708.0 × 34.0 <2WD>, 509.0 × 29.0 <4WD>

*NOTE: *: Indicates the distance between each joint centre.*

CONSTRUCTION DIAGRAM



REAR AXLE <2WD>

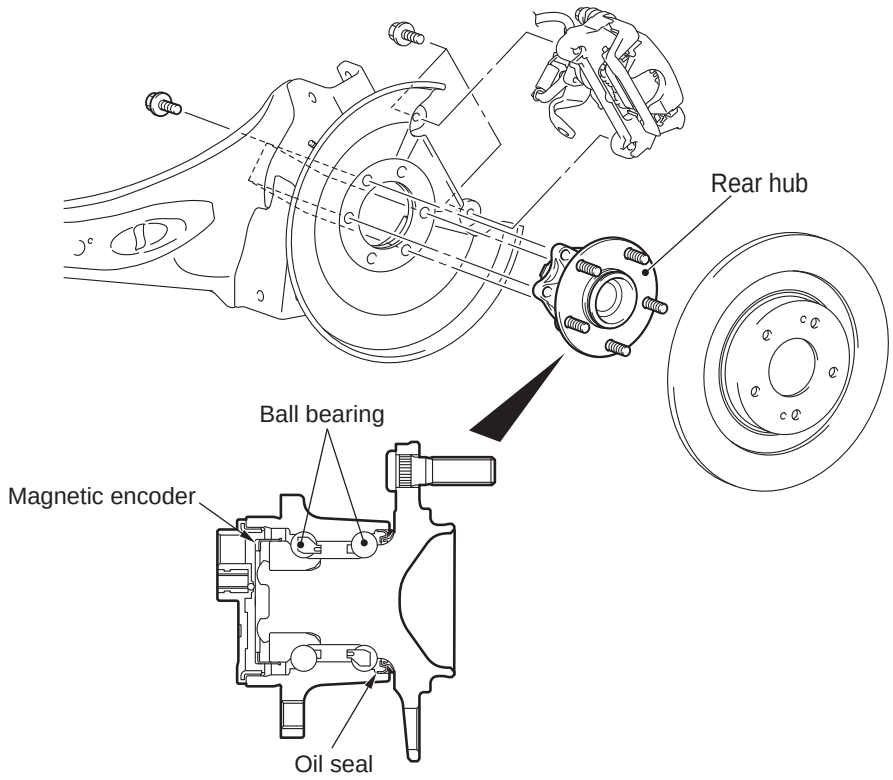
The rear axle has the following features:

- The wheel bearing is a unit ball bearing (double-row angular contact ball bearing) which incorporates the oil seals and is highly resistant to thrust loads.
- The number of parts has been reduced by integrating the magnetic encoder for ABS wheel speed detection into the wheel bearing.

SPECIFICATIONS

Item		Specification
Wheel bearing	Bearing type	Unit ball bearing (double-row angular contact ball bearing)

CONSTRUCTION DIAGRAM



ACB05764AB

REAR AXLE <4WD>

For the rear axle, the unit ball bearing (double-row angular contact ball bearing) in which the hub and ball bearing are incorporated has been adopted for the wheel bearing, and the EUJ–ETJ type constant velocity joint for the driveshaft.
The following features are also available.

- The lightweight and compact EUJ type constant velocity joint has been installed on the wheel side of the driveshaft, and the lightweight compact ETJ type constant velocity joint has been installed on the differential side.
- Adoption of the electronic control 4WD optimizes the size of the driveshaft constant velocity joint and achieves the weight saving.
- Lead-free grease for the constant velocity joint has been adopted.
- Hexavalent chromium has been eliminated from the dust cover material.
- The number of parts has been reduced by integrating the magnetic encoder for ABS wheel speed detection into the wheel bearing.

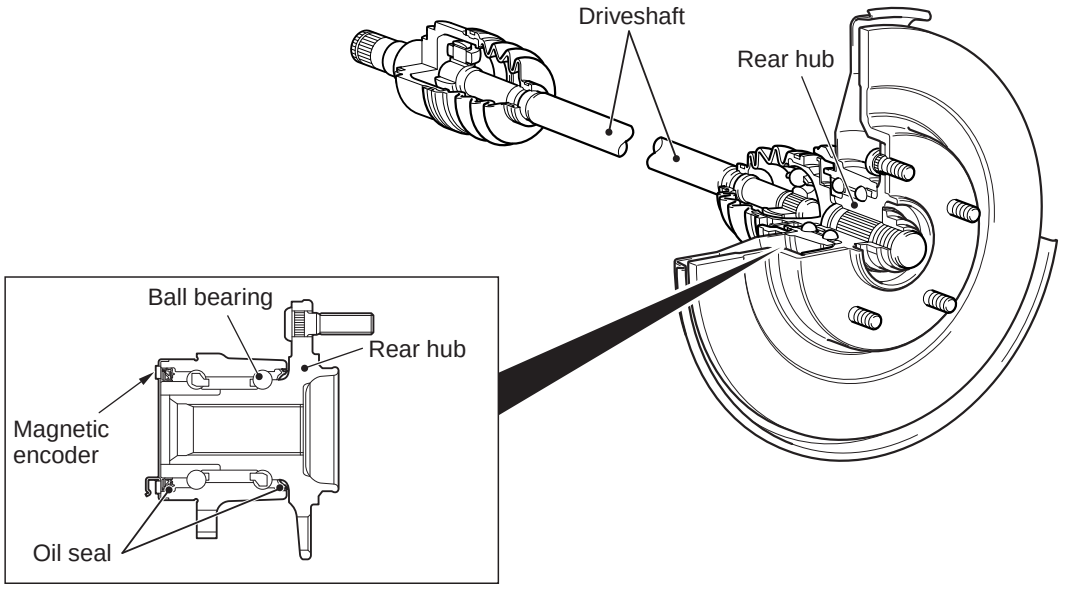
NOTE:
EUJ (High Efficiency Compact Undercut Joint): UJ(Undercut Free Joint): Large-angle constant velocity joint
ETJ (High Efficiency Compact Tripod joint): Axially sliding constant velocity joint

SPECIFICATIONS

Item			Specification
Wheel bearing	Bearing type		Unit ball bearing (double-row angular contact ball bearing)
Driveshaft	Joint type	Outer	EUJ
		Inner	ETJ
	Shaft length* × Shaft diameter mm	LH	496.0 × 24
		RH	576.4 × 24

*NOTE: *: Indicates the distance between the centre of each joint.*

CONSTRUCTION DIAGRAM

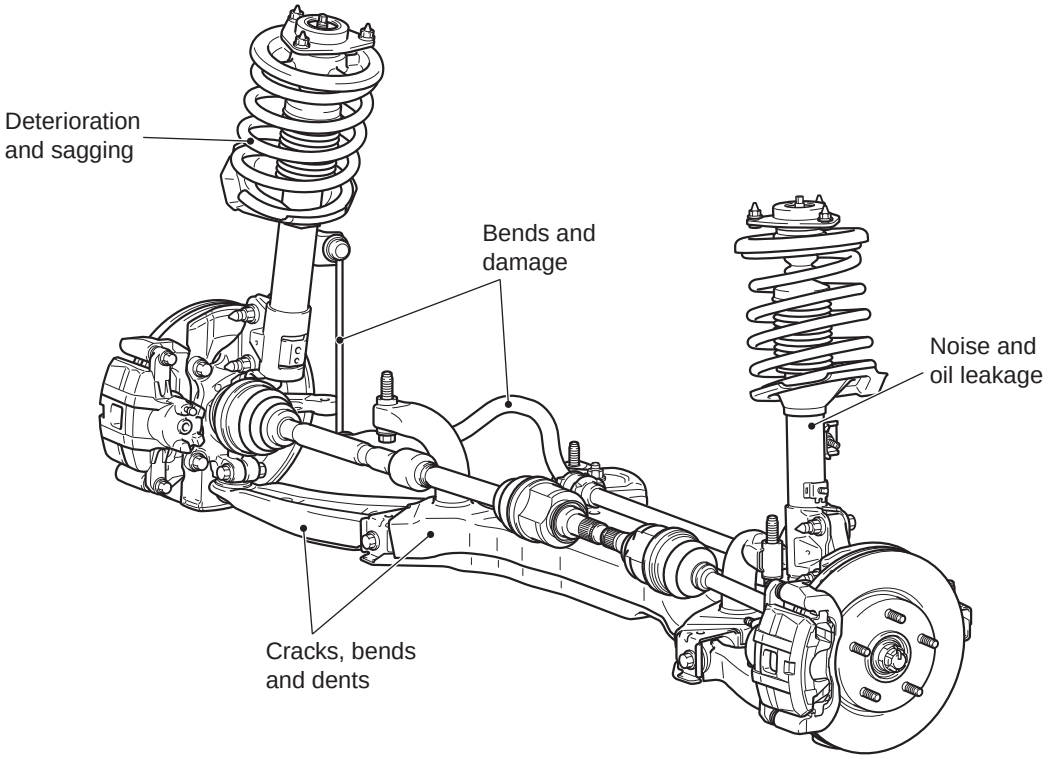


ACC02148AB

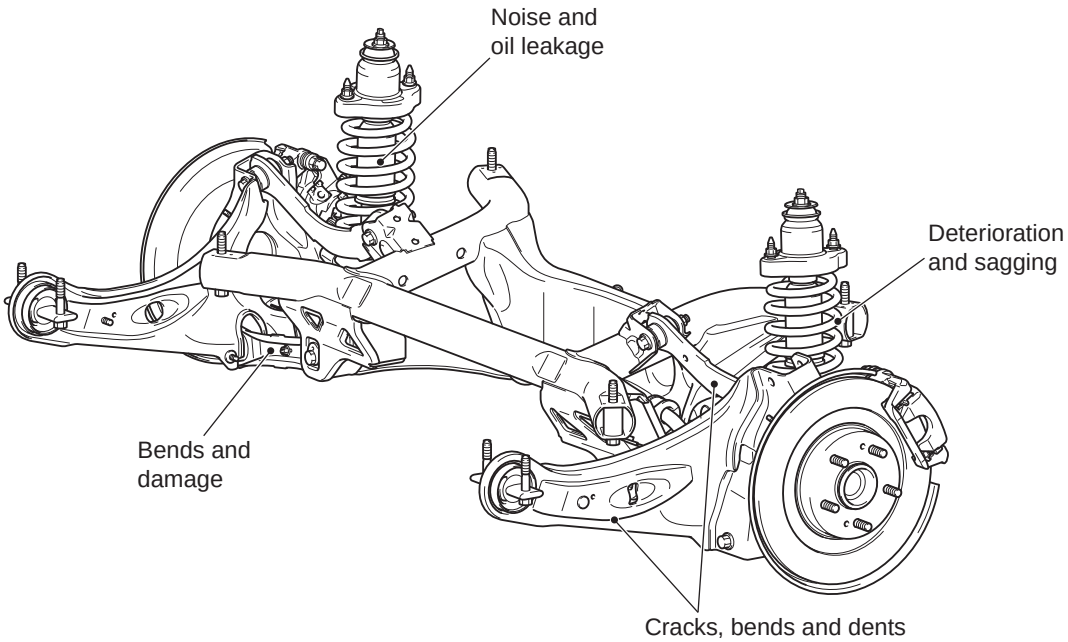
CHECK SUSPENSION SYSTEM FOR DAMAGE AND LOOSENESS

1. Check each portion of suspension for damage visually.

FRONT SUSPENSION



REAR SUSPENSION

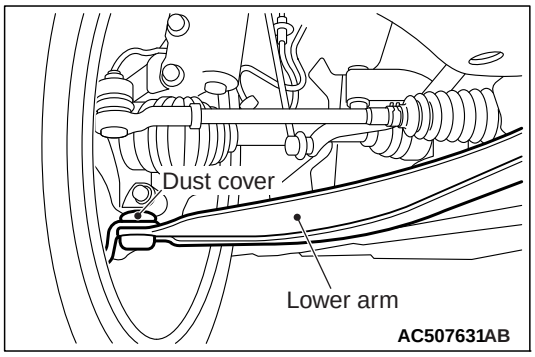


ACC00842

2. Check each installation bolt and nut for looseness by spanner or similar tool.

CHECK SUSPENSION ARM BALL JOINTS FOR PLAY, AND DUST COVERS FOR DAMAGE

LOWER ARM BALL JOINT AXIAL PLAY CHECK

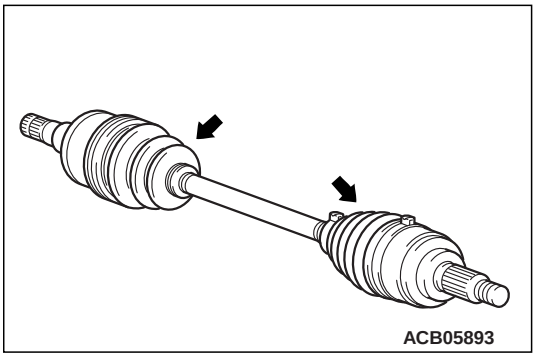


1. Raise the vehicle.
2. Move the lower arm up and down with your hands to check for an excessive play in the axial direction of the ball joint. If there is an excessive play, replace the lower arm assembly.

DUST COVERS FOR DAMAGE

Check dust covers for damage.

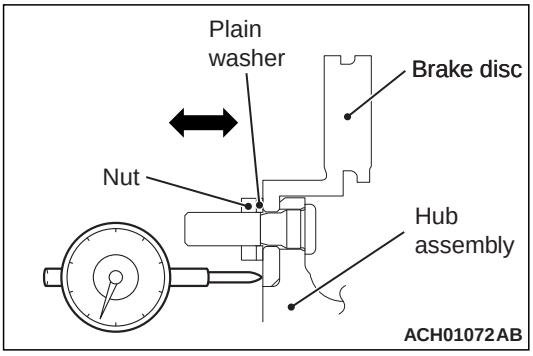
CHECK DRIVESHAFT BOOTS FOR DAMAGE



Check the driveshaft boots for damage.

CHECK FRONT AND REAR WHEEL BEARINGS FOR PLAY

1. Remove the wheel assembly and the brake pad assembly.
2. Insert M12 plain washers, and tighten the nuts (M12 × 1.5) diagonally and evenly to the specified torque (98±10N·m) to secure the brake disc to the hub assembly.



3. Set a dial gauge as shown in the figure. Move the hub in the axial direction and measure the axial play.

   Limit:
   0.05 mm <Front>
   0.05 mm <Rear>

4. On completion, install the wheel assembly and the brake pad assembly.

5.1.2. Stub axles

M6140100200021

"Not Applicable"

5.1.3. Wheel bearings

M6140100300028

"Not Applicable"

5.2. Wheels and tyres

5.2.1. Road wheel hub

M6140200100021

"Not Applicable"

5.2.2. Wheels

M6140200200028

The wheels and tyres of the following specifications have been established.

SPECIFICATIONS

Road wheel and tyre

<2000>

Item		Standard			Option	
Wheel	Type	Steel type	Aluminium type	Aluminium type	Aluminium type	Aluminium type
	Size	16 × 6.5JJ	16 × 6.5J	18 × 7J	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	38	38	38	38	38
	PCD mm	114.3	114.3	114.3	114.3	114.3
Tyre	Size	215/70R16 100H	215/70R16 100H	225/55R18 98H	215/70R16 100H	225/55R18 98H

<2200>

Item		Standard			Option	
Wheel	Type	Steel type	Aluminium type	Aluminium type	Aluminium type	Aluminium type
	Size	16 × 6.5JJ	16 × 6.5J	18 × 7J	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	38	38	38	38	38
	PCD mm	114.3	114.3	114.3	114.3	114.3
Tyre	Size	215/70R16 100H	215/70R16 100H	225/55R18 98H	215/70R16 100H	225/55R18 98H

<2400>

Item		Standard	Option
Wheel	Type	Aluminium type	Aluminium type
	Size	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	38	38
	PCD mm	114.3	114.3
Tyre	Size	215/70R16 100H	225/55R18 98H

NOTE: PCD indicates the pitch circle diameter of the wheel installation holes.

Spare wheel and tyre

<Standard>

Item				
Wheel	Type	Steel type	Aluminium type	Aluminium type
	Size	16 × 6.5JJ	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	38	38	38
	PCD mm	114.3	114.3	114.3
Tyre	Size	215/70R16 100H	215/70R16 100H	225/55R18 98H

<Option>

Item					
Wheel	Type	Steel type	Steel type	Aluminium type	Aluminium type
	Size	16 × 4.0T	17 × 4.0T	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	40	40	38	38
	PCD mm	114.3	114.3	114.3	114.3
Tyre	Size	T155/90D16	T155/80D17	215/70R16 100H	225/55R18 98H

NOTE: PCD indicates the pitch circle diameter of the wheel installation holes.

5.2.3. Tyres

M6140200300025

The wheels and tyres of the following specifications have been established.

SPECIFICATIONS

Road wheel and tyre

<2000>

Item		**Standard**			**Option**	
Wheel	Type	Steel type	Aluminium type	Aluminium type	Aluminium type	Aluminium type
	Size	16 × 6.5JJ	16 × 6.5J	18 × 7J	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	38	38	38	38	38
	PCD mm	114.3	114.3	114.3	114.3	114.3
Tyre	Size	215/70R16 100H	215/70R16 100H	225/55R18 98H	215/70R16 100H	225/55R18 98H

<2200>

Item		Standard			Option	
Wheel	Type	Steel type	Aluminium type	Aluminium type	Aluminium type	Aluminium type
	Size	16 × 6.5JJ	16 × 6.5J	18 × 7J	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	38	38	38	38	38
	PCD mm	114.3	114.3	114.3	114.3	114.3
Tyre	Size	215/70R16 100H	215/70R16 100H	225/55R18 98H	215/70R16 100H	225/55R18 98H

<2400>

Item		Standard	Option
Wheel	Type	Aluminium type	Aluminium type
	Size	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	38	38
	PCD mm	114.3	114.3
Tyre	Size	215/70R16 100H	225/55R18 98H

NOTE: PCD indicates the pitch circle diameter of the wheel installation holes.

Spare wheel and tyre

<Standard>

Item				
Wheel	Type	Steel type	Aluminium type	Aluminium type
	Size	16 × 6.5JJ	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	38	38	38
	PCD mm	114.3	114.3	114.3
Tyre	Size	215/70R16 100H	215/70R16 100H	225/55R18 98H

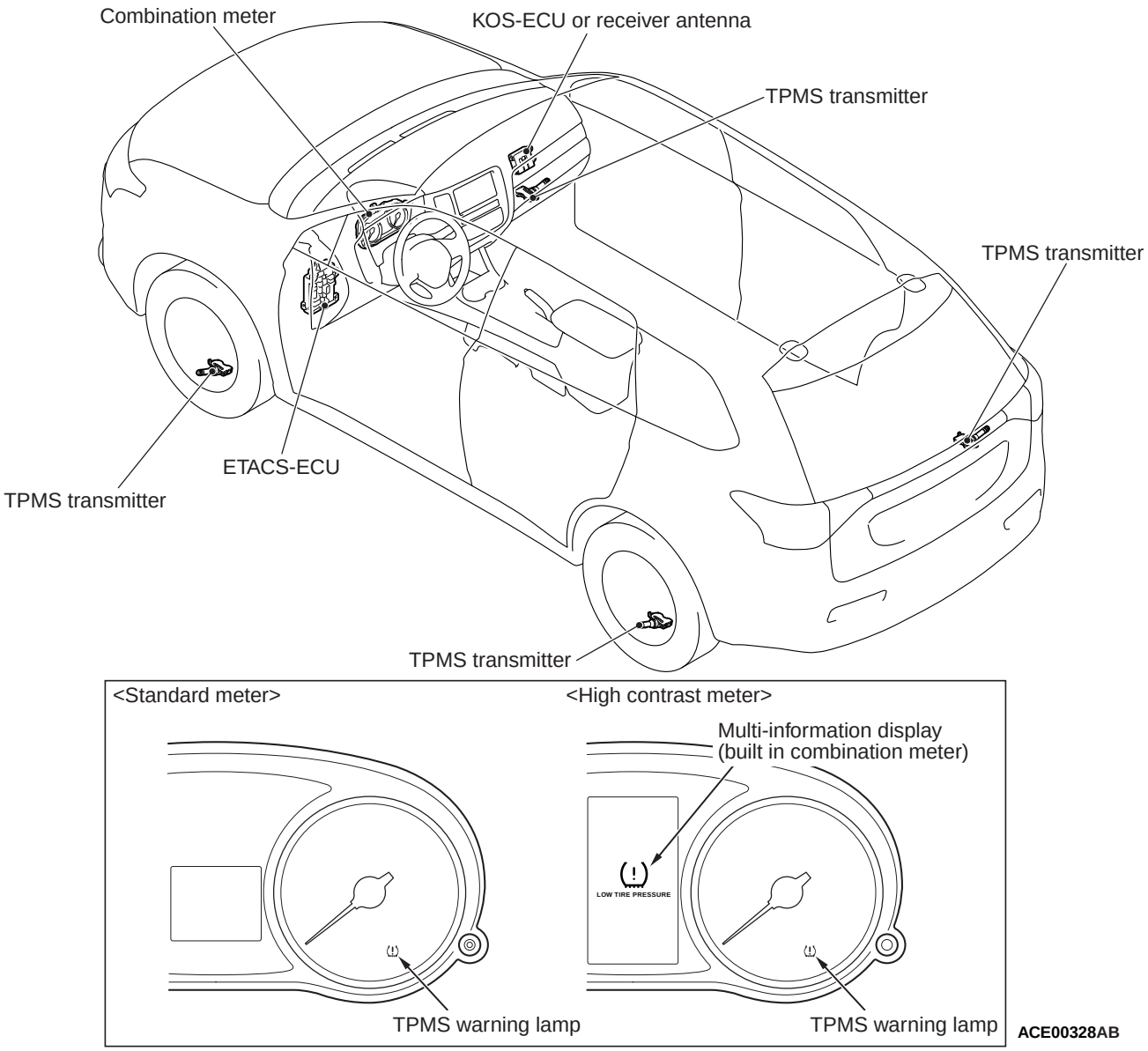
<Option>

Item					
Wheel	Type	Steel type	Steel type	Aluminium type	Aluminium type
	Size	16 × 4.0T	17 × 4.0T	16 × 6.5J	18 × 7J
	Amount of wheel offset mm	40	40	38	38
	PCD mm	114.3	114.3	114.3	114.3
Tyre	Size	T155/90D16	T155/80D17	215/70R16 100H	225/55R18 98H

NOTE: PCD indicates the pitch circle diameter of the wheel installation holes.

TYRE PRESSURE MONITORING SYSTEM (TPMS)

CONSTRUCTION DIAGRAM



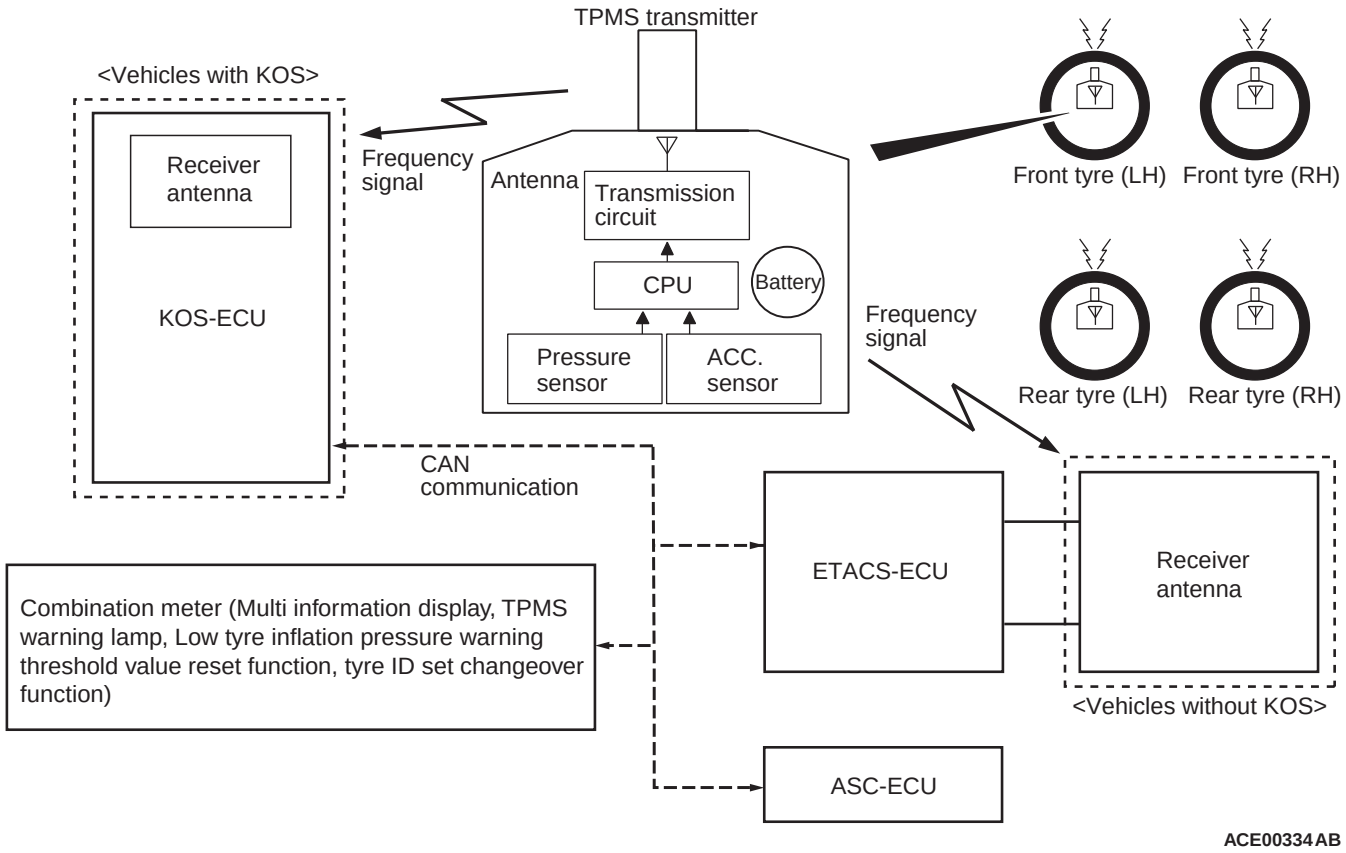
Main components and functions

Parts name	Functional description
KOS-ECU	Wireless communication with the TPMS transmitter
ETACS-ECU	Wire communication with the receiver antenna <Vehicles without KOS>
Receiver antenna	Wireless communication with the TPMS transmitter <Vehicles without KOS>
TPMS transmitter	Measure tyre pressure directly, then send radio frequency signal to receiver antenna module.

Parts name	Functional description
Combination meter (Multi information display, TPMS warning lamp, low tyre inflation pressure warning threshold value reset function, tyre ID set changeover function)	Communicates with KOS-ECU or ETACS-ECU via CAN. Receives the warning request or warning information from KOS-ECU or ETACS-ECU, activates* the warning lamp. Warning symbol and message is additionally displayed on the multi information display. When executing the low tyre inflation pressure warning threshold value reset function and the tyre ID set changeover function, the execution menu is displayed.

*NOTE: *: Illuminates for tyre pressure warning. Flashes for about 1 minute and then continuously illuminated for TPMS malfunction warning.*

System configuration



TYRE PRESSURE MONITORING SYSTEM (TPMS) FUNCTION

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

OPERATION

- The signals from the TPMS transmitter are received by the KOS-ECU or ETACS-ECU via receiver antenna <without KOS>.
- KOS-ECU or ETACS-ECU <without KOS> processes input signals from each TPMS transmitter as well as vehicle speed signals from the ASC-ECU. It receives the atmospheric pressure signal from engine-ECU, and when the atmospheric pressure is low (such as at high altitude), it calibrates the tyre pressure received from TPMS transmitter and makes a judgement of warning. When the road tyre pressure is low, it sends a warning signal causing the TPMS warning lamp to be illuminated. When the TPMS has problems, it sends a warning signal causing the TPMS warning lamp to be flashed*.

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

- For 3 seconds after the engine switch is turned to the "ON" position, KOS-ECU or ETACS-ECU <without KOS> illuminates the TPMS warning lamp to check any breaks in the TPMS warning lamp circuit.
- By connecting the M.U.T.-III to the diagnosis connector, data stored in KOS-ECU or ETACS-ECU <without KOS> (data of tyre pressure and TPMS transmitter ID, the alarm status and warning history, etc.) can be displayed and TPMS transmitter ID can be registered.
- Two sets of four TPMS transmitters can be registered as sets 1 and 2.

NOTE: If the TPMS transmitter is replaced, register the ID codes of all TPMS transmitters again about the ID set of tyre which includes the replaced transmitter using the M.U.T.-III.

- Low tyre inflation pressure warning threshold value reset and tyre ID set changeover can be performed. (By registering two sets at the dealer in advance, the tyre ID set can be freely switched by operating the combination meter.)

NOTE: When the tyre ID set is switched, the low tyre inflation pressure warning threshold value will be automatically reset.

TPMS TRANSMITTER (TYRE PRESSURE SENSOR)

The TPMS transmitter combines the valve and tyre pressure sensor in a single unit. The TPMS transmitters are mounted inside the tyres. The TPMS transmitter measures tyre pressure directly with its tyre pressure sensor and sends radio frequency signals to KOS-ECU or ETACS-ECU <without KOS>. The TPMS transmitter includes acceleration sensor that senses tyre rotation, and change tyre 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.

TYRE 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 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 ±10 kPa from the last transmitted pressure value, an additional transmission will occur.

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

5.3. Suspension system

5.3.1. Springs and stabiliser

M6140300100028

"Not Applicable"

5.3.2. Shock absorbers

M6140300200025

"Not Applicable"

5.3.2.1. efficiency testing of damping (X)2

M6140310100029

"Not Applicable"

5.3.3. Torque tubes, radius arms, wishbones and suspension arms

M6140300300022

"Not Applicable"

5.3.4. Suspension joints

M6140300400029

"Not Applicable"

5.3.5. Air suspension

M6140300500026

"Not Applicable"

GROUP 6

CHASSIS AND CHASSIS ATTACHMENTS

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6.1. Chassis or frame and attachments

6.1.1. General condition

M6150100100025

"Not Applicable"

6.1.2. Exhaust pipes and silencers

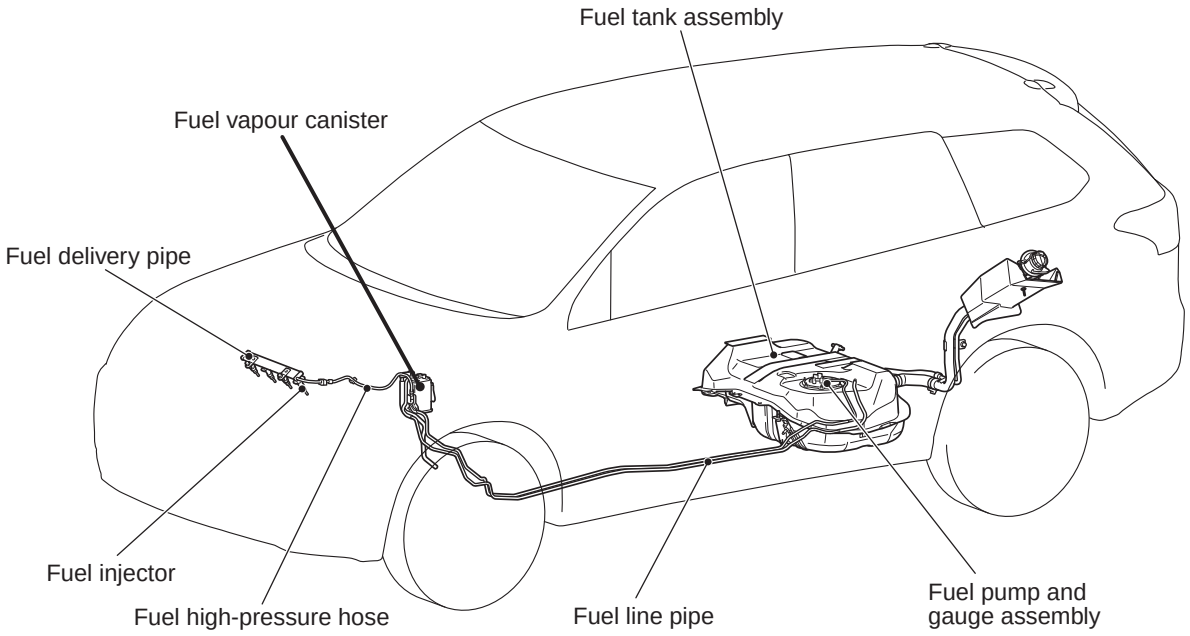
M6150100200022

"Not Applicable"

6.1.3. Fuel tank and pipes (including heating fuel tank and pipes)

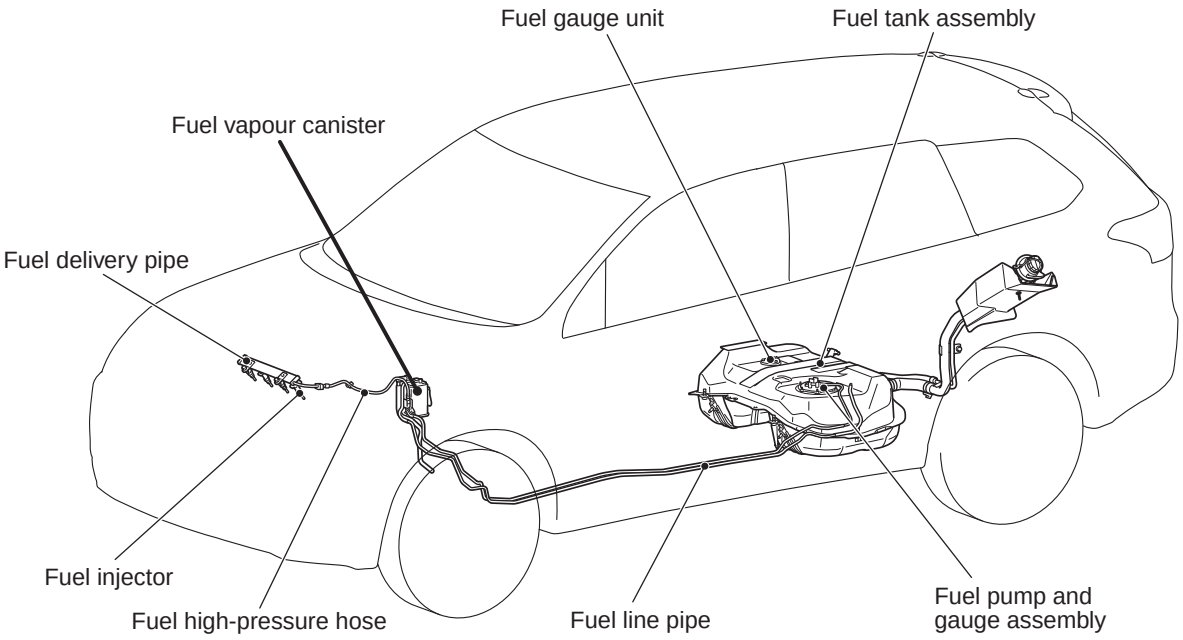
M6150100300029

<2WD>



ACB05409AB

<4WD>



ACB05408AB

6.1.4. Bumpers, lateral protection and rear underrun devices

M6150100400026

"Not Applicable"

6.1.5. Spare wheel carrier (if fitted)

M6150100500023

"Not Applicable"

6.1.6. Mechanical coupling and towing device

M6150100600020

"Not Applicable"

6.1.7. Transmission

M6150100700027

"Not Applicable"

6.1.8. Engine mountings

M6150100800024

"Not Applicable"

6.1.9 Engine performance (X) 2

M6150100900021

“Query raised for this content”

6.2. Cab and bodywork

6.2.1. Condition

M6150200100022

"Not Applicable"

6.2.2. Mounting

M6150200200029

"Not Applicable"

6.2.3. Doors and door catches

M6150200300026

"Not Applicable"

6.2.4. Floor

M6150200400023

"Not Applicable"

6.2.5. Driver's seat

M6150200500020

"Not Applicable"

6.2.6. Other seats

M6150200600027

- Max Number of seats total (excluding driver's seat) - 6
- Number of rear-facing seats - 0

6.2.7. Driving controls

M6150200700024

"Not Applicable"

6.2.8. Cab steps

M6150200800021

"Not Applicable"

6.2.9. Other interior and exterior fittings and equipment

M6150200900028

"Not Applicable"

6.2.10. Mudguards (wings), spray suppression devices

M6150201000028

"Not Applicable"

6.2.11. Stand

M6150201100025

"Not Applicable"

6.2.12. Handgrips and footrests

M6150201200022

"Not Applicable"

GROUP 7

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7.10. SPEED LIMITATION DEVICE (IF FITTED/ REQUIRED) 7-22

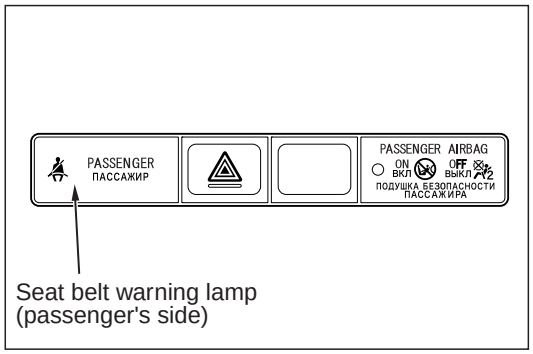
7.11 ODOMETER IF AVAILABLE (X)2 7-23

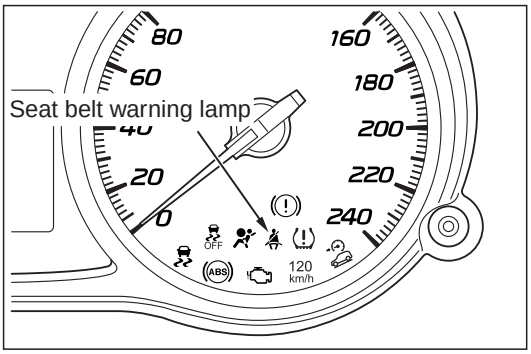
7.12 ELECTRONIC STABILITY CONTROL (ESC) IF FITTED/REQUIRED. 7-24

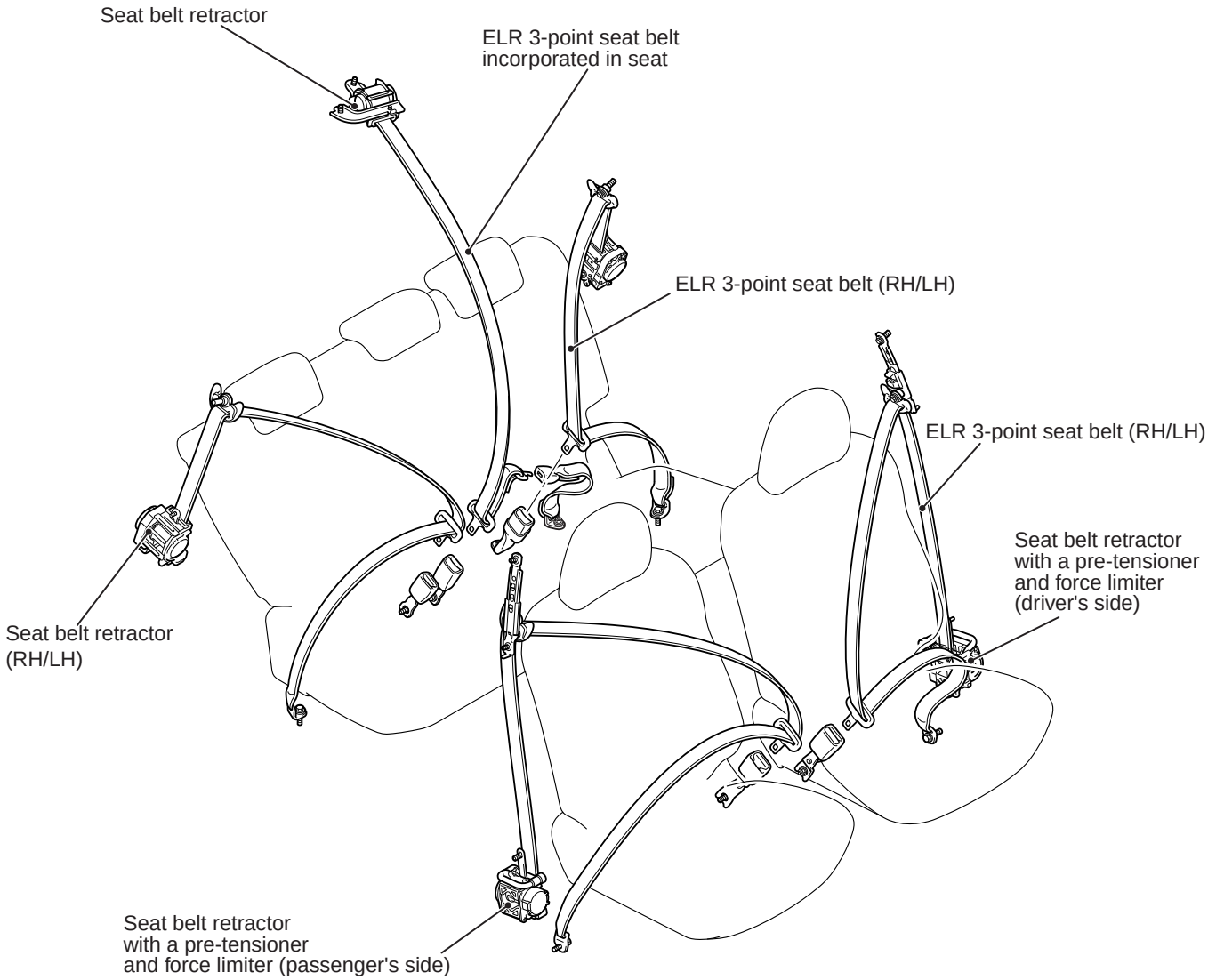
7.1. Safety-belts/buckles and restraint systems (as regards L category: L6/L7)

7.1.1. Security of safety-belts/buckles mounting

M6160100100026







ACC04516AB

The seat belts offer the following features:

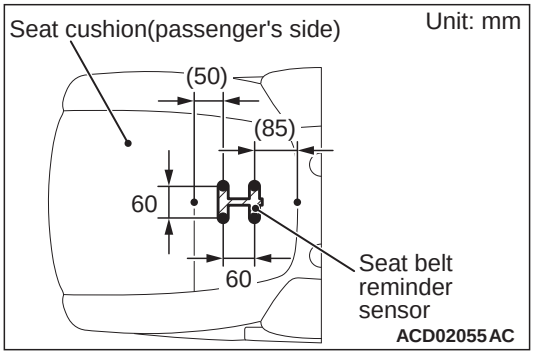
<Front seat belt>

- The 3-point seat belt with ELR has been adopted together with a pre-tensioner and force limiter.
- A seat belt warning lamp has been included on the combination meter to encourage the driver to fasten the seat belt when the belt is not connected.
- A seat belt warning lamp has been included on the centre panel to encourage the passenger to fasten the seat belt when the belt is not connected.

<Second seat belt>

- 3-point seat belt with ELR has been installed.
- The seat belt tongue can be inserted into the buckle easily as the self-standing buckles are used for all seating positions.

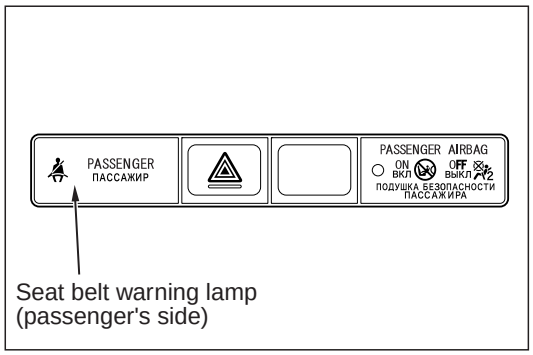
SEAT BELT REMINDER SENSOR <PASSENGER'S SIDE>

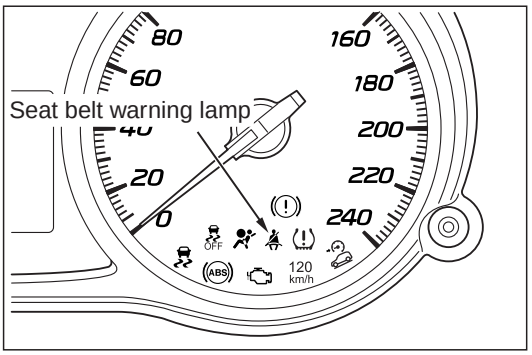


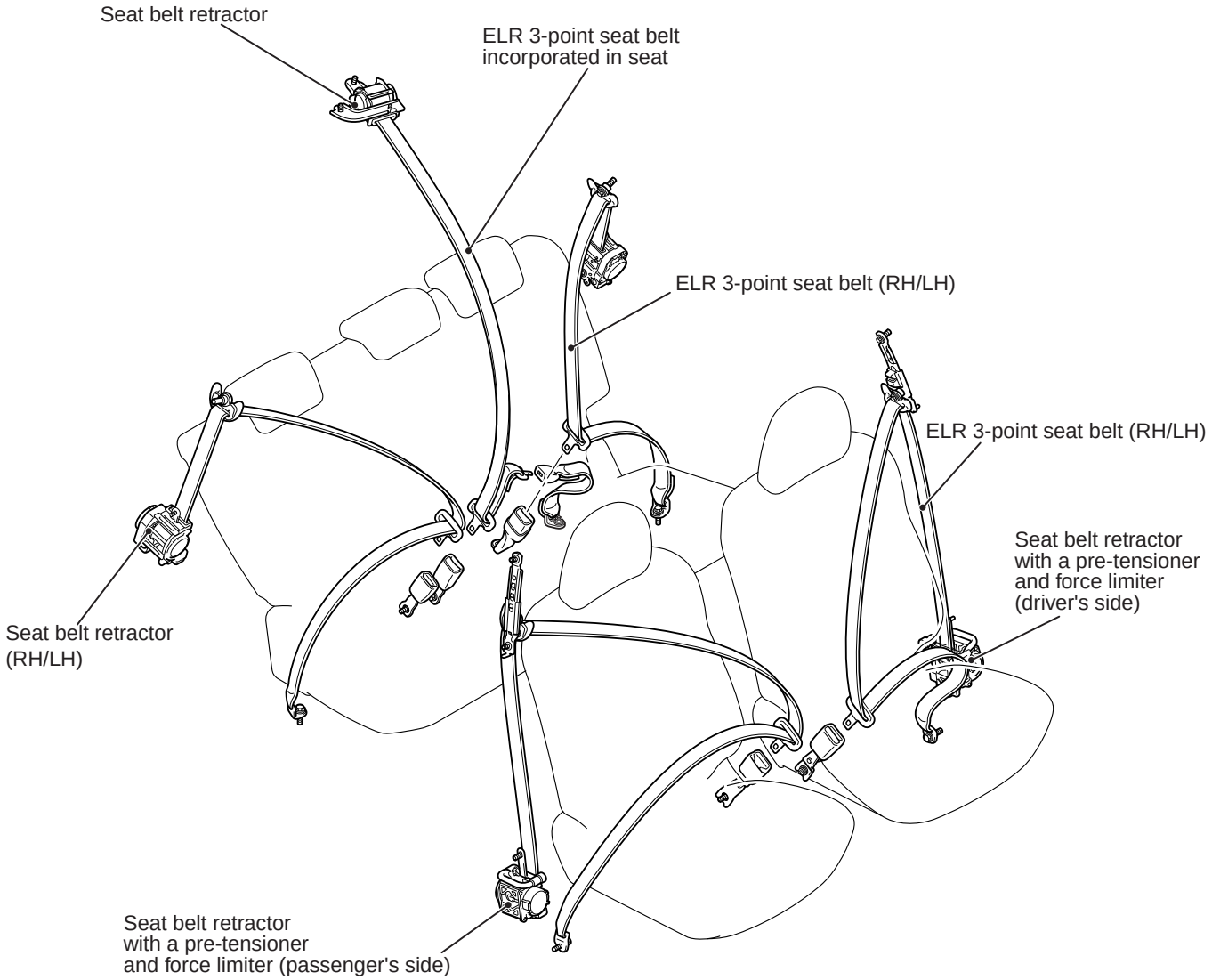
A seat belt reminder sensor is embedded in the front passenger's seat cushion. This sensor detects whether the front passenger is seated or not. If the passenger is seated without fastening the seat belt, the system will issue a warning to fasten the seat belt.Four electrodes of the sensor are located at each corner on a thin plastic film.The system will determine that the passenger is seated if any of the sensor electrodes are closed due to a load. If the seat belt is not fastened, the system will activate the warning lamp and the buzzer.If the vehicle is driven without fastening the seat belt, the warning lamp and the buzzer will be activated for approx. 90 seconds to warn the passenger to fasten the seat belt.

7.1.2. Condition of safety-belts/buckles.

M6160100200023







ACC04516AB

The seat belts offer the following features:

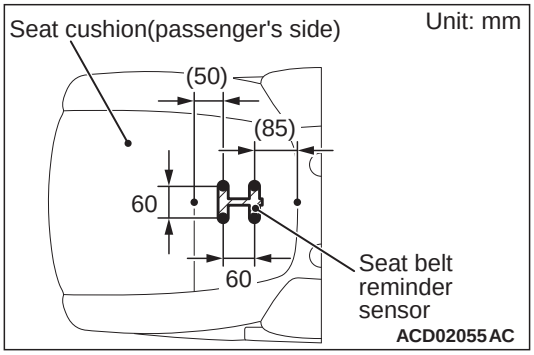
<Front seat belt>

- The 3-point seat belt with ELR has been adopted together with a pre-tensioner and force limiter.
- A seat belt warning lamp has been included on the combination meter to encourage the driver to fasten the seat belt when the belt is not connected.
- A seat belt warning lamp has been included on the centre panel to encourage the passenger to fasten the seat belt when the belt is not connected.

<Second seat belt>

- 3-point seat belt with ELR has been installed.
- The seat belt tongue can be inserted into the buckle easily as the self-standing buckles are used for all seating positions.

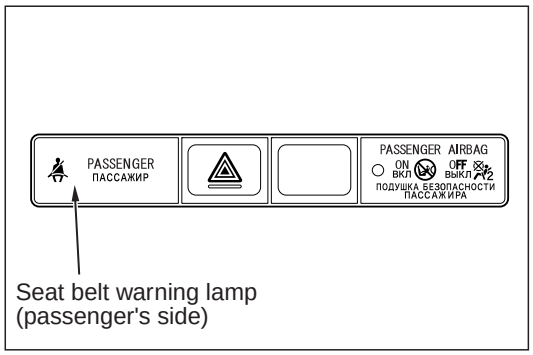
SEAT BELT REMINDER SENSOR <PASSENGER'S SIDE>

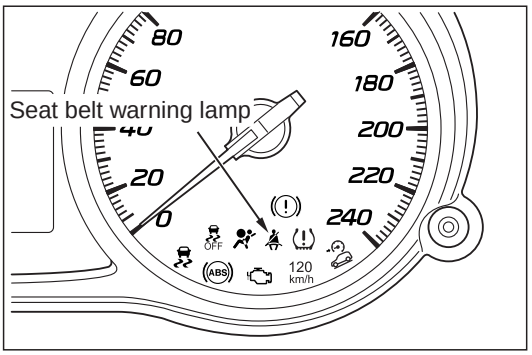


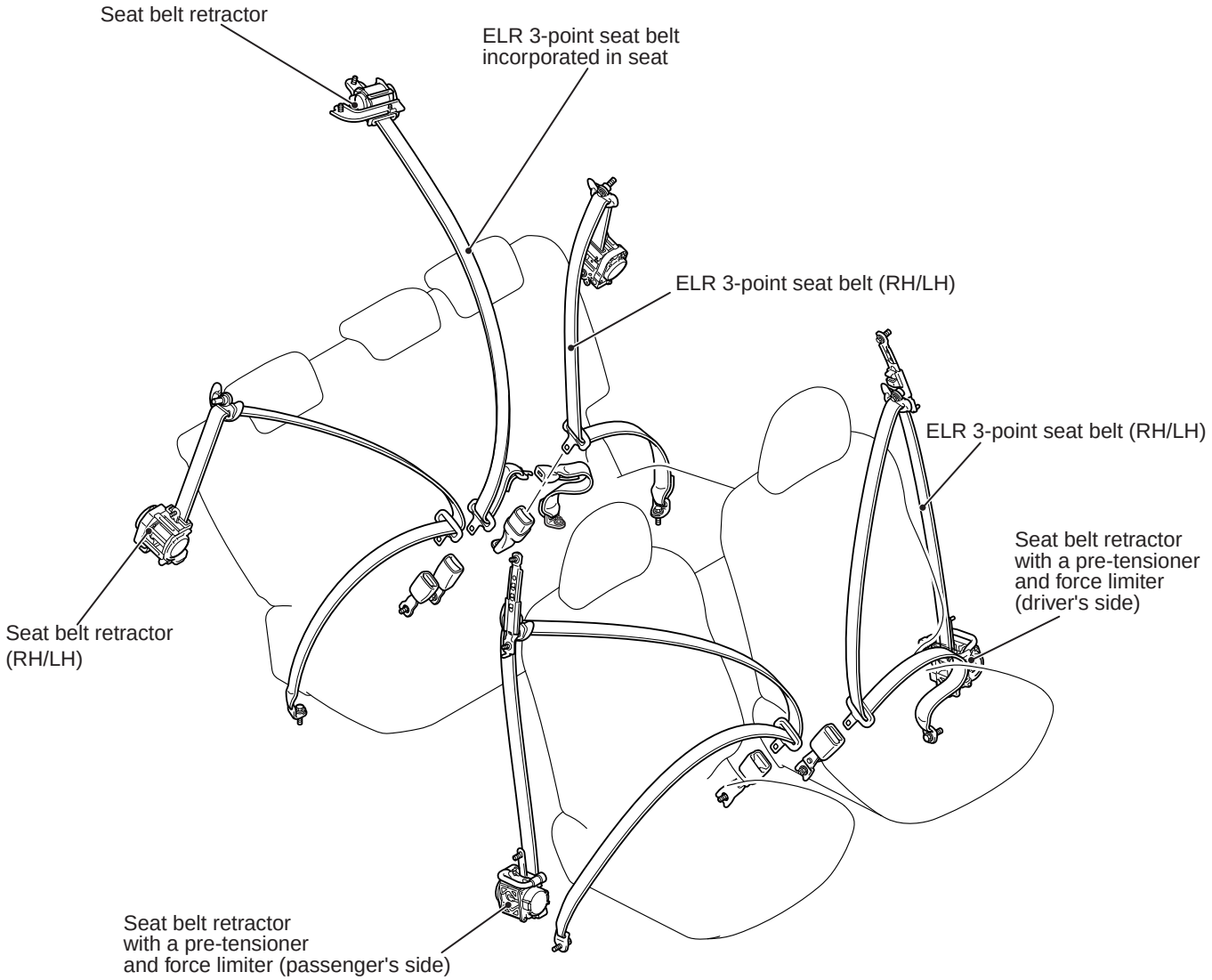
A seat belt reminder sensor is embedded in the front passenger's seat cushion. This sensor detects whether the front passenger is seated or not. If the passenger is seated without fastening the seat belt, the system will issue a warning to fasten the seat belt.Four electrodes of the sensor are located at each corner on a thin plastic film.The system will determine that the passenger is seated if any of the sensor electrodes are closed due to a load. If the seat belt is not fastened, the system will activate the warning lamp and the buzzer.If the vehicle is driven without fastening the seat belt, the warning lamp and the buzzer will be activated for approx. 90 seconds to warn the passenger to fasten the seat belt.

7.1.3. Safety belt load limiter

M6160100300020







ACC04516AB

The seat belts offer the following features:

<Front seat belt>

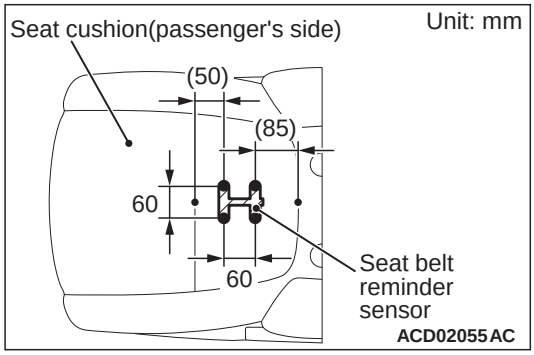
- The 3-point seat belt with ELR has been adopted together with a pre-tensioner and force limiter.
- A seat belt warning lamp has been included on the combination meter to encourage the driver to fasten the seat belt when the belt is not connected.

- A seat belt warning lamp has been included on the centre panel to encourage the passenger to fasten the seat belt when the belt is not connected.

<Second seat belt>

- 3-point seat belt with ELR has been installed.
- The seat belt tongue can be inserted into the buckle easily as the self-standing buckles are used for all seating positions.

SEAT BELT REMINDER SENSOR <PASSENGER'S SIDE>



A seat belt reminder sensor is embedded in the front passenger's seat cushion. This sensor detects whether the front passenger is seated or not. If the passenger is seated without fastening the seat belt, the system will issue a warning to fasten the seat belt.Four electrodes of the sensor are located at each corner on a thin plastic film.The system will determine that the passenger is seated if any of the sensor electrodes are closed due to a load. If the seat belt is not fastened, the system will activate the warning lamp and the buzzer.If the vehicle is driven without fastening the seat belt, the warning lamp and the buzzer will be activated for approx. 90 seconds to warn the passenger to fasten the seat belt.

7.1.4. Safety belt Pre-tensioners

M6160100400027

- To provide a better safety upon impact, the driver's and front passenger's air bags have been installed to all vehicles as standard. Furthermore, the driver's SRS knee airbag, the SRS side airbags or the SRS curtain airbags have been installed as standard or optional equipment depending on model type.
- The SRS* air bag is a system that is effective with the seat belt fastened, and it is designed as a supplemental system of the seat belt.
- The driver's and front passenger's SRS air bag are activated when an impact exceeding the threshold is applied upon a frontal collision, and the cushion air bag is instantaneously inflated to protect the head and chest areas of the front seat passengers.
- The passenger's air bag cut off switch which can enable and disable the passenger's (front) air bag has been equipped in the instrument panel of passenger's side.
- The driver's knee air bag is activated when an impact exceeds the threshold upon a frontal collision, and the cushion air bag is instantaneously inflated for better protection of the driver.
- The side-airbag is activated when an impact exceeds the threshold upon a side collision, and the cushion air bag is instantaneously inflated to protect the chest area of the front seat passengers.
- The curtain air bag is activated simultaneously with the side-airbag upon a side collision to protect the heads of the front seat and second seat passengers.
- For the inflator, the gas which is harmless to the human body has been adopted.
- The seat belt pre-tensioner is activated simultaneously with the deployment of driver's and passenger's (front) air bags in case of a frontal collision. Seat belts are pulled in to eliminate the slack upon a collision, thus improving the initial occupant restraint, and reducing the travel distance of the occupants. For the passenger's seat, in addition to the seat belt pre-tensioner for the shoulder side, the lap pre-tensioner has been installed on the outer seat belt lower anchor side in order to improve the restraining performance around the waist in addition to the chest area.

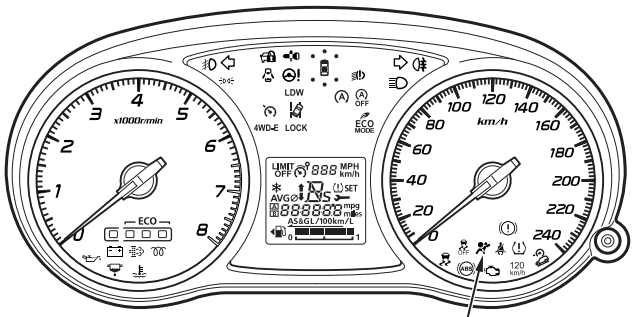
CONSTRUCTION DIAGRAM

⚠ CAUTION

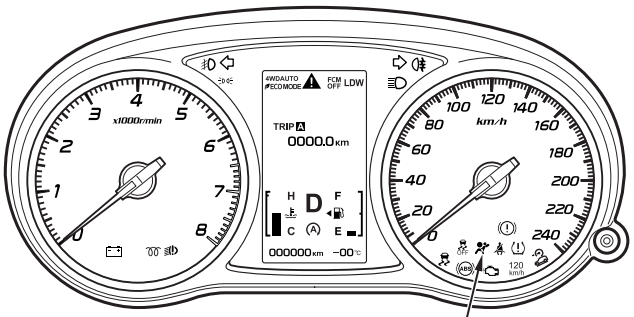
Do not disassemble the SRS air bag components or seat belt with pre-tensioner. Also, do not apply an impact.

*NOTE: *: SRS (Supplemental Restraint System)*

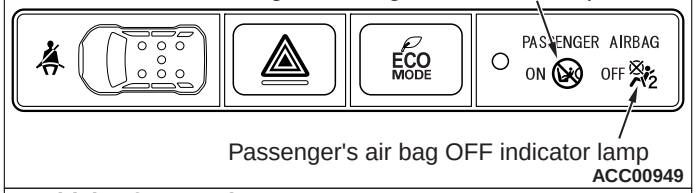
<Standard meter>



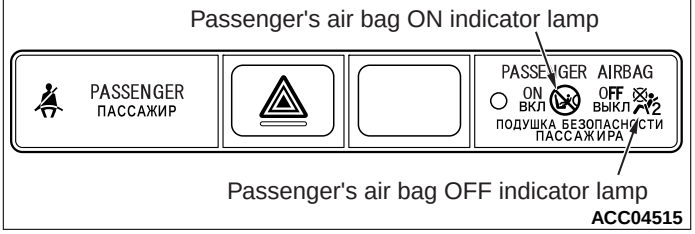
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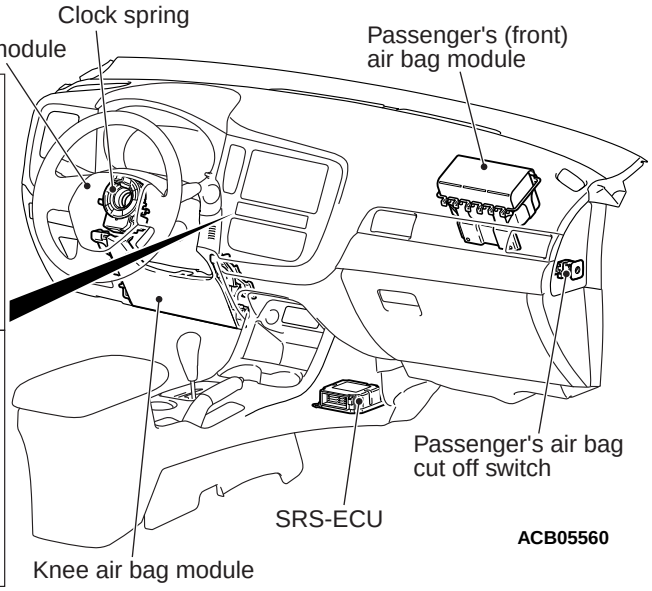


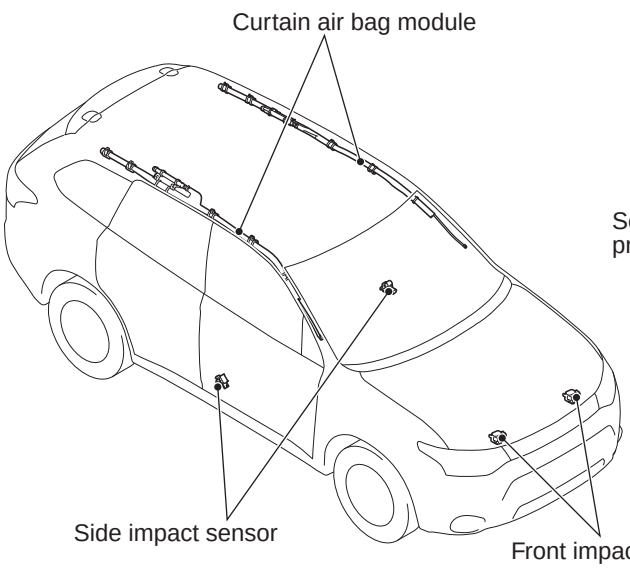
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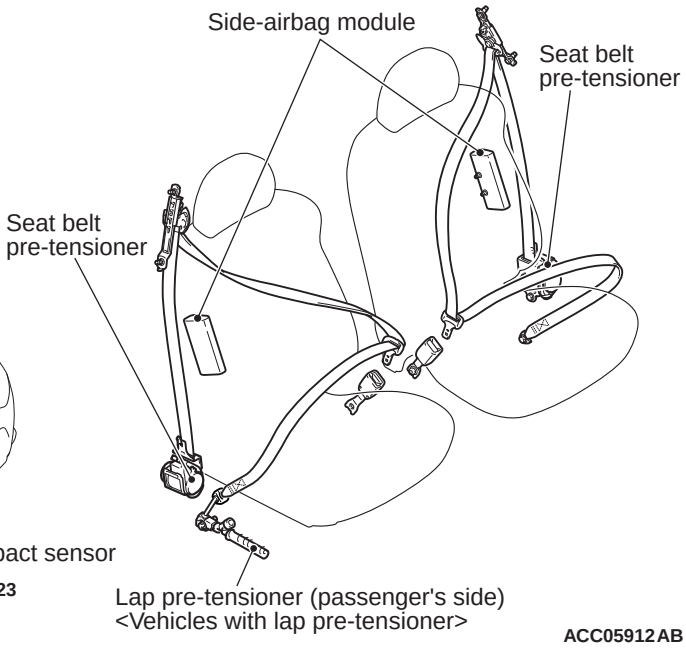


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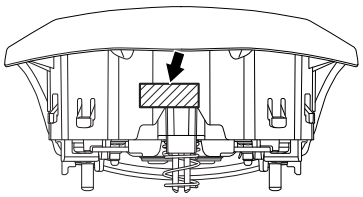




CAUTION LABELS

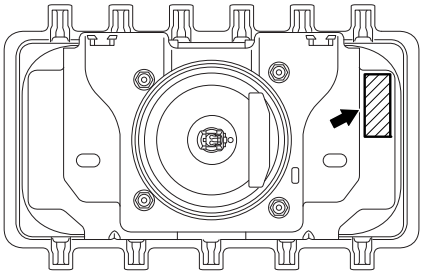
The labels indicating the precautions for handling and maintenance of SRS air bags and seat belt with pre-tensioner are attached to the locations shown in the figure. If the label is damaged or is dirty, replace with the new label.

Driver's air bag module



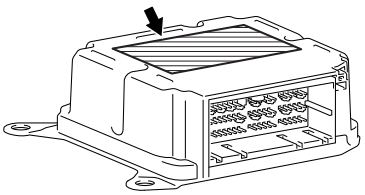
ACC02943

Passenger's (front) air bag module



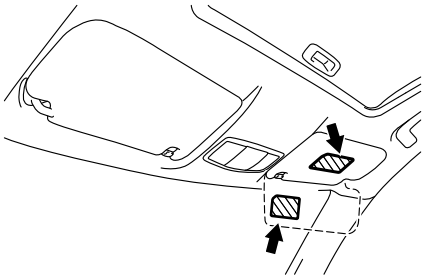
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SRS-ECU

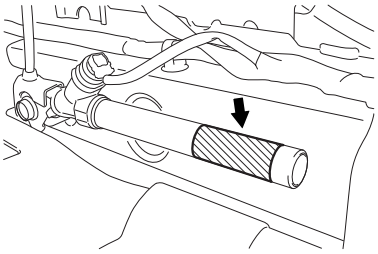


ACB05614

Sunvisor*

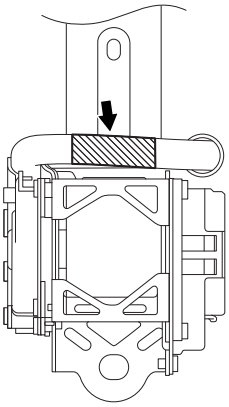


Lap pre-tensioner (right)



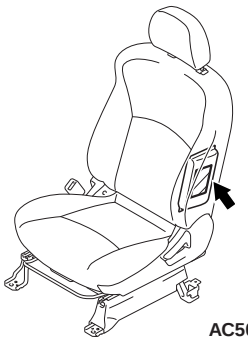
AC506233

Seat belt pre-tensioner (right and left)



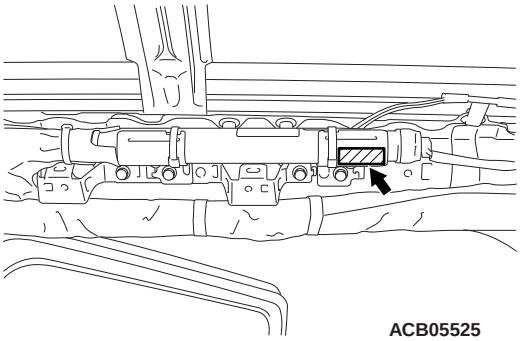
ACC00035

Side-airbag module (right and left)



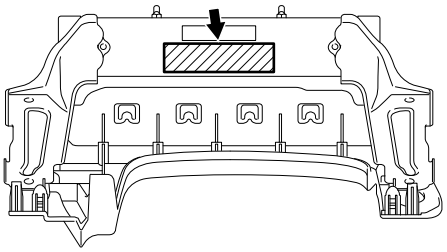
AC506241

Curtain air bag module (right and left)



ACB05525

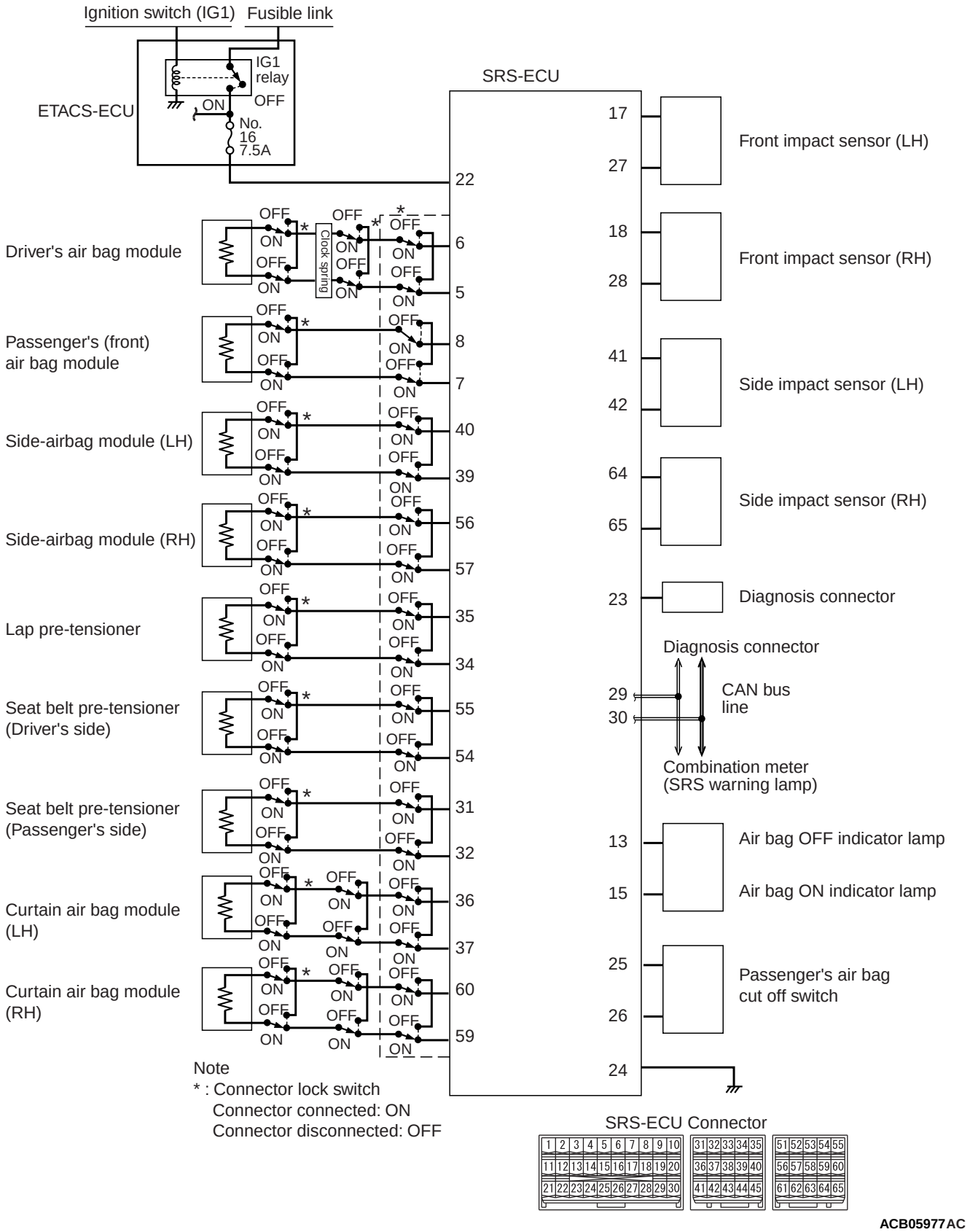
Knee air bag module



ACB05536

ACC07144AB

SRS SYSTEM CIRCUIT DIAGRAM



ACB05977AC

Number in system circuit diagram	Circuit name	Universal harness Wire size and colour
1	Driver’s knee air bag (squib) (-)	L
2	Driver’s knee air bag (squib) (+)	R
5	Driver's air bag squib (-)	GR
6	Driver's air bag squib (+)	W-B
7	Passenger's (front) air bag squib (+)	P
8	Passenger's (front) air bag squib (-)	LG
13	Passenger’s air bag OFF indicator lamp	V
15	Passenger's air bag ON indicator lamp	BR
17	Left-side front impact sensor (+)	W
18	Right-side front impact sensor (+)	G
22	Ignition switch (IG1) power supply (fuse No. 16)	Y
23	Diagnosis connector	B-W
24	Earth	B
25	Passenger's air bag cut off switch (-)	B-L
26	Passenger's air bag cut off switch (+)	GR-G
27	Left-side front impact sensor (-)	R
28	Right-side front impact sensor (-)	Y
29	CAN-C_L	L
30	CAN-C_H	G
31	Passenger's seat belt pre-tensioner squib (+)	W-B
32	Passenger's seat belt pre-tensioner squib (-)	B-W
34	Passenger's seat belt lap pre-tensioner squib (-)	G
35	Passenger's seat belt lap pre-tensioner squib (+)	R
36	Left-side curtain air bag squib (+)	Y
37	Left-side curtain air bag squib (-)	BR
39	Left-side side-airbag squib (-)	P
40	Left-side side-airbag squib (+)	V
41	Left-side side impact sensor (+)	W
42	Left-side side impact sensor (-)	B
54	Driver's seat belt pre-tensioner squib (-)	Y
55	Driver's seat belt pre-tensioner squib (+)	BR
56	Right-side side-airbag squib (+)	L
57	Right-side side-airbag squib (-)	GR
59	Right-side curtain air bag squib (-)	G
60	Right-side curtain air bag squib (+)	R
64	Right-side side impact sensor (-)	P
65	Right-side side impact sensor (+)	V

NOTE: For how to read the harness wire diameter and wire colour, refer to the Electrical Wiring Diagram.

7.1.5. Airbag

M6160100500024

- To provide a better safety upon impact, the driver's and front passenger's air bags have been installed to all vehicles as standard. Furthermore, the driver's SRS knee airbag, the SRS side air-bags or the SRS curtain airbags have been installed as standard or optional equipment depending on model type.
- The SRS* air bag is a system that is effective with the seat belt fastened, and it is designed as a supplemental system of the seat belt.
- The driver's and front passenger's SRS air bag are activated when an impact exceeding the threshold is applied upon a frontal collision, and the cushion air bag is instantaneously inflated to protect the head and chest areas of the front seat passengers.
- The passenger’s air bag cut off switch which can enable and disable the passenger’s (front) air bag has been equipped in the instrument panel of passenger’s side.
- The driver's knee air bag is activated when an impact exceeds the threshold upon a frontal collision, and the cushion air bag is instantaneously inflated for better protection of the driver.
- The side-airbag is activated when an impact exceeds the threshold upon a side collision, and the cushion air bag is instantaneously inflated to protect the chest area of the front seat passengers.
- The curtain air bag is activated simultaneously with the side-airbag upon a side collision to protect the heads of the front seat and second seat passengers.
- For the inflator, the gas which is harmless to the human body has been adopted.
- The seat belt pre-tensioner is activated simultaneously with the deployment of driver's and passenger's (front) air bags in case of a frontal collision. Seat belts are pulled in to eliminate the slack upon a collision, thus improving the initial occupant restraint, and reducing the travel distance of the occupants. For the passenger's seat, in addition to the seat belt pre-tensioner for the shoulder side, the lap pre-tensioner has been installed on the outer seat belt lower anchor side in order to improve the restraining performance around the waist in addition to the chest area.

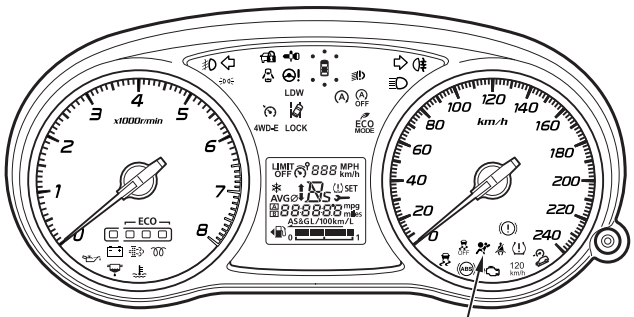
⚠ CAUTION

Do not disassemble the SRS air bag components or seat belt with pre-tensioner. Also, do not apply an impact.

*NOTE: *: SRS (Supplemental Restraint System)*

CONSTRUCTION DIAGRAM

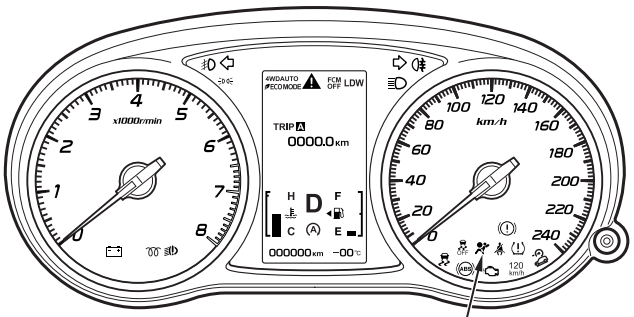
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SRS warning lamp

ACC00843

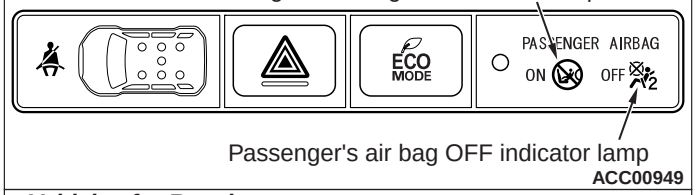
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SRS warning lamp

ACC00846

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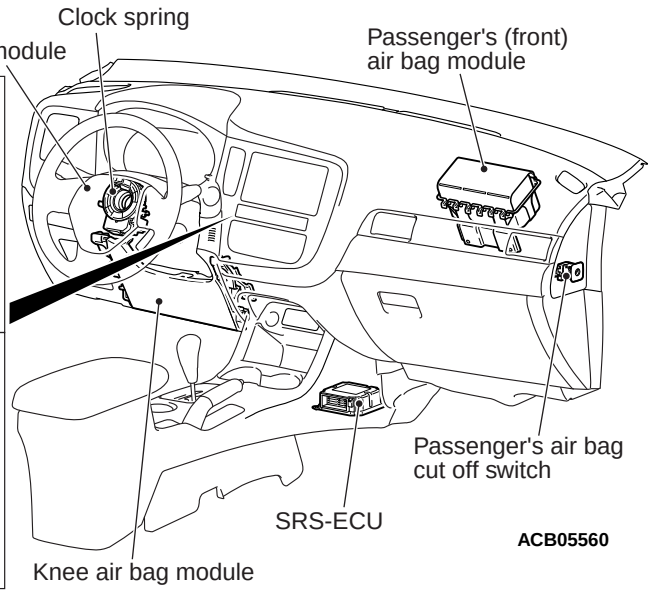


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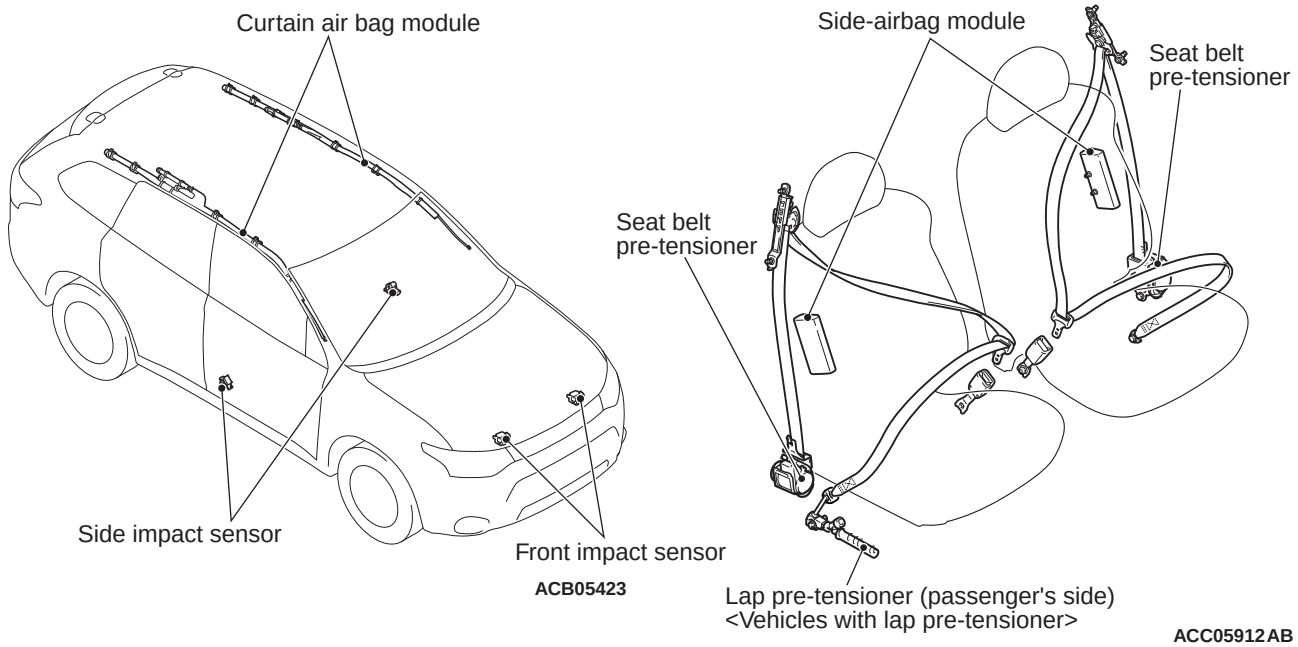
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ACC04515



ACB05560



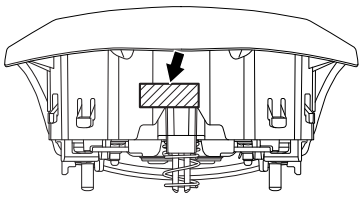
ACB05423

ACC05912AB

CAUTION LABELS

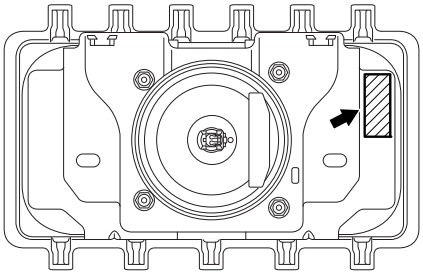
The labels indicating the precautions for handling and maintenance of SRS air bags and seat belt with pre-tensioner are attached to the locations shown in the figure. If the label is damaged or is dirty, replace with the new label.

Driver's air bag module



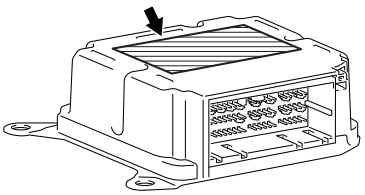
ACC02943

Passenger's (front) air bag module



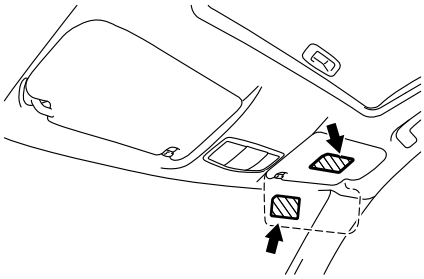
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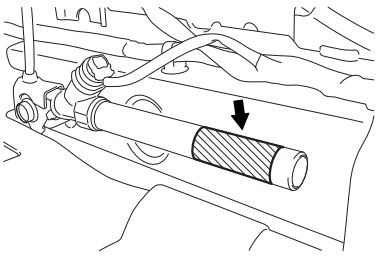


ACB05614

Sunvisor*

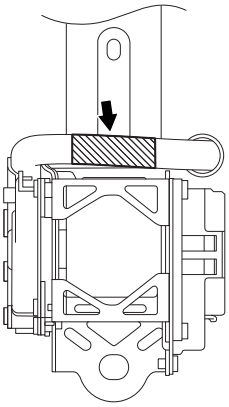


Lap pre-tensioner (right)



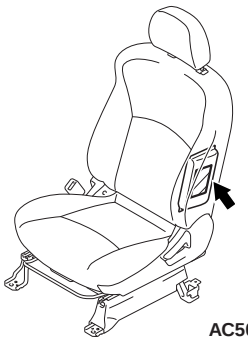
AC506233

Seat belt pre-tensioner (right and left)



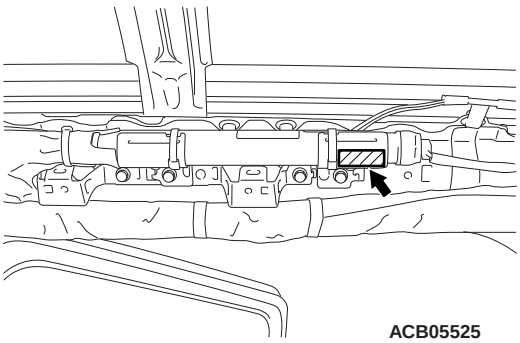
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Side-airbag module (right and left)



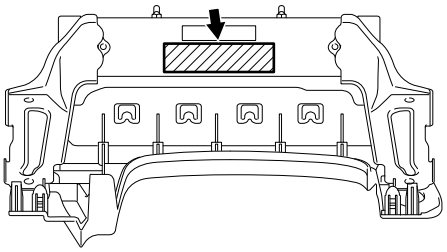
AC506241

Curtain air bag module (right and left)



ACB05525

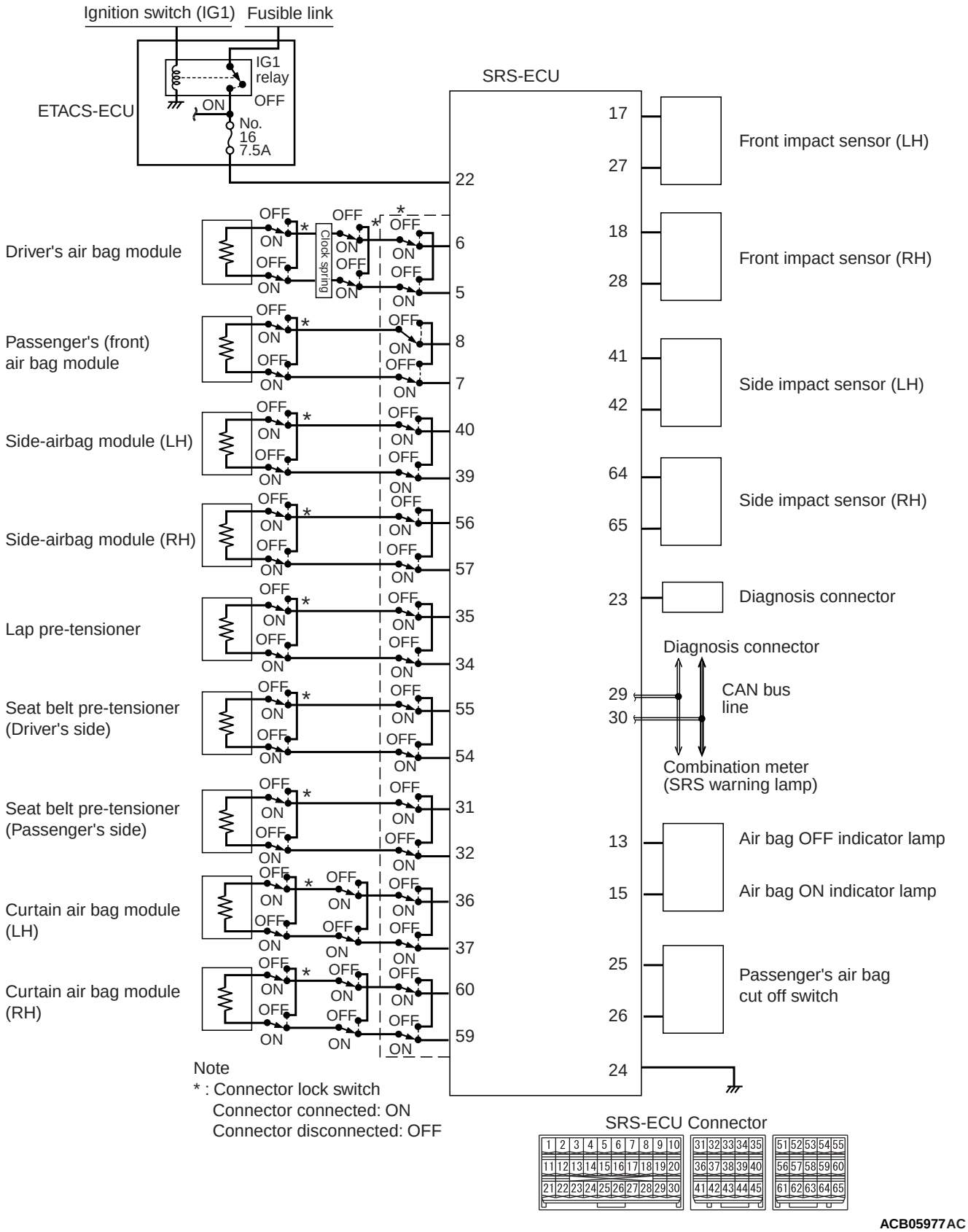
Knee air bag module



ACB05536

ACC07144AB

SRS SYSTEM CIRCUIT DIAGRAM



ACB05977AC

Number in system circuit diagram	Circuit name	Universal harness Wire size and colour
1	Driver’s knee air bag (squib) (-)	L
2	Driver’s knee air bag (squib) (+)	R
5	Driver's air bag squib (-)	GR
6	Driver's air bag squib (+)	W-B
7	Passenger's (front) air bag squib (+)	P
8	Passenger's (front) air bag squib (-)	LG
13	Passenger’s air bag OFF indicator lamp	V
15	Passenger's air bag ON indicator lamp	BR
17	Left-side front impact sensor (+)	W
18	Right-side front impact sensor (+)	G
22	Ignition switch (IG1) power supply (fuse No. 16)	Y
23	Diagnosis connector	B-W
24	Earth	B
25	Passenger's air bag cut off switch (-)	B-L
26	Passenger's air bag cut off switch (+)	GR-G
27	Left-side front impact sensor (-)	R
28	Right-side front impact sensor (-)	Y
29	CAN-C_L	L
30	CAN-C_H	G
31	Passenger's seat belt pre-tensioner squib (+)	W-B
32	Passenger's seat belt pre-tensioner squib (-)	B-W
34	Passenger's seat belt lap pre-tensioner squib (-)	G
35	Passenger's seat belt lap pre-tensioner squib (+)	R
36	Left-side curtain air bag squib (+)	Y
37	Left-side curtain air bag squib (-)	BR
39	Left-side side-airbag squib (-)	P
40	Left-side side-airbag squib (+)	V
41	Left-side side impact sensor (+)	W
42	Left-side side impact sensor (-)	B
54	Driver's seat belt pre-tensioner squib (-)	Y
55	Driver's seat belt pre-tensioner squib (+)	BR
56	Right-side side-airbag squib (+)	L
57	Right-side side-airbag squib (-)	GR
59	Right-side curtain air bag squib (-)	G
60	Right-side curtain air bag squib (+)	R
64	Right-side side impact sensor (-)	P
65	Right-side side impact sensor (+)	V

NOTE: For how to read the harness wire diameter and wire colour, refer to the Electrical Wiring Diagram.

7.1.6. SRS Systems

M6160100600021

- To provide a better safety upon impact, the driver's and front passenger's air bags have been installed to all vehicles as standard. Furthermore, the driver's SRS knee airbag, the SRS side air-bags or the SRS curtain airbags have been installed as standard or optional equipment depending on model type.
- The SRS* air bag is a system that is effective with the seat belt fastened, and it is designed as a supplemental system of the seat belt.
- The driver's and front passenger's SRS air bag are activated when an impact exceeding the threshold is applied upon a frontal collision, and the cushion air bag is instantaneously inflated to protect the head and chest areas of the front seat passengers.
- The passenger’s air bag cut off switch which can enable and disable the passenger’s (front) air bag has been equipped in the instrument panel of passenger’s side.
- The driver's knee air bag is activated when an impact exceeds the threshold upon a frontal collision, and the cushion air bag is instantaneously inflated for better protection of the driver.
- The side-airbag is activated when an impact exceeds the threshold upon a side collision, and the cushion air bag is instantaneously inflated to protect the chest area of the front seat passengers.
- The curtain air bag is activated simultaneously with the side-airbag upon a side collision to protect the heads of the front seat and second seat passengers.
- For the inflator, the gas which is harmless to the human body has been adopted.
- The seat belt pre-tensioner is activated simultaneously with the deployment of driver's and passenger's (front) air bags in case of a frontal collision. Seat belts are pulled in to eliminate the slack upon a collision, thus improving the initial occupant restraint, and reducing the travel distance of the occupants. For the passenger's seat, in addition to the seat belt pre-tensioner for the shoulder side, the lap pre-tensioner has been installed on the outer seat belt lower anchor side in order to improve the restraining performance around the waist in addition to the chest area.

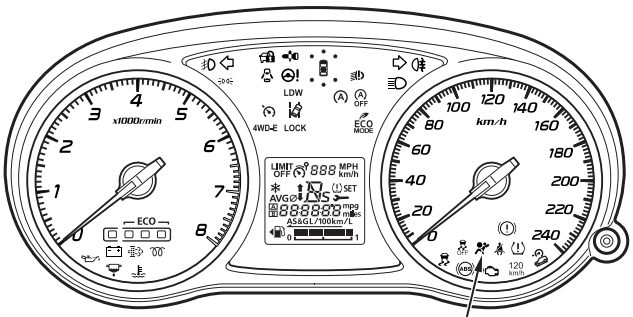
⚠ CAUTION

Do not disassemble the SRS air bag components or seat belt with pre-tensioner. Also, do not apply an impact.

*NOTE: *: SRS (Supplemental Restraint System)*

CONSTRUCTION DIAGRAM

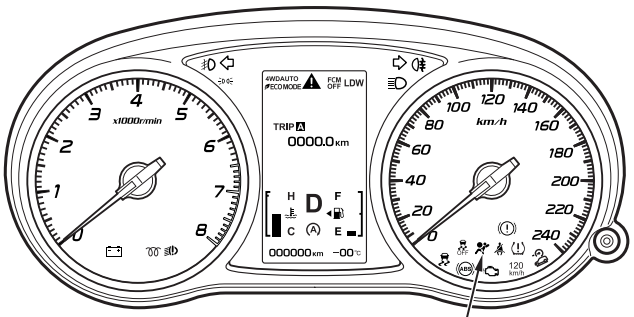
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SRS warning lamp

ACC00843

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SRS warning lamp

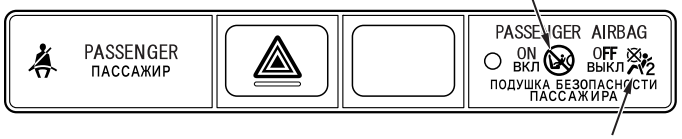
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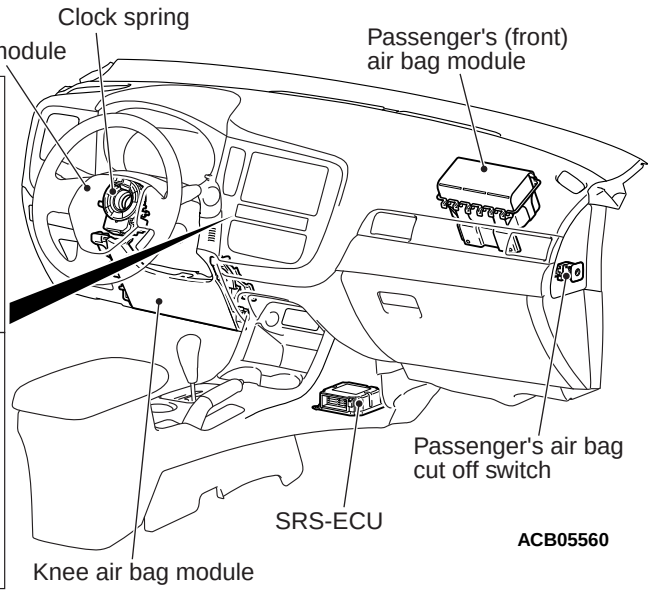


ACC00949

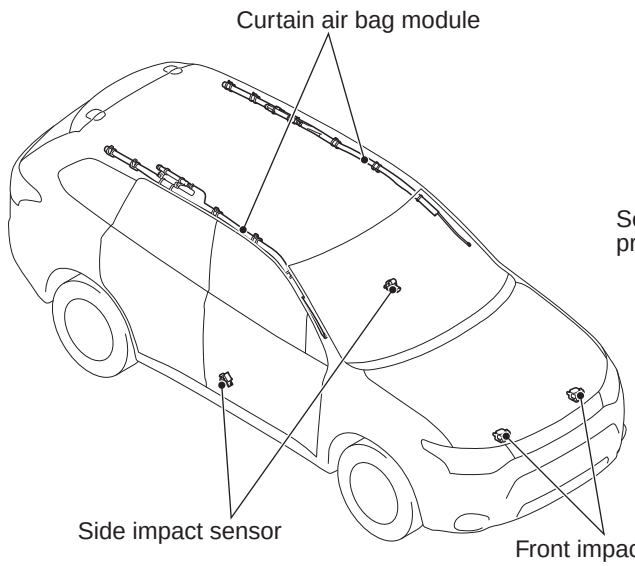
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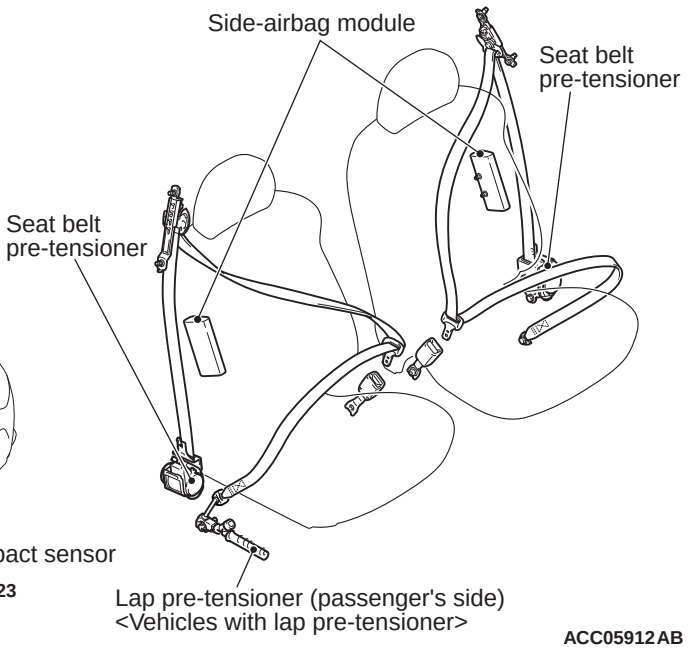
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ACB05560



ACB05423

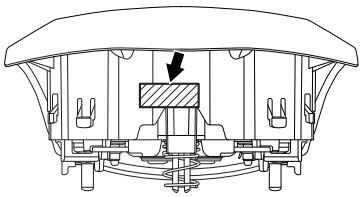


ACC05912AB

CAUTION LABELS

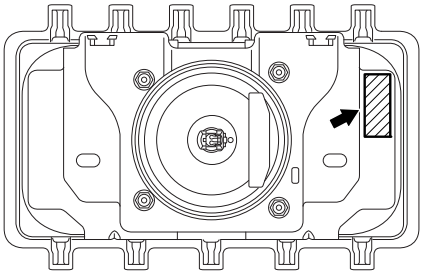
The labels indicating the precautions for handling and maintenance of SRS air bags and seat belt with pre-tensioner are attached to the locations shown in the figure. If the label is damaged or is dirty, replace with the new label.

Driver's air bag module



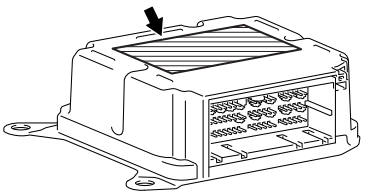
ACC02943

Passenger's (front) air bag module



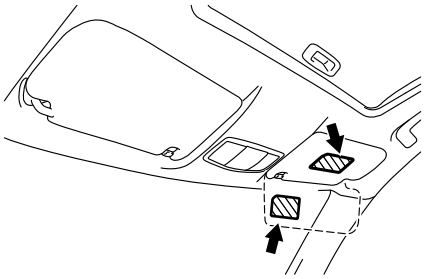
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SRS-ECU

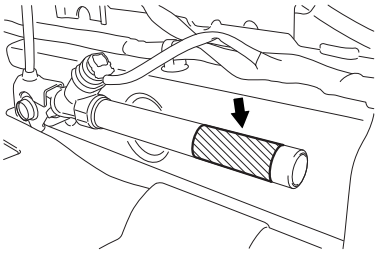


ACB05614

Sunvisor*

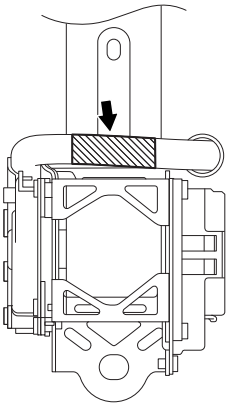


Lap pre-tensioner (right)



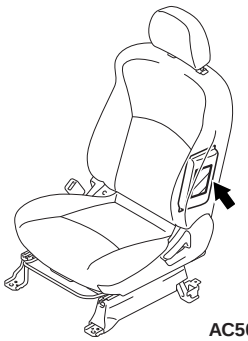
AC506233

Seat belt pre-tensioner (right and left)



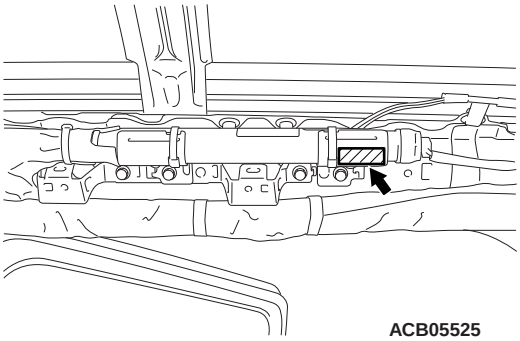
ACC00035

Side-airbag module (right and left)



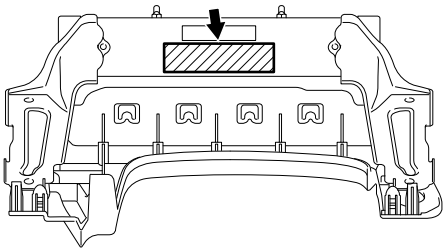
AC506241

Curtain air bag module (right and left)



ACB05525

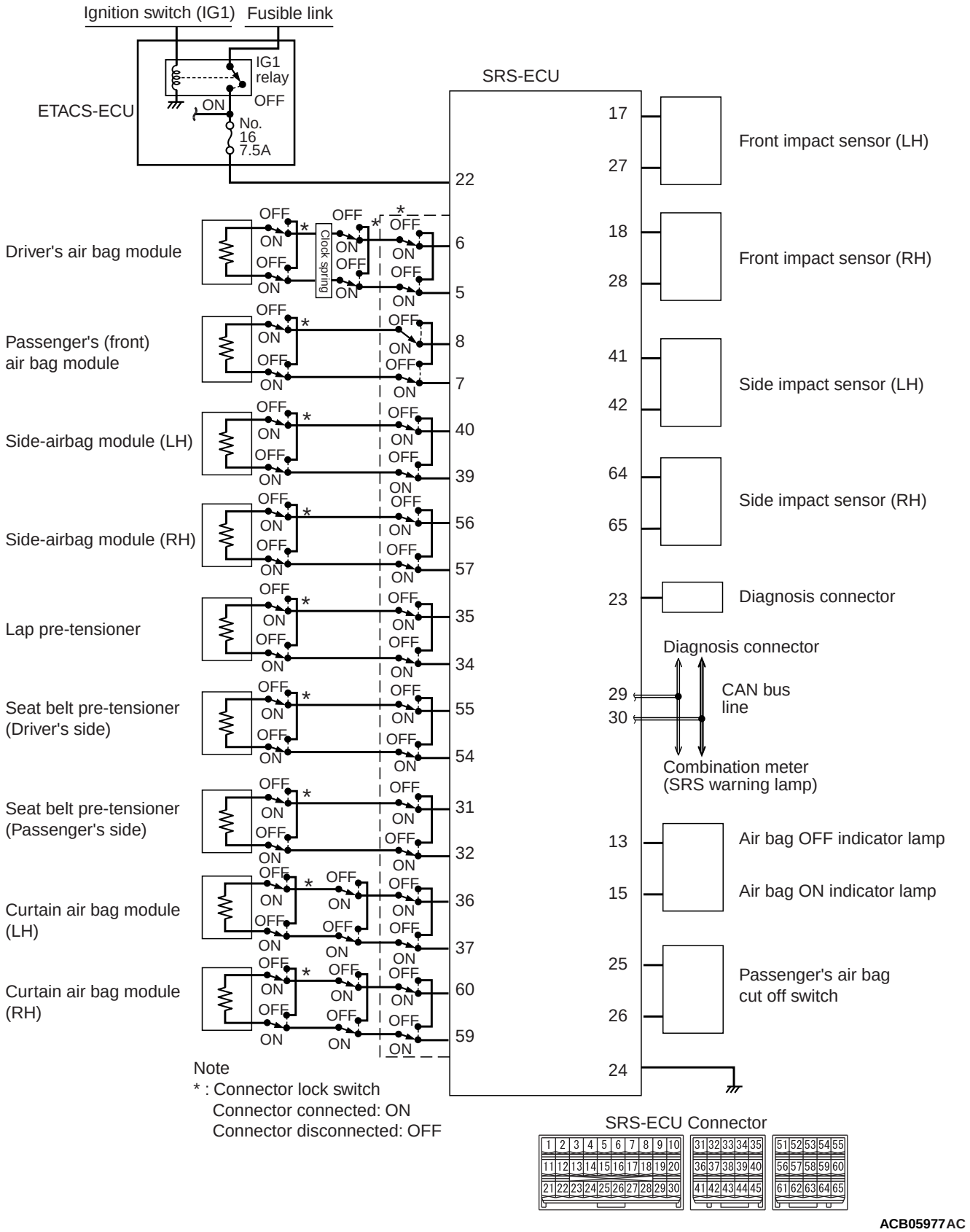
Knee air bag module



ACB05536

ACC07144AB

SRS SYSTEM CIRCUIT DIAGRAM



ACB05977AC

Number in system circuit diagram	Circuit name	Universal harness Wire size and colour
1	Driver’s knee air bag (squib) (-)	L
2	Driver’s knee air bag (squib) (+)	R
5	Driver's air bag squib (-)	GR
6	Driver's air bag squib (+)	W-B
7	Passenger's (front) air bag squib (+)	P
8	Passenger's (front) air bag squib (-)	LG
13	Passenger’s air bag OFF indicator lamp	V
15	Passenger's air bag ON indicator lamp	BR
17	Left-side front impact sensor (+)	W
18	Right-side front impact sensor (+)	G
22	Ignition switch (IG1) power supply (fuse No. 16)	Y
23	Diagnosis connector	B-W
24	Earth	B
25	Passenger's air bag cut off switch (-)	B-L
26	Passenger's air bag cut off switch (+)	GR-G
27	Left-side front impact sensor (-)	R
28	Right-side front impact sensor (-)	Y
29	CAN-C_L	L
30	CAN-C_H	G
31	Passenger's seat belt pre-tensioner squib (+)	W-B
32	Passenger's seat belt pre-tensioner squib (-)	B-W
34	Passenger's seat belt lap pre-tensioner squib (-)	G
35	Passenger's seat belt lap pre-tensioner squib (+)	R
36	Left-side curtain air bag squib (+)	Y
37	Left-side curtain air bag squib (-)	BR
39	Left-side side-airbag squib (-)	P
40	Left-side side-airbag squib (+)	V
41	Left-side side impact sensor (+)	W
42	Left-side side impact sensor (-)	B
54	Driver's seat belt pre-tensioner squib (-)	Y
55	Driver's seat belt pre-tensioner squib (+)	BR
56	Right-side side-airbag squib (+)	L
57	Right-side side-airbag squib (-)	GR
59	Right-side curtain air bag squib (-)	G
60	Right-side curtain air bag squib (+)	R
64	Right-side side impact sensor (-)	P
65	Right-side side impact sensor (+)	V

NOTE: For how to read the harness wire diameter and wire colour, refer to the Electrical Wiring Diagram.

7.2. Fire extinguisher (X)2

M6169200000045

"Not Applicable"

7.3. Locks and anti-theft device

M6169300000020

"Not Applicable"

7.4. Warning triangle (if required) (X)2

M6169400000027

"Not Applicable"

7.5. First aid kit. (if required) (X)2

M6169500000024

"Not Applicable"

7.6. Wheel chocks (wedges) (if required) (X)2

M6169600000021

"Not Applicable"

7.7. Audible warning device

M6169700000028

"Not Applicable"

7.8. Speedometer

M6169800000025

"Not Applicable"

7.9. Tachograph (if fitted/required)

M6169900000022

"Not Applicable"

7.10. Speed limitation device (if fitted/required)

M6161100000022

"Not Applicable"

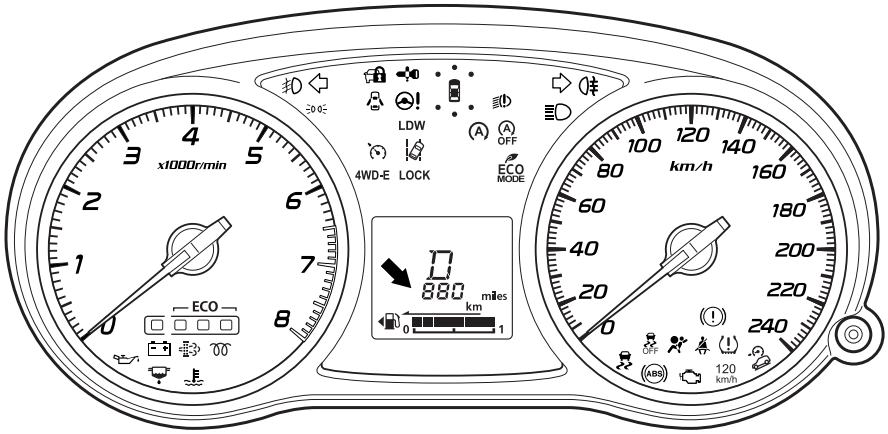
7.11 Odometer if available (X)2

M6160200000026

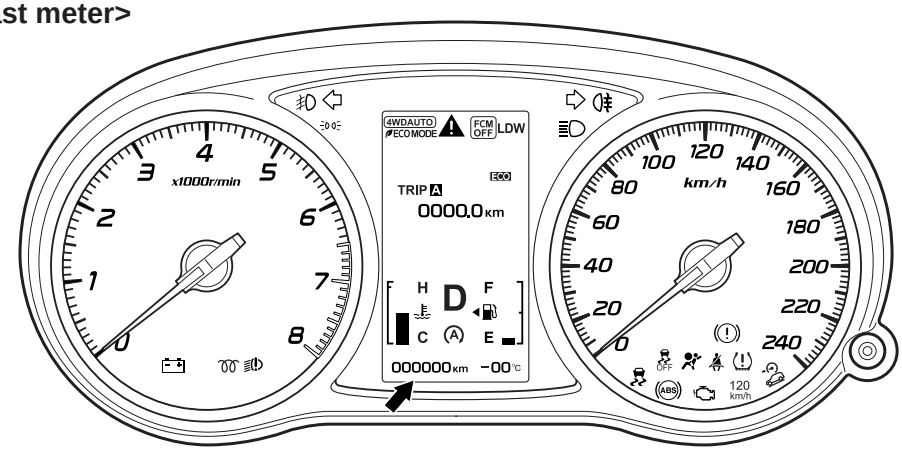
Visual Inspection

Check the odometer for displaying the total traveling distance of vehicle.

<Standard meter>



<High contrast meter>



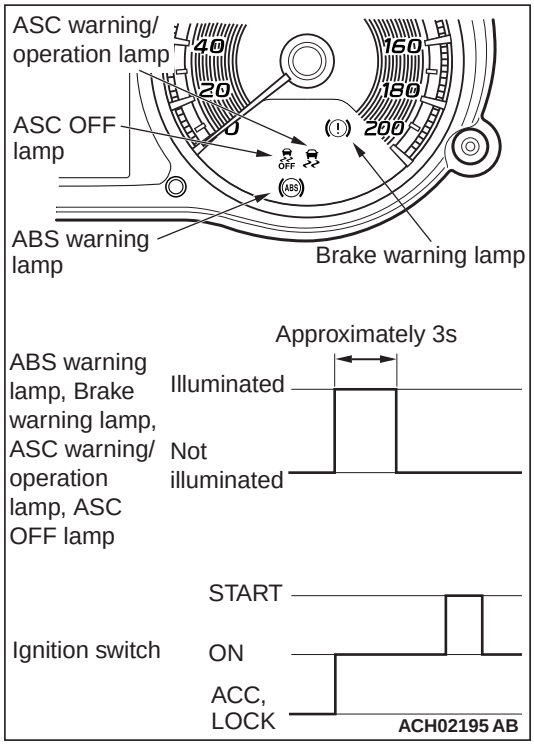
ACI01864AB

7.12 Electronic Stability Control (ESC) if fitted/required

M6161200000029

Check that ABS and brake warning lamps, ASC warning/operation lamp, brake auto hold indicator illuminate as follows.

NOTE: The brake warning lamp is used as a warning lamp for parking brake, brake fluid level, and EBD control.



1. When the ignition switch is turned to the ON position, ABS and brake warning lamps, ASC warning/operation lamp, ASC OFF lamp illuminate.
2. The ABS and brake warning lamps, ASC warning/ operation lamp, ASC OFF lamp illuminate for three seconds[*1] and then turn OFF[*2].
3. Otherwise, check the diagnosis code.

NOTE:

- *[*1]: The ABS warning lamp, ASC warning/operation lamp, ASC OFF lamp may stay ON until the vehicle speed reaches 10 km/h. As far as ASC-ECU sets any diagnosis code related to the wheel speed sensor malfunction or the motor malfunction as past trouble, ASC-ECU continues illuminating the ABS warning lamp until it verifies that the malfunction for that code is resolved (startup check).*

If the steering wheel sensor or the G and yaw rate sensor system was detected to be defective during ignition switch being ON at the last time, the ASC warning/operation lamp and the ASC OFF lamp will illuminate until the vehicle speed reaches approx. 10 km/h, then the steering wheel is turned to either right or left and then the ECU determines that the system is normal.

- *[*2]: The brake warning lamp does not turn OFF when the parking brake is applied or the brake fluid level is lowered.*

GROUP 8

NUISANCE

CONTENTS

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8.1. Noise

8.1.1 Noise suppression system

M6170100100027

“Query raised for this content”

8.2. Exhaust emissions

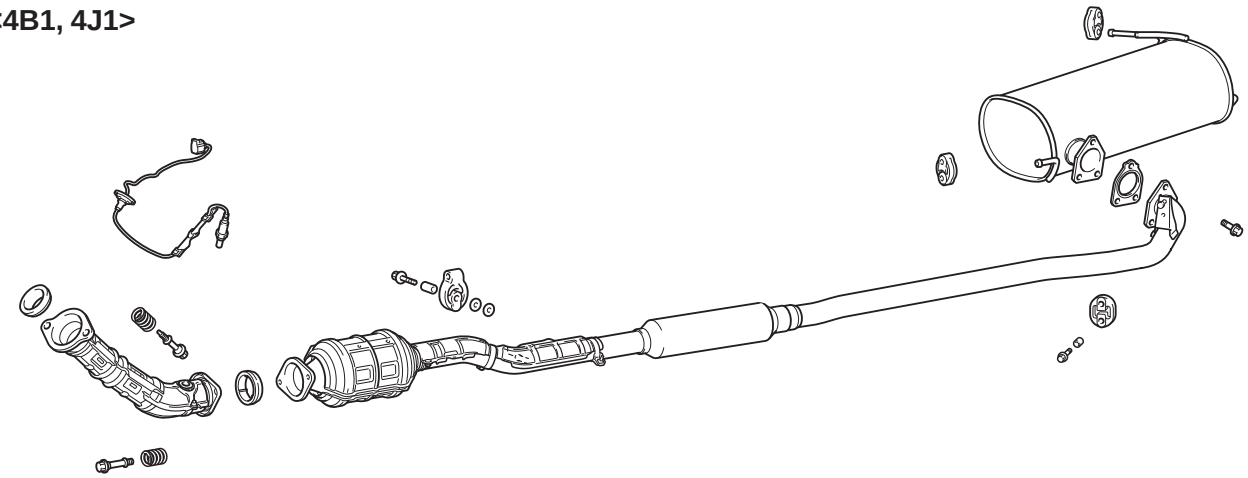
8.2.1 Positive ignition engine emissions

8.2.1.1 Exhaust emissions control equipment

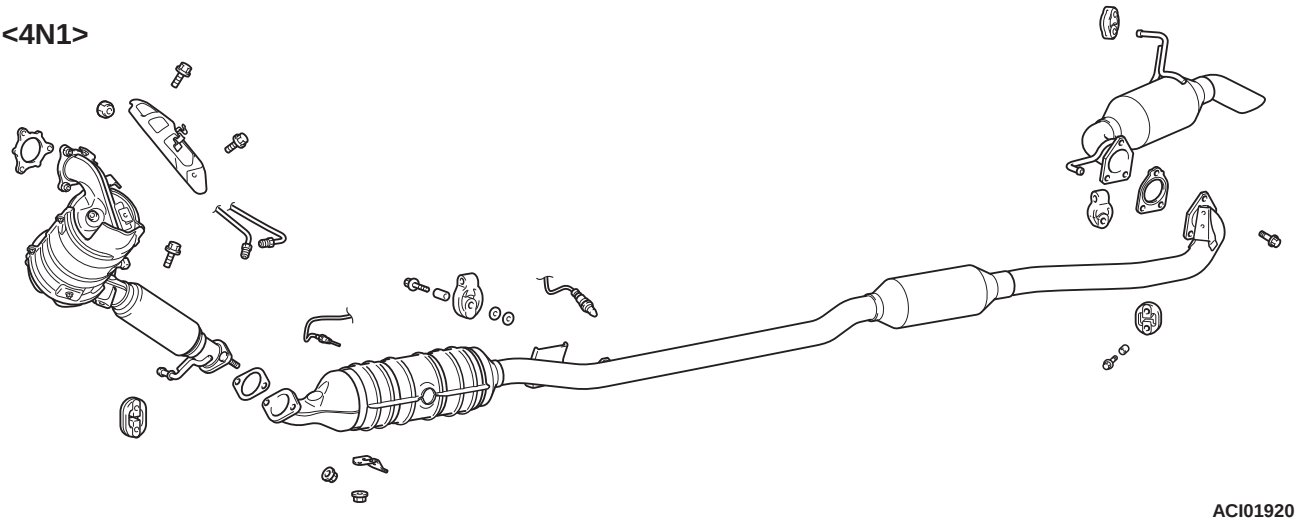
M6170200200043

CONSTRUCTION DIAGRAM

<4B1, 4J1>



<4N1>



ACI01920 AB

8.2.1.2 Gaseous emissions

M6170200300028

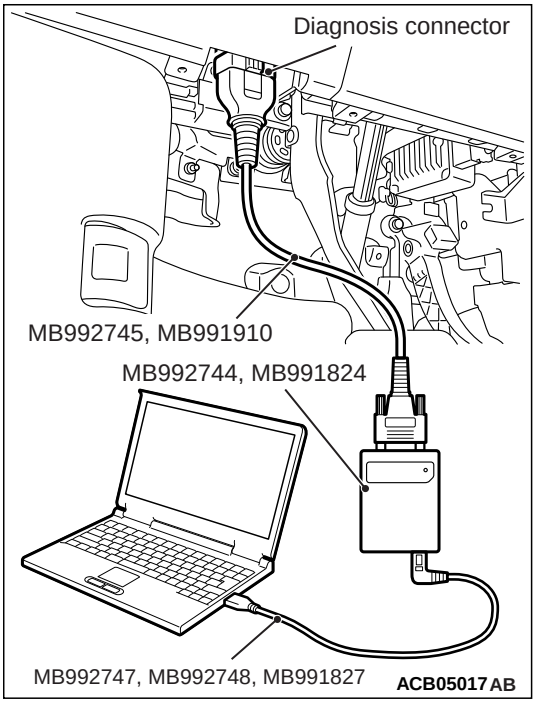
PRE-INSPECTION CONDITION

"Pre-inspection condition" refers to the condition that the vehicle must be in before proper engine inspection can be carried out. If you see the words "Set the vehicle to the pre-inspection condition". In this manual, it means to set the vehicle to the following condition.

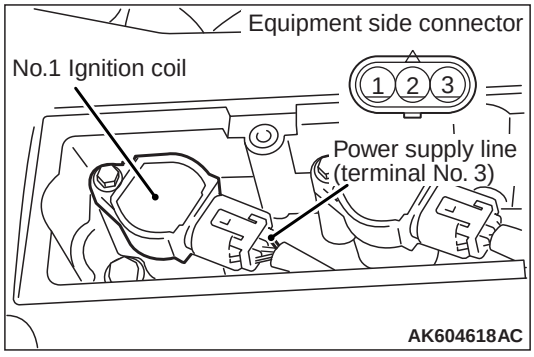
- Engine coolant temperature 80 to 90°C
- Lamps, electric cooling fan and all accessories: OFF
- M/T: Neutral
- CVT: P range

IDLE MIXTURE CHECK

<4B1>



1. Before inspection, set the vehicle to the pre-inspection condition.
2. Turn the ignition switch to "LOCK" (OFF) position.
3. Connect the M.U.T.-III to the diagnosis connector.



4. Set the timing light to the power supply line (terminal No. 3) of the ignition coil No. 1.
5. Start the engine and let it run at idle.
6. Check that ignition timing is at the standard value.

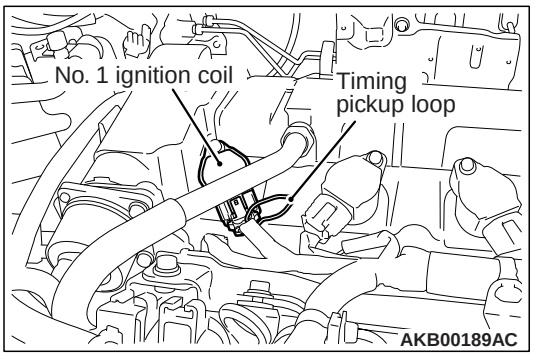
   Standard value: approximately 10° BTDC

   NOTE:
   - *The ignition timing may fluctuate within ±7°. This is normal.*
   - *In higher altitude, the ignition timing is more advanced than the standard value by approximately 5°.*
   - *Wait till approximately 1 minute passes after the engine started, and check the ignition timing when the engine stabilized.*
7. Run the engine at 2,000 – 3,000 r/min for 2 minutes.
8. Set the CO, HC tester.
9. Check the CO contents and the HC contents at idle.

   Standard value
   CO contents: 0.3 % or less
   HC contents: 200 ppm or less
10. If there is a deviation from the standard value, inspect the MPI system.
11. Remove the HC, CO tester and timing light.
12. Turn the ignition switch to the "LOCK" (OFF) position and then disconnect the M.U.T-III.

<4J1>

1. Before inspection, set the vehicle to the pre-inspection condition.
2. Turn the ignition switch to the "LOCK" (OFF) position and then connect the M.U.T.-III to the diagnosis connector.



3. Set a timing light to the power supply line (terminal No. 3) of the ignition coil No. 1.

   NOTE: The power supply line is looped and also longer than the other ones.

4. Start the engine and let it run at idle.
5. Check that ignition timing is at the standard value.

   Standard value: approximately 10° BTDC

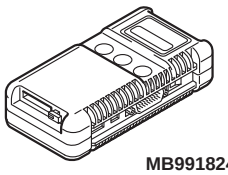
   NOTE:
   - *The ignition timing may fluctuate within ±7°. This is normal.*
   - *In higher altitude, the ignition timing is more advanced than the standard value by approximately 5°.*
   - *Wait till approximately 1 minute passes after the engine started, and check the ignition timing when the engine stabilized.*
6. Run the engine at 2,000 – 3,000 r/min for 2 minutes.
7. Set the CO, HC tester.
8. Check the CO contents and the HC contents at idle.

   Standard value
   CO contents: 0.3 % or less
   HC contents: 200 ppm or less
9. If there is a deviation from the standard value, inspect the MPI system
10. Remove the timing light and CO, HC tester.
11. Turn the ignition switch to "LOCK" (OFF) position and then disconnect the M.U.T.-III.

MULTI USE TESTER (M.U.T.-III) SUB ASSEMBLY

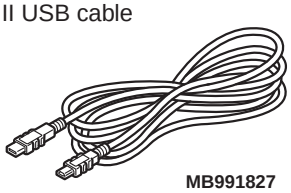
MULTI USE TESTER (M.U.T.-III) sub assembly

Vehicle communication interface (V.C.I.)



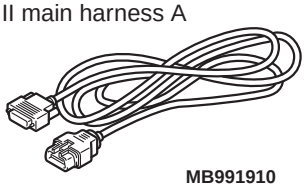
MB991824

M.U.T.-III USB cable



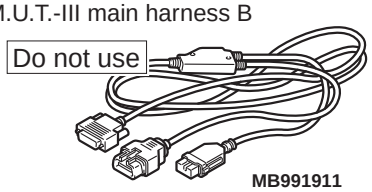
MB991827

M.U.T.-III main harness A



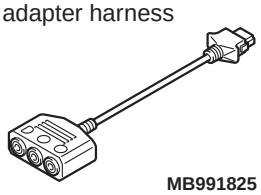
MB991910

M.U.T.-III main harness B



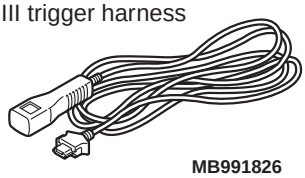
MB991911

M.U.T.-III adapter harness



MB991825

M.U.T.-III trigger harness



MB991826

AC305090AJ

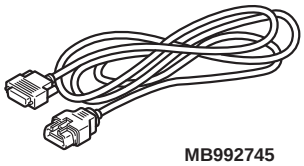
MULTI USE TESTER (M.U.T.-III)

Vehicle communication interface-Lite (V.C.I.-Lite)



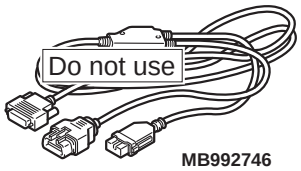
MB992744

V.C.I.-Lite main harness A



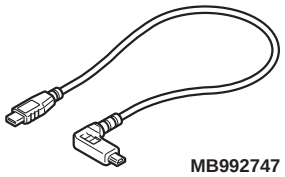
MB992745

V.C.I.-Lite main harness B



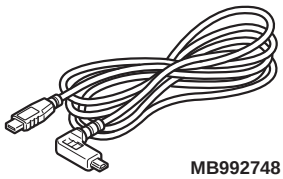
MB992746

V.C.I.-Lite USB cable short



MB992747

V.C.I.-Lite USB cable long



MB992748

ACB05419AB

- Both the special tool V.C.I. (MB991824) and the special tool V.C.I.-Lite (MB992744) can be used.

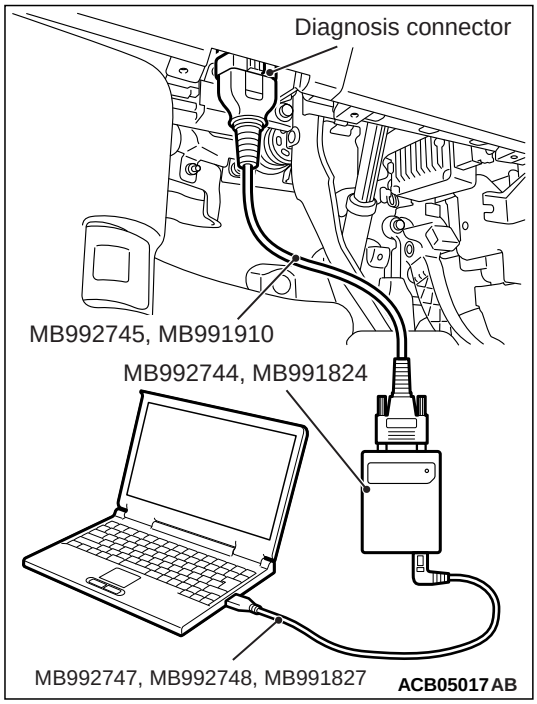
⚠ CAUTION

For the V.C.I., use MB991827 and MB991910. For the V.C.I.-Lite, use MB992745, MB992747 and MB992748.

- Refer to the "M.U.T.-III Owner's manual" for instructions on handling the M.U.T.-III.

⚠ CAUTION

Turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting the M.U.T.-III.



Connect the M.U.T.-III to the diagnosis connector as shown in the illustration.

8.2.2 Compression ignition engine emissions

8.2.2.1 Exhaust emission control equipment

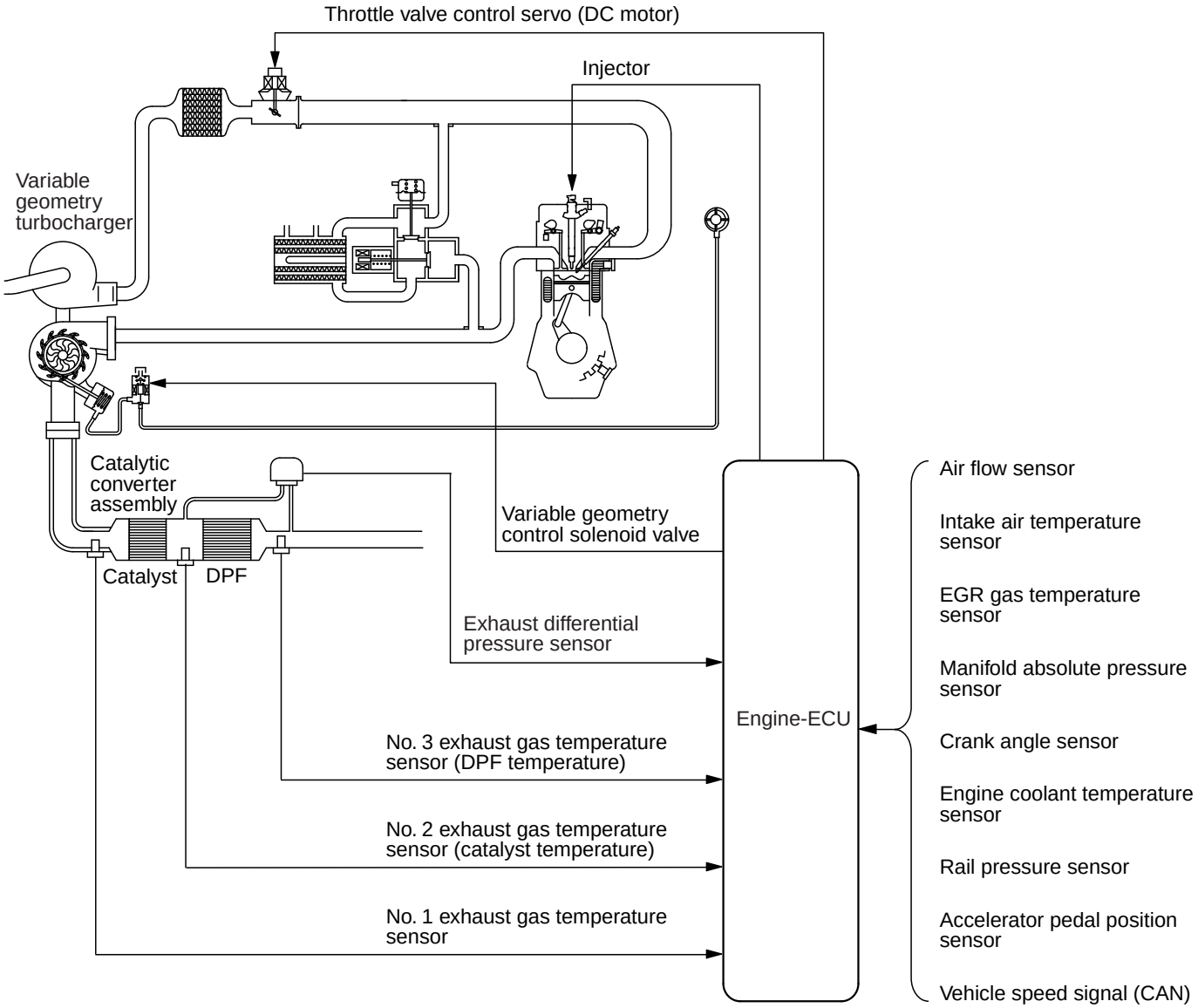
M6170201100027

GENERAL INFORMATION <DIESEL PARTICULATE FILTER SYSTEM>

The Diesel Particulate Filter (DPF) system is used to adsorb and remove the Particulate Matter (PM) contained in the exhaust gas. The engine-ECU anticipates the amount of PM accumulated in the DPF through the input signal from each sensor.

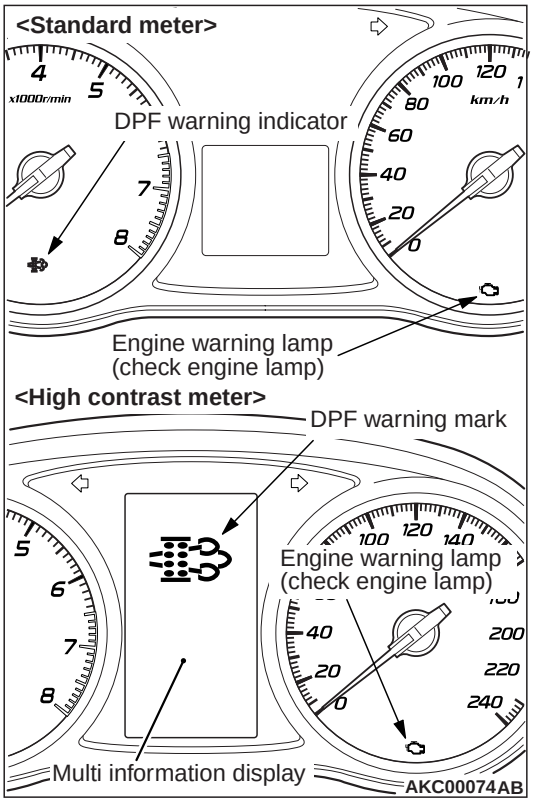
If the PM accumulates more than the standard, the engine-ECU carries out the control that automatically regenerates the DPF under certain conditions to remove the PM. At the DPF regeneration, the DPF temperature gets high and high temperature exhaust gases are given off.

SYSTEM DIAGRAM



AKC00073AB

DPF WARNING SIGNAL



When the anticipated PM accumulation becomes larger in amount and reaches the specified level, the engine-ECU encourages the driver to drive under the driving conditions required for the DPF regeneration by showing the DPF warning mark on the multi information display <High contrast meter> or illuminating the DPF warning indicator <Standard meter>. When the PM accumulated in the DPF reaches its clogged or damaged level, the engine-ECU warns the driver that the vehicle must be brought to the workshop by showing the DPF warning mark in the multi information display <High contrast meter> or illuminating the DPF warning indicator <Standard meter> and illuminating the engine warning lamp. When the vehicle is brought into the shop with the DPF warning mark shown, service the vehicle in accordance with the following procedures.

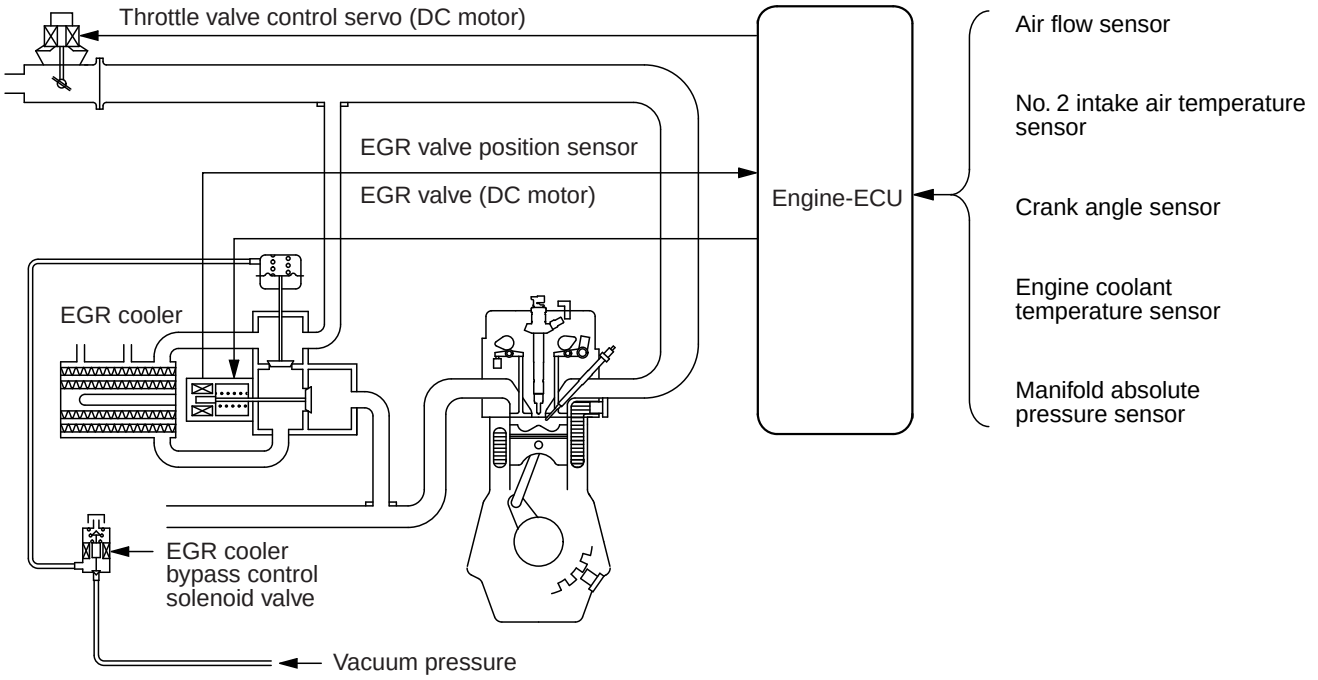
DPF warning mark or DPF indicator	Engine warning lamp	State and service
Shown/Illuminate	Being lit	The engine-ECU estimates that the PM will excessively be accumulated in the DPF. At that time, the engine-ECU should store the diagnosis codes (P1498 and P2463). Carry out the troubleshooting regarding the stored diagnosis codes. *NOTE: The diagnosis code P2463 should be stored if the engine-ECU estimates that the PM will more excessively be accumulated after the P1498 is stored and the PM will reach the level where the DPF cannot be regenerated.*
Shown/Illuminate	Not being lit	The status is that the driver is advised to drive the vehicle under the driving conditions in which the DPF automatic regeneration can be carried out because it is assumed that the PM is accumulated more than the specified value in the DPF. In this case, the DPF regeneration must be carried out using one of the following two methods: • After the engine warm-up, the vehicle must be driven at more than 40 km/h until the DPF warning mark is extinguished. The driving time is approximately 20 minutes. It is all right that the vehicle or the engine stops during the driving. • Using the MUT-III, the forcible DPF regeneration must be carried out.

<EGR SYSTEM>

The electronically controlled EGR system consists of an EGR valve, engine-ECU and sensors.
The EGR valve aims at reducing the amount of NOx (nitric oxide) discharge that increases with the rise in the exhaust gas temperature. Also, the EGR cooler bypass system is employed. By blocking the exhaust gas flow not to pass through the EGR cooler at the engine cold state, HC (hydrocarbon) emissions are reduced. Thus, the engine-ECU optimally controls the exhaust gas temperature in accordance with the operating conditions of the engine.

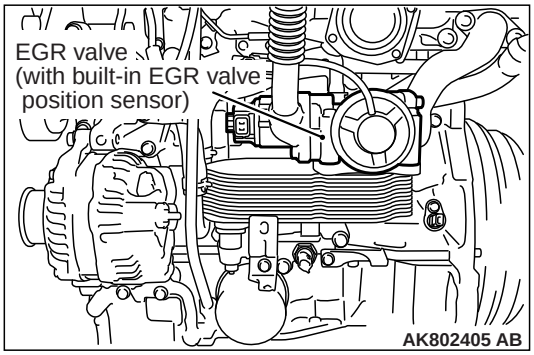
To further improve the exhaust gas reduction performance, the system provides the engine-ECU feedback on the EGR valve opening. Thus, it effects EGR control to optimize the operating conditions of the engine.

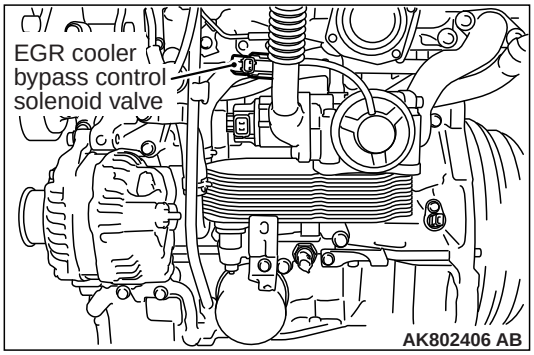
SYSTEM DIAGRAM

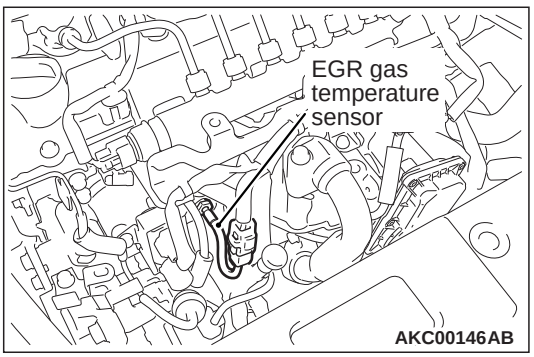


AKC00070AB

COMPONENT LOCATION







8.2.2.2 Opacity

M6170201200024

PRE-INSPECTION CONDITION

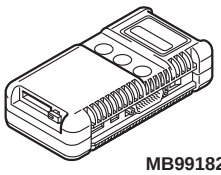
"Pre-inspection condition" refers to the condition that the vehicle must be in before proper engine inspection can be carried out. If you see the words "Set the vehicle to the pre-inspection condition". In this manual, it means to set the vehicle to the following condition.

- Engine coolant temperature 80 to 90°C
- Lamps, electric cooling fan and all accessories: OFF
- M/T: Neutral
- CVT: P range

MULTI USE TESTER (M.U.T.-III) SUB ASSEMBLY

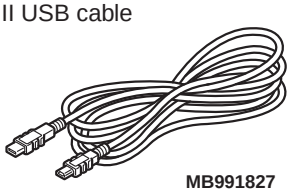
MULTI USE TESTER (M.U.T.-III) sub assembly

Vehicle communication interface (V.C.I.)



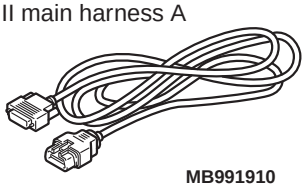
MB991824

M.U.T.-III USB cable



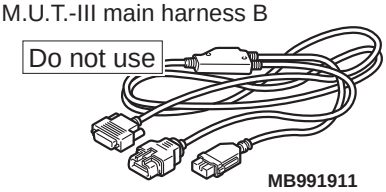
MB991827

M.U.T.-III main harness A



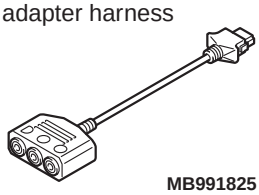
MB991910

M.U.T.-III main harness B



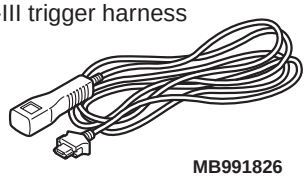
MB991911

M.U.T.-III adapter harness



MB991825

M.U.T.-III trigger harness



MB991826

AC305090AJ

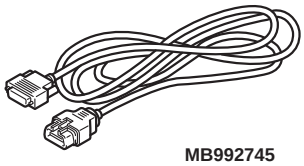
MULTI USE TESTER (M.U.T.-III)

Vehicle communication interface-Lite (V.C.I.-Lite)



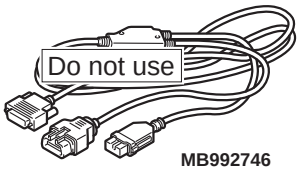
MB992744

V.C.I.-Lite main harness A



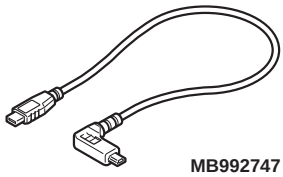
MB992745

V.C.I.-Lite main harness B



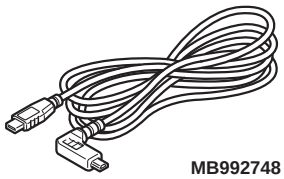
MB992746

V.C.I.-Lite USB cable short



MB992747

V.C.I.-Lite USB cable long



MB992748

ACB05419AB

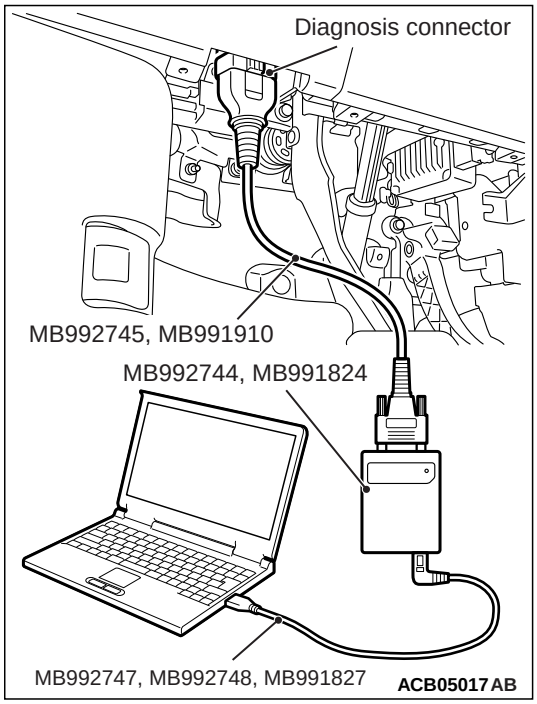
- Both the special tool V.C.I. (MB991824) and the special tool V.C.I.-Lite (MB992744) can be used.

⚠ CAUTION

For the V.C.I., use MB991827 and MB991910. For the V.C.I.-Lite, use MB992745, MB992747 and MB992748.

- Refer to the "M.U.T.-III Owner's manual" for instructions on handling the M.U.T.-III.

⚠ CAUTION
Turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting the M.U.T.-III.



Connect the M.U.T.-III to the diagnosis connector as shown in the illustration.

8.3. Electromagnetic interference suppression

M6170300000035

"Not Applicable"

8.4. Other items related to the environment

8.4.1. Fluid leaks

M6170400100028

"Not Applicable"

GROUP 9

SUPPLEMENTARY TESTS FOR PASSENGER-CARRYING VEHICLES CATEGORIES M2, M3

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9.1. Doors

9.1.1. Entrance and exit doors

M6180100100028

"Not Applicable"

9.1.2. Emergency exits

M6180100200025

"Not Applicable"

9.2. Demisting and defrosting system (X)2

M6180200000028

"Not Applicable"

9.3. Ventilation & heating system (X)2

M6180300000025

"Not Applicable"

9.4. Seats

9.4.1. Passenger seats (including seats for accompanying personnel)

M6180400100029

"Not Applicable"

9.4.2. Driver's seat (additional requirements)

M6180400200026

"Not Applicable"

9.5. Interior lighting and destination devices (X)2

M6180500000029

"Not Applicable"

9.6. Gangways, standing areas

M6180600000026

"Not Applicable"

9.7. Stairs and steps

M6180700000023

"Not Applicable"

9.8. Passenger communication system (X)2

M6180800000020

"Not Applicable"

9.9. Notices (X)2

M6180900000027

"Not Applicable"

9.10. Requirements regarding the transportation of children. (X)2

9.10.1. Doors

M6181000100024

"Not Applicable"

9.10.2. Signalling and special equipment

M6181000200021

"Not Applicable"

9.11. Requirements regarding the transportation of persons with reduced mobility (X)2

9.11.1. Doors, ramps and lifts

M6181100100021

"Not Applicable"

9.11.2. Wheelchair restraint system

M6181100200028

"Not Applicable"

9.11.3. Signalling and special equipment

M6181100300025

"Not Applicable"

9.12. Other special equipment (X)2

9.12.1. Installations for food preparation

M6181200100028

"Not Applicable"

9.12.2. Sanitary installation

M6181200200025

"Not Applicable"

9.12.3. Other devices (e.g. audio-visual systems)

M6181200300022

"Not Applicable"