

BODY ELECTRICAL

LIGHTING

■ DESCRIPTION

The new GS300 has the following systems:

System	Outline
Headlights	Four sculptured multi-reflector type headlights, in which the low-beam and high-beam lights are mounted separately, have been adopted on all models. Also, Discharge headlights have been adopted to the low-beam headlights as optional equipment. This headlights provides a high level of visibility. The basic construction and operation of Discharge headlights are the same as in the LS400.
Automatic Headlight Beam Level Control System	An automatic headlight beam level control system has been adopted, which automatically maintains the headlight beams at a constant level in relation to the vehicle posture that is detected by sensors. The basic construction and operation are the same as in the LS400.
Automatic Light Control System	Positioning the light control switch at AUTO turns the headlights and taillights on or off, depending on the light availability surrounding the vehicle, as detected by the automatic light control sensor. For details, see the next page.
Daytime Running Light System	This system is designed to automatically activate the headlights during the daytime.
Illuminated Entry System	This system is useful when entering the vehicle, fastening the seat belts and inserting the ignition key into the key cylinder in the dark. As in the previous model, when any of the doors is opened, the illuminated entry system turns on the illumination lights around the ignition key cylinder, dome light (only when the control switch is at DOOR position), footwell illuminations (for the driver and front passenger) simultaneously and fade out in about 15 seconds. Also, the control of this system is performed by the No. 2 body ECU.

■ AUTOMATIC LIGHT CONTROL SYSTEM

1. General

When the light control switch is at the AUTO position, the automatic light control sensor detects the ambient light and automatically turns the taillight and headlight on or off accordingly.

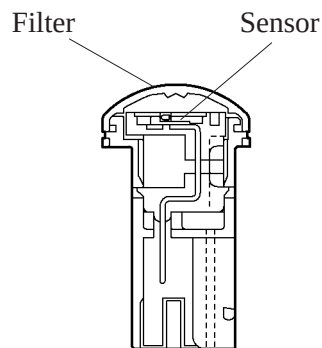
The automatic light control system of the new GS300 has the following features:

- The function for judging the light of the vehicle's surroundings and the function for controlling the taillight and headlight relays are enclosed in the No. 2 body ECU.
- A light sensitivity adjustment function, which is implemented by the customized body electronics system, has been provided.
- A control has been provided to reduce the instances in which the headlights are turned ON/OFF by this system.

2. Construction and Operation

Automatic Light Control Sensor

- The control function of the automatic light control system has been integrated in the No. 2 body ECU. Accordingly, the automatic light control sensor now consists only of the light sensor that detects the illuminance of the vehicle's surrounding light.
The light sensor is comprised of a photo diode which senses the available light, power source circuit and frequency output circuit.
- The brightness that is detected by this sensor is transmitted to the No. 2 body ECU in the form of signals based on the frequency output system.
- The sensitivity of this sensor can be adjusted to 5 stages by the customized body electronics system.



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► Specifications ◀

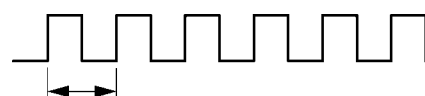
Destination Item		Europe*1		Australia G.C.C. Countries	
ON/OFF Delay Time for the Lights	OFF	Approx.	4 sec.	Taillight	Approx. 2.0 sec.
				Headlight	Approx. 4.0 sec.
	ON	Approx.	6 sec.	Taillight	Approx. 0.15 sec.
				Headlight	Approx. 1.0 sec.
			Approx. 0.25 sec.*2	Headlight	Approx. 0.25 sec.*2

*1: Headlights and taillights turn ON and OFF simultaneously.

*2: Control to turn ON the lights immediately when driving in a tunnel.

1) Frequency Output Circuit

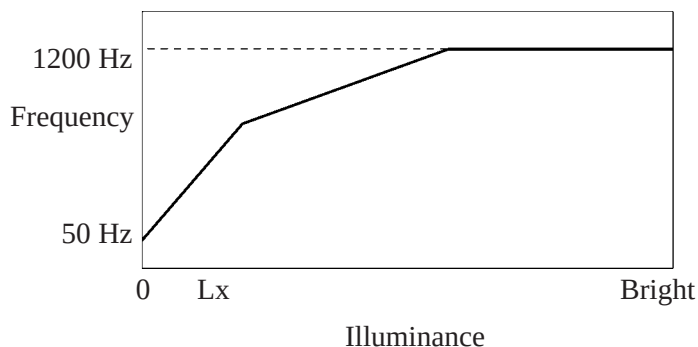
The frequency output circuit varies the frequency of the pulses that are output by the sensor in accordance with the illuminance that is detected by the automatic light control sensor.



Frequency Varies from 50 Hz
According to Illuminance

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Output Pulse



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Frequency Characteristics Diagram

No. 2 Body ECU

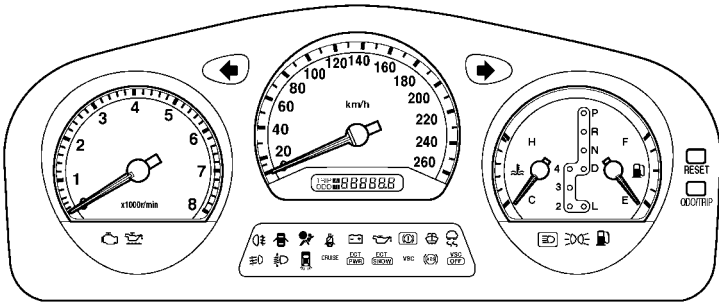
- The control functions of the automatic light control system, such as the function to judge the illuminance of the vehicle's surroundings and the function to control the taillight and headlight relays, are integrated in the No. 2 body ECU. Accordingly, the body ECU performs system control based on the illuminance signal that is sent by the automatic light control sensor.
- After the headlights are turned OFF, if the body ECU detects that the headlights are turned ON again within 10 seconds, the ECU changes the headlight OFF delay time from 4 seconds to 10 seconds. Accordingly, the ON/OFF operation of the headlights, which could occur while driving through a consecutive string of tunnels, can be minimized.

METER

■ COMBINATION METER

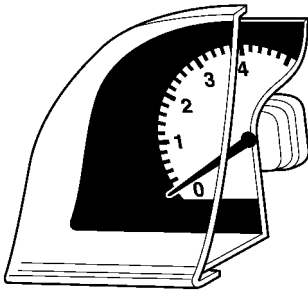
The combination meter of new GS300 has the following features:

- Sporty, triple-lens independent electronic analog meters that offer superb visibility and a high-tech look have been adopted.



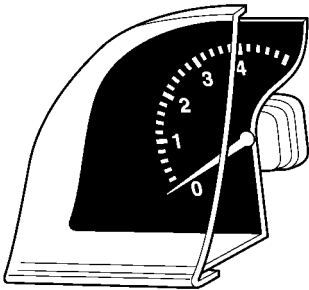
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- In contrast to the meter used on the previous model in which the pointer and scale meter were illuminated, the new GS300 has adopted a system in which the pointer and scale are silhouetted against an illuminated dial plate.



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New

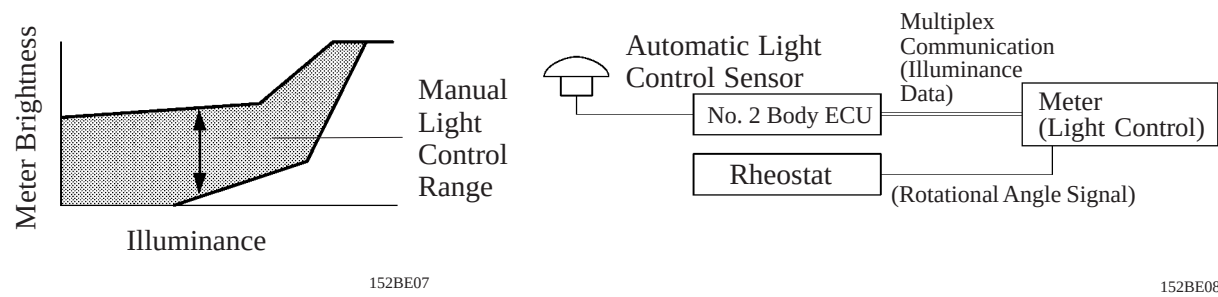


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Previous

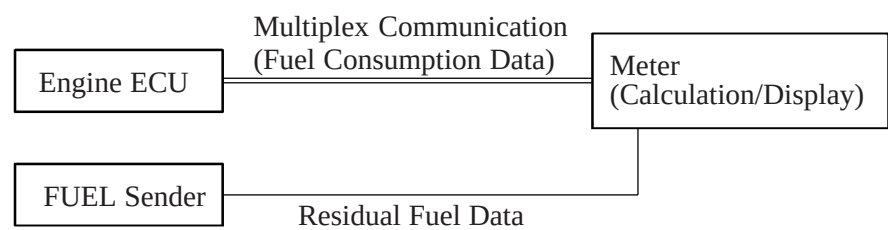
- To ensure an optimal meter brightness continuously from dusk to night, an automatic light control system that uses an automatic light control sensor has been newly adopted. In addition, a rheostat switch has been provided to enable the driver to adjust the meter brightness as desired.

► System Diagram ◀



- To minimize the fluctuation of the fuel gauge needle while driving up or down hill or during cornering, the position of the fuel gauge needle of the new GS300 is determined by calculating the residual fuel data that is sent from the fuel sender to the meter, and the fuel consumption data that is sent from the engine ECU to the meter.

► System Diagram ◀

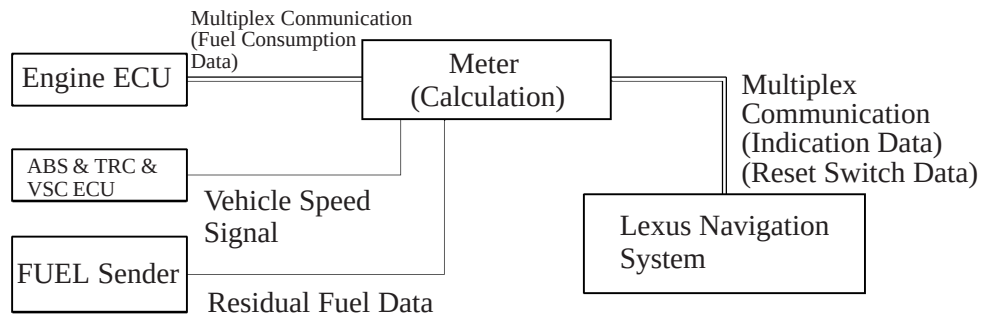


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- A drive monitor has been adopted to show cruise information and warnings such as the average vehicle speed, average fuel consumption, etc., on the display of the Lexus navigation system.
The drive monitor analyzes the various types of data that are sent from the engine ECU, ABS & TRC & VSC ECU, and fuel sender gauge to the meter and sends the results of the analysis to be shown on the display of the Lexus navigation system. The items that are shown on the display by this function are as follows.

Item	Details
Driven Distance After Refueling	If more than 10 liters is refueled, the meter detects that refueling has occurred based on the signals received from the fuel sender gauge, and resets the driven distance data that is stored in memory. Following the resetting of the data, the meter calculates the cumulative driven distance and sends this information to be shown on the display. The indication on the display is updated at 0.1km intervals.
Average Fuel Consumption After Refueling	If more than 10 liters is refueled, the meter detects that refueling has occurred based on the signals received from the fuel sender gauge and resets the average fuel consumption data that is stored in memory. Following the resetting of the data, the meter calculates the cumulative average fuel consumption and sends this information to be shown on the display. The indication on the display is updated at 10-second intervals.
Driven Distance After Engine Starting	The meter resets the driven distance data that is stored in memory each time the engine is started. Following the resetting of the data, the meter calculates the cumulative driven distance and sends this information to be shown on the display. The indication on the display is updated at 0.1km intervals.
Instant Fuel Consumption	The meter calculates the fuel consumption rate each time the engine makes 20 revolutions and sends this information to be shown on the display. The indication on the display is updated at 0.5-second intervals.
Average Fuel Consumption	When the reset switch is turned ON, the meter resets the average fuel consumption data that is stored in memory. Following the resetting of data, the meter calculates the cumulative average fuel consumption and sends this information to be shown on the display. The indication on the display is updated at 10-second intervals.
Average Speed	When the reset switch is turned ON, the meter resets the average vehicle speed data that is stored in memory. Following the resetting of data, the meter calculates the cumulative average vehicle speed and sends this information to be shown on the display. The indication on the display is updated at 10-second intervals.
Continuous Drivable Distance	The meter calculates the estimated continuous drivable distance (based on the residual fuel data that is sent from the fuel sender gauge to the meter and the fuel consumption data of the preceding ten and several km that is calculated by the meter and stored in memory) and sends this information to be shown on the display. The indication on the display is updated each time the estimated continuous drivable distance decreases by 1 km. Furthermore, if the fuel consumption rate for the preceding ten and several km changes suddenly, the data is updated and this information is sent to the display to update the indication on the display.

► System Diagram ◀



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- The functions described below have been provided to enable the hand-held tester to be used for diagnosis in case a malfunction occurs in the meter.

① Meter's functions to output its internal data to the hand-held tester

The following types of data are output via the No. 1 body ECU to the hand-held tester that is connected to the data link connector:

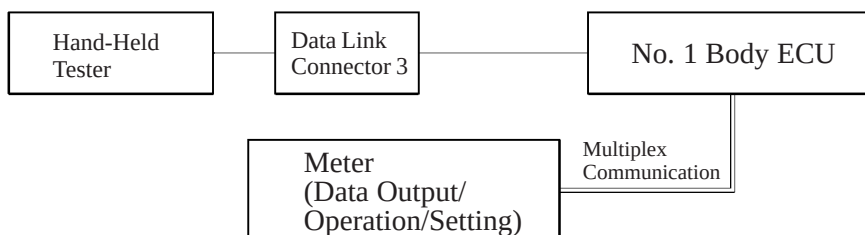
- Vehicle speed
- Engine rpm
- Signals input from the fuel sender gauge
- Signals input from the rheostat adjust switch
- Illumination light source (cold cathode tube) ambient temperature data

② Hand-held tester's functions for activating the various types of meters

The hand-held tester outputs the signals to activate the following types of meters for verifying their operation:

- Speedometer
- Tachometer
- Fuel Gauge
- Water Temperature Gauge
- Warning Lights

► System Diagram ◀



152BE12

AIR CONDITIONING

■ DESCRIPTION

1. General

The air conditioning system in the new GS300 has the following features:

- A fully automatic controlled type air conditioning system is used on all models.
- A semi-center location air conditioning unit, in which the evaporator and heater core are placed in the center of the vehicle, has been newly adopted.
- The construction of the evaporation, heater core, and blower fan has been changed.
- A left/right independent temperature control system, in which the temperature for the driver and the front passenger can be controlled independently, has been newly adopted.
- A 2-dimensional dome-type solar sensor which detects the amount of left/right solar radiation have been newly adopted.
- Shower ducts, which guide warm air to the entire footwell area, have been adopted.
- A variable-capacity compressor, in which the capacity of the compressor varies in accordance with the cooling load, has been adopted on models except G.C.C. Countries.
- A sub-cool condenser, which cools the refrigerant twice, has been adopted.
- As in the LS400, an automatic recirculation system that automatically switches the air inlet mode according to the level of concentration of exhaust gases in the outside air, has been adopted on models except G.C.C. Countries.
- The water valve and the EPR (Evaporator Pressure Regulator) have been discontinued.

► Performance ◀

Model		New	Previous
Item			
Heater	Heat Ouput W (Kcal/h)	5200 (4470)	5400 (4640)
	Air Flow Volume (m³/h)	350	350*
	Power Consumption (W)	210	195
Air Conditioner	Heat Ouput W (Kcal/h)	5600 (4820)	←
	Air Flow Volume (m³/h)	550	560
	Power Consumption (W)	260	←

*: With side vent closed

► Specifications ◀

Model				New	Previous
Item					
Ventilation and Heater	Heater Core	Type		Multi-Flow Type	Dimpled Tube Type
		Size W × H × L mm (in.)		100 × 264.1 × 27 (3.9 × 10.4 × 1.1)	177.8 × 200 × 32 (7.0 × 7.9 × 1.3)
		Fin Pitch mm (in.)		1.8 (0.07)	2.0 (0.08)
	Blower	Motor Type		S80Fs – 12T	S80Fs – 12.5T
		Fan Type		Radial Fan	Sirocco Fan
		Fan Size Dia. × H mm (in.)		180 × 70 (7.1 × 2.8)	150 × 85 (5.9 × 3.4)
Air Conditioner	Condenser	Type		Multi-Flow Type (Sub-Cool Type)	3-Passage Type
		Size W × H × L mm (in.)		670 × 397.3 × 16 (26.4 × 15.6 × 0.6)	706 × 382.4 × 22 (27.8 × 15.1 × 0.9)
		Fin Pitch mm (in.)		3.2 (0.13)*, 4.0 (0.16)	3.5 (0.14)
	Evaporator	Type		Drawn Cup Type	←
		Size W × H × L mm (in.)		291.6 × 215 × 58 (11.4 × 8.5 × 2.3)	278.3 × 200 × 105 (10.9 × 7.9 × 4.1)
		Fin Pitch mm (in.)		3.5 (0.14)	4.0 (0.16)
	Compressor	Type		7SB16, 10PA20*	10PA20

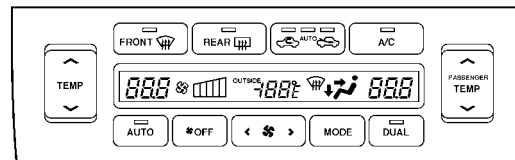
*: Models for G.C.C. Countries

■ CONSTRUCTION AND OPERATION

1. Heater Control Panel

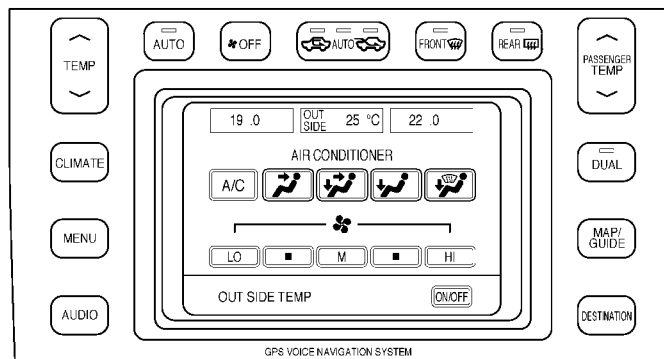
Two types of heater control panels are provided.

- The models without a Lexus navigation system have adopted an easy-to-use push-button type heater control panel. This control panel uses an LCD (Liquid Crystal Display) panel to show the set temperature, air outlet mode, blower speed, and outside temperature to ensure excellent visibility.
- The models with a Lexus navigation system (European models only) have adopted a heater control panel, which consists of push switches located around the navigation system display and a touch switch that is operated by touching the display panel.
- The touch switch is used to turn the air conditioner ON/OFF and to select the air outlet modes and blower speeds. This control panel shows the set temperature and outside temperature on the display. The outside temperature can be shown on the display in two manners: continuous, or only in the air conditioner control screen.
- To ensure the ease of operation of the left/right independent control, a passenger temperature control switch is provided on the passenger side of the heater control panel. A “DUAL” switch is also provided to change from the left/right independent control to the linked control.
- An indicator is provided in the air inlet control switch to indicate that the automatic recirculation system is in operation.



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Models without Lexus Navigation System

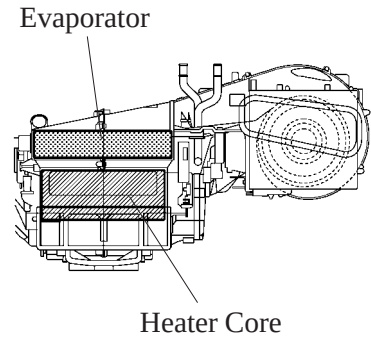


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Models with Lexus Navigation System (European Models Only)

2. Air Conditioning Unit

A semi-center location air conditioning unit, in which the evaporator and heater core are placed in the vehicle's longitudinal direction, has been newly adopted. As a result, the air conditioning unit has been made more compact and lightweight than that of the previous model. In addition, a left/right independent temperature control system has been adopted to improve comfort.

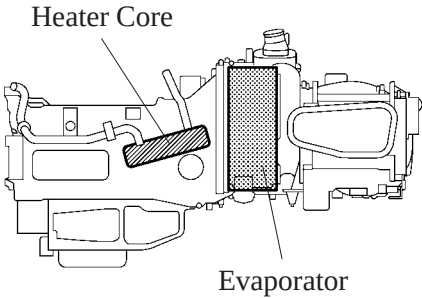


Heater Core

Evaporator

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New



Evaporator

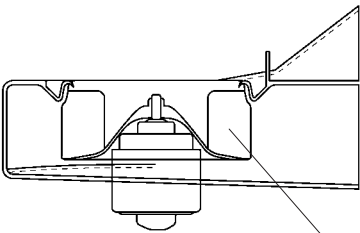
Heater Core

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Previous

Blower Fan

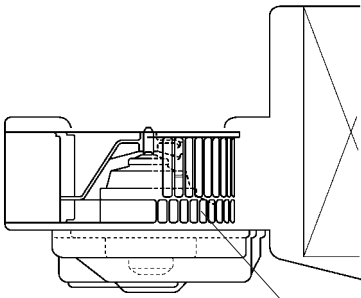
A radial fan that has a larger diameter and narrower width than the sirocco fan of the previous model has been newly adopted to realize a more compact blower unit. In addition, the previous dual suction blower has been discontinued.



Radial Fan

New

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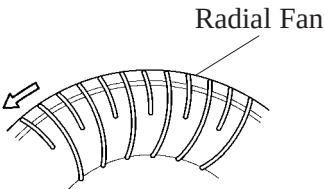


Sirocco Fan

Previous

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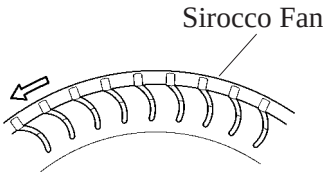
Blower Unit



Radial Fan

New

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Sirocco Fan

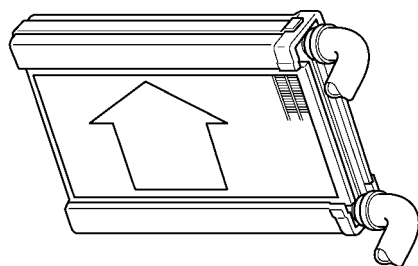
Previous

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Fan Configuration

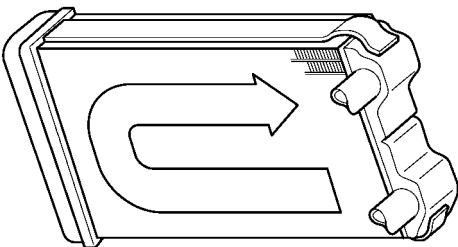
Heater Core

The flow of the heater water in the heater core has been changed from the previous U-turn flow to a full-path flow. Due to the resulting improvement in the heat exchanging efficiency of the heater core, the heater core itself could be made thinner. In addition, the heater core material has been changed from copper to aluminum.



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New

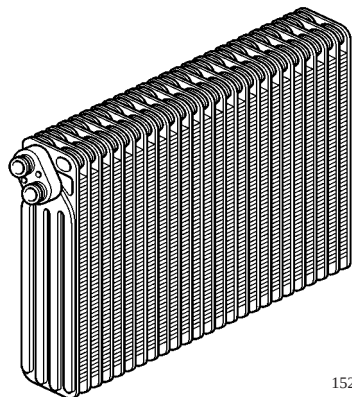


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Previous

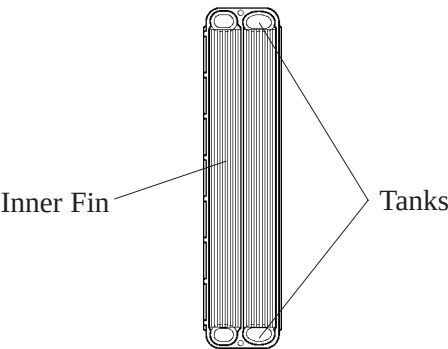
Evaporator

By placing the tanks at the top and the bottom of the evaporator unit and by adopting an inner fin construction, the heat exchanging efficiency has been improved and the evaporator unit’s temperature distribution has been made more uniform. As a result, it has become possible to realize a thinner evaporator construction.

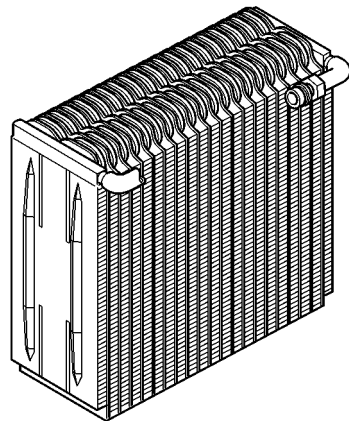


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New

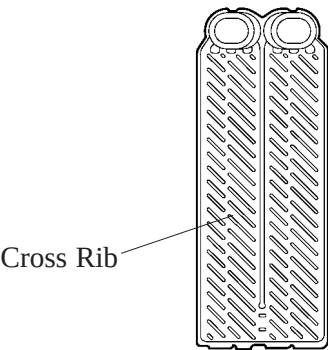


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BE25

Previous



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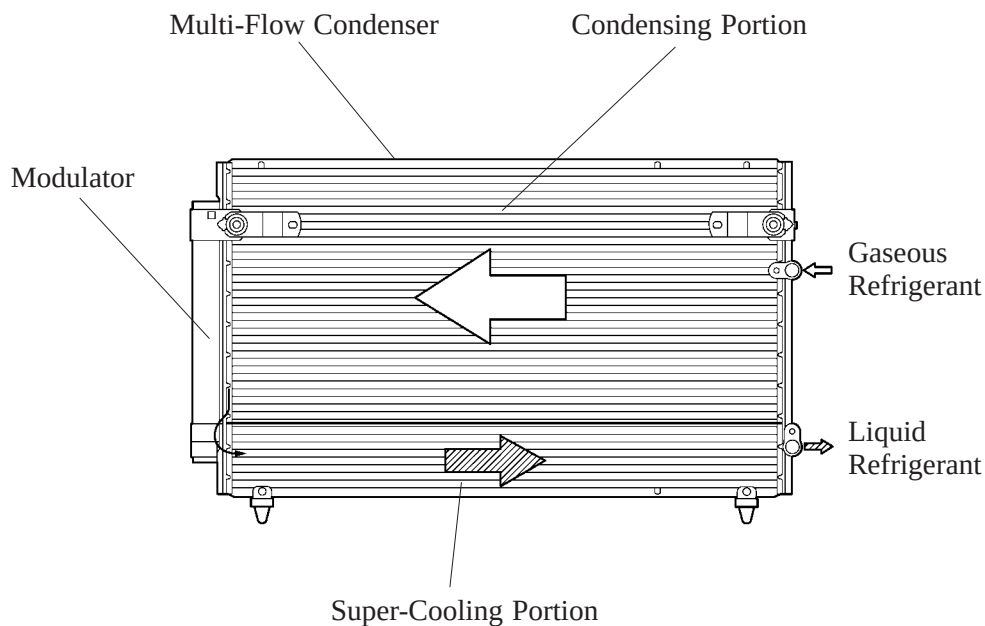
3. Condenser

The new model has newly adopted a sub-cool condenser in which a multi-flow condenser (consisting of two cooling portions: a condensing portion and a super-cooling portion) and a gas-liquid separator (modulator) have been integrated. This condenser has adopted the sub-cool cycle for its cooling cycle system to improve the heat exchanging efficiency.

Sub-Cool Cycle

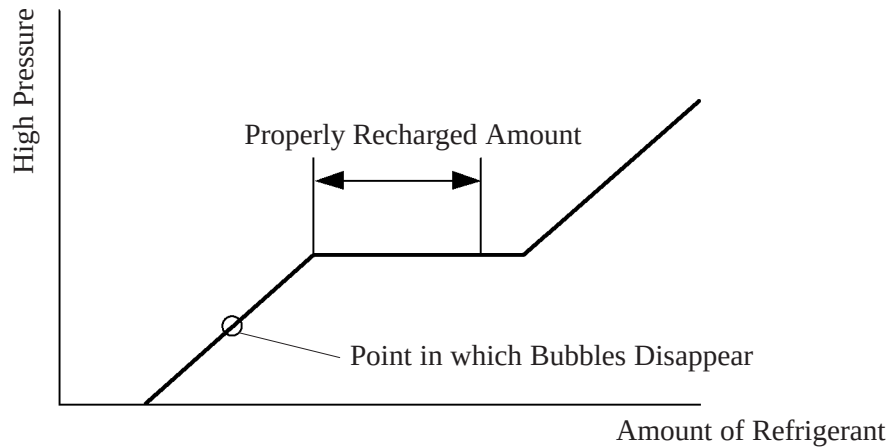
The receiver cycle of the previous condenser could not convert the gaseous refrigerant that was sent by the compressor into a completely liquefied state in the condenser. Thus, a portion of the refrigerant remained in the gaseous state as it was sent to the evaporator.

In the sub-cool cycle of the sub-cool condenser that has been adopted on the new model, after the refrigerant passes through the condensing portion of the condenser, both the liquid refrigerant and the gaseous refrigerant that could not be liquefied are cooled again in the super-cooling portion. Thus, the refrigerant is sent to the evaporator in an almost completely liquefied state.



NOTE: The point at which the air bubbles disappear in the refrigerant of the sub-cool cycle is lower than the proper amount of refrigerant with which the system must be filled. Therefore, if the system is recharged with refrigerant based on the point at which the air bubbles disappear, the amount of refrigerant would be insufficient. As a result, the cooling performance of the system will be affected.

For the proper method of verifying the amount of the refrigerant and to recharge the system with refrigerant, see the GS300 Repair Manual (Pub. No. RM588E).



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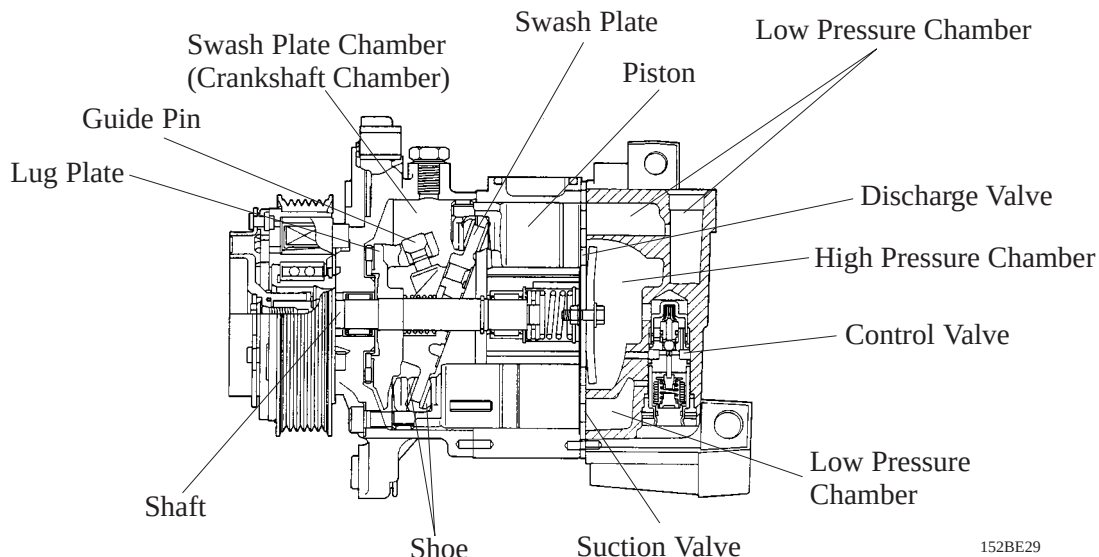
4. Compressor

A continuously variable capacity compressor that varies the capacity of the compressor according to the cooling load of the air conditioner has been adopted on models except G.C.C. Countries.

Construction

When the magnetic clutch is turned ON and the shaft rotates, this movement is transmitted via the lug plate that is connected to the shaft to rotate the swash plate. This rotational movement of the swash plate is transmitted via the shoe to the reciprocal movement of the piston in the cylinder, which performs the suction, compression, and discharge of the refrigerant.

The control for varying the compressor capacity is effected in the following manner: Based on the changes in pressure that occur in the low-pressure side in accordance with the cooling load, the control valve regulates the swash plate chamber's internal pressure to vary within the low- to medium pressure range. This change of pressure changes the swash plate angle, varies the piston stroke, and changes the amount of refrigerant that is discharged.



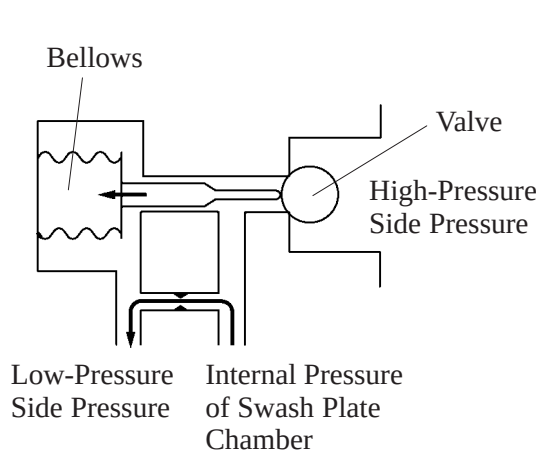
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Operation

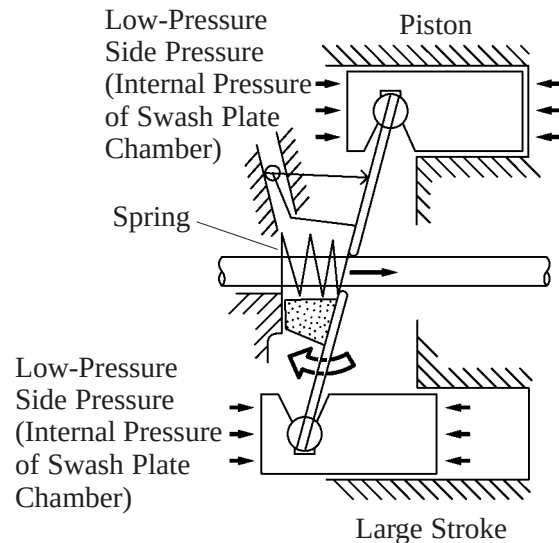
1) When the cooling load is large (interior temperature is high), operating at 100% capacity

When the cooling load becomes large and the pressure in the low-pressure side increases, the bellows in the control valve contracts, causing the valve to close between the high-pressure chamber and the swash plate chamber. As a result, the internal pressure in the swash plate decreases gradually, causing the internal pressure in the swash plate and the pressure of the low-pressure side to ultimately reach equilibrium.

At this time, the compound force (consisting of the pressure of the low-pressure side, the reaction force from the lug plate, and the force of the spring) that is applied to the left side of the piston becomes lower than the internal pressure of the cylinder that is applied to the right side of the piston. Therefore, the piston moves towards the left, causing the tilt of the swash plate to increase. Accordingly, the amount of piston stroke increases, and when the piston stroke is at its maximum (when the tilt of the swash plate is at its maximum), the compressor operates at its 100% capacity.



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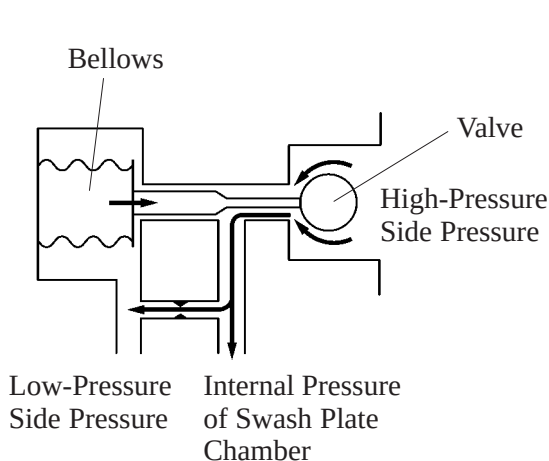


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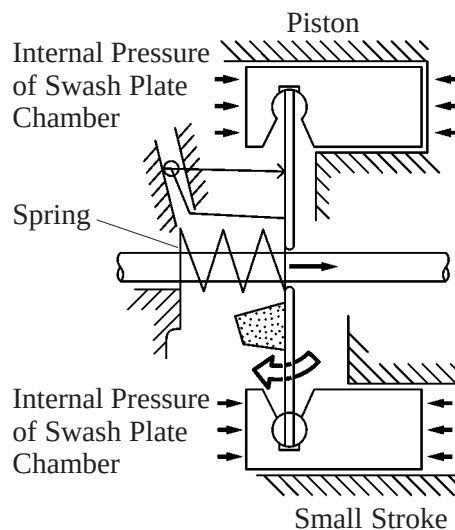
2) When the cooling load is small (interior temperature is low)

When the cooling load becomes small and the pressure of the low-pressure side decreases, the bellows in the control valve expands, causing the valve between the high-pressure chamber and the swash plate chamber to open. As a result, the pressure of the high-pressure side is introduced into the swash plate chamber, causing the pressure in the swash plate chamber to increase.

Therefore, the compound force (consisting of the pressure in the swash plate chamber, the reaction force from the lug plate, and the spring force) that is applied to the left side of the piston becomes higher than the internal pressure of the cylinder that is applied to the right side of the piston. Then, the piston moves to the right, causing the tilt of the swash plate to decrease. As a result, the piston stroke becomes shorter and the amount of refrigerant that is discharged becomes smaller. As the rotational resistance decreases in this manner, the engine load is reduced and fuel economy is improved.



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5. Automatic Recirculation System (Models except G.C.C. Countries)

The automatic recirculation system uses an exhaust gas sensor, which detects CO and HC, to measure the amount of concentration of harmful elements such as CO and HC that are present in the air outside of the vehicle. This system automatically changes the air inlet mode based on the level of concentration of those gases.

The basic construction and operation of this system are the same as in the LS400.

For details, see the Lexus New Car Features Supplement (Pub. No. NCF144E).

ACCESSORIES

■ DESCRIPTION

The new GS300 includes the accessory systems shown in the following table.

System	Outline
Power Window System	This system includes “one-touch auto up-and-down”, “key-linked all-door up-and-down”, “jam protection” and “key-off operation” functions. The basic construction and operation of these functions are the same as in the LS400.
Door Lock Control System	This system has a “key-linked lock and unlock”, “key-confine prevention” and “manual unlock prohibition” functions. The basic operation of “key-linked lock and unlock” and “key-confine prevention” functions are the same as in the LS400. For details of the “manual unlock prevention” function, see page 147.
Wireless Door Lock Remote Control System	As in the LS400, the multi-function type wireless door lock remote control system has been adopted. This system uses a transmitter that can be used to lock and unlock all the doors, open the power windows, etc. Also, the construction of the system has been changed to enable the system to be controlled by the body ECU. The basic construction and operation are the same as in the LS400.
Theft Deterrent System	As in the previous model, when an attempt is made to forcibly enter the vehicle or open the hood or trunk lid without a key, or when the battery terminals are removed and reconnected, this system sounds the horn and flashes the headlights, taillights and turn signal lights for about 1 minute to alert the owner. On the new GS300, in conjunction with the adoption of the engine immobiliser system, the illuminating pattern of the indicator light has been changed and the starter cutoff function has been discontinued. The basic construction and operation are the same as in the LS400.
Engine Immobiliser System	This is a theft-deterrent system which disables the engine unless the ignition key used to start the engine has an ID code that matches the pre-registered code in the vehicle.
Power Seat	As in the previous model, the front seats are power assisted by electric motors so that the seat positions can be adjusted easily by a simple switch operation.
Seat Heater	The seat heater system improves the comfort of the driver and the front passenger in a cold weather by heating the surface of the seats. It is a 2-mode control type system that provides a switch to turn the heater ON and OFF. On the new GS300, the seat heater wire is placed directly underneath the seat cover to increase the heat rising speed.

System	Outline
Outside Rear View Mirror	As in the previous model, electrical remote control type mirrors provided with an internal heater, which operates in conjunction with the rear window defogger, have been adopted. In addition, the new model has newly adopted EC (electrochromic) mirrors which can automatically vary their reflection rate.
Automatic Glare-Resistant EC Mirror System	This system automatically reduces the reflection rate of the inner and outside mirrors by using an EC (electrochromic) element to dampen the bright glare of the headlights of the vehicle driving behind. The basic construction and operation are the same as in the LS400. However, on the new GS300, the reflection rate of outside mirror varies steplessly.
SRS Airbag	The SRS (Supplemental Restraint System) airbag is provided for the driver and front passenger. The SRS airbag has been designed to lessen the shock to the head and chest of the driver and front passenger in the event of a frontal impact collision as a supplement to the seat belt. A 3-sensor type airbag system is used in which the detection of deceleration during a collision as well as control of the airbag system is accomplished by the front airbag sensor and airbag sensor assembly. For details, see page 138 .
SRS Side Airbag	The SRS side airbag is provided for the outer side of the front seat back, SRS side airbag has been designed to help reducing the impact energy that is transmitted to the driver and front passenger in the event of a side collision. The basic construction and operation are the same as in the LS400.
Cruise Control System	Once it has been set at desired vehicle speed, this system automatically adjusts the engine throttle position to maintain the vehicle speed at the desired speed without operating the acceleration pedal. On the new GS300, in conjunction with the adoption of the ETCS-i in the engine, a cruise control system that uses the throttle control motor, which is a part of the ETCS-i, has been adopted. Also, the cruise control ECU has been integrated with the ECM. The basic construction and operation are the same as in the LS400.
Moon Roof	The moon roof is a tilt-up and sliding type the same as in the previous model. This system includes “one-touch slide open and close (models except for Australia)”, “one-touch slide open (models for Australia)” “key-linked slide open and close”, “jam-protection” and “key-off operation” functions. The basic operation of those functions are the same as in the LS400. To determine the jamming of the moon roof, the moon roof jam protection function uses a hall IC and magnets that are enclosed in the moon roof drive motor to detect any changes in the rotation of the motor.
Memory System	The desired seat position can be stored (as well as tilt and telescopic steering and outside rear view mirror positions) in memory. 2 different driving positions can be memorized in the power seat ECU. The basic operation of this system is the same as in the LS400. However, on the GS300, the position of the driver’s shoulder belt anchor cannot be stored in memory.

System	Outline
Seat Belt Warning System	If the driver or the front passenger has not buckled the respective seat belt when the ignition switch is turned ON, the seat belt warning system illuminates the warning light and sounds the buzzer to inform the driver and the front passenger that their seat belts have not been buckled. The basic construction and operation are the same as in the LS400.
Key Reminder System	It sounds a buzzer to warn the driver that the ignition key is still in the key cylinder. This helps to prevent the driver from getting locked out. The basic operation is the same as in the previous model.

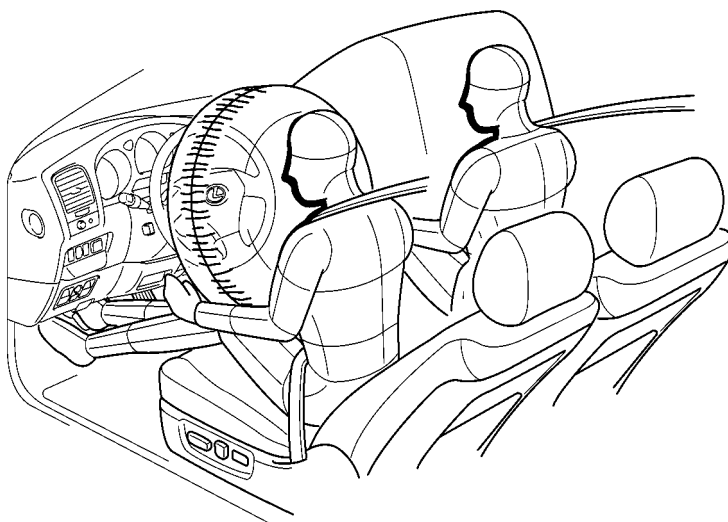
■ SRS AIRBAG

1. General

The SRS (Supplemental Restraint System) airbag is designed to help lessen the shock to the driver and front passenger as a supplement to the seat belt.

This system in the new GS300 has the following features:

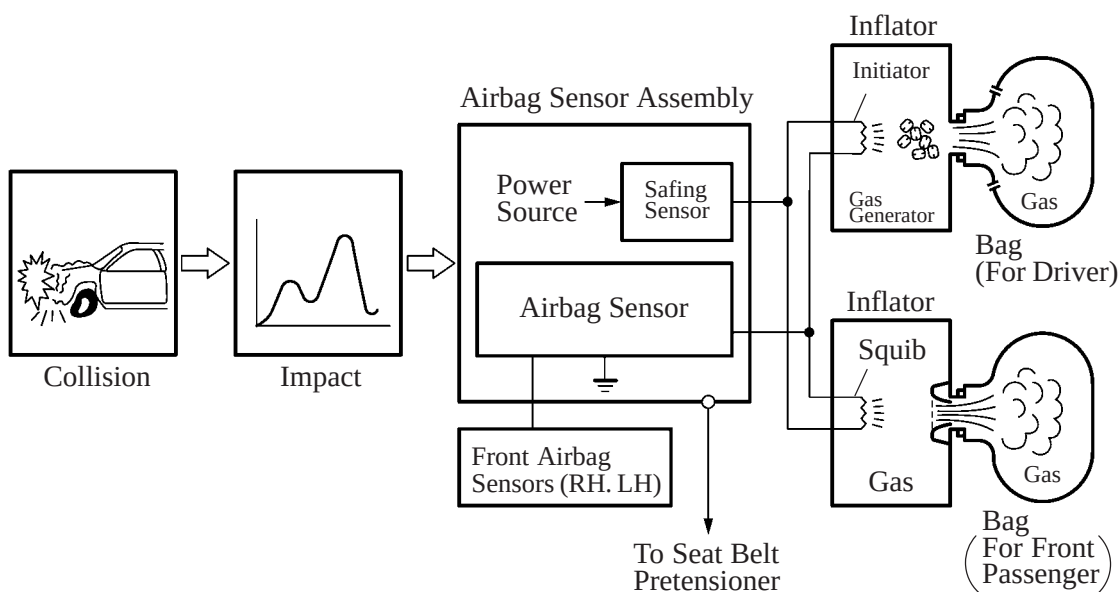
- The inflator for driver and front passenger has been changed.
- Front airbag sensors have been newly adopted.
- The construction of airbag sensor assembly has been changed.
- The airbag sensor assembly controls the SRS airbag and the seat belt pretensioner.



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► System Diagram ◀

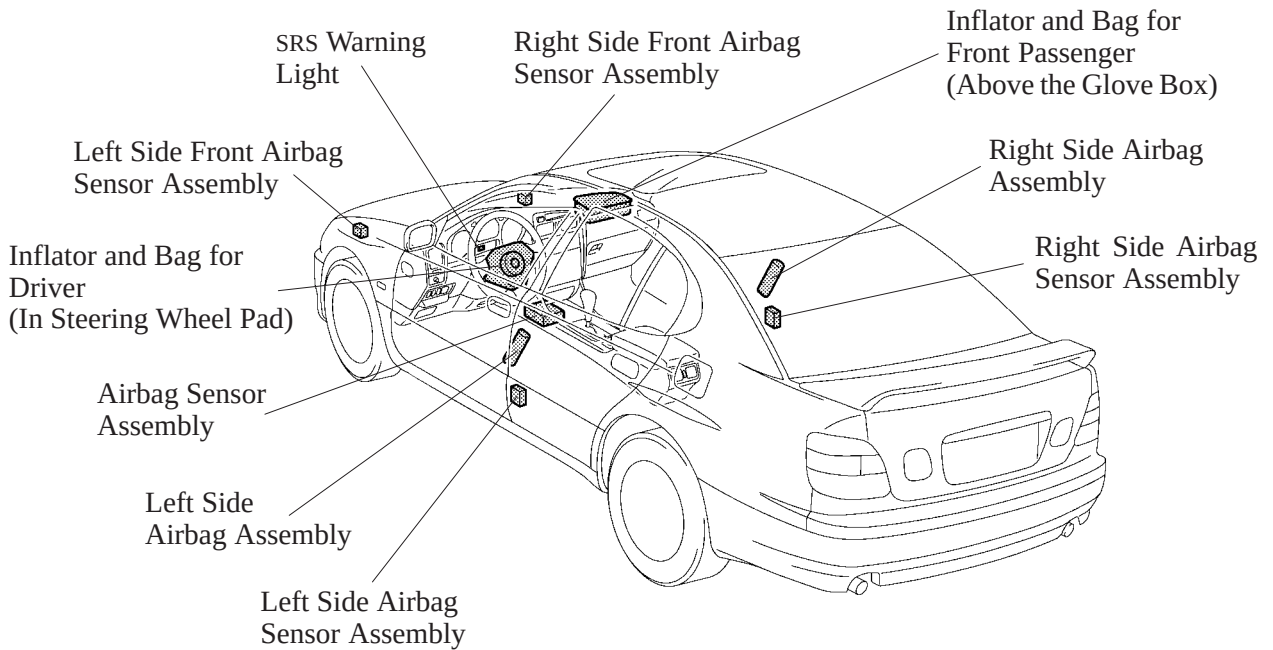
The activation processes of the SRS airbag is as illustrated below.



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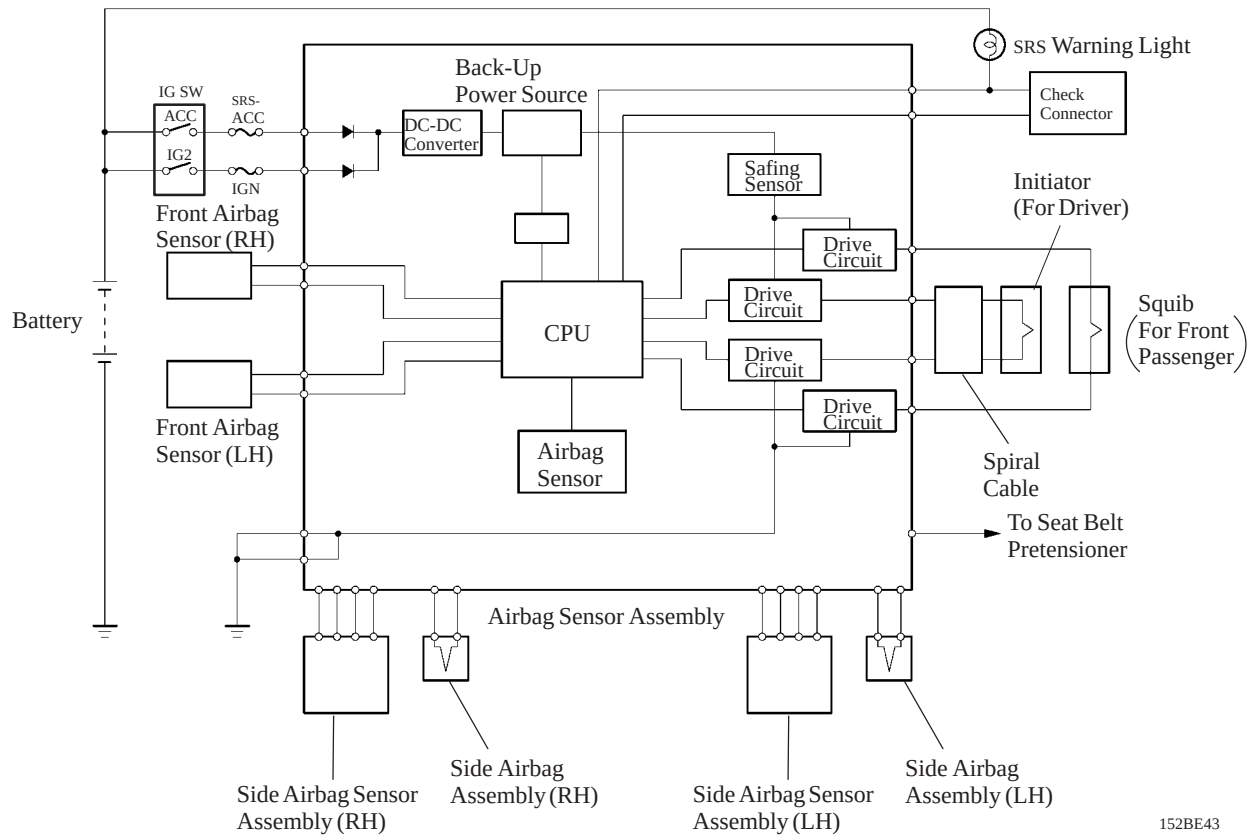
2. Layout of Components

The major function parts of the airbag system are shown below.



143BE04

3. Wiring Diagram

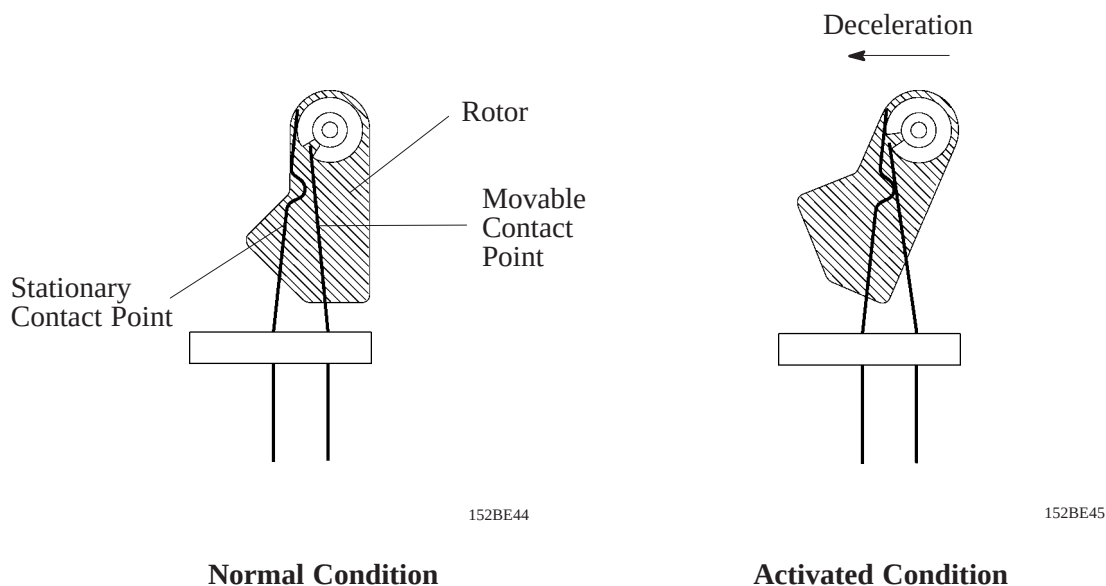


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4. Construction and Operation

Front Airbag Sensor

The front airbag sensor consists of rotor, movable contact point and a stationary contact point. The rotor is fixed by the initial set load of the movable contact point. At the same time, the movable contact point restrains the movement of the rotor which is generated during vehicle deceleration. If a sudden deceleration that exceeds a predetermined value occurs due to a collision of the vehicle, the rotor will rotate. The rotational movement of the rotor pushes the movable contact point and causes the movable and stationary contact points to come into contact. As a result, an ON signal is generated and transmitted to the airbag sensor assembly.



Airbag Sensor Assembly

1) Description

The airbag sensor assembly is mounted on the center floor under the instrument panel. It receives signals from the airbag sensor enclosed in the airbag sensor assembly and front airbag sensor and judges whether the airbag and seat belt pretensioner must be activated or not, and then diagnoses system malfunctions.

2) Construction and Operation

The airbag sensor assembly consists of airbag sensor, safing sensor, ignition control circuit, diagnosis circuit, etc.

a. Airbag Sensor, Ignition Control Circuit

- The airbag sensor is enclosed in the airbag sensor assembly. Based on the deceleration of the vehicle that occurs during a collision, the distortion that is created in the sensor is converted into an electric signal. This signal is a linear representation of the deceleration rate.
- The ignition control circuit performs a prescribed calculation based on the signal output by the airbag sensor and the front airbag sensor. If these calculated values are larger than a predetermined value, it activates the ignition operation.

b. Safing Sensor

The safing sensor is enclosed in the airbag sensor assembly. The sensor turns ON and outputs an ON signal to the airbag sensor assembly if a deceleration force that is higher than a predetermined value is applied to the safing sensor as a result of a frontal collision.

c. Back-Up Power Source

The back-up power source consists of a power supply capacitor and a DC-DC converter. In case of a power system failure during a collision, the power supply capacitor discharges and supplies electric power to the system. The DC-DC converter is a boosting transformer when the battery voltage drops below a certain level.

d. Diagnosis Circuit

This circuit constantly diagnoses the system for any malfunction. When a malfunction is detected, it lights up the SRS warning light on the combination meter to alert the driver.

e. Memory Circuit

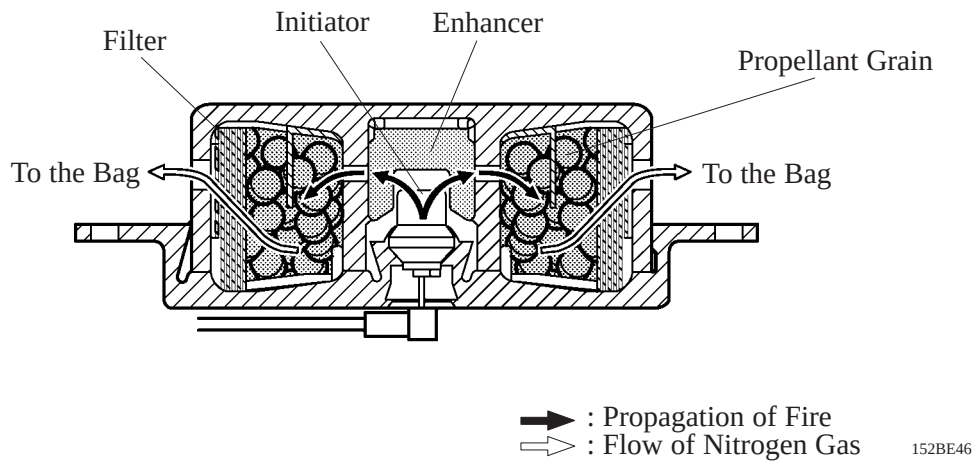
When a malfunction is detected by the diagnosis circuit, it is coded and stored in this memory circuit.

Inflator

1) For Driver

The inflator for driver is comprised of an initiator, enhancer, propellant grain, etc.

If the airbag sensor is activated by deceleration due to frontal collision, electric current then ignites the initiator located in the inflator. The flame spreads instantaneously to the propellant grain, and a large amount of nitrogen gas is generated from the propellant grain. The gas flows through the filter where cinders are removed and the gas is cooled before filling the bag. Then, as it expands, the driver's bag tears open the wheel pad outer layer to expand further and to help to restrain the impact applied to the head and chest of the driver.

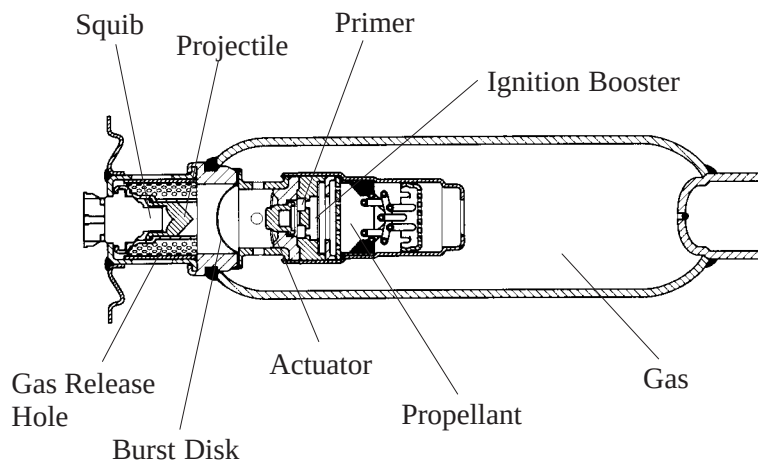


2) For Front Passenger

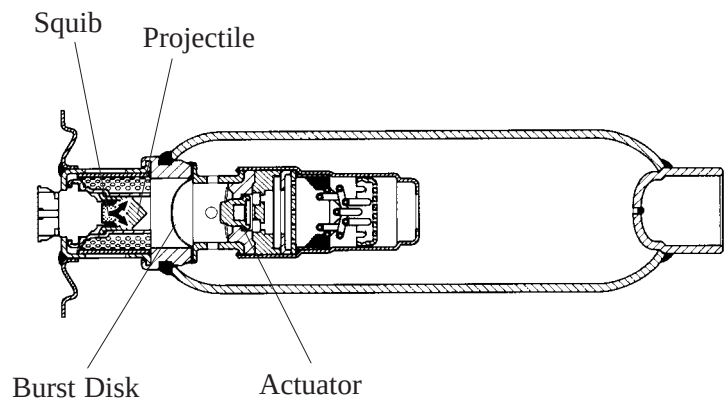
The inflator for front passenger is comprised of a squib, projectile, burst disk, propellant, high pressure argon gas and etc.

If the airbag sensor is turned on by deceleration due to frontal collision, electric current then ignites the squib located in the inflator. The projectile which fired by the ignition of the squib pierces through the burst disk and collides with the actuator, which causes the primer to ignite. The flame of the primer spreads instantaneously to the ignition booster and to the propellant. The gas which expanded by the heat of the ignition of the propellant flows into the airbag via the gas release hole, thus inflating the airbag.

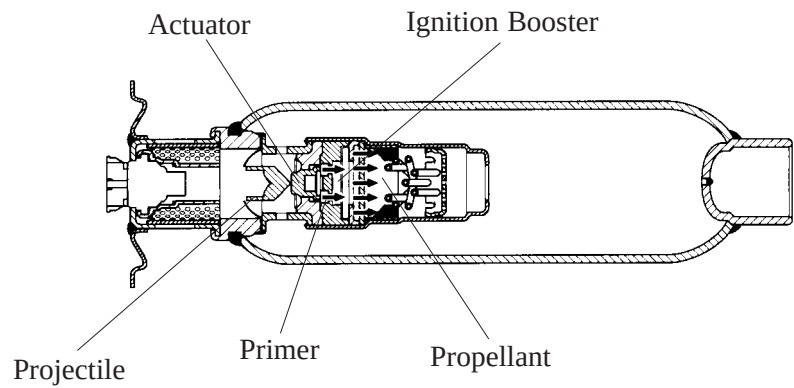
► Construction ◀



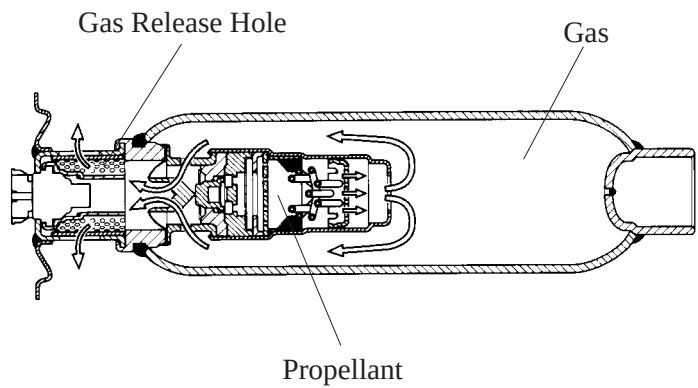
► Operation ◀



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152BE37

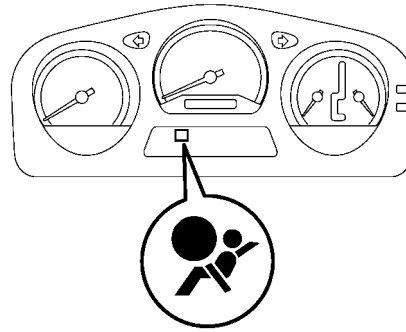
➡ : Propagation of Fire
➡ : Flow of Argon Gas

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SRS Warning Light

The SRS warning light is located on the combination meter.

It comes on to alert the driver about the system trouble when a malfunction is detected in selfdiagnosis of the airbag sensor assembly and side airbag sensor assembly. In normal operating conditions when the ignition switch is turned to the ACC or ON position, the light comes on for about 6 seconds and then goes off.



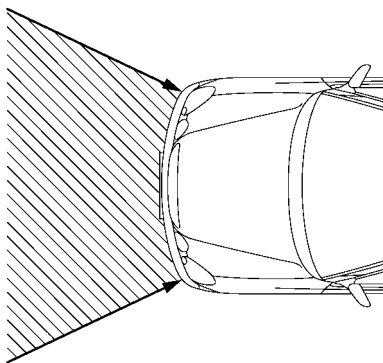
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SRS Warning Light

5. System Operation

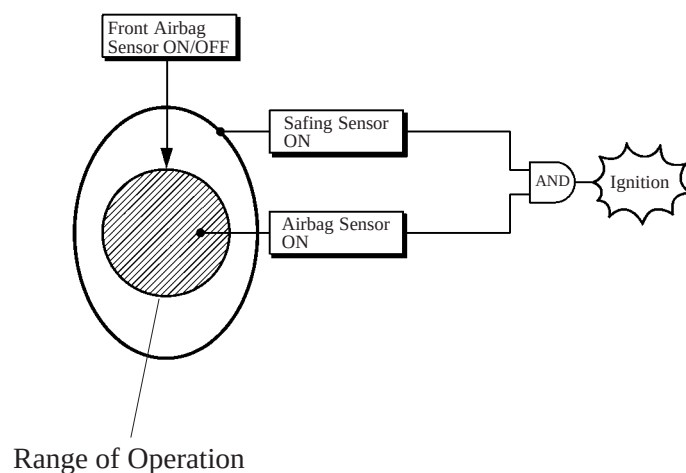
Ignition Judgement and Condition

- When the vehicle collides in the hatched area (Fig. 1) and the shock is larger than a predetermined level, the airbag and the seat belt pretensioner are activated automatically. The airbag sensor is characteristically turned in such a way that it can judge the need for ignition in collisions within the hatched area.
- The safing sensor is designed to be activated by a smaller deceleration rate than that of the airbag sensor. As illustrated in Fig. 2 below, ignition is operated when current flows to the squib. This happens when a safing sensor and the airbag sensor go on simultaneously.
- Airbag sensor assembly judges whether or not to inflate the airbag in accordance with ON/OFF of the front airbag sensor and the deceleration detected by the airbag sensor.



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Fig. 1



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Fig. 2

MULTIPLEX COMMUNICATION SYSTEM

DESCRIPTION

A multiplex communication system has been adopted for the body electrical system control, including the power window system and the door lock control system, etc.

This system has the following characteristics.

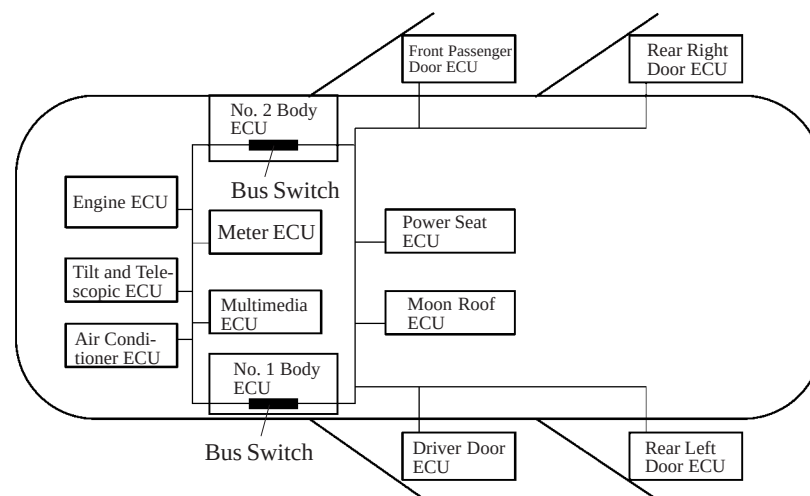
- As in the LS400, this system's functionality as well as its expandability have been improved through the adoption of the large-scale multiplex communication system.
- Along with the adoption of the large-scale multiplex communication system, the BEAN (Body Electronics Area Network), which excels in communication capability, has been adopted for the communication system.
- A customized body electronics system, which improves the malfunction diagnostic function, enables the functions to be changed according to customer needs, and reduces the types of parts, has been adopted.

SYSTEM CONSTRUCTION

The functions of the multiplex communication system on the new GS300 has the following characteristics.

- In addition to the communication that is implemented between ECUs Multiplex communication has been adopted in the transfer of signals between systems and parts such as the engine ECU, combination meter, air conditioner, etc.
- Certain control functions of the system, such as automatic light control, wireless door lock control, etc., have been integrated into this system.
- If a malfunction occurs in the communication bus that transfers the signals between parts and ECUs, a bus switch is provided in the No. 1 and 2 body ECUs to separate the instrument panel bus (which links the meter, engine ECU, etc. with the No. 1 and 2 body ECUs) from the door bus (which links the door switches, seat ECU, etc. with the No. 1 and 2 body ECUs).

► System Diagram ◀



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■ SYSTEM OPERATION

1. General

The corresponding chart below illustrates the relationship between the body electrical system and the ECUs under the control of the multiplex communication system.

Components System	Door Bus								Instrument Panel Bus				
	No. 1 Body ECU	No. 2 Body ECU	Driver Door ECU	Front Passenger Door ECU	Rear Right Door ECU	Rear Left Door ECU	Seat ECU	Moon Roof ECU	Engine ECU	Meter ECU	Air Conditioner ECU	Multi Media ECU	Tilt and Telescopic ECU
Power Window	△	△	○	△	△	△		△					
Door Lock Control	○	△	△	△	△	△				△			
Wireless Door Lock Remote Control	○	△	△	△	△	△		△					
Light Auto Turn-Off		○	△	△	△	△							
Automatic Light Control		○	△							△			
Theft Deterrent	○	△	△	△	△	△							
Illuminated Entry		○	△	△	△	△							
Key Reminder Buzzer		○	△										
Trunk Lid Open	○												
Mirror Control	△	△	○	○									
Shift Lock System		○							△				
Front and Rear Fog Lights Control		○								△			
Customized Body Electronics	○		△	△	△	△		△			△		
Diagnosis	○	△	△	△	△	△	△	△		△	△		△
Memory Adjust			△	△			○						△
Seat Belt Warning	△	△								○			
ECT Signal Processing	△								○	△			
Air Conditioner Control	△								△		○	△	
Displays of Various Meters	△	△	△	△	△	△		△	△	○	△	△	
Displays of Various Types of Vehicle Information									△	○		△	

- : Master control (The ECU, which has a central role in controlling each system, outputs the signals to other ECUs to activate motors or other applicable components.)
- △: Sub control (The ECU which has a supporting role in controlling each system, outputs control signals to the master control, or receives signals from the master control to activate motors or other applicable components.)

Power Window System

The power window system provides the following function:

- Jam protection function
- One-touch auto up-and-down function
- One-touch auto up-and-down remote control function
- Transmitter-linked up-and-down function
- Key-linked up-and-down function

The operation of these functions are basically the same as those of the LS400.

Door Lock Control System

The door lock control system provides the following functions:

- Key-linked lock and unlock function
- Key-confine prevention function
- Manual unlock prevention function

The operation of the functions are basically the same as those of the LS400, except for the manual unlock prevention function.

1) Manual Unlock Prevention Function

When the doors are locked through the operation of the door key cylinder, the transmitter, or through the key-less lock operation, this function prohibits the unlock operation to be effected through the door lock control switch until the doors are unlocked by turning the ignition ON or operating the door key cylinder, or through the unlock operation of the transmitter.

Wireless Door Lock Remote Control System

The wireless door lock remote control system provides the following functions:

- All doors lock/unlock operation
- Trunk lid open operation
- Auto lock function
- Transmitter switch misoperation prevention function
- Repeat function
- Interior light function
- Security function
- Operation verification beeper function
- Door ajar warning function

The operation of these functions are basically the same as those of the LS400.

Light Auto Turn-Off System

The light auto turn-off system provides the following functions:

- Light auto turn-off function (When the taillights are ON.)
- Headlight off delay control function (When the headlights and taillights are ON.)

The operation of these functions are basically the same as those of the LS400.

Automatic Light Control System

The automatic light control system controls the headlights and taillights to turn ON and OFF in accordance with the light availability surrounding the vehicle.

The operation of this system are basically the same as those of the LS400.

Theft Deterrent System

A theft deterrent system is used to prevent vehicle theft. When the system is set, the horn and headlights, taillights and turn signal lights operate if the door, hood or trunk lid is forcibly opened.

The operation of this system is basically the same as those of the LS400.

Illuminated Entry System

The system operation of this system is basically the same as in the LS400.

However, the new GS300 is not provided with a seat belt inner buckle illumination.

Also, the length of time during which the ignition key cylinder light and the dome light remain illuminated can be changed in the Customized Body Electronics System.

Warning System

The warning system provides the following systems:

- Key reminder system
- Seat belt warning buzzer and light system

The system operation of these system are basically the same as in the LS400.

Trunk Lid Open System

The No. 1 body ECU detects the output signal from the trunk lid opener switch. When the trunk lid opener switch is turned ON, the No. 1 body ECU activates the trunk lid opener.

Fog Light Control System

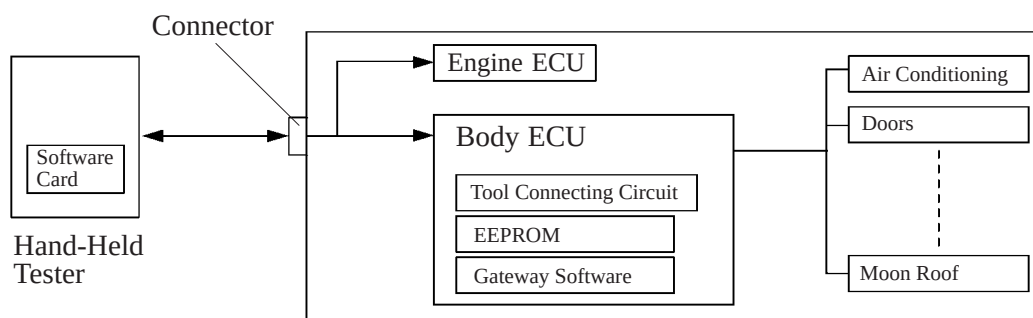
The No. 2 body ECU detects the output signal from the fog light switch. When the fog light switch is turned ON, the No. 2 body ECU activates the fog light relay to illuminate the fog lights.

Customized Body Electronics System

1) General

The customized body electronics system can change the specification of functions (by changing their settings) according to customer preferences by a hand-held tester to overwrite the EEPROM that is enclosed in the body ECU.

► System Diagram ◀



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2) Operation

The specifications of the systems and functions that can be changed by operating a hand-held tester are listed next page.

System	Content	Initial Setting			Selection	Customer Recognition	Customer Unrecognizableness
		Europe	Australia	G.C.C. Countries			
Wireless Door Lock Remote Control System	Wireless Operation	Permission	Permission	Permission	Permission/Prohibition	○	—
	Operation Verification Beeper Volume Adjustment	84%	84%	84%	93/89/75/50 (%) / Prohibition (Small ↔ Large)	○	—
	Door Ajar Warning Beeper	ON	ON	ON	ON/OFF	○	—
	Time Until the Operation of the Autolock Function	30 sec.	30 sec.	30 sec.	60/30 (sec.)	○	—
	Trunk Lid Open Operation	0.8 sec. Pressed Continuously	0.8 sec. Pressed Continuously	0.8 sec. Pressed Continuously	Pressed Once/0.8 sec. Pressed Continuously/Pressed Twice/Non-Operation	○	—
	All Door's Unlock Operation (Unlock Switch Pressed Twice)	OFF	ON	ON	ON/OFF	○	—
	Interior Light Function	ON	ON	ON	ON/OFF	○	—
	Panic Alarm Operation	OFF*	ON	OFF*	ON/OFF	○	—
	Car-Finding Operation	OFF*	ON	ON	ON/OFF	○	—
	Speed Sensitive Auto Door Lock Function	OFF*	OFF*	OFF*	—	○	—
Door Lock Control System	All Door's Unlock Operation (Door Key Operated Twice)	OFF	ON	ON	ON/OFF	○	—
	All Door's Unlock Operation (Opening the driver's door within 10 seconds after turning the ignition switch from ON to OFF)	OFF	OFF	OFF	ON/OFF	—	○
	All Door's Unlock Operation (With the ignition switch ON, and vehicle speed 0, engaging the shift lever to the P range)	OFF	OFF	OFF	ON/OFF	—	○
	All Door's Unlock Operation (With the ignition switch ON, engaging the shift lever to the D range. However, once the locks operate, they will not operate until the ignition switch is turned again from OFF to ON.)	OFF*	OFF*	OFF*	—	—	○

*: Unable to change

System	Content	Initial Setting			Selection	Customer Recognition	Customer Unrecognizableness
		Europe	Australia	G.C.C. Countries			
Theft Deterrent System	Theft Deterrent System	ON*	ON*	ON*	—	○	—
	Alarm operation time	27.5 sec.*	27.5 sec.*	60 sec.*	—	○	—
	Passive Mode	OFF*	OFF	OFF	ON/OFF	○	—
	Operation Verification Light Function	Parking Lights	Parking Lights	Parking Lights	Parking Lights/OFF	○	—
Power Window System	Key-Linked Open Operation	ON	ON	ON	ON/OFF	○	—
	Key-Linked Close Operation	ON	ON	ON	ON/OFF	○	—
	Transmitter Operation Linked Open Operation	ON	ON	ON	ON/OFF	○	—
	Transmitter Operation Linked Close Operation	ON	OFF*	ON	ON/OFF	○	—
Moon Roof	Door Key Linked Open Operation	ON	ON	ON	ON/OFF	○	—
	Door Key Linked Close Operation	ON	ON	ON	ON/OFF	○	—
	Transmitter Operation Linked Open Operation	ON	ON	ON	ON/OFF	○	—
	Transmitter Operation Linked Close Operation	ON	OFF*	ON	ON/OFF	○	—
	Door Key Linked Operation Selection	Slide	Slide	Slide	Slide/Tilt	○	—
	Transmitter Operation Linked Operation Selection	Slide	Slide	Slide	Slide/Tilt	○	—
Illuminated Entry System	Interior lights illuminate when the doors are unlocked by the operation of the door key.	ON	ON	ON	ON/OFF	○	—
	Interior Light Illumination Time	15 sec.	15 sec.	15 sec.	7.5/15/30 (sec.)	○	—

*: Unable to change

System	Content	Initial Setting			Selection	Customer Recognition	Customer Unrecognizableness
		Europe	Australia	G.C.C. Countries			
Reminder System	Key Reminder Buzzer Volume	—	—	Large	Small/Medium/Large	○	—
	Key Reminder Buzzer Sound- ing Interval	—	—	0.9 sec.	0.6/0.9/1.2 (sec.)	○	—
	Light Reminder Buzzer	ON	OFF	OFF	ON/OFF	○	—
	Seat Belt Warning Buzzer	OFF	OFF	ON*	ON/OFF	○	—
Automatic Light Control System	Delay Time of Taillights Illumination	—	0.1 sec.	0.1 sec.	1.0/0.1 (sec.)	○	—
	Sensitivity Adjustment	0	0	0	-40/-20/0/+20/+40 (%)	○	—
	Display Dimmer Level Light Sensitivity Control (for dimming)	0	0	0	-2/-1/0/+1/+2	○	—
	Display Dimmer Level Light Sensitivity Control (cancel dimming)	0	0	0	-2/-1/0/+1/+2	○	—
Power Tilt and Telescopic Steering	Auto Tilt Away operation	ON	ON	ON	ON/OFF	○	—
Air Conditioner	Set Temperature Shift Control Function	0	0	0	-2/-1/0/+1/+2 (°C)	—	○
	With the Cool Down, Air Inlet Mode Automatically Switch Function	ON	ON	—	ON/OFF	—	○
	Automatic Mode Linked Compressor Control Function	ON	ON	ON	ON/OFF	—	○
	Defroster Linked Compressor Control Function	ON	ON	ON	ON/OFF	—	○
	Air Inlet Mode Switch Function (with the Pressure Switch OFF or Compressor Lock	ON	ON	ON	ON/OFF	—	○

*: Unable to change

LEXUS NAVIGATION SYSTEM (European Models Only)

■ DESCRIPTION

The Lexus navigation system displays the operating conditions of the air conditioner and of the audio system, trip information that is enclosed in the center cluster.

Furthermore, based on the GPS (Global Positioning System) voice navigation function, it analyzes the position of the vehicle and indicates that position on the map that is displayed on the screen, and provides voice instructions to guide the driver through the route to reach around the destination that has been selected. The basic construction and operation of this system are the same as in the LS400.

However, in the Lexus navigation system of the new GS300, the air conditioner temperature that is set for the driver, the temperature that is set for the front passenger, and the outside air temperature are displayed on the screen.

Listed below are the main functions of the Lexus Navigation system.

Function	Outline
Navigation Function	● Displays the present location and the direction of travel. ● Zooms in and out, rotates, and moves the map. ● Measures and corrects the present location. ● Sets and displays the route. ● Sets the destination. ● Zooms in at intersections and gives voice guidance. ● Displays the remaining distance to the destination and the expected time of arrival. ● Automatically resumes a route search. ● Searches for facilities in the vicinity of the present location. ● Registers, corrects, deletes, and displays Marked Points and Avoid Area. ● Enables or disables the display of the locus of travel. ● Corrects of coefficient of distance. ● Adjusts the voice guidance volume.
Audio Screen Display Function	Displays the operating condition of audio system.
Air Conditioner Screen Display Function	Displays the operating condition of the air conditioner.
On-Board Computer Screen Display Function	● Displays trip information/memory. ● Displays screen quality adjustment. ● Changes the units. ● Displays the possible continuous travel distance. ● Switches between day and night display.
On-Screen Display Function	● Displays the operating condition of audio system. ● Displays the outside temperature.
Diagnosis Screen Display Function	● Displays system diagnosis. ● Displays various types of coefficient settings.