

4. Appendix

MAJOR TECHNICAL SPECIFICATIONS

Item			Area	Europe		
Body Type			5-Door Wagon			
Vehicle Grade			—			
Model Code			MCU15L-AWPGKW	MUC15R-AWPGKW		
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	4580 (180.3)	←	5
		Width	mm (in.)	1815 (71.5)	←	
		Height	mm (in.)	1660 (65.4)	←	
	Wheel Base		mm (in.)	2615 (103)	←	
	Tread	Front	mm (in.)	1565 (61.6)	←	
		Rear	mm (in.)	1550 (61.0)	←	10
	Room	Length	mm (in.)	—	—	
		Width	mm (in.)	—	—	
		Height	mm (in.)	—	—	
	Overhang	Front	mm (in.)	930 (36.6)	←	
		Rear	mm (in.)	1035 (40.7)	←	15
	Min. Running Ground Clearance		mm (in.)	—	—	
	Angle of Approach		degrees	280	←	
	Angle of Departure		degrees	220	←	
	Curb Weight	Front	kg (lb)	—	—	
		Rear	kg (lb)	—	—	20
	Gross Vehicle Weight	Total	kg (lb)	—	—	
		Front	kg (lb)	—	—	
		Rear	kg (lb)	—	—	
Total		kg (lb)	—	—		
Fuel Tank Capacity		ℓ (Imp.gal.)	73 (16.06)	←	25	
Luggage Compartment Capacity*1		m ³ (cu.ft.)	1.076 (37.9)/0.905 (31.9)	←		
Performance	Max. Speed		km/h (mph)	180 (112)	←	
	Max. Cruising Speed		km/h (mph)	—	—	
	Acceleration	0 to 100 km/h	sec.	—	—	
		0 to 400 m	sec.	—	—	30
	Max. Permissible Speed	1st Gear	km/h (mph)	62 (39)	←	
		2nd Gear	km/h (mph)	111 (69)	←	
		3rd Gear	km/h (mph)	173 (108)	←	
		4th Gear	km/h (mph)	180 (112)	←	
	Min. Turning Radius	Tire	m (ft.)	—	—	35
Body		m (ft.)	—	—		
Engine	Engine Type		1MZ-FE	←		
	Valve Mechanism		24-Valve, DOHC	←		
	Bore × Stroke		mm (in.)	87.5 × 83.0 (3.44 × 3.27)	←	
	Displacement		cm ³ (cu.in.)	2995 (182.7)	←	40
	Compression Ratio		10.5 : 1	←		
	Carburetor Type or Injection Pump Type (Diesel)		EFI	←		
	Research Octane No. or Cetane No. (Diesel)		91 or higher	←		
	Max. Output (EEC)		kW/rpm	—	—	
Max. Torque (EEC)		N-m/rpm	—	—	45	
Engine Electrical	Battery Capacity (5HR)	Voltage & Amp. hr.	12 – 56	←		
	Alternator Output	Watts	1560	←		
Chassis	Starter Output		kW	1.4	←	
	Clutch Type		—	—		
	Transaxle Type		—	U140F	←	50
	Transmission Gear Ratio	In First	—	3.938	←	
		In Second	—	2.194	←	
		In Third	—	1.411	←	
		In Fourth	—	1.019	←	
		In Reverse	—	3.141	←	55
	Counter Gear Ratio		—	—	—	
	Differential Gear Ratio (Final)		—	3.291	←	
	Transfer and Rear Differential Gear Ratio		—	2.928	←	
	Rear Differential Gear Size		in.	6.69	←	
	Brake Type	Front	—	Ventilated Disc	←	60
		Rear	—	Solid Disc	←	
	Parking Brake Type		—	Drum	←	
	Brake Booster Type and Size		in.	Tandem 8.5" +8.5"	←	
	Proportioning Valve Type		—	—	—	
	Suspension Type	Front	—	MacPherson Strut	←	65
		Rear	—	MacPherson Strut	←	
Stabilizer Bar	Front	—	STD	←		
	Rear	—	STD	←		
Steering Gear Type		—	Rack and Pinion	←		
Steering Gear Ratio (Overall)		—	16.0 : 1	15.7 : 1	70	
Power Steering Type		—	Integral Type	←		

*1: Min./Max.

FOREWORD

To assist you in your sales and service activities, this manual explains the main characteristics of the new LEXUS RX350/330/300, in particular providing a technical explanation of the construction and operation of new mechanisms and new technology used.

Applicable models: MCU15 series

This manual is divided into 4 sections.

- 1. Introduction** — Exterior appearance and model code.
- 2. New Model Outline** — Explanation of the product to give a general understanding of its features.
- 3. Technical Description** — Technical explanation of the construction and operation of each new system and component.
- 4. Appendix** — Major technical specifications of the vehicle.

CAUTION, **NOTICE**, **REFERENCE** and **NOTE** are used in the following ways:

CAUTION	A potentially hazardous situation which could result in injury to people may occur if instructions on what to do or not do are ignored.
NOTICE	Damage to the vehicle or components may occur if instructions on what to do or not do are ignored.
REFERENCE	Explains the theory behind mechanisms and techniques.
NOTE	Notes or comments not included under the above 3 titles.

For detailed service specifications and repair procedures, refer to the following Repair Manuals:

Manual Name		Pub. No.
● LEXUS RX300 Repair Manual	Vol. 1	RM785E1
	Vol. 2	RM785E2
● LEXUS RX300 Electrical Wiring Diagram		EWD422F

All information contained herein is the most up-to-date at the time of publication. We reserve the right to make changes without prior notice.

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1. Introduction

EXTERIOR APPEARANCE



187IN01



187IN02

MODEL CODE AND MODEL LINE-UP

MODEL CODE

MCU15 L – A W P G K W

1
2
3
4
5
6
7
8

IN

1	BASIC MODEL CODE
	MCU15 : LEXUS RX300 With 1MZ-FE Engine

5	GEAR SHIFT TYPE
	P : 4-Speed Automatic

2	STEERING WHEEL POSITION
	L : Left-Hand Drive R : Right-Hand Drive

6	GRADE
	G : –

3	MODEL NAME
	A : RX300

7	ENGINE SPECIFICATION
	K : Compact DOHC and EFI

4	BODY TYPE
	W : 5-Door Wagon

8	DESTINATION
	W : Europe

MODEL LINE-UP

DESTINATION	ENGINE	GRADE	DRIVE TYPE	TRANSAXLE
				U140F
Europe	1MZ-FE	–	Full - Time 4WD	MCU15L-AWPGKW
				MCU15R-AWPGKW

2. New Model Outline

CONCEPT

The long awaited LEXUS RX300 Debuts! A highly dimensional new concept vehicle homogenizing the usability of a high-class passenger vehicle and an RV.

The active yet stylish design ensures an imposing image around the city.

Surpassing quietness and high seat positioning for easy driving.

Added to this.... handling that adjusts easily to slightly uneven road surfaces.

Displaying the superior capacity to cope with any conditions - heedless of time and place....
we are proud to announce the debut of the SPORTS UTILITY VEHICLE —

<LEXUS RX300>!

A new concept vehicle with all-round functions that ensures all drivers can get the maximum
and best use of this excellent new vehicle.



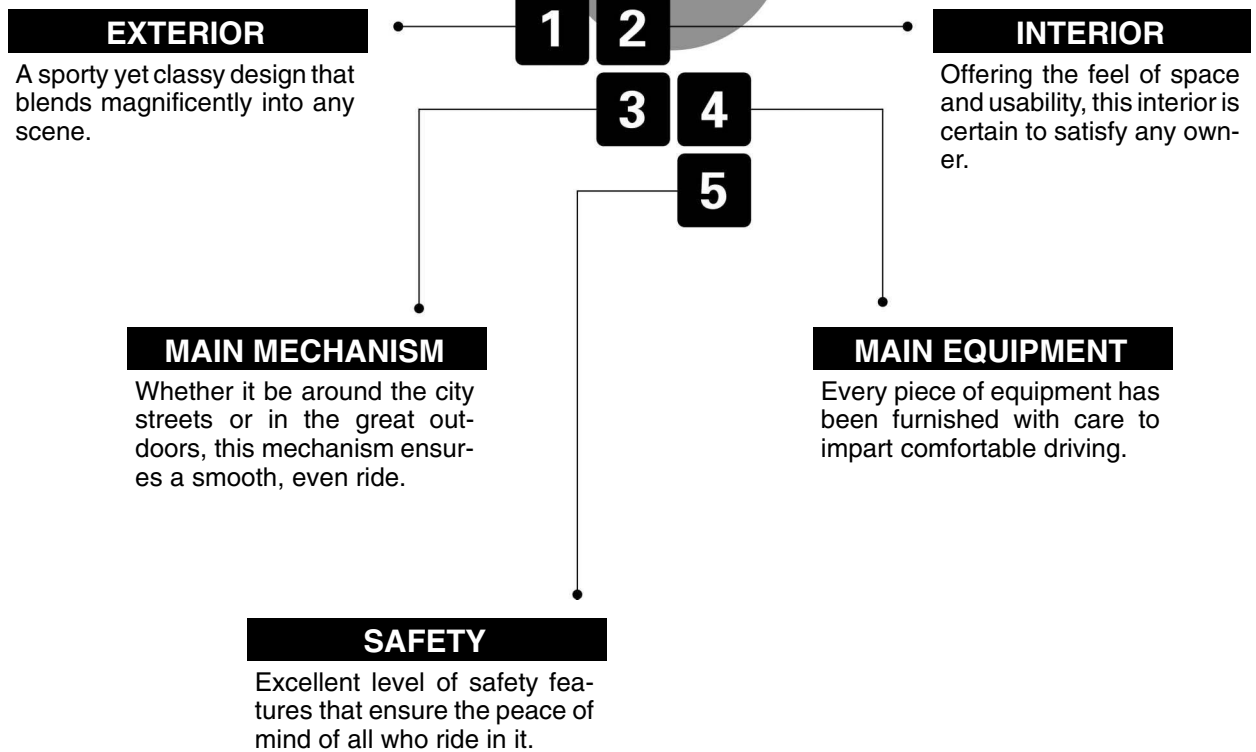
187IN01

SUV

SPORTS UTILITY VEHICLE

MO

LEXUS RX300 **5** FEATURES



EXTERIOR

A sporty yet classy design that blends magnificently into any scene.

Front Design

A strong and gutsy front view that will allure anyone who sees it.

- The grill with horizontal bars of differing thickness produces a classy yet sporty image.
- The head lamp extension has been treated with green smoke plating for a sharp design.
- The middle grill has been made the same color as the rest of the exterior to achieve a masked-look front with a low center of gravity.



187IN01

Side Design

A forward cab, flowing silhouette.

- A short nose and long deck have been utilized to create the appeal of a new generation SUV.
- The carrier section of the roof carrier slides to ensure ease of use.



187MO01



Rear Design

The rear design has been enlarged and rounded to exhibit width.

- The rear window with a wide feel and rear panel produce top quality appeal.
- The rear combination lamps have taken “roundness” as their motif for a sporty look.
- The positioning of cylindrical, barrel-shaped tail and stop lens in the dark smoke plated extensions and of plated turn signal and back-up light and rear fog light a level below has produced a rear view which expresses a characteristic and high-class feel.



187IN02

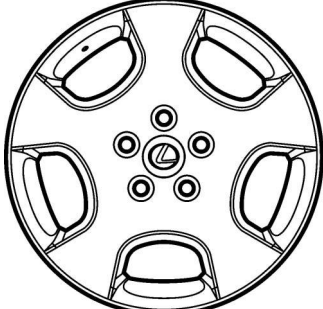
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Tire & Disc Wheel

215/70R16 6.5J aluminum wheels are standard.

225/60R16 6.5J aluminum wheels are optional for LHD models.

Size	215/70R16 6.5J	225/60R17 6.5J (OPTION)
Off-set (mm)	35	35
P.C.D.* (mm)	114.3	114.3
Design	 187MO02	 187MO03

*: Pitch Circle Diameter

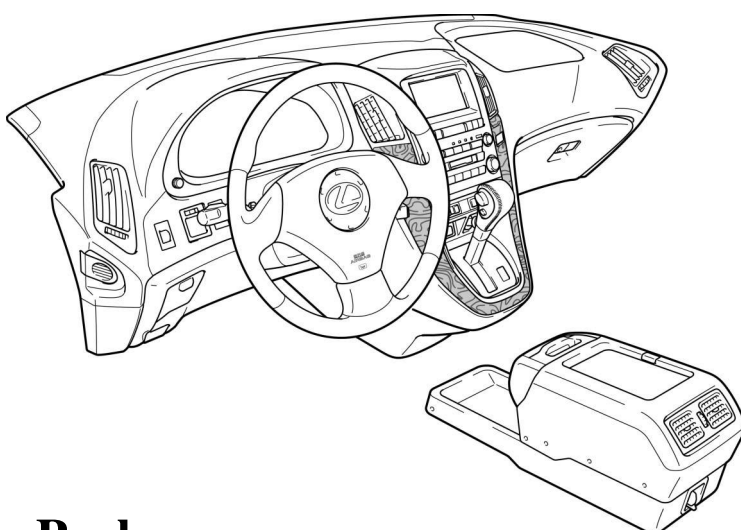
INTERIOR

Offering the feel of space and usability, this interior is certain to satisfy any owner.

Instrument Panel

Polished design and superior functionality lend support to comfortable driving.

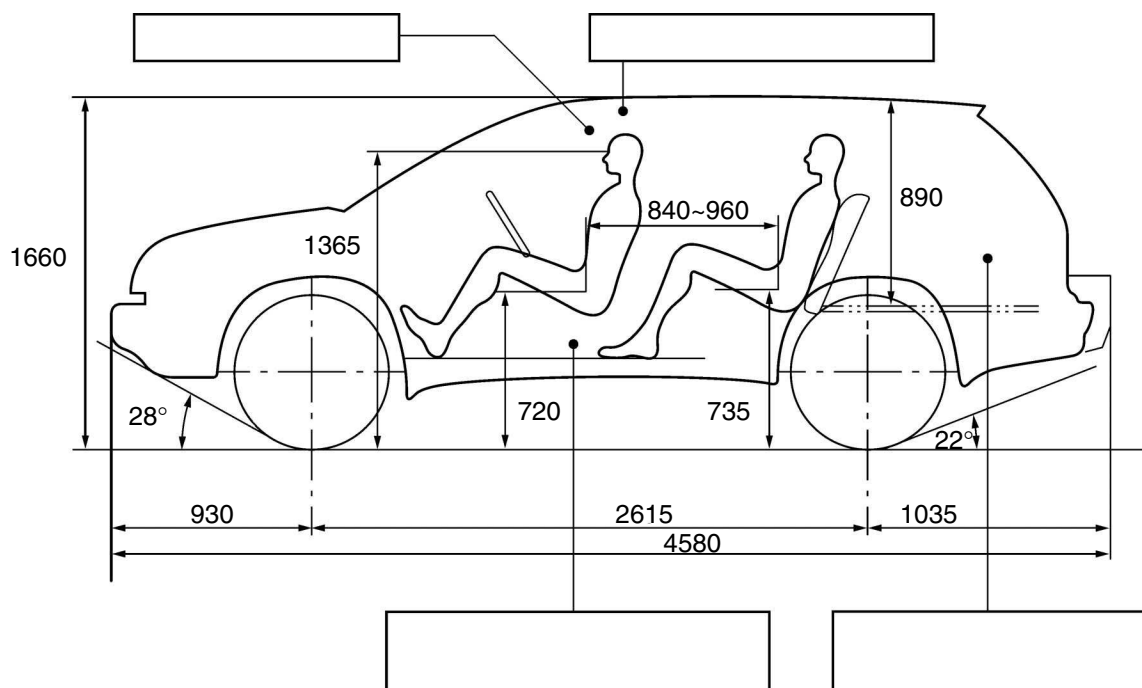
- The center cluster is provided in aluminum. A wood-paneled version is available as an option.
- The shift lever knob and steering wheel are of real leather. Leather & wood assembly is optional.



187MO04

Package

An outstanding package giving full consideration to ease of access and seating comfort, with the following features:



D05



Meter

An optitron meter with luminescent characters, indicators and scales has been adopted.

- Three-eye graphic meter has both a sporty and high-class feel in addition to superior ease of visual confirmation.



187BE04



187BE05



Seat

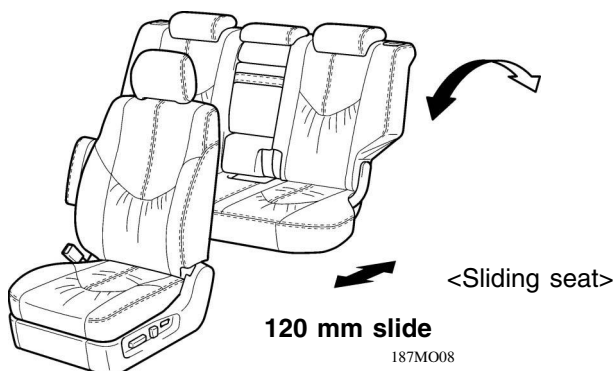
High quality seats providing the relaxed feel of first-class seating.

[Front Seat]

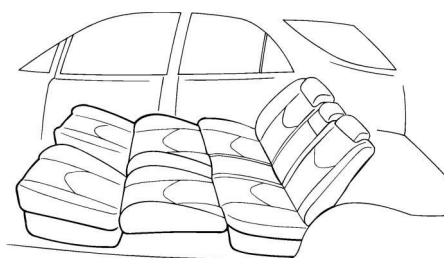
- Arm rests have been set for the driver's and front passenger's seats, supporting the comfort of those riding in the front.
- The front seats can be reclined backwards to a semi-flat position to create a relaxed and spacious effect.
- An 8-way power seat has been adopted for both the driver's and front passenger's seats.
- Fabric seats are standard. Leather specification seats are available as an option.

[Rear Seat]

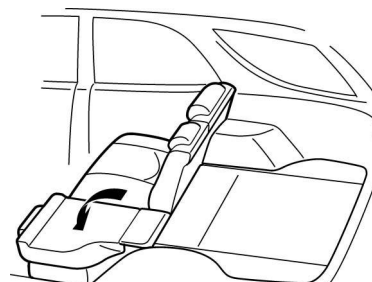
- The rear seat is fitted with a slide of 120 mm in length which enables the seat to be slid to four different positions.
- A 6:4 dividable fold-down seat has been adopted. Furthermore, the rear seat is fitted with a one-touch fold-down mechanism, which enables the seat to slide back and fold down at the touch of a button even when the seat has been slid fully forward.
- Headrests for 3 seats have been provided.
- Fabric seats are standard. Real leather specifications are available as an option.



187MO08



187MO09



187MO10

MAIN MECHANISM

Whether it be around the city streets or in the great outdoors, this mechanism ensures a smooth, even ride.



V6 3L 1MZ-FE Engine

Fitted with a V6 3-liter 1MZ-FE engine which utilizes VVT-i and ACIS (3-stage Acoustic Control Induction System). This engine achieves unrivalled quietness and torque at low and medium speeds, in addition to excellent fuel economy.

VVT-i (Variable Valve Timing intelligent)

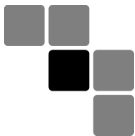
The timing of the opening and closing of the intake valves is controlled by the computer according to driving conditions, such as engine speed and level of acceleration. Thus, smooth intake and exhaust are achieved to greatly improve torque in the low and medium speed zones. This also contributes to better fuel economy and reducing of exhaust emission.

ACIS (3 Stage Acoustic Control Induction System)

This system switches between 3 stages of the intake manifold in accordance with engine speed and throttle opening angle through the use of control valves which have been fitted at 2 positions along the length of the induction path. This greatly improves induction efficiency and torque in the low and medium speed range.

Active Control Engine Mount

This function utilizes the negative pressure of the engine to move the diaphragm inside the engine mount, thus actively controlling the mount characteristics. This reduces vibration at idling. As a result, the RX300 realizes the superior quietness which is proof of it being a high-class vehicle.



Automatic Transaxle

- The compact and high-capacity 4-speed U140F automatic Super ECT (Electronically Controlled Transaxle) has been adopted to match the output characteristics of the new 1MZ-FE engine

It is a compact, lightweight, and highly rigid automatic transaxle in which the transaxle, front and center differentials, and the transfer unit have been integrated into a compact package.

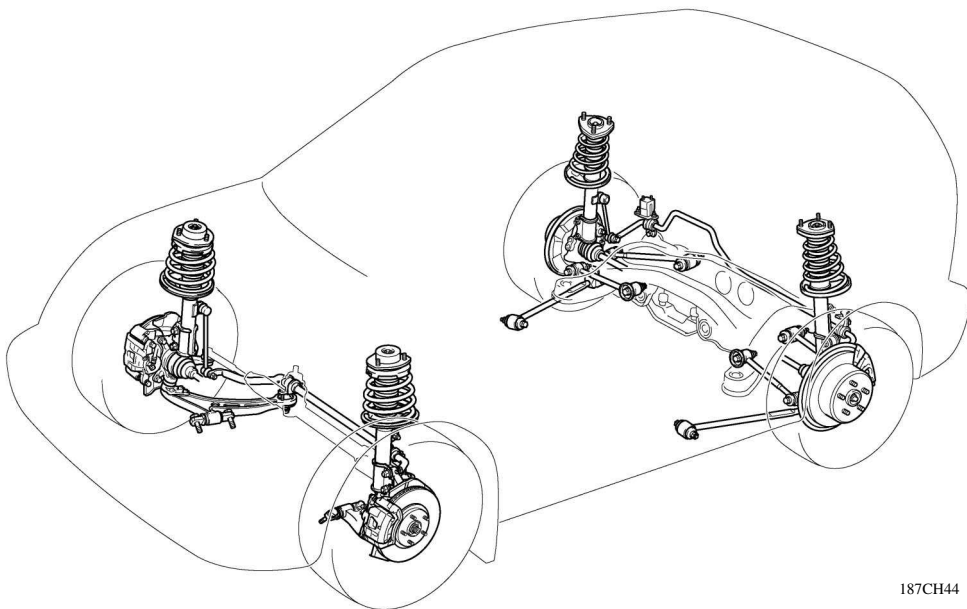
Transfer

5-pinion type and 4-pinion type are adopted as the center differential and front differential of the 4WD type.

A viscous coupling is adopted as the center differential restricting mechanism.

Suspension

MacPherson strut type suspension has been selected for the front and the rear. This combination realizes superior riding comfort and stable drive even on rough roads.

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187CH44

MAIN EQUIPMENT

Every piece of equipment has been furnished with care to impart comfortable driving.

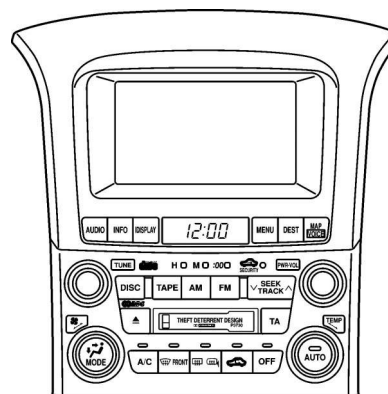


Multi-Information Display

- A 5.8 inch liquid crystal touch panel type multi-information display is standard.
- Information screens for audio operation status and operation screen can be indicated on the multi-information display. Furthermore, a clock and the outside temperature display are also indicated on the screen.

[Audio System]

- An AM/FM cassette and 6-speaker system compatible with the multi-information display has been adopted.
- As the touch panel type is used to operate audio system, the multi-information display simultaneously indicates the operating status of the audio system.
- A power pole antenna has been provided at the bottom of the right side quarter window.



RHD Model 187MO11

[GPS Voice Navigation]

- GPS voice navigation has been adopted as an option. *Some areas not included.
- A 2-screen display function which can display map and turn list or map and enlarged intersection has been included.
- By utilizing DVD (Digital Versatile Disc) as the memory media for map data, it is now possible to handle a large volume of data.

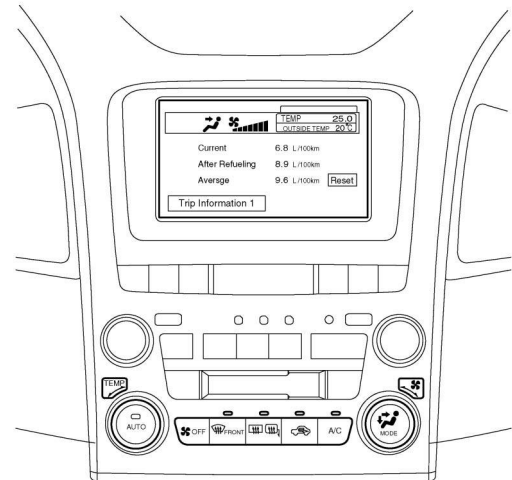
Main Function of Multi-Information Display

Screen	Function
Map screen display (option)	Enlargement / reduction, rotation and movement of map
	Indication of current position and direction of travel
	Correction of current position
	Setting, change and indication of route
	Voice guidance
	Indication of enlarged intersections
	Memory and indication of map position
Audio screen	Status of audio equipment and audio operation screen indication
Trip information screen	Distance after refueling & average speed indication
	Fuel consumption screen indication
Adjustment screen	Sound quality adjustment screen indication
	Image quality adjustment screen indication
	No indication
On-screen indication	Audio status indication
	Air conditioner status indication
	Warning indication
Interrupt screen	Warning indication
Diagnosis screen display	Displays system diagnosis
	Displays various types of coefficient settings

Air Conditioner

An automatic air conditioner that has given full consideration to ease of use is fitted as standard.

- A clean air filter which removes pollen and dust has been fitted as standard for purifying the air inside the cab.
- The set temperature, vent outlet mode and air flow level are each indicated on the multi-information display.



LHD Model

187BE32

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Wireless Door Lock Remote Control System

An convenient integrated wireless door lock system, which makes it possible to lock and unlock all doors on the vehicle without inserting the ignition key in the door has been selected as standard on all models. When the doors are locked, the hazard lights blink as an answer back. Furthermore, a double locking function has also been included. When all the doors are locked using the door key or by wireless, this function makes it impossible to open the doors from inside of the cab in order to prevent theft of the car, etc. - unlocking is only possible using the key or by wireless.

Power Window System

All door windows have been fitted with power windows including auto up/down and jam protection functions.

Engine Immobiliser System

An immobiliser system and security system have been fitted as standard equipment. The immobiliser system is a theft prevention device which will not allow the engine to start is any other than the correct key is used. This system is constructed so that the engine will only start if the ID code of the transponder chip buried in the key and the ID code registered in the Engine ECU match.

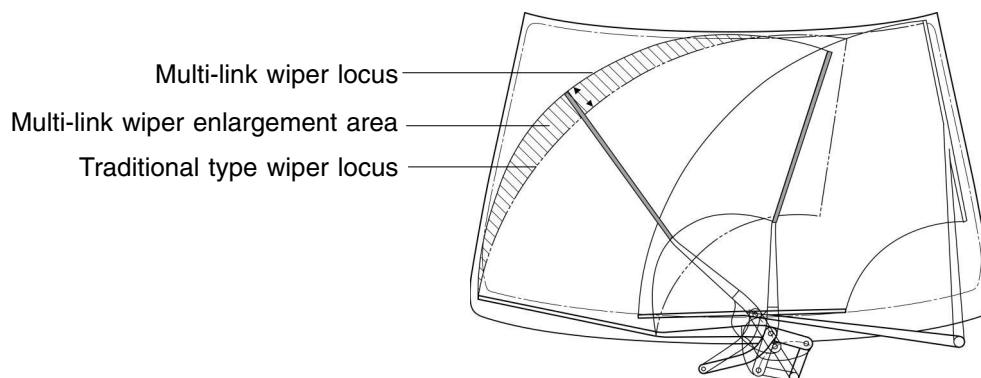
Theft Deterrent System

When any attempt is made to forcibly enter the vehicle or open the hood or back door with anything other than the wireless, or when the battery terminals are removed and reconnected, this system sounds the horn and siren and flashes the interior and hazard lights for approximately 27.5 seconds to alert the owner. At the same time it locks all doors.

MAIN EQUIPMENT

Multi-Link Wiper

A Multi-link wiper with a larger wipe surface area in front of the front passenger seat when compared with traditional link type wipers has been selected for the RX300. This helps ensure clear frontal vision in the rain.

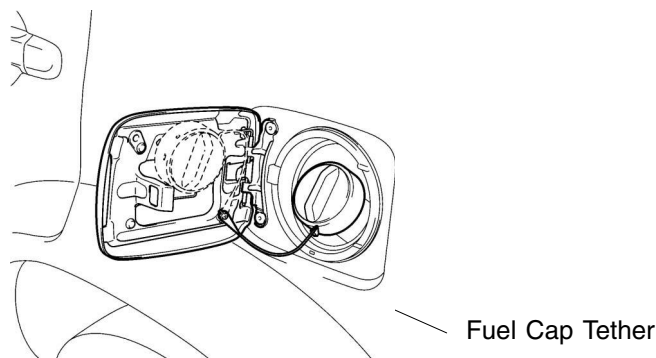


186T-047

187MO13

Fuel Cap Tether

There is no concern over losing the fuel cap as a tether, which joins it to the fuel lid, has been fitted.



187MO14

EC Mirror (option)

This mirror uses an EC (electrochromic) element, which automatically reduces the reflectivity of the inside and outside mirrors, in order to reduce the amount of glare from headlights from the rear.

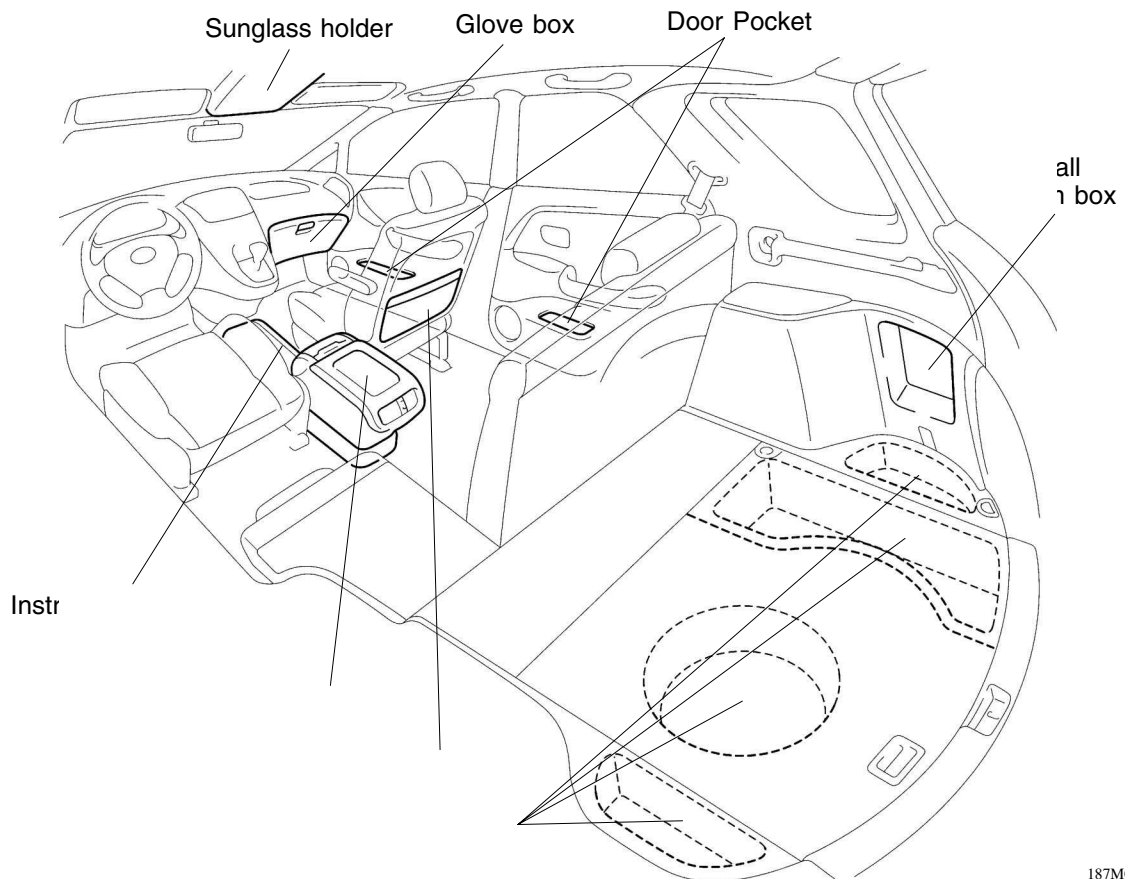
Door Key Cylinder with Free Wheel Function

This is a function to protect the key cylinders of front door and back door from being damaged. If anything other than the correct key is inserted in the key cylinder and turned, it will simply turn round and round inside the cylinder.



Cargo & Storage Space

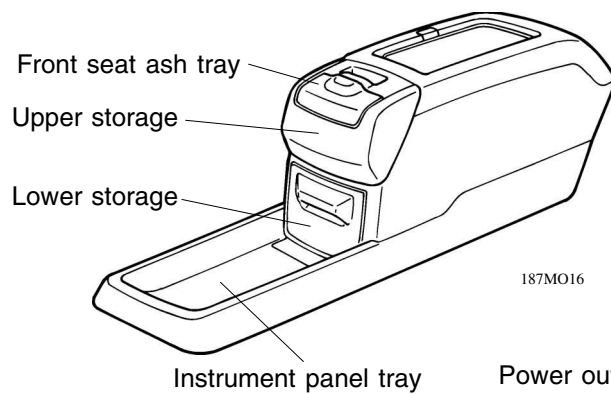
A variety of storage space has been provided to further improve functionality.



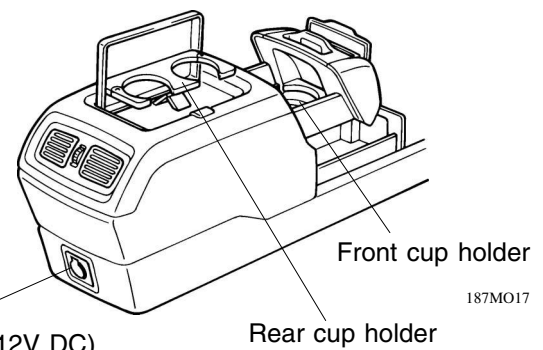
187MO15

[Multifunctional console with 2-layer type sliding box]

The console is a large, 2-layer pull out type. Integrated with the console is the rear seat cup holder and power outlet, etc. to ensure it is compatible with a variety of uses.



187MO16



187MO17

SAFETY

Excellent level of safety features that ensure the peace of mind of all who ride in it.



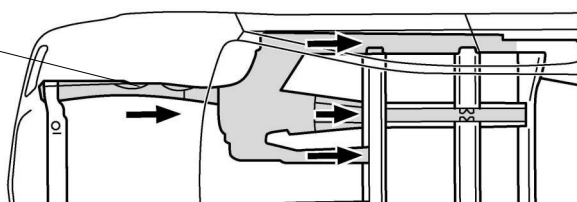
Passive Safety Body

An impact absorbing body which absorbs and distributes the impact from front and side collisions to ease the effects of the impact on the driver and passengers, and a high-strength body structure which minimizes deformation of the cabin itself have been adopted as passive safety measures.

[Frontal Collisions]

The front section of the body frame and underbody absorb and distribute the load generated by a frontal collision, while the strong cabin frame eases the effect of the impact on the driver and passengers and minimizes deformation of the cabin.

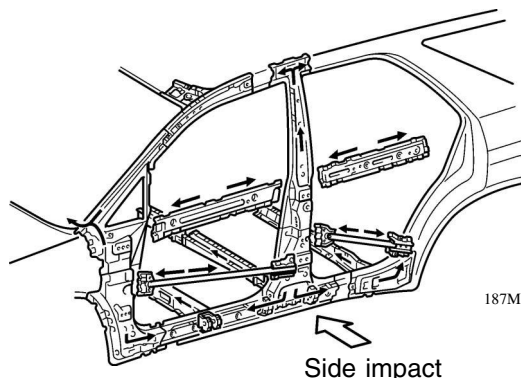
The front side members are of a straight design to be effectively deformed from the front end. Also, in the event of a front collision, the force of the impact is effectively distributed to each of the braces and members through the sections where they join the cabin.



187MO18

[Side Collisions]

Along with the body structure which effectively absorbs and distributes the load on the frame in side collisions, we have maintained the strength of each pillar, rocker panel and door to minimize deformation of the cabin.



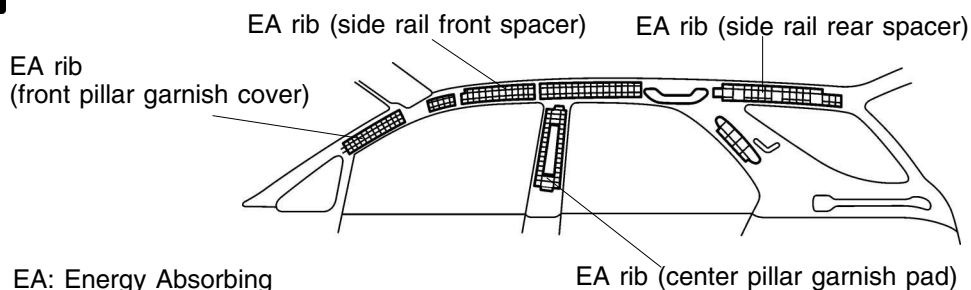
187MO19

Side impact



Head Impact Protection Structure

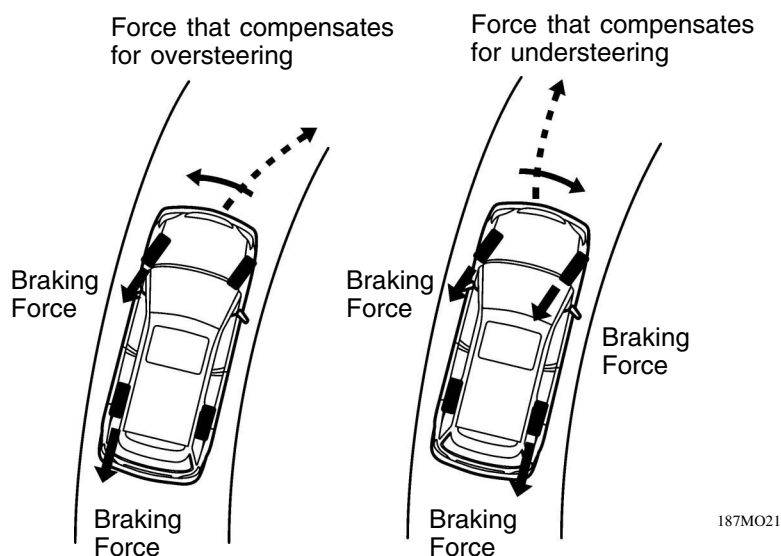
The construction adopted for the pillar trims and roof sides gives full consideration to protecting the heads of the driver and passengers in the event of a collision.



187MO20

VSC (Vehicle Stability Control)

The primary purpose of the ABS and TRC system has been to help the vehicle's stability during braking and acceleration. In contrast, the purpose of the VSC system is to help the vehicle's stability during cornering. Depending on the unexpected situations or external elements such as the ground surface conditions, vehicle speed, and emergency avoidance maneuvers, the vehicle may exhibit strong understeer or oversteer tendencies. In such situations, the VSC system dampens the strong understeer or oversteer to help vehicle stability.



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Brake Assist

The primary purpose of the Brake Assist system is to provide an auxiliary brake force assist to the driver who cannot generate a large brake force during emergency braking, thus maximizing the vehicle's brake performance.

SRS Airbag

SRS airbags are standard for the driver's and front passenger's seats on all models. In the event of a frontal collision, the airbags function to support the seatbelts in reducing the impact to the driver and front passenger. SRS side airbags, which ease the impact in side collisions are also provided as standard.

ABS with EBD

ABS, which prevents wheel locking during braking, thus contributing to ensuring vehicle stability and steering performance has been adopted for the RX300. Further, EBD (front and rear braking force distribution control) which uses the ABS hydraulic control unit to realize proper braking force distribution between front and rear wheels in accordance with driving conditions, is provided as a set with the ABS. EBD also controls the braking forces of right and left wheels, helping maintain the vehicle stability during cornering braking. These functions make it possible to ensure the excellent braking performance.

Seat Belt with Pretensioner & Force Limiter

A pretensioner which takes up the slack in the seat belt in a collision and a force limiter which eases the effect of the impact from the seat belt on the chest have been selected for the front seats. For the rear seats as well, 3 sets of 3-point ALR/ELR seat belts have been set selected as standard.



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Опубликованная на данном веб-сайте информация предназначена и доступна только для пользователей, которые имеют достаточные профессиональные и технические навыки, знания и квалификацию, а также все необходимое оборудование и инструменты. Определенные операции ремонта и технического обслуживания должны выполняться с использованием соответствующего оборудования и инструментов, а также запасных частей или узлов. Ответственность за любую операцию ремонта и технического обслуживания, предпринятую любым пользователем данного сайта на основании, в результате или в связи с технической информацией, опубликованной на данном сайте, несет исключительно сам пользователь, а Toyota Motor Europe NV/SA, любые ее дочерние компании и/или национальные дистрибьюторы не могут нести ответственность ни за какие телесные повреждения, имущественный ущерб, потери, затраты и любой прочий ущерб, либо за нарушение любых законодательных или регуляторных положений, возникшее в результате такой операции ремонта и технического обслуживания.

2. Гарантийная информация, содержащаяся в данных документах

Любая информация, связанная с условиями любой специальной гарантии, предоставляемой Toyota Motor Europe NV/SA и всеми ее дочерними компаниями и/или национальными дистрибьюторами, и включенная в любой документ, опубликованный на данном сайте, не является технической информацией. Эта информация относится к прежним гарантийным обязательствам, принятым на себя Toyota Motor Europe NV/SA и любыми ее дочерними компаниями и/или национальными дистрибьюторами, и, как следствие, Toyota Motor Europe NV/SA и любые ее дочерние компании и/или национальные дистрибьюторы не связаны этими гарантийными обязательствами, а также любыми их условиями. Ни при каких обстоятельствах такая информация не означает обязательств или обещаний Toyota Motor Europe NV/SA и любых ее дочерних компаний и/или национальных дистрибьюторов относительно применения, расширения или обновления этой гарантии.

3. Право на усовершенствование или ремонт

Из того факта, что сегмент технической информации, относящийся к конкретному усовершенствованию или ремонтным работам для любой определенной группы автомобилей, опубликован на данном сайте, и что автомобиль, принадлежащий пользователю сайта или эксплуатируемый им, принадлежит к этой группе, не следует, что автомобиль пользователя должен фактически подвергаться данному усовершенствованию или ремонту, или что владельцу или пользователю предоставляется право на такой ремонт либо за вознаграждение, либо в рамках гарантийного обслуживания.



Service Bulletin

Section: Chassis / Power
Train
Ref. No.: CP-7003

Date: Feb., 2007
Page: 1 of 2

Area Application : Все страны

Model Name : LS600hL, LS600h, LS460L, LS460, LS430, LS400, GS300, GS350, GS400, GS430, GS450h, SC430, SC400, SC300, ES350, ES330, ES300, ES250, IS200, IS250, IS300, IS350, IS220d, LX450, LX470, GX470, RX300, RX330, RX350, RX400h

Model Code : ALL MODELS

Subject : ОЧИСТКА ПРИ УСТАНОВКЕ НОВОГО ПРИВОДНОГО ВАЛА

Резьбовая часть нового приводного вала (поверхность, контактирующая с гайкой ступицы) покрыта антикоррозионной консистентной смазкой.

Если при установке нового приводного вала гайка ступицы затягивается без удаления антикоррозионной смазки с приводного вала, приложенный момент затяжки может превышать номинальный.

Данная процедура предназначена для удаления антикоррозионной смазки с новых приводных валов и подразумевает тщательное и полное ее удаление при установке нового приводного вала.

Part No. Information :

№ детали	Наименование детали	К-во
Не применимо	Не применимо	Не применимо

Production Effective :

VIN	Дата производства
Не применимо	Не применимо

Service Bulletin

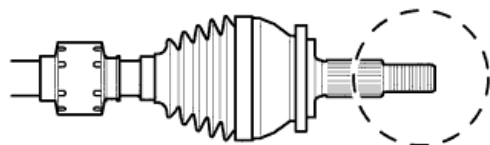
Ref. No.: CP-7003

Page: 2 of 2

ПРИВОДНОЙ ВАЛ ПРИВОДНОЙ ВАЛ В СБОРЕ

ОЧИСТКА

ОЧИСТИТЕ ПРИВОДНОЙ ВАЛ



C139511

Используя растворитель, не содержащий смолистых веществ, полностью удалите антикоррозионную консистентную смазку, масло и посторонний материал с резьбовой части приводного вала (с поверхности, вступающей в контакт с гайкой ступицы).

Notice:

- Если приводной вал используется повторно, и на нем имеется масло или посторонний материал, очистите приводной вал.
- Если масло или посторонний материал имеется на гайке ступицы, очистите ее в таком же порядке.
- Если имеется указание, запрещающее повторное использование гайки ступицы, всегда используйте новую гайку ступицы.



Отказ от ответственности

1. Использование технической информации

Опубликованная на данном веб-сайте информация предназначена и доступна только для пользователей, которые имеют достаточные профессиональные и технические навыки, знания и квалификацию, а также все необходимое оборудование и инструменты. Определенные операции ремонта и технического обслуживания должны выполняться с использованием соответствующего оборудования и инструментов, а также запасных частей или узлов. Ответственность за любую операцию ремонта и технического обслуживания, предпринятую любым пользователем данного сайта на основании, в результате или в связи с технической информацией, опубликованной на данном сайте, несет исключительно сам пользователь, а Toyota Motor Europe NV/SA, любые ее дочерние компании и/или национальные дистрибьюторы не могут нести ответственность ни за какие телесные повреждения, имущественный ущерб, потери, затраты и любой прочий ущерб, либо за нарушение любых законодательных или регуляторных положений, возникшее в результате такой операции ремонта и технического обслуживания.

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Бюллетень технического обслуживания

Раздел: Шасси /
силовая
передача
Номер СР-7009
ссылки:
Дата: Октябрь 2007 г.

Страница: 1 из 13

Регион : Европа, Австралия, без специального рынка сбыта

Название модели : LS600hL, LS600h, LS460L, LS460, LS430, LS400, GS300, GS350, GS400, GS430, GS450h, GS460, SC430, SC400, SC300, ES350, ES330, ES300, ES250, IS200, IS250, IS300, IS350, IS220d, IS F, LX450, LX470, GX470, RX300, RX330, RX350, RX400h

Код модели : ДЛЯ ВСЕХ МОДЕЛЕЙ

Тема : АВТОМОБИЛЬ УВОДИТ В ОДНУ СТОРОНУ

Данный бюллетень содержит общую информацию по диагностике и устранению увода автомобиля, а также специальную информацию, помогающую уточнить жалобы на увод.

Эта информация дополняет процедуры, указанные в Руководстве по ремонту, когда присутствуют следующие признаки:

- Водитель удерживает рулевое колесо, не прикладывая к нему усилие для поворота при движении вперед, а автомобиль смещается вправо или влево.
- При движении вперед водитель должен подруливать вправо или влево, чтобы поддерживать прямой курс.

Примечание:

- 4 апреля 2006 г.: К применимым автомобилям добавлены модели 2007 модельного года.
- 21 октября 2005 г.: К применимым автомобилям добавлены модели Toyota 2003-2006 модельных годов и Scion 2004-2006 модельных годов. На рисунок в процедуре ремонта 3 добавлено примечание.
- 1 марта 2004 г.: Изменено примечание на шаге 2-А раздела "Регулировка углов установки колес и характеристики шин".

Информация о номере запасной части :

Каталожный номер новой детали	Наименование новой детали	К-во
Нет данных	Нет данных	Нет данных

Дата производства :

Применимые модели	Год выпуска модели
Автомобили Toyota	2002 - 2007
Автомобили Scion	2004 - 2007

Данный бюллетень содержит следующие разделы Регулировка углов установки колес и характеристики шин

Бюллетень технического обслуживания

Номер СР-7009
ссылки:

Страница: 2 из 13

№	Тема	Страница
1	Соотношение между углами установки колес и уводом в одну сторону	3
2	Соотношение между характеристиками шин и уводом в одну сторону	3

Блок-схема порядка выполнения ремонта

№	Тема	Страница
1	Блок-схема	5

Порядок выполнения ремонта

№	Тема	Страница
1	Важное примечание	6
2	Поиск неисправностей	6
3	Увод автомобиля вызван углами установки колес	7
4	Увод автомобиля вызван конусностью шин	8
5	Метод регулировки развала колес	9

ПОДВЕСКА И ОСИ ШИНЫ И КОЛЕСА

РЕГУЛИРОВКА УГЛОВ УСТАНОВКИ КОЛЕС И ХАРАКТЕРИСТИКИ ШИН

1. Соотношение между углами установки колес и уводом в одну сторону

Большой поперечный развал или угол продольного наклона оси поворота колеса может вызвать увод автомобиля.

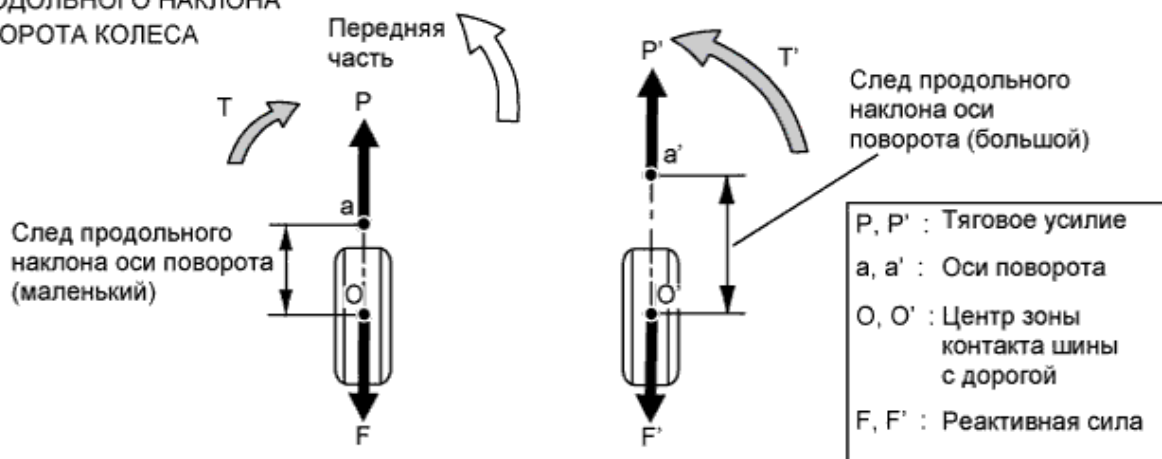
РЕГУЛИРОВКА УГЛОВ УСТАНОВКИ КОЛЕС	НАПРАВЛЕНИЕ УВОДА АВТОМОБИЛЯ
Развал	Автомобиль уводит в направлении колеса с большим развалом
Продольный наклон шкворня	Автомобиль уводит в направлении колеса с малым углом продольного наклона оси поворота

РАЗВАЛ КОЛЕС



C172277E01

УГОЛ ПРОДОЛЬНОГО НАКЛОНА ОСИ ПОВОРОТА КОЛЕСА



C172278E01

Если поперечный развал или угол продольного наклона оси поворота колеса соответствует заданному диапазону (не более 30'), заметный увод автомобиля не будет происходить вследствие расхождений развала или угла продольного наклона оси поворота между сторонами.

Примечание:

Если развал или угол продольного наклона оси поворота не превышает 30', рулевое колесо удерживается прямо без поворотного усилия, при движении по ровной дороге со скоростью 100 км/час (62 мили в час) смещение вследствие регулировки не превышает 0,5 м (1,64 фута) на участке 100 м (109 ярдов).

2. Соотношение между характеристиками шин и уводом в одну сторону

Радиальные шины при вращении создают усилие между шиной и поверхностью дороги в боковом направлении. Это боковое усилие включает два фактора:

- Увод от контакта качения, направление которого зависит от направления вращения шин.
- Конусность, которая создает усилие в постоянном направлении независимо от направления вращения шин.

Если эти боковые усилия слишком велики, автомобиль будет уводить в сторону.

(а) Увод от контакта качения

Боковое усилие создается контактом качения за счет конструкции ремней внутри протектора шины.

В радиальных шинах провод ремня расположен по диагонали, как показано на рисунке ниже.

Таким образом, в этом направлении протектор легко изменяет форму (растягивается), и создается боковое усилие между шиной и поверхностью дороги.



Примечание:

Боковое усилие от контакта качения предотвращает смещение автомобиля вследствие наклона дороги, поэтому во многих случаях боковое усилие, направленное влево, обеспечивает компенсацию наклона дороги вправо.

(b) Конусность

Конусность создает боковое усилие вследствие различия форм левой и правой сторон шины.

Направление создаваемого бокового усилия зависит жесткости боковин шины и различия высоты левой и правой сторон шины.



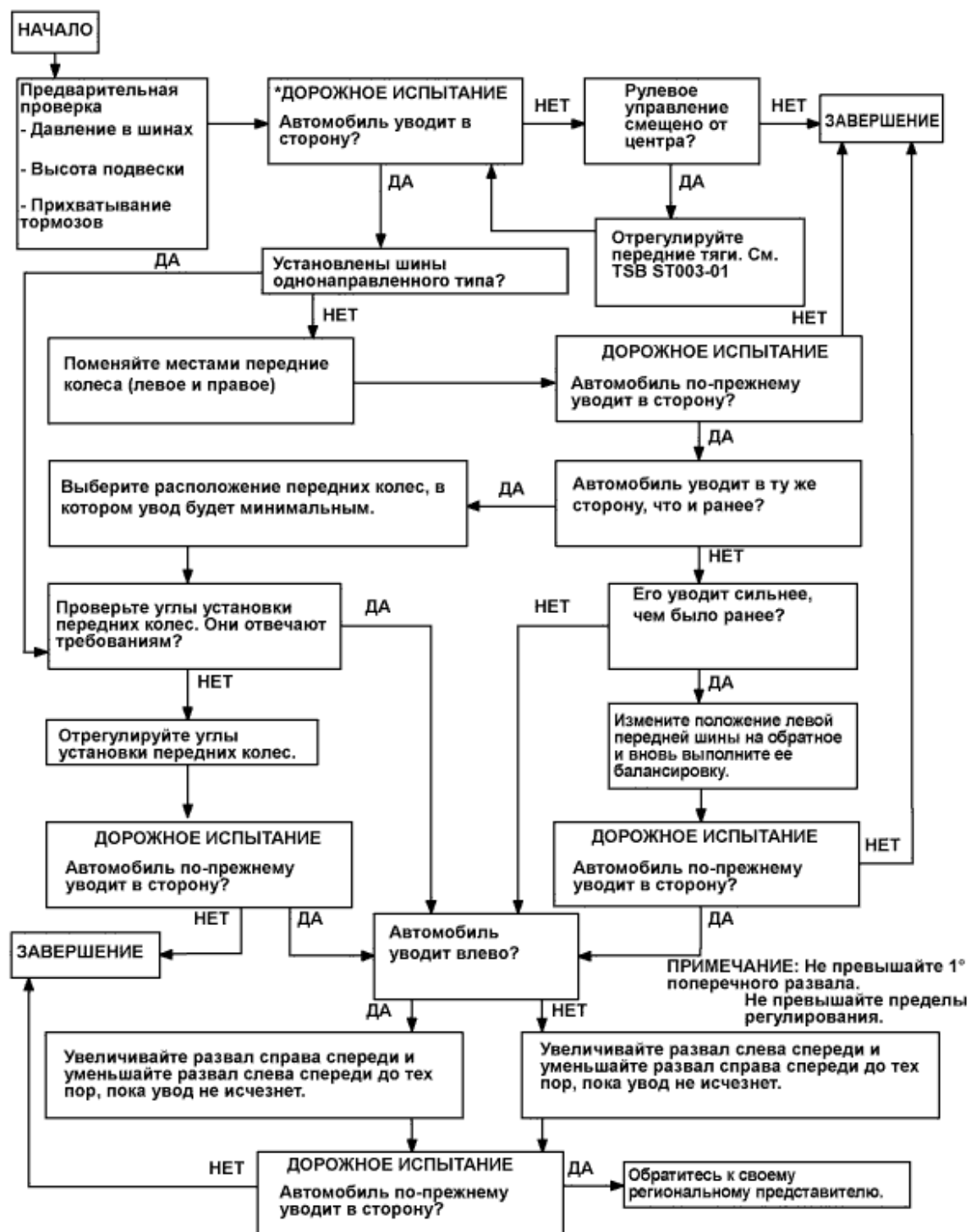
C172280E01

Примечание:

- Если увод автомобиля вызван шинами, наибольшее влияние имеет боковое усилие, создаваемое вследствие конусности. Если рулевое колесо удерживается прямо без усилия поворота, при движении по ровной дороге со скоростью 100 км/час (62 мили в час) смещение автомобиля не может превышать 1,5 м (5 футов) на участке 100 м (109 ярдов).
- Если автомобиль уводит вследствие конусности, величину смещения можно уменьшить, а направление смещения изменить, переставив шину или перевернув ее при установке на колесо.

Блок-схема порядка выполнения ремонта

1. Блок-схема



C172281E01

* Выберите ровную дорогу, на которой можно двигаться по прямой 100 метров с постоянной скоростью 35 миль в час. Убедитесь в безопасности движения и установите рулевое колесо прямо. Совершите поездку на автомобиле по прямой на расстояние 100 м при постоянной скорости 35 км/час, не прикладывая усилия к рулевому колесу для его поворота.

(a) Автомобиль движется прямо, однако рулевое колесо находится под некоторым углом. →
РУЛЕВОЕ КОЛЕСО СМЕЩЕНО ОТ ЦЕНТРА

(b) Автомобиль не движется по прямой. → УВОД РУЛЕВОГО УПРАВЛЕНИЯ

ПОРЯДОК ВЫПОЛНЕНИЯ РЕМОНТА

1. ВАЖНОЕ ПРИМЕЧАНИЕ

Перед устранением увода автомобиля в одну сторону следует ясно установить причину увода. Зачастую причиной увода автомобиля в сторону признается регулировка углов установки колес. Однако, фактической причиной может быть боковое усилие, создаваемое шинами. Выполнение регулировки углов установки колес, когда причиной является усилие от шин, может привести к выходу углов установки колес на пределы заданных диапазонов. Затем это может вызвать другие проблемы, такие как неравномерный износ шин и т.д.

2. Поиск неисправностей

Вначале определите причину увода автомобиля в сторону (регулировка углов установки колес или характеристики шин), а затем определите требуемый ремонт.

(a) Выполните следующие проверки и при необходимости выполните корректировки.

(1) Проверьте размер, износ и давление накачки шин.

(2) Проверьте, не наклоняется ли заметно автомобиль назад/вперед или влево/вправо.

Примечание:

Наклон автомобиля вызывает расхождение развала и угла продольного наклона оси поворота слева/справа и может обусловить увод автомобиля в сторону.

(3) Проверьте тормоза на наличие прихвата.

(b) Удостоверьтесь в наличии признаков неисправности.

Совершите на автомобиле поездку в сопровождении клиента, чтобы проверить, относится ли жалоба клиента к уводу автомобиля в сторону или смещению рулевого колеса относительно центра. Если проблема заключается в смещении рулевого колеса относительно центра, отрегулируйте передние тяги на автомобиле. Также определите направление и степень увода автомобиля.

(c) Определите, уводит ли автомобиль вследствие регулировки углов установки колес или шин.

(1) Переставьте левую и правую передние шины (если шины не являются однонаправленными).

(2) Выполните дорожное испытание и определите, изменилось ли направление увода автомобиля.

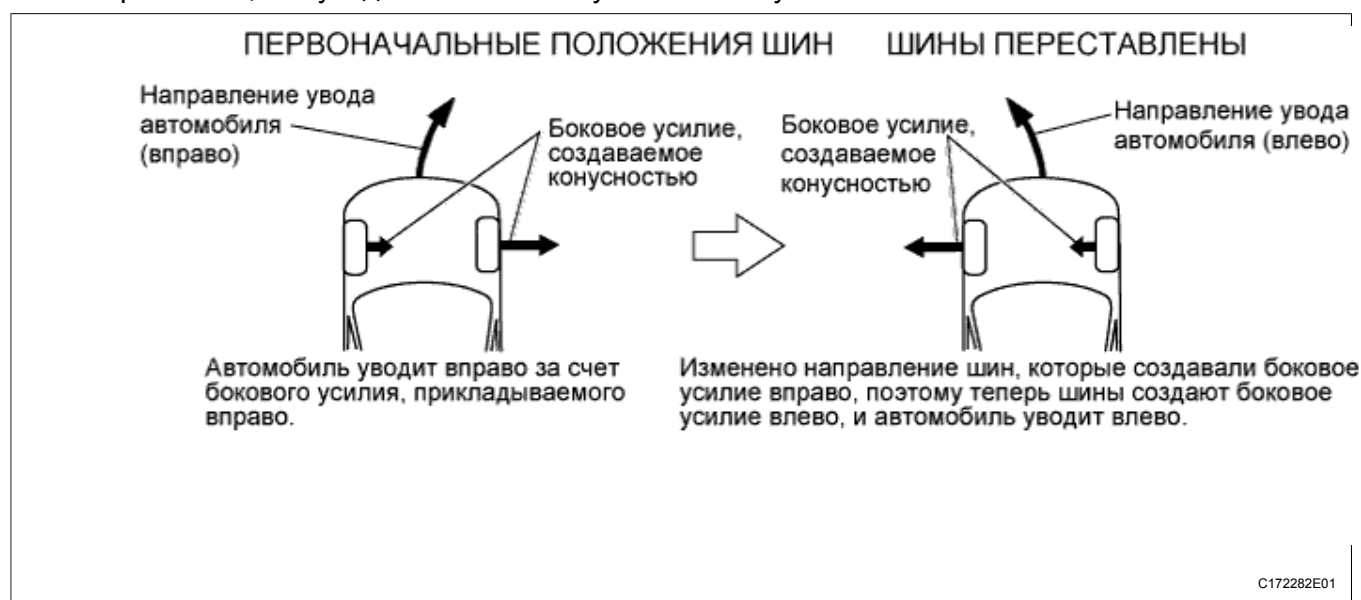
ПРИЗНАК	ВОЗМОЖНАЯ ПРИЧИНА	КОРРЕКТИРУЮЩИЕ ДЕЙСТВИЯ
Направление увода автомобиля не изменилось	Регулировка углов установки передних колес	Перейдите к процедуре ремонта 3. Увод автомобиля вызван регулировкой углов установки колес (страница 7).

ПРИЗНАК	ВОЗМОЖНАЯ ПРИЧИНА	КОРРЕКТИРУЮЩИЕ ДЕЙСТВИЯ
Увод автомобиля устранен	Конусность шин	Ремонт завершен. Увод автомобиля вызван конусностью шин (страница 8)
Направление увода автомобиля изменилось	Конусность шин	Перейдите к процедуре ремонта 4. Увод автомобиля вызван конусностью шин (страница 8).

Подсказка:

Полезные советы для определения причины увода автомобиля:

- Направление бокового усилия вследствие конусности шин изменяется при перестановке левой и правой шин. Поэтому, если направление увода изменяется, когда шины переставлены, это говорит о том, что увод автомобиля обусловлен конусностью шин.



- Если направление увода не изменяется после перестановки передних шин, причиной увода автомобиля не является конусность шин. В этом случае вероятной причиной является регулировка углов установки передних колес.

3. Увод автомобиля вызван углами установки колес

Если в результате диагностики определено, что автомобиль уводит в сторону вследствие регулировки углов установки колес, выполните ремонт в соответствии со следующей процедурой.



C172283E01

КОГДА АВТОМОБИЛЬ УВОДИТ ВЛЕВО	КОГДА АВТОМОБИЛЬ УВОДИТ ВПРАВО
Увеличивайте развал справа спереди и уменьшайте развал слева спереди до тех пор, пока увод не исчезнет.	Увеличивайте развал слева спереди и уменьшайте развал справа спереди до тех пор, пока увод не исчезнет.

Примечание:

- Поддерживайте поперечный развал в пределах 1°.
- Поддерживайте развал каждого колеса в пределах, установленных спецификацией (+/-45' от центрального значения).
- Если наблюдается выход за пределы, установленные спецификацией, это приведет к неравномерному износу шин.

4. Увод автомобиля вызван конусностью шин

Если в результате диагностики определено, что автомобиль уводит в сторону вследствие конусности, выполните ремонт в соответствии со следующими процедурами.

Показатель конусности шин как причины

При перестановке передних шин направление увода изменяется. Перейдите к ШАГУ 1.

(а) ШАГ 1

Снимите левую переднюю шину с колеса и переверните ее. Затем выполните дорожное испытание и проверьте, изменилось ли направление увода.

Подсказка:

Эта операция позволяет определить, какая шина создает большее боковое усилие – левая или правая. Перевернуть можно любую шину. В данном примере перевернута левая шина.

Если автомобиль уводит в том же направлении: Перейдите к ШАГУ 2.

Боковое усилие, создаваемое правой передней шиной, превышает усилие левой шины, и автомобиль уводит в результате действия бокового усилия от правой шины.

ПЕРВОНАЧАЛЬНЫЕ
ПОЛОЖЕНИЯ ШИН

Направление увода
автомобиля

Боковое усилие,
создаваемое
конусностью (меньше)

Боковое усилие,
создаваемое
конусностью
(больше)

УСТАНОВКА ЛЕВОЙ ШИНЫ В
ОБРАТНОМ НАПРАВЛЕНИИ

Обратное

Боковое усилие,
создаваемое
конусностью
(меньше)

Направление увода
автомобиля (такое же)

Боковое усилие,
создаваемое
конусностью (больше)

C172284E01

Если автомобиль уводит в противоположном направлении: Перейдите к ШАГУ 2.

Боковое усилие, создаваемое левой передней шиной, превышает усилие правой шины, и автомобиль уводит в результате действия бокового усилия от левой шины.

ПЕРВОНАЧАЛЬНЫЕ
ПОЛОЖЕНИЯ ШИН

Направление увода
автомобиля

Боковое усилие,
создаваемое
конусностью
(больше)

УСТАНОВКА ЛЕВОЙ ШИНЫ В
ОБРАТНОМ НАПРАВЛЕНИИ

Обратное

Боковое усилие,
создаваемое
конусностью
(больше)

Направление увода
автомобиля
(противоположное)

Боковое усилие,
создаваемое
конусностью
(меньше)

C172285E01

Если увод автомобиля устранен: Ремонт закончен.

Боковое усилие, создаваемое левой и правой передними шинами, практически одинаково, поэтому боковое усилие нейтрализуется, и автомобиль движется прямо. Ремонт завершен.

(b) ШАГ 2:

Поменяйте местами переднюю шину с большим боковым усилием и заднюю шину и проверьте, изменился ли увод автомобиля.

Примечание:

При перестановке передней шины с большим боковым усилием назад уровень увода автомобиля обычно уменьшается.

Если увод автомобиля по-прежнему наблюдается: Перейдите к ШАГУ 3.

Если увод автомобиля устранен: Ремонт закончен.

(с) ШАГ 3:

Отрегулируйте поперечный развал, чтобы устранить увод автомобиля.

Подсказка:

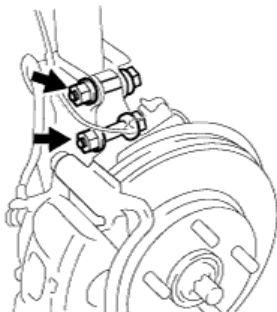
Если шины установлены в местах, в которых при их вращении наблюдается наименьший увод автомобиля, регулировка углов установки колес потребует минимальных изменений.

КОГДА АВТОМОБИЛЬ УВОДИТ ВЛЕВО	КОГДА АВТОМОБИЛЬ УВОДИТ ВПРАВО
Увеличивайте развал справа спереди и уменьшайте развал слева спереди до тех пор, пока увод не исчезнет.	Увеличивайте развал слева спереди и уменьшайте развал справа спереди до тех пор, пока увод не исчезнет.

Примечание:

- Поддерживайте поперечный развал в пределах 1°.
- Поддерживайте развал каждого колеса в пределах, установленных спецификацией (+/-45' от центрального значения).
- Если наблюдается выход за пределы, установленные спецификацией, это приведет к неравномерному износу шин.

5. Метод регулировки развала колес

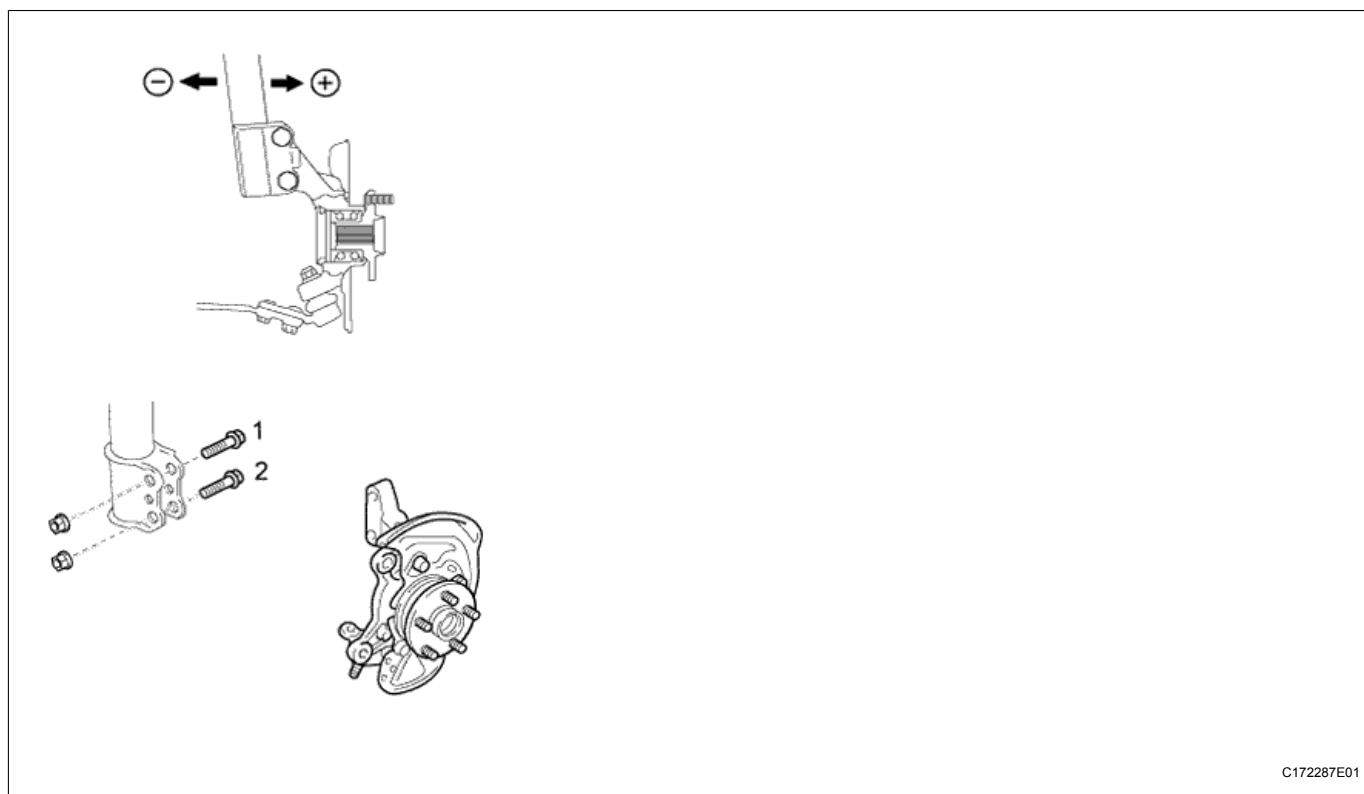


C172286

Примечание:

- После регулировки развала колес проверьте сходжение.
- Метод регулировки развала зависит от модели автомобиля, поэтому обратитесь к руководству по ремонту соответствующего автомобиля. (Это пример из Руководства по ремонту Sienna).

(а) Снимите передние колеса и зажим датчика частоты вращения колеса.



(b) Отверните 2 гайки с нижней стороны амортизатора.

(c) Смажьте резьбу гаек моторным маслом.

(d) Временно заверните 2 гайки.

(e) Отрегулируйте развал, перемещая вперед или назад нижнюю часть амортизатора в направлении, в котором требуется регулировка развала.

(f) Затяните гайки.

Момент: 210 N*m 2150 Kg*cm 155 ft.*lbf

(g) Установите передние колеса.

Момент: 104 N*m 1050 Kg*cm 77 ft.*lbf

(h) Проверьте развал колес.

Бюллетень технического обслуживания

Номер CP-7009
ссылки:

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Регулировочные данные	Болт		Регулировочный болт					
	Установочный болт		1 метка		2 метки		3 метки	
	1	2	1	2	1	2	1	2
15'	●			●				
30'	●				●			
45'	●							●
1° 00'			●					●
1° 15'				●				●
1° 30'							●	●

C172288E01

Примечание:

Значение регулировки установочных болтов составляет 6'-30' (0,1°-0,5°).

При регулировке более чем на 45' замените верхние и нижние установочные болты поворотных кулаков на регулировочные болты. Если значение развала НЕ соответствует спецификации, с помощью таблицы определите, насколько необходимо дополнительно отрегулировать развал, и выберите соответствующий болт регулировки развала.

(i) Вновь выполните шаги с 5-а по 5-н. Между шагами 5-б и 5-с замените 1 или 2 выбранных болта.

Подсказка:

При замене двух болтов меняйте 1 болт за раз.

Если увод автомобиля устранен: Ремонт закончен.

Если увод автомобиля по-прежнему наблюдается: Обратитесь за помощью к своему местному представителю.



Отказ от ответственности

1. Использование технической информации

Опубликованная на данном веб-сайте информация предназначена и доступна только для пользователей, которые имеют достаточные профессиональные и технические навыки, знания и квалификацию, а также все необходимое оборудование и инструменты. Определенные операции ремонта и технического обслуживания должны выполняться с использованием соответствующего оборудования и инструментов, а также запасных частей или узлов. Ответственность за любую операцию ремонта и технического обслуживания, предпринятую любым пользователем данного сайта на основании, в результате или в связи с технической информацией, опубликованной на данном сайте, несет исключительно сам пользователь, а Toyota Motor Europe NV/SA, любые ее дочерние компании и/или национальные дистрибьюторы не могут нести ответственность ни за какие телесные повреждения, имущественный ущерб, потери, затраты и любой прочий ущерб, либо за нарушение любых законодательных или регуляторных положений, возникшее в результате такой операции ремонта и технического обслуживания.

2. Гарантийная информация, содержащаяся в данных документах

Любая информация, связанная с условиями любой специальной гарантии, предоставляемой Toyota Motor Europe NV/SA и всеми ее дочерними компаниями и/или национальными дистрибьюторами, и включенная в любой документ, опубликованный на данном сайте, не является технической информацией. Эта информация относится к прежним гарантийным обязательствам, принятым на себя Toyota Motor Europe NV/SA и любыми ее дочерними компаниями и/или национальными дистрибьюторами, и, как следствие, Toyota Motor Europe NV/SA и любые ее дочерние компании и/или национальные дистрибьюторы не связаны этими гарантийными обязательствами, а также любыми их условиями. Ни при каких обстоятельствах такая информация не означает обязательств или обещаний Toyota Motor Europe NV/SA и любых ее дочерних компаний и/или национальных дистрибьюторов относительно применения, расширения или обновления этой гарантии.

3. Право на усовершенствование или ремонт

Из того факта, что сегмент технической информации, относящийся к конкретному усовершенствованию или ремонтным работам для любой определенной группы автомобилей, опубликован на данном сайте, и что автомобиль, принадлежащий пользователю сайта или эксплуатируемый им, принадлежит к этой группе, не следует, что автомобиль пользователя должен фактически подвергаться данному усовершенствованию или ремонту, или что владельцу или пользователю предоставляется право на такой ремонт либо за вознаграждение, либо в рамках гарантийного обслуживания.



Бюллетень технического обслуживания

Раздел: Шасси / силовая
передача
Номер CP-7011
ссылки:
Дата: Декабрь 2007 г.
Страница: 1 из 2

Регион : Все страны

Название модели : LS600hL, LS600h, LS460L, LS460, LS430, LS400, GS300, GS350, GS400, GS430, GS450h, GS460, SC430, SC400, SC300, ES350, ES330, ES300, ES250, IS200, IS250, IS300, IS350, IS220d, IS F, LX450, LX470, LX570, GX470, RX300, RX330, RX350, RX400h

Код модели : ДЛЯ ВСЕХ МОДЕЛЕЙ

Тема : ОТСОЕДИНИТЕ АККУМУЛЯТОРНУЮ БАТАРЕЮ И ВЫПОЛНИТЕ КАЛИБРОВКУ "НУЛЯ" ДАТЧИКА ПОСЛЕ РЕГУЛИРОВКИ УГЛОВ УСТАНОВКИ КОЛЕС

Данный бюллетень технического обслуживания содержит информацию для автомобилей, снабженных VSC.

На автомобилях, оборудованных системой VSC, после регулировки углов установки колес, а также после снятия/установки или замены деталей шасси, обязательно отсоедините аккумуляторную батарею и выполните описанную ниже процедуру инициализации, чтобы система VSC могла функционировать нормально:

Мы предоставляем процедуру для автомобилей с VSC, которая требует отсоединения аккумуляторной батареи и, при необходимости, калибровки "нуля" датчика (в зависимости от модели) после регулировки углов установки колес.

Информация о номере запасной части :

Номер детали	Наименование детали	К-во
Не применимо	Не применимо	Не применимо

Дата производства :

VIN	Дата производства
Не применимо	Не применимо

ПОДВЕСКА И ОСИ

РЕГУЛИРОВКА УГЛОВ УСТАНОВКИ ПЕРЕДНИХ/ЗАДНИХ КОЛЕС

РЕГУЛИРОВКА

Подсказка:

- Отсоедините отрицательный вывод аккумуляторной батареи более чем на 2 с.
- Подсоедините отрицательный вывод аккумуляторной батареи.
- Выполните калибровку "нуля" датчика рысканья и/или проверьте калибровку "нуля" датчика угла поворота рулевого колеса после регулировки углов установки колес. (При необходимости обратитесь к Руководству по ремонту.)

1. ПРОВЕРЬТЕ ШИНЫ

(а) Проверьте шины.

2. ПРОВЕРКА И/ИЛИ РЕГУЛИРОВКА УГЛОВ УСТАНОВКИ КОЛЕС

Подсказка:

См. руководства по ремонту.

3. ПЕРЕДНИЕ КОЛЕСА РАСПОЛОЖЕНЫ СТРОГО ПРЯМО

4. ОТСОЕДИНИТЕ ПРОВОД ОТ ОТРИЦАТЕЛЬНОГО ВЫВОДА АККУМУЛЯТОРНОЙ БАТАРЕИ (ДЛЯ МОДЕЛЕЙ С VSC)

Примечание:

Отсоедините отрицательный вывод аккумуляторной батареи более чем на 2 с.

5. ПОДСОЕДИНИТЕ ПРОВОД К ОТРИЦАТЕЛЬНОМУ ВЫВОДУ АККУМУЛЯТОРНОЙ БАТАРЕИ (ДЛЯ МОДЕЛЕЙ С VSC)

6. ВЫПОЛНИТЕ КАЛИБРОВКУ "НУЛЯ" ДАТЧИКА РЫСКАНЬЯ И/ИЛИ ПРОВЕРЬТЕ КАЛИБРОВКУ "НУЛЯ" ДАТЧИКА УГЛА ПОВОРОТА РУЛЕВОГО КОЛЕСА. (ПРИ НЕОБХОДИМОСТИ)

Подсказка:

См. Руководство по ремонту.



Отказ от ответственности

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Любая информация, связанная с условиями любой специальной гарантии, предоставляемой Toyota Motor Europe NV/SA и всеми ее дочерними компаниями и/или национальными дистрибьюторами, и включенная в любой документ, опубликованный на данном сайте, не является технической информацией. Эта информация относится к прежним гарантийным обязательствам, принятым на себя Toyota Motor Europe NV/SA и любыми ее дочерними компаниями и/или национальными дистрибьюторами, и, как следствие, Toyota Motor Europe NV/SA и любые ее дочерние компании и/или национальные дистрибьюторы не связаны этими гарантийными обязательствами, а также любыми их условиями. Ни при каких обстоятельствах такая информация не означает обязательств или обещаний Toyota Motor Europe NV/SA и любых ее дочерних компаний и/или национальных дистрибьюторов относительно применения, расширения или обновления этой гарантии.

3. Право на усовершенствование или ремонт

Из того факта, что сегмент технической информации, относящийся к конкретному усовершенствованию или ремонтным работам для любой определенной группы автомобилей, опубликован на данном сайте, и что автомобиль, принадлежащий пользователю сайта или эксплуатируемый им, принадлежит к этой группе, не следует, что автомобиль пользователя должен фактически подвергаться данному усовершенствованию или ремонту, или что владельцу или пользователю предоставляется право на такой ремонт либо за вознаграждение, либо в рамках гарантийного обслуживания.



Бюллетень технического обслуживания

Раздел: Двигатель

Номер EG-6003

ссылки:

Дата: Март 2008 г.

Страница: 1 из 22

Регион : Европа

Название модели : LS430, LS400, GS300, GS400, GS430, GS450h, SC430, SC400, SC300, ES350, ES330, ES300, ES250, IS200, IS250, IS300, IS350, IS220d, LX450, LX470, GX470, RX300, RX330, RX350, RX400h

Код модели : ДЛЯ ВСЕХ МОДЕЛЕЙ

Тема : СПОСОБ ПЕРЕПРОГРАММИРОВАНИЯ ЭБУ ДВИГАТЕЛЯ С ПОМОЩЬЮ ПОРТАТИВНОГО ДИАГНОСТИЧЕСКОГО ПРИБОРА II

Данный бюллетень технического обслуживания представляет собой исправленный вариант документа № EG-6003, выпущенного в апреле 2006 г., и содержит следующие добавления.

- Процедуры 3, 5, 6, 9, 10, 11, 12, 13 и 14 на схеме выполнения операций
- Предостережения (g, h) относительно перепрограммирования
- ПРИМЕЧАНИЕ для шага 4 в процедуре выполнения работ

Первое указанное выше добавление применимо к ЭБУ дизельного двигателя, но не к ЭБУ бензинового двигателя.

В данном бюллетене технического обслуживания в общих чертах поясняется способ перепрограммирования ЭБУ двигателя с помощью портативного диагностического прибора II. Если вследствие каких-либо изменений требуется перепрограммировать ЭБУ двигателя, всегда обращайтесь к особым указаниям, поставляемым с файлами идентификационных номеров калибровки.

Информация о номере запасной части :

Каталожный номер новой детали	Наименование новой детали	К-во
Не применимо	Не применимо	Не применимо

Дата производства :

VIN	Дата производства
Не применимо	Не применимо

ПОДГОТОВКА ДВИГАТЕЛЬ НЕОБХОДИМЫЕ ДЕТАЛИ

Каталожный номер	Наименование детали	Примечание
Всегда обращайтесь к особой информации по перепрограммированию	Этикетка авторизованной модификации (каталожный номер 89685-20010)	Эту этикетку необходимо приклеить к крышке ЭБУ после перепрограммирования. Этикетка подтверждает, что изменение программного обеспечения двигателя выполнено в соответствии с техническими условиями изготовителя.
	Файл данных калибровки	В файле содержится модифицированная программа ЭБУ, предоставленная TMC.
	CUW (V6R1 или более поздняя)	Данное программное обеспечение используется для загрузки калибровочных данных с ПК в портативный диагностический прибор II.

НЕОБХОДИМЫЕ ИНСТРУМЕНТЫ

Наименование детали	Номер детали	Функция
Портативный диагностический прибор II (версия программного обеспечения 2.1 или более поздняя)	PZ-432-IT020-00	Перепрограммирование ЭБУ двигателя
Персональный компьютер	-	Загрузите модифицированное программное обеспечение в портативный диагностический прибор II
Кабель USB	-	Подсоедините портативный диагностический прибор II к ПК
Стандартные инструменты	-	-

СХЕМА ВЫПОЛНЕНИЯ ОПЕРАЦИЙ

1	ПОСРЕДСТВОМ VIN АВТОМОБИЛЯ ПРОВЕРЬТЕ, ТРЕБУЕТСЯ ЛИ ВЫПОЛНИТЬ МОДИФИКАЦИЮ (ВСЕГДА ОБРАЩАЙТЕСЬ К ЗАПРОСУ НА ОСОБУЮ МОДИФИКАЦИЮ)
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НЕТ

ДАЛЬНЕЙШИЕ ДЕЙСТВИЯ НЕ ТРЕБУЮТСЯ

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Номер EG-6003
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ДА

- 2** С ПОМОЩЬЮ ПОРТАТИВНОГО ДИАГНОСТИЧЕСКОГО ПРИБОРА II ПРОВЕРЬТЕ, НЕ ВЫПОЛНЯЛОСЬ ЛИ ПЕРЕПРОГРАММИРОВАНИЕ ЭБУ ДВИГАТЕЛЯ НОВЫМ CID

ДА

ДАЛЬНЕЙШИЕ ДЕЙСТВИЯ НЕ ТРЕБУЮТСЯ

НЕТ

- 3** СЧИТАЙТЕ ЗАПИСЬ КАТАЛИТИЧЕСКОГО НЕЙТРАЛИЗАТОРА, ЕСЛИ АВТОМОБИЛЬ СНАБЖЕН DPNR ИЛИ DPF

Примечание:

Перед перепрограммированием ЭБУ необходимо сохранить запись о термическом износе каталитического нейтрализатора. Это гарантирует, что в новом ЭБУ можно будет сохранить правильные данные в случае сбоя перепрограммирования. (Подробно процедура описана в соответствующем разделе руководства по ремонту автомобиля.)

ДАЛЕЕ

- 4** ВЫПОЛНИТЕ ПЕРЕПРОГРАММИРОВАНИЕ ЭБУ ДВИГАТЕЛЯ НОВЫМ CID

ДАЛЕЕ

- 5** УБЕДИТЕСЬ В УСПЕШНОСТИ ПЕРЕПРОГРАММИРОВАНИЯ

NG

ПЕРЕЙДИТЕ К ШАГУ 9

ОК

- 6** ИЗВЛЕКИТЕ ПРЕДОХРАНИТЕЛЬ EFI БОЛЕЕ ЧЕМ НА 1 МИНУТУ, ЧТОБЫ СБРОСИТЬ НАСТРОЙКИ ЭБУ ДВИГАТЕЛЯ

Подсказка:

Либо можно отсоединить провод от отрицательного (-) вывода аккумуляторной батареи на время более 1 минуты.

ДАЛЕЕ

- 7** ПОСЛЕ ПЕРЕПРОГРАММИРОВАНИЯ ЭБУ ПРОВЕРЬТЕ СОСТОЯНИЕ АВТОМОБИЛЯ

ДАЛЕЕ

Бюллетень технического обслуживания

Номер EG-6003
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8 ПРИКРЕПИТЕ ТАБЛИЧКУ С ДАННЫМИ БЛОКА УПРАВЛЕНИЯ ДВИГАТЕЛЕМ НА ЭБУ ДВИГАТЕЛЯ

ДАЛЕЕ

КОНЕЦ

9 ЗАМЕНИТЕ ЭБУ ДВИГАТЕЛЯ

ДАЛЕЕ

10 ВВЕДИТЕ КОМПЕНСАЦИОННЫЕ КОДЫ ФОРСУНОК И ПЕРЕДАЙТЕ ЗАПИСЬ КАТАЛИТИЧЕСКОГО НЕЙТРАЛИЗАТОРА В НОВЫЙ ЭБУ

Примечание:

Неверная регистрация компенсационного кода форсунки может быть причиной неисправности.

ДАЛЕЕ

11 С ПОМОЩЬЮ ПОРТАТИВНОГО ДИАГНОСТИЧЕСКОГО ПРИБОРА II ПРОВЕРЬТЕ, НЕ ВЫПОЛНЯЛОСЬ ЛИ ПЕРЕПРОГРАММИРОВАНИЕ ЭБУ ДВИГАТЕЛЯ НОВЫМ CID

ДА

ДАЛЬНЕЙШИЕ ДЕЙСТВИЯ НЕ ТРЕБУЮТСЯ

НЕТ

12 ВЫПОЛНИТЕ ПЕРЕПРОГРАММИРОВАНИЕ ЭБУ ДВИГАТЕЛЯ НОВЫМ CID

ДАЛЕЕ

13 ПОСЛЕ ПЕРЕПРОГРАММИРОВАНИЯ ЭБУ ПРОВЕРЬТЕ СОСТОЯНИЕ АВТОМОБИЛЯ

ДАЛЕЕ

14 ПРИКРЕПИТЕ ТАБЛИЧКУ С ДАННЫМИ БЛОКА УПРАВЛЕНИЯ ДВИГАТЕЛЕМ НА ЭБУ ДВИГАТЕЛЯ

ДАЛЕЕ

КОНЕЦ

ИНФОРМАЦИЯ ОБ ИДЕНТИФИКАЦИОННОМ НОМЕРЕ КАЛИБРОВКИ

Текущий CID		Новый CID
Код модели (тип двигателя)	8-значный идентификационный номер	8-значный идентификационный номер (новый)

ПРЕДОСТЕРЕЖЕНИЕ

1. ПРЕДОСТЕРЕЖЕНИЕ ПО ПЕРЕПРОГРАММИРОВАНИЮ

- (a) Во время перепрограммирования ЭБУ не отсоединяйте кабель от разъема DLC3.
- (b) Во время перепрограммирования ЭБУ не выключайте зажигание / не нажимайте кнопку Engine START.
- (c) Во время перепрограммирования ЭБУ не подключайте электрическую нагрузку автомобиля (не включайте аудиосистему, освещение салона, кондиционер, вентилятор радиатора, вентилятор салона и т.п.) Не допускается изменение напряжения аккумуляторной батареи.
- (d) Во время перепрограммирования ЭБУ не нажимайте педаль тормоза.
- (e) Надежно затяните стояночный тормоз.
- (f) Перед перепрограммированием ЭБУ убедитесь, что напряжение аккумуляторной батареи превышает 12 В.
- (g) Если напряжение аккумуляторной батареи ниже 12 В или составляет ровно 12 В, зарядите аккумуляторную батарею.
- Не допускается зарядка аккумуляторной батареи во время перепрограммирования. (Отсоедините зарядное устройство от аккумуляторной батареи.)
- (h) Если ЭБУ двигателя установлен в моторном отсеке, убедитесь, что капот открыт, и температура в отсеке не превышает 70°C (158°F).

ПОРЯДОК ВЫПОЛНЕНИЯ РАБОТ

Подсказка:

В данном руководстве рассматривается случай с двигателем 2AD-FHV.

- Текущий CID: 30551000
- Новый CID: 30551200

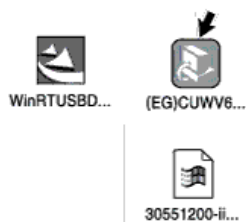
1. ПРОВЕРЬТЕ ТЕКУЩИЙ ИДЕНТИФИКАЦИОННЫЙ НОМЕР ЭБУ

- (a) На основании текущего идентификационного номера проверьте, требуется ли обновление ЭБУ.

2. УСТАНОВИТЕ ПРОГРАММНОЕ ОБЕСПЕЧЕНИЕ CUW НА ПК

- (a) Подготовьте необходимые файлы.

(1) Загрузите/скопируйте следующие файлы в любой каталог на ПК.



A142035

- (EG) CUWV6R1.exe

Примечание:

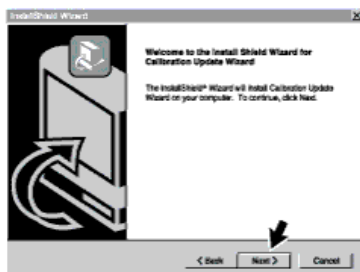
Не используйте ПО версии ниже 6.1

- WinRTUSBDriver.exe
- xxxxxxxx-ii.cuw

(b) Установите программное обеспечение CUW.

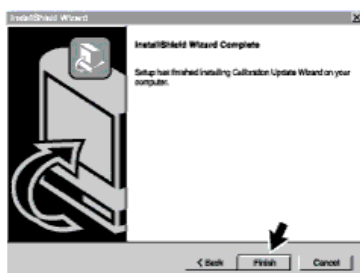
(1) Два раза щелкните по пиктограмме "(EG)CUWV6R1.exe", показанной на рисунке.

(2) Когда появится окно "Welcome to the install Shield Wizard for Calibration Update Wizard" (добро пожаловать в мастер установки мастера обновления калибровочных данных), нажмите "Next" (далее).



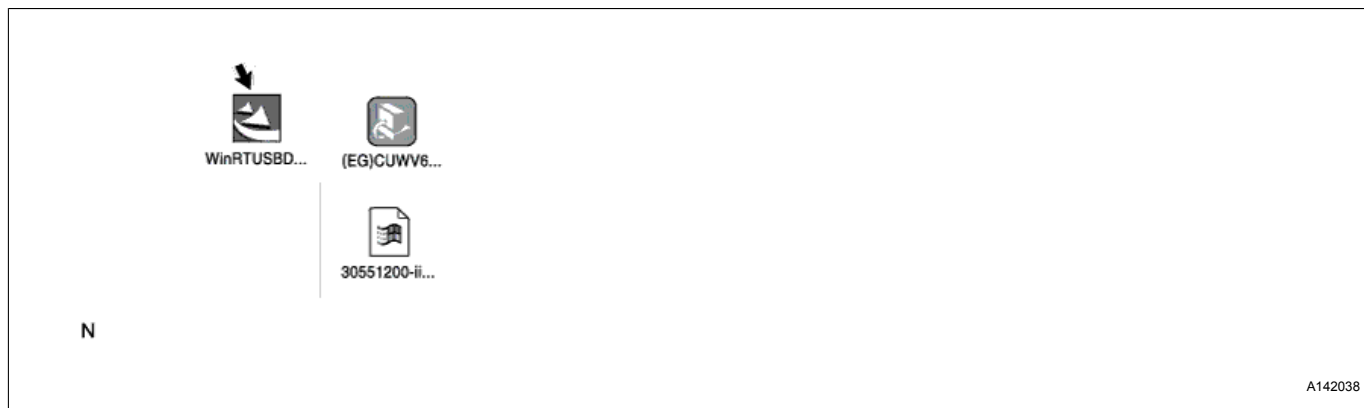
A142036

(3) Когда появится сообщение "Install Shield Wizard Complete" (работа мастера установки завершена), нажмите "Finish" (завершить).

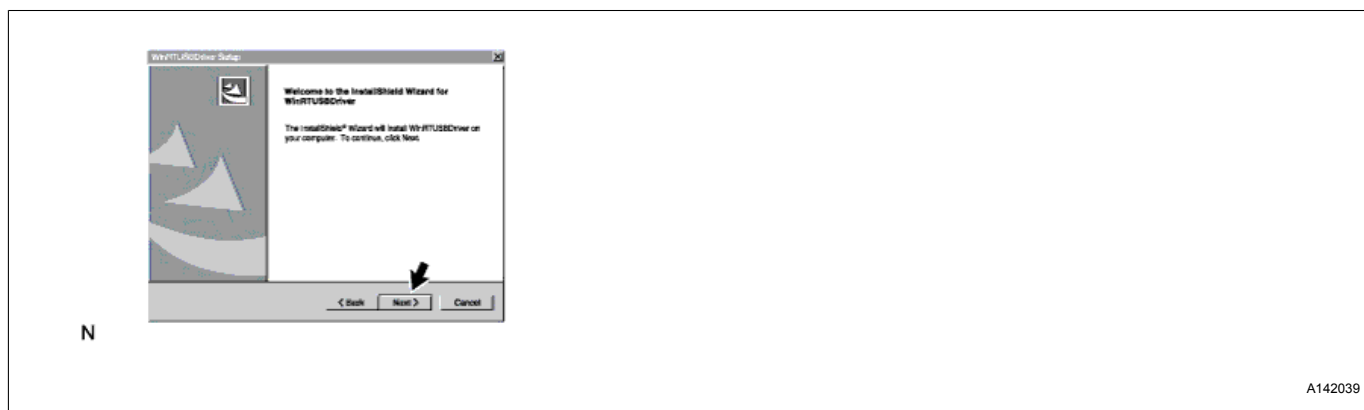


(с) Установите драйвер USB.

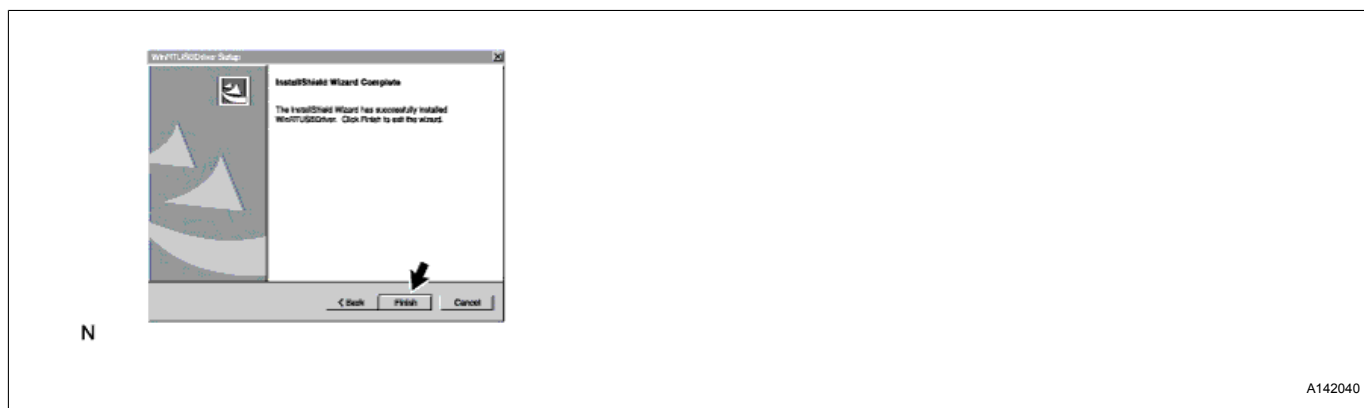
(1) Дважды щелкните по пиктограмме "WinRTUSBDriver.exe", показанной на рисунке.



(2) Когда появится окно "Welcome to the InstallShield Wizard for WinRTUSBDriver" (добро пожаловать в мастер установки драйвера WinRTUSBDriver), нажмите "Next" (далее).



(3) Когда появится сообщение "InstallShield Wizard Complete" (работа мастера установки завершена), нажмите "Finish" (завершить).



3. ЗАГРУЗИТЕ КАЛИБРОВОЧНЫЕ ДАННЫЕ С ПК В ПОРТАТИВНЫЙ ДИАГНОСТИЧЕСКИЙ ПРИБОР II

(а) Соедините ПК и портативный диагностический прибор II с помощью USB-кабеля.



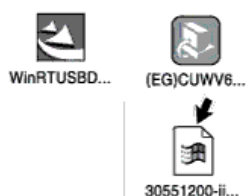
N

A142041

(b) Включите портативный диагностический прибор II.

(c) Загрузите калибровочные данные.

(1) Дважды щелкните по пиктограмме файла "xxxxxxx-ii.cuw", показанной на рисунке.



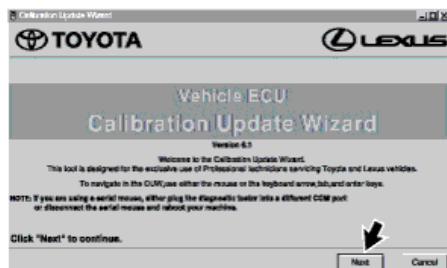
N

A142042

Примечание:

Имя файла на рисунке приводится только в качестве примера.

(2) Нажмите "Next".



N

A142043

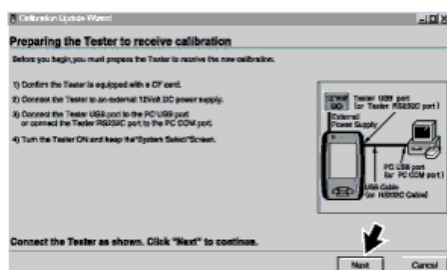
(3) Выберите "Intelligent Tester II" (портативный диагностический прибор II) и нажмите "Next".



N

A142044

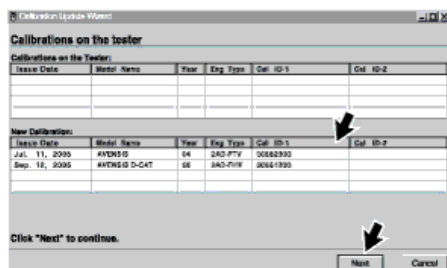
(4) Если все соединения установлены и исправны, нажмите "Next".



N

A142045

(5) Проверьте модель автомобиля и идентификационный номер калибровки и нажмите "Next".



N

A142046

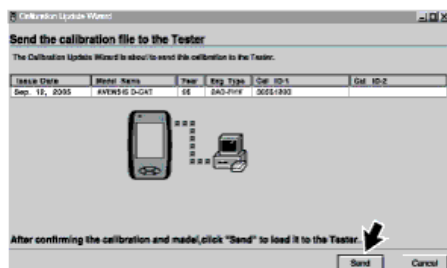
Пример для 2AD-FHV:

Идентификационный номер калибровки: 30551200

Примечание:

Если во внутренней памяти портативного диагностического прибора II недостаточно свободного пространства, вверху экрана появится предупреждающее сообщение. В этом случае вместо кнопки "Send" (отправить) появится кнопка "Delete" (удалить). Выберите файл, подлежащий удалению с портативного диагностического прибора II, и нажмите "Delete". Как только для загрузки программного обеспечения освободится достаточное пространство, появится кнопка "Send", и процедуру загрузки можно будет продолжить.

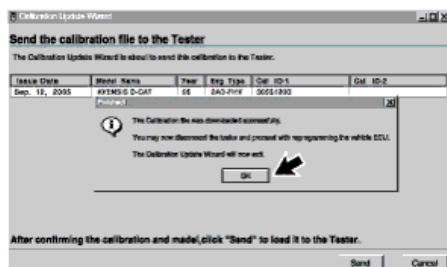
(6) Нажмите "Send".



N

A142047

(7) Нажмите "OK".



N

A142048

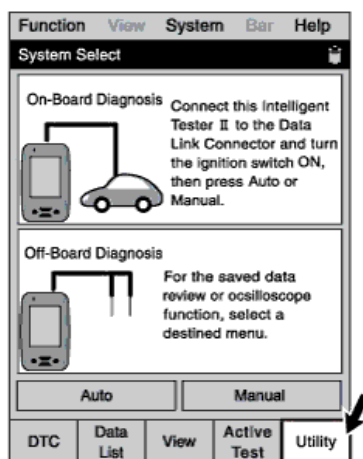
(8) Выключите портативный диагностический прибор II.

Примечание:

Благодаря этому действию завершается загрузка нового программного обеспечения с ПК в портативный диагностический прибор II.

(d) Проверьте загруженные данные.

(1) Включите портативный диагностический прибор II.



-
- (2) Нажмите кнопку "Utility" (сервисные функции) на дисплее.
- (3) Нажмите "ECU Reprogramming" (перепрограммирование ЭБУ).

Function	View	System	Bar	Help
Utility				
Utility				
All Codes 				
ECU Reprogramming				
Voltage meter				
DTC	Data List	View	Active Test	Utility

A142050

- (4) Выберите "Calibration File Manager" (менеджер калибровочных файлов) и нажмите "Enter" (ВВОД).

Function View System Bar Help

Utility

ECU Reprogramming

System :

Reprogramming Item

Current Vehicle Calibration ID

Reprogramming

Calibration File Manager

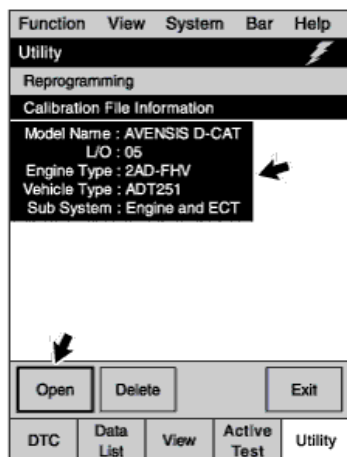
Item Information

To review and delete a calibration file.

DTC Data List View Active Test Utility

A142051

- (5) Выберите файл, соответствующий типу автомобиля, подлежащего перепрограммированию, и нажмите "Open" (открыть).



N

A142052

Подсказка:

- Название модели: AVENSIS D-CAT
- L/O: 05
- Тип двигателя: 2AD-FHV
- Тип автомобиля: ADT251
- Подсистема: Engine and ECT (двигатель и ECT)

Рисунок слева приводится только для демонстрации окна "Calibration File Information" (информация о калибровочном файле). Фактическое содержание окна зависит от программного обеспечения, подлежащего загрузке.

(6) Проверьте идентификационный номер калибровки.

Пример для 2AD-FHV:

Идентификационный номер калибровки: 30551200

(7) Выключите портативный диагностический прибор II.

4. ПЕРЕПРОГРАММИРОВАНИЕ ЭБУ



A142053E01

Примечание:

Ошибки, возникшие во время перепрограммирования флеш-памяти, могут привести к необратимому повреждению ЭБУ. Риски необходимо минимизировать, приняв следующие меры.

- Убедитесь, что напряжение аккумуляторной батареи составляет от 12 до 14 В.
- Если напряжение аккумуляторной батареи ниже 12 В или составляет ровно 12 В, зарядите аккумуляторную батарею.

Не допускается зарядка аккумуляторной батареи во время перепрограммирования.

(Отсоедините зарядное устройство от аккумуляторной батареи.)

- Выключите все электрооборудование (аудиосистему, отопитель, обогреватель заднего стекла, электрические стеклоподъемники и т.п.).
- Во время перепрограммирования не подключайте электрическую нагрузку (не допускается изменение напряжения аккумуляторной батареи).
- Закройте все двери автомобиля.
- Во время перепрограммирования не выполняйте следующие действия: прекращение процедуры, управление замком/выключателем зажигания.
- Надежно затяните стояночный тормоз.
- Если ЭБУ двигателя установлен в моторном отсеке, убедитесь, что капот открыт, и температура в отсеке не превышает 70°C (158°F).

(a) Отсоедините разъем(ы) электродвигателя вентилятора системы охлаждения.

Подсказка:

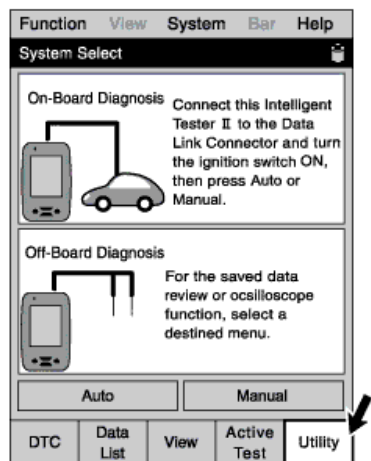
Данная мера гарантирует, что вентилятор не включится во время перепрограммирования.

(b) Подсоедините портативный диагностический прибор II к DLC3.

(c) Включите портативный диагностический прибор II.

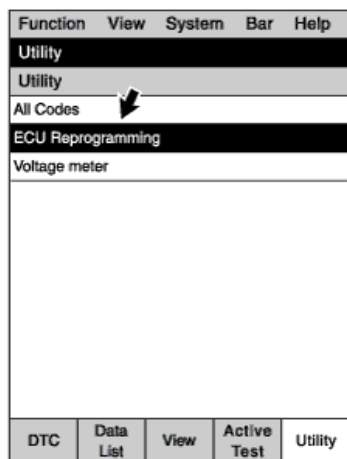
(d) Проверьте текущий идентификационный номер калибровки в ЭБУ двигателя.

(1) Нажмите "Utility".



A150563

(2) Выберите "ECU Reprogramming".



N

A142055

(3) Выберите "Engine and ECT" (двигатель и ECT).

Function	View	System	Bar	Help
Utility				
Reprogramming				
System :	Engine and ECT			
Reprogram	HV ECU			
Current Vehicle	ECT ECU			
Calibration File Information				
Item Information				
				Enter
				Exit
DTC	Data List	View	Active Test	Utility

N

A142056

(4) Выберите "Current Vehicle Calibration ID" (текущий идентификационный номер калибровки автомобиля) и нажмите "Enter".

Function	View	System	Bar	Help
Utility				
Reprogramming				
System :	Engine and ECT			
Reprogramming Item				
Current Vehicle Calibration ID				
Calibration File Information				
Item Information				
To confirm the current Calibration ID of the vehicle.				
				Enter
				Exit
DTC	Data List	View	Active Test	Utility

N

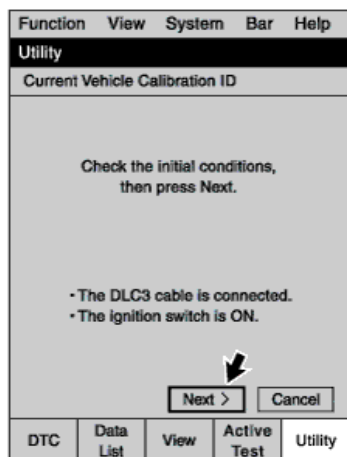
A142057

(5) Вставьте ключ в замок зажигания и поверните его в положение "IG ON".

Примечание:

Не запускайте двигатель.

(6) Нажмите "Next".



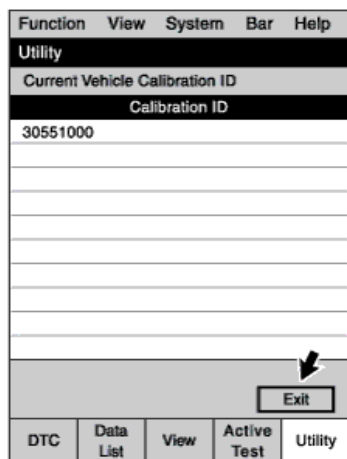
N

A142058

(7) Убедитесь, что идентификационный номер калибровки, отображаемый на экране, соответствует старому идентификационному номеру калибровки автомобиля, подлежащего перепрограммированию.

Пример для 2AD-FHV

Идентификационный номер калибровки: 30551000



N

A142059

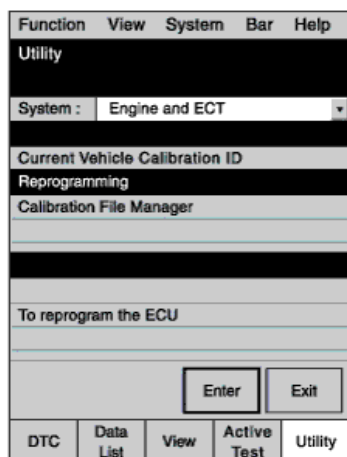
Подсказка:

- Все остальные идентификационные номера калибровки (кроме вышеуказанных) не следует учитывать.
- Если вместо старого идентификационного номера калибровки автомобиля, подлежащего перепрограммированию, отображается другой номер, не выполняйте перепрограммирование.

(8) Нажмите "Exit" (выход).

(e) Перепрограммируйте ЭБУ.

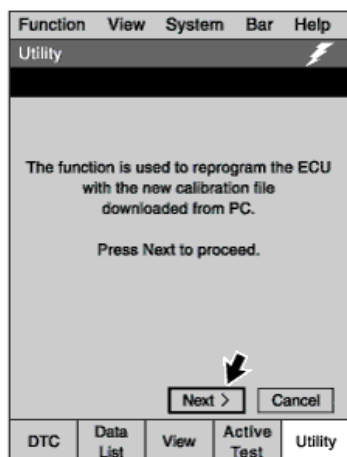
(1) Выберите "Reprogramming" (перепрограммирование) и нажмите "Enter".



N

A143970

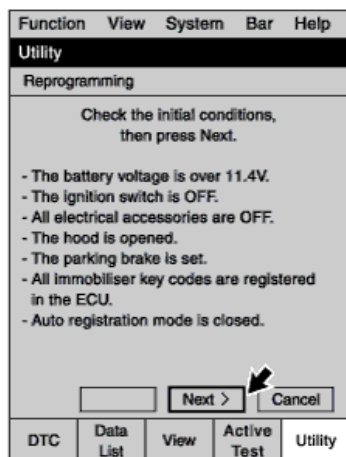
(2) Нажмите "Next".



N

A143971

(3) Следуйте всем указаниям, отображаемым на дисплее.



N

A142060

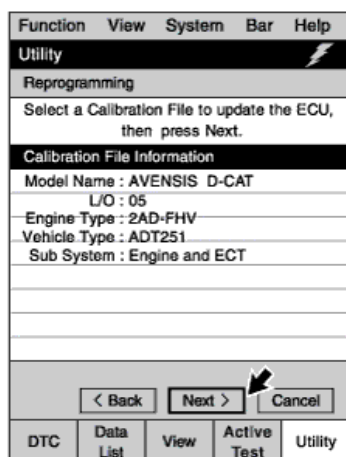
Подсказка:

Пример:

- Зажигание выключено.
- Все электрооборудование выключено.
- Прочие

(4) Нажмите "Next".

(5) Выберите калибровочный файл, подлежащий обновлению (модель автомобиля, подлежащая перепрограммированию) и нажмите "Next".



N

A142061

Пример

AVENSIS '05 (2AD-FHV)

(6) Выберите "Calibration ID" и нажмите "Next".

New Calibration ID		Update
Calibration ID I	30551200	NO

N

A145805

Подсказка:

- Пример для 2AD-FHV

Новый идентификационный номер калибровки: 30551200

- По завершении перепрограммирования в колонке "Update" (обновление) отобразится "YES" (да).

(7) Выберите "Calibration ID" и нажмите "Next".

Пример для 2AD-FHV

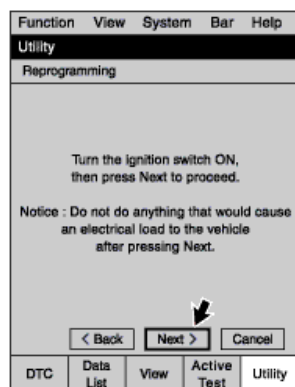
Текущий идентификационный номер калибровки: 30551000

Calibration ID
30551000
30551100

N

A142063

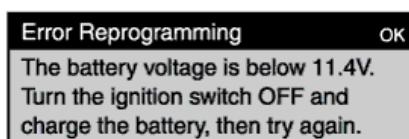
(8) Включите зажигание, но не запускайте двигатель. После включения зажигания нажмите "Next".



N

A142064

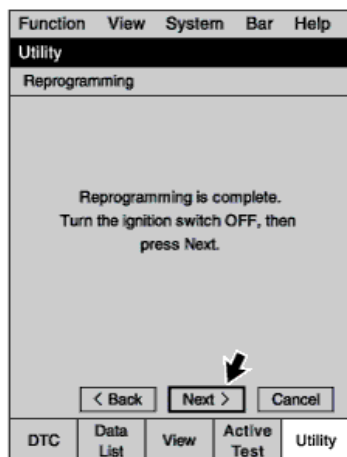
(9) Если появится сообщение об ошибке, показанное на рисунке слева, зарядите аккумуляторную батарею и выполните перепрограммирование снова.



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A142065

(10) По завершении перепрограммирования выключите зажигание.



N

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(11) Нажмите "Next".

(f) Еще раз проверьте идентификационный номер калибровки в ЭБУ двигателя.

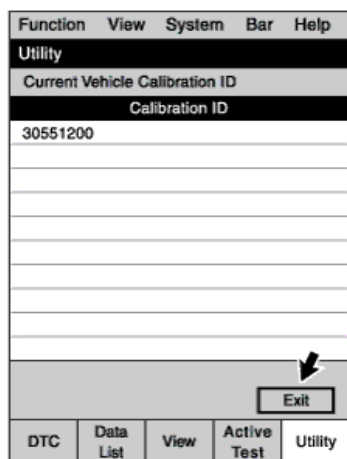
(1) Выберите "Current Vehicle Calibration ID".

(2) Нажмите "Enter".

(3) Включите зажигание.

(4) Нажмите "Next".

(5) Проверьте, отображается ли на экране портативного диагностического прибора новый идентификационный номер калибровки.



N

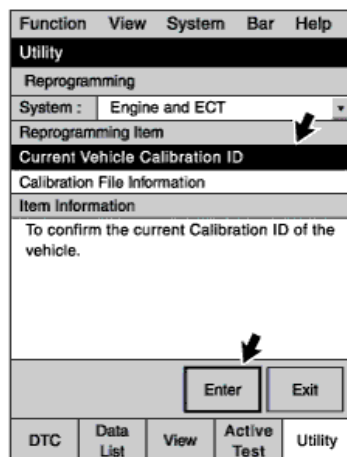
A142068

Подсказка:

Пример для 2AD-FHV

Новый идентификационный номер калибровки: 30551200

(6) Нажмите "Exit" (выход).



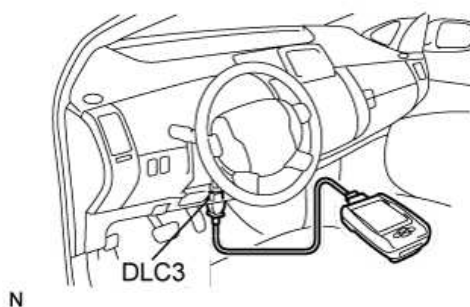
N

A142067

(g) Удалите DTC.

(1) Убедитесь, что рычаг переключения передач установлен в нейтральное положение (для моделей с автоматической трансмиссией – в положение P).

(2) Включите портативный диагностический прибор II.



A142053E01

(3) Включите зажигание.

(4) Проверьте DTC с помощью портативного диагностического прибора II.

(5) Убедитесь, что для всех систем в колонке "History" (архив) отображается состояние "OK", а затем нажмите "Exit". В противном случае нажмите "Clear All" (удалить все).

Примечание:

После перепрограммирования ЭБУ могут регистрироваться некоторые DTC. Их необходимо удалить.

(h) Подсоедините разъем(ы) электродвигателя вентилятора системы охлаждения.



Отказ от ответственности

1. Использование технической информации

Опубликованная на данном веб-сайте информация предназначена и доступна только для пользователей, которые имеют достаточные профессиональные и технические навыки, знания и квалификацию, а также все необходимое оборудование и инструменты. Определенные операции ремонта и технического обслуживания должны выполняться с использованием соответствующего оборудования и инструментов, а также запасных частей или узлов. Ответственность за любую операцию ремонта и технического обслуживания, предпринятую любым пользователем данного сайта на основании, в результате или в связи с технической информацией, опубликованной на данном сайте, несет исключительно сам пользователь, а Toyota Motor Europe NV/SA, любые ее дочерние компании и/или национальные дистрибьюторы не могут нести ответственность ни за какие телесные повреждения, имущественный ущерб, потери, затраты и любой прочий ущерб, либо за нарушение любых законодательных или регуляторных положений, возникшее в результате такой операции ремонта и технического обслуживания.

2. Гарантийная информация, содержащаяся в данных документах

Любая информация, связанная с условиями любой специальной гарантии, предоставляемой Toyota Motor Europe NV/SA и всеми ее дочерними компаниями и/или национальными дистрибьюторами, и включенная в любой документ, опубликованный на данном сайте, не является технической информацией. Эта информация относится к прежним гарантийным обязательствам, принятым на себя Toyota Motor Europe NV/SA и любыми ее дочерними компаниями и/или национальными дистрибьюторами, и, как следствие, Toyota Motor Europe NV/SA и любые ее дочерние компании и/или национальные дистрибьюторы не связаны этими гарантийными обязательствами, а также любыми их условиями. Ни при каких обстоятельствах такая информация не означает обязательств или обещаний Toyota Motor Europe NV/SA и любых ее дочерних компаний и/или национальных дистрибьюторов относительно применения, расширения или обновления этой гарантии.

3. Право на усовершенствование или ремонт

Из того факта, что сегмент технической информации, относящийся к конкретному усовершенствованию или ремонтным работам для любой определенной группы автомобилей, опубликован на данном сайте, и что автомобиль, принадлежащий пользователю сайта или эксплуатируемый им, принадлежит к этой группе, не следует, что автомобиль пользователя должен фактически подвергаться данному усовершенствованию или ремонту, или что владельцу или пользователю предоставляется право на такой ремонт либо за вознаграждение, либо в рамках гарантийного обслуживания.



Бюллетень технического обслуживания

Раздел: Двигатель

Номер EG-7009

ссылки:

Дата: Декабрь 2007 г.

Страница: 1 из 8

Регион : Европа, без специального рынка сбыта, страны Персидского залива, Австралия

Название модели : LS600hL, LS600h, LS460L, LS460, LS430, LS400, GS300, GS350, GS400, GS430, GS450h, SC430, SC400, SC300, ES350, ES330, ES300, ES250, IS200, IS250, IS300, IS350, IS220d, LX450, LX470, GX470, RX300, RX330, RX350, RX400h

Код модели : ДЛЯ ВСЕХ МОДЕЛЕЙ

Тема : ТОЧНАЯ ПРОВЕРКА УГОЛЬНОГО АДсорБЕРА (ТОЛЬКО ДЛЯ АВТОМОБИЛЕЙ С БЕНЗИНОВЫМ ДВИГАТЕЛЕМ)

В последнее время ужесточились нормы токсичности топливных испарений, что приводит к увеличению объема продувки. Поэтому постоянно возрастает количество случаев засорения фильтров. Когда воздушный фильтр засорен, он действует как препятствие, прикладывая нагрузку и, возможно, деформируя топливный бак. В худшем случае топливный бак может треснуть.

Проверка угольного адсорбера на засорение производится периодически, и использовавшаяся ранее процедура позволяет выявить неисправный адсорбер, если он засорен полностью, однако она не дает возможности определить частичное засорение адсорбера.

Мы предоставляем новые методы проверки, которые можно использовать для точной диагностики. Адсорбер необходимо правильно проверять и обслуживать.

Информация о номере запасной части :

Каталожный номер новой детали	Наименование новой детали	К-во
Не применимо	Не применимо	Не применимо

Дата производства :

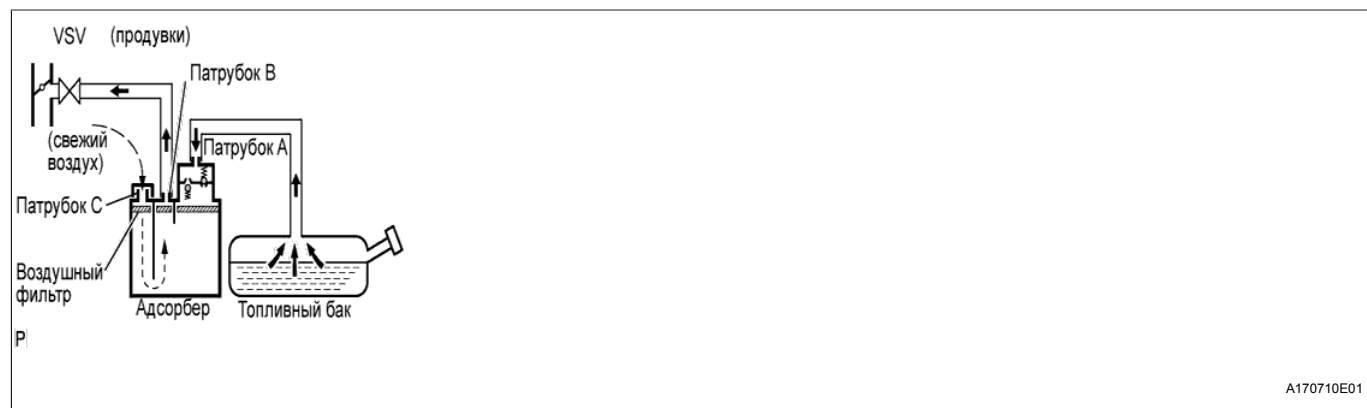
№ рамы	Дата производства
Не применимо	Не применимо

ДВИГАТЕЛЬ УГОЛЬНЫЙ АДСОРБЕР

ПРОВЕРКА

1. ДЕЙСТВИТЕЛЬНО ДЛЯ МОДЕЛЕЙ

Все модели с бензиновым двигателем



Подсказка:

На рисунках патрубки обозначены следующим образом.

Патрубок А: канал бака

Патрубок В: канал продувки

Патрубок С: воздушный канал

2. ИНФОРМАЦИЯ О ПРОЦЕДУРЕ ПРОВЕРКИ

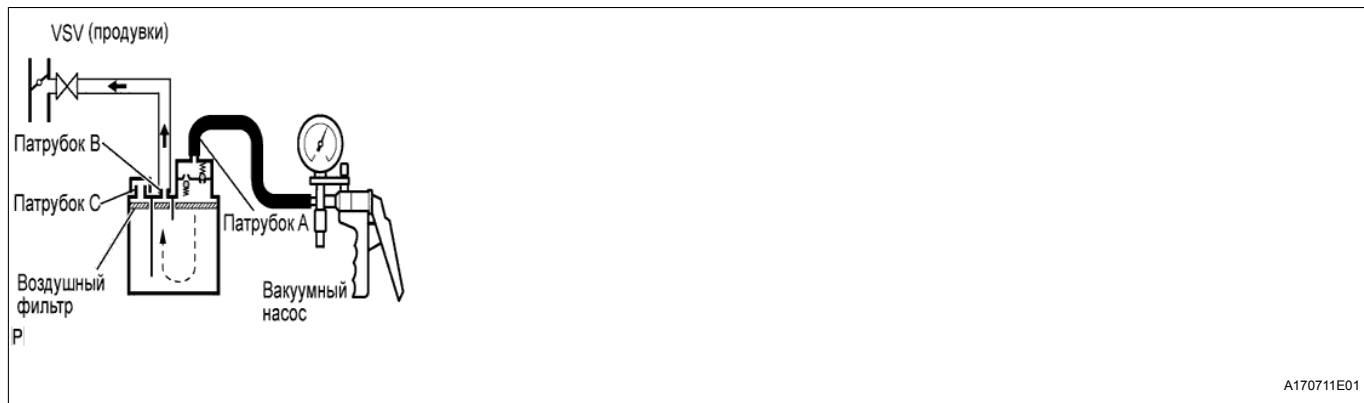
Разработаны два метода проверки фильтра на засорение: "метод пробки наливной горловины топливного бака", при использовании которого диагностика основана на наличии звука всасывания из пробки наливной горловины топливного бака", и "метод создания разрежения", в котором для точной диагностики применяется вакуумный насос.

(а) Процедура проверки 1 (метод наливной горловины топливного бака)



При использовании данного метода засорение воздушного фильтра определяется путем контроля звука всасывания из крышки наливной горловины после завершения предыдущей процедуры проверки адсорбера.

(b) Процедура проверки 2 (метод создания разрежения)



Так как проверка фильтра на засорение производится с помощью манометра вакуумного насоса, засорение может быть диагностировано точнее, чем с помощью предыдущей процедуры проверки адсорбера.

3. ПРОВЕРКА

(a) Процедура проверки 1 (метод наливной горловины топливного бака)

(1) Проверьте воздушный фильтр на засорение (без использования портативного диагностического прибора)

1. После запуска и прогрева двигателя дайте ему поработать на холостом ходу в течение 15 мин, а затем откройте пробку наливной горловины топливного бака, чтобы уравнивать давление в баке с атмосферным давлением.

2. Закройте пробку наливной горловины топливного бака и дайте двигателю поработать на холостом ходу в течение 30 с. Затем прислушайтесь к звуку всасывания, вновь открывая пробку наливной горловины топливного бака.

ОК

Звуки всасывания должны отсутствовать. Если есть звук всасывания, сопровождающийся запахом бензина, этот звук обусловлен избыточным давлением в баке, вызывающим выход воздуха наружу, и является нормальным.

(2) Проверьте воздушный фильтр на засорение (с использованием портативного диагностического прибора)

Подсказка:

Если возможна диагностика VSV продувки в режиме Active Test с помощью портативного диагностического прибора, проверку можно выполнить без прогрева двигателя и работы на холостом ходу в течение 15 мин.

1. Подсоедините портативный диагностический прибор к DLC3.

2. Запустите двигатель.

3. Следуя указаниям на дисплее портативного диагностического прибора, выберите ACTIVE TEST / Activate the VSV for Evap Control.

4. Откройте пробку наливной горловины топливного бака, чтобы уравнивать давление в баке с атмосферным давлением.

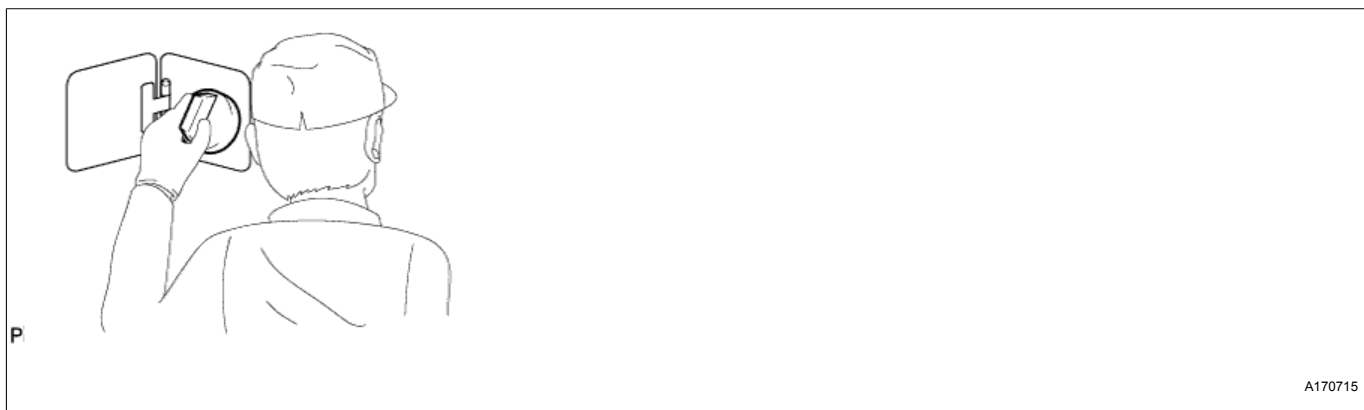
5. Выполните испытание PURGE VSV в режиме Active Test при условии, что двигатель работает на холостом ходу.

6. Закройте пробку наливной горловины топливного бака.

7. Закройте пробку наливной горловины топливного бака на 30 с, а затем прислушайтесь к звуку всасывания, вновь открывая пробку наливной горловины топливного бака.

ОК

Звуки всасывания должны отсутствовать. Если есть звук всасывания, сопровождающийся запахом бензина, этот звук обусловлен избыточным давлением в баке, вызывающим выход воздуха наружу, и является нормальным.



В данном методе засорение воздушного фильтра определяется путем выполнения следующих проверок после завершения предыдущей процедуры проверки адсорбера.

Предыдущая процедура проверки адсорбера рассмотрена в руководстве по ремонту автомобиля.

(b) Процедура проверки 2 (метод создания разрежения)

(1) Проверьте, нет ли утечек

1. Проверьте поверхность адсорбера на наличие трещин, царапин, а также проверьте, нет ли запаха бензина.

(2) Проверьте клапан избыточного давления

Подсказка:

*: На некоторых адсорберах воздушный канал закрыт колпачком, однако для проверки снимать колпачок не требуется.

1. Снимите шланг топливного бака, подсоединенный к патрубку бака адсорбера (A), и закройте снятый шланг топливного бака пробкой шланга.

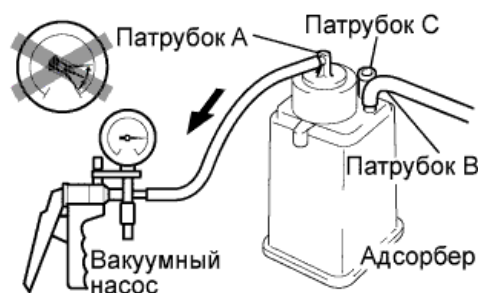
2. Подсоедините шланг для проверки (шланг, поставляемый с устройством создания разрежения) к патрубку бака адсорбера.

3. Создайте в шланге высокое давление (4,71 кПа (0,05 кгс*см², 0,7 фунта на кв. дюйм)

ОК

Убедитесь, что воздух может прокачиваться через шланг.

(3) Проверьте вакуумный клапан



A170714E01

1. Подсоедините вакуумный насос к шлангу для проверки и создайте разрежение.

ОК

Убедитесь, что показание стрелки манометра вакуумного насоса не увеличивается по сравнению с первоначальным положением. (При создании разрежения стрелка может дрожать, однако если стрелка быстро возвращается в первоначальное положение, то проблем нет.)

(4) Проверьте воздушный фильтр на засорение (без использования портативного диагностического прибора)

1. После запуска и прогрева двигателя дайте ему поработать на холостом ходу и проверьте показание манометра вакуумного насоса через 15 мин.

Подсказка:

Для гибридных автомобилей и пр. с функцией автоматической остановки двигателя перейдите в режим проверки, чтобы не допустить остановки двигателя. Режим проверки рассмотрен в руководстве по ремонту для данной модели.

ОК

Убедитесь, что показание стрелки манометра вакуумного насоса не увеличивается по сравнению с первоначальным положением. (Стрелка может дрожать вследствие вибрации двигателя и прочих факторов, однако если стрелка быстро возвращается в первоначальное положение, то проблем нет.)

(5) Проверьте воздушный фильтр на засорение (с использованием портативного диагностического прибора)

Подсказка:

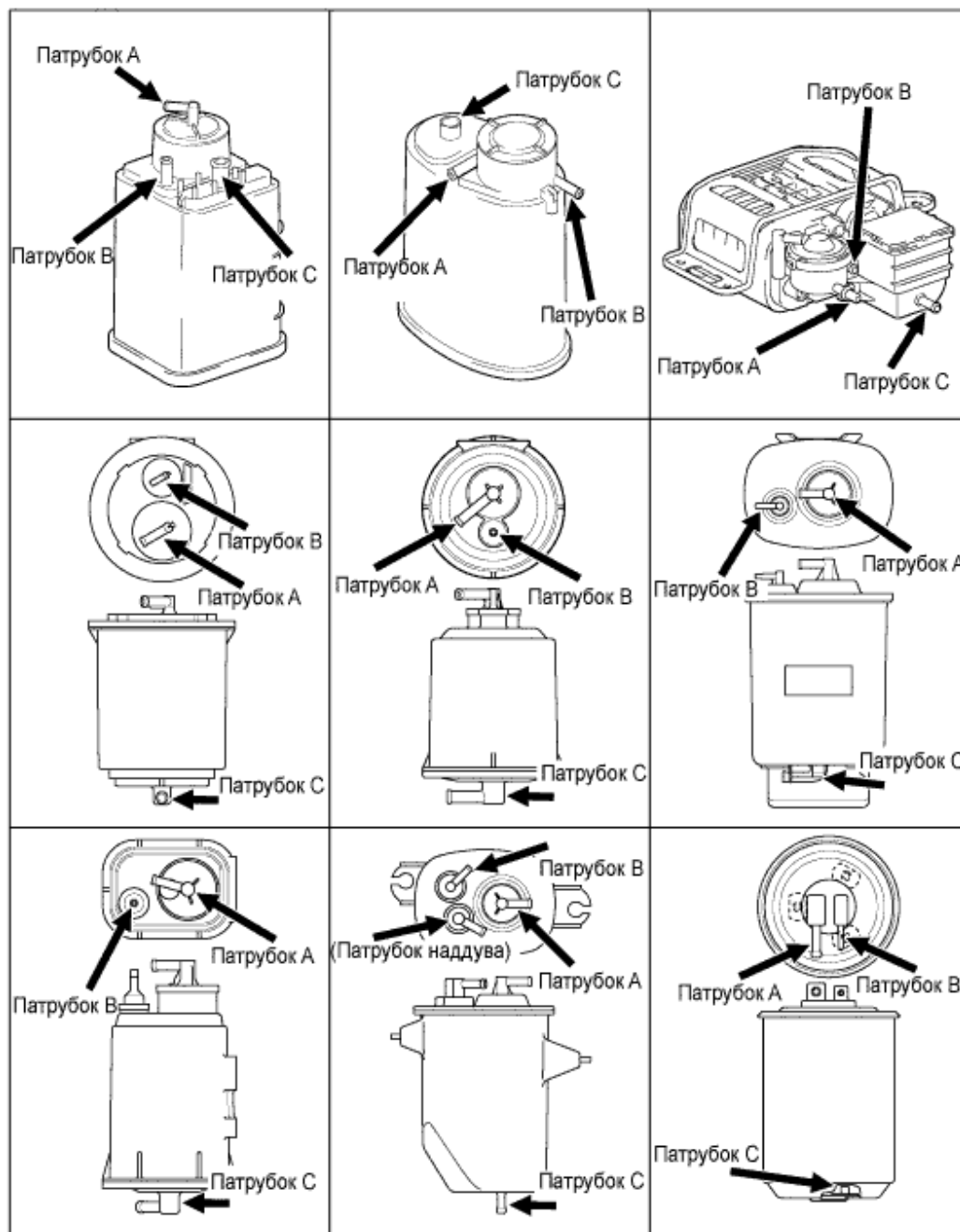
Если возможна диагностика VSV продувки в режиме Active Test с помощью портативного диагностического прибора, проверку можно выполнить без прогрева двигателя и работы на холостом ходу в течение 15 мин.

1. Подсоедините портативный диагностический прибор к DLC3.
2. Запустите двигатель.
3. Следуя указаниям на дисплее портативного диагностического прибора, выберите ACTIVE TEST / Activate the VSV for Evap Control.
4. Выполните испытание в режиме Active Test при условии, что двигатель работает на холостом ходу.

ОК

Убедитесь, что показание стрелки манометра вакуумного насоса не увеличивается по сравнению с первоначальным положением. (Стрелка может дрожать вследствие вибрации двигателя и прочих факторов, однако, если стрелка быстро возвращается в первоначальное положение, то проблем нет.)

ТИПЫ УГОЛЬНЫХ АДСОРБЕРОВ



Патрубок А: канал бака

Патрубок В: канал продувки

Патрубок С: воздушный канал

УКАЗАНИЕ: Положение установки указано в руководстве по ремонту для данной модели.

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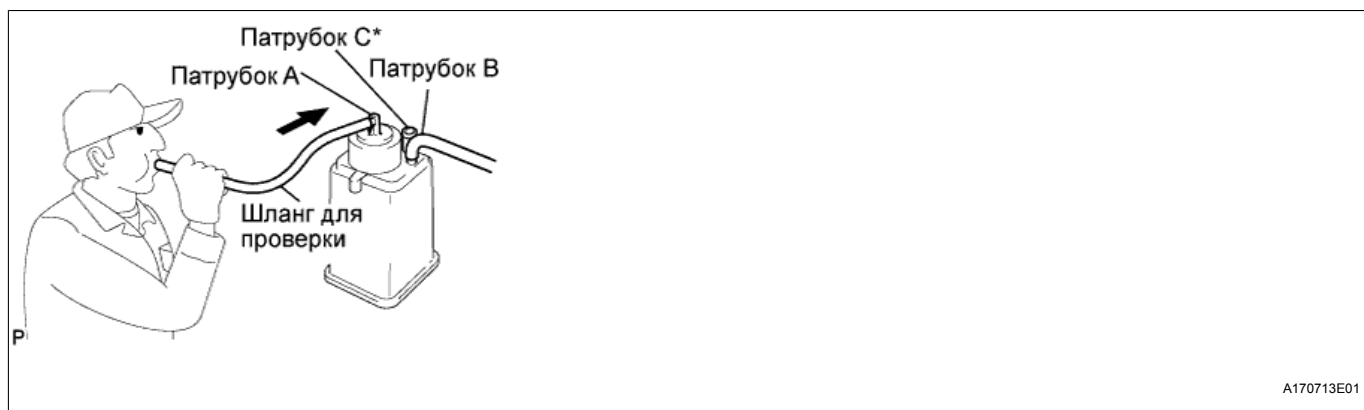


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3. Technical Description

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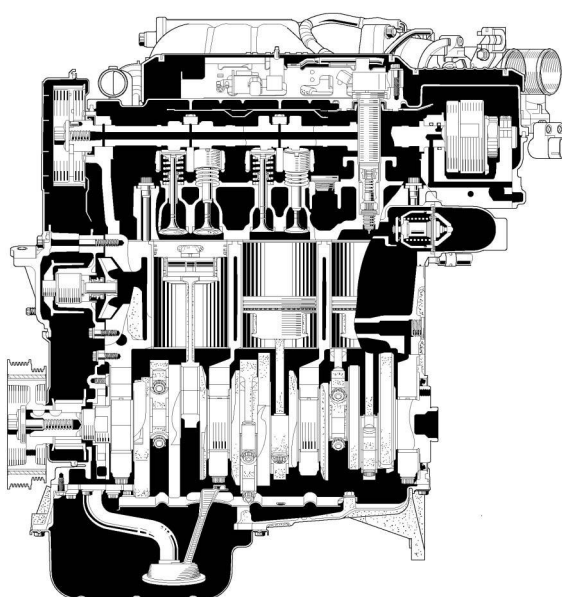
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ENGINE

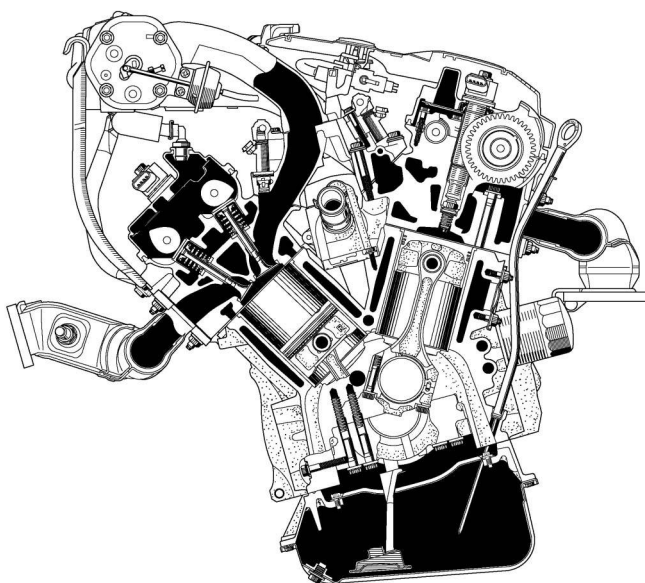
1MZ-FE ENGINE

■ DESCRIPTION

The 1MZ-FE engine has adopted the VVT-i (Variable Valve Timing-intelligent) system and 3-stage ACIS (Acoustic Control Induction System) to improve engine performance and fuel economy and to reduce exhaust emissions. In addition, it has adopted the active control engine mount to reduce noise and vibration.



187EG01



187EG02

► Specifications ◀

Item			1MZ-FE Engine
No. of Cyls. & Arrangement			6-Cylinder, V Type
Valve Mechanism			24-Valve, DOHC, Belt & Gear Drive
Combustion Chamber			Pentroof
Manifolds			Cross-Flow
Fuel System			EFI
Displacement		cm ³ (cu. in.)	2995 (182.7)
Bore × Stroke		mm (in.)	87.5 × 83.0 (3.44 × 3.27)
Compression Ratio			10.5 : 1
Max. Output		[EEC]	—
Max. Torque		[EEC]	—
Valve Timing	Intake	Open	−4° ~ 56° BTDC
		Close	60° ~ 0° ABDC
	Exhaust	Open	46° BBDC
		Close	2° ATDC
Fuel Octane Number		RON	91 or higher
Oil Grade			API SJ EC or ILSAC

■ FEATURES OF 1MZ-FE ENGINE

The 1MZ-FE engine has been able to achieve the following performance through the adoption of the items listed below.

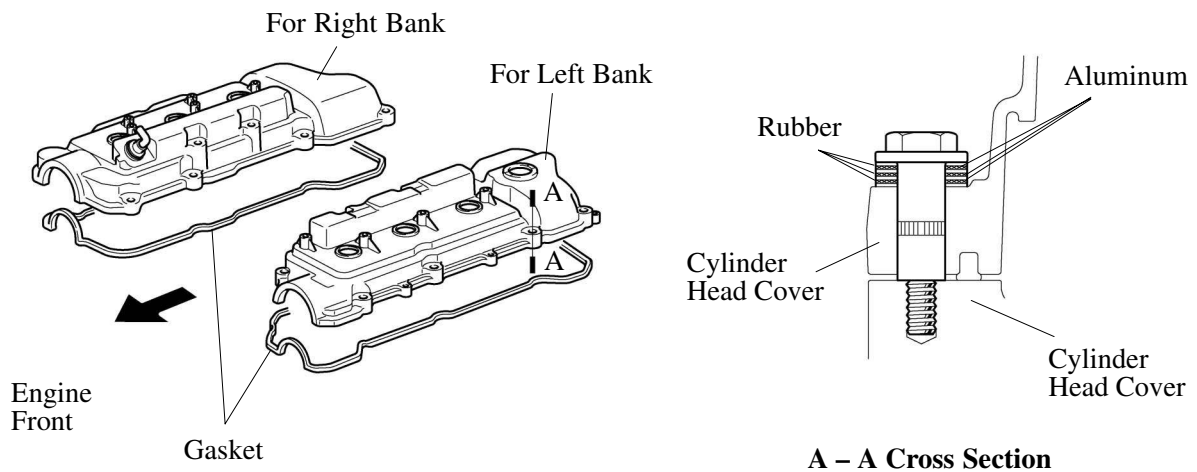
- (1) High performance and fuel economy
- (2) Low noise and vibration
- (3) Lightweight and compact design
- (4) Good serviceability
- (5) Clean emission

Item	(1)	(2)	(3)	(4)	(5)
The VVT-i system is used.	○				○
Compact plug-in type mass air flow meter is used.			○		
The direction of the rotation of the electric cooling fan has been reversed to reduce intake air temperature.	○				
A 2-valve throttle body has been adopted to accommodate the 3-stage ACIS.	○				
A ball joint has been adopted at the exhaust pipe to reduce vibration.		○			
A 2-way exhaust control system has been adopted to improve engine performance and to ensure an even quieter operation.	○	○			
A DIS (Direct Ignition System) makes ignition timing adjustment unnecessary.	○			○	
An active control engine mount is used on the front engine mount and a liquid-filled compound mount is used on the rear engine mount.		○			
Iridium-tipped spark plugs have been adopted to improve ignition.	○			○	
An aluminum radiator core is used for weight reduction.			○		
A fuel returnless system has been adopted to prevent the internal temperature of the fuel tank from rising, and to reduce the evaporative emissions.					○

■ ENGINE PROPER

1. Cylinder Head Cover

- Lightweight yet high-strength aluminum diecast cylinder head covers are used.
- In order to improve sealing, reduce noise, and prevent excessive tightening during service, an aluminum washer made of vibration-damping laminated aluminum sheet is used on the evenly spaced shoulder bolts which fasten the cylinder head covers.

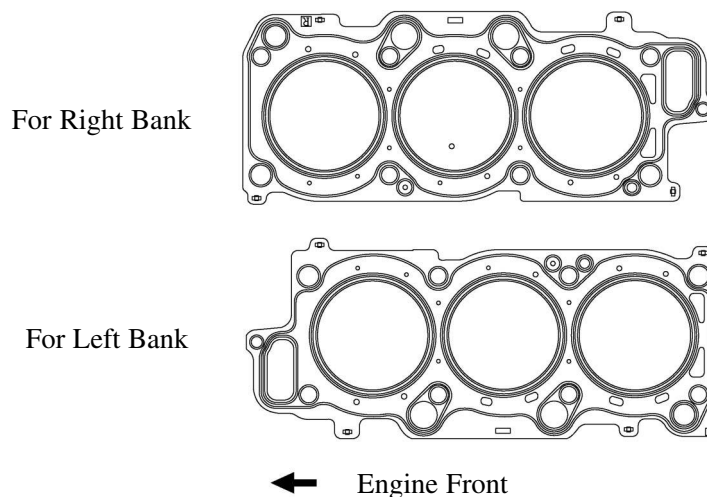


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2. Cylinder Head Gasket

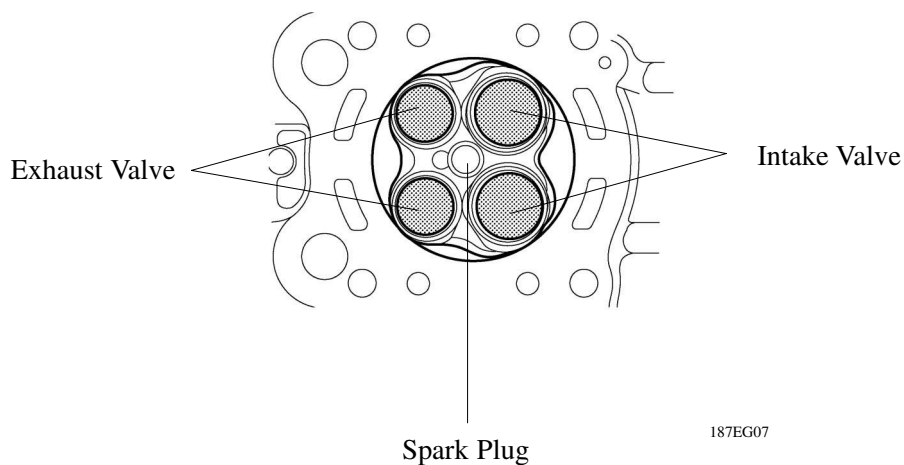
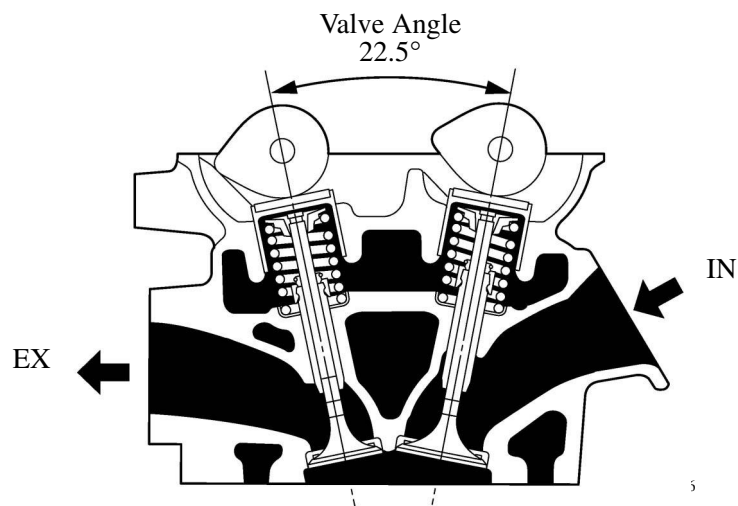
- A carbon graphite type cylinder head gasket which offers superior pressure resistance and sealing performance has been adopted.
- The bore grommets are made of stainless steel to increase reliability and durability.



187EG05

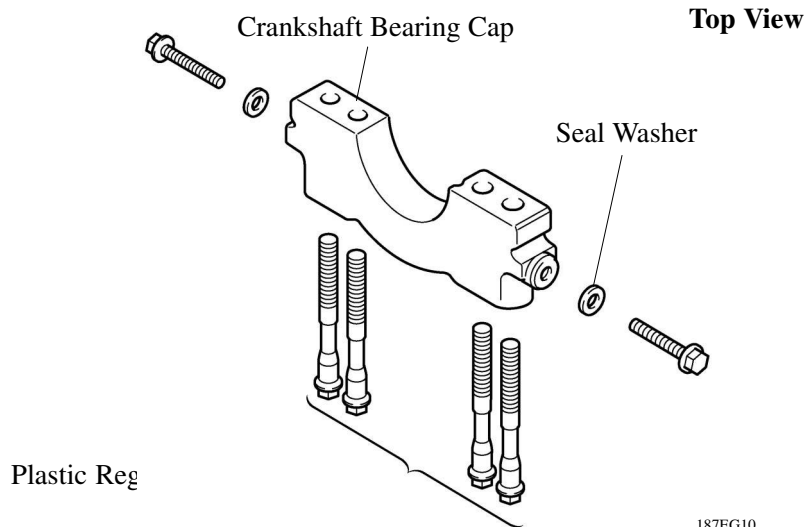
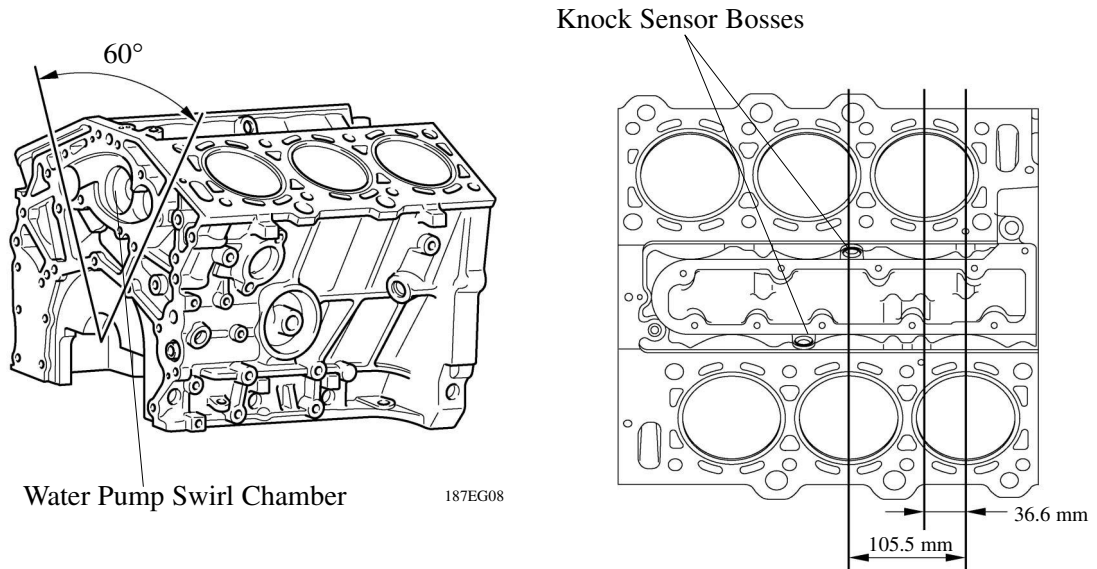
3. Cylinder Head

- The cylinder head, which is made of aluminum, has adopted a pentroof-type combustion chamber. The spark plug has been located in the center of the combustion chamber in order to improve the engine's antiknocking performance.
- The angle of the intake and exhaust valves is narrowed and set at 22.5° to permit a compact cylinder head.
- Upright, small-diameter intake ports are adopted to improve the torque at low-to-medium speeds.
- In order to reduce intake & exhaust air resistance, the cross section of the protrusion of the valve guide into the intake port has been reduced by decreasing the valve stem diameter and the valve guide outer diameter.
- Plastic region tightening bolt is used for the cylinder head bolts for good axial tension.



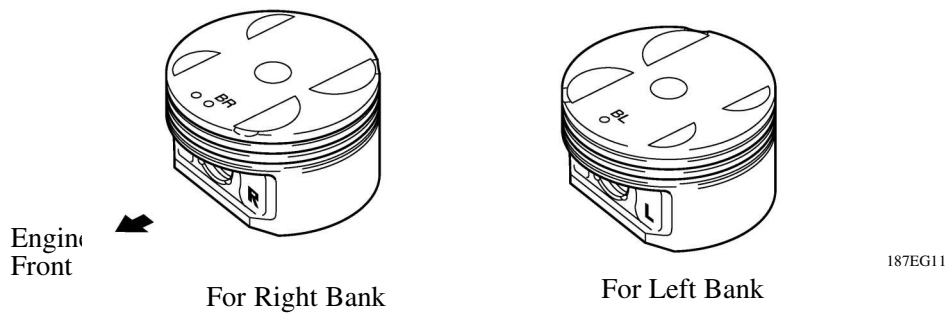
4. Cylinder Block

- The cylinder block has a bank angle of 60°, a bank offset of 36.6 mm (1.44 in.) and a bore pitch of 105.5 mm (4.15 in.), resulting in a compact block.
- Lightweight aluminum alloy is used for the cylinder block.
- A thin cast-iron liner is press-fit inside the cylinder to ensure an added reliability. This liner is thin, so that boring is not possible.
- A water pump swirl chamber and an inlet passage to the pump are provided in the V-bank to help make the engine compact.
- Knock sensor bosses are provided at 2 locations in the V-bank.
- The crankshaft bearing caps are tightened using 4 plastic-region bolts for each journal. In addition, each cap is tightened laterally to improve its reliability.



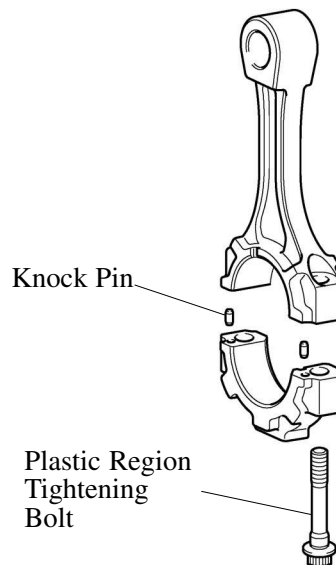
5. Piston

- The piston is made of aluminum alloy and skirt area is made compact and lightweight.
- Resin coating is applied to the piston skirt area and thin piston rings are used to reduce friction.
- Each of the pistons is made specifically for the right or left bank.
- Full floating type piston pins are used.



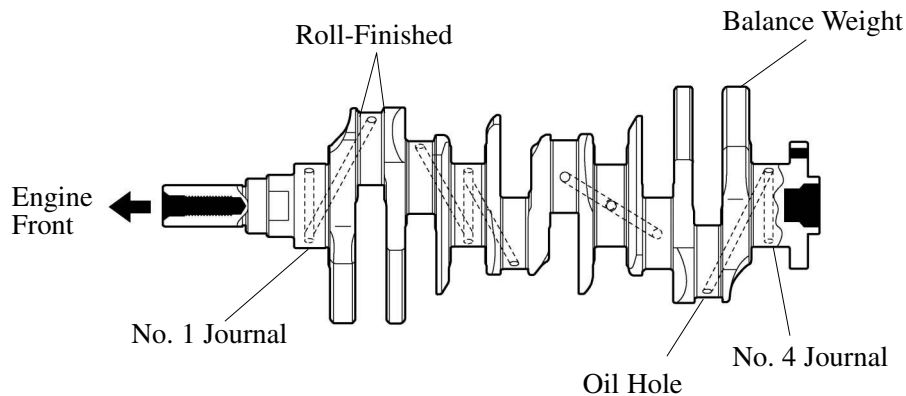
6. Connecting Rod

- Connecting rods that have been forged for high strength are used for weight reduction.
- An aluminum bearing with overlay is used for the connecting rod bearings to improve durability.
- Plastic region tightening bolts are used.
- Knock pins are used at the mating surfaces of the bearing caps of the connecting rod to minimize the shifting of the bearing caps during assembly.



7. Crankshaft

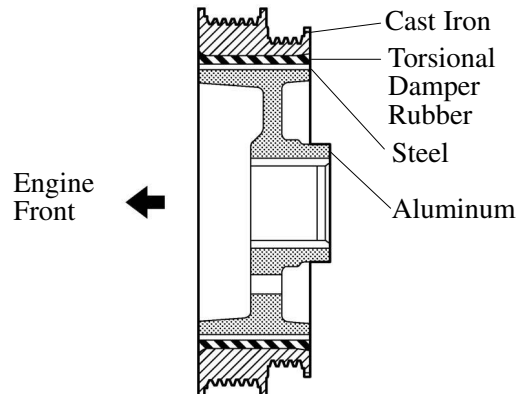
- The crankshaft is made of forged steel and has 4 journals and 9 balance weights.
- All pins and journals fillets are roll-finished to maintain adequate strength.
- The crankshaft bearings for the No. 1 and No. 4 journals are made wider to decrease noise and vibration, and those for the No. 2 and No. 3 journals are made narrower to reduce friction.



187EG13

8. Crankshaft Pulley

- The crankshaft pulley hub is made of aluminum to reduce weight and vibration.
- The rigidity of the torsional damper rubber has been optimized to reduce noise.

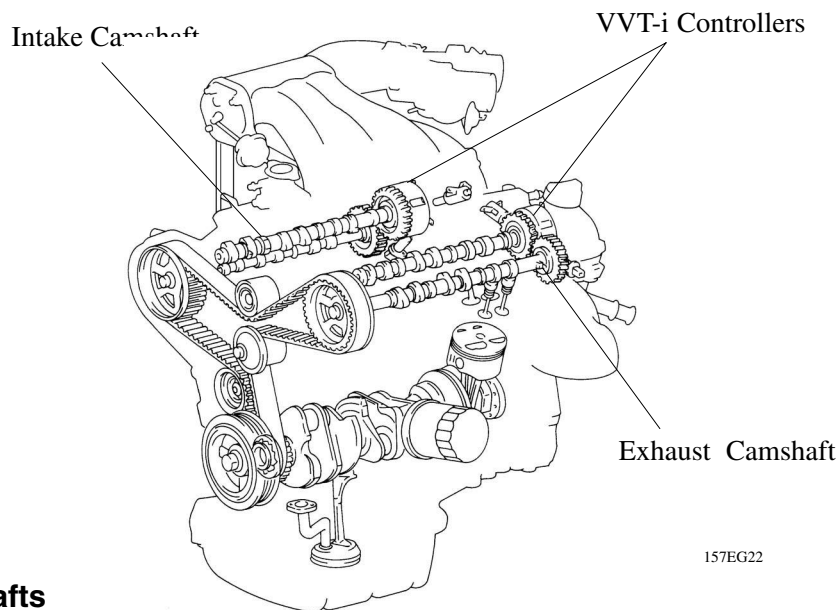


187EG14

■ VALVE MECHANISM

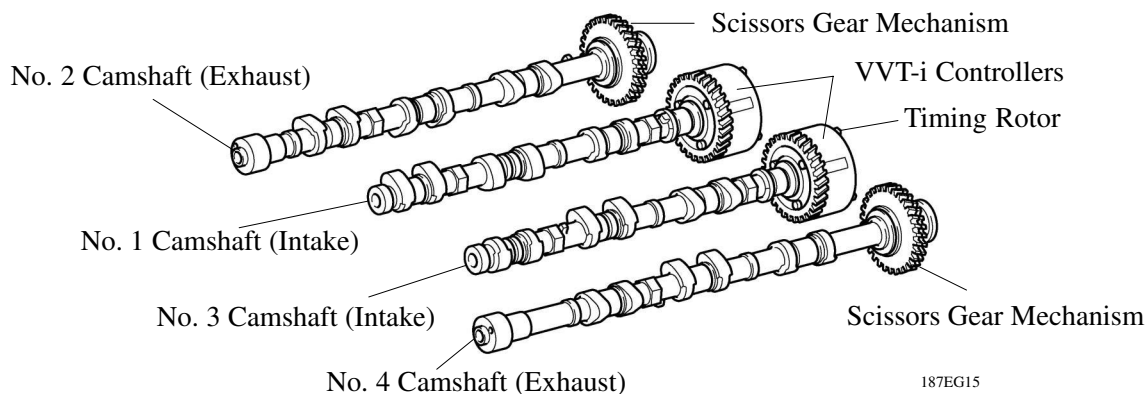
1. General

- Each cylinder has 2 intake valves and 2 exhaust valves.
- The valves are directly opened and closed by 4 camshafts.
- The exhaust camshafts are driven by a timing belt, while the intake camshafts are driven through gears on the exhaust camshafts.
- The VVT-i system is used to improve fuel economy, engine performance and reduce exhaust emission. For details, see page 48 (VVT-i System Section).



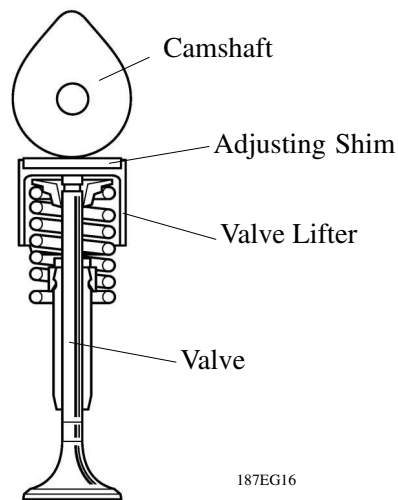
2. Camshafts

- In conjunction with the adoption of the VVT-i system, an oil passage is provided in the intake camshaft in order to supply engine oil to the VVT-i system.
- A VVT-i controller has been installed on the back of the intake camshaft to vary the timing of the intake valves.
- To detect the camshaft position, a timing rotor that is provided on the VVT-i controller is used to generate 3 pulses for every 2 revolutions of the crankshaft.
- The intake camshafts are driven by gears on the exhaust camshafts. The scissors gear mechanism is used on the exhaust camshaft to control backlash and suppress gear noise.



3. Intake and Exhaust Valve and Valve Lifter

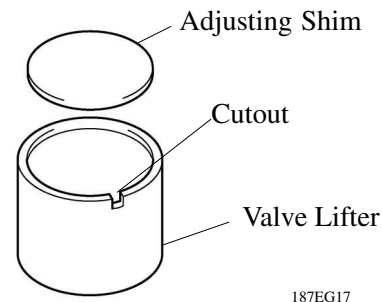
- Narrower valve stems have been adopted to reduce the intake and exhaust resistance and for weight reduction.
- The adjusting shim has been located directly above the valve lifter. This construction allows the adjusting shim to be replaced without removing the camshaft, which improves the serviceability during valve clearance adjustment.
- A cutout is provided in the valve lifter to improve the serviceability of replacing the adjusting shims.



► Specifications ◀

mm (in.)

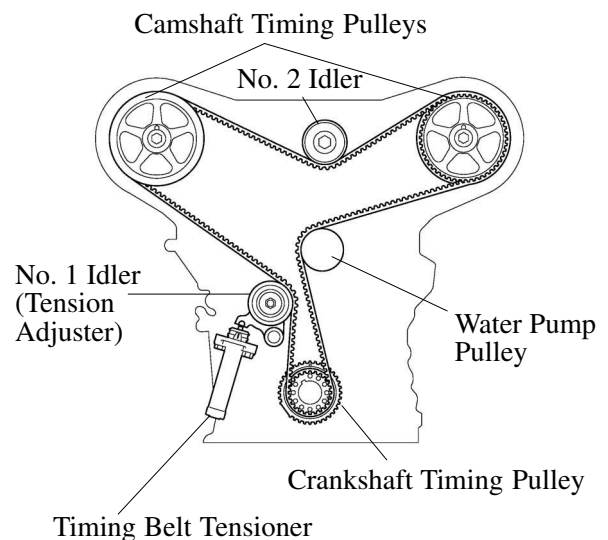
Item	Intake Valve	Exhaust Valve
Face Diameter	34.0 (1.34)	27.3 (1.07)
Stem Diameter	5.5 (0.22)	5.5 (0.22)



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4. Timing Belt

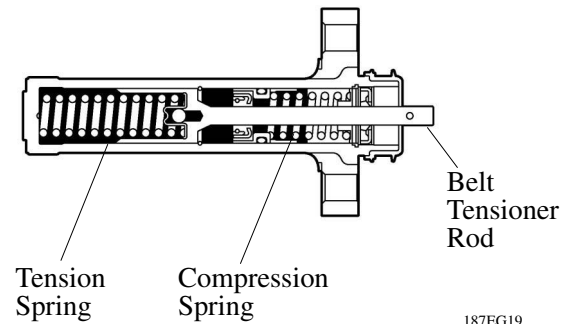
The timing belt tooth configuration has been designed to help to reduce noise and to enable the belt to transmit power under high load factors.



5. Timing Belt Tensioner

The timing belt tensioner uses a spring and siricon oil damper, and maintains proper timing belt tension at all times.

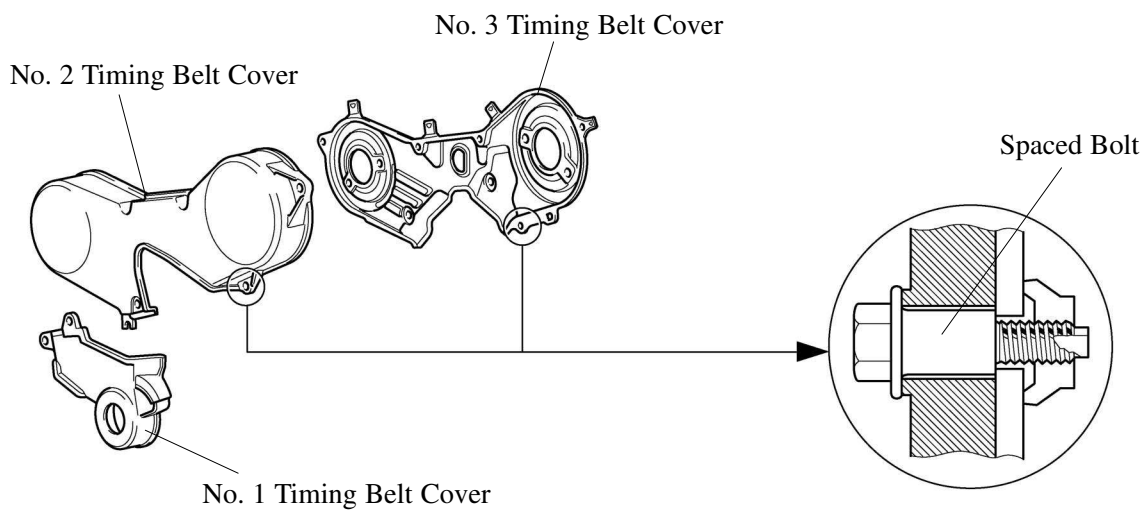
The timing belt tensioner suppresses noise generated by the timing belt.



187EG19

6. Timing Belt Cover

The timing belt cover is divided into 3 pieces, designated No. 1 to No. 3. The NO. 1 and 2 timing belt covers are made of resin, and tightened with evenly spaced bolts. The No. 3 timing belt cover is made of steel sheet, and is attached to the engine via rubber bushings to reduce noise.

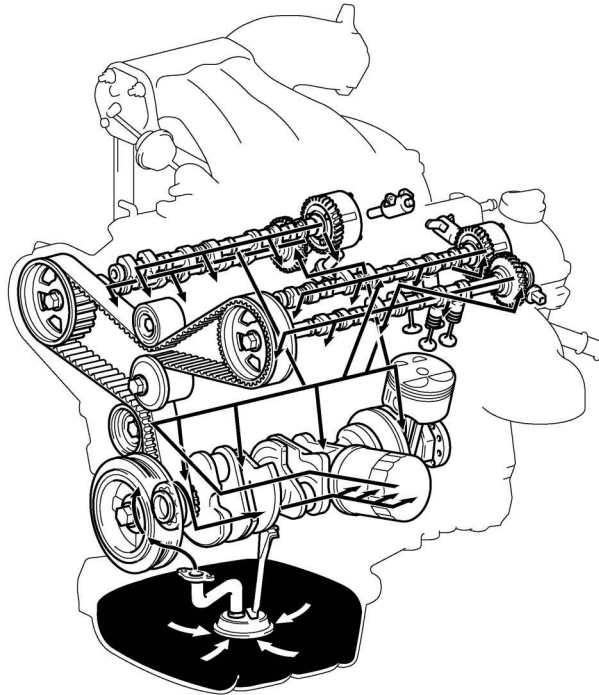


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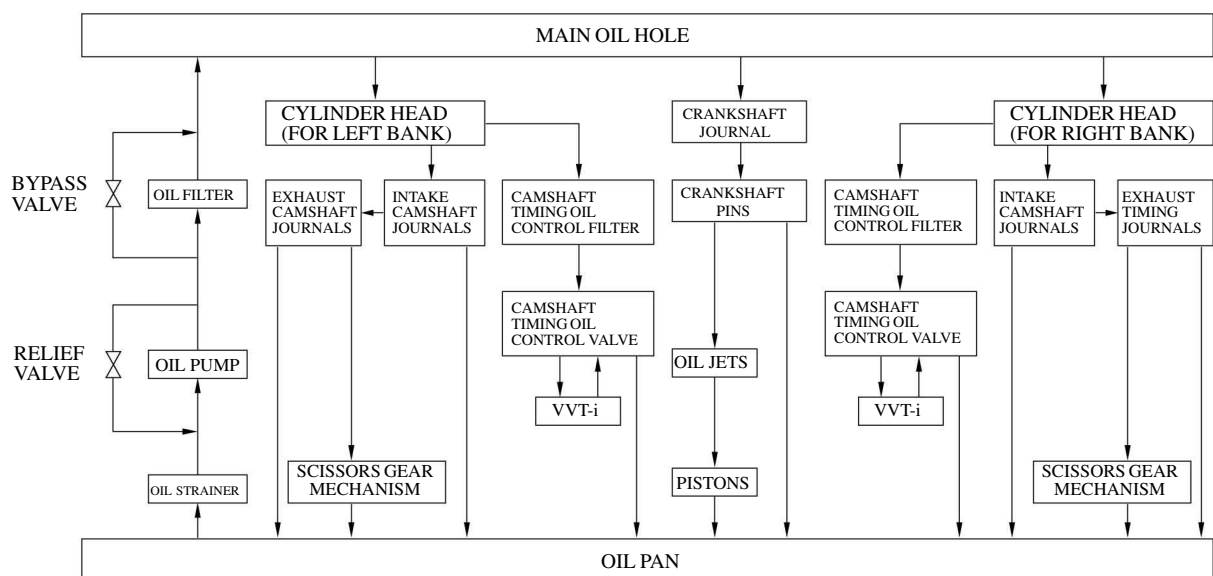
■ LUBRICATION SYSTEM

1. General

- The lubrication is fully pressurized and all oil passes through an oil filter.
- A trochoid gear type oil pump is directly driven by the crankshaft.



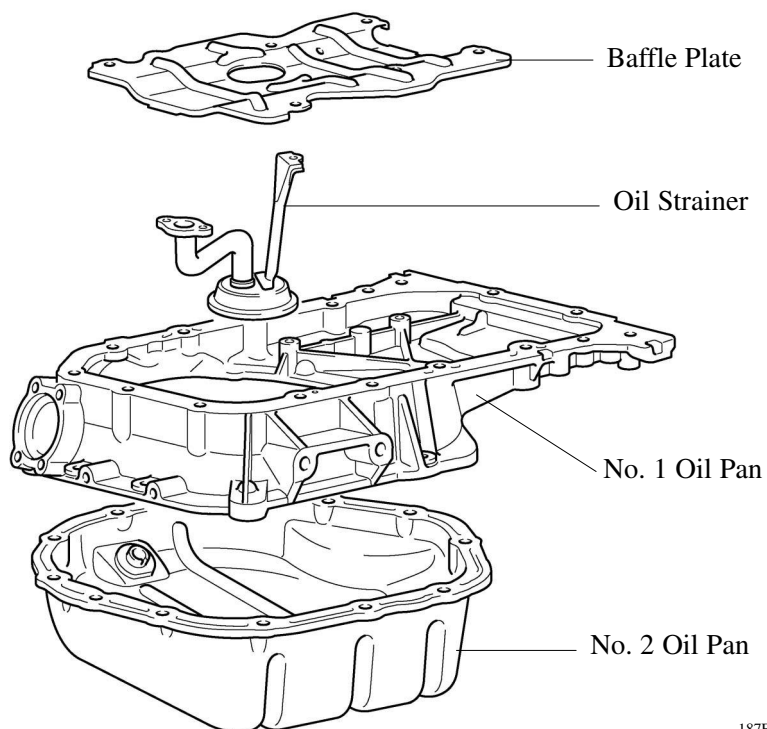
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2. Oil Pan

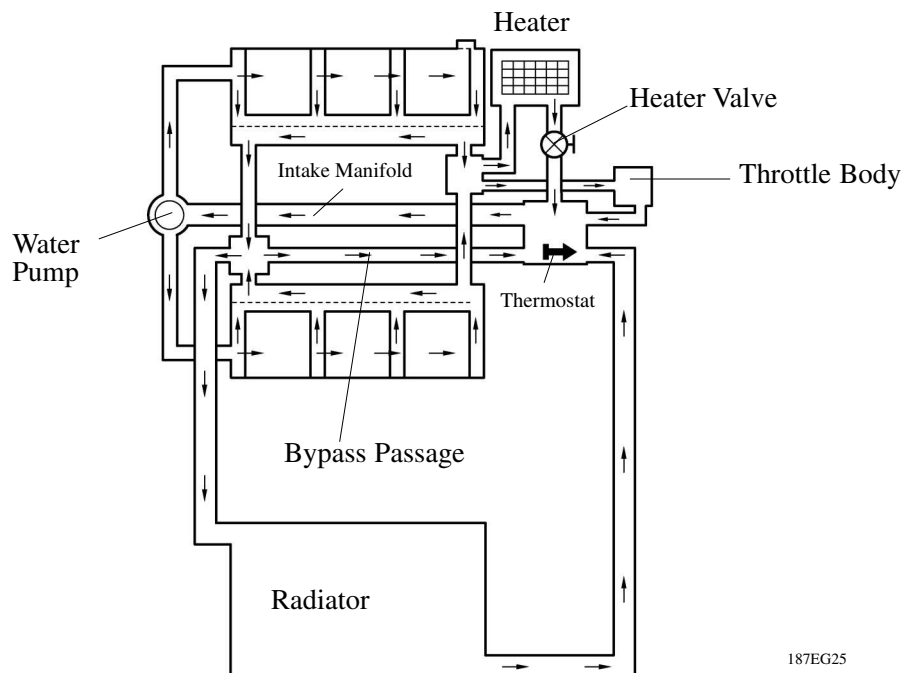
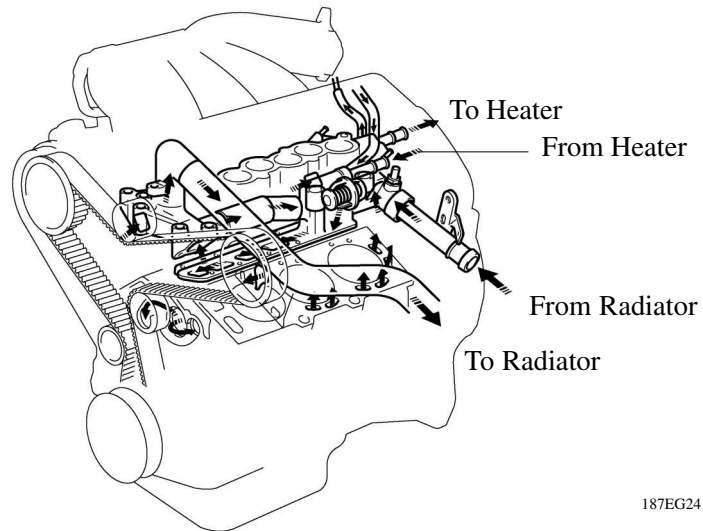
- The oil pan is made up of 2 pieces. No. 1 oil pan is made of aluminum alloy and No. 2 oil pan is made of steel sheet.
- No. 1 oil pan is secured to the cylinder block and the transaxle housing and is increasing rigidity.



187EG23

■ COOLING SYSTEM

- The cooling system is a pressurized, forced - circulation type.
- A thermostat having a bypass valve is located on the water pump inlet side of the cooling circuit.

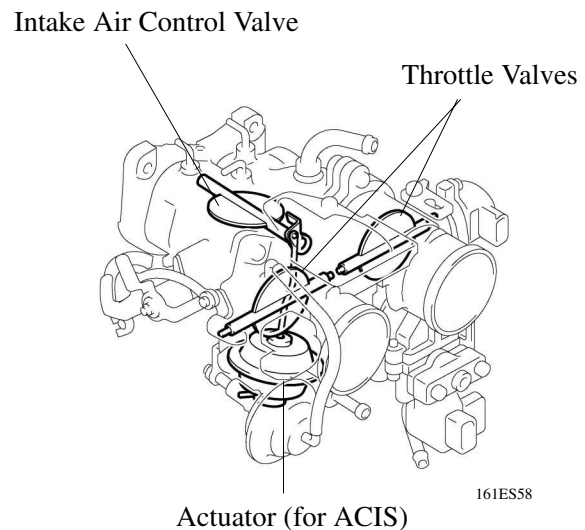


■ INTAKE AND EXHAUST SYSTEM

1. Throttle Body

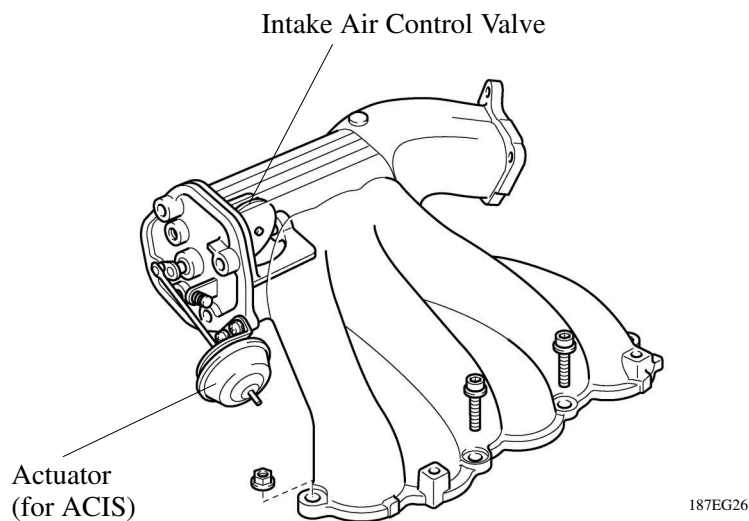
To accommodate the 3-stage ACIS (Acoustic Control Induction System), a throttle body that provides 2 barrels throttle valve has been adopted. The intake air control valve for the 3-stage ACIS is integrated in the throttle body.

For details, see page 54 (ACIS Section).



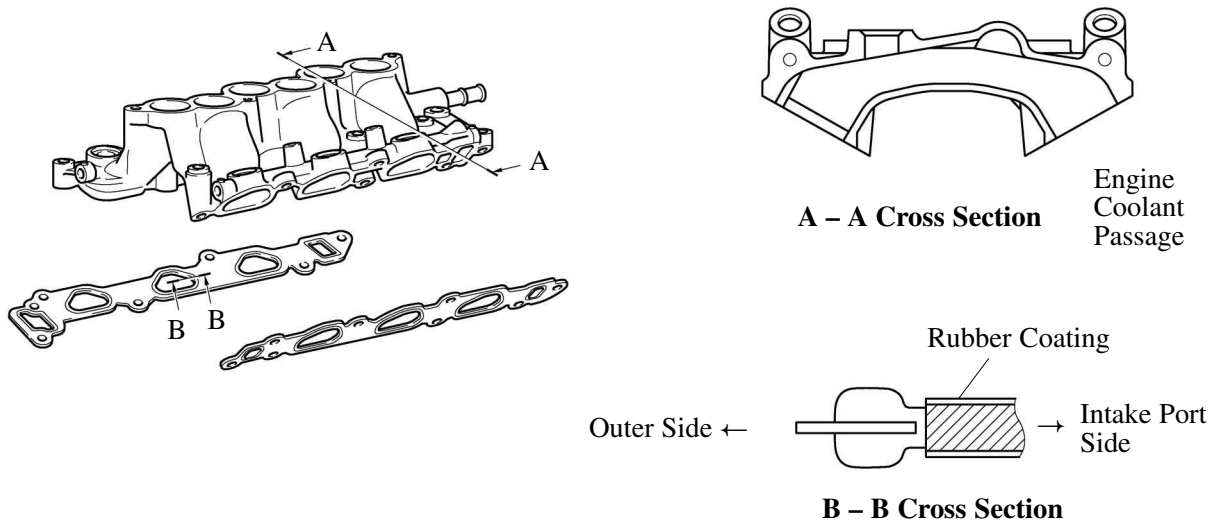
2. Intake Air Chamber

The intake air chamber consists of upper and lower sections and contains an intake air control valve. This valve is activated by ACIS and is used to alter the intake pipe length to improve the engine performance in all speed ranges.



3. Intake Manifold

- The port diameter of the intake manifold has been increased and the port length has been optimized to improve engine performance.
- An engine coolant passage connects the left and right banks at the rear end of the intake manifold.
- The intake manifold gasket has rubber coating applied onto surface, and provide superior durability.

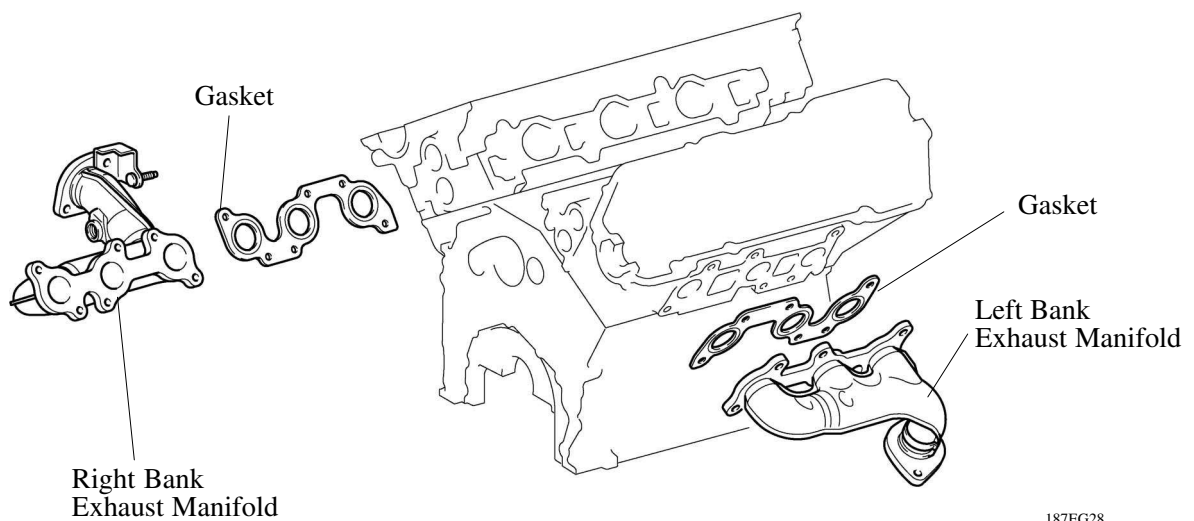


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187EG27

4. Exhaust Manifold

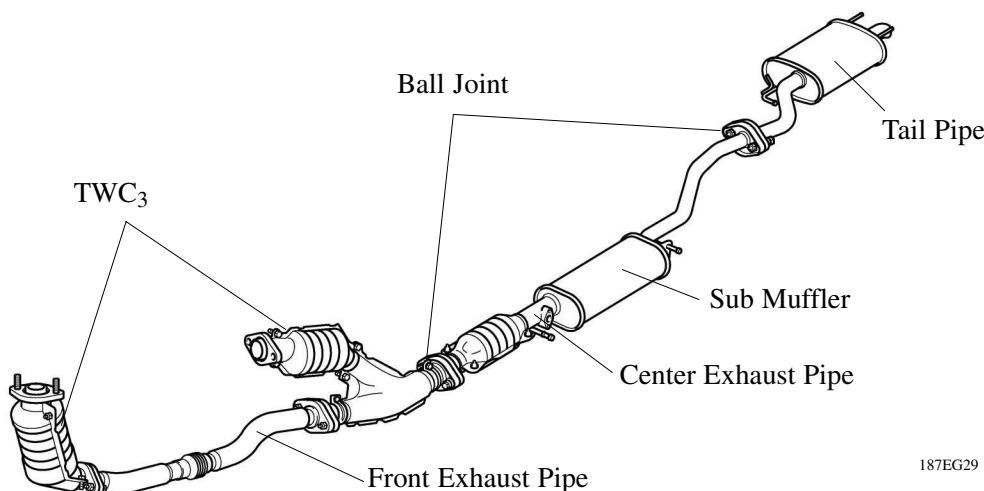
A stainless steel exhaust manifold is used for improving the warm-up of the three-way catalytic converter and for weight reduction.



187EG28

5. Exhaust Pipe

- A ball joint has been adopted for the connection between the front exhaust pipe and the center exhaust pipe, as well as between the center exhaust pipe and the tailpipe to reduce vibration.
- A 2-way exhaust control system has been adopted to improve engine performance and ensure an even quieter operation.



187EG29

2-Way Exhaust Control System

- This system reduces the back pressure by opening and closing a control valve that is enclosed in the main muffler, thus varying the exhaust gas passage.
- The valve opens steplessly in accordance with the operating condition of the engine, thus enabling a quieter operation at lower engine speeds, and reducing back pressure at higher engine speeds.

1) Construction

The control valve is enclosed in the main muffler. When the exhaust gas pressure overcomes the spring pressure, the control valve opens steplessly in accordance with the exhaust gas pressure.

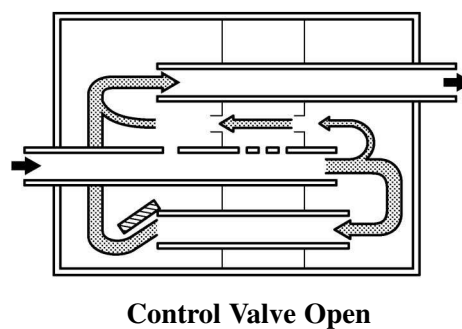
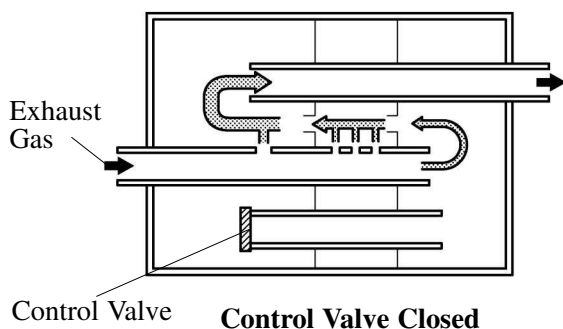
2) Operation

a. When Control Valve is Closed (low engine speed)

Since the pressure in the main muffler is low, the control valve is closed. Hence exhaust gas does not pass the bypass passage, and exhaust noise is decreased by the main muffler.

b. When Control Valve is Open (middle to high engine speed)

The control valve opens more as the engine speed and the back pressure in the muffler increase. This allows a large volume of exhaust gas to pass the bypass passage, thereby substantially decreasing the back pressure.

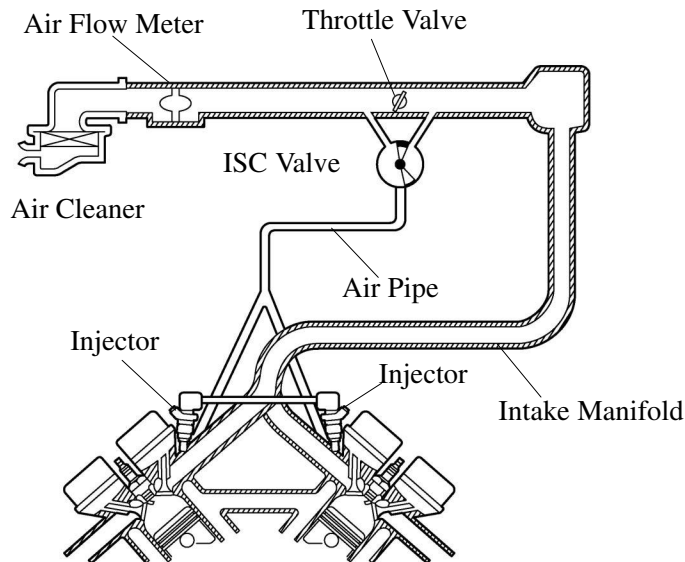


187EG30

■ FUEL SYSTEM

1. Air Assist Fuel Injection System

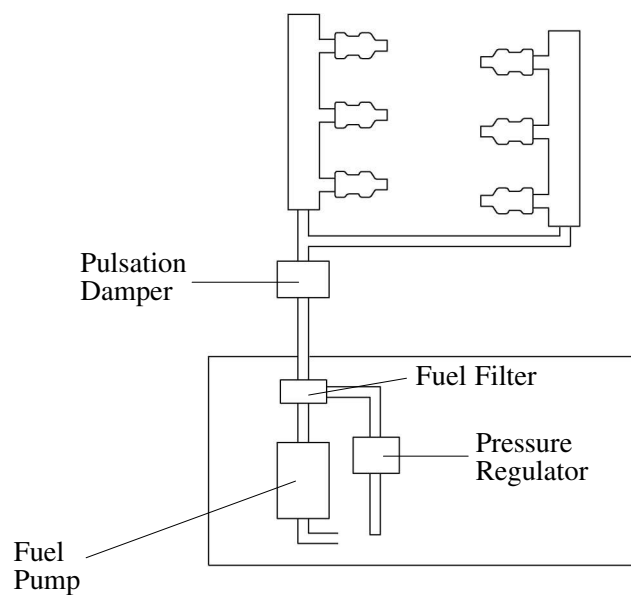
This system is designed to regulate air intake to the upstream (atmospheric side) of the throttle valve using the ISC valve, and direct it to the nozzle of the fuel injector inside the intake manifold (negative pressure side). This promotes atomization of the fuel while reducing emissions and improving fuel economy and idle stability.



187EG31

2. Fuel Returnless System

This system is to reduce the evaporative emission. As shown below, integrating the pressure regulator and fuel filter with the fuel pump assembly made it possible to discontinue the return of fuel from the engine area and prevent temperature rise inside the fuel tank.



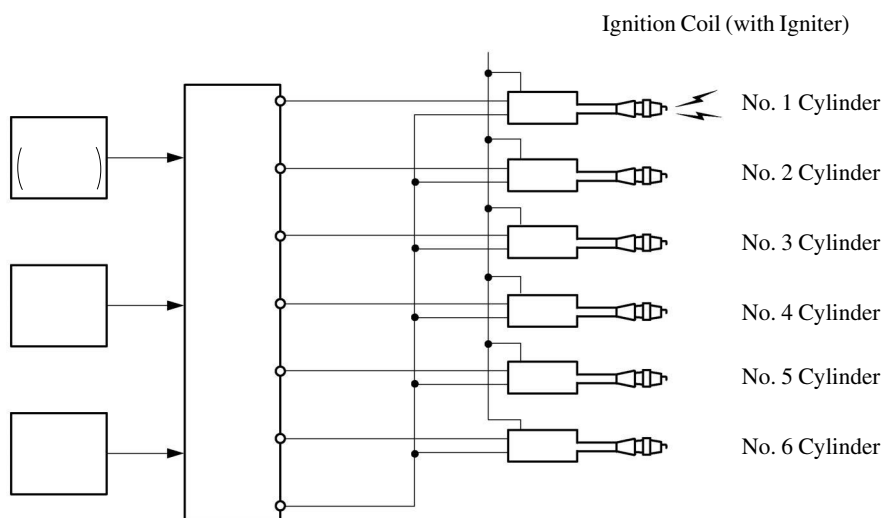
187EG32

■ IGNITION SYSTEM

1. General

A DIS (Direct Ignition System) has been adopted in the 1MZ-FE engine. The DIS improves the ignition timing accuracy, reduces high-voltage loss, and enhances the overall reliability of the ignition system by eliminating the distributor.

The DIS in 1MZ-FE engine is an independent ignition system which has one ignition coil for each cylinder.



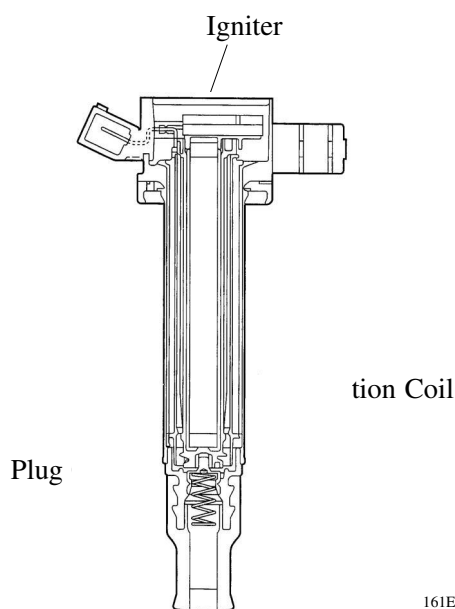
161ES43

2. Ignition Coil

A compact and cylindrical ignition coil with a built-in igniter has been adopted.

Shaped in such a way that it can be placed directly over the spark plug, the ignition coil is installed in the spark plug hole of the cylinder head.

As a result, the high-tension cords are no longer necessary and high-voltage loss and electromagnetic interference have been reduced.



161ES45

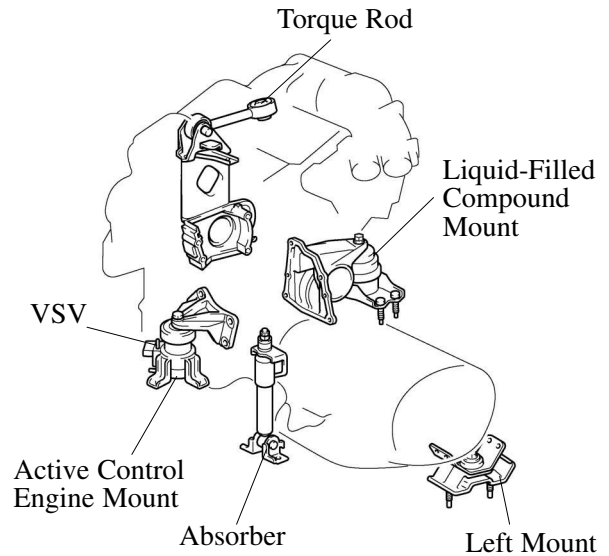
3. Spark Plug

Iridium-tipped spark plugs have been adopted to improve ignition performance while maintaining the same level of durability of the platinum-tipped spark plugs.

ENGINE MOUNT

1. General

A 3-point support on the front subframe has been adopted. An active control engine mount has been adopted for the front engine mount and a liquid-filled compound mount has been adopted for the rear engine mount to reduce noise and vibration and to achieve high levels of both riding comfort and drivability.



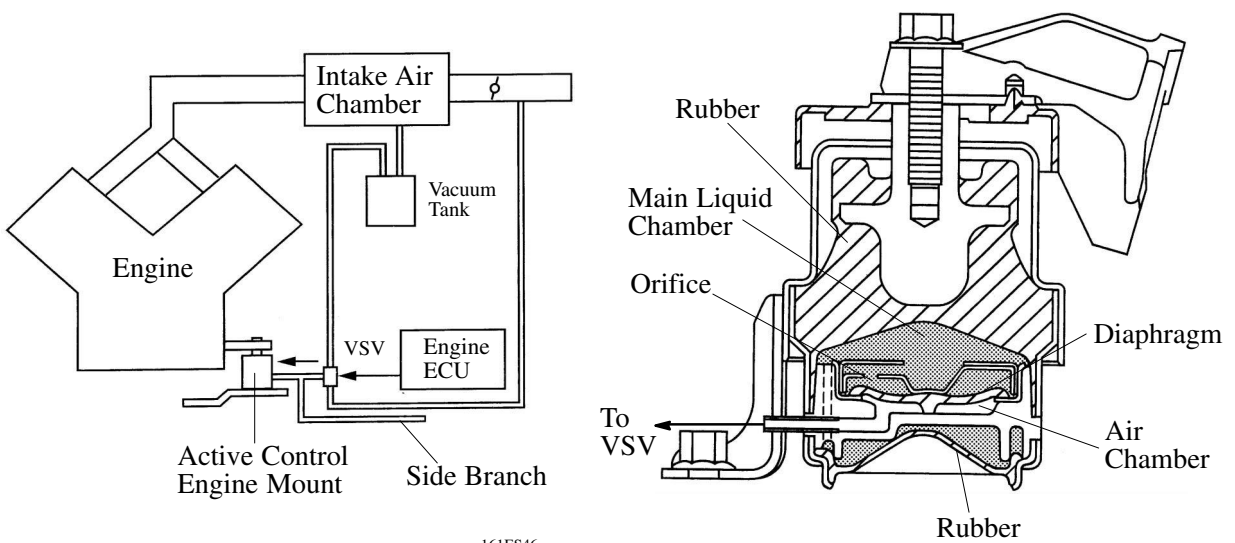
187EG40

EG

2. Active Control Engine Mount

The operating range of the active control engine mount is during idling under the engine speeds of 900 rpm. Signals that are synchronized to the engine rpm (number of combustions) are sent by the engine ECU to the VSV and the engine vacuum is utilized to vary the pressure of the intake air chamber in the active control engine mount. As a result, the diaphragm vibrates, and using the liquid as a medium, the rubber mount vibrates. This vibration of the engine mount acts to cancel out the engine vibration during idle, thus reducing the vibration and noise at idle.

The engine mount's force to generate vibrations is adjusted through the effects of the orifice and the side branch.



161ES46

161ES47

■ ENGINE CONTROL SYSTEM

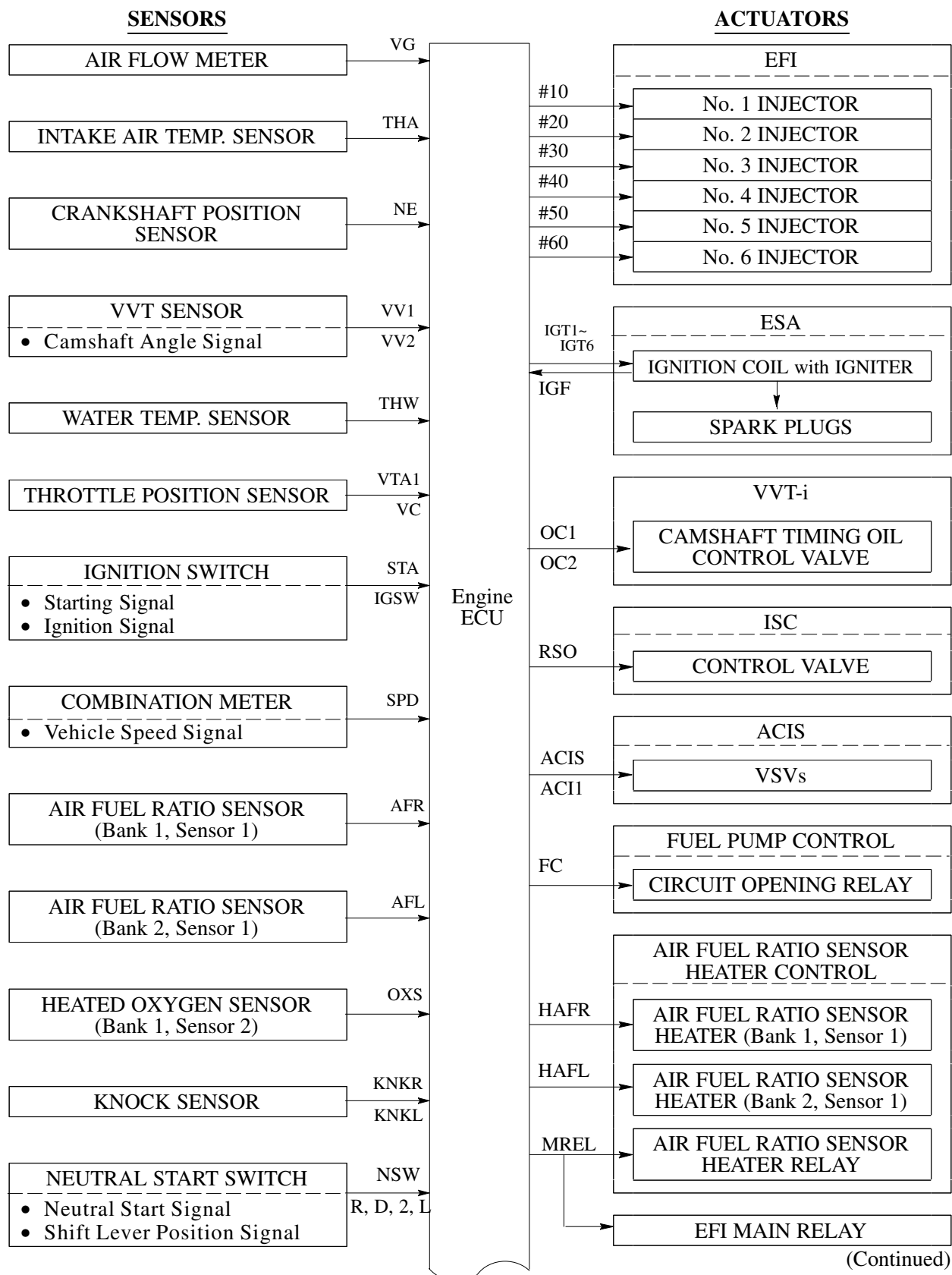
1. General

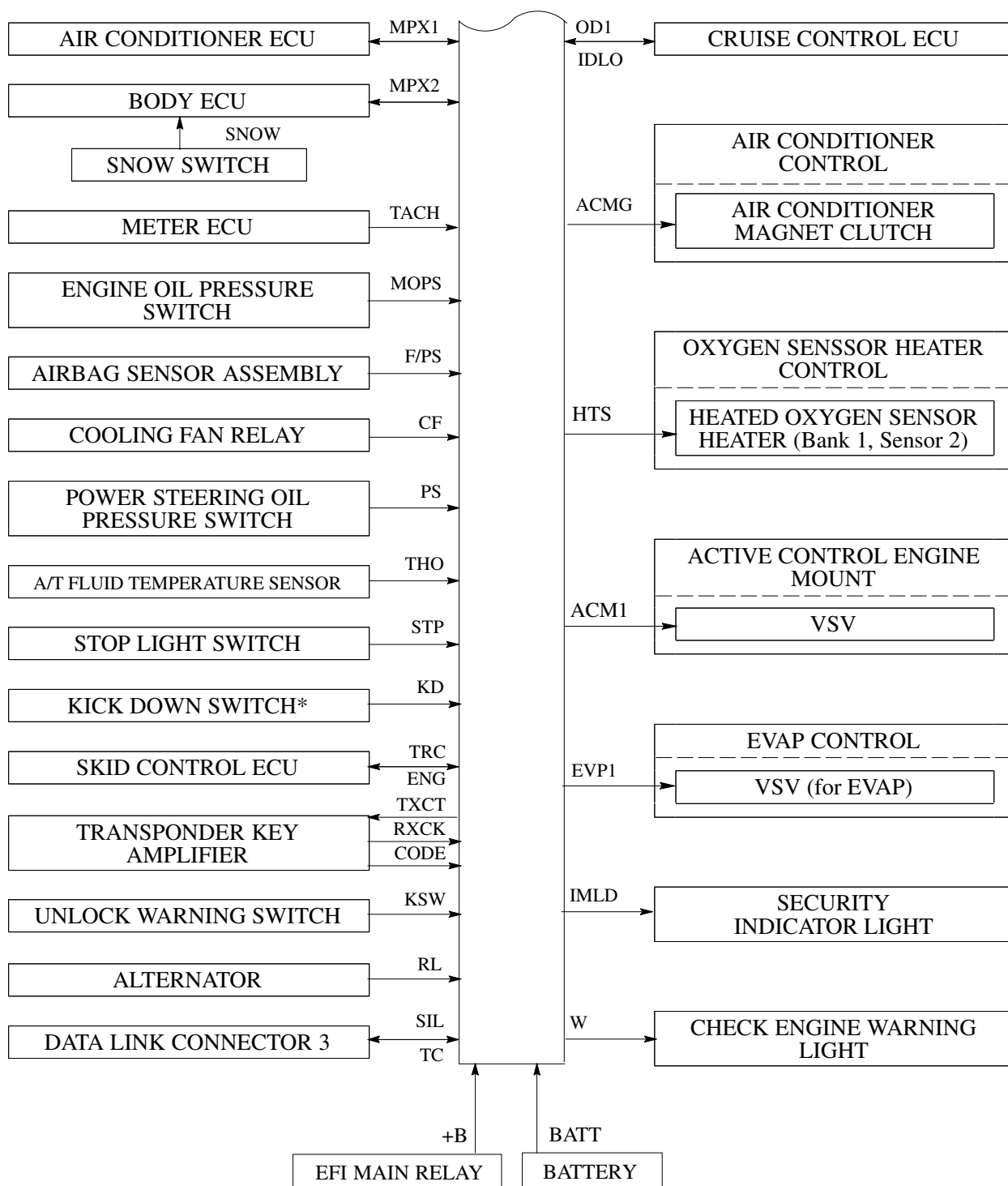
The engine control system for the 1MZ-FE engine has following system.

System	Outline
EFI (Electronic Fuel Injection)	● An L-type EFI system directly detects the intake air volume with a hot-wire type air flow meter. ● The fuel injection is a sequential multiport fuel injection system.
ESA (Electronic Spark Advance)	● Ignition timing is determined by the engine ECU based on signals from various sensors. Corrects ignition timing in response to engine knocking. ● The torque control correction during automatic transmission gear shifting has been used to minimize the shift shock. ● 2 knock sensors are used to improve knock detection.
ISC (Idle Speed Control)	A rotary solenoid type ISC valve controls the fast idle and idle speed.
VVT-i (Variable Valve Timing-intelligent)	Controls the intake camshaft to an optimal valve timing in accordance with the engine condition.
ACIS (Acoustic Control Induction System)	The intake air passages are switched according to the engine speed and throttle valve opening angle to provide high performance in all speed ranges.
Fuel Pump Control	● Fuel pump operation is controlled by signal from the engine ECU. ● A fuel cut control is adopted to stop the fuel pump when the SRS airbag is deployed.
Air Fuel Ratio Sensor Heater Control	Maintains the temperature of the air fuel ratio sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.
Oxygen Sensor Heater Control	Maintains the temperature of the oxygen sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.
Air Conditioning Cut-off Control	By turning the air conditioning compressor ON or OFF in accordance with the engine condition, drivability is maintained.
Evaporative Emission Control	The engine ECU controls the purge flow of evaporative emissions (HC) in the charcoal canister in accordance with engine conditions.
Engine Immobilizer	Prohibits fuel delivery and ignition if an attempt is made to start the engine with an invalid ignition key.
Function to communicate with multiplex communication system	Communicates with the body ECU, A/C ECU, meter ECU, etc., on the body side, to input/output necessary signals.
Active Control Engine Mount	The spring characteristic of the front engine mount is controlled variably to reduce idling vibration.
Diagnosis	When the engine ECU detects a malfunction, the engine ECU diagnoses and memorizes the failed section.
Fail-safe	When the engine ECU detects a malfunction, the engine ECU stops or controls the engine according to the data already stored in the memory.

2. Construction

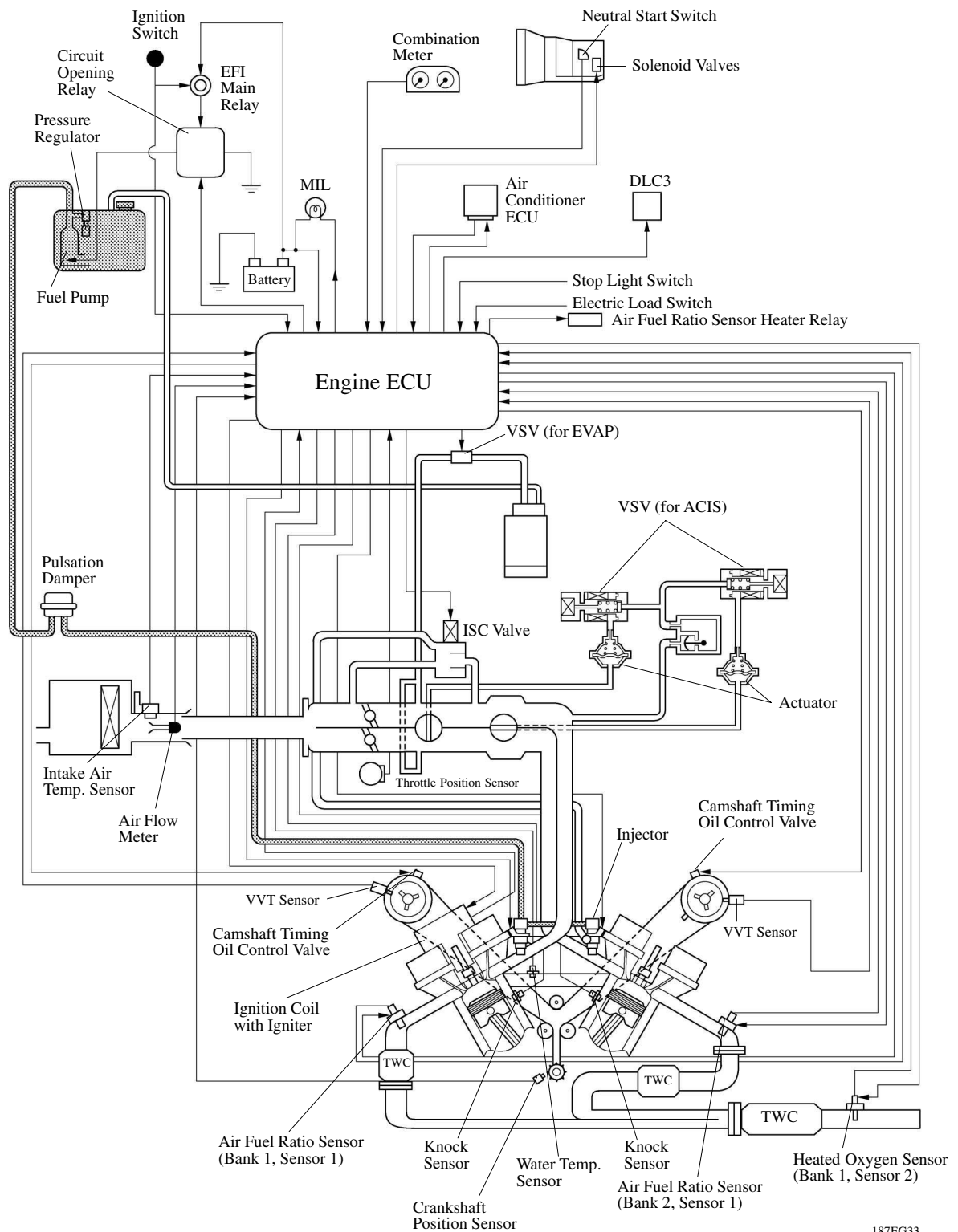
The configuration of the engine control system in the 1MZ-FE engine is shown in the following chart.



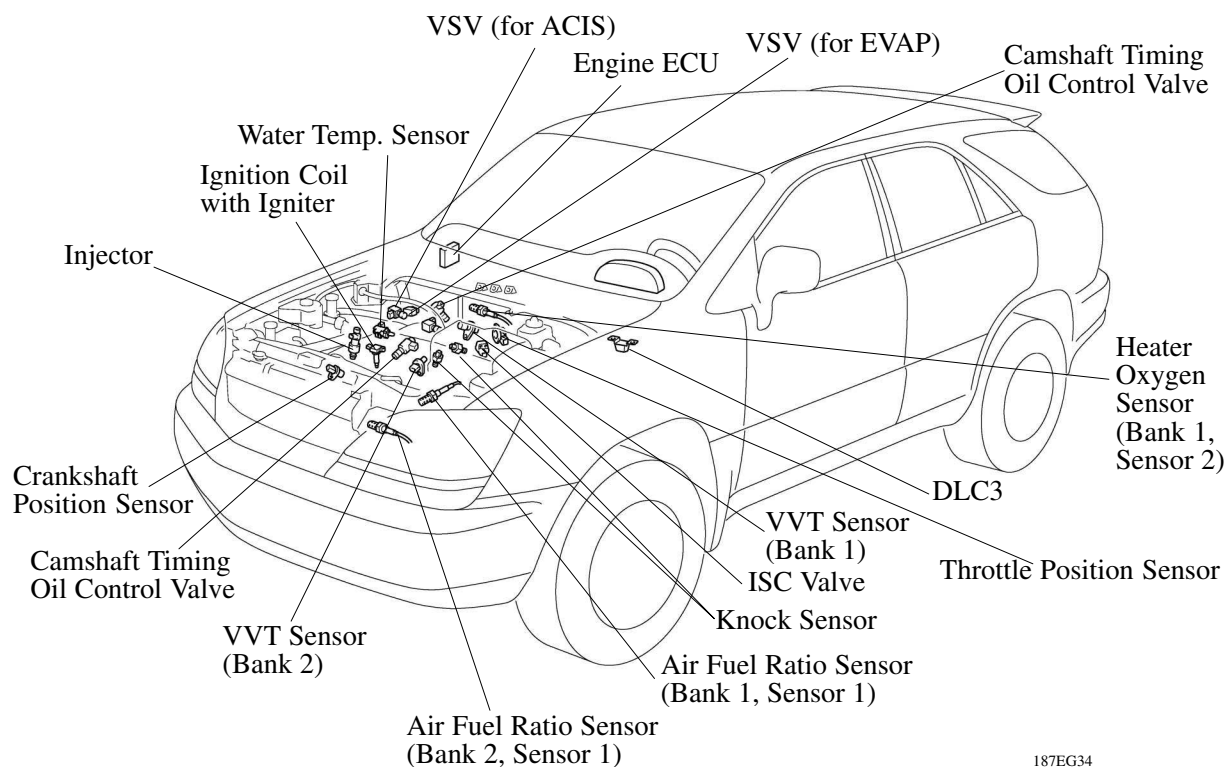


*: Only LHD models for Europe

3. Engine Control System Diagram



4. Layout of Components



5. Main Components of Engine Control System

General

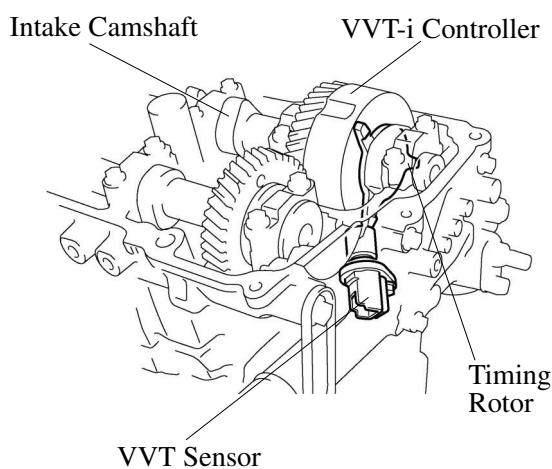
The main components of the 1MZ-FE engine control system are as follows:

Component	Outline	Quantity
Air Flow Meter	Hot-Wire Type	1
Crankshaft Position Sensor (Rotor Teeth)	Pick-Up Coil Type (36 – 2)	1
VVT Sensor (Rotor Teeth)	Pick-Up Coil Type 3	1
Throttle Position Sensor	Linear Type	1
Knock Sensor	Built-In Piezoelectric Type	2
Air Fuel Ratio Sensor (Bank 1, Sensor 1) (Bank 2, Sensor 2)	Type with heater	2
Oxygen Sensor (Bank 1, Sensor 2)	Type with heater	1
Injector	4-Hole Type with Air Assist	6
ISC Valve	Rotary Solenoid Type	1

EG

VVT Sensor

A VVT sensor is mounted on the intake side of each cylinder head. To detect the camshaft position, a timing rotor that is provided on the VVT-i controller is used to generate 3 pulses for every 2 revolutions of the crankshaft.

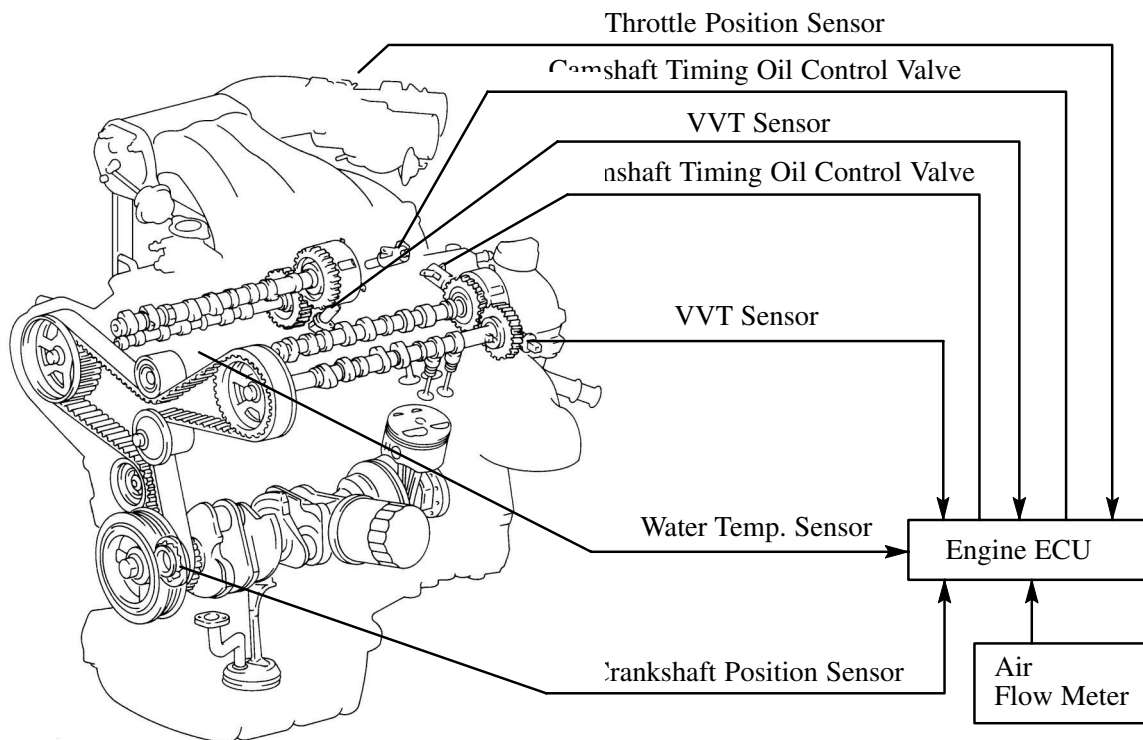


161ES42

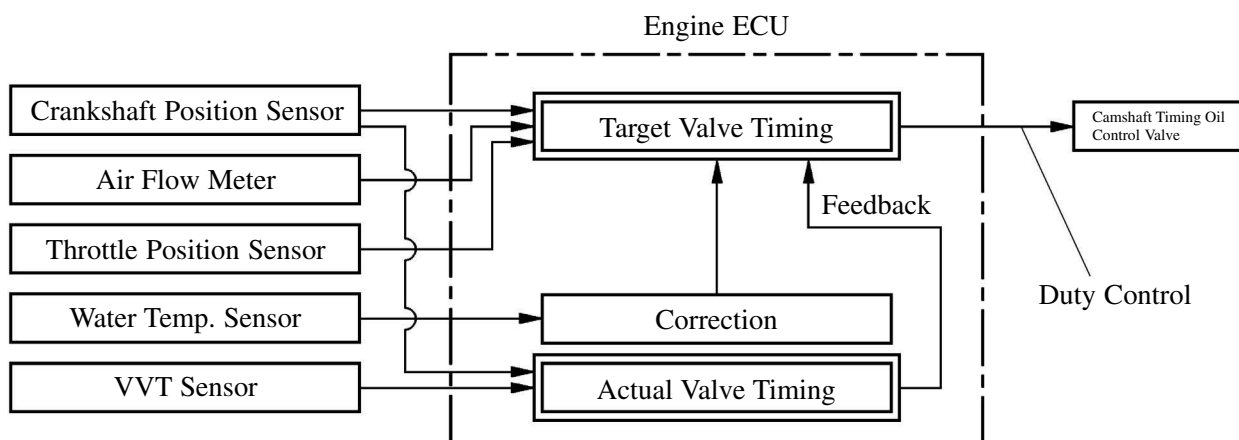
6. VVT-i (Variable Valve Timing-intelligent) System

General

The VVT-i system is designed to control the intake camshaft within a wide range of 60° (of crankshaft angle) to provide a valve timing that is optimally suited to the engine condition, thus realizing improved torque in all the speed ranges and fuel economy, and reduce exhaust emissions.



157EG22



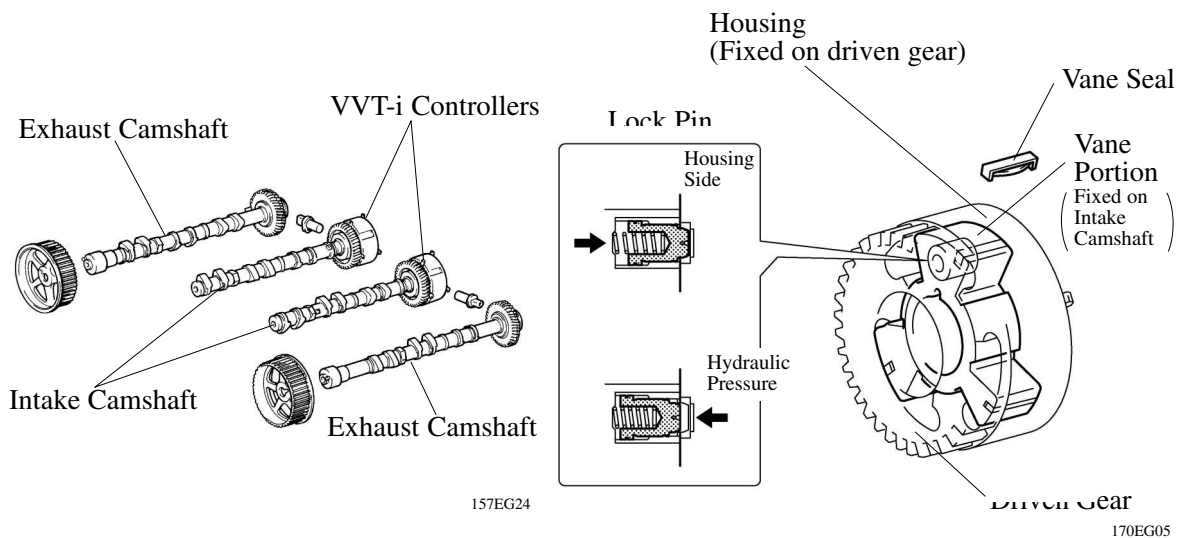
157EG23

Construction

1) VVT-i Controller

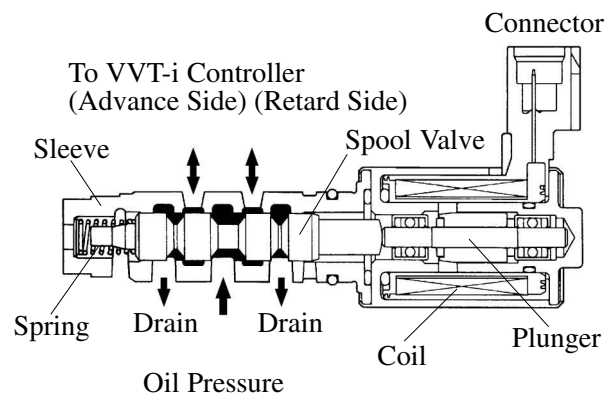
This controller consists of the housing driven from the exhaust camshaft and the vane coupled with the intake camshaft.

The oil pressure sent from the advance or retard side path at the intake camshaft causes rotation in the VVT-i controller vane circumferential direction to vary the intake valve timing continuously. Also, when the engine is stopped, in order to improve startability, intake camshaft will become the most retarded state because of the external force such as the valve spring force. At this time, a lock pin fixes the housing and the vane in the VVT-i controller. After the engine starts, the lock pin is released by the hydraulic pressure.



2) Camshaft Timing Oil Control Valve

The camshaft timing oil control valve controls the spool valve position in accordance with the duty control from the engine ECU thus allocating the hydraulic pressure that is applied to the VVT-i controller to the advance and the retard side. When the engine is stopped, the camshaft timing oil control valve is in the most retarded state.

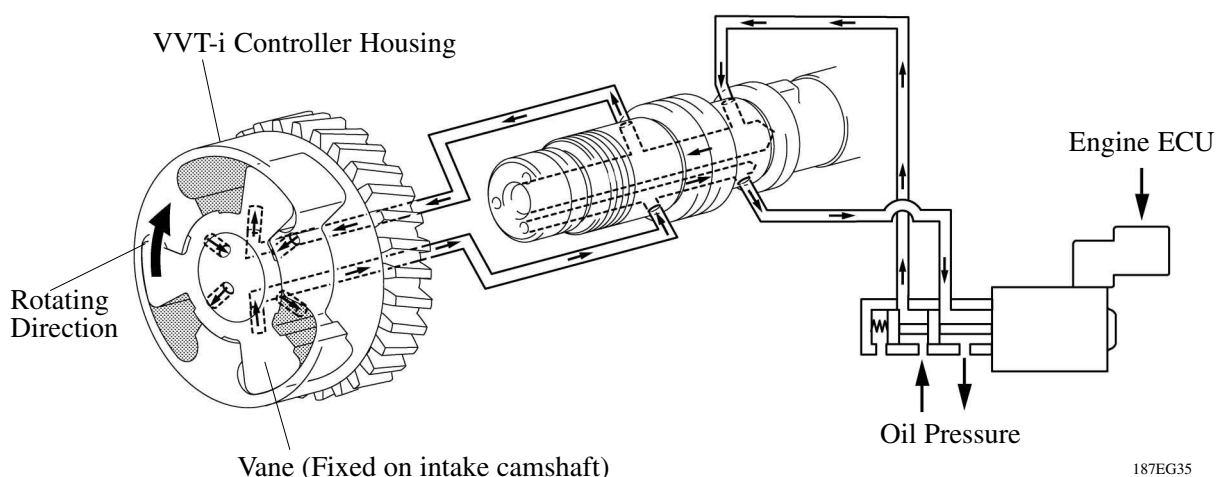


Operation

The camshaft timing oil control valve selects the path to the VVT-i controller according to the advance, retard or hold signal from the engine ECU. The VVT-i controller rotates the intake camshaft in the timing advance or retard position or holds it according to the position where the oil pressure is applied.

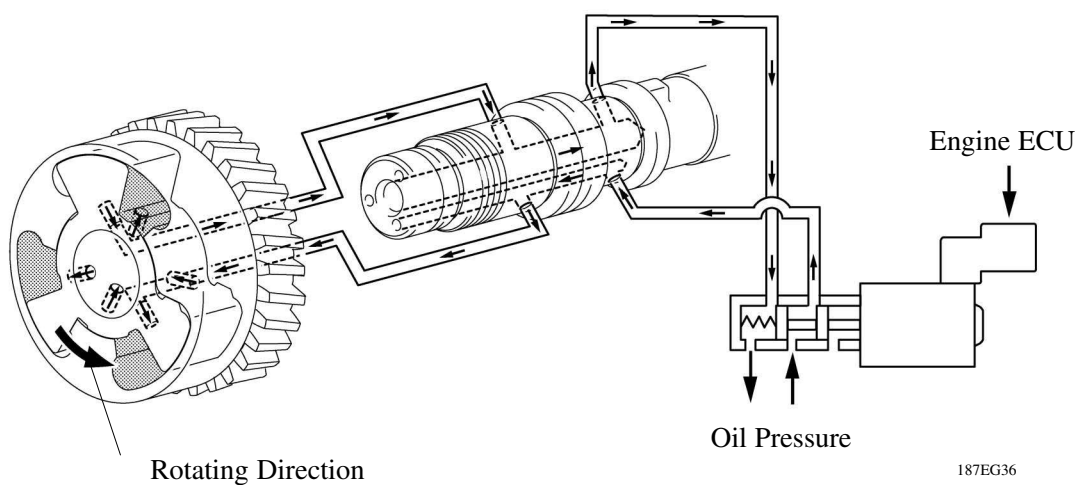
1) Advance

When the camshaft timing oil control valve is positioned as illustrated below by the advance signal from the engine ECU, the resultant oil pressure is applied to the timing advance side vane chamber to rotate the camshaft in the timing advance direction.



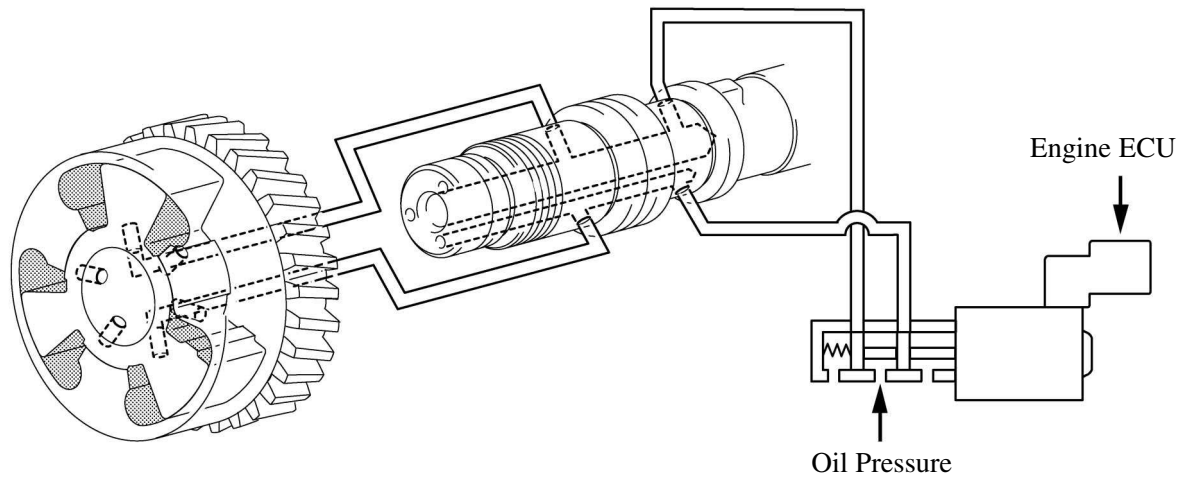
2) Retard

When the camshaft timing oil control valve is positioned as illustrated below by the retard signal from the engine ECU, the resultant oil pressure is applied to the timing retard side vane chamber to rotate the camshaft in the timing retard direction.



3) Hold

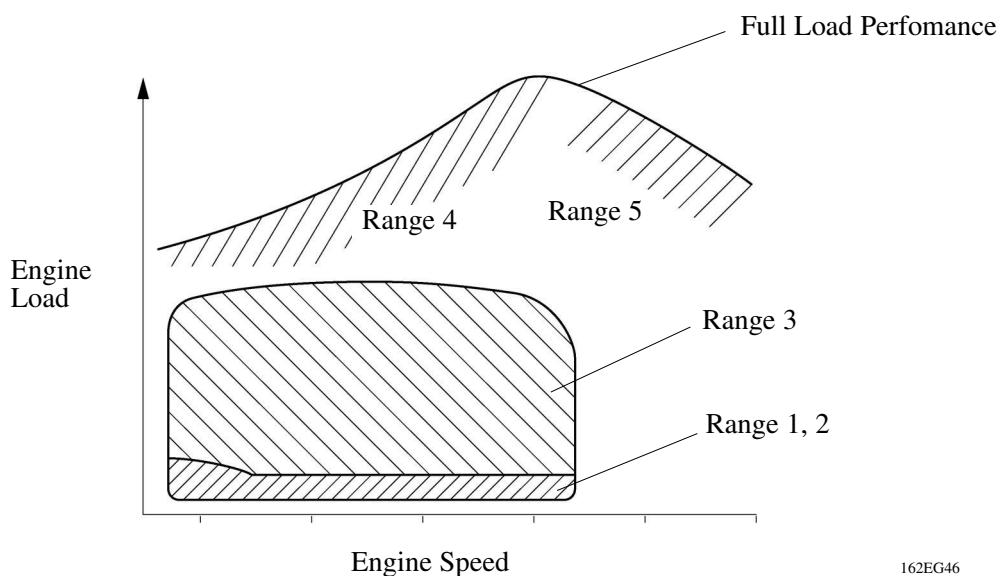
The engine ECU calculates the target timing angle according to the traveling state to perform control as described in the previous page. After setting at the target timing, the valve timing is held by keeping the camshaft timing oil control valve in the neutral position unless the traveling state changes. This adjusts the valve timing at the desired target position and prevents the engine oil from running out when it is unnecessary.



187EG37

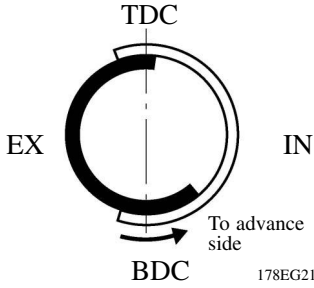
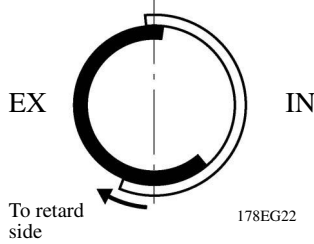
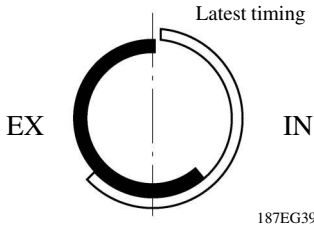
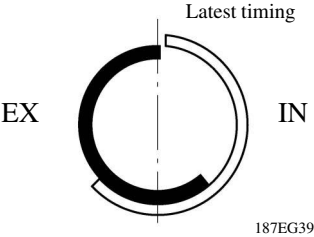
In proportion to the engine speed, intake air volume, throttle position and coolant temperature, the Engine ECU calculates an optimal valve timing under each driving condition and control the camshaft timing oil control valve. In addition, Engine ECU uses signal from the VVT sensors and the crankshaft position sensor to detect the actual valve timing, thus performing feedback control to achieve the target valve timing.

► Operation During Various Driving Condition (Conceptual Diagram) ◀



162EG46

Operation State	Range	Valve Timing	Objective	Effect
During Idling	1	TDC Latest timing EX IN BDC 187EG39	Eliminating overlap to reduce blow back to the intake side	Stabilized idling rpm Better fuel economy
At Light Load	2	To retard side EX IN 178EG19	Decreasing overlap to eliminate blow back to the intake side	Ensured engine stability
At Medium Load	3	To advance side EX IN 178EG20	Increasing overlap to increase internal EGR for pumping loss elimination	Better fuel economy Improved emission control

Operation State	Range	Valve Timing	Objective	Effect
In Low to Medium Speed Range with Heavy Load	4		Advancing the intake valve close timing for volumetric efficiency improvement	Improved torque in low to medium speed range
In High Speed Range with Heavy Load	5		Retarding the intake valve close timing for volumetric efficiency improvement	Improved output
At Low Temperatures	—		Eliminating overlap to prevent blow back to the intake side for reduction of fuel increase at low temperatures, and stabilizing the idling rpm for decreasing fast idle rotation	Stabilized fast idle rpm Better fuel economy
Upon Starting/Stopping the Engine	—		Eliminating overlap to eliminate blow back to the intake side	Improved startability

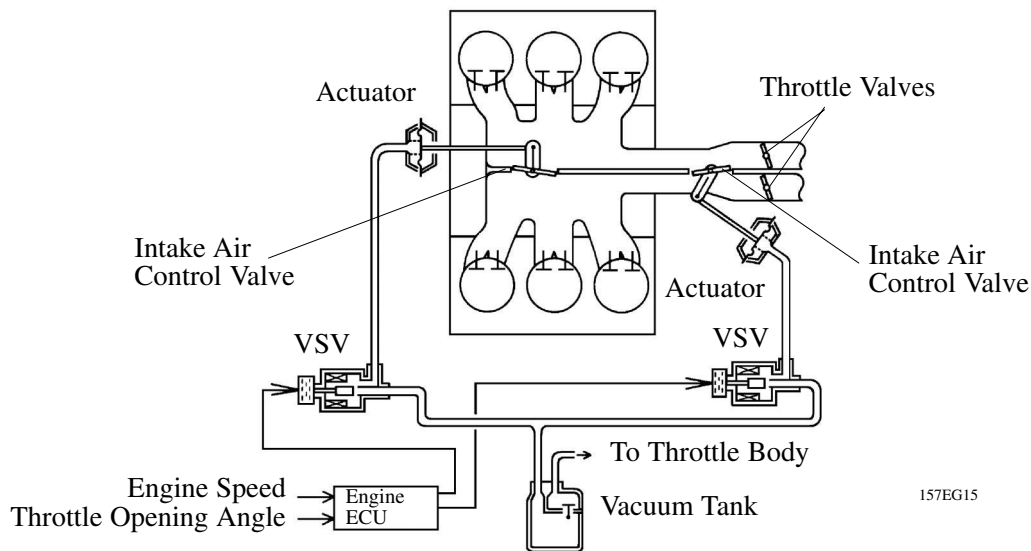
7. ACIS (Acoustic Control Induction System)

General

The ACIS improves the torque in the whole range, especially that in the low-speed range, by changing the intake manifold length in three stages.

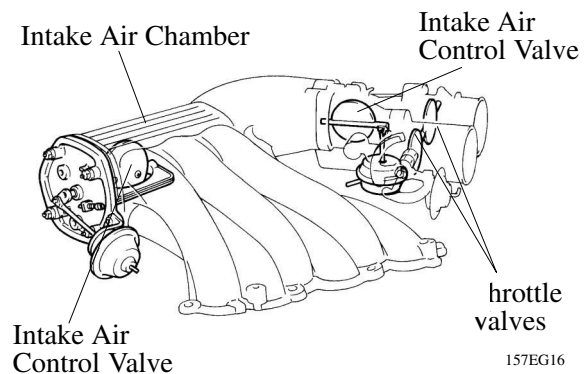
To suit the intake pulsations, this system controls the effective intake manifold length in three stages by opening and closing the 2 intake air control valves that are provided in the intake air chamber and downstream of the throttle valves in accordance with the engine speed and the throttle opening angle.

► System Diagram ◀



Intake Air Control Valve

The intake air control valves, which are provided in the intake air chamber and the lower reaches of the throttle valves, open and close to change the effective length of the intake manifold in three stages.

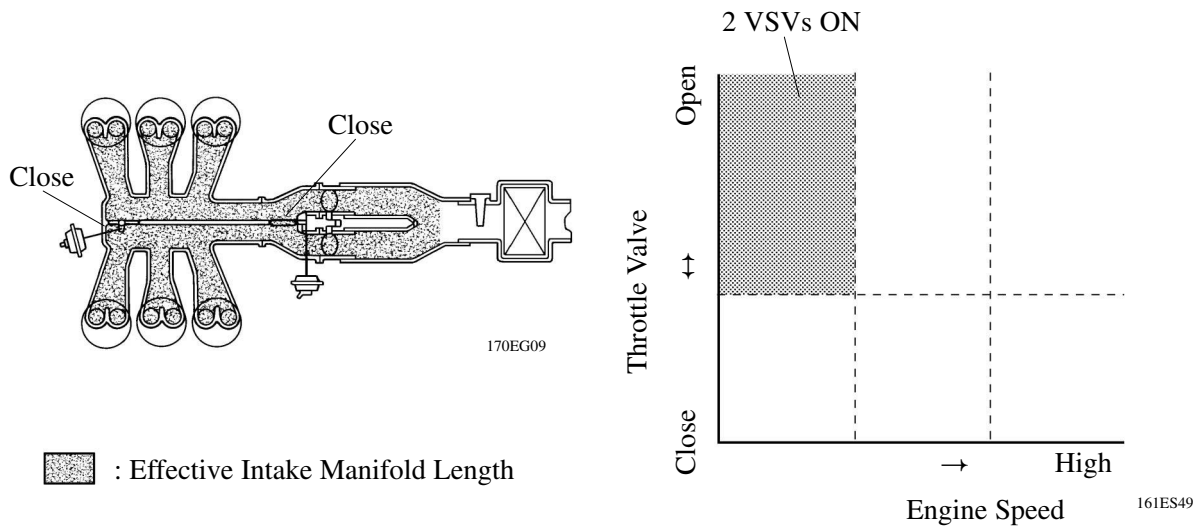


Operation

1) Heavy Load in the Low-Speed Range

To suit the longest cycle of the intake pulsations, the Engine ECU turns ON 2 VSVs so that the vacuum acts on 2 actuators.

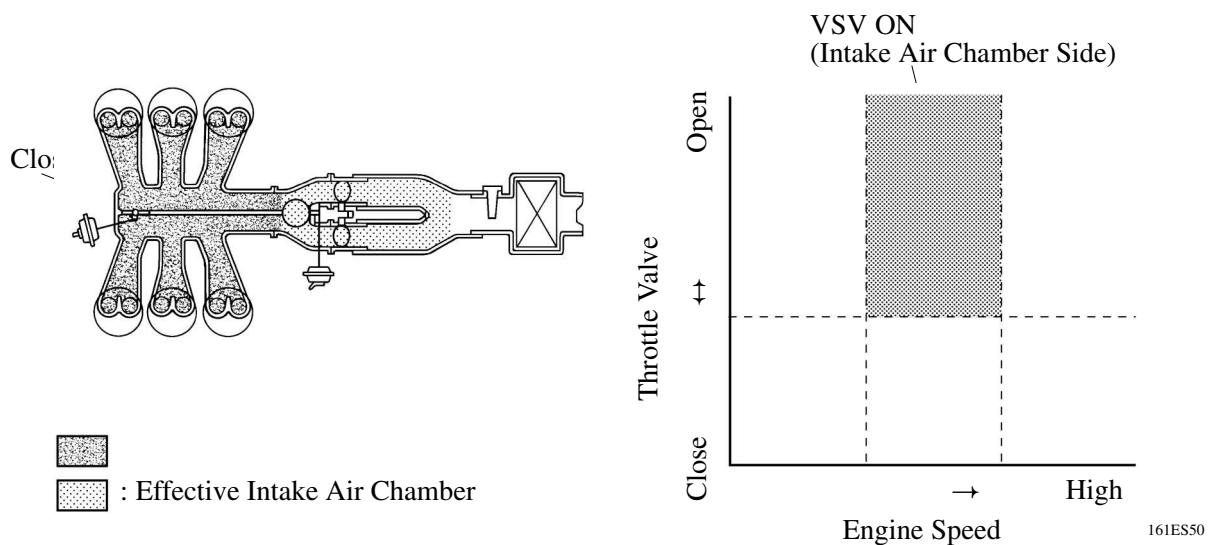
As a result, the 2 intake air control valves close, enabling the intake air chamber, throttle body, and air cleaner hose to function as an intake manifold.



2) Heavy Load in the Mid-Speed Range

To suit the relatively long cycle of the intake pulsations, the Engine ECU turns ON the VSV of the intake air chamber side and turns OFF the VSV of the throttle valve side, so that the vacuum acts on the actuator of the intake air chamber side and the atmospheric air is drawn into the actuator of the throttle valve side.

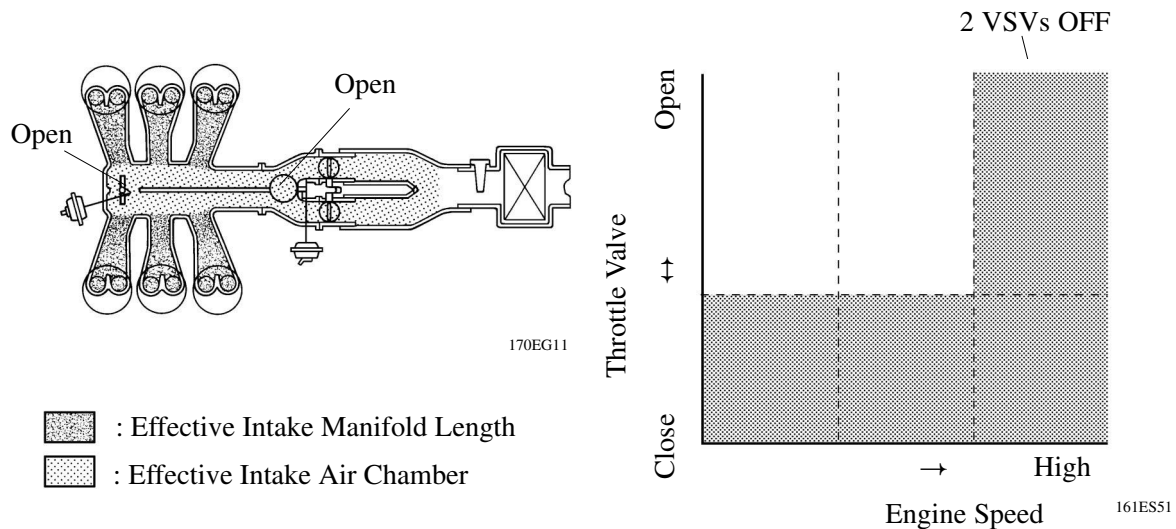
As a result, the intake air control valve in the intake air chamber closes, the intake air control valve downstream of the throttle valve opens, enabling the intake air chamber to function as an intake manifold.



3) During Idling, Light Load, and High-Speed Range

To suit the short cycle of intake pulsations, the engine ECU turns OFF the 2 VSVs, so that the atmospheric air is drawn into the 2 actuators.

As a result, the 2 intake air control valves open, enabling the intake air chamber to function as a normal intake air chamber.

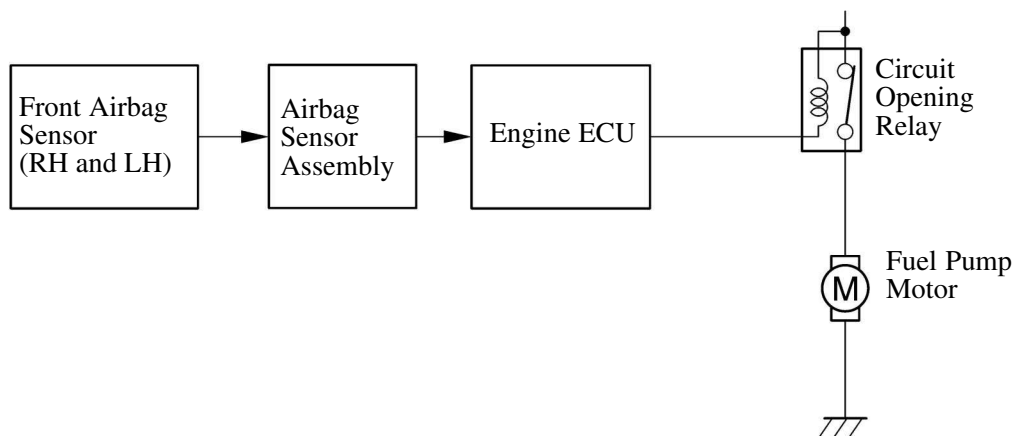


8. Fuel Pump Control

A fuel cut control is adopted to stop the fuel pump when the SRS airbag is deployed.

In this system, the airbag deployment signal from the airbag sensor assembly is detected by the engine ECU, which turns OFF the circuit opening relay.

After the fuel cut control has been activated, turning the ignition switch from OFF to ON cancels the fuel cut control, thus engine can be restarted.



9. Engine Immobiliser System

The engine immobiliser system has been designed to prevent the vehicle from being stolen. This system uses a engine ECU that stores the ID code of the authorized ignition key. If an attempt is made to start the engine using an unauthorized key, the engine ECU prohibit fuel delivery and ignition, effectively disabling the engine. For details see page 148 in the Engine Immobiliser System section.

10. Diagnosis System

The diagnosis system of the 1MZ-FE engine has adopted the EURO-OBD (Europe On-Board Diagnosis) that complies with European regulations.

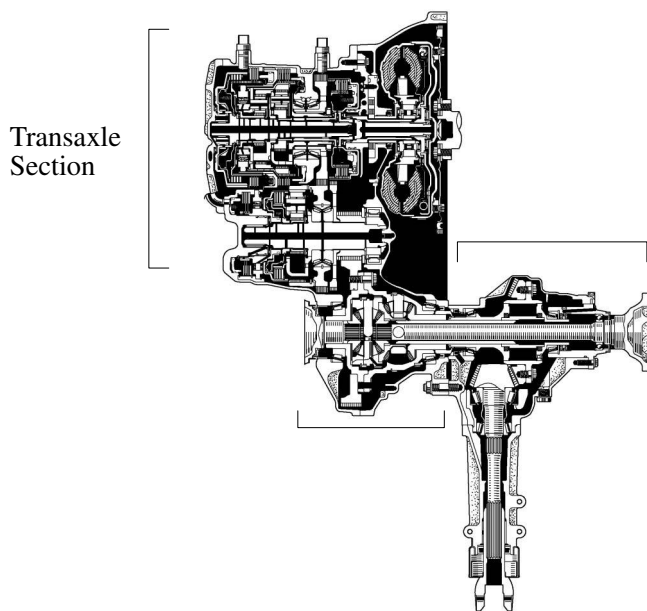
For details on the DTCs (Diagnostic Trouble Codes), refer to the LEXUS RX300 Repair Manual (Pub. No. RM785E).

CHASSIS

U140F AUTOMATIC TRANSAXLE

■ DESCRIPTION

- The compact and high-capacity 4-speed U140F automatic transaxle [Super ECT (Electronically Controlled Transaxle)] has been adopted to match the output characteristics of the new 1MZ-FE engine. It is a compact, lightweight, and highly rigid automatic transaxle in which the transaxle, front and center differentials, and the transfer unit have been integrated into a compact package.
- The snow mode switch is used. Further more, the European LHD models is provided with a kick down switch.
- The MF2AV transfer unit that uses a viscous coupling has been adopted to accomplish the limited slip effect of the center differential.
- Automatic transaxle fluid used is T-IV.



18SCH07

► Specifications ◀

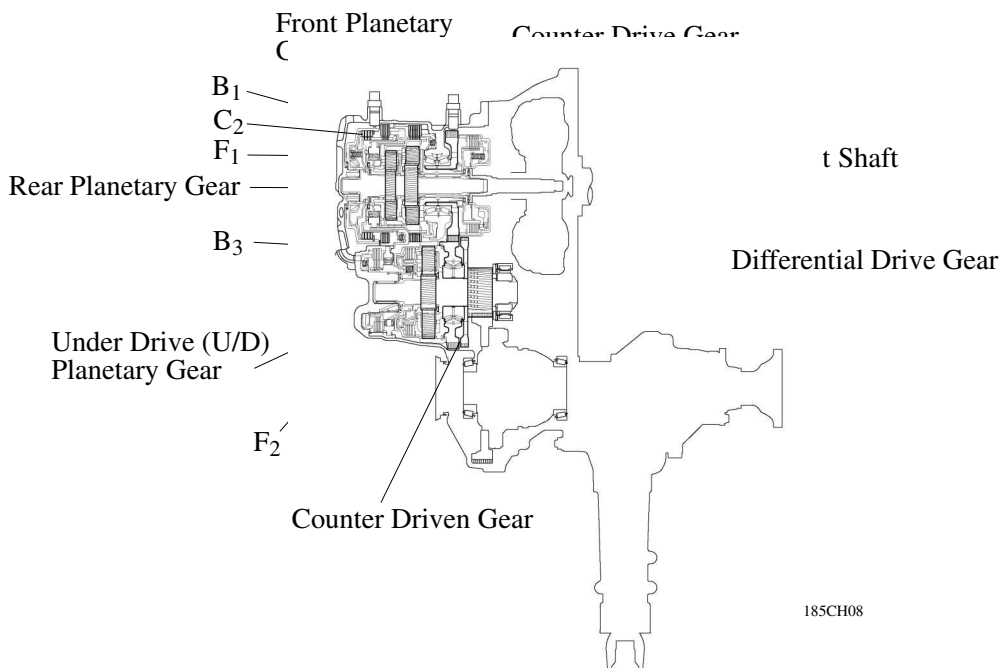
Transaxle Type		U140F
Transfer Type		MF2AV
Gear Ratio*	1st	3.938
	2nd	2.194
	3rd	1.411
	4th	1.019
	Reverse	3.141
Differential Gear Ratio		3.291
Fluid Capacity Liters (US qts, Imp. qts)		9.0 (9.5, 7.9)
Fluid Type		ATF Type T-IV
Transfer Gear Gain Ratio		0.341
Transfer	Oil Grade	API GL-5
	Oil Viscosity	SAE 85W-90
	Oil Capacity Liters (US qts, Imp. qts)	0.9 (0.95, 0.79)

* : Counter Gear Ratio Included

■ PLANETARY GEAR UNIT

1. General

The U140F automatic transaxle has adopted a new gear layout. In the new gear layout, the counter drive and driven gears are placed in front of the front planetary gear and the under drive (U/D) planetary gear unit is placed above the counter shaft. Furthermore, the force transmission method has been changed by eliminating the brake and the one-way clutch. As a result, a torque capacity that accommodates the high output engine has been attained, while realizing a compact gear unit.



► Specifications ◀

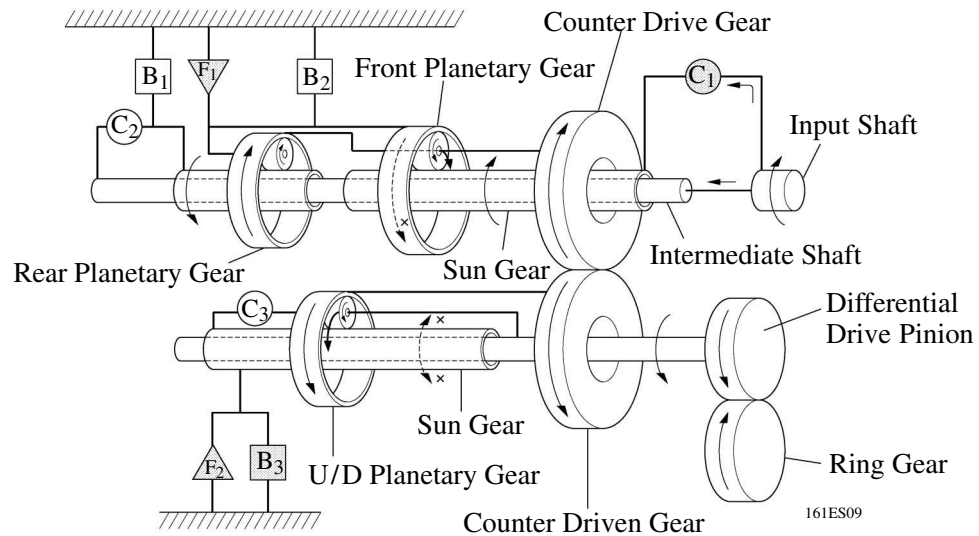
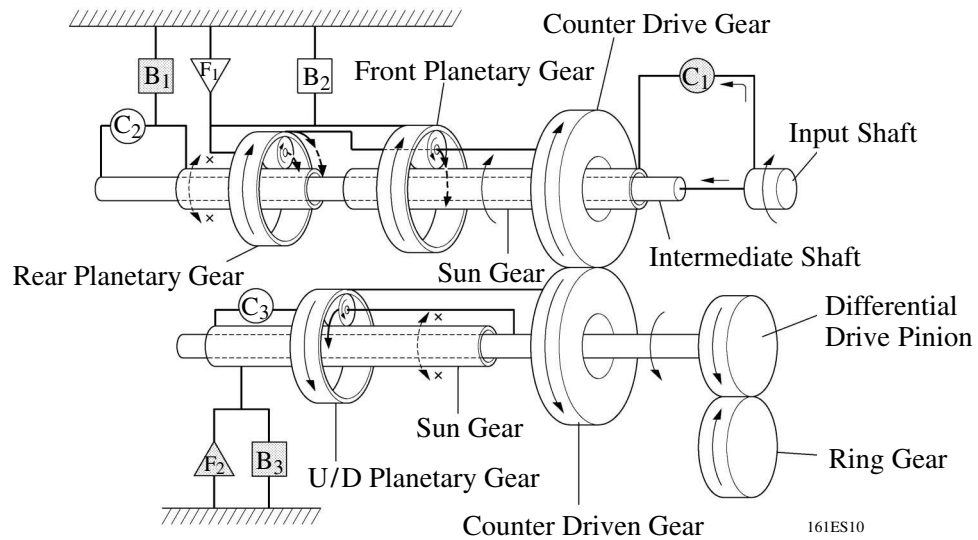
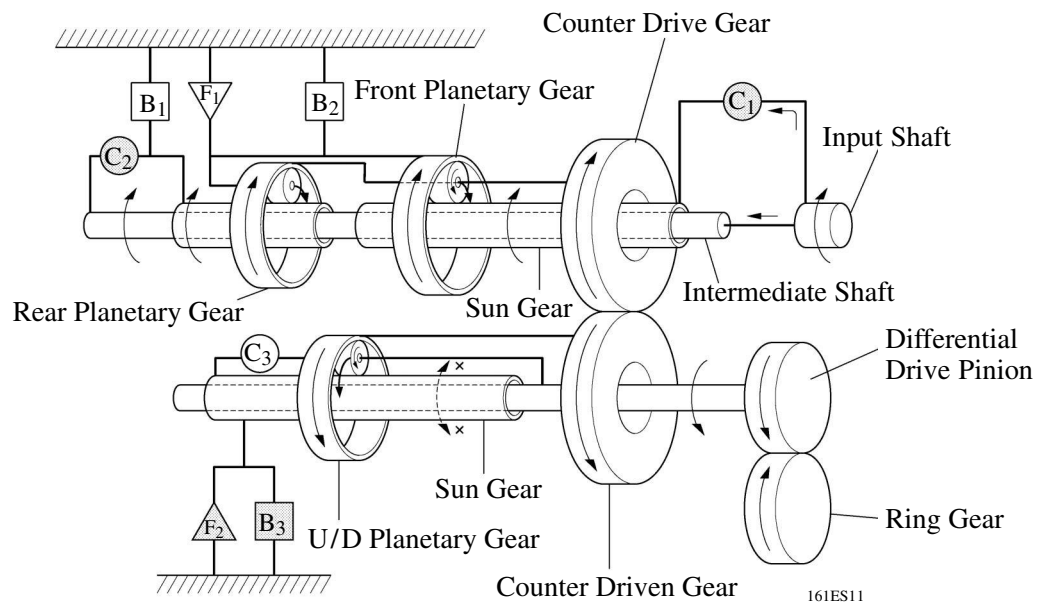
C ₁	Forward Clutch	The No. of Discs	6
C ₂	Direct Clutch		4
C ₃	U/D Direct Clutch		4
B ₁	2nd Brake		4
B ₂	1st & Reverse Brake		7
B ₃	U/D Brake		4
F ₁	No. 1 One-Way Clutch	The No. of Sprags	28
F ₂	U/D One-Way Clutch		24
Front Planetary Gear	The No. of Sun Gear Teeth		43
	The No. of Pinion Gear Teeth		17
	The No. of Ring Gear Teeth		77
Rear Planetary Gear	The No. of Sun Gear Teeth		31
	The No. of Pinion Gear Teeth		19
	The No. of Ring Gear Teeth		69
U/D Planetary Gear	The No. of Sun Gear Teeth		35
	The No. of Pinion Gear Teeth		28
	The No. of Ring Gear Teeth		91
Counter Gear	The No. of Drive Gear Teeth		52
	The No. of Driven Gear Teeth		53

2. Motive Power Transaxle

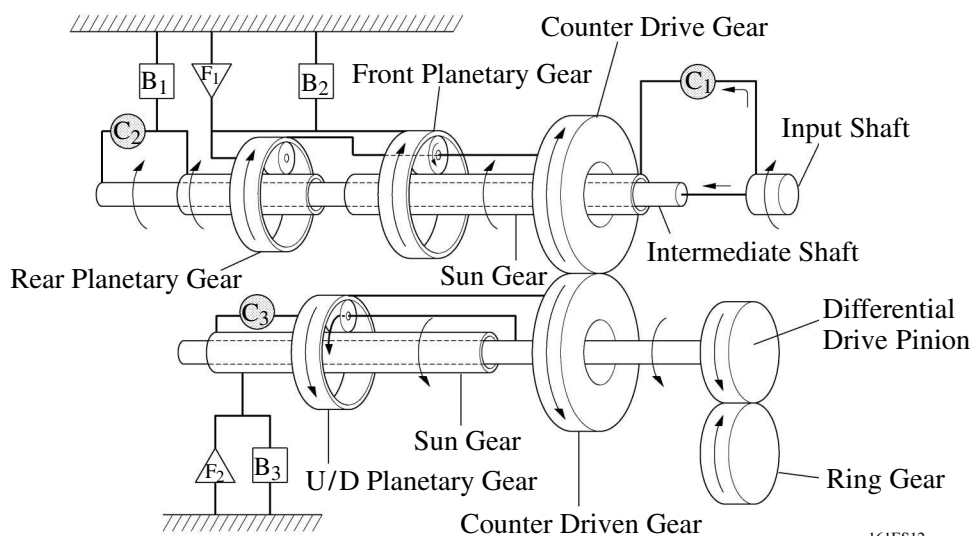
► Operating Conditions ◀

Shift Lever Position	Gear	Solenoid Valve SL1	Solenoid Valve SL2	Solenoid Valve S2	Solenoid Valve DSL	C ₁	C ₂	C ₃	B ₁	B ₂	B ₃	F ₁	F ₂
P	Park	ON	ON	OFF	OFF						○		
R	Reverse	ON	OFF	OFF	OFF		○			○	○		
N	Neutral	ON	ON	OFF	OFF						○		
D	1st	ON	ON	OFF	OFF	○					○	○	○
	2nd	OFF	ON	OFF	OFF	○			○		○		○
	3rd	OFF	OFF	OFF	OFF/ON*	○	○				○		○
	4th	OFF	OFF	ON	OFF/ON*	○	○	○					
2	1st	ON	ON	OFF	OFF	○					○	○	○
	2nd	OFF	ON	OFF	OFF	○			○		○		○
L	1st	ON	ON	OFF	ON	○				○	○	○	○

*: Lock-up ON

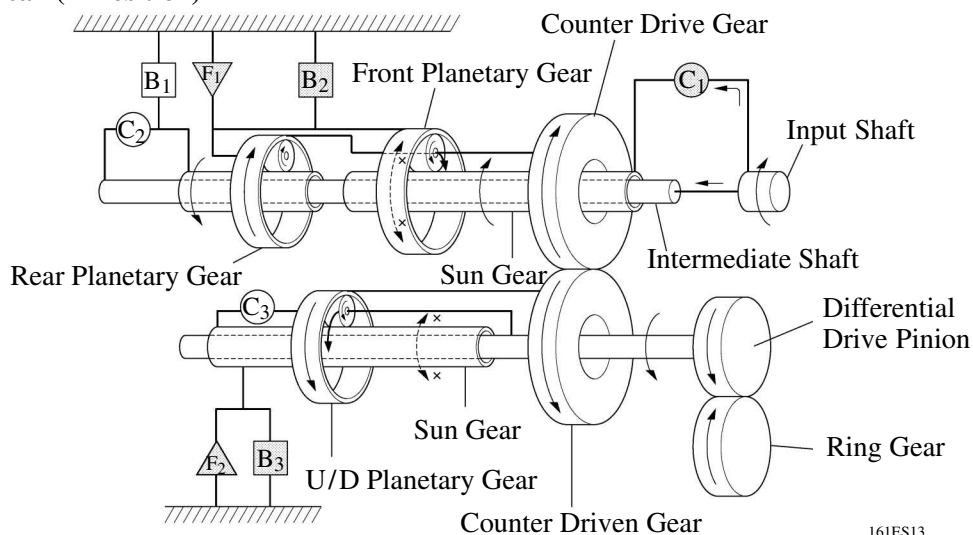
1) 1st Gear (D or 2 Position)**2) 2nd Gear (D or 2 Position)****3) 3rd Gear (D Position)**

4) 4th Gear (D Position)



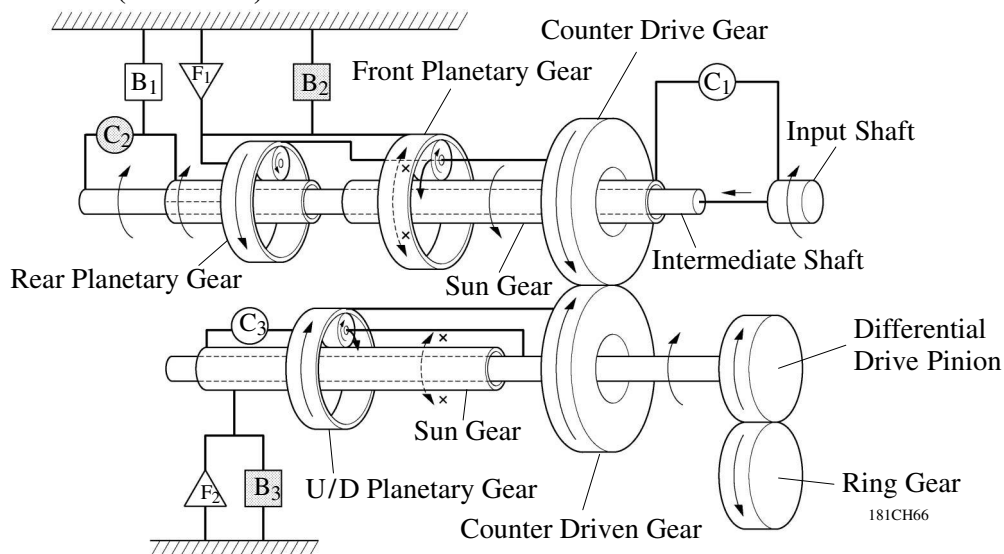
161ES12

5) 1st Gear (L Position)



161ES13

6) Reverse Gear (R Position)

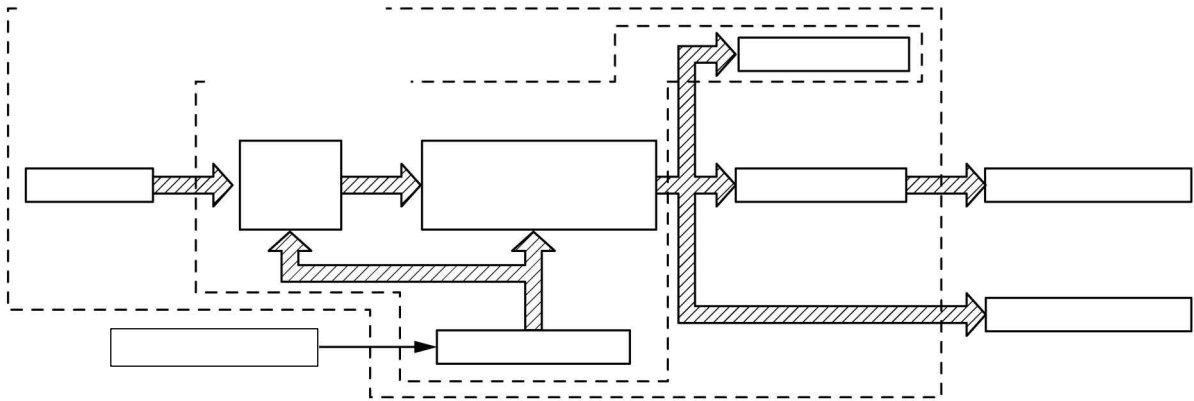


181CH66

■ HYDRAULIC CONTROL SYSTEM

1. General

The hydraulic control system is composed of the oil pump, the valve body, the solenoid valves, the accumulators, the clutches and brakes as well as the fluid passages which connected all of these components. Based on the hydraulic pressure acting on the torque converter clutch, clutches and brakes in accordance with the vehicle driving conditions.

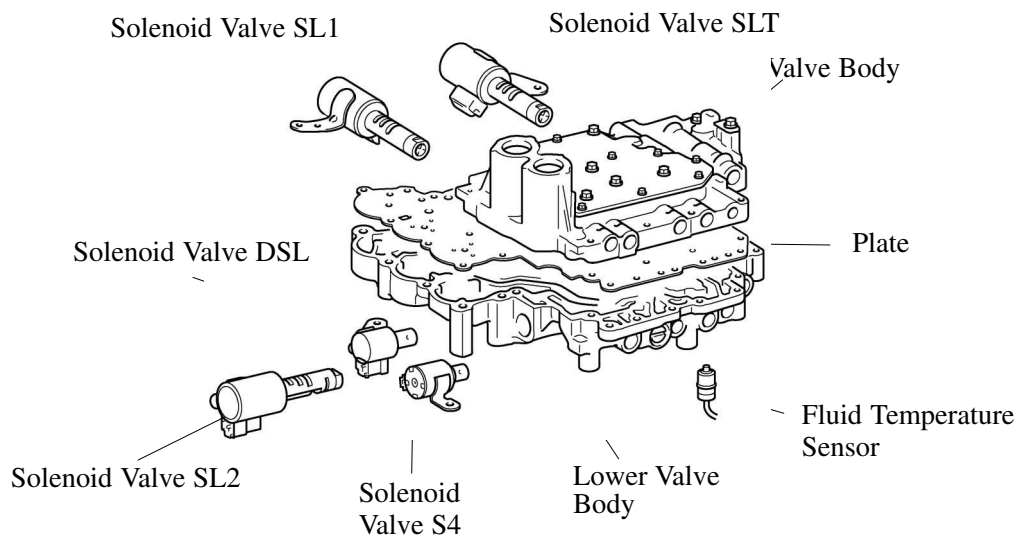


165CH56

CH

2. Valve Body

The valve body has a two-stage construction. Also, a compact, lightweight, and highly rigid valve body has been realized. All the solenoid valves are installed in the lower valve body.

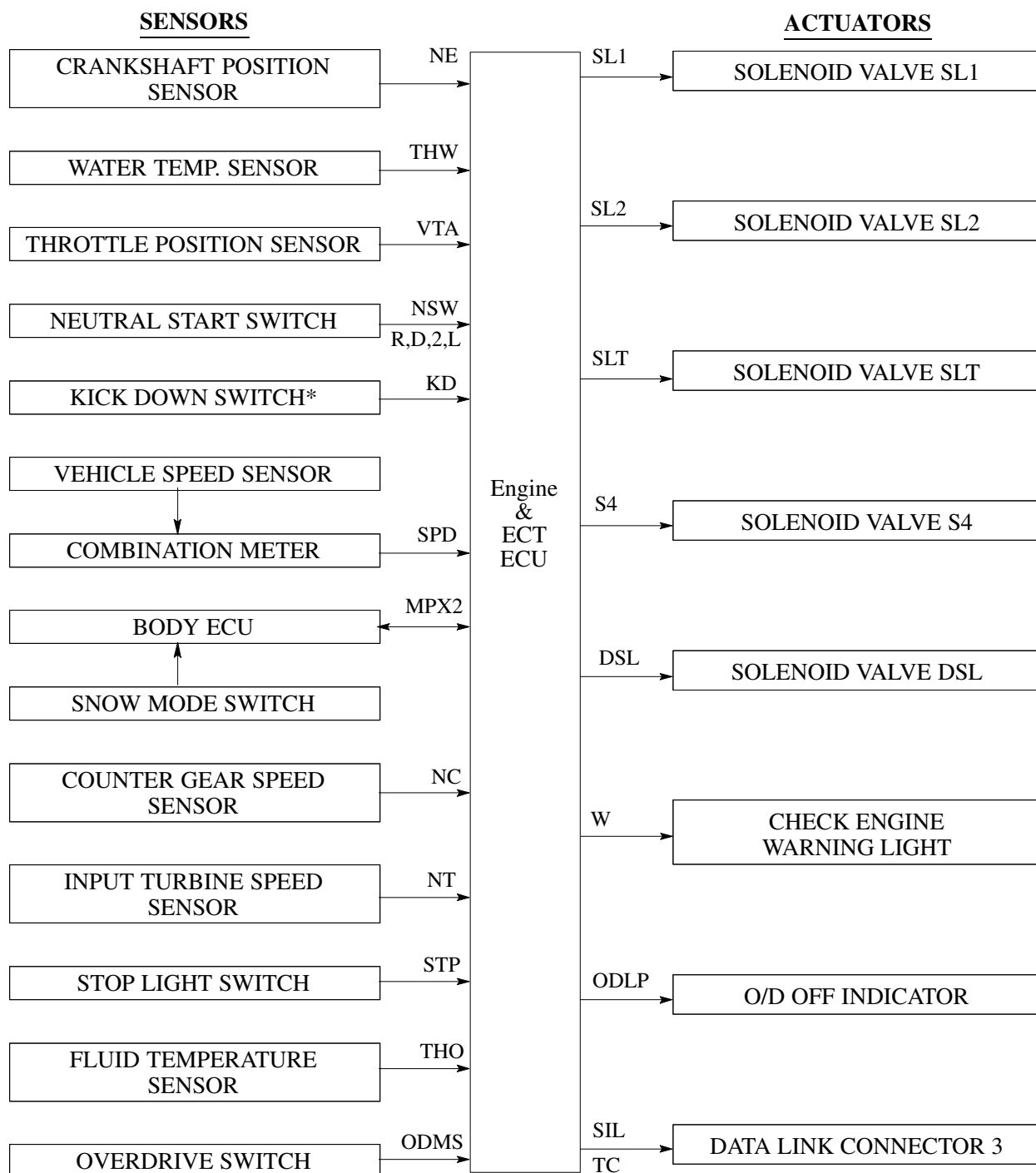


181CH111

■ ELECTRONIC CONTROL SYSTEM

1. Construction

The configuration of the electronic control system in the U140F automatic transaxle is as shown in the following chart.



*: Only for the European LHD Models.

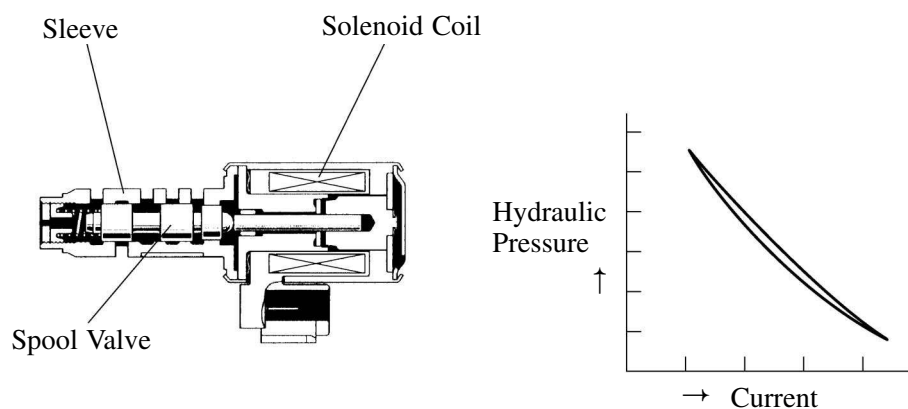
2. Solenoid Valves

Solenoid Valves SL1, SL2 and SLT

1) General

In order to provide a hydraulic pressure that is proportion to current that flows to the solenoid coil, the solenoid valve SL1, SL2 and SLT linearly controls the line pressure and clutch and brake engagement pressure based on the signals it receives from the engine & ECT ECU.

The solenoid valves SL1, SL2 and SLT have the same basic structure.



161ES22

CH

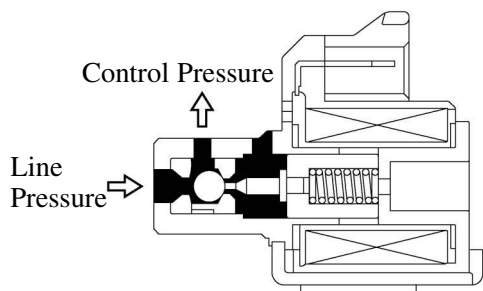
2) Functions of Solenoid Valve SL1, SL2 and SLT

Solenoid	Action	Function
SL1	For clutch and brake engagement pressure control	● B ₁ brake pressure control
SL2		● Lock-up clutch pressure control
SLT	For line pressure control	● C ₂ clutch pressure control
		● Line pressure control
		● Secondary pressure control

Solenoid Valves S4 and DSL

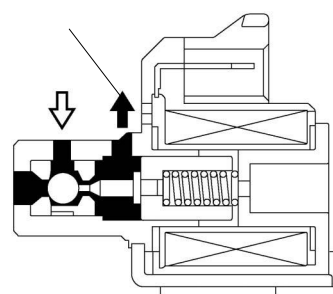
1) General

The solenoid valves S4 and DSL use a three-way solenoid valve.



Solenoid Valve ON

161ES65

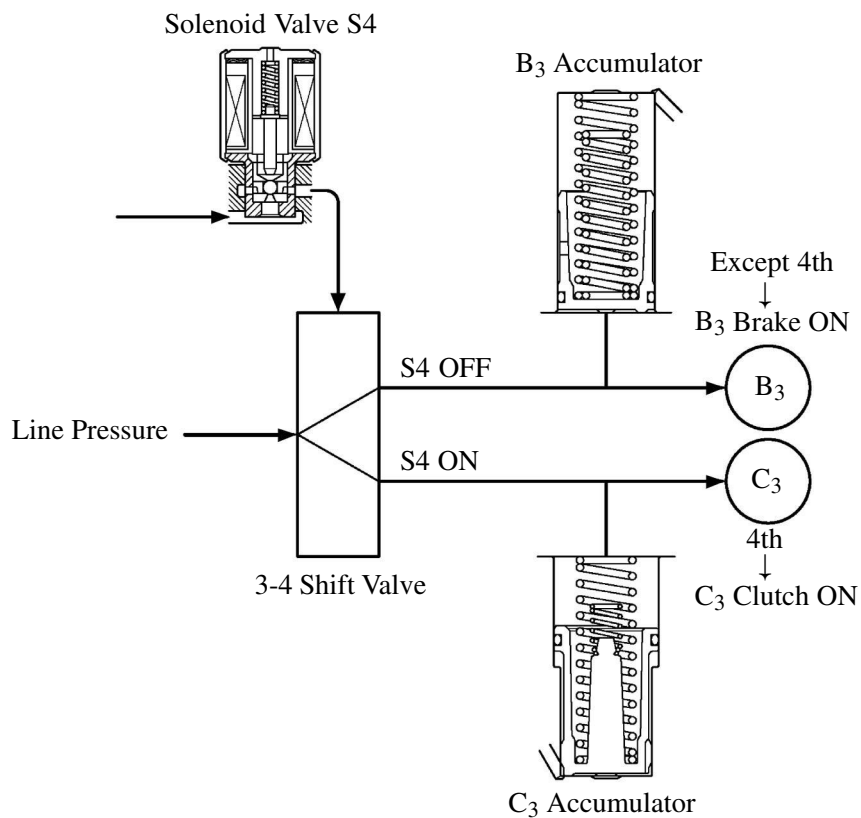


Solenoid Valve OFF

181CH12

2) Function of Solenoid Valve S4

The solenoid valves S4 when set to ON controls the 3-4 shift valve to establish the 4th by changing over the fluid pressure applied to B₃ brake and C₃ clutch.

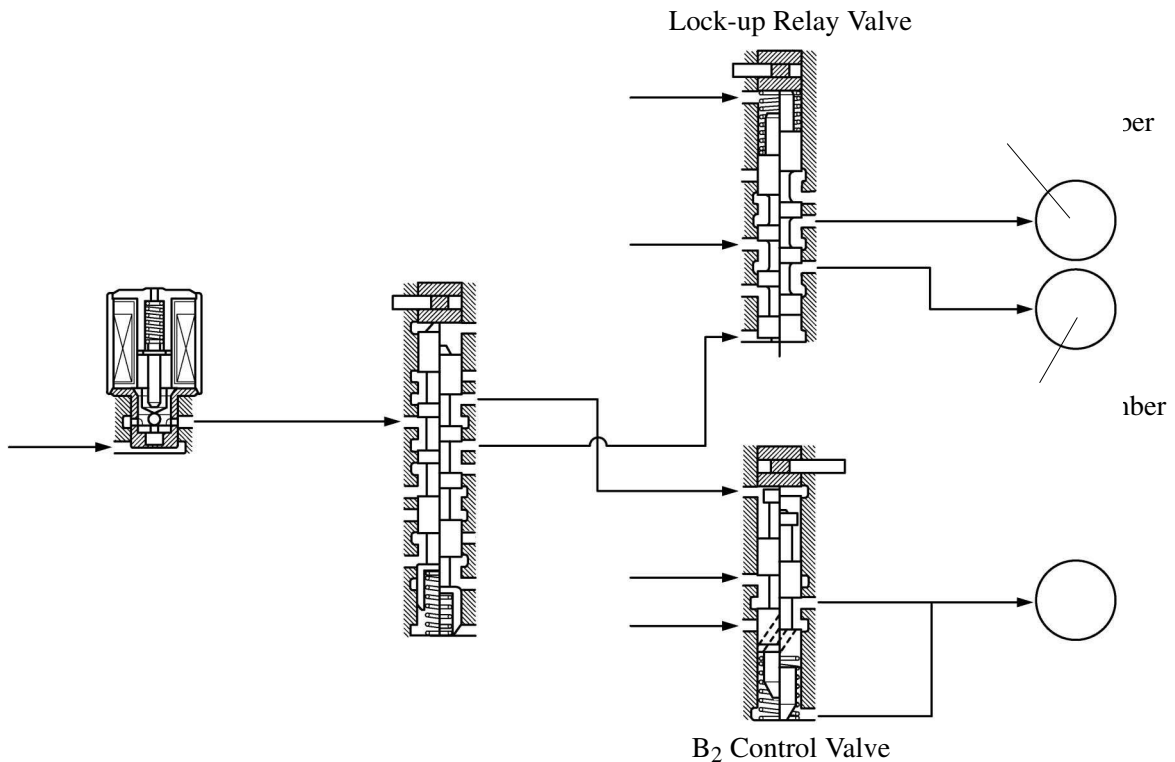


161ES23

3) Function of Solenoid Valve DSL

The solenoid valve DSL controls the B₂ control valve via the C₂ lock valve when the transaxle is shifted in the R or L position.

During lock-up, the lock-up relay valve is controlled via the C₂ lock valve.



181CH13

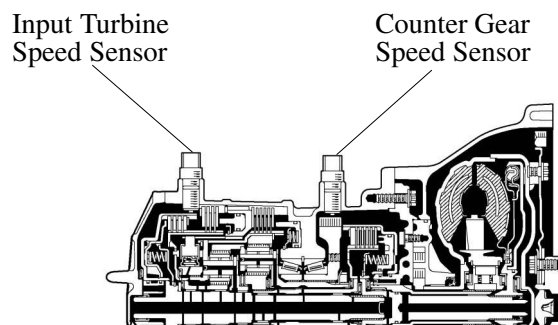
CH

3. Fluid Temperature Sensor

A fluid temperature sensor is installed inside the valve body for direct detection of the fluid temperature.

4. Speed Sensors

The U140F automatic transaxle has adopted an input turbine speed sensor (for the NT signal) and a counter gear speed sensor (for the NC signal). Thus, the engine & ECT ECU can detect the timing of the shifting of the gears and appropriately control the engine torque and hydraulic pressure in response to the various conditions.



181CH14

■ AUTOMATIC TRANSAXLE CONTROL SYSTEM

1. General

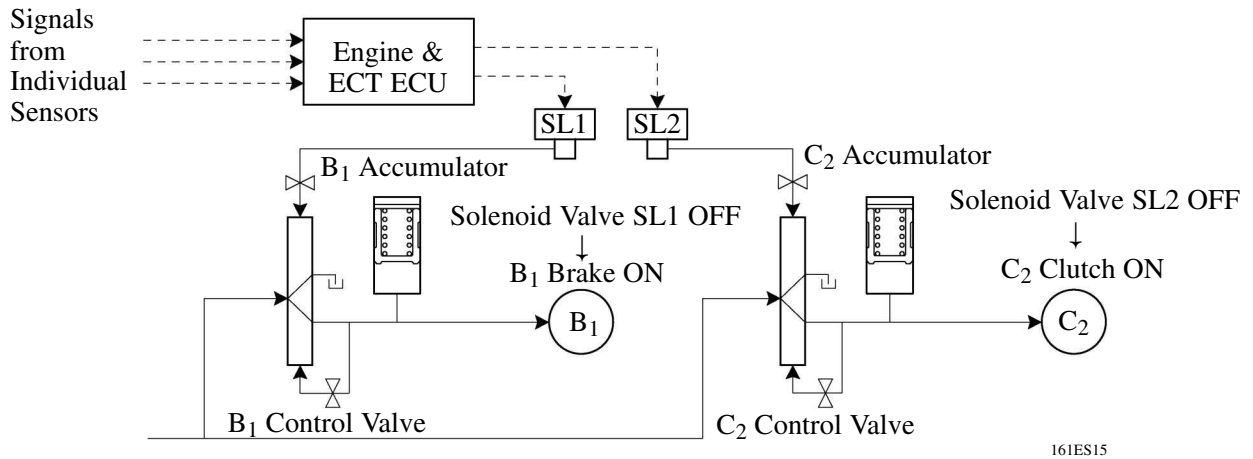
The automatic transaxle control system of the U140F automatic transaxle consists of the controls listed below.

System	Function
Clutch Pressure Control	- Controls the pressure that is applied directly to B₁ brake and C₂ clutch by actuating the shift solenoid valve in accordance with the engine & ECT ECU signals. - The solenoid valves SL1 and SL2 minutely controls the clutch pressure in accordance with the engine output and driving conditions.
Apply Orifice Control	The apply orifice control valve varies the apply orifice to control the flow volume supplied to the B ₃ brake.
Centrifugal Fluid Pressure Cancelling Mechanism	Applies an equal pressure from the opposite side to cancel the influence of the pressure that is created by centrifugal force.
Line Pressure Optimal Control	Actuates the solenoid valve SLT to control the line pressure in accordance with information from the engine & ECT ECU and the operating conditions of the transaxle.
Snow Mode Control	The snow mode control enables the driver to select the snow mode switch which allows the vehicle to start in 2nd gear.
Engine Torque Control	Retards the engine ignition timing temporarily to improve shift feeling during up or down shifting.
Shift Timing Control	The engine & ECT ECU sends current to the solenoid valve SL1 and/or SL2 based on signals from each sensor and shifts the gear.
Lock-Up Timing Control	The engine & ECT ECU sends current to the shift solenoid valve based on signals from each sensor and engages or disengages the lock-up clutch.
“N” to “D” Squat Control	When the shift lever is shifted from “N” to “D” range, the gear is temporarily shifted to 3rd and then to 1st to reduce vehicle squat.

2. Clutch Pressure Control

Clutch to Clutch Pressure Control

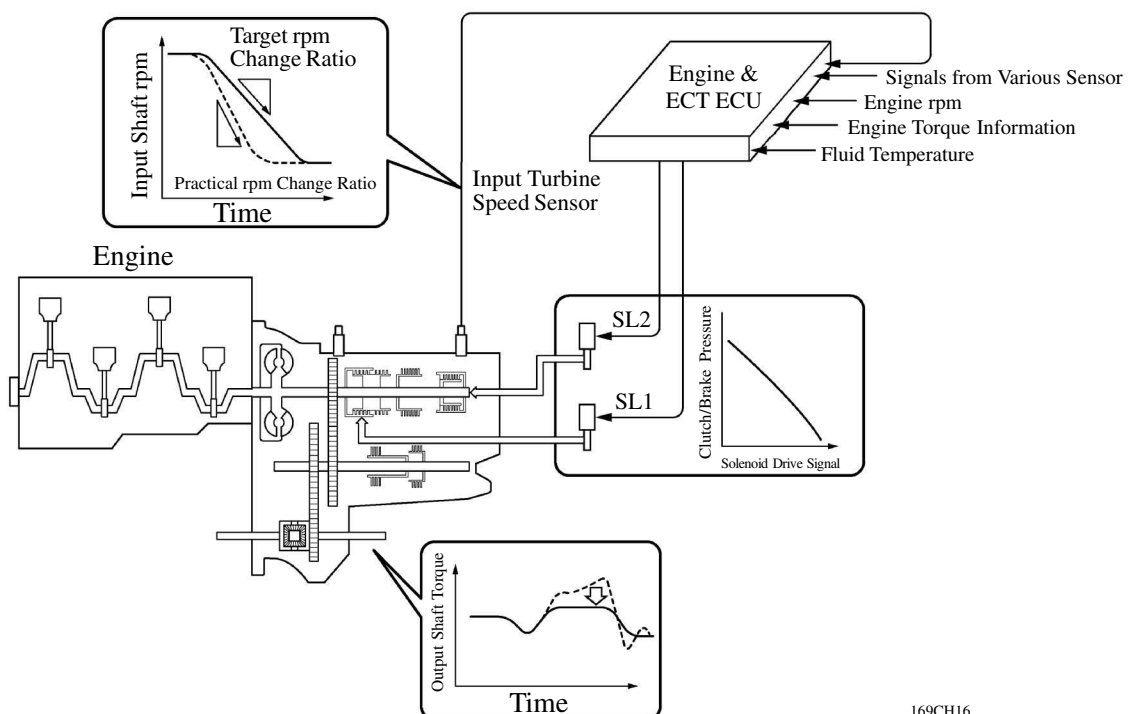
A direct clutch pressure control has been adopted for shifting from the 1st to 2nd gear, and from the 2nd to 3rd gear. Actuates solenoid valves SL1 and SL2 in accordance with the signals from the engine & ECT ECU, and guides this output pressure directly to control valves B₁ and C₂ in order to regulate the line pressure that acts on the B₁ brake and C₂ clutch. As a result, compact B₁ and C₂ accumulators without a back pressure chamber have been realized.



CH

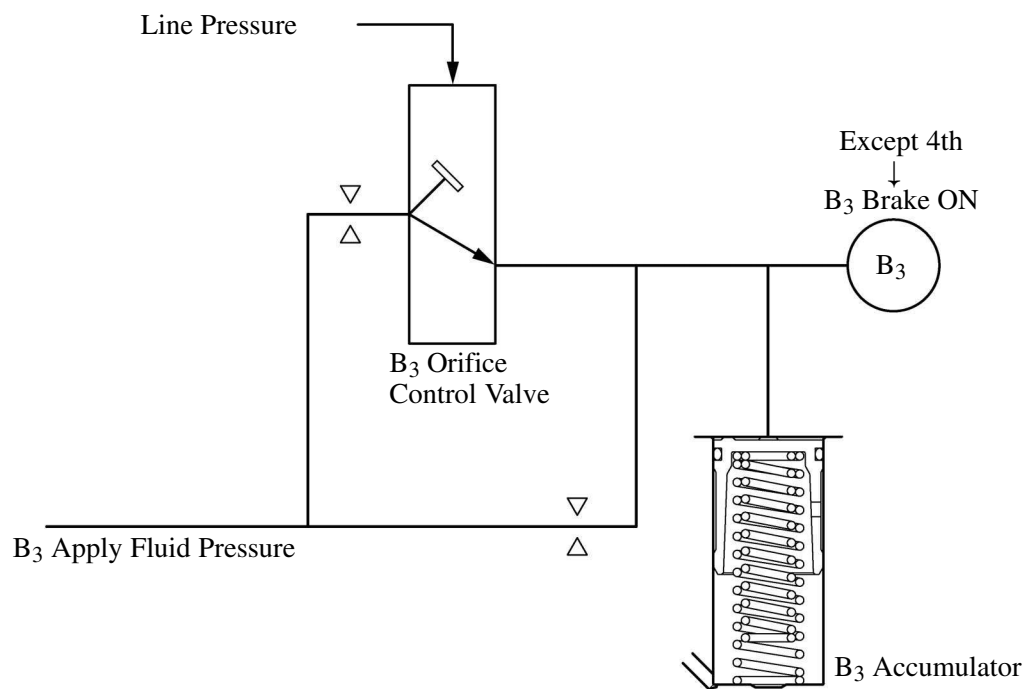
Clutch Pressure Optimal Control

Solenoid valves SL1 and SL2 are used for optimal control of clutch pressure. The engine & ECT ECU monitors the signals from various types of sensors such as the input turbine speed sensor, allowing shift solenoid valves SL1 and SL2 to minutely control the clutch pressure in accordance with engine output and driving conditions. As a result, smooth shift characteristics have been realized.



3. Apply Orifice Control

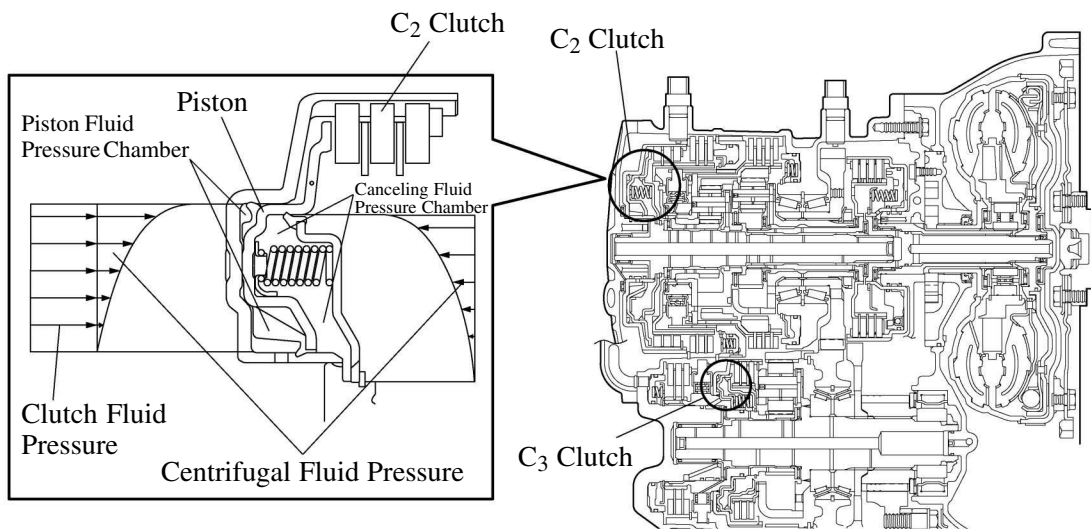
The B₃ orifice control valve has been provided for the B₃ brake, which is applied when shifting from 4th to 3rd. The B₃ orifice control valve is controlled by the amount of the line pressure in accordance with shifting conditions, and the flow volume of the fluid that is supplied to the B₃ brake is controlled by varying the size of the control valve's apply orifice.



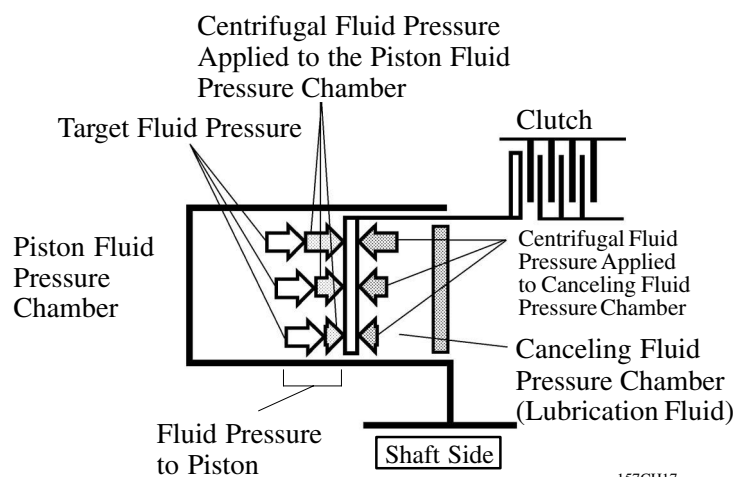
157CH19

4. Centrifugal Fluid Pressure Canceling Mechanism

A centrifugal fluid pressure canceling mechanism has been adopted in the C1, C2 and C3 clutches that are applied when shifting from 2nd to 3rd and from 3rd to 4th. In the conventional clutch mechanism, to prevent the generation of pressure by the centrifugal force that is applied to the fluid in the piston fluid pressure chamber when the clutch is released, a check ball is provided to discharge the fluid. Therefore, before the clutch can be subsequently applied, it took time for the fluid to fill the piston fluid pressure chamber. During shifting, in addition to the pressure that is controlled by the valve body, the pressure that acts on the fluid in the piston fluid pressure chamber also exerts influence, which is dependent upon rpm fluctuations. In order to eliminate this influence, a canceling fluid pressure chamber is provided opposite to the piston fluid pressure chamber. By utilizing the lubrication fluid such as that of the shaft, the same amount of centrifugal force is applied, thus canceling the centrifugal force that is applied to the piston itself. Accordingly, it is not necessary to discharge the fluid through the use of a check ball, and a highly responsive and smooth shifting characteristic has been achieved.



169CH47

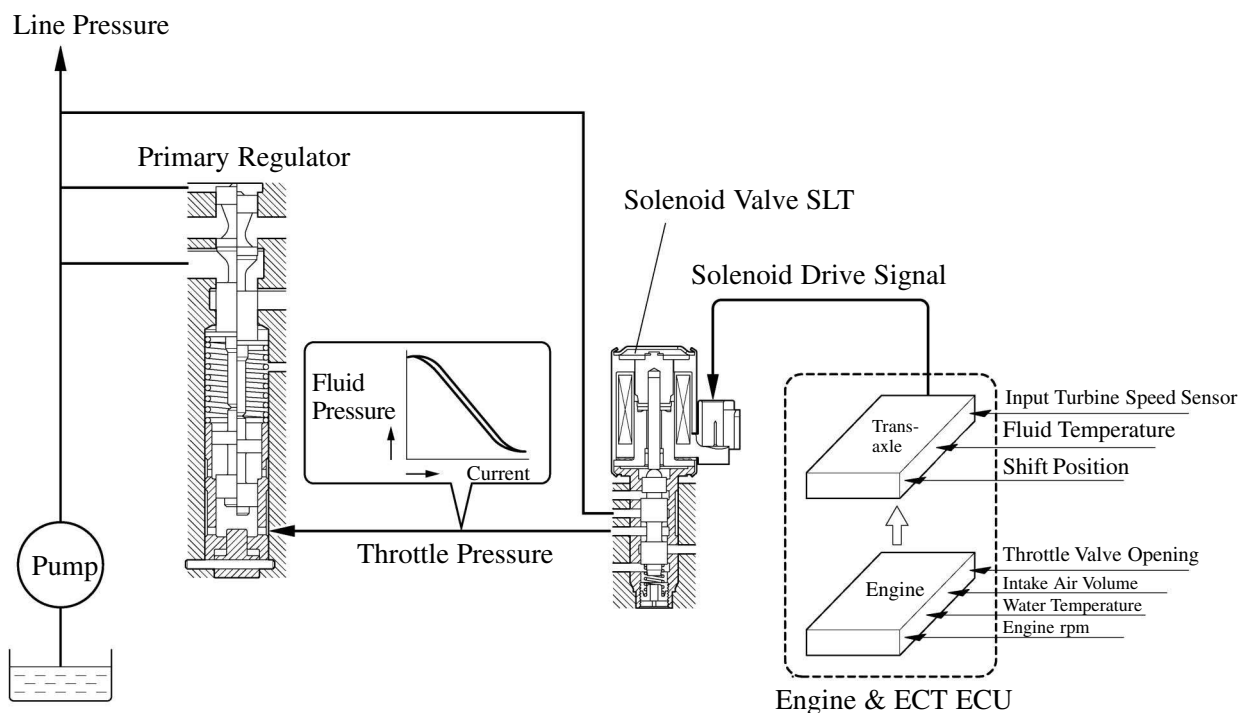


157CH17

Fluid pressure applied to piston	–	Centrifugal fluid pressure applied to canceling fluid pressure chamber	=	Target fluid pressure (original clutch pressure)
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5. Line Pressure Optimal Control

The line pressure is controlled by using a solenoid valve SLT. Through the use of the solenoid valve SLT, the line pressure is optimally controlled in accordance with the engine torque information, as well as with the internal operating conditions of the torque converter and the transaxle. Accordingly, the line pressure can be controlled minutely in accordance with the engine output, traveling condition, and the ATF temperature, thus realizing smooth shift characteristics and optimizing the workload on the oil pump.



6. Snow Mode Control

General

The snow mode control enables the driver to select the snow mode which allows the vehicle to start in 2nd gear.

Operation

- When the snow mode is selected while the shift lever is in the “D” or “2” position, the vehicle can start in the 2nd gear. After a start, if the shift lever is in the “D” position, the transmission will shift up automatically into 3rd and overdrive gears, as usual. If the shift lever is in the “2” position, the transmission will continue to operate in the 2nd gear.
- When vehicle is allowed to start in 2nd gear under the snow mode, it accelerates more gently and provides better control. This also minimize the fluctuation of the drive force transmitted to the tires realizing a smoother start with minimum slippage.

► Shift Program ◀

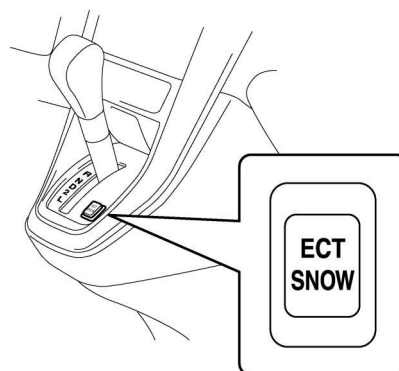
⇒: Up-Shift ⇐: Down-Shift

Mode Shift Lever Position	Normal	Snow
D (O/D Switch ON)	1st ⇐⇒ 2nd ⇐⇒ 3rd ⇐⇒ O/D	2nd ⇐⇒ 3rd ⇐⇒ O/D
2	1st ⇐⇒ 2nd ⇐ 3rd	2nd ⇐ 3rd
L	1st ⇐ 2nd	←

CH

Snow Mode Switch Light

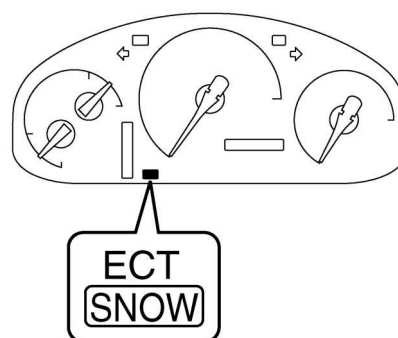
This switch is a momentary type switch which turns on upon pressing and turns off upon pressing it again. Also, the snow mode is canceled once the ignition switch is turned off and returns to the normal mode.



187CH01

Snow Mode Indicaotor Light

A snow mode indicator light which turns on when the snow mode is selected is provided in the combination meter.



187CH02

LHD Model

■ FAIL SAFE FUNCTION

This function minimizes the loss of operability when any abnormality occurs in each sensor or solenoid. Control is effected as follows if a malfunction occurs in the sensors and solenoids:

- During a speed sensor malfunction, the vehicle speed is detected through the signals from the counter gear speed sensor to effect normal control.
- During a counter gear speed sensor malfunction, 4th upshift is prohibited.
- During an ATF temperature sensor malfunction, 4th upshift is prohibited.
- During a malfunction in the solenoid valve SL1, SL2, or S4, the current to the faulty solenoid valve is cut off and control is effected by operating the normal solenoid valves. Shift control is effected as described in the table below, depending on the faulty solenoid.

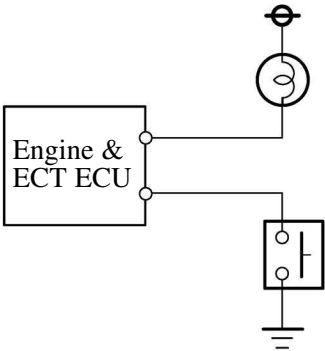
When all solenoids are normal				When shift solenoid SL1 is abnormal								When SL2 is abnormal				When S4 is abnormal			
				Traveling 3rd or 4th				Traveling 1st or 2nd											
Solenoid			Gear	Solenoid			Gear	Solenoid			Gear	Solenoid			Gear	Solenoid			Gear
SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4	
ON	ON	OFF	1st	×	ON ↓ OFF	OFF	3rd	×	ON	OFF	2nd	ON ↓ OFF	×	OFF	3rd	ON	ON	×	1st
OFF	ON	OFF	2nd	×	ON ↓ OFF	OFF	3rd	×	ON	OFF	2nd	OFF	×	OFF	3rd	OFF	ON	×	2nd
OFF	OFF	OFF	3rd	×	OFF	OFF	3rd	×	OFF ↓ ON	OFF ↓ ON	3rd	OFF	×	OFF	3rd	OFF	OFF	×	3rd
OFF	OFF	ON	4th	×	OFF	ON	4th	×	OFF ↓ ON	ON	3rd	OFF	×	ON	4th	OFF	OFF	×	3rd

When SL1 and SL2 are abnormal				When SL1 and S4 are abnormal								When SL2 and S4 are abnormal				When SL1, SL2 and S4 are abnormal			
				Traveling 3rd or 4th				Traveling 1st or 2nd											
Solenoid			Gear	Solenoid			Gear	Solenoid			Gear	Solenoid			Gear	Solenoid			Gear
SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4	
×	×	OFF	3rd	×	ON ↓ OFF	×	3rd	×	ON	×	2nd	ON ↓ OFF	×	×	3rd	×	×	×	3rd
×	×	OFF	3rd	×	ON ↓ OFF	×	3rd	×	ON	×	2nd	OFF	×	×	3rd	×	×	×	3rd
×	×	OFF	3rd	×	OFF	×	3rd	×	OFF ↓ ON	×	2nd	OFF	×	×	3rd	×	×	×	3rd
×	×	ON	4th	×	OFF	×	3rd	×	OFF ↓ ON	×	2nd	OFF	×	×	3rd	×	×	×	3rd

*: B₁ is constantly operating.

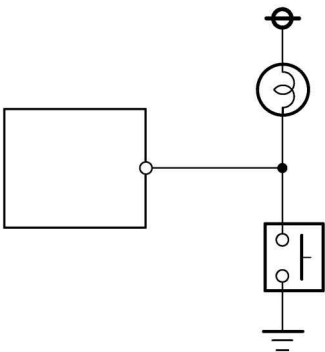
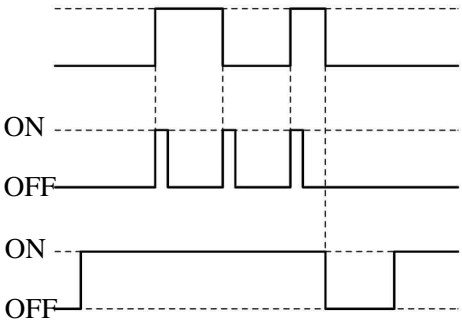
■ OVERDRIVE SWITCH

The overdrive switch has been adopted on the momentary type switch.
Pressing the momentary switch closes (turns ON) the contact points, and releasing the switch opens (turns OFF) the contact points. Accordingly, pressing the switch causes the signal to be input into the engine & ECT ECU.
Pressing the switch in overdrive turns OFF the overdrive. Pressing it again turns the overdrive back ON.
When the overdrive is OFF, turning the ignition switch from OFF to ON turns the overdrive back ON.



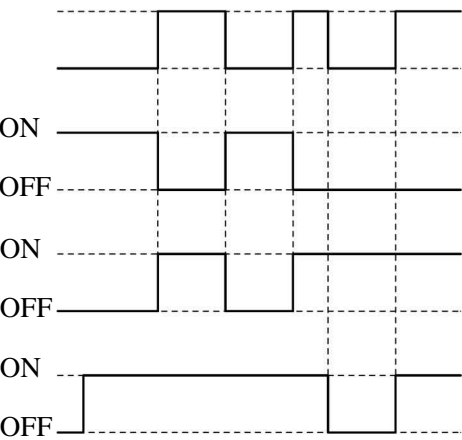
New

172GN01



Conventional

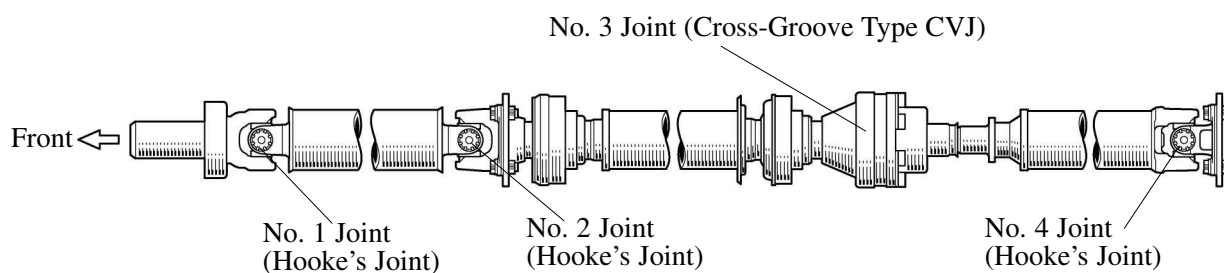
172GN02



PROPELLER SHAFT

DESCRIPTION

The LEXUS RX300 has adopted a 4-joint type propeller shaft. A cross-groove type CVJ (Constant Velocity Joint) with excellent high-speed and high-road durability is used for the No. 3 joint to reduce vibration and noise.



157CH29

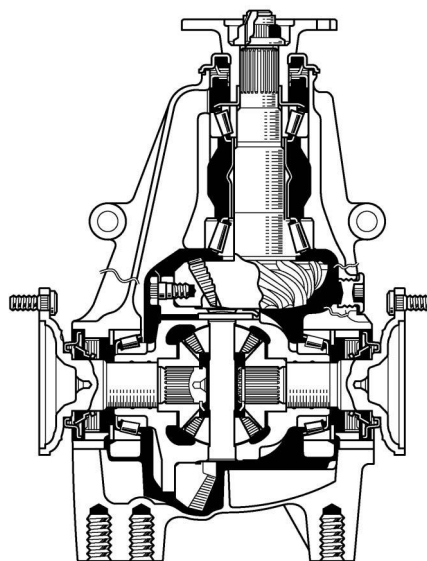
REAR DIFFERENTIAL

DESCRIPTION

The conventional type, with a 2-pinion gear, is used.

► Specification ◀

Item		F17SU
Differential Gear Ratio		2.928
Drive Pinion	No. of Teeth	14
Ring Gear	Size mm (in.)	170 (6.7)
	No. of Teeth	41
No. of Differential Pinion		2



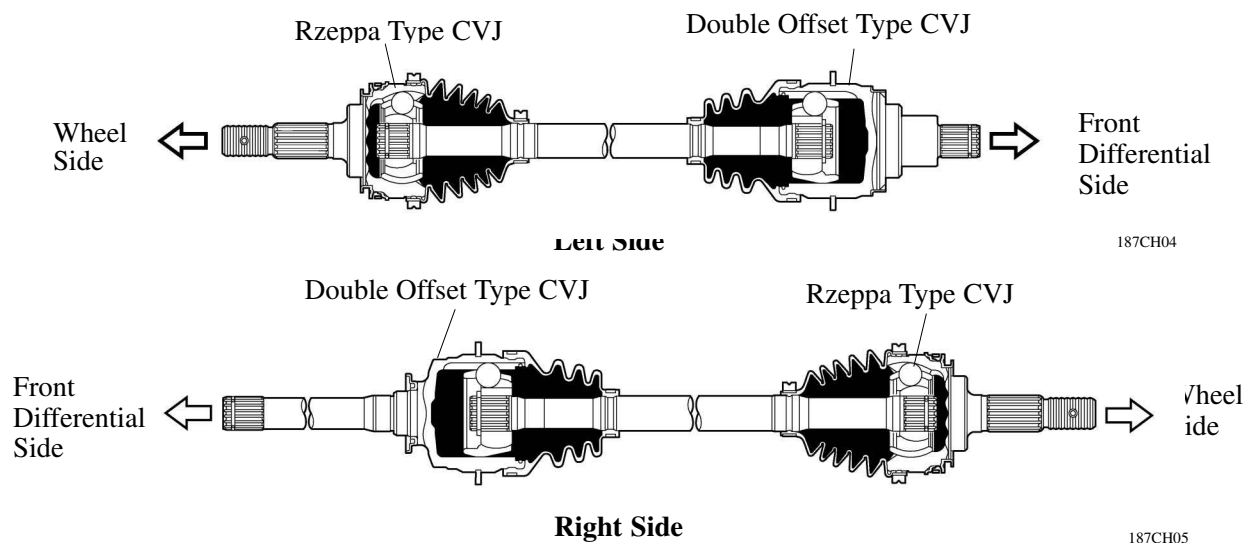
187CH03

DRIVE SHAFT

DESCRIPTION

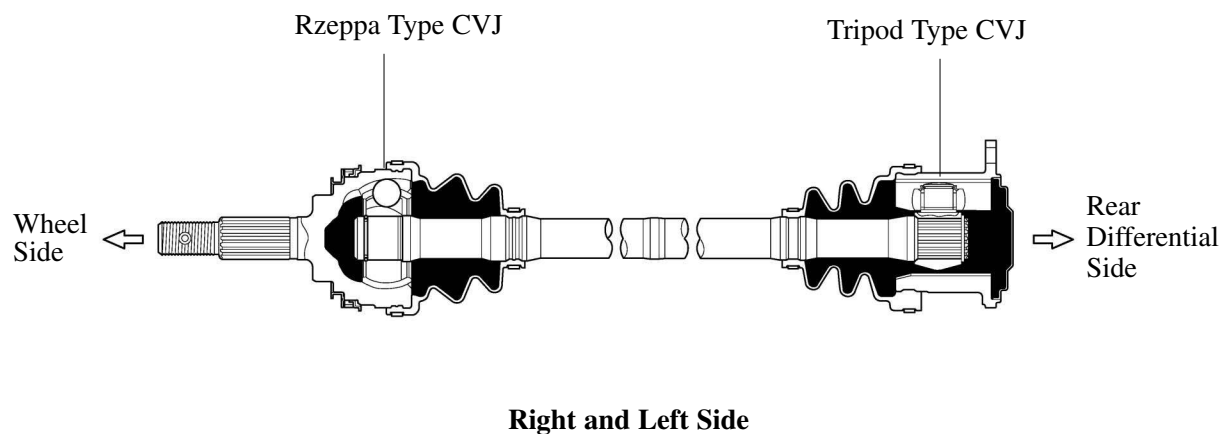
- The front drive shaft uses the double offset type CVJ (Constant Velocity Joint) on the front differential side, and Rzeppa type CVJ on the wheel side.
- The rear drive shaft uses the tripod type CVJ on the rear differential side, and Rzeppa type CVJ on the wheel side.

► Front Drive Shaft ◀



CH

► Rear Drive Shaft ◀

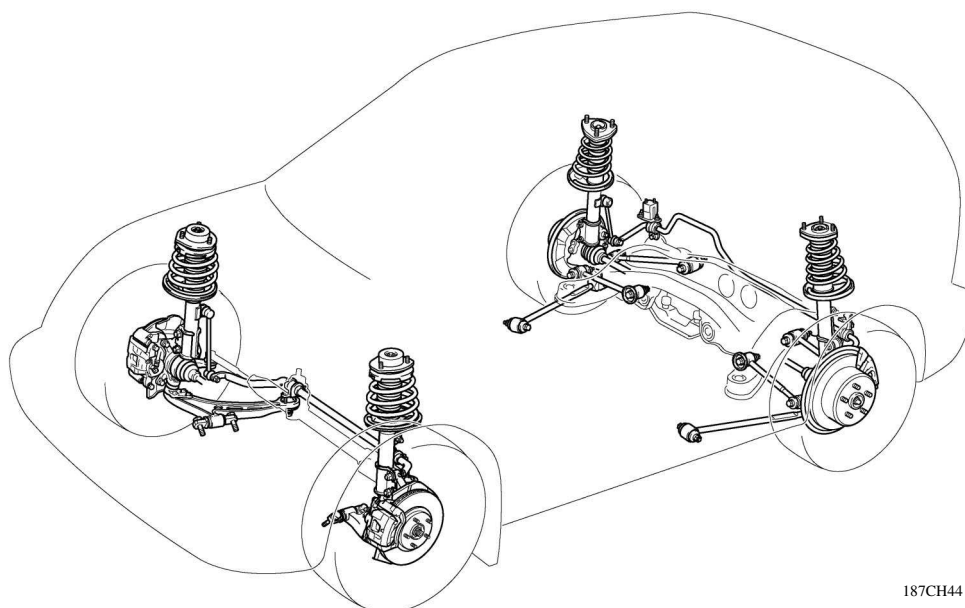


SUSPENSION AND AXLES

■ SUSPENSION

1. General

A MacPherson strut type independent suspension is used for both the front and rear suspension. On the LEXUS RX300, the characteristics, the allocation of the components, the spring and shock absorber have been optimally tuned to realize excellent riding comfort, stability and controllability.



187CH44

► Specifications ◀

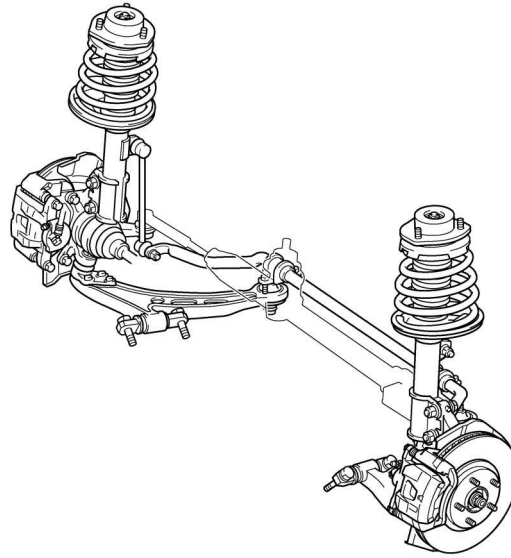
Front Suspension	Tread	mm (in.)	1566 (61.6)
	Caster* ¹	degrees	2°09'
	Camber* ¹	degrees	-0°24'
	Toe-In* ¹	mm (in.)	1 (0.04)
	King Pin Inclination* ¹	degrees	12°10'
Rear Suspension	Tread	mm (in.)	1555 (61.2)
	Camber* ¹	degrees	-0°42'
	Toe-In* ¹	mm (in.)	3 (0.12)

*¹: Unloaded Vehicle Condition

2. Front Suspension

General

The MacPherson strut type suspension features an L-shaped lower arm with strut bar function. Its optimal suspension geometry ensures smooth controllability, and assists stability, riding comfort, and the ability to overcome rough terrain.



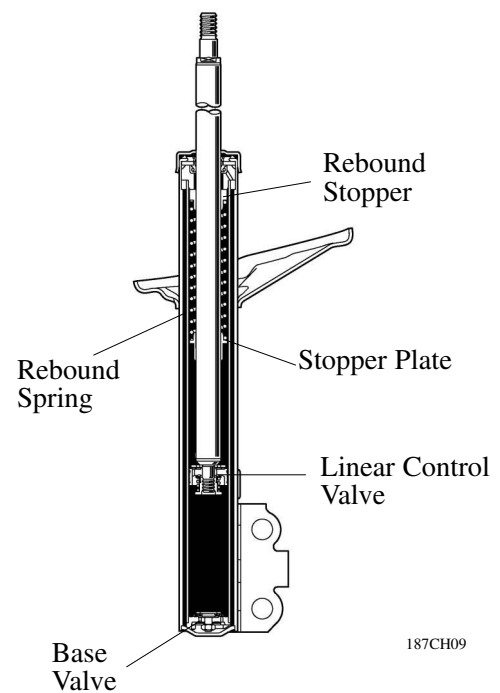
187CH08

CH

Shock Absorber

1) General

Low-pressure (N_2) gas sealed front shock absorbers with a linear control valve and a built-in rebound spring have been adopted to realize both driving stability and riding comfort.

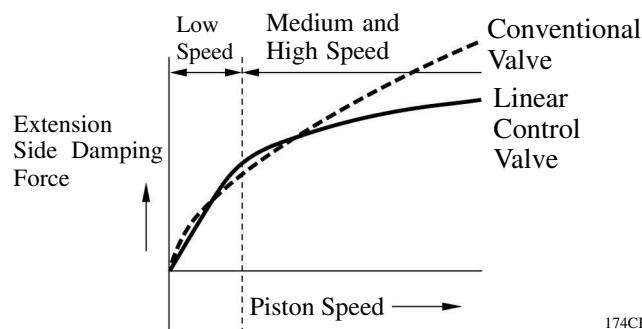
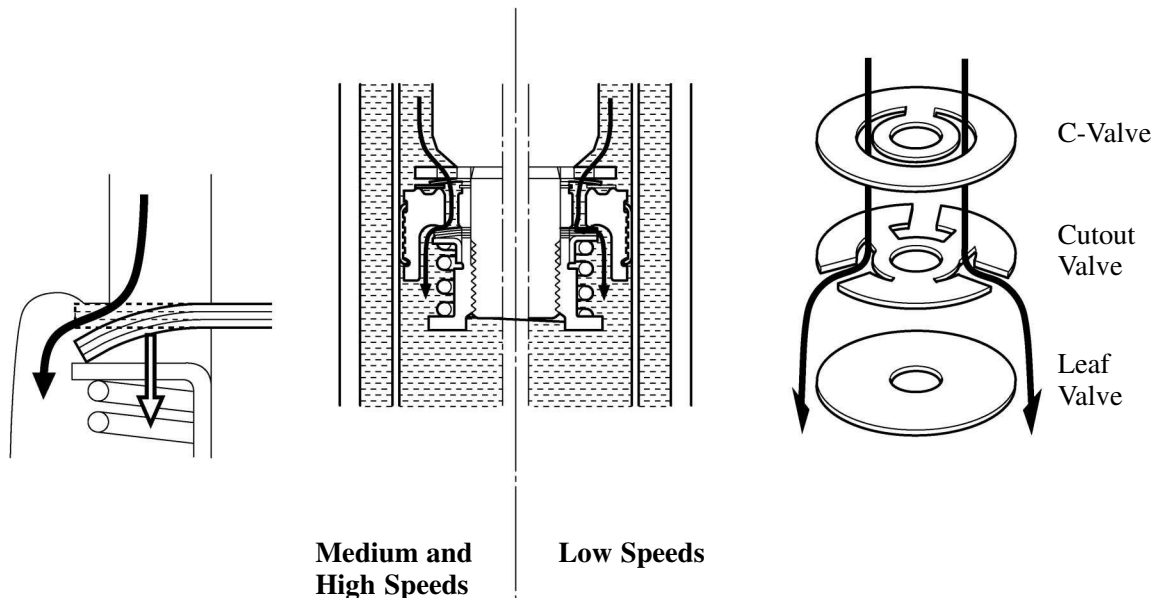


187CH09

2) Linear Control Valve

The linear control valve consists of a C-valve, a cutout valve and a leaf valve. These valves adopt a laminate construction and form orifices. At low piston speeds, the oil flows through the cutouts of the valves to achieve a linear damping force. At medium and high piston speeds, the valves flex to increase the amount of oil that flows through, thus reducing the damping force.

Through the adoption of the linear control valve, the changes in the damping force are made constant at low piston speeds, thus making the vehicle behave more smoothly in relation to the steering operation. At medium and high piston speeds, the damping force is reduced to lessen the vehicle vibrations in relation to the roughness of the road surface.

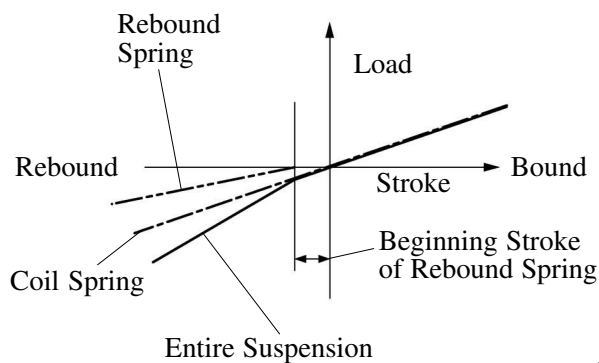


Damping Force Characteristics

174CH02

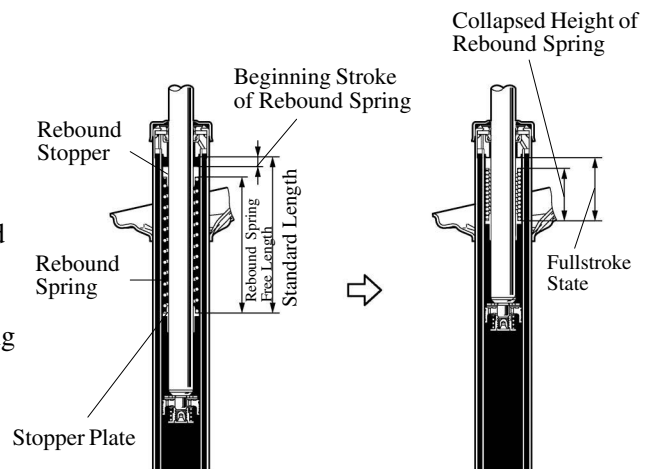
3) Rebound Spring

In the front shock absorber with a built in rebound spring, the function of the rebound spring that is provided in the shock absorber case combines with the function of the coil spring in order to restrain the elongation of the entire suspension during rebounds. Consequently, only the function of the coil spring is applied when the suspension stroke is small during normal driving, in order to realize a soft and comfortable ride. However, when the inner wheel makes large rebounds, such as when the vehicle is cornering, the functions of both the rebound spring and the coil spring are combined in order to reduce the elongation of the entire suspension. As a result, the vehicle's excellent maneuverability and stability have been realized.

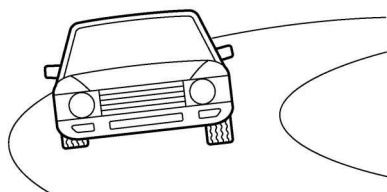


Characteristics of shock absorber with built-in rebound spring

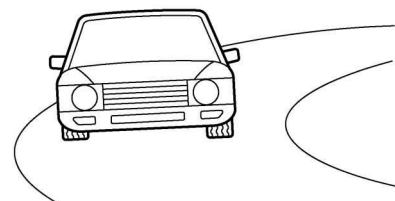
185CH16



185CH17



Without Rebound Spring

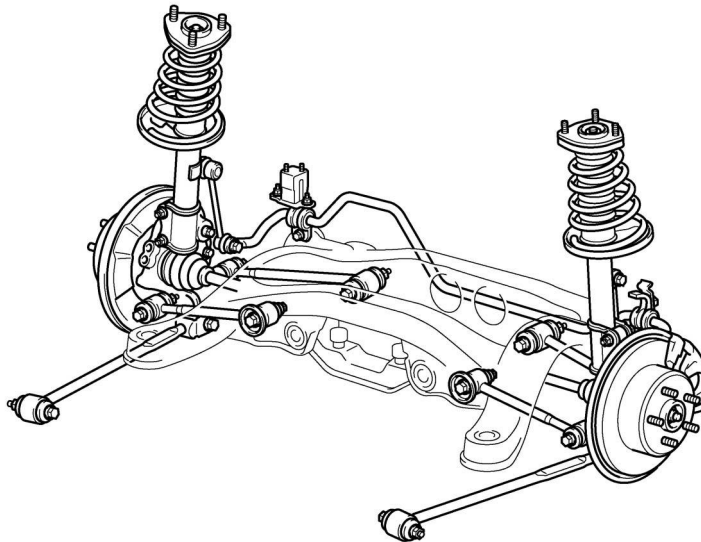


With Rebound Spring

187CH10

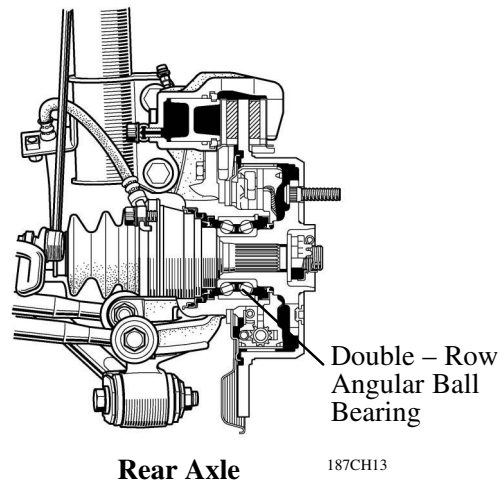
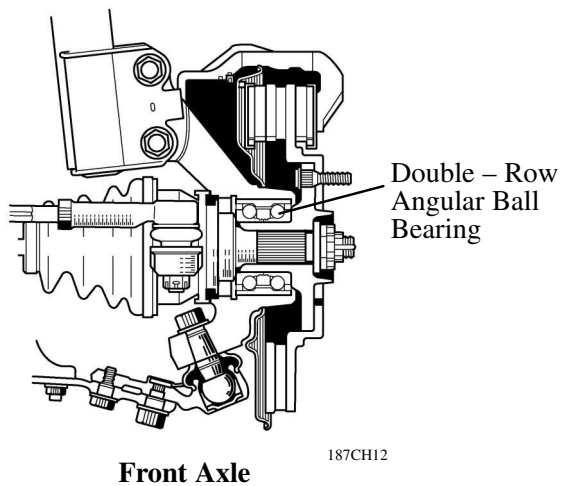
3. Rear Suspension

- MacPherson strut suspension is used.
- Rear suspension realizes excellent stability and controllability by optimizing the suspension geometry and camber change.



■ AXLES

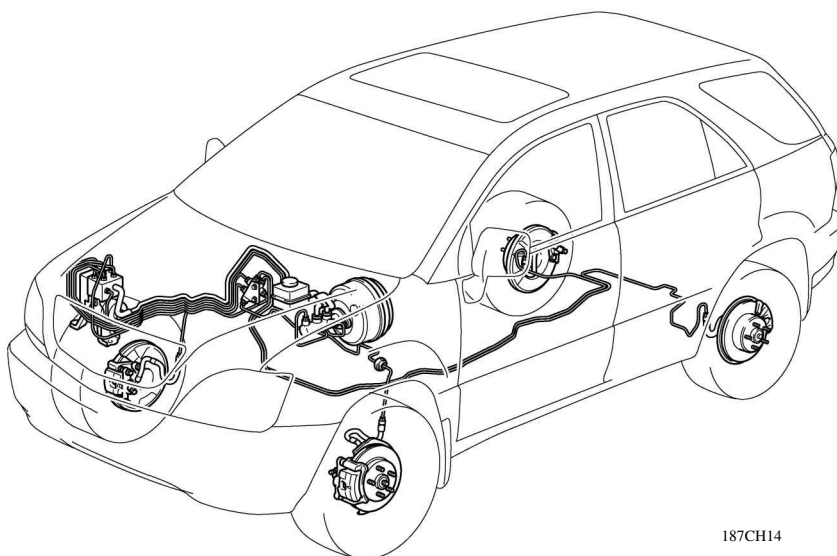
A double – row angular ball bearing is used for both the front and rear axles.



BRAKES

DESCRIPTION

- The ventilated disc brakes is used for front brakes and the solid disc brakes is used for rear brakes.
- The ABS with EBD & Brake Assist & TRC & VSC system is provided as standard equipment.
ABS (Anti-lock Brake System), EBD (Electronic Brake force Distribution), TRC (Traction Control), VSC (Vehicle Stability Control)



CH

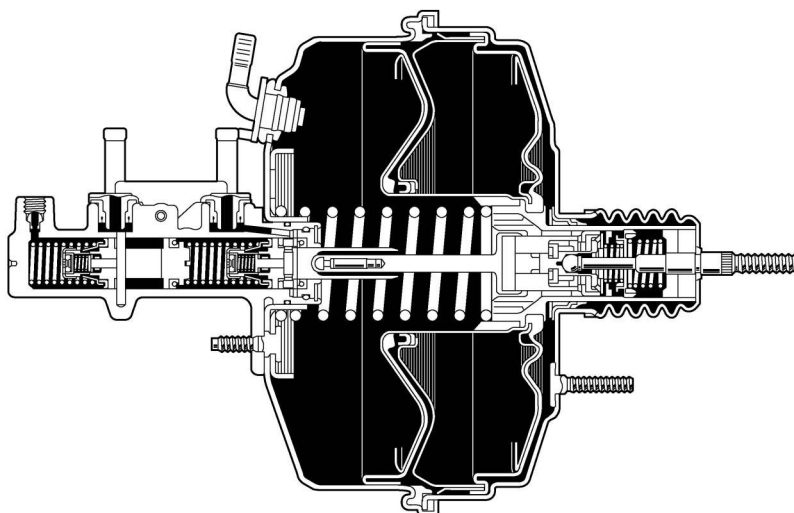
► Specifications ◀

Master Cylinder	Type	Tandem
	Diameter mm (in.)	25.4 (1.0)
Brake Booster	Type	Tandem
	Size in.	8.5" + 8.5"
Front Brake	Type	Ventilated Disc
	Caliper Type	AX60
	Wheel Cylinder Dia. mm (in.)	60.33 (2.38)
	Rotor Size (D × T)* mm (in.)	296 × 28 (11.65 × 1.1)
Rear Brake	Type	Solid Disc
	Caliper Type	PD40R
	Wheel Cylinder Dia. mm (in.)	40.45 (1.59)
	Rotor Size (D × T)* mm (in.)	288 × 10 (11.33 × 0.39)
Parking Brake	Type	Drum
	Size mm (in.)	170 (6.69)
	Lever Type	Pedal
ABS with EBD & Brake Assist & TRC & VSC		STD

*: D: Outer Diameter, T: Thickness

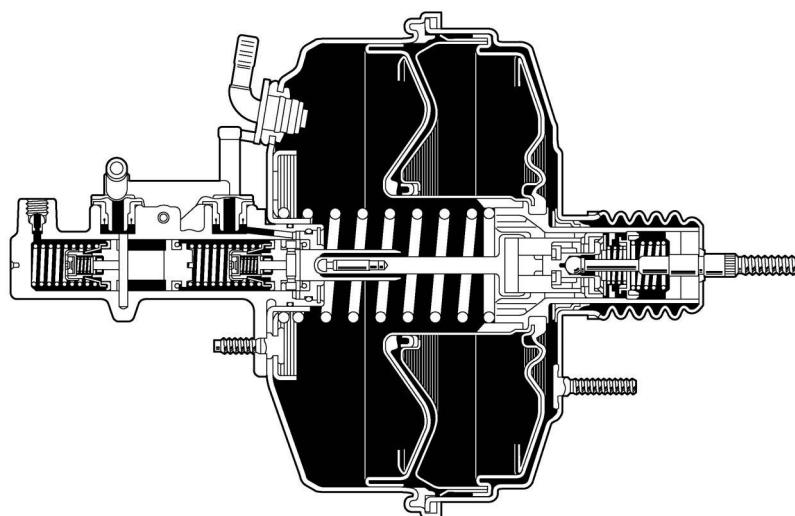
■ MASTER CYLINDER AND BRAKE BOOSTER

- A type of brake booster into which the master cylinder is inserted has been adopted to achieve a compact configuration.
- A long-type 8.5-inch tandem brake booster that matches the stroke of the master cylinder has been adopted to achieve an optimal braking force.



LHD Model

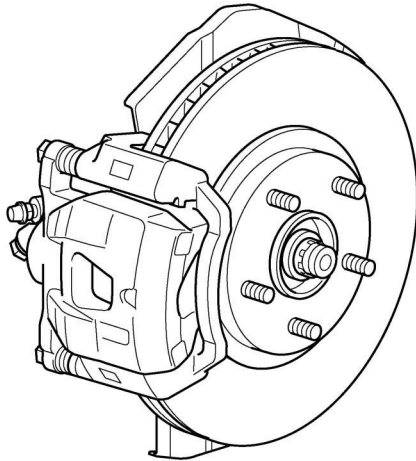
187CH15



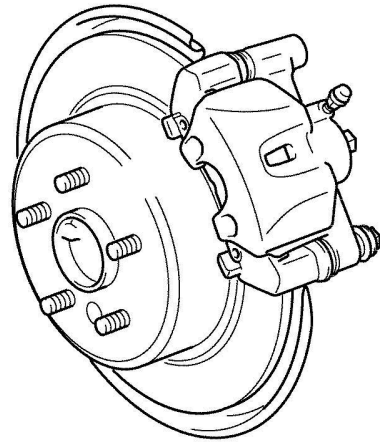
RHD Model

■ FRONT AND REAR BRAKES

- The front brakes use 16-inch ventilated disc brakes.
- The rear brakes use 15-inch solid disc brakes.



117

Front Brake

187CH18

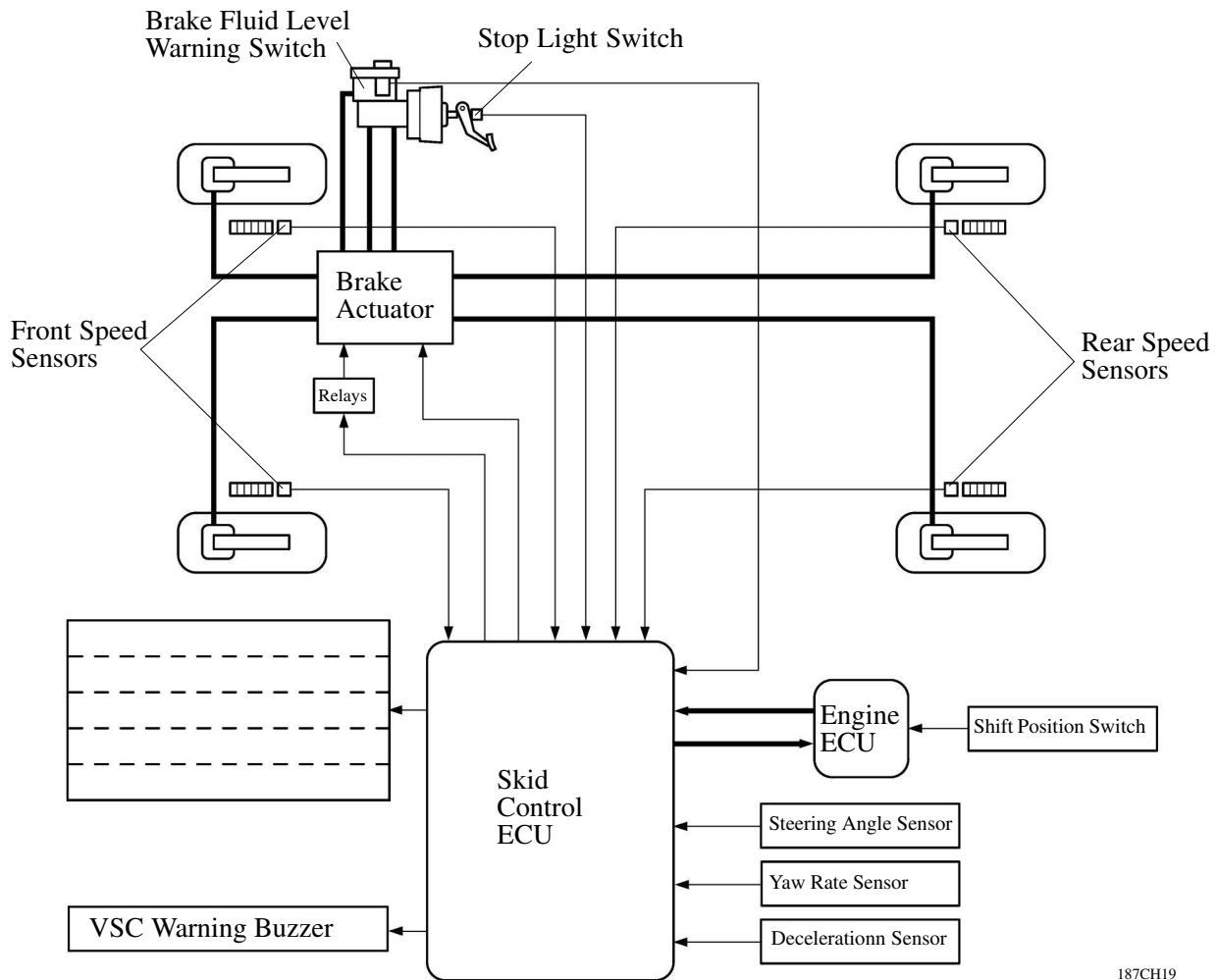
Rear Brake**CH**

■ ABS with EBD & BRAKE ASSIST & TRC & VSC SYSTEM

1. General

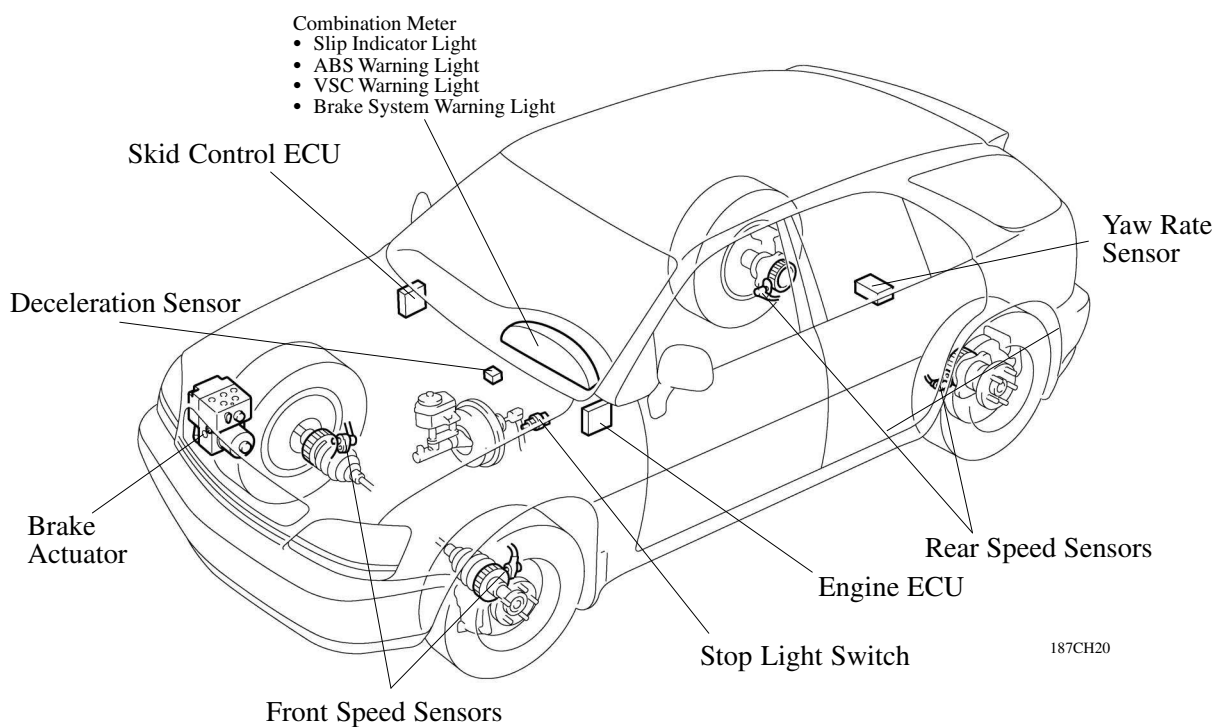
- The primary purpose of the ABS and TRC system has been to help the vehicle's stability during braking and acceleration. In contrast, the purpose of the VSC system is to help the vehicle's stability during cornering.
- Ordinarily, the vehicle corners in a stable manner in accordance with the steering operation. However, depending on the unexpected situations or external elements such as the ground surface conditions, vehicle speed, and emergency avoidance maneuvers, the vehicle may exhibit strong understeer or oversteer tendencies. In such situations, the VSC system dampens the strong understeer or oversteer to help vehicle stability.
- The primary purpose of the Brake Assist system is to provide an auxiliary brake force assist to the driver who cannot generate a large brake force during emergency braking, thus maximizing the vehicle's brake performance.
- The EBD control utilizes ABS, realizing the proper brake force distribution between front and rear wheels in accordance with the driving conditions.
In addition, during cornering braking, it also controls the brake forces of right and left wheels, helping to maintain the vehicle stability.

2. System Diagram



187CH19

3. Layout of Main Components



187CH20

4. Function of Main Components

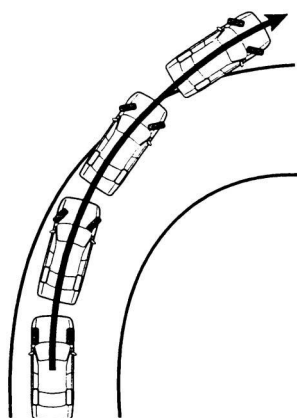
Components		Function
Warning Light and Indicator Light	ABS Warning Light	Lights up to alert the driver when the ECU detects the malfunction in the ABS or Brake Assist System.
	VSC Warning Light	Lights up to alert the driver when the ECU detects the malfunction in the VSC system.
	Slip Indicator Light	Blinks to inform the driver when the TRC system or the VSC system is operated.
	Brake System Warning Light	Lights up together with the ABS warning light to alert the driver when the ECU detects the malfunction not only in the ABS but also in the EBD control.
Engine ECU		Sends the throttle valve opening angle signal, shift position signal, etc., to the skid control ECU.
Skid Control ECU		Judges the vehicle driving condition based on signals from each sensor, and sends brake control signal to the brake actuator. Also transmits the control information to the engine ECU.
Speed Sensors		Detect the wheel speed of each of four wheels.
Brake Actuator		Changes the fluid path based on the signals from the skid control ECU during the operation of the ABS with EBD & Brake Assist & TRC & VSC system, in order to control the fluid pressure that is applied to the wheel cylinders.
	Master Cylinder Pressure Sensor	Assembled in the brake actuator and detects the master cylinder pressure.
Control Relay	Pump Motor Relay	Supply power to the pump motor in the actuator.
	Solenoid Relay	Supply power to the solenoid valves in the actuator.
Brake Fluid Level Warning Switch		Detects the brake fluid level.
VSC Warning Buzzer		Emits an intermittent sound to inform the driver that the ECU detects the strong understeer tendency or strong oversteer tendency.
Stop Light Switch		Detects the brake depressing signal.
Yaw Rate Sensor		Detects the vehicle's yaw rate.
Deceleration Sensor		Detects the vehicle's acceleration in the lateral directions.
Steering Angle Sensor		Detects the steering direction and angle of the steering wheel.

5. Outline of VSC System

General

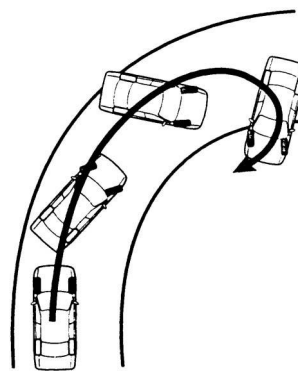
The followings are two examples that can be considered as circumstances in which the tires overcome their lateral grip limit.

- When the front wheels lose grip in relation to the rear wheels (strong understeer tendency).
- When the rear wheels lose grip in relation to the front wheels (strong oversteer tendency).



151CH17

Strong Understeer Tendency



151CH16

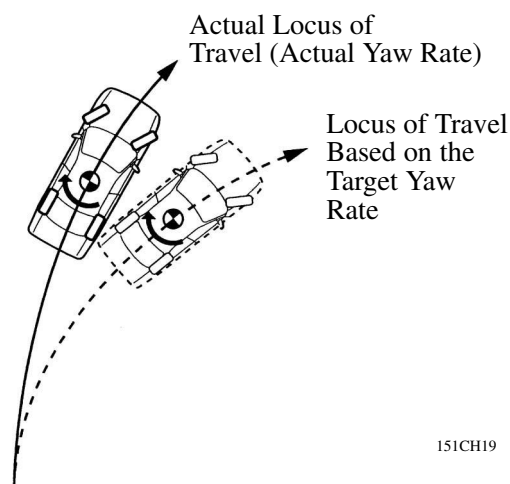
Strong Oversteer Tendency

Method for Determining the Vehicle Condition

To determine the condition of the vehicle, sensors detect the steering angle, vehicle speed, vehicle's yaw rate, and the vehicle's lateral acceleration, which are then calculated by the skid control ECU.

1) Determining Understeer

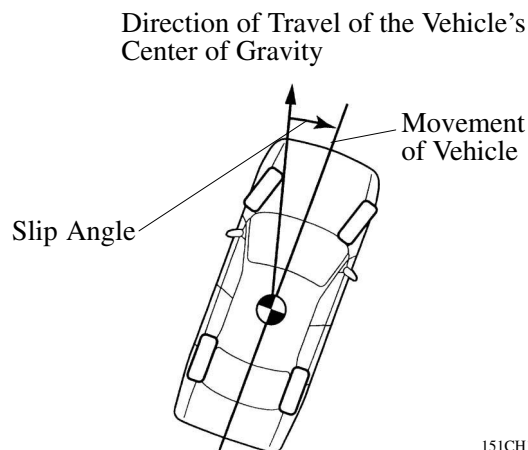
Whether or not the vehicle is in the state of understeer is determined by the difference between the target yaw rate and the vehicle's actual yaw rate. when the vehicle's actual yaw rate is smaller than the yaw rate (a target yaw rate that is determined by the vehicle speed and steering angle) that should be rightfully generated when the driver operates the steering wheel, it means the vehicle is making a turn at a greater angle than the loss of travel. Thus, the ECU determines that there is a large tendency to understeer.



151CH19

2) Determining Oversteer

Whether or not the vehicle is in the state of oversteer is determined by the values of the vehicle's slip angle and the vehicle's slip angular velocity (time-dependent changes in the vehicle's slip angle). When the vehicle's slip angle is large, and the slip angular velocity is also large, the ECU determines that the vehicle has a large oversteer tendency.



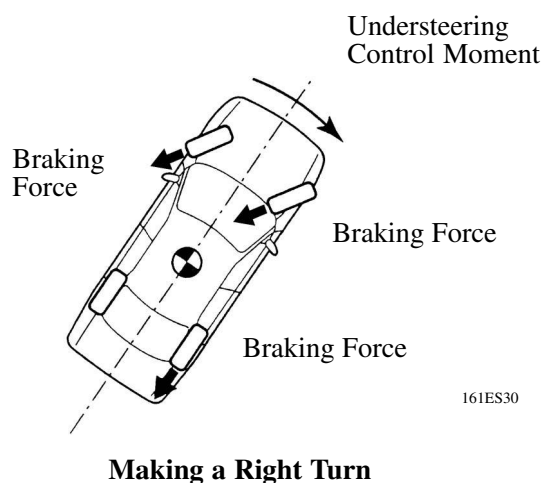
151CH18

Method of VSC Operation

When the skid control ECU determines that the vehicle exhibits a tendency to understeer or oversteer, it decreases the engine output and applies the brake of a front or rear wheel to control the vehicle's yaw moment.

1) Dampening a Strong Understeer

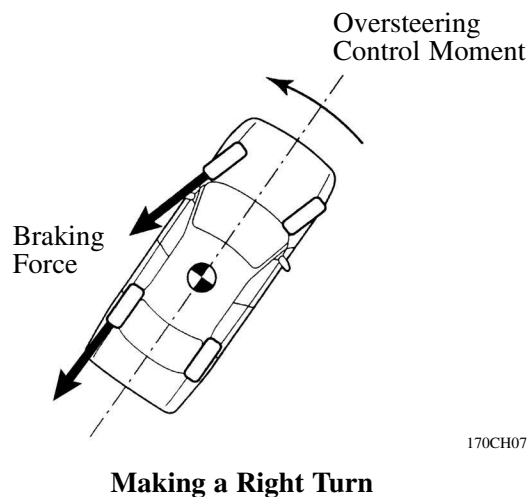
When the skid control ECU determines that the vehicle exhibits a strong tendency to understeer, depending on the extent of that tendency, it controls the engine output and applies the brakes of the front wheels and inside rear wheel, thus providing the vehicle with an understeer control moment, which helps dampen its tendency to understeer. Also, depending on whether the brakes are ON or OFF and the condition of the vehicle, there are circumstances in which the brakes might not be applied to the wheels even if those wheels are targeted for braking.



161ES30

2) Dampening a Strong Oversteer

When the skid control ECU determines that the vehicle exhibits a strong tendency to oversteer, depending on the extent of that tendency, it controls the engine output and applies the brakes of the front and rear wheels of the outside of the turn, thus generating an inertial moment in the vehicle's outward direction, which helps dampen its tendency to oversteer.



170CH07

6. Outline of Brake Assist System

Brake Assist interprets a quick push of the brake pedal as emergency braking and supplements the braking power applied if the driver has not stepped hard enough on the brake pedal.

In emergencies, drivers, especially inexperienced ones, often panic and do not apply sufficient pressure on the brake pedal.

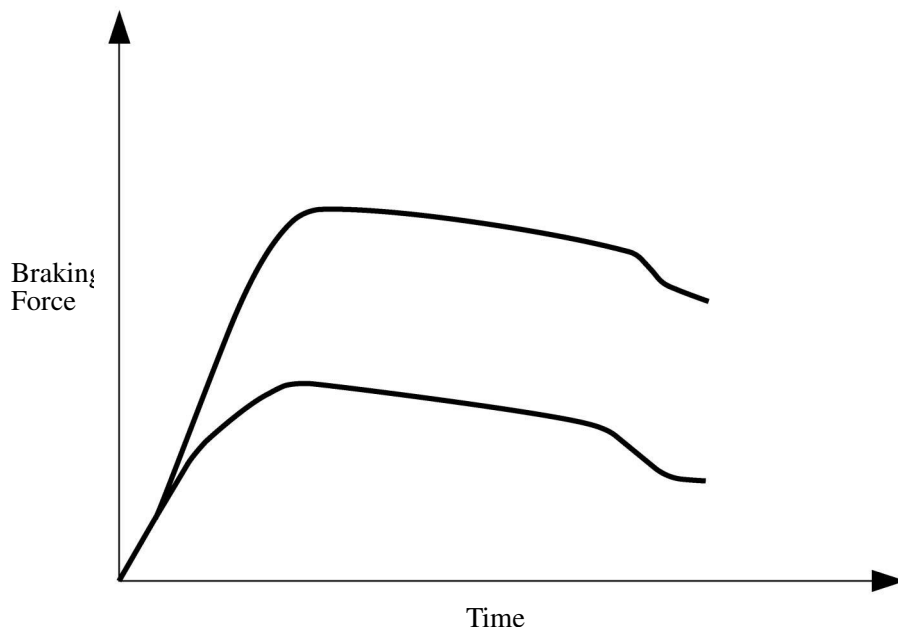
Brake Assist system measures the speed and force with which the brake pedal is pushed to determine whether the driver is attempting to brake rapidly, and applies additional pressure to maximize braking performance of both conventional brakes and ABS equipped brakes.

A key feature of Brake Assist is that the timing the degree of braking assistance are designed to ensure that the driver does not discern anything unusual about the braking operation. When the driver intentionally eases up on the brake pedal, the system reduce the amount of assistance it provides.

— REFERENCE —

Effectiveness of the Brake Assist Operation:

- a. During emergency braking, an inexperienced driver, or a driver in a state of panic might not be able to firmly depress the brake pedal, although driver can depress it quickly. As a result, only a small amount of brake force is generated.
- b. The pedal effort of this type of driver might weaken as time passes, causing a reduction in the braking force.
- c. Based on how quickly the brake pedal is depressed, the Brake Assist operation assesses the intention of the driver to apply emergency braking and increases the brake force.
- d. After the Brake Assist operation, if the driver intentionally releases the brake pedal, the assist operation reduces the amount of Brake Assist in order to reduce the feeling of uneasiness.



7. Outline of EBD Control

General

The EBD control utilizes ABS, realizing the proper brake force distribution between front and rear wheels in accordance with the driving conditions.

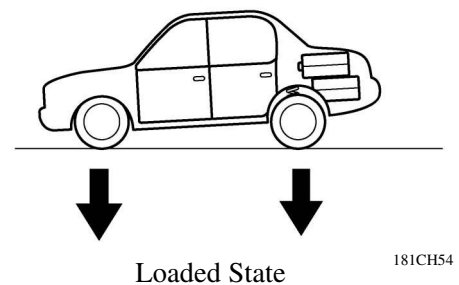
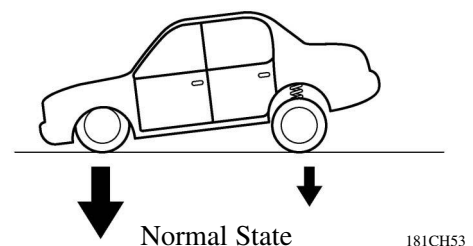
In addition, during cornering braking, it also controls the brake forces of right and left wheels, helping to maintain the vehicle stability.

The distribution of the brake force, which was performed mechanically in the past, is now performed under electrical control of the skid control ECU, which precisely controls the brake force in accordance with the vehicle's driving conditions.

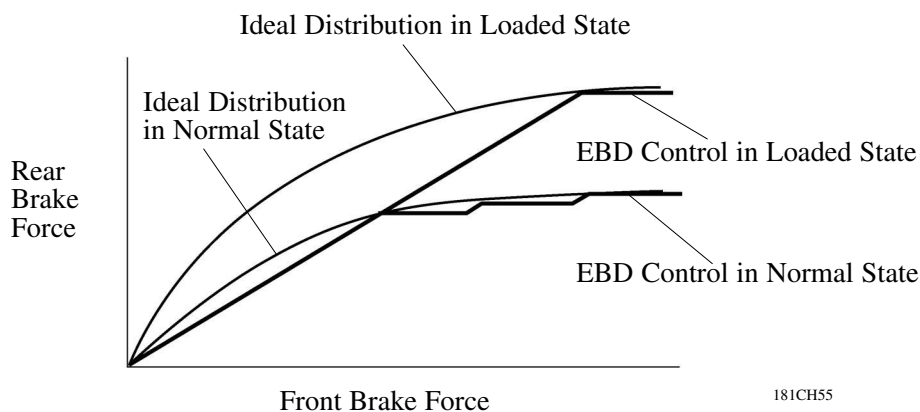
Front/Rear Wheels Brake Force Distribution

If the brakes are applied while the vehicle is moving straight forward, the transfer of the load reduces the load that is applied to the rear wheels. In this case, if the same amount of brake force is applied to the four wheels, the rear wheels with the smaller load will become susceptible to locking. The skid control ECU determines this condition by way of the signals from the speed sensor, and regulates the brake actuator in order to optimally control the distribution of the brake force to the rear wheels.

For example, the amount of the load that is applied to the rear wheels during braking varies whether or not the vehicle is carrying a load. The amount of the load that is applied to the rear wheels also varies in accordance with the extent of the deceleration. Thus, the distribution of the brake force to the rear is optimally controlled in order to effectively utilize the braking force of the rear wheels under these conditions.

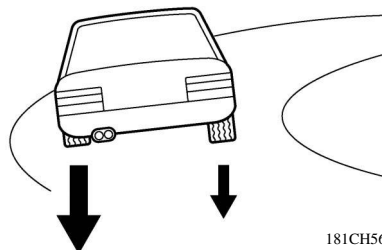


► EBD Control Concept ◀



Right/Left wheels Brake Force Distribution (During cornering braking)

When the brakes are applied while the vehicle is cornering, the load that is applied to the inner wheel decreases. In this case, if the same amount of brake force is applied to the four wheels, the inner wheel with the smaller load will become susceptible to locking. The skid control ECU determines this condition by way of the signals from the speed sensor and deceleration sensor, and regulates the brake actuator in order to optimally control the distribution of the brake force to the inner wheel.



Brake Actuator (ABS with EBD & Brake Assist & TRC & VSC Actuator)

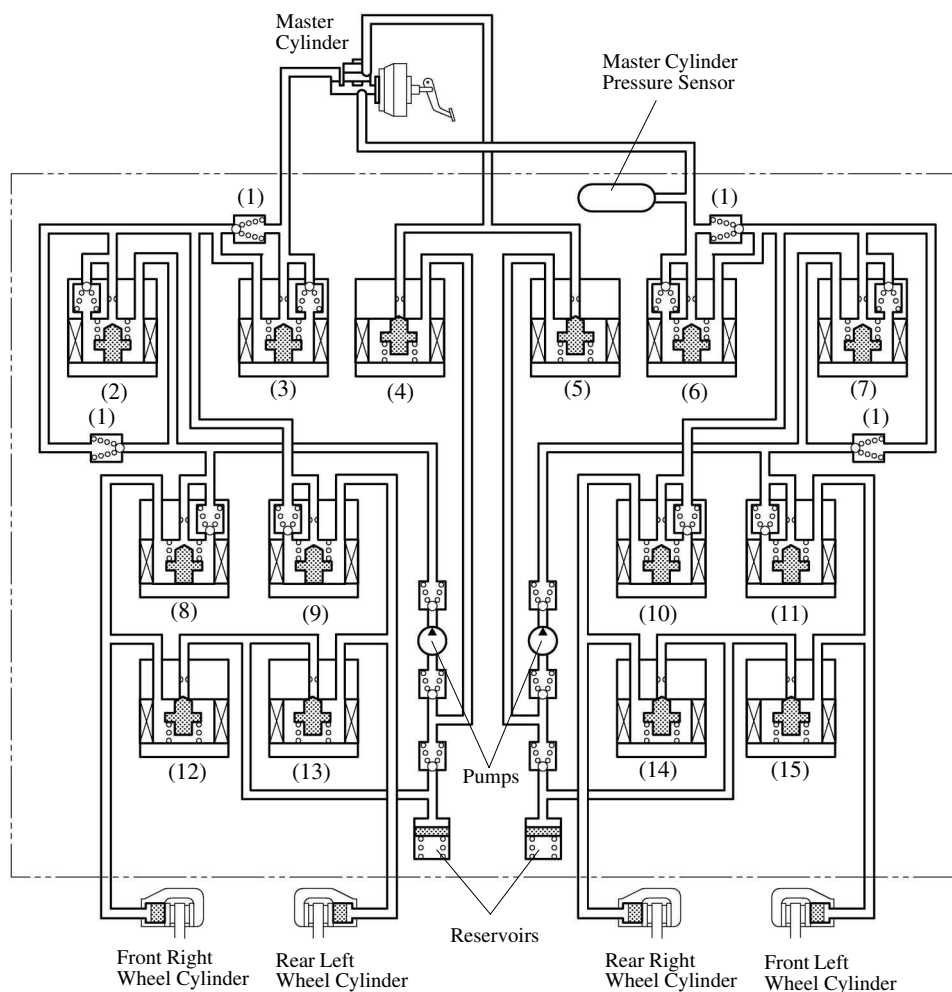
1) Construction

The brake actuator consists of 14 two-position solenoid valves, 1 motor 2 pumps, 2 reservoirs, 4 pressure regulator valves ((1)) and master cylinder pressure sensor.

The 14 two-position solenoid valves consist of 4 master cylinder cut solenoid valve ((2), (3), (6), (7)), 2 reservoir cut solenoid valves ((4), (5)), 4 pressure holding valves ((8), (9), (10), (11)), and 4 pressure reduction valves ((12), (13), (14), (15)).

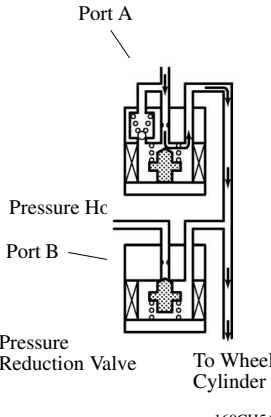
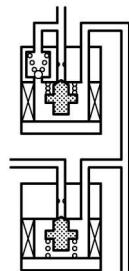
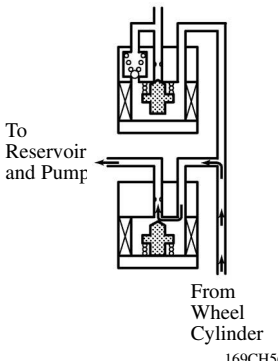
Pressure regulator valve ((1)) is assembled into the master cylinder cut solenoid valve ((2), (3), (6), (7)).

2) Hydraulic Circuit



3) ABS with EBD Operation

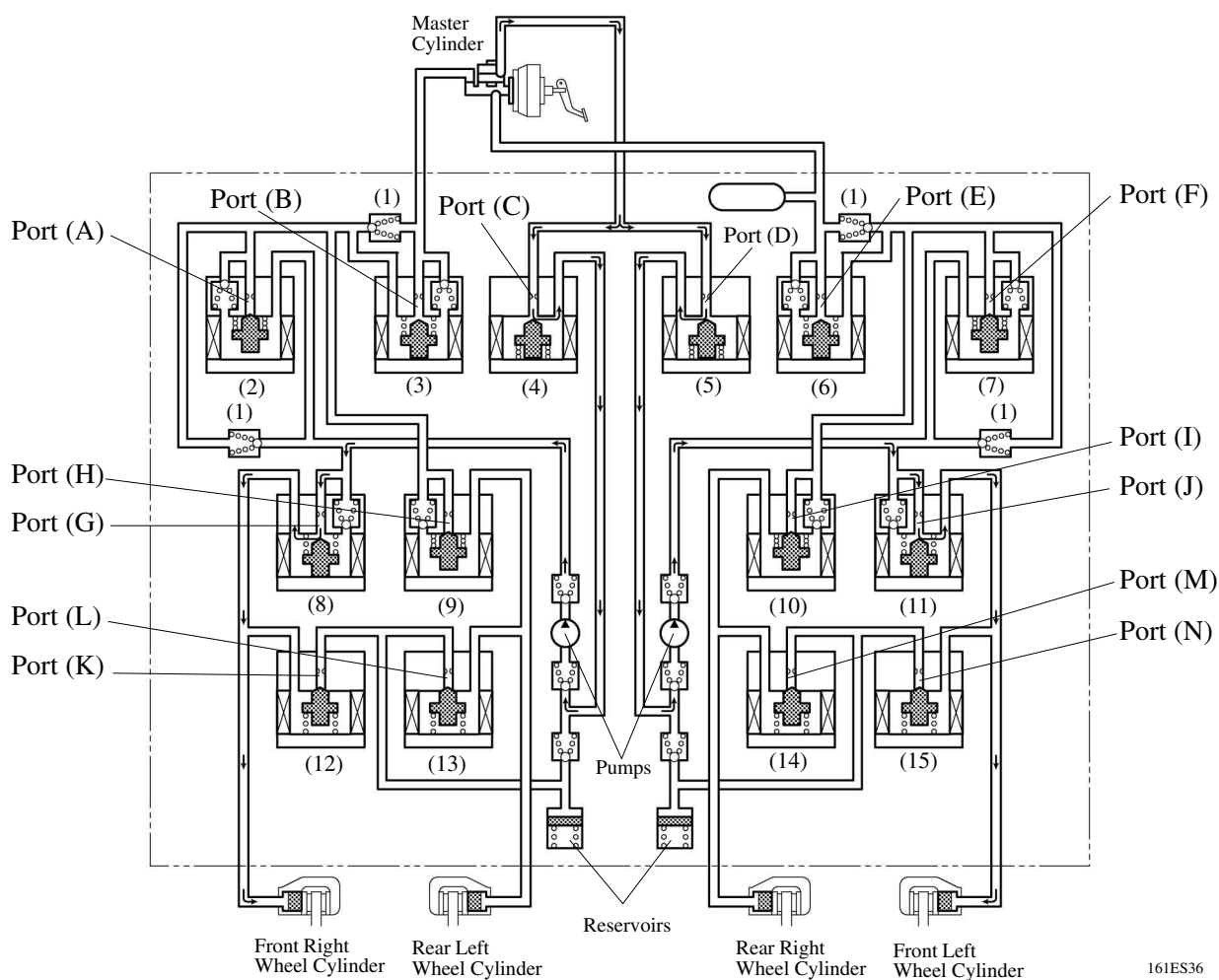
Based on the signals received from the 4 wheel speed sensors and deceleration sensor, the skid control ECU calculates each wheel speed and deceleration, and checks wheel slipping condition. And according to the slipping condition, the ECU controls the pressure holding valve and pressure reduction valve in order to adjust the fluid pressure of each wheel cylinder in the following 3 modes: pressure reduction, pressure holding, and pressure increase modes.

Not Activated	Normal Braking	—	—
Activated	Pressure Increase Mode	Pressure Holding Mode	Pressure Reduction Mode
Hydraulic Circuit	 Port A Pressure Hc Port B Pressure Reduction Valve To Wheel Cylinder 169CH54	 169CH55	 To Reservoir and Pump From Wheel Cylinder 169CH56
Pressure Holding Valve (Port A)	OFF (Open)	ON (Close)	ON (Close)
Pressure Reduction Valve (Port B)	OFF (Close)	OFF (Close)	ON (Open)
Wheel Cylinder Pressure	Increase	Hold	Reduction

4) TRC Operation

The fluid pressure that is generated by the pump is regulated by the pressure regulator valve to the required pressure. Thus, the wheel cylinder of the drive wheels are controlled in the following 3 modes: pressure reduction, pressure holding, and pressure increase modes, to restrain the slippage of the drive wheels. The diagram below shows the hydraulic circuit in the pressure increase mode when the TRC system is activated.

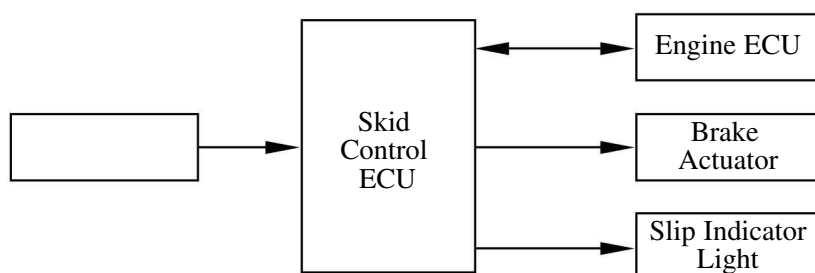
In other operating modes, the pressure holding valve and the pressure reduction valve are turned ON/OFF according to the ABS operation pattern described on the previous page.



161ES36

Increase Mode

► System Diagram ◀



187CH41

Mode Solenoid Valves		TRC Not Activated	TRC Activated		
			Pressure Increase Mode	Pressure Holding Mode	Pressure Reduction Mode
(2)	Master Cylinder Cut Solenoid Valve (Front)	OFF	ON	ON	ON
(7)	Port: (A), (F)	Open	Close	Close	Close
(3)	Master Cylinder Cut Solenoid Valve (Front, Rear)	OFF	OFF	OFF	OFF
(6)	Port: (B), (E)	Open	Open	Open	Open
(4)	Reservoir Cut Solenoid Valve	OFF	ON	ON	ON
(5)	Port: (C), (D)	Close	Open	Open	Open
(8)	Pressure Holding Valve (Front)	OFF	OFF	ON	ON
(11)	Port: (G), (J)	Open	Open	Close	Close
(9)	Pressure Holding Valve (Rear)	OFF	OFF	OFF	OFF
(11)	Port: (H), (I)	Open	Open	Open	Open
(12)	Pressure Reduction Valve (Front)	OFF	OFF	OFF	ON
(15)	Port: (K), (N)	Close	Close	Close	Close
(13)	Pressure Reduction Valve (Rear)	OFF	OFF	OFF	OFF
(14)	Port: (L), (M)	Close	Close	Close	Close
Wheel Cylinder Pressure		Front wheels	—	Increase	Hold
		Rear wheels	—	—	—

5) VSC Operation

a. General

The VSC system, by way of solenoid valves, controls the fluid pressure that is generated by the pump and applies it to the brake wheel cylinder of each wheel in the following 3 modes: pressure reduction, pressure holding, and pressure increase modes. As a result, the tendency to understeer or oversteer is restrained.

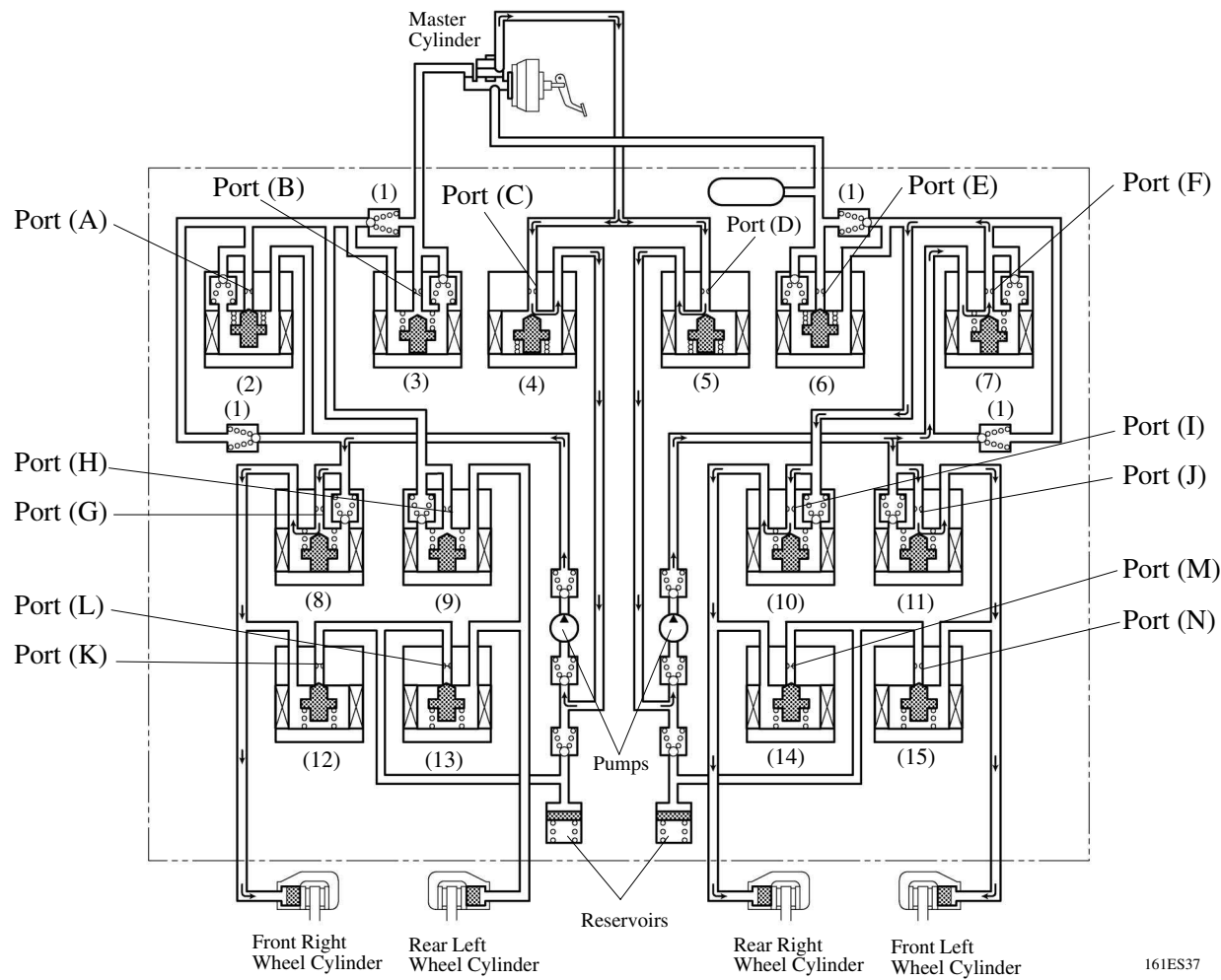
b. Understeer Restraining Control

In understeer restraining control, the brakes of the front wheels and rear wheel of the inner side of the turn is applied.

Also, depending on whether the brake is ON or OFF and the condition of the vehicle, there are circumstances in which the brake might not be applied to the wheels even if those wheels are targeted for braking.

The diagram below shows the hydraulic circuit in the pressure increase mode, as it restrains an understeer condition while the vehicle makes a right turn.

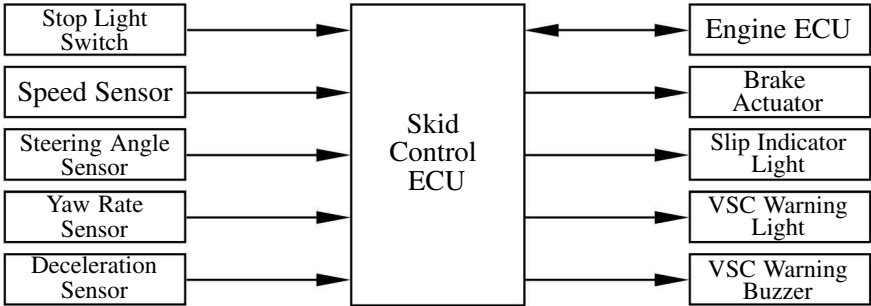
In other operating modes, the pressure holding valve and the pressure reduction valve are turned ON/OFF according to the ABS operation pattern.



161ES37

Increase Mode

► System Diagram ◀



187CH42

► While the Vehicle Makes a Right Turn ◀

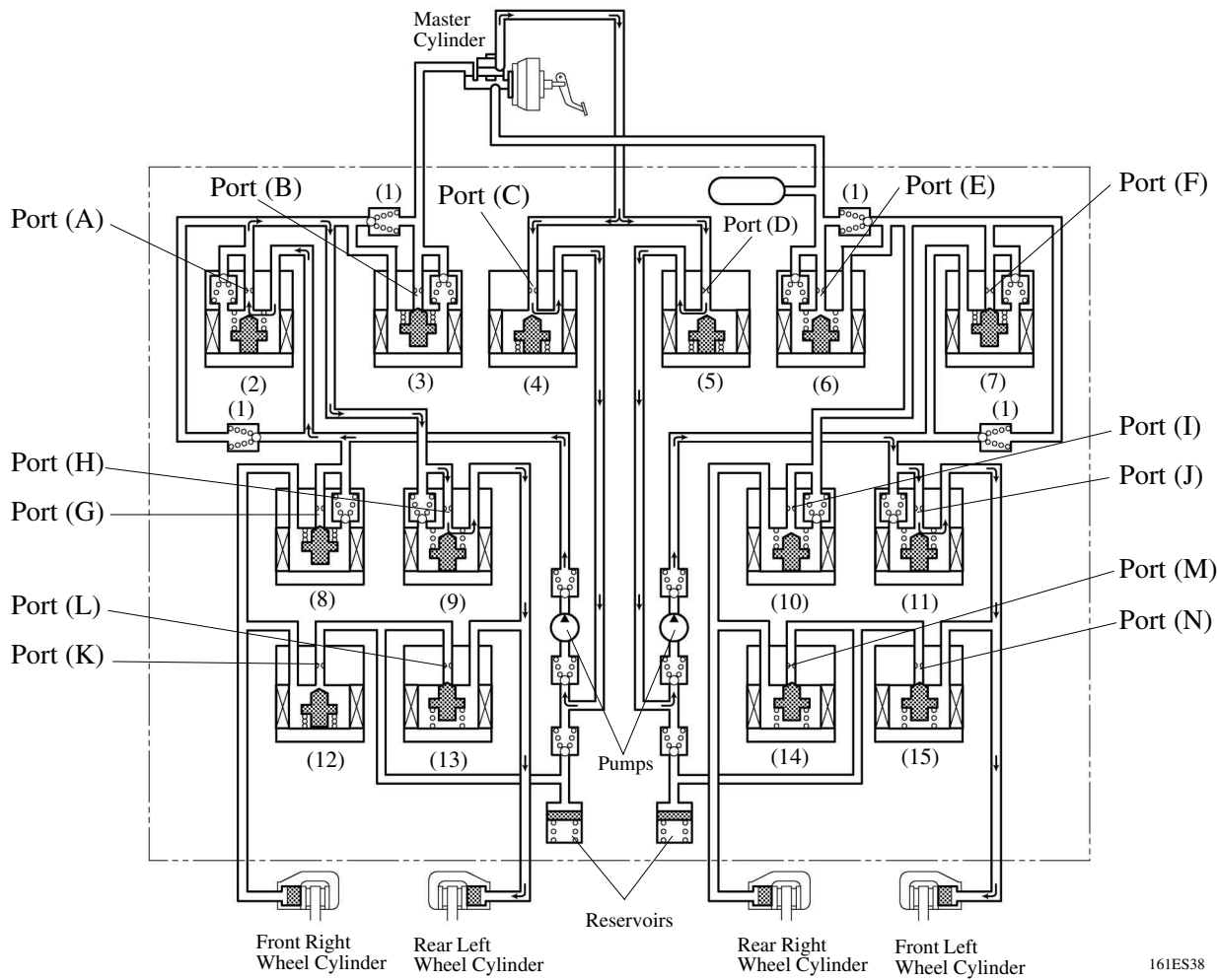
Mode Solenoid Valves			VSC Not Activated	VSC Activated			
				Pressure Increase Mode	Pressure Holding Mode	Pressure Reduction Mode	
(2)	Master Cylinder Cut Solenoid Valve (Front Right)		OFF	ON	ON	ON	
	Port: (A)		Open	Close	Close	Close	
(3)	Master Cylinder Cut Solenoid Valve (Fornt Right, Rear Left)		OFF	OFF	OFF	OFF	
	Port: (B)		Open	Open	Open	Open	
(6)	Master Cylinder Cut Solenoid Valve (Front Left, Rear Right)		OFF	ON	ON	ON	
	Port: (E)		Open	Close	Close	Close	
(7)	Master Cylinder Cut Solenoid Valve (Front Left)		OFF	OFF	OFF	OFF	
	Port: (F)		Open	Open	Open	Open	
(4)	Reservoir Cut Solenoid Valve		OFF	ON	ON	ON	
(5)	Port: (C), (D)		Close	Open	Open	Open	
(8)	Pressure Holding Valve (Front)		OFF	OFF	ON	ON	
(11)	Port: (G), (J)		Open	Open	Close	Close	
(9)	Pressure Holding Valve (Rear Left)		OFF	OFF	OFF	OFF	
	Port: (H)		Open	Open	Open	Open	
(10)	Pressure Holding Valve (Rear Right)		OFF	OFF	ON	ON	
	Port: (I)		Open	Open	Close	Close	
(12)	Pressure Reduction Valve (Front)		OFF	OFF	OFF	ON	
(15)	Port: (K), (N)		Close	Close	Close	Open	
(13)	Pressure Reduction Valve (Rear Left)		OFF	OFF	OFF	OFF	
	Port: (L)		Close	Close	Close	Close	
(14)	Pressure Reduction Valve (Rear Right)		OFF	OFF	OFF	ON	
	Port: (M)		Close	Close	Close	Open	
Wheel Cylinder Pressure			Front Right wheel	—	Increase	Hold	Reduction
			Front Left wheel	—	Increase	Hold	Reduction
			Rear Right wheel	—	Increase	Hold	Reduction
			Rear Left wheel	—	—	—	—

c. Oversteer Restraining Control

In oversteer restraining control, the brake of the front and rear wheels of the outer side of the turn is applied. As an example, the diagram below shows the hydraulic circuit in the pressure increase mode, as it restrains an oversteer condition while the vehicle makes a right turn.

As in understeer restraining control, in other operating modes, the pressure holding valve and the pressure reduction valve are turned ON/OFF according to the ABS operation pattern.

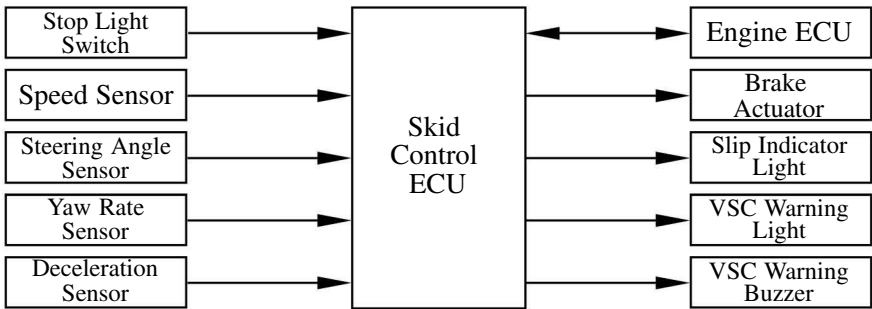
However, in oversteer control, the pressure holding valve is turned ON and blocks the hydraulic passage to the front inner wheel in order to prevent applying the brake to the front inner wheel.



161ES38

Increase Mode

► System Diagram ◀



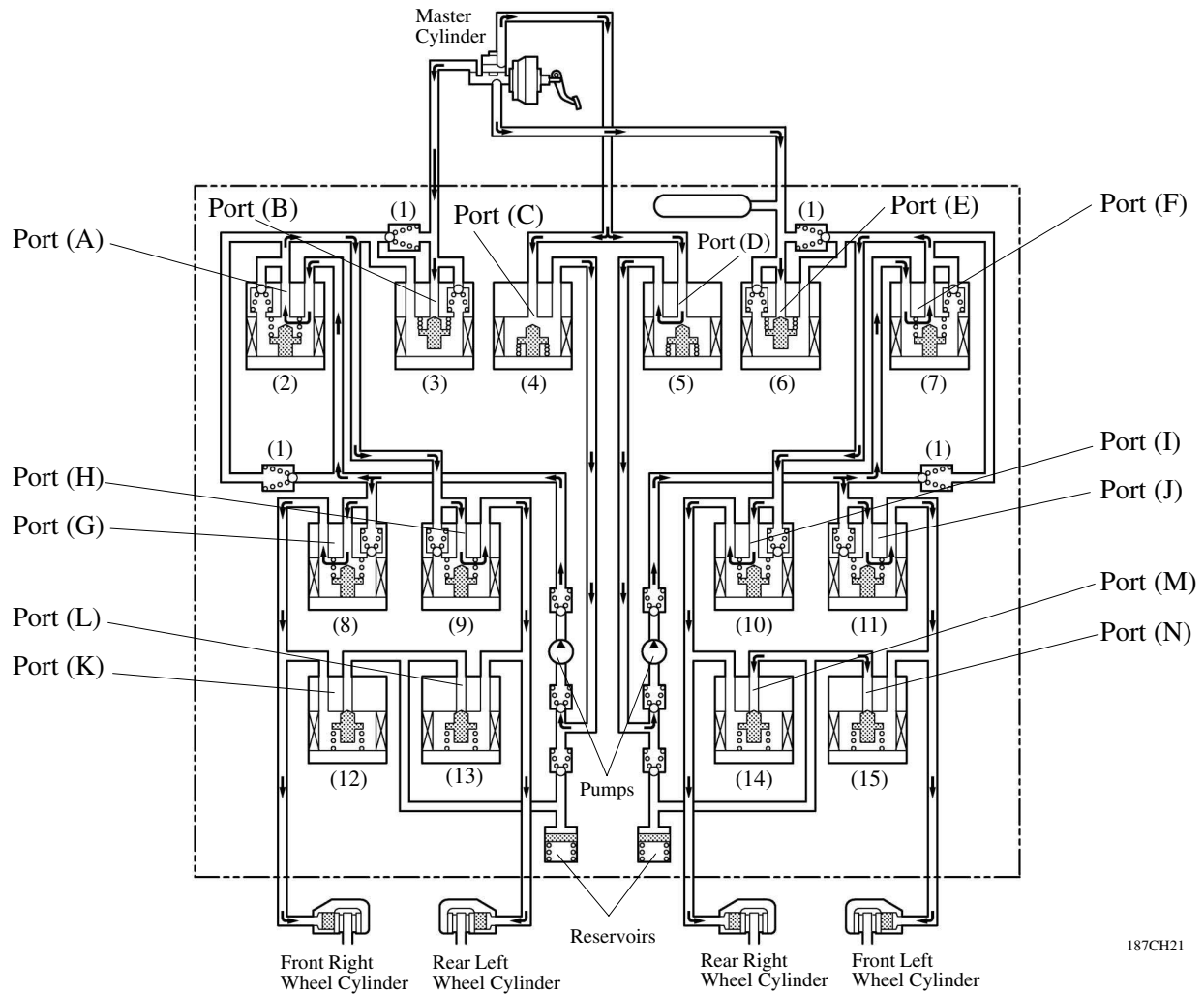
187CH42

► While the Vehicle Makes a Right Turn ◀

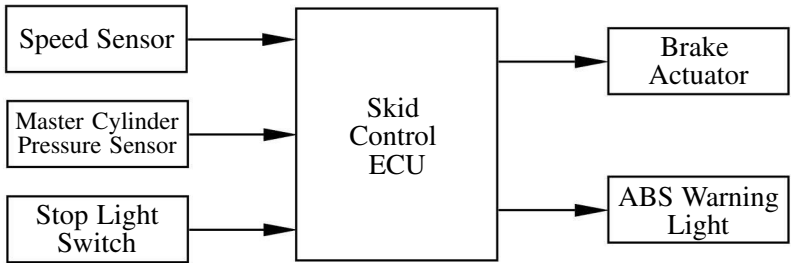
Mode Solenoid Valves		VSC Not Activated	VSC Activated		
			Pressure Increase Mode	Pressure Holding Mode	Pressure Reduction Mode
(2)	Master Cylinder Cut Solenoid Valve (Front Right)	OFF	OFF	OFF	OFF
	Port: (A)	Open	Open	Open	Open
(3)	Master Cylinder Cut Solenoid Valve (Front Right, Rear Left)	OFF	ON	ON	ON
	Port: (B)	Open	Close	Close	Close
(6)	Master Cylinder Cut Solenoid Valve (Front Left, Rear Right)	OFF	OFF	OFF	OFF
	Port: (E)	Open	Open	Open	Open
(7)	Master Cylinder Cut Solenoid Valve (Front Left)	OFF	ON	ON	ON
	Port: (F)	Open	Close	Close	Close
(4)	Reservoir Cut Solenoid Valve	OFF	ON	ON	ON
(5)	Port: (C), (D)	Close	Open	Open	Open
(8)	Pressure Holding Valve (Front Right)	OFF	ON	ON	ON
	Port: (G)	Open	Close	Close	Close
(11)	Pressure Holding Valve (Front Left)	OFF	OFF	ON	ON
	Port: (J)	Open	Open	Close	Close
(9)	Pressure Holding Valve (Rear Left)	OFF	OFF	ON	ON
	Port: (H)	Open	Open	Close	Close
(10)	Pressure Holding Valve (Rear Right)	OFF	OFF	OFF	OFF
	Port: (I)	Open	Open	Open	Open
(12)	Pressure Reduction Valve (Front Right)	OFF	OFF	OFF	OFF
	Port: (K)	Close	Close	Close	Close
(13)	Pressure Reduction Valve (Rear Left)	OFF	OFF	OFF	ON
	Port: (L)	Close	Close	Close	Open
(14)	Pressure Reduction Valve (Rear Right)	OFF	OFF	OFF	OFF
	Port: (M)	Close	Close	Close	Close
(15)	Pressure Reduction Valve (Front Left)	OFF	OFF	OFF	ON
	Port: (N)	Close	Close	Close	Open
Wheel Cylinder Pressure		Front Right wheel	—	—	—
		Front Left wheel	—	Increase	Hold
		Rear Right wheel	—	—	—
		Rear Left wheel	—	Increase	Hold

6) Brake Assist Operation

The fluid pressure that has been generated by the pump in the brake actuator is directed to the wheel cylinders. By applying a greater fluid pressure than the master cylinder, a greater braking force is achieved.



► System Diagram ◀



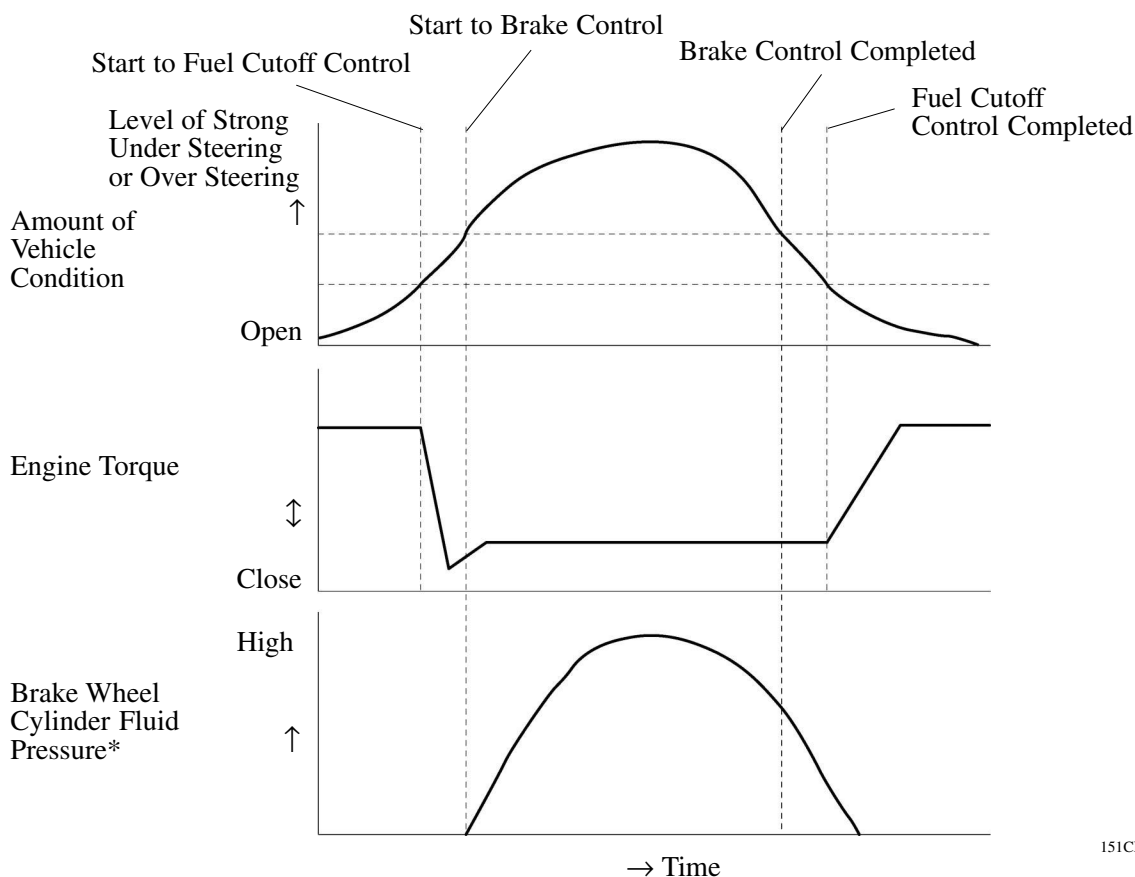
Item		Brake Assist Not Activated	Brake Assist Activated
(2)	Master Cylinder Cut Solenoid Valve (Front)	OFF	OFF
(7)	Port: (A), (F)	Open	Open
(3)	Master Cylinder Cut Solenoid Valve (Front, Rear)	OFF	ON
(6)	Port: (B), (E)	Open	Close
(4)	Reservoir Cut Solenoid Valve	OFF	ON
(5)	Port: (C), (D)	Close	Open
(8), (9)	Pressure Holding Valve (Front, Rear)	OFF	OFF
(10), (11)	Port: (G), (H), (I), (J)	Open	Open
(12), (13)	Pressure Reduction Valve (Front, Rear)	OFF	OFF
(14), (15)	Port: (K), (L), (M), (N)	Close	Close

Skid Control ECU

1) Vehicle Stability Control

Based on the 4 types of sensor signals received from the speed sensors, yaw rate sensor, deceleration sensor and steering sensor, the skid control ECU calculates the amount of vehicle condition.

If a strong understeer or oversteer tendency is created during an emergency avoidance maneuver or cornering, and the skid control ECU determines that the amount of vehicle condition exceeds a prescribed value, it controls the engine torque control through fuel cutoff and the brake fluid pressure according to the amount of the vehicle condition.



*: The wheel cylinder that activates varies depending on the condition of the vehicle.

2) Initial Check

After the ignition is turned ON, and the vehicle attains an approximate speed of 6 km/h (4 mph) or more only at first time, the skid control ECU performs an initial check.

The functions of each solenoid valve and pump motor in the actuator are checked in order.

3) Self-Diagnosis

If the skid control ECU detects a malfunction in the VSC system, the warning light that corresponds to the function in which the malfunction has been detected lights up, as indicated in the table below, to alert the driver of the malfunction. The ECU will also store the codes of the malfunctions. The DTCs (Diagnostic Trouble Codes) can be accessed through the blinking of the VSC warning light or the use of a hand-held tester. For details, see the LEXUS RX300 Chassis & Body Repair Manual (Pub. No. RM785E).

Item	ABS	TRC	VSC	EBD	Brake Assist
ABS Warning Light	○	—	—	—	○
Brake System Warning Light	—	—	—	○	—
VSC Warning Light	○	○	○	—	—

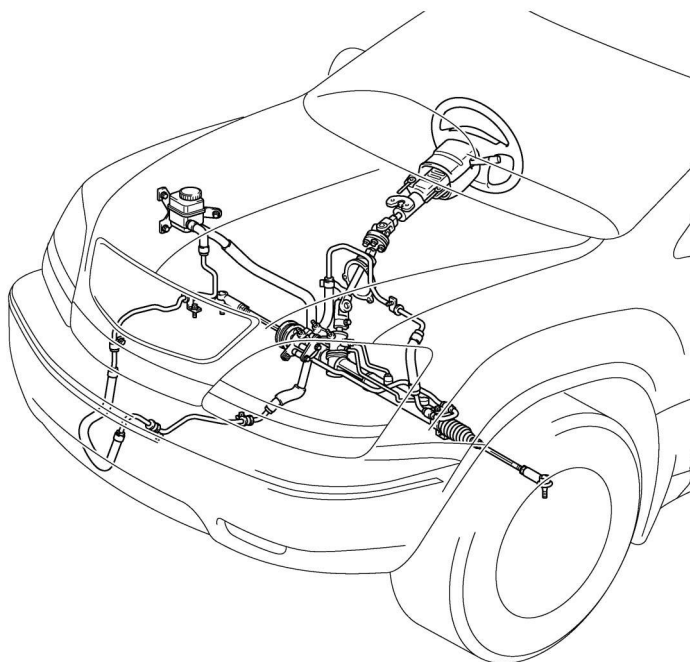
4) Fail Safe

In the event of a malfunction in the skid control ECU turns on the ABS warning light and the VSC warning light and prohibits the ABS, TRC, VSC and Brake Assist control. In the case of the malfunction that the EBD control can not be carried out, the ECU also turns on the brake system warning light and prohibits the EBD control.

STEERING

■ DESCRIPTION

The engine revolution sensing type rack and pinion power steering is used. In addition, the same tilt mechanism and energy absorbing mechanism are used.



187CH22

CH

RHD Model

► Specifications ◀

Item	RHD	LHD
Gear Ratio (Overall)	15.7	16.0
No. of Turns Lock to Lock	2.82	2.60
Rack Stroke mm (in.)	137.2 (5.40)	126.4 (4.98)
Fluid Type	ATF Type DEXRON [®] II or III	←

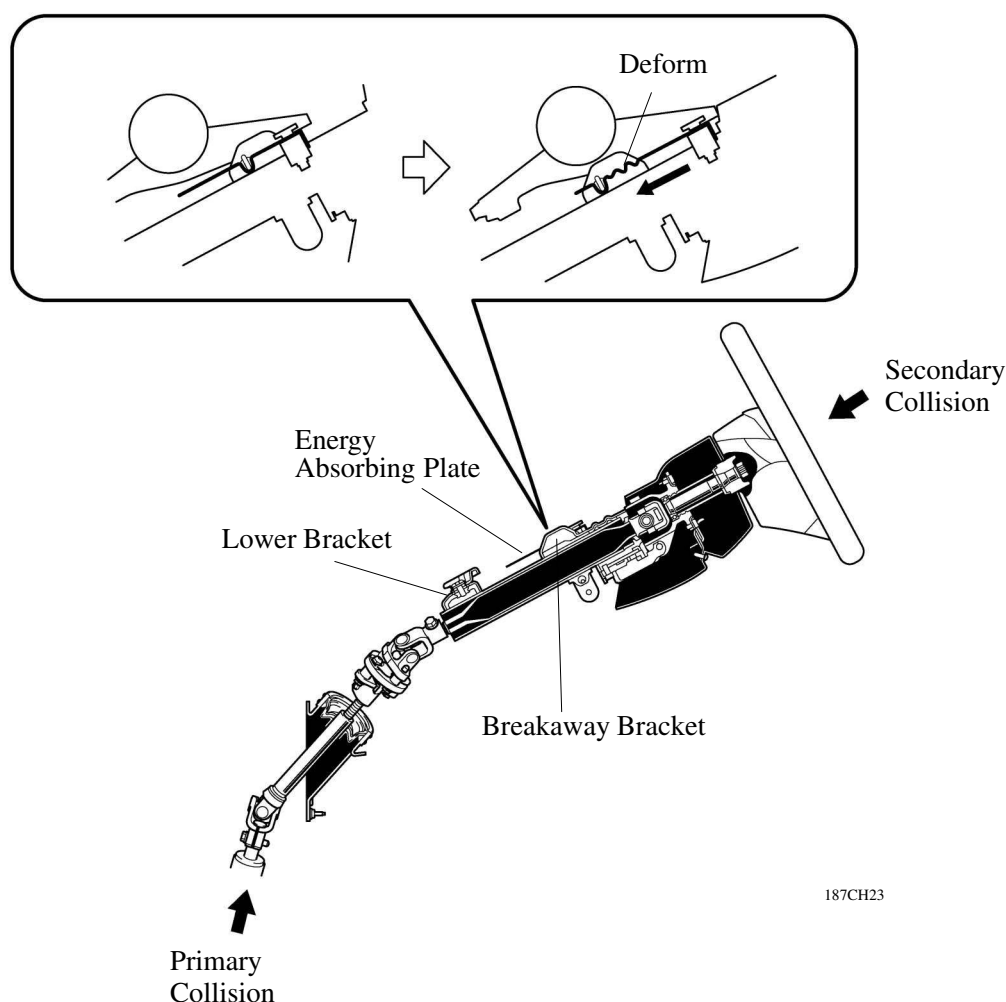
■ ENERGY ABSORBING MECHANISM

The energy absorbing mechanism in the steering column consists of a lower bracket, breakaway bracket, energy absorbing plate and a contractile main shaft. The steering column is mounted onto the instrument panel reinforcement via a lower bracket and breakaway bracket which is supported via a capsule and energy absorbing plate. The steering column and the steering gear box are connected with a contractile intermediate shaft. Operational examples of this mechanism are follows.

When the steering gear box moves during a collision (primary collision), the main shaft and the intermediate shaft contract, thus reduce the chance that the steering column and the steering wheel protrude into the cabin.

When an impact is transmitted to the steering wheel in a collision (secondary collision), the steering wheel and the driver airbag help absorb the impact. In addition, the breakaway bracket and the lower bracket separate, causing the entire steering column to move forward.

At this time, the energy absorbing plate becomes deformed to help absorb the impact of the secondary collision.



187CH23

BODY

BODY STRUCTURE

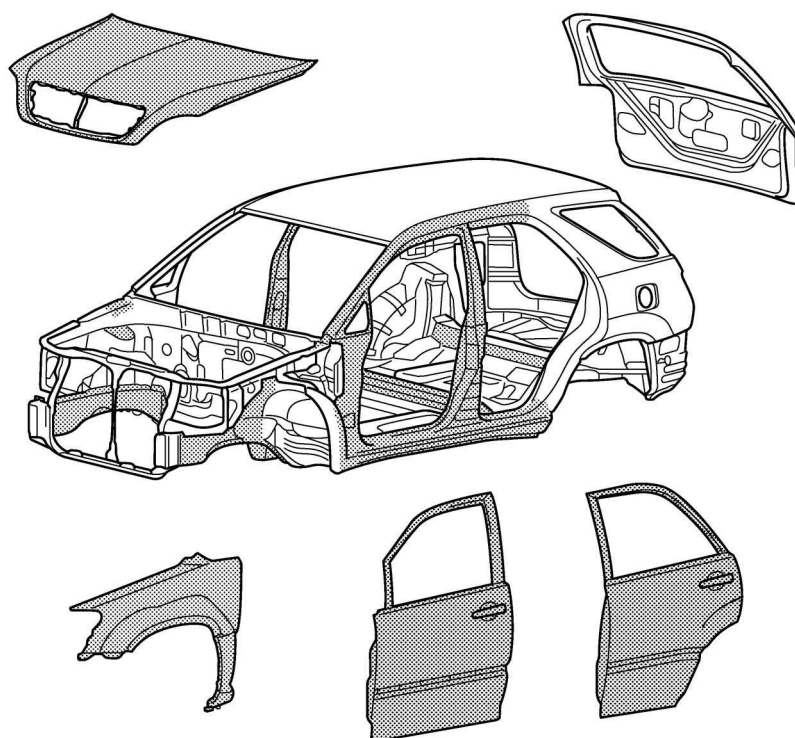
■ DESCRIPTION

The new RX300 has adopted a body construction that achieves both high rigidity and safety.

■ LIGHTWEIGHT AND HIGHLY RIGID BODY

High strength sheet steel has been used in order to ensure body rigidity and realize a lightweight body.

■ : High Strength Sheet Steel



BO

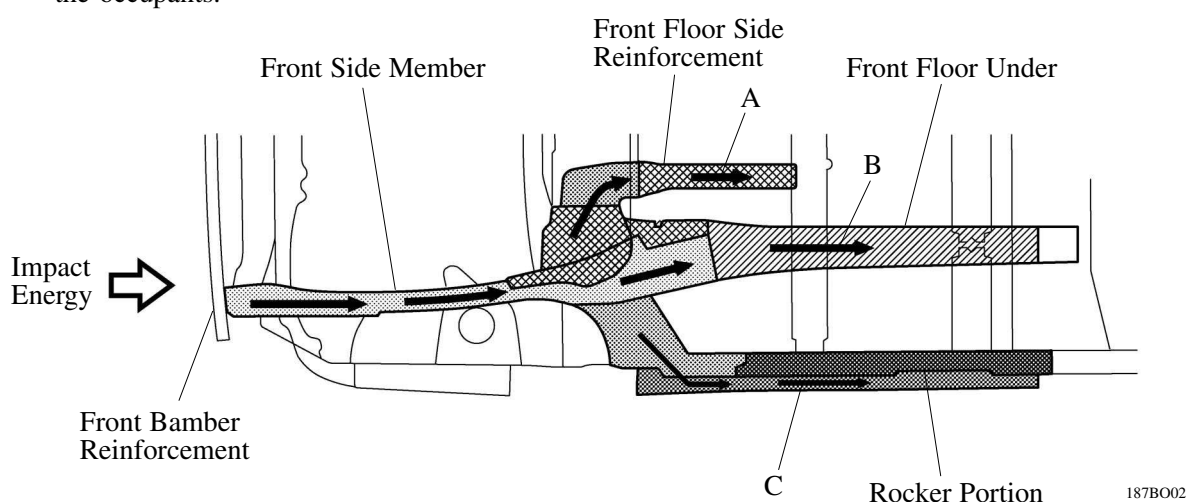
■ SAFETY FEATURES

1. General

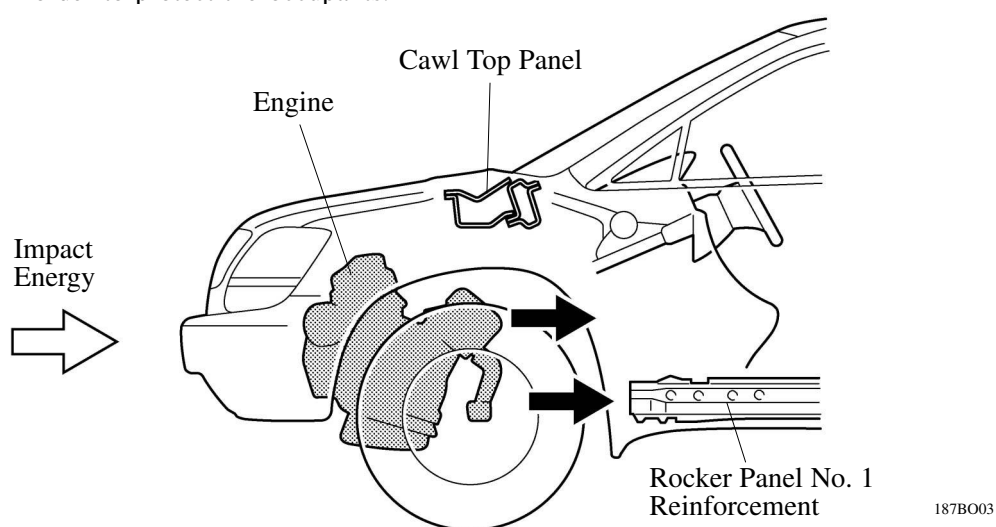
The impact absorbing body structure of the RX300 can effectively help absorb the energy of impact in the event of a frontal or side collision. This structure also realizes high-performance occupant protection through the use of reinforcements and members that help to minimize cabin deformation.

2. Impact Absorbing Structure for frontal Collision

- The energy that is created during a frontal collision is effectively dissipated in the following three directions: from the front side member to the front floor side reinforcement (direction A), to the front floor under reinforcement (direction B), and to the rocker (direction C). By dampening the impact that is applied to the cabin floor in this manner, this structure helps maintain the space that is required for protecting the occupants.



- The engine has been located lower than the cowl top panel so that even if the engine moves rearward during a frontal collision, its influences to the windshield glass, instrument panel, or the steering are minimized, in order to protect the occupants.



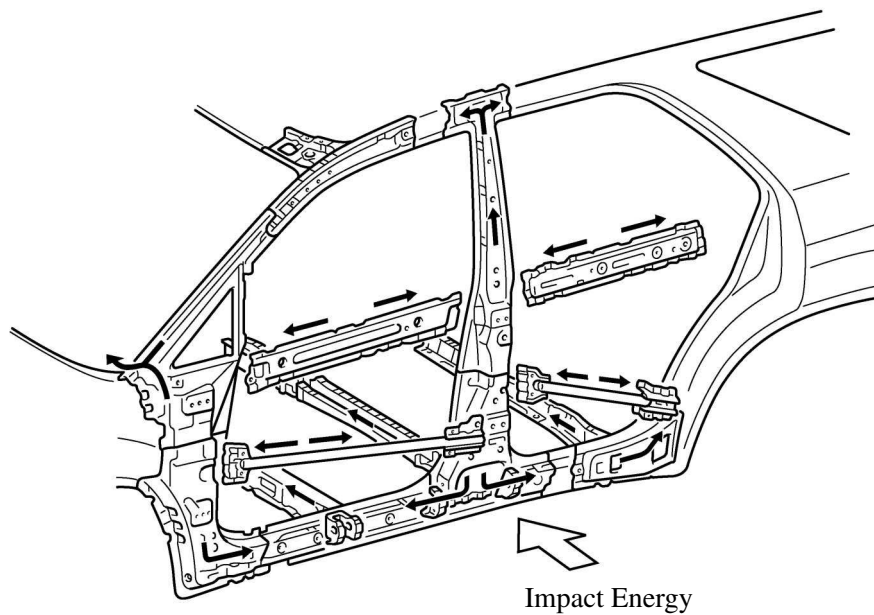
3. Impact Absorbing Structure for Side Collision

Impact energy of a side collision directed to the cabin area is dispersed throughout the body via pillar reinforcements, side impact protection beams, floor cross members, thus helping minimize the impact energy finally directed to the cabin.

In addition, the body is made of reinforced joints and high strength sheet steel, in order to help maintain the maximum preservation of the cabin space. And, in order to make the door energy absorbent, a closed cross section configuration is provided at the belt line area of the front and rear doors.

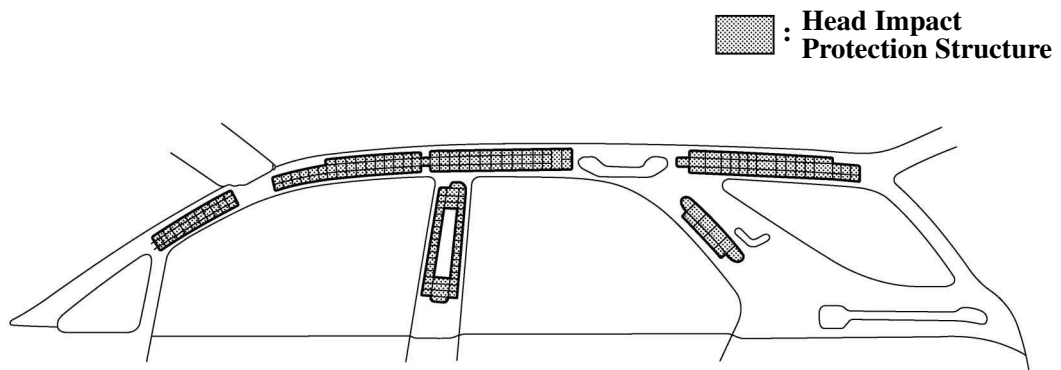
Also, a Head Impact Protection Structure has been adopted. With this type of construction, if the occupant's head hits against the roof side rail and pillar in reaction to a collision, the inner panel of the roof side rail and pillar collapses to help reduce the impact.

► Impact Absorbing Structure for Side Collision ◀



187BO04

► Head Impact Protection Structure ◀



187BO05

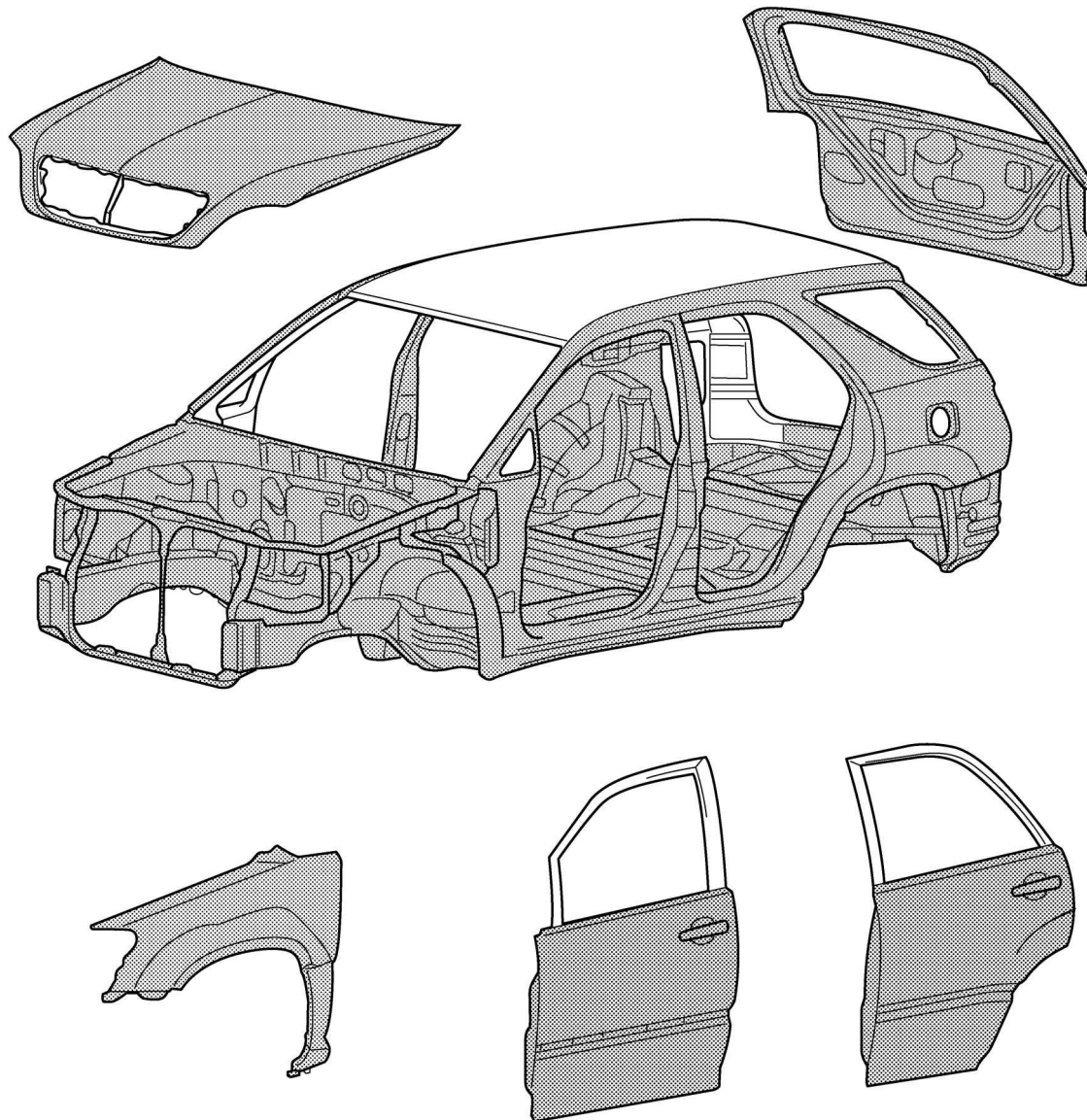
■ RUST-RESISTANT BODY

1. General

Rust-resistant performance is enhanced by extensive use of anti-corrosion sheet steel, as well as by an anti-corrosion treatment which includes the application of wax, sealer and anti-chipping paint to easily corroded parts such as the hood, doors and rocker panels.

2. Anti-Corrosion Sheet Steel

Anti-corrosion sheet steel is used in all areas other than the roof and interior parts.

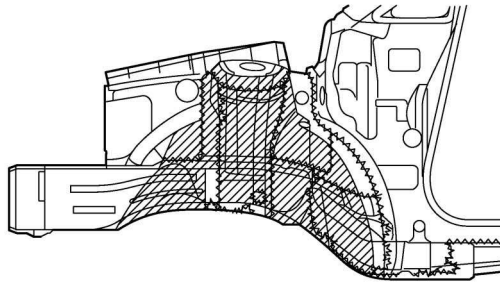


3. Wax and Sealer

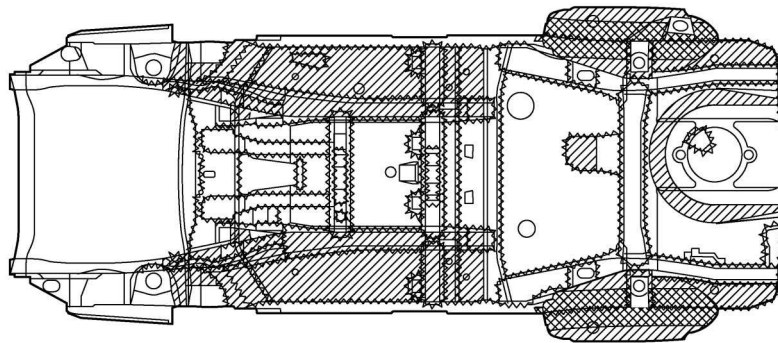
Wax and sealer are applied to the hemmed portions of the hood, door panels and back door to improve rust protection.

4. Under Coat

Formed PVC (Polyvinyl Chloride) coating is applied to the under side of the body. A thick coating to improve rust resistant performance is applied to the front and rear wheel houses, the fender apron and other parts which are subject to damage by stone chipping.



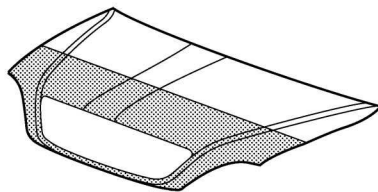
- : Formed PVC Coating Area (Thick Coating)
- : Formed PVC Coating Area
- : Edge Seal



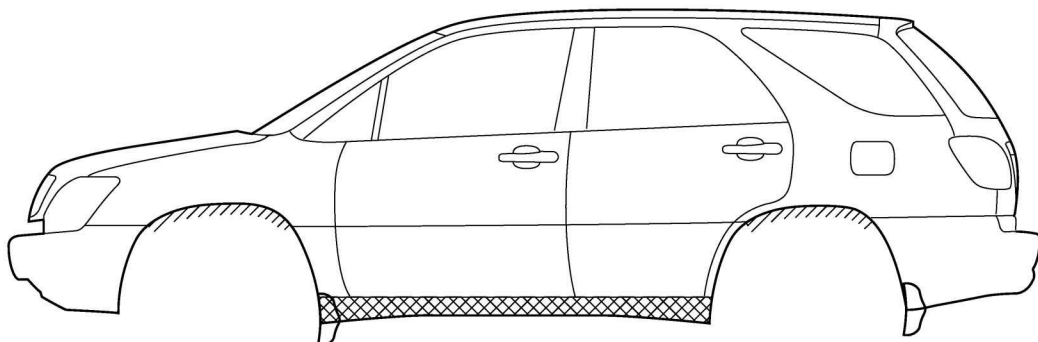
BO

5. Anti-Chipping Application

Anti-chipping paint and PVC chipping primer are applied to the lower door panel area, front wheel arch and the rocker panel area to protect them from being damaged by stone chipping. In addition, soft-chip primer is applied to the hood.



- : Soft-Chip Primer
- ▨ : Anti-Chipping Paint
- ▩ : PVC Chipping Primer



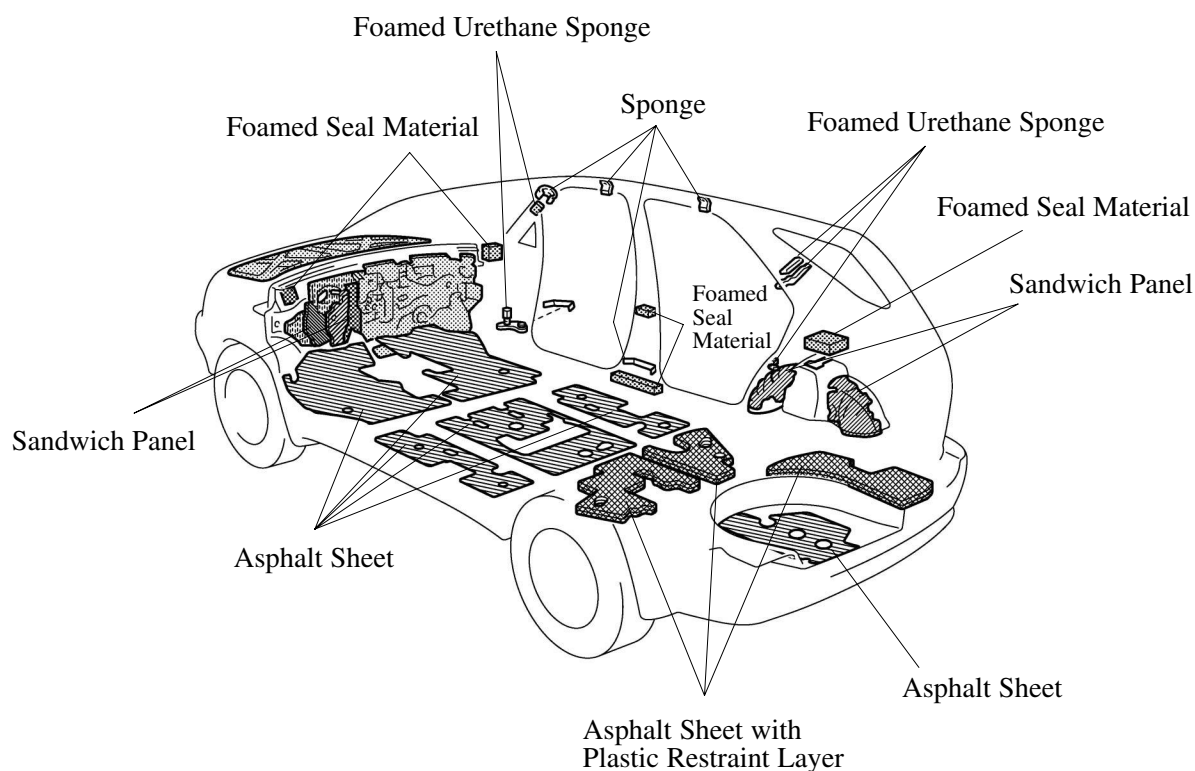
■ LOW VIBRATION AND LOW NOISE BODY

1. General

Effective application of vibration damping and noise suppressant materials reduces engine and road noise.

2. Noise Absorbing and Vibration Damping Materials

- Sandwich panels are used in the dash panel and rear wheel housings, and in the front floor tunnel to reduce engine and road noise.
- Asphalt sheets are optimally placed to reduce engine and road noise for quieter vehicle operation.
- Foamed urethane sponge and foamed seal material are applied onto the roof panel and pillars to reduce wind and road noise.
- The joining rigidity of the parts in the periphery of the suspension has been increased to reduce road noise.



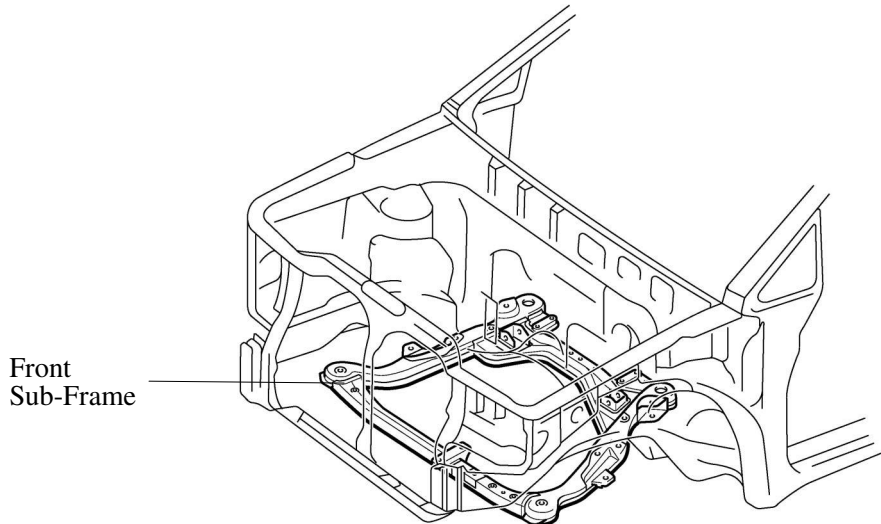
3. Sub-Frame

The highly rigid front sub-frame helps reduce noise and vibration.

The engine and the transaxle are installed onto the front sub-frame fitted to the vehicle's body.

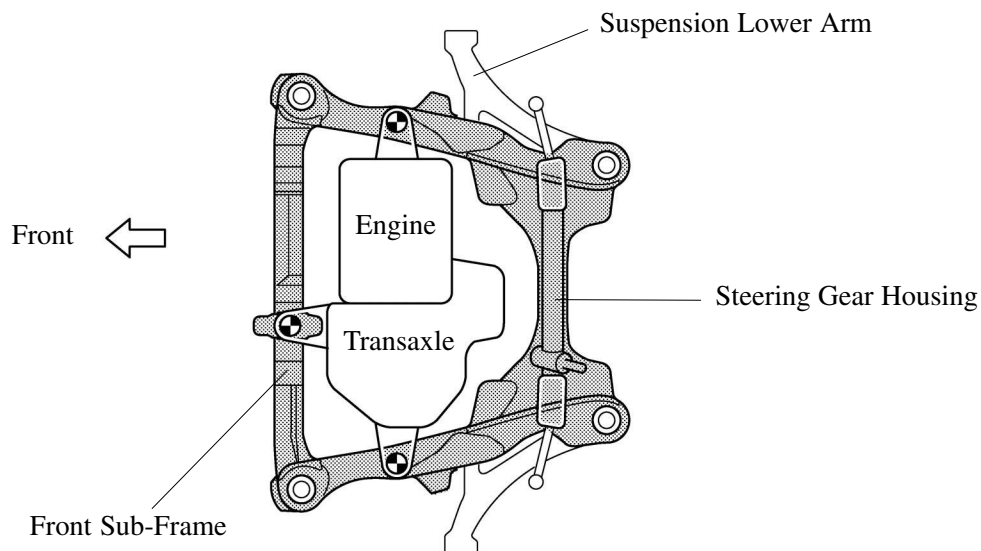
The front lower arms and the steering link are also fitted to the sub-frame. Vibration is suppressed in two stages by means of a rubber bushing between the body and the sub-frame, and also by rubber bushings between the sub-frame, the engine and transaxle.

► Location of Sub-Frame ◀◀



187BO10

► Front Sub-Frame Installation Points ◀◀



◎ : Installation Point of Sub-Frame to Body

⊕ : Installation Point of Engine and Transaxle to Sub-Frame

181BO12

Service Tip

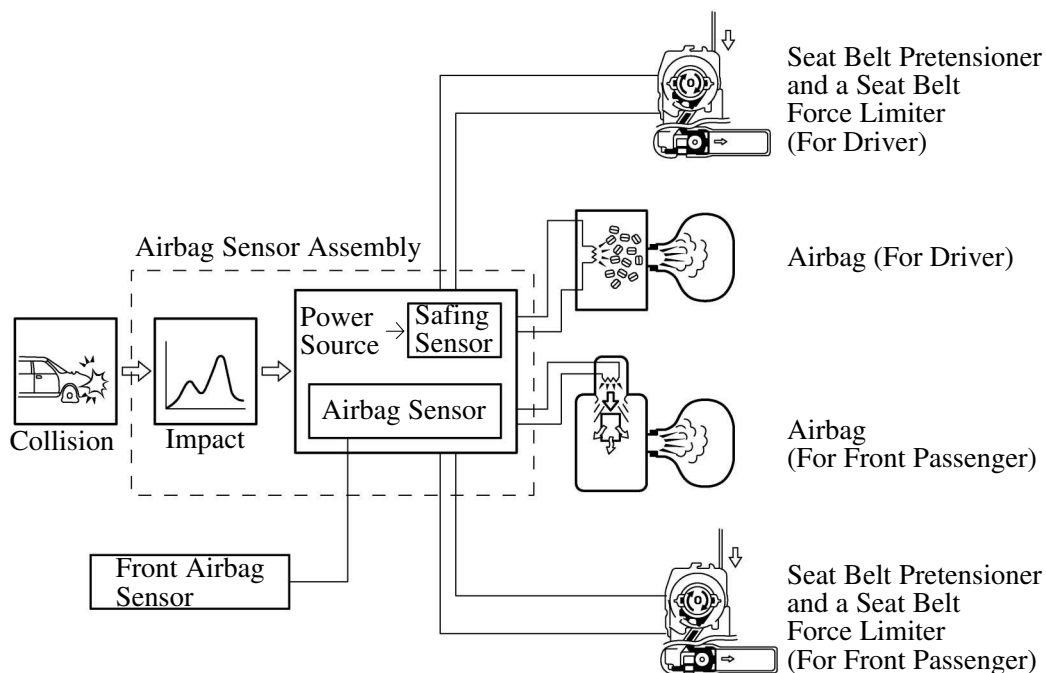
To remove or install the engine/transaxle, do so from underneath the vehicle, together with the front sub-frame.

ENHANCEMENT OF PRODUCT APPEAL

■ SEAT BELT

- The front seats are provided with a 3-point ELR (Emergency Locking Retractor) seat belt.
- The rear seats are provided with a 3-point ELR and ALR (Automatic Locking Retractor) seat belt.
- The front seats are provided with an electrical sensing type seat belt pretensioner and a seat belt force limiter. In the beginning of a collision, the seat belt pretensioner instantly pulls up the seat belt thus providing the excellent belt's effectiveness in restraining the occupant.
When the impact of a collision causes the tension of the seat belt applied to the occupant to reach a predetermined level, the force limiter restrains the tension, thus controlling the force applied to the occupant's chest area.
- In accordance with the ignition signal from the airbag sensor assembly, the seat belt pretensioner activates simultaneously with the deployment of the SRS airbags for the driver and front passenger.

► System Diagram ◀



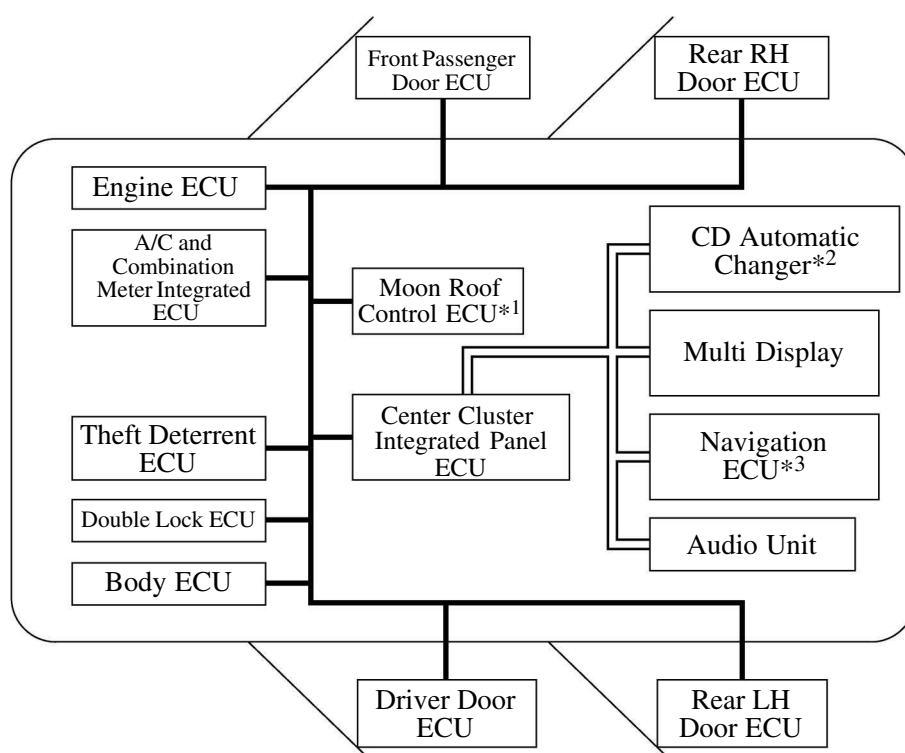
BODY ELECTRICAL

MULTIPLEX COMMUNICATION SYSTEM

■ DESCRIPTION

- A multiplex communication system has been adopted for body electrical system control and to achieve a slimmer wiring harnesses configuration.
- The BEAN (Body Electronics Area Network) has been adopted between the body ECU, engine ECU, air conditioner and combination meter integrated ECU, theft deterrent ECU, double lock ECU, driver door ECU, front passenger door ECU, rear RH door ECU, rear LH door ECU, moon roof control ECU, and center cluster integration panel ECU. Furthermore, AVC-LAN (Audio Visual Communication-Local Area Network) has been adopted between the center cluster integration panel ECU, multi display, audio unit, CD automatic changer, and navigation ECU. The conversion of communication signals between BEAN and AVC-LAN is performed by the center cluster integration panel ECU.
- A customized body electronics system, which improves the malfunction diagnostic function, enables the functions to be changed according to customer needs, and reduce the types of parts, has been adopted.

► System Diagram ◀



*1: with Moon Roof

*2: with CD Automatic Changer

*3: with GPS Voice Navigation System

— : BEAN
— : AVC-LAN

BE

■ SYSTEM OPERATION

1. General

The ECUs that pertain to the body electrical system perform the functions and system controls described in the following chart.

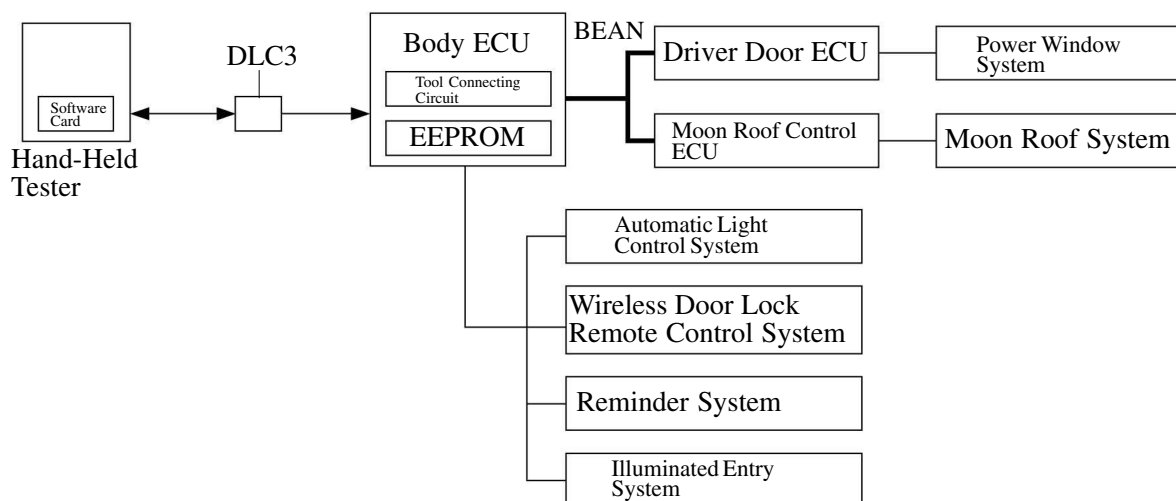
ECUs	Function and System Control
Body ECU	• Wireless door lock remote control system control • Door lock system control • Illuminated entry system control • Automatic light control system control • Light automatic turn-off system control • Daytime running light system control • Key reminder system control • Seat belt warning light control (for Driver's Side) • Rear wiper control • Customized body electronics function • Front and rear fog light control • Diagnosis
Engine ECU	• Engine control • Diagnosis
Theft Deterrent ECU	Theft deterrent system control
Double Lock ECU	Double locking system control
A/C and Combination Meter Integrated ECU	• Meter control • Illuminated and flashing control of indicator and warning light • Air conditioner control
Moon Roof Control ECU	Moon roof control
Center Cluster Integration Panel ECU	• Conversion of data between BEAN and AVC-LAN • Transmission of vehicle information to the multi display assembly, in order for it to be displayed on multi-information display
Driver Door ECU	Power window system control (All door)
Front Passenger Door ECU	Power window system control (Front passenger door only)
Rear RH Door ECU	Power window system control (Rear RH door only)
Rear LH Door ECU	Power window system control (Rear LH door only)

2. Customized Body Electronics System

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 ◀



187BE20

Operation

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

System	Content	Initial Setting	Setting
Wireless Door Lock Remote Control System	Wireless Operation	Permission	Permission/Prohibition
	Time Until the Operation of the Automatic Lock Function	30 sec.	60/30 sec.
	Interior Light Function	ON	ON/OFF
Automatic Light Control System	Sensitivity Adjustment	0	−40/−20/0/+20/+40 (%)
Reminder System	Light Reminder Function	ON	ON/OFF
Illuminated Entry System	Interior lights illuminate when the doors are unlocked by the operation of the door key.	ON	ON/OFF
	Interior Light Illumination Time	15 sec.	7.5/15/30 sec.
Power Window System	Key-linked Open Operation	ON	ON/OFF
	Key-linked Close Operation	ON	ON/OFF
Moon Roof	Key-linked Open Operation	ON	ON/OFF
	Key-linked Close Operation	ON	ON/OFF
	Key-linked Operation Selection	Slide	Slide/Tilt
	Transmitter Operation Linked Operation Selection	Slide	Slide/Tilt

BE

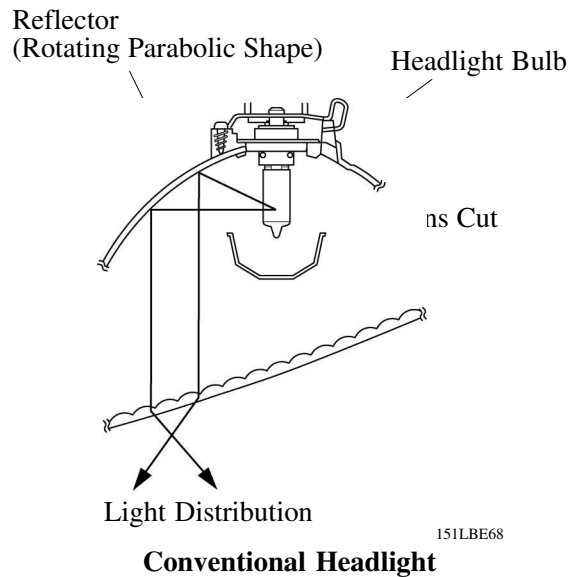
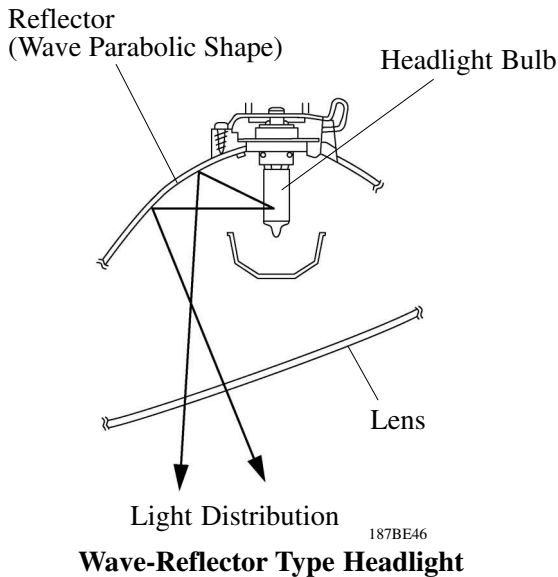
LIGHTING

HEADLIGHT

The RX300 has adopted the wave-reflector headlights.

Conventional headlights accomplish the dispersion and distribution of the light that is emitted by the bulbs through the lens cut pattern. However, with the wave-reflector type headlights, the light from the bulbs is dispersed and distributed through wave parabolic shaped reflectors. As a result, the lens cut pattern is no longer provided in the center of the lens, thus realizing a clear look.

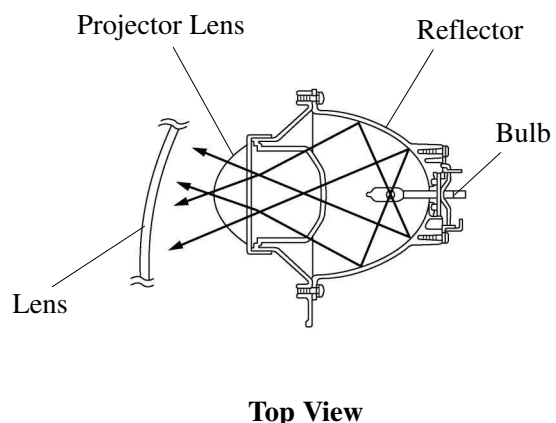
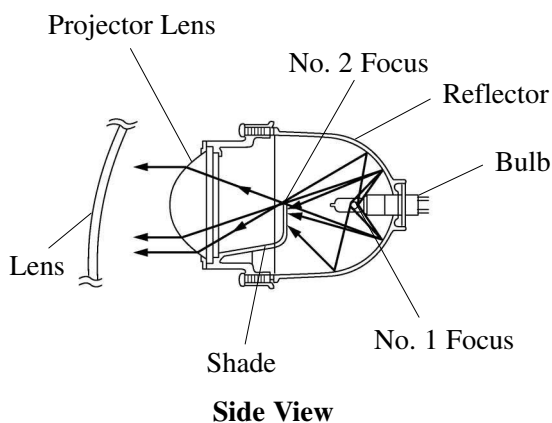
► Light Distribution Imaginary Diagram ◀



FRONT FOG LIGHT

The projector light used for the front fog lights has the bulb located at one of the two focal points (No. 1 focus) while the beam collected at the other focal point (No. 2 focus) by the oval-shaped reflector reflects the light, projecting it forward to the projection lens. With this type of light, the effective usage range of the incident beam striking the upper reflector is wide and ensures a sufficient level of light. Compared to the ordinary semi-sealed beam type lamp, this type can be made more compact and since the beam from the source of light is concentrated in a narrower range, the amount of light leaking away from the direction of projection is small.

► Imaginary Diagram ◀



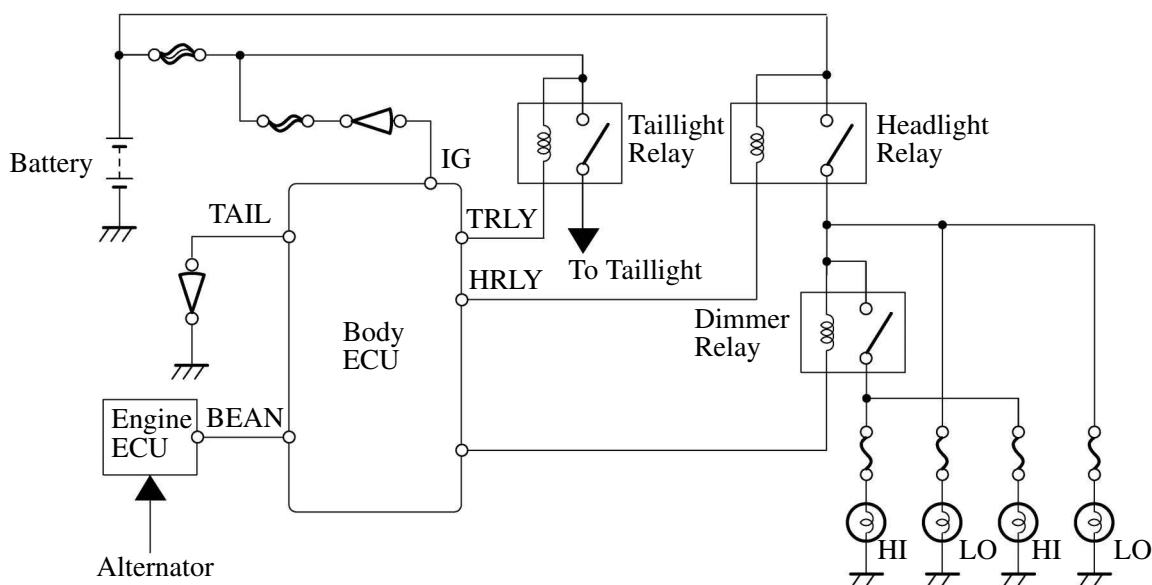
Cross Section

DAYTIME RUNNING LIGHT SYSTEM

This system is designed to automatically activate the low-beam of the headlights during the daytime to keep the car highly visible to other vehicles. This system is optional equipment on certain models for LHD vehicle. This system is controlled by the body ECU. This system is enabled when the conditions given below are met.

- Ignition switch ON condition
- Alternator L terminal signal input
- Light control switch OFF condition

Wiring Diagram



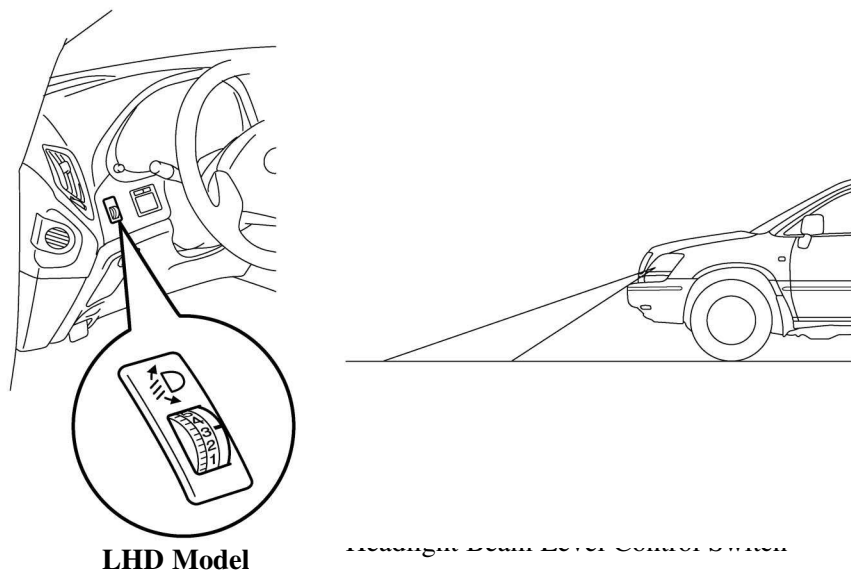
187BE02

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HEADLIGHT BEAM LEVEL

This system keeps the low-beam of the headlights adjusted to the appropriate level in accordance with the number (weight) of passengers and volume of luggage.

The headlight low-beam level can be adjusted by operating the headlight beam level control switch.



LHD Model

Headlight Beam Level Control Switch

187BE03

■ AUTOMATIC LIGHT CONTROL SYSTEM

- An automatic light control system, which automatically turns the headlights and taillights ON and OFF according to the brightness of the vehicle's surroundings, has been adopted.
- Based on the signals output by the automatic light control sensor located on the instrument panel, the body ECU detects the brightness of the surroundings to control operation of the headlights and taillights.

■ LIGHT AUTO TURN-OFF SYSTEM

- When the ignition key is turned from ON to LOCK position and the driver's door is opened with the taillights and headlights on, this system automatically turns them off.
- This system is controlled by the body ECU.

■ ILLUMINATED ENTRY SYSTEM

- When a door is unlocked through a key operation or transmitter operation, or if a door is opened or closed, the illuminated entry system turns ON the dome light and the ignition key illumination.
- If the ignition switch is turned to the ACC or ON position or if all doors are locked during the 15 seconds in which these lights are ON, they will immediately turn OFF.
- This system is controlled by the body ECU.

■ LIGHT REMINDER SYSTEM

When the ignition key is turned from the ON or ACC to LOCK position while the driver's door open with the taillights or headlights turned on, this system warns the driver that the lights remain on by sounding the buzzer.

METER

■ COMBINATION METER

1. General

- An optitron display type combination meter has been adopted. The optitron display type meter realizes excellent visibility through the use of smoke acrylic in the protective panel, and a cold cathode lamp that is very bright and has high contrast for illuminating the indicator and the dial (see-through illumination). Its face is black when no current is applied.
- An odometer and trip meter which used LCD (Liquid Crystal Display) have been adopted.
- An air conditioner and combination meter integrated ECU is enclosed in the combination meter. This ECU comprises a meter ECU that computes and processes the signals that are input and output from the various systems in the vehicle to the combination meter, and an air conditioner ECU that controls the temperature of the air conditioner. This ECU maintains communication with other ECUs through the BEAN (Body Electronics Area Network).
- The speedometer electrically detects the signals from the vehicle speed sensor (for ABS) via the ABS ECU.
- The fuel gauge operates in accordance with the data that has been corrected by the air conditioner and combination meter integrated ECU. This prevents the fluctuation of the indicator and ensures a more accurate display of the remaining fuel volume.



LHD Model

LCD

187BE04



RHD Model

LCD

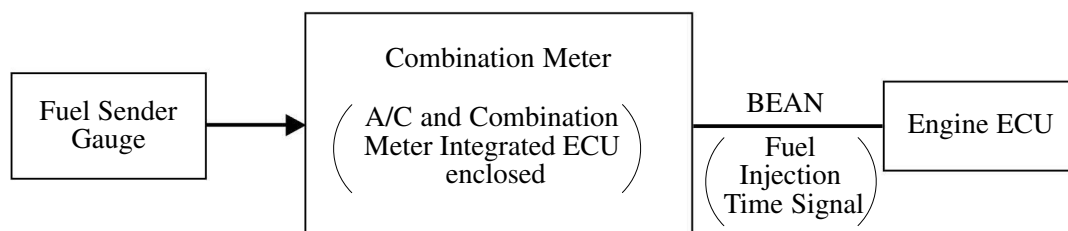
187BE05

2. Fuel Gauge

The fuel gauge is operated by the air conditioner and combination meter integrated ECU. The air conditioner and combination meter integrated ECU receives the inputs of the fuel sender gauge signal and the fuel injection time signal (correction data) from the engine ECU via the BEAN.

The air conditioner and combination meter integrated ECU computes and corrects these two signals to prevent the fluctuation of the indicator and to ensure a more accurate display of the remaining fuel volume. However, if a fuel injection time signal from the engine ECU is not input from the BEAN, only the correction function will be disabled in the air conditioner and combination meter integrated ECU. Therefore, the fuel gauge will display the remaining fuel volume in a normal manner in accordance with the signal received from the fuel sender gauge.

► System Diagram ◀



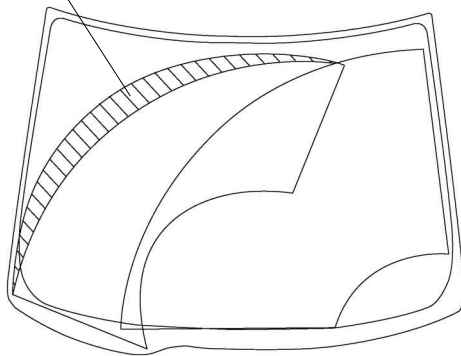
WIPER

■ MULTI-LINK WIPER

1. General

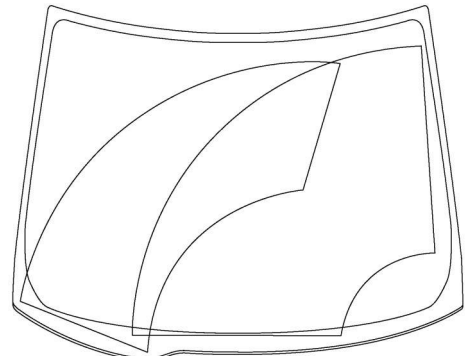
The telescopic wiper consists of a wiper arm for the front passenger side that wipes telescopically from the stopped position to the upper return position in order to enlarge the wiping area.

Wiping area enlarged through the telescopic movement



182BE10

Multi-link Type

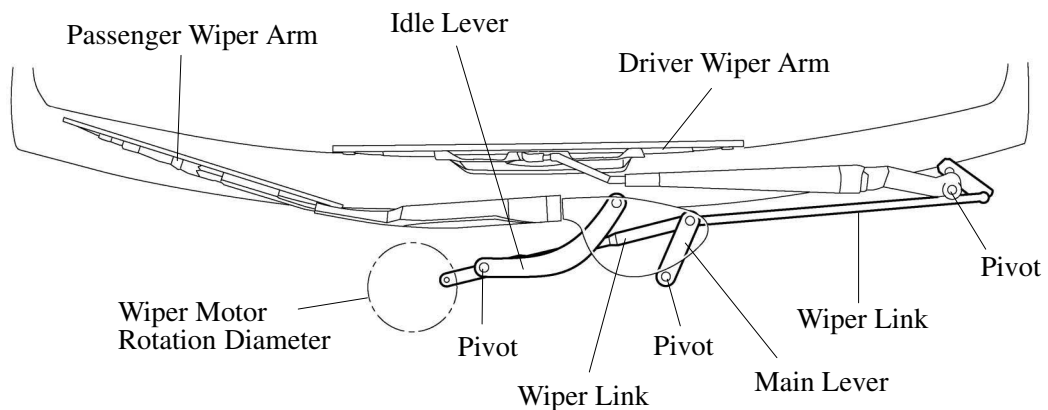


182BE09

Conventional Type

2. Construction

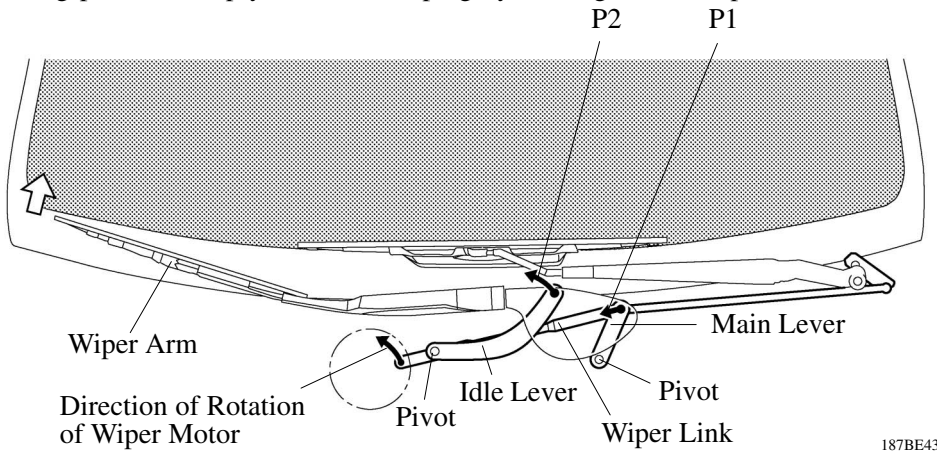
The multi-link wiper mainly consists of a driver wiper arm, passenger wiper arm, main lever, idle lever, wiper link and wiper motor.



187BE42

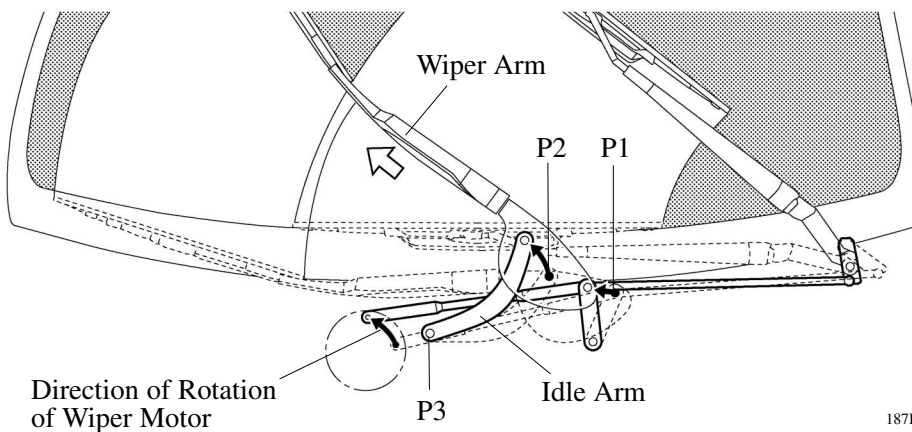
3. Operation

- With the rotation of the wiper motor, the wiper link for driving wiper will operate and connection point P1 with the main lever will move toward the arrow mark by the influence of the wiper link with a pivot as a supporting point. With this, the connection point P2 between the arm and the idle lever becomes the supporting point of the pry and starts wiping by holding the arm upward.



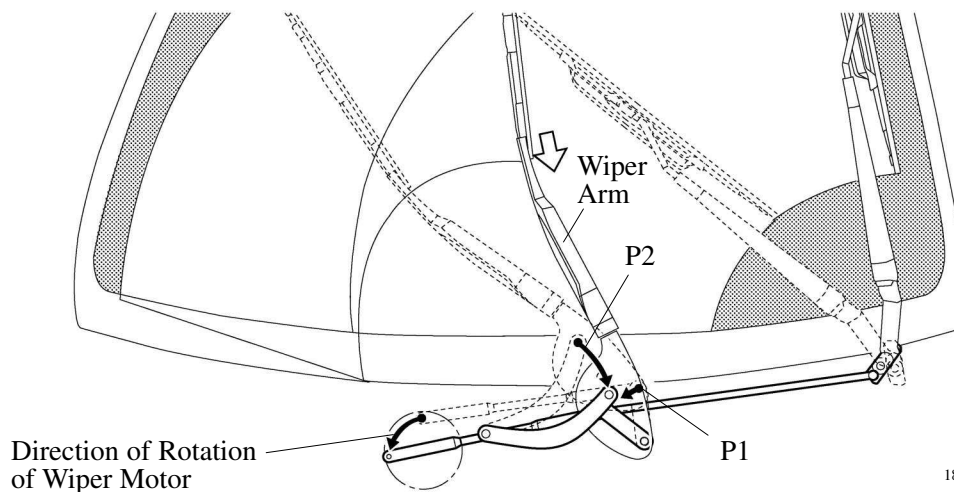
187BE43

- In addition, when the wiper motor rotates, P1 and P2 will move toward the arrow mark. Then, the wiper arm with P3 as a supporting point will rise by the influence of the idle arm as if expanding upward to the left. With this, it enables to wipe wider range.



187BE44

- When the wiper motor rotates more, P1 and P2 will move toward the arrow mark. The wiper arm with P2 as a supporting point will move toward contracting direction and wipe further to the upper reversal position.



187BE45

AIR CONDITIONER

DESCRIPTION

1. General

The air conditioner system in the RX300 has the following features:

- A automatic controlled type air conditioner system is standard equipment.
- A multi-tank, super-slim structure evaporator has been adopted.
- A compact, lightweight, and highly efficient straight flow (full-path flow) aluminum heater core has been adopted.
- A semi-center location air conditioner unit, in which the evaporator and heater core are placed in the vehicle's longitudinal direction, has been adopted.
- A clean air filter that excepts in removing pollen and dust is optional equipment.
- The heater exchange efficiency has been improved through the adoption of the sub-cool condenser.
- A rear heater duct and a console duct have been adopted to ensure the proper air conditioner performance for the rear seat area.

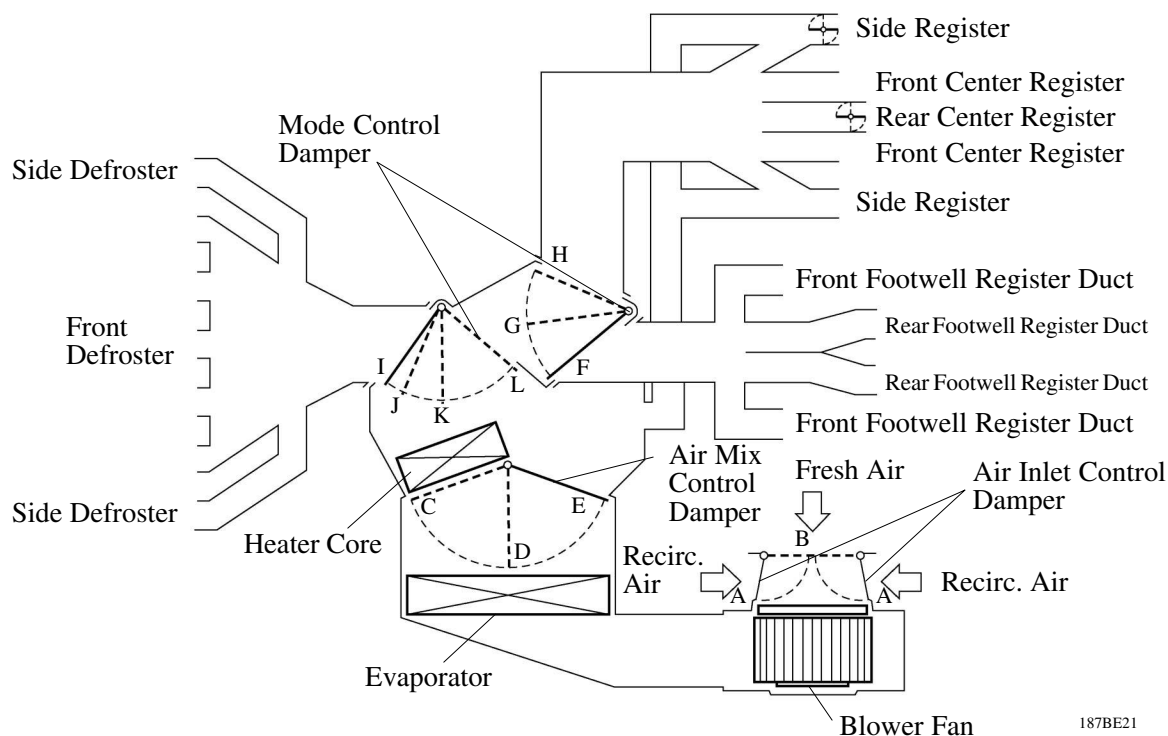
► Performance ◀

Heater	Heat Output	W (Kcal/h)	5200 (4472)
	Air Flow Volume	m ³ /h	340
	Power Consumption	W	210
Air Conditioner	Heat Output	W (Kcal/h)	5600 (4816)
	Air Flow Volume	m ³ /h	530
	Power Consumption	W	260

► Specifications ◀

Ventilation and Heater	Heater Core	Type	Straight Flow (Full-path Flow)
		Size W × H × L mm (in.)	264.1 × 100 × 27 (10.4 × 3.9 × 1.06)
		Fin Pitch mm (in.)	1.8 (0.07)
	Blower	Motor Type	S80FS12.5T
		Fan Size Dia. × H mm (in.)	180 × 70 (7.1 × 2.8)
Air Conditioner	Condenser	Type	Multi-flow (Sub-cool)
		Size W × H × L mm (in.)	690 × 407 × 16 (27.2 × 16.0 × 0.6)
		Fin Pitch mm (in.)	3.6 (0.14)
	Evaporator	Type	Drawn Cup (Multi-tank, Super-slim Structure)
		Size W × H × L mm (in.)	291.6 × 215 × 58 (11.5 × 8.5 × 2.3)
		Fin Pitch mm (in.)	4.0 (0.16)
	Compressor	Type	10S17

2. Mode Position and Damper Operation

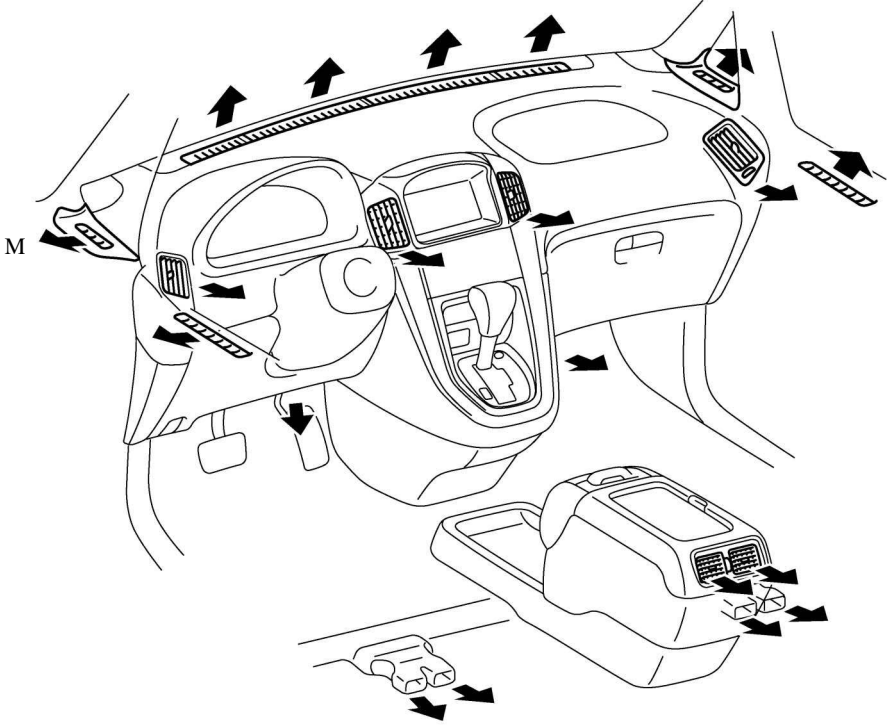


187BE21

► Function of Main Damper ◀

Control Damper	Control Position		Damper Position	Operation
Air Inlet Control Damper	FRESH	187BE23	A	Brings in fresh air.
	RECIRC	187BE41	B	Recirculates internal air.
Air Mix Control Damper	MAX COLD		C	Fixes the cooling capability to maximum.
	MAX HOT		E	Fixes the heating capability to maximum.
	TEMP SETTING 18 ~ 32°C		D	Varies the mixture ratio of the fresh air and the recirculation air in order to regulate the temperature continuously from HOT to COLD.
Mode Control Damper	FACE	187BE24	F, I	Air blows out of the front and rear center registers, and side register.
	BI-LEVEL	187BE25	G, I	Air blows out of the front and rear center registers, side register, and front and rear footwell register ducts. The occupants' head area can be kept cold while warming up their feet by adjusting the temperature setting knob.
	FOOT	Manual	H, I	Air blows out of the front and rear footwell register ducts, and side register.
		Auto-matic	H, J	Air blows out of the front and rear footwell register ducts, and side register. In addition, air blows out slightly from the front defroster and side defroster.
	FOOT/DEF	187BE27	H, K	Defrosts the windshield through the front defroster, side defroster, and side register, while air is also blown out from the front and rear footwell register ducts.
	DEF	187BE28	H, L	Defrosts the windshield through the front defroster, side defroster, and side register.

3. Air Outlets and Air Volume Ratios

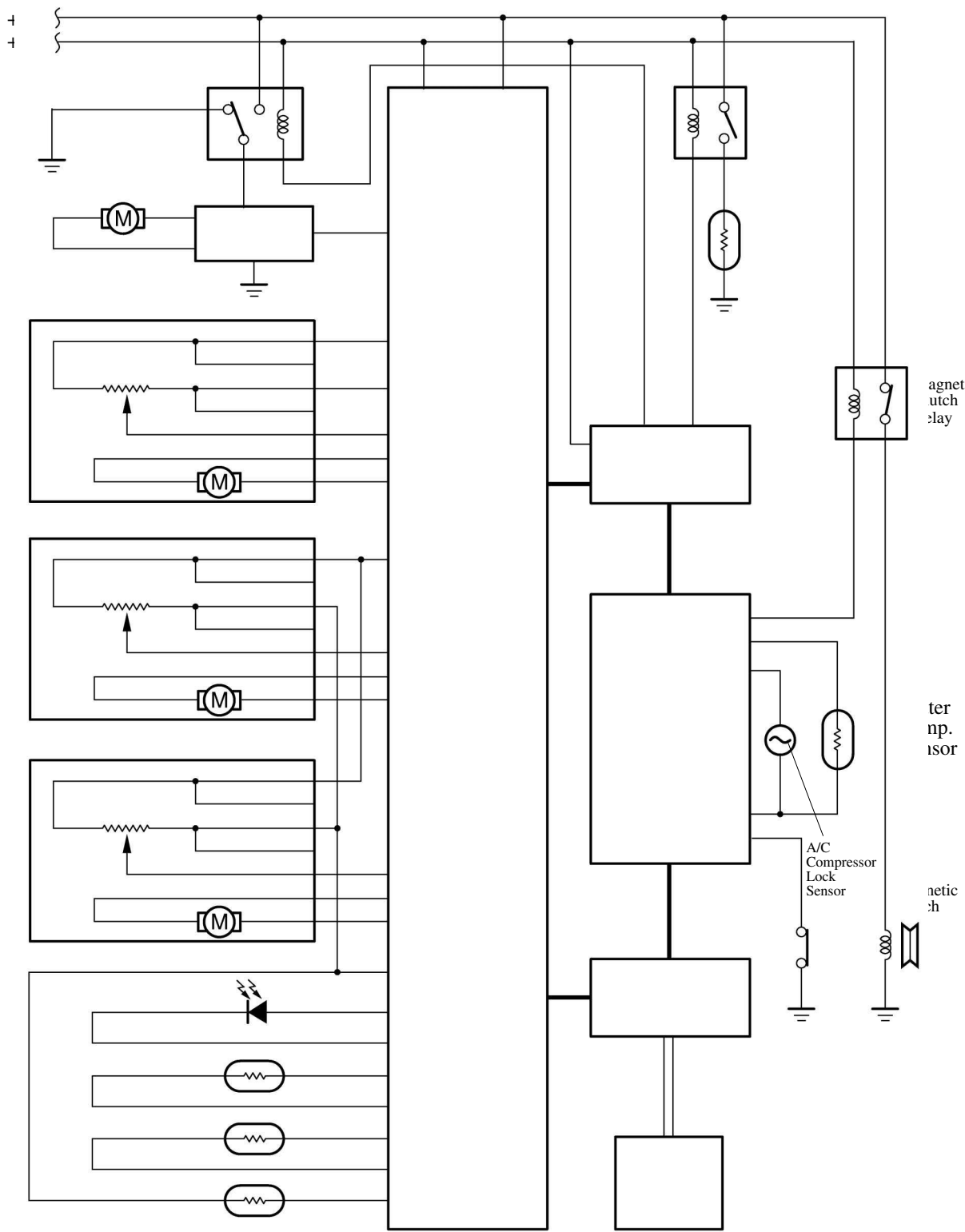


LHD Model

Air Outlet Mode	Air Outlet		Register			Footwell		Defroster	
	Available Mode		Front		Rear	Front		Defroster	
	Auto- matic	Manual	Center	Side	Center	Front	Rear	Front	Side
 FACE 187BE24	●	●	○	○	○				
 BI-LEVEL 187BE25	●	●	○	○	○	○	○		
 FOOT 187BE26		●		○		○	○		
	●			○		○	○	○	○
 FOOT/DEF 187BE27		●		○		○	○	○	○
 DEF 187BE28		●		○				○	○
Air Outlet Position Symbol			B, C	A, D	I	F, H	G, E	K, L	J, M

The size of the circle ○ indicates the proportion of air flow volume.

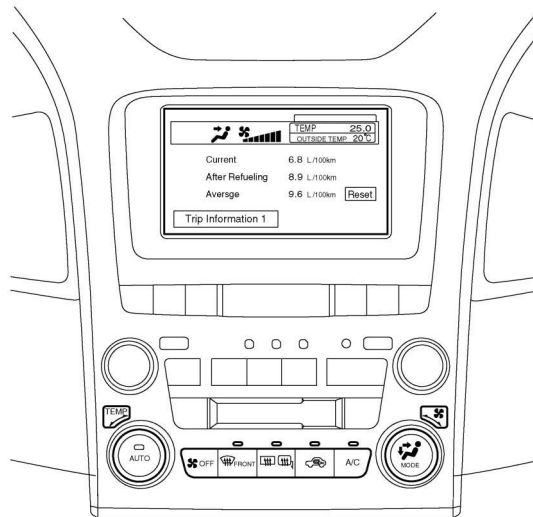
4. System Diagram



■ CONSTRUCTION AND OPERATION

1. Air Conditioner Control Panel (Center Cluster Integrated Panel Switch)

- The control switches for the air conditioner have been provided on the center cluster integrated panel to ensure the ease of use.
- The operating conditions of the air conditioner are shown on the multi display screen that excels in visibility.



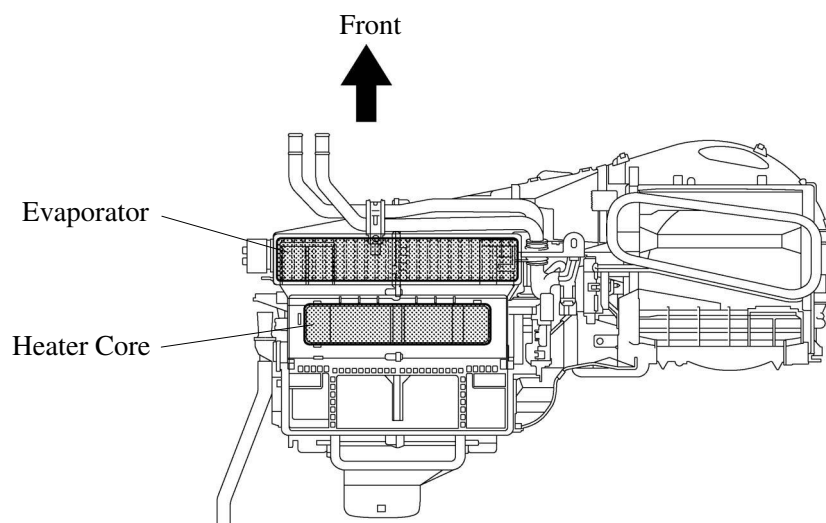
LHD Model

187BE32

2. Air Conditioner Unit

General

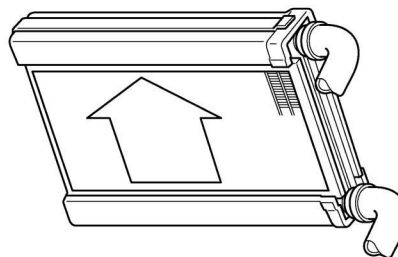
A semi-center location air conditioner unit, in which the multi-tank, super-slim structure type evaporator and straight flow (full-path flew) heater core are placed in the vehicle's longitudinal direction, has been adopted.



187BE39

Heater Core

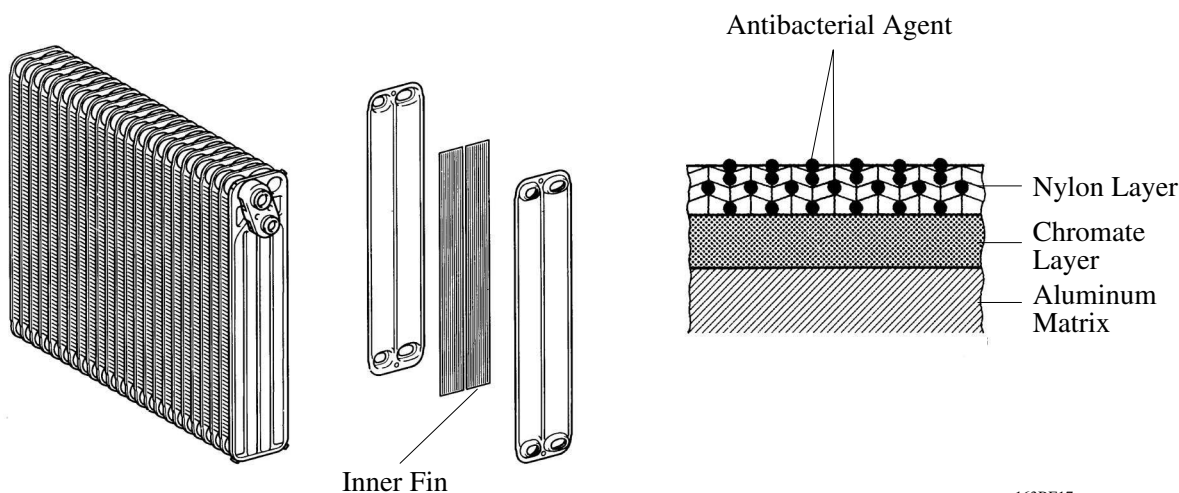
The flow of the heater water in the heater core has been adopted a straight flow (full-pass flow). A aluminum flat tube type heater core is used.



152BE21

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. Furthermore, the evaporator body has been coated with a type of resin that contains an antibacterial agent in order to minimize the source of foul odor and the propagation of bacteria.



163BE17

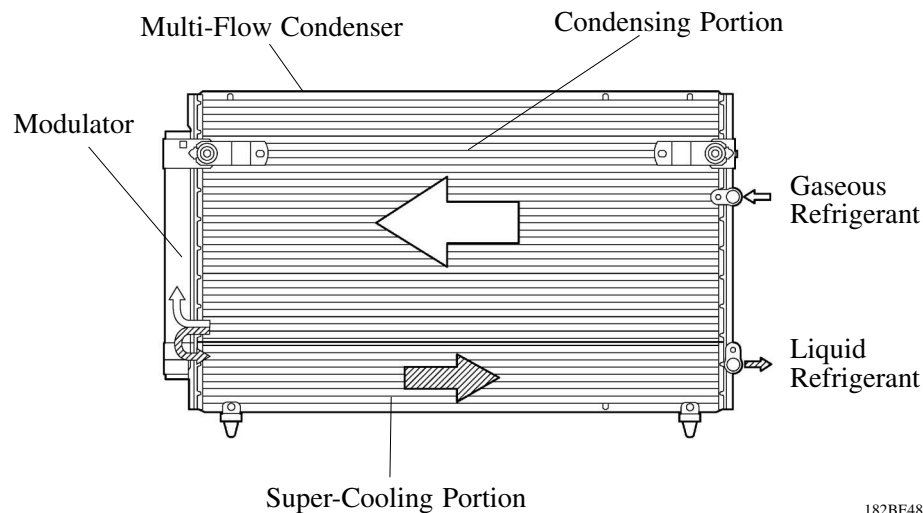
3. Condenser

General

The RX300 has adopted 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

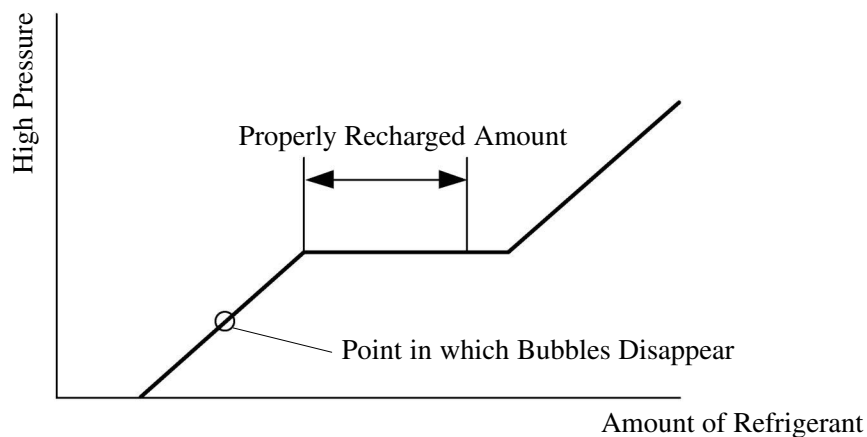
In the sub-cool cycle of the sub-cool condenser that has been adopted, after the refrigerant passes through the condensing portion of the condenser, both the liquid refrigerant and the gaseous refrigerant that could not be liquefied are cooled again in the super-cooling portion. Thus, the refrigerant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



182BE48

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.

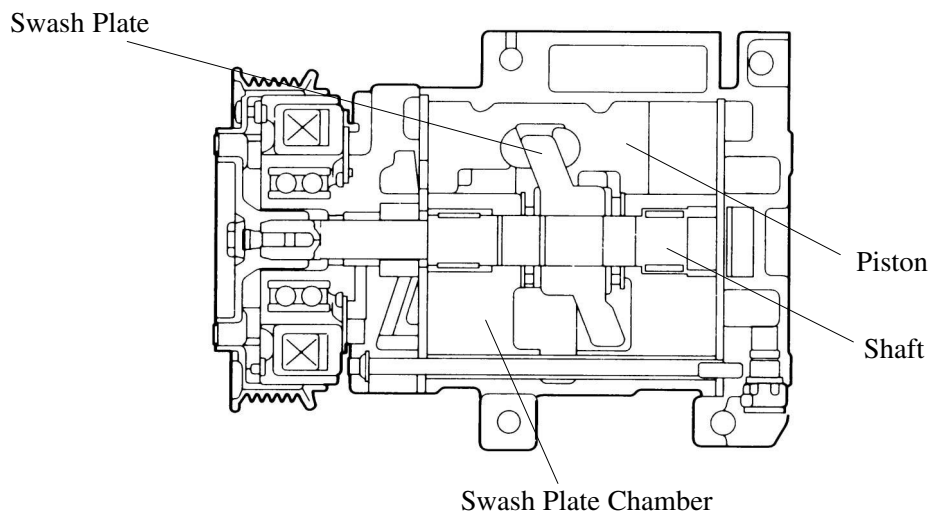
For the proper method of verifying the amount of the refrigerant and to recharge the system with refrigerant, see the LEXUS RX300 Repair Manual (Pub. No. RM785E).



152BE40

4. Compressor

A compact, lightweight, and low-noise swash plate type compressor has been adopted on the RX300.

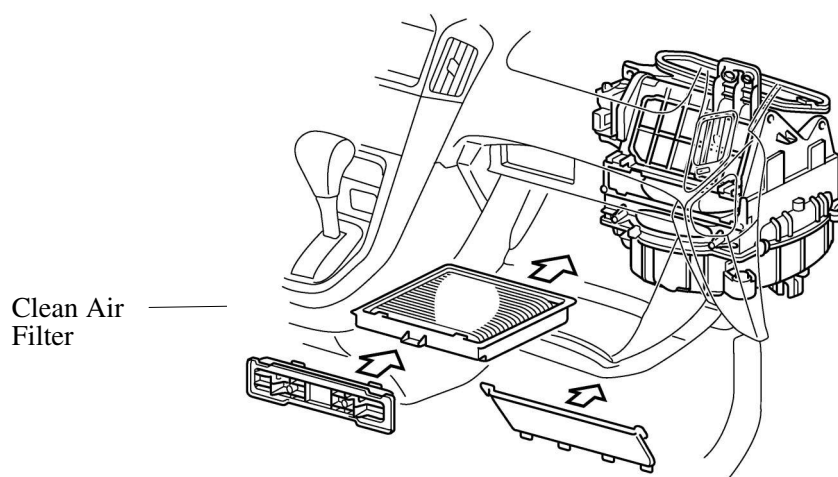


5. Clean Air Filter

A clean air filter that excels in removing pollen and dust is optional equipment.

This filter, which cleans the air in the cabin, is made of polyester. Thus, it can be disposed of easily as a combustible material, a feature that is provided in consideration of the environment.

To facilitate the replacement of the filter, a one-touch clip is used in the filter cover which is unified with filter case. Thus, a construction that excels in serviceability has been realized.



Service Tip

The replacement interval for the clean air filter is 30,000 km.
However, it varies with the use conditions (or environment).

6. Air Conditioner ECU

General

Air conditioner ECU is built in combination meter. The automatic controlled type air conditioner system has following control.

Control	Outline
Outlet Air Temperature Control	In response to the temperature control switch setting, the required outlet air temperature, evaporator temperature sensor, and water temperature sensor compensations are used by the air mix control damper control to calculate a tentative damper opening angle, through an arithmetic circuit in the air mix damper, to arrive at a target damper opening angle.
Blower Control	This function controls the operation of the blower motor in accordance with the signals from the water temperature sensor, evaporator temperature sensor, and the solar sensor. In addition, it protects the blower motor controller from the sudden drive current that occurs when the blower motor is activated.
Air Outlet Control	When the AUTO switch has been turned ON, automatic control causes the servomotor (for air mix control) to rotate to a desired position in accordance with the target damper opening, which is based on the calculation of the required outlet air temperature. Furthermore, under automatic control, the potentiometer in the servomotor (for air mix control) is used to detect the actual damper opening, as opposed to the calculated target damper opening, so that control can be effected to match the actual damper opening to the calculated target damper opening.
Air Inlet Control	Drives the servomotor (for air inlet) according to the operation of the air inlet control switch and fixes the dampers in the FRESH or RECIRC position.
Compressor Control	This control turns OFF the magnetic clutch of the compressor when the blower motor is turned OFF at the time the water temperature is below a predetermined value, an abnormal refrigerant pressure has been input, or the discharge temperature of the evaporator is below a predetermined value.
Rear Window Defogger Control	Switches the rear defogger and outside rear view mirror heaters on for 15 minutes when the rear defogger switch is switched on. Switches them off if the switch is pressed while they are operating.
Outer Temperature Indication Control	Based on the signals from the ambient temperature sensor, this control calculates the outside temperature, which is then corrected in the air conditioner ECU, and shown in the multi display.
Self-diagnosis	Checks the sensors in accordance with operation of the air conditioner switches, then multi display a DTC (Diagnosis Trouble Code) to indicate if there is a malfunction or not (sensor check function).
	Drives the actuators through a predetermined sequence in accordance with the operation of the air conditioner switches (actuator check function).

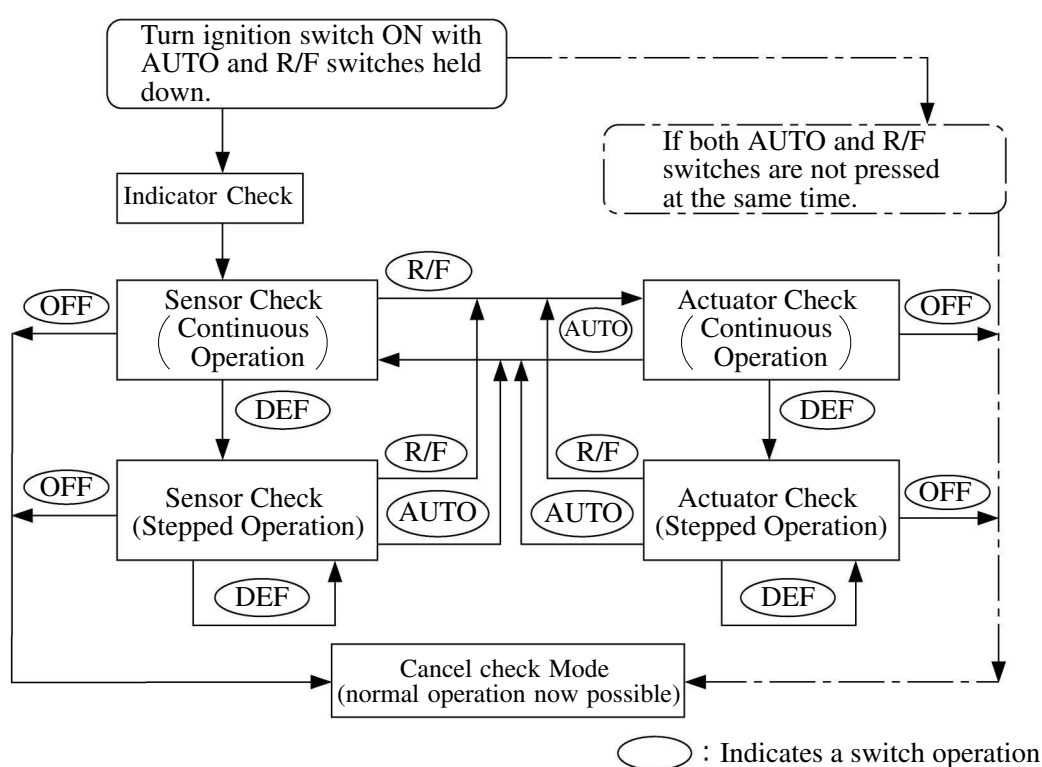
Self-Diagnosis

- The air conditioner ECU has a self-diagnosis function. It stores any operation failures in the air conditioner system memory in the form of a malfunction code. By operating switches on the air conditioner control switches, the stored malfunction code will be indicated. Since diagnostic results are stored directly by electric power from the battery, they are not cleared even when the ignition switch is turned off.

► Functions ◀

Function	Outline
Indicator Check	Checks indicator lights and temperature setting display.
Sensor Check	Checks the past and present malfunctions of the sensors, and clearing the past malfunction data.
Actuator Check	Checks against actuator check pattern if blower motor, servo motors and magnetic clutch are operating correctly according to signals from ECU.

- The check functions can be started by the following procedure shown below.



187BE33

For details on the indicator check, sensor check, actuator check function, and clearing of this system, refer to the LEXUS RX300 Repair Manual (Pub. No. RM785E).

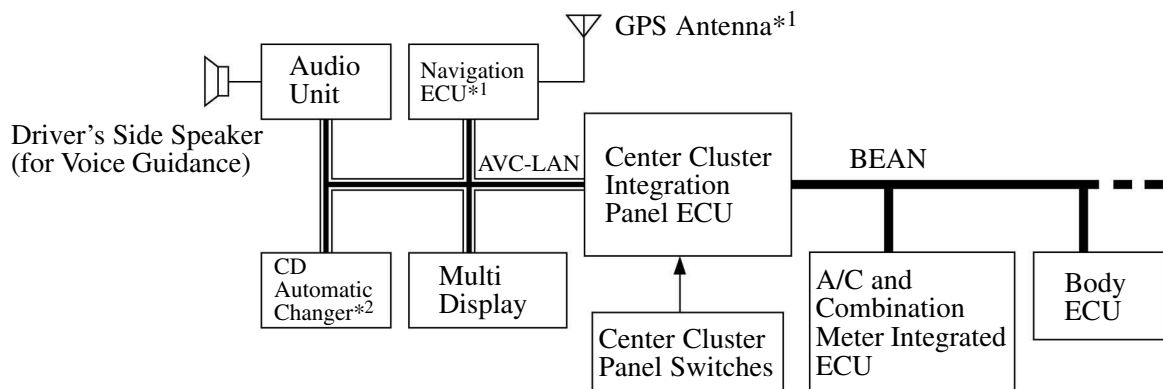
ACCESSORIES

■ MULTI DISPLAY

1. General

- A multi display has been provided on the center cluster panel as standard equipment. A 5.8-inch wide LCD (Liquid Crystal Display) with a pressure-sensitive touch panel has been adopted to ensure the ease of use.
- A GPS (Global Positioning System) voice navigation is offered as an option. Through the use of the GPS and the map data in a DVD (Digital Versatile Disc), this navigation system analyzes the position of the vehicle and indicates that position on the map that is displayed on the screen. Additionally, it provides voice instructions to guide the driver through the route to reach the destination that has been selected.

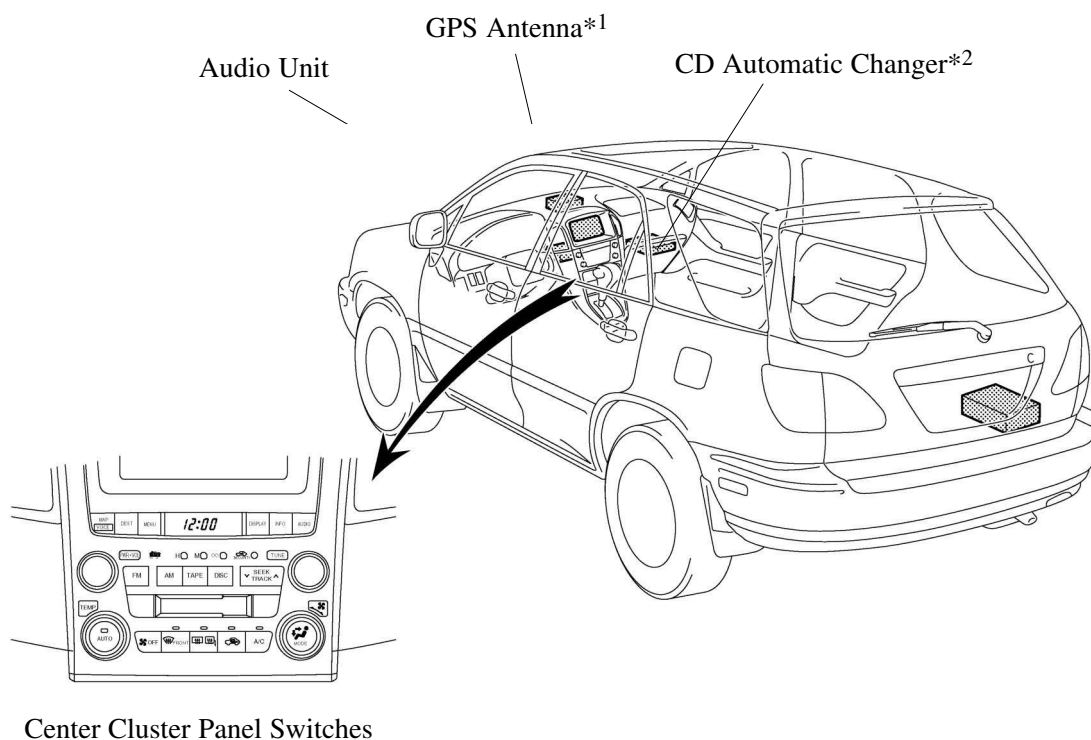
2. System Diagram



*1: with GPS Voice Navigation System

*2: with CD Automatic Changer

3. Layout of Main Components



*1: with GPS Voice Navigation System

*2: with CD Automatic Changer

187BE35

4. Construction and Operation

Center Cluster Integrated Panel ECU

The center cluster integrated panel ECU transmits the vehicle information to the multi display in order for it to be displayed on display. In addition, the center cluster integrated panel ECU transmits the cluster panel switch signals to the air conditioner and combination meter integrated ECU. Because vehicle information is transmitted by the ECUs that maintain communication on the BEAN (Body Electronics Area Network), the center cluster integrated ECU converts this information into signals for AVC-LAN use and sends it to the multi display.

Multi Display

1) General

Upon receiving the vehicle information that is transmitted by the center cluster integrated panel ECU, the navigation information that is transmitted by the navigation ECU, and the operation information from the audio unit, multi display displays these data on the display. Listed below are the main function of the multi display.

Function	Outline
Audio Screen Display	• Status of audio equipment and audio operation screen indication. • Sound quality adjustment screen indication.
On-screen Display	• Display the operating condition of the air conditioner. • Display the outside temperature.
Adjustment Screen Display	Image quality adjustment screen indication.
Trip Information Display	• Distance After Refueling • Average Speed • Fuel Consumption (Current, After Refueling, Average)
Navigation Screen Display*	• Language Selector • Enlargement/reduction, rotation and movement of map. • Indication of current position and direction of travel. • Correction of current position. • Setting, change and indication of route. • Voice guidance. There are many additional functions. For details, see the followings.
Diagnosis Screen Display	• Service Check Menu • Display Check • Navigation Check For details, see page 136.

*: with GPS Voice Navigation System

2) Navigation

The navigation screen is a function that is provided in the GPS voice navigation system. Based on the map data on the DVD, signals from the GPS satellites, signals from the built-in gyro sensor, and signals from the vehicle's speed sensor, the vehicle's present position, direction of travel, and driven distance are calculated and displayed on this screen. This screen has the display functions listed below.

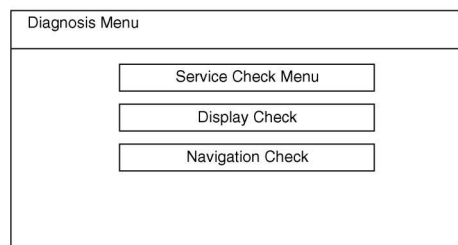
Item		Outline
Map Display	Heading Up/North Up	Changes the orientation of the map.
	Front Wide	Displays a map in the direction of travel of the vehicle in an enlarged form.
	Stepless Scale Display	Changes the scale of the map from the basic 11 steps to an even finer display.
	Direct Scale Change	Directly select and display the map scale.
	Multi-step Scale Display	Change and display the map scale in 11 stages.
	Scroll Display	Scrolls the screen to display the desired point on the map.
	Split-view Display	Displays different modes on a screen that is split into two views.
	Points-of-Interest Display	Displays selected types of marks on the map.
	Taillight-interlocked Map Color Change	Changes the displayed color on the map screen when the taillights are turned ON.
	Road Number Sign Board Display	Displays the road numbers on the map.

(Continued)

Item		Outline
Des- tination Search	Hybrid Points-of-inter- est Search	Narrows the search by names of the points-of-interest, category, and areas.
	Hybrid Street Search	Narrows the search by street name and area.
	Points-of-Interest Pin- point Display	Pinpoints and displays the position of the point-of-interest.
	Telephone number search	Performs search by telephone number.
	Address Search	Searches for a house number.
	Special Memory Point	Sets a pre-registered point as a destination point while driving.
	Nearest Points-of-Inter- est Search List Display	Searches nearest points-of-interest and displays a list.
	Intersection Search	By specifying two streets, the point at which they intersect is set as the destination point.
Search	Search Condition Des- ignation	Searches for the recommended, shortest, and other routes.
	Regulated Road Con- sideration	Performs search while considering regulated roads.
Language Selector		The language of the text displayed on the navigation screen and of the voice guidance can be selected from five languages (English, French, German, Italian, and Dutch).
Guid- ance	Right or Left Turn Guidance	Voice guidance to instruct the direction of travel to be taken.
	Motorway Direction of Travel Guidance	Voice guidance to instruct the direction of travel to take on the motorway.
	Distance Display to Destination	Displays the distance from the present location to the destina- tion.
	Motorway Branching Lane Guidance	Guides the lane in which to drive when the motorway branches (only on the model for Germany).
	Intersection Zoom-in Display	Zoom-in display when approaching an intersection.
	Motorway SA/PA Information	Displays information on the SA (service area) and PA (parking area) of the motorway.

3) Diagnosis Screen

This system's diagnosis screen can be displayed and operated on the multi display. The diagnosis menu contains the following three items: Service Check Menu, Display Check, and Navigation Check. For details, refer to the LEXUS RX300 Repair Manual (Pub. No. RM785E).



187BE37

5. GPS (Global Positioning System) Voice Navigation

General

The GPS voice navigation function combines the radiowave navigation system that determines the present position through the GPS signals, and the self-contained navigation system that detects the driven distance and the direction of travel through the speed sensors and the gyro sensor that is contained in the navigation ECU. The GPS voice navigation function is a high-precision navigation system that indicates the vehicle position on the map display on the DVD (Digital Versatile Disc) drive and guides the route from the present position to the destination on a map and pictogram and through voice instructions.

The multi display shows the data that has been calculated by the radiowave navigation system and the self-contained navigation system.

Construction and Operation

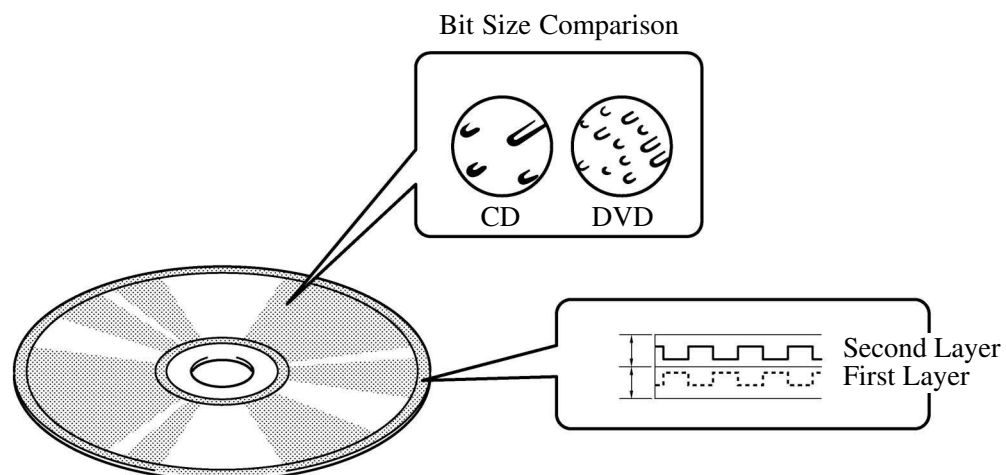
1) General

The GPS voice navigation function consists of the following components:

- DVD-ROM
- GPS Antenna
- Speed Sensor
- Speaker
- Navigation ECU
- GPS Receiver (contained in the navigation ECU)
- Gyro Sensor (contained in the navigation ECU)

2) DVD (Digital Versatile Disc)

The DVD, which uses a smaller laser beam diameter than the CD (Compact Disc), is able to record and play back a greater amount of data because it can handle pits, or signal grooves, at a higher density. The volume of data that a 12 cm-diameter DVD can store is equivalent to approximately 7.5 times that of a CD-ROM, totaling 4.7 gigabytes. The navigation system has adopted a dual-layer DVD, which has two layers per side to store a large capacity of signal data, totaling 8.5 gigabytes.



3) GPS Antenna

The GPS function receives, via an GPS antenna, the signals that are transmitted from the GPS satellites located in space at an approximate altitude of 20,000 km, in order to determine the vehicle's present position.

4) Speed Sensor

The navigation ECU will receive the vehicle speed signal directly from A/C and combination meter integrated ECU.

5) Speaker

Outputs the sound signals that are transmitted from the audio unit. Also outputs the navigation voice instructions via the driver's side speaker.

6) Navigation ECU**General**

Based on the map data on the DVD, signals from the GPS satellites, signals from the built-in gyro sensor, and signals from the A/C and combination meter integrated ECU, this ECU calculates the vehicle's present position, direction of travel, and driven distance, and transmits the data on the multi display. In addition, it outputs navigation voice instructions.

The GPS receiver and GPS sensor are contained in the navigation ECU.

GPS Receiver

The GPS receiver demodulates the signals that are received by the GPS antenna from the satellites and outputs them to the navigation ECU.

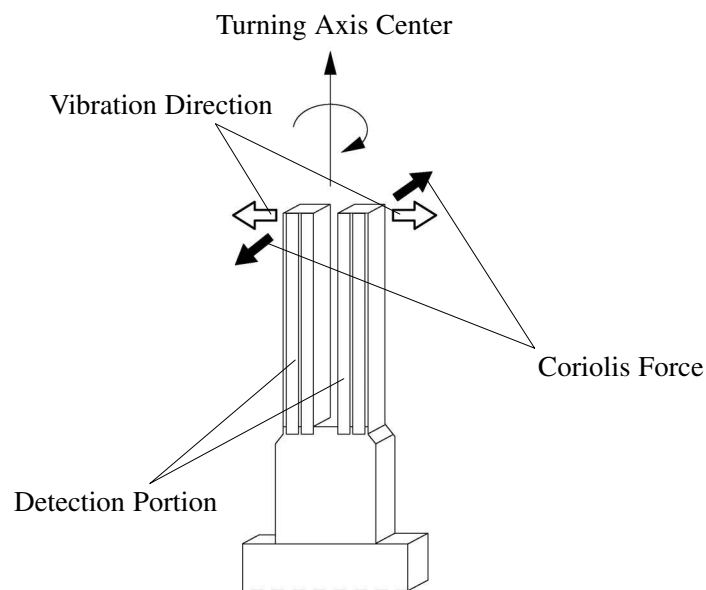
Gyro Sensor

The gyro sensor is designed to detect the yaw rate of vertical axis turn of the vehicle and installed in the navigation ECU.

The gyro sensor has a turning-fork shape type piezoelectric ceramic piece inside. This piezoelectric ceramic piece deforms by charging voltage and generates voltage by deforming with force.

The piezoelectric ceramic piece inside the gyro sensor is vibrated by the driving circuit and when the vehicle turns (when the detection portion turns to the axis direction), coriolis force is added to the detection portion. With this force, the detection portion is twisted. The voltage generated by this twisting is signal-processed inside the gyro sensor and outputted.

Navigation ECU receives this signal and judges the yaw rate of the vehicle.



Detecting the Vehicle Position

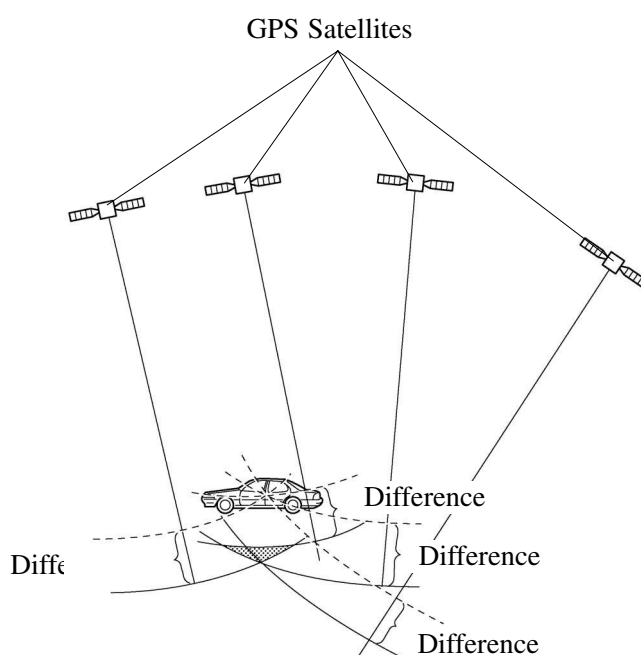
The navigation ECU calculates the position based on the principle of a 3-point measurement.

The GPS satellites are equipped with high-precision clocks. Thus, the satellites are able to transmit continuous orbit signals and radiowave transmission time signals.

The navigation ECU also contains a clock, which can understand the radiowave time signals that are received from the satellites.

As a result, the length of time that is taken by the radiowaves to arrive from the satellites to the antenna can be determined. Thus, the lengths of time that elapse for the radiowaves of the 4 satellites to reach the antenna are measured. Each of these lengths of time are multiplied by the luminous flux (the rate of transmission of luminous energy: approximately 300,000 km per second), the results of which are the distances from the satellites to the antenna. Because the positions of the GPS satellites are known by their signals, the receiving point (vehicle position) can be rendered as the point in which the 4 spheres (of which the centers are the respective satellites) converge.

However, due to the differences that exist between the clocks of the satellite and the ECU, the 4 spheres do not converge at a single point. Therefore, the ECU uses another satellite to calculate the point at which the 4 spheres converge at a single point and corrects its internal clock. As a result, the ECU determines the vehicle position and adjusts its internal clock to the clocks of the satellites.

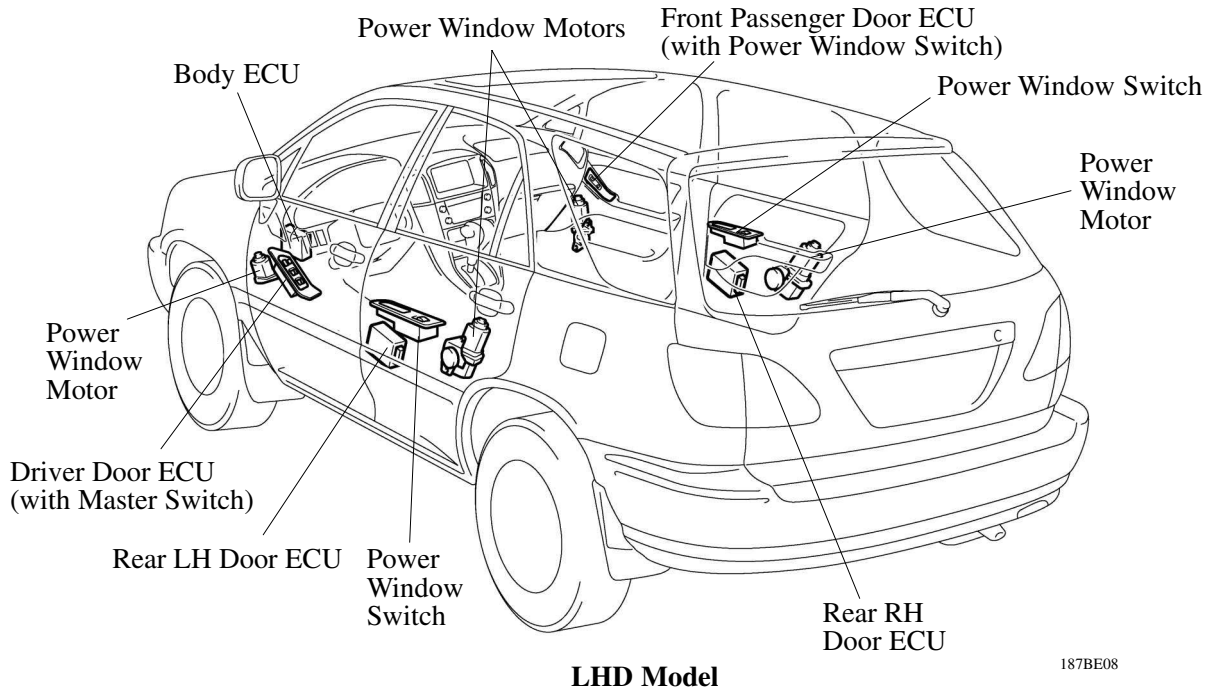


■ POWER WINDOW SYSTEM

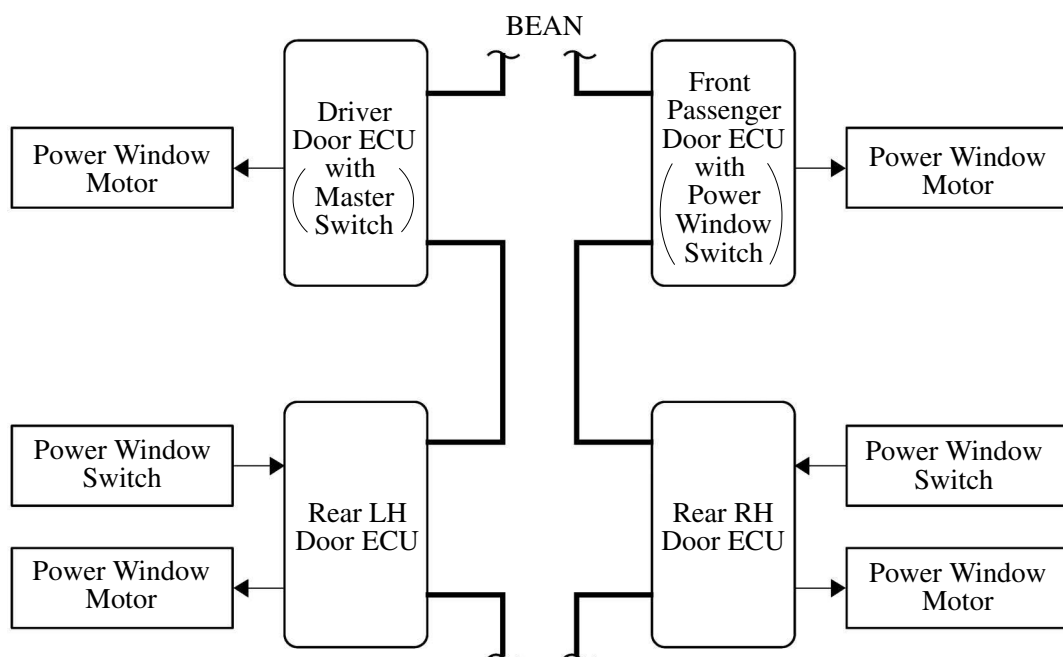
1. General

The following four ECUs effect the control of the power window in the respective doors: the driver door ECU, front passenger door ECU, rear RH door ECU, and rear LH door ECU. The driver's door ECU is integrated with the master switch. The control of other seats by the master switch is effected at the respective ECUs, via the BEAN (Body Electronics Area Network).

2. Layout of Components



3. System Diagram



4. Function

The power window system has the following functions.

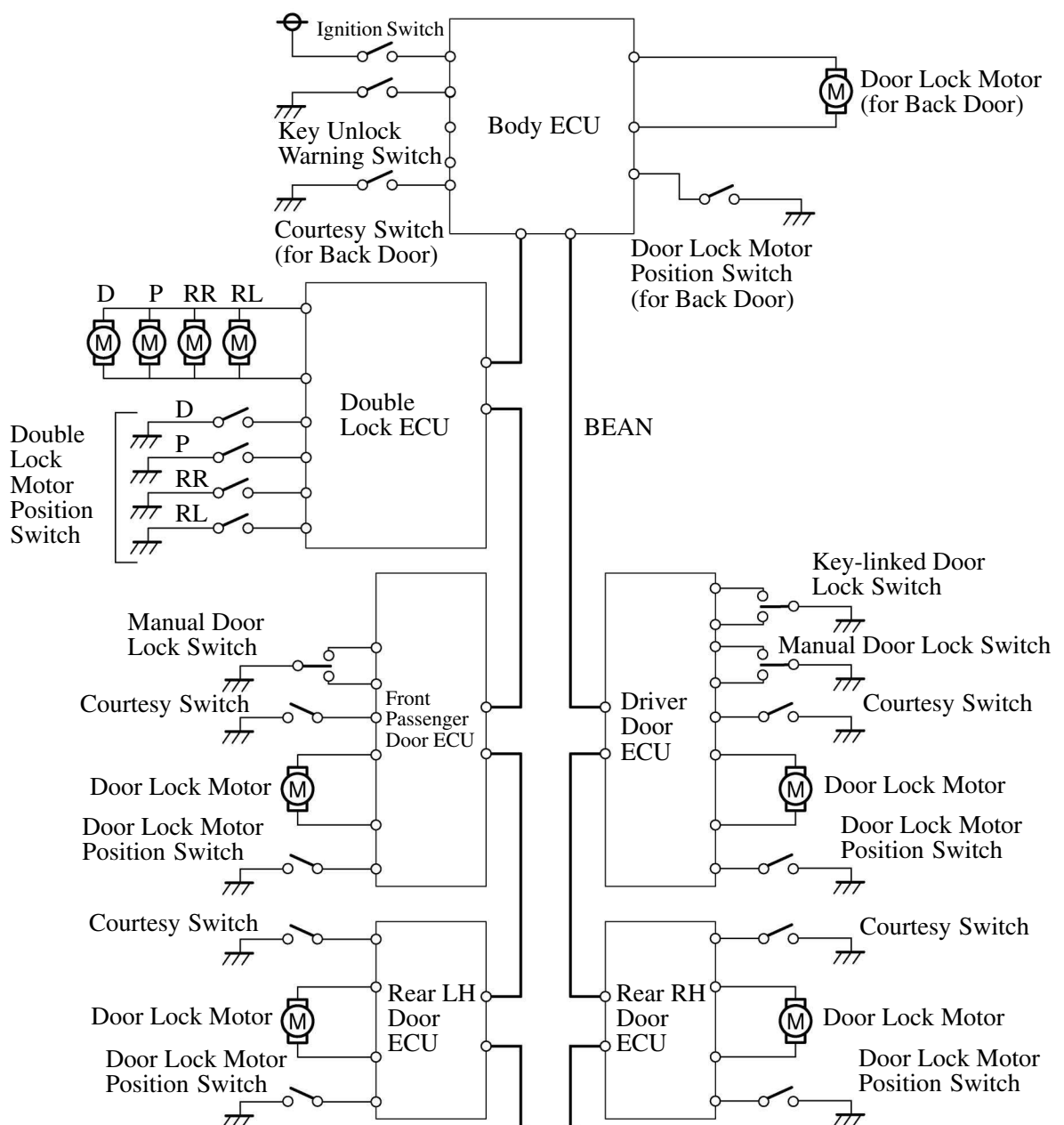
Function	Outline
All-door one-touch auto up-and-down function	The “all-door one-touch auto up-and-down” function enables the window of any door to be fully opened or closed at a touch of the power window switch.
Remote control function	The up and down operations of the front passenger window and the rear windows can be controlled by operating the power window master switch.
Key-off operation function	The driver’s door key-off operation function makes it possible to operate the power window for approximately 45 seconds after the ignition key is turned to the ACC or LOCK position, before and while the driver’s door is opened, but once it is closed, this system won’t operate.
Jam protection function	A “jam protection” function automatically stops the power window and moves it downward if a foreign objects gets jammed in the window during one-touch auto-up operation.
Key-linked operation function	A “key-linked operation” function, which is linked to the driver door key cylinder operation, opens and closes the window of the driver’s door.

■ DOOR LOCK CONTROL SYSTEM

1. General

- This system has a “key-linked lock and unlock”, a “key-confine prevention”, and a “driver’s and front passenger doors manual unlock prohibition” functions.
- For improved theft deterrence performance, a double locking system is standard equipment.
- This system is controlled by the body ECU. The body ECU outputs signals via the BEAN to the respective ECUs (driver door ECU, front passenger door ECU, rear RH door ECU, rear LH door ECU, and double lock ECU). Upon receiving the signals, the ECUs operate the respective actuators.
However, the control of the back door is effected by the body ECU, which operates the door lock motor.

► System Diagram ◀



2. Function

Function	Outline
Key-linked lock and unlock function	This function, which is linked with the key cylinder, can lock or unlock all the doors when a lock or unlock operation is effected.
Key confine prevention function	Provided that the key is inserted in the ignition key cylinder and the driver's door is open, an attempt to lock the door will cause all the doors to unlock.
Manual unlock prohibition function	When a lock operation is effected through wireless door lock remote control, this function prohibits the driver's and front passenger door lock switches from becoming unlocked.
Double locking function	The double locking system also prevents the doors from being opened through the operation of the inside door knobs. Thus, the doors cannot be opened either from the inside or the outside of the vehicle.

3. Double Locking System

General

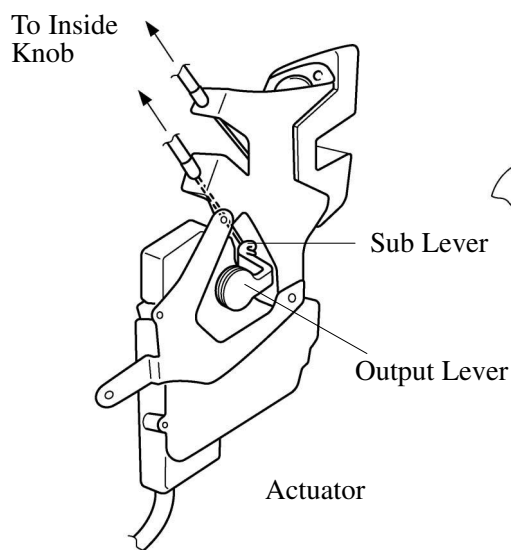
- The double locking system also prevents the doors from being opened through the operation of the inside door knobs. Thus, the doors cannot be opened either from the inside or the outside of the vehicle.
- To lock the doors with this system, pressing the transmitter's LOCK switch, then pressing it again within 5 seconds activates the double locking system.

CAUTION

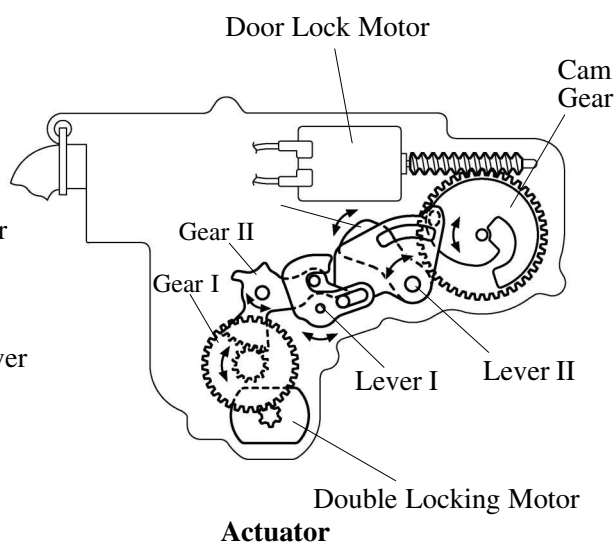
Never activate the double locking system when there are people in the vehicle because the doors cannot be opened from the inside of the vehicle.
If locking the doors by accident, press "Unlock" button of the transmitter.

Construction

The actuator contains both the mechanism for the door lock system and the double locking system including a motor and a gear.



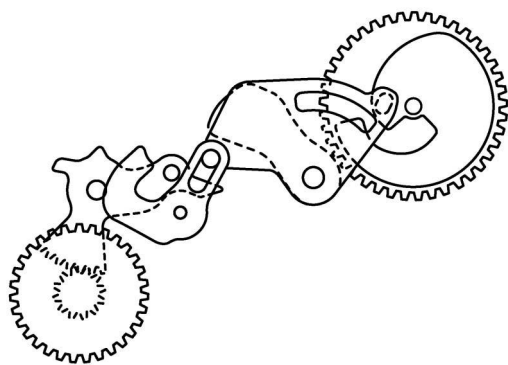
187BE10



176BE06

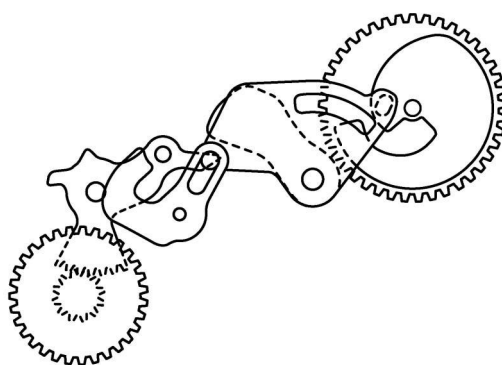
Operation

- When a door is locked through the operation of the transmitter, it locks in the normal manner; furthermore, the sub lever becomes disengaged by the function of the double locking motor. As a result, if an attempt is made to unlock the door by operating the inside knob, the sub lever will merely mis-swing, without being able to unlock the door.
- The locking/unlocking function of the double locking system is normally activate by operating the transmitter. However, as an emergency unlocking maneuver, only the driver's door can be unlocked with a key.



Normal Lock Condition

176BE07



Double Lock Condition

176BE08

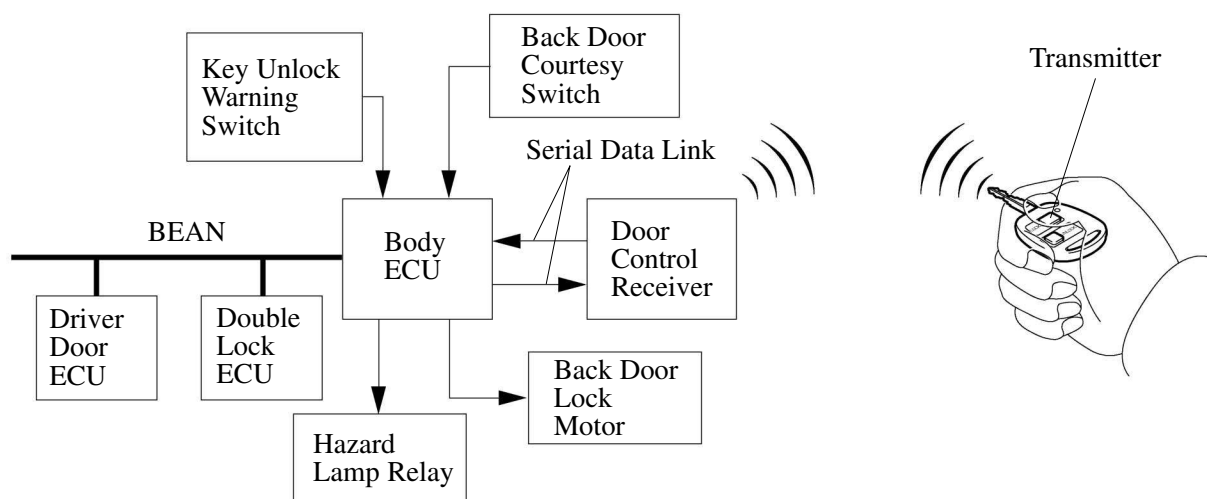
■ WIRELESS DOOR LOCK REMOTE CONTROL SYSTEM

1. General

The wireless door lock remote control system is a convenient system for locking and unlocking all the doors, at a distance. This system in the RX300 has the following features:

- In this system, the wireless door control receiver performs the code identification process and the body ECU effects the door lock control. Serial data link is provided for communication between the wireless door control receiver and the body ECU. The body ECU outputs signals to the respective ECUs via the BEAN. Upon receiving the signals, the ECUs operate the respective actuators. However, the control of the back door is effected by the body ECU, which operates the actuator.
- A key-integrated, two-button (lock, unlock) type transmitter has been adopted.
- A rolling code system, in which the signal configuration changes each time when a signal is transmitted by the transmitter, has been adopted.
- The hazard light is flashed once when locking, and the hazard light is flashed twice when unlocking, to inform that the operation has been completed.

► System Diagram ◀



187BE11

Service Tip

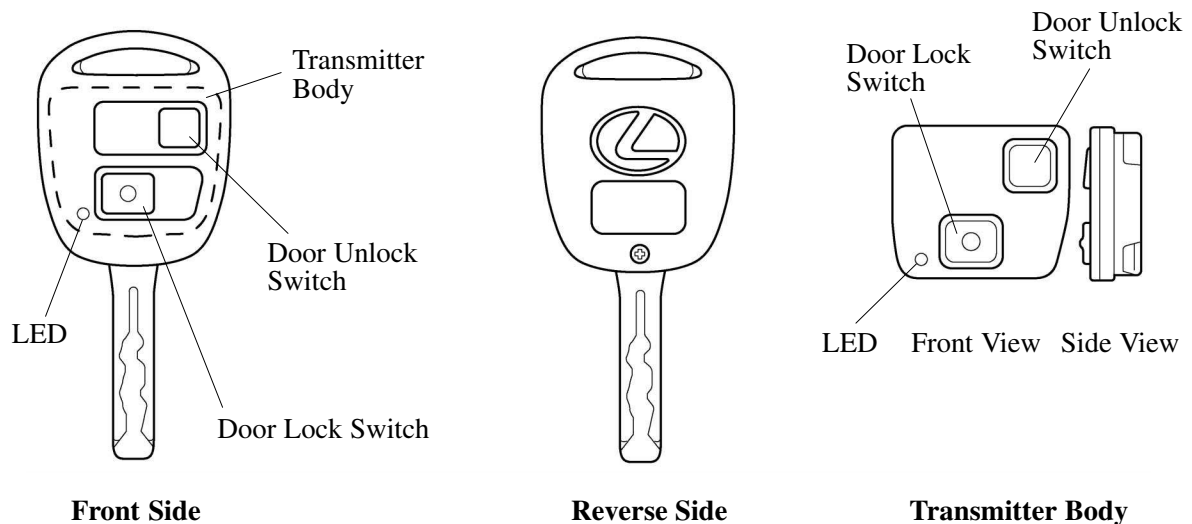
In case of making new ignition key due to the loss of it, it is necessary to register recognition code. Refer to see the LEXUS RX300 Repair Manual (Pub. No. RM785E).

2. Construction

Transmitter

A key-integrated, two-button (lock, unlock) type transmitter has been adopted.

This transmitter is equipped with an LED display function to monitor the condition of the battery. Furthermore, its construction allows the key molded portion and the transmitter body to be separated completely for improved serviceability.



187BE12

3. Function

General

The wireless door lock remote control system in the RX300 has the following functions.

Function	Outline
All Doors Lock or Unlock Operation	Pressing the door lock switch or the door unlock switch locks or unlocks all the doors. The hazard light is flashed once when locking, and the hazard light is flashed twice when unlocking, to inform that the operation has been completed.
Auto Lock Function	If none of the doors are opened within approximately 30 seconds after they are unlocked by the wireless door lock remote control, all the doors are locked again automatically.
Illuminated Entry Function	When all the driver's doors are locked, pressing the "door unlock" switch causes the interior lights to illuminate simultaneously with the unlock operation.
Transmitter Switch Misoperation Prevention Function	When an ignition key is in the ignition key cylinder or any of the doors is not closed completely, the wireless door lock remote control is temporarily cancelled to prevent misoperation. However, unlock can be operated when with any door opened.
Security Function	Send an operation signal as a rolling code.
Repeat Function	If no changes occur in the lock condition when the door lock switch is pressed once, this function causes the body ECU to output a lock signal once again.
Transmitter Recognition Code Registration Function	Enables the registering (writing and storing) of 4 types of transmitter recognition code in the EEPROM that is contained in the door control receiver.

Transmitter Recognition Code Registration Function

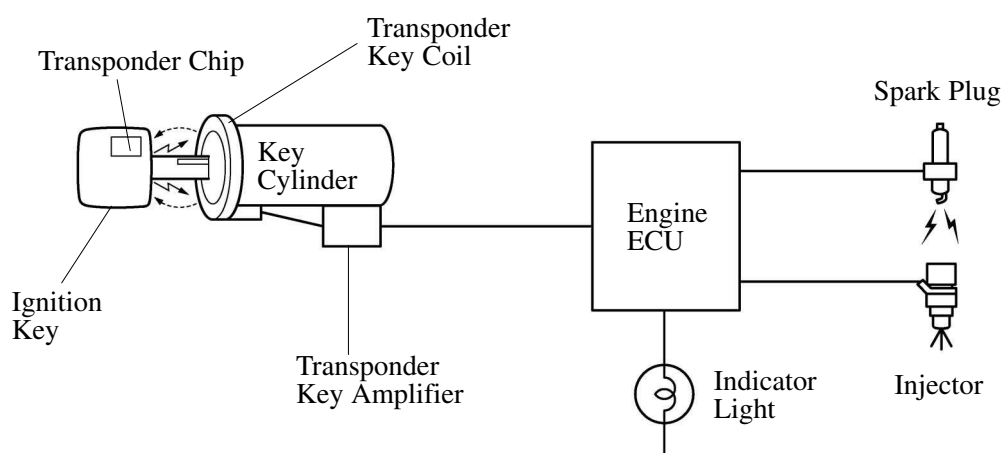
The table below shows the 4 special coded ID registration function modes through which up to 4 different codes can be registered. The codes are electronically registered (written to and stored) in the EEPROM. For details of the recognition code registration procedure, refer to the LEXUS RX300 Repair Manual (Pub. No. RM785E) to register the codes correctly.

Mode	Function
Rewrite Mode	Erases all previously registered codes and registers only the newly received codes. This mode is used whenever a transmitter or the body ECU is replaced.
Add Mode	Adds a newly received code while preserving any previously registered codes. This mode is used when adding a new transmitter. If the number of codes exceeds 4, the oldest registered code is erased first.
Confirm Mode	Confirms how many codes are currently registered. When adding a new code, this mode is used to check how many codes already exist.
Prohibit Mode	To delete all the registered codes and to prohibit the wireless door lock function. This mode is used when the transmitter is lost.

■ ENGINE IMMOBILISER SYSTEM

The engine immobiliser system is theft deterrent system which disables the engine from starting using the ignition key with an ID code that matched is the pre-registered code in the vehicle. This system consists of the transponder chip, coil, amplifier, and immobiliser ECU. The immobiliser ECU is enclosed in the engine ECU. This system adopts a transponder system which uses a transponder chip embedded in the grip of the ignition key. When the coil located around the ignition key cylinder receives the ID code signal transmitted by the transponder chip, the engine ECU determines whether or not the ID code matches the code stored.

► System Diagram ◀



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Service Tip

In case of making new ignition key due to the loss of it, it is necessary to register ID code. Refer to see the LEXUS RX300 Repair Manual (Pub. No. RM785E).

THEFT DETERRENT SYSTEM

1. General

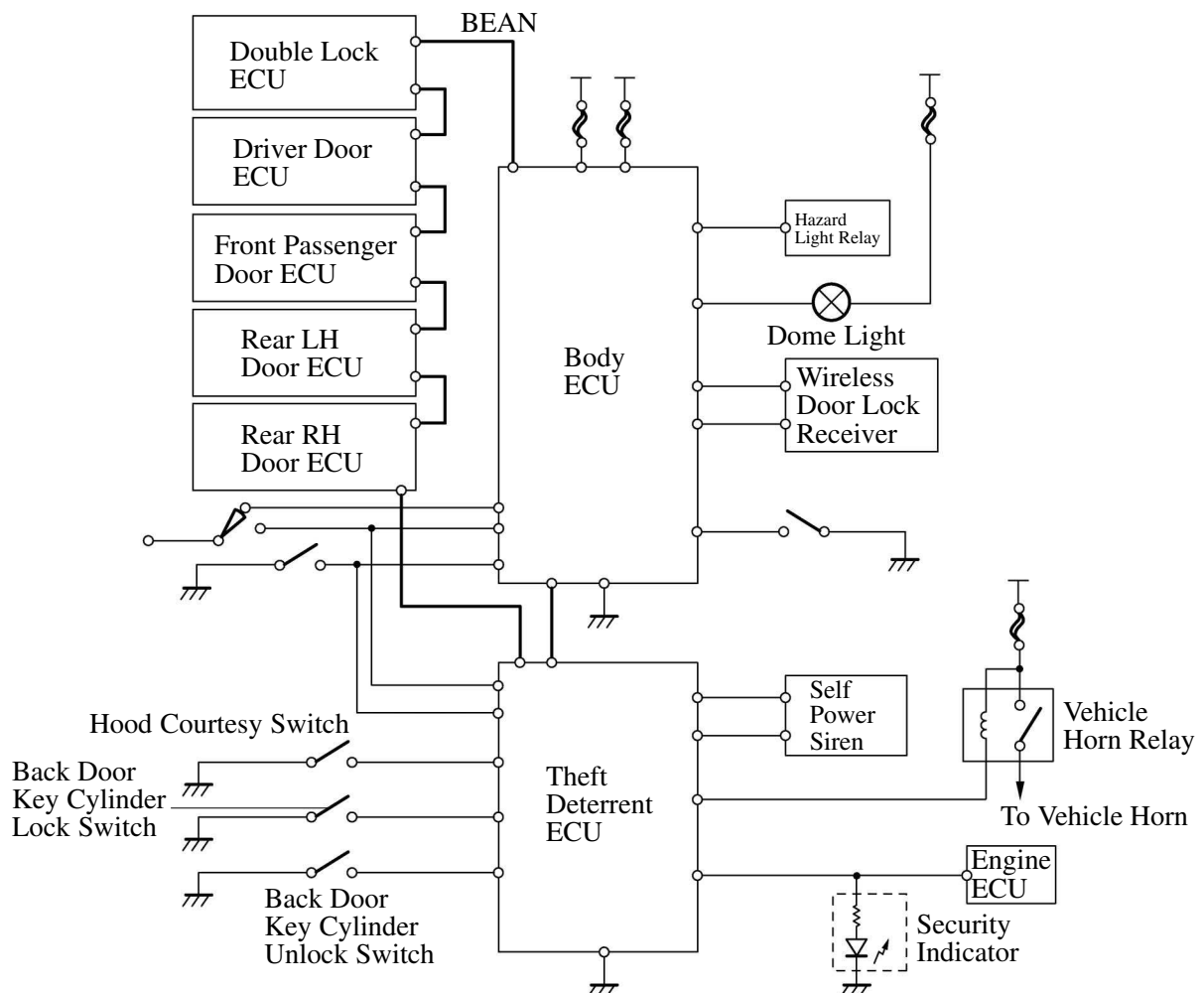
- The theft deterrent system uses the door lock control system components and some other parts. The theft deterrent system will operate when somebody attempts to forcibly enter the vehicle or open the engine hood or all the doors without using transmitter, or when the battery terminals are removed and reconnected. The warning specifications of this system are listed below.

Warning Specifications ◀

Warning Method	Vehicle Horn	Sounds at approximately 0.25 second intervals.
	Interior Light	Illuminates
	Hazard Light	Flashing
	Self Power Siren	Sounds at the cycle of the self-powered siren itself.
	Door Lock Motors	Locking
Warning Time		Approximately 27.5 seconds

- The control of this system is effected by the theft deterrent ECU.

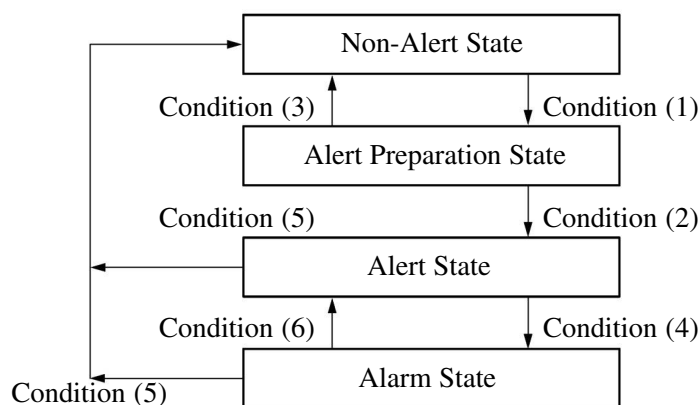
Wiring Diagram ◀



► List of Input Output Signals ◀

Transmission ECU	Input Signal	Outline
Body ECU	IG	Condition signal from ignition key switch.
	KSW	Signal indicating the presence of absence of a key in ignition key cylinder.
	WDLK	Lock signal from wireless door lock remote control.
	WDUL	Unlock signal from wireless door lock remote control.
	LSWB	Door lock position switch signal from back door.
	DSWB	Condition signal from back door courtesy switch.
	ACC	Condition signal from ACC switch.
	ILE	Interior light illumination output signal.
	HAZ	Output signal to hazard light relay.
Driver Door ECU	DCTY	Condition signal from driver door courtesy switch.
	DKL	Lock signal from driver door key cylinder.
	DKUL	Unlock signal from driver door key cylinder.
	LSWD	Door lock position switch signal from driver door.
Front Passenger Door ECU	PCTY	Condition signal from front passenger door courtesy switch.
	LSWP	Door lock position switch signal from front passenger door.
Rear LH Door ECU	LCTY	Condition signal from rear left door courtesy switch.
	LSWL	Door lock position switch signal from rear left door.
Rear RH Door ECU	RCTY	Condition signal from rear right door courtesy switch.
	LSWR	Door lock position switch signal from rear right door.
Theft Deterrent ECU	IND	Output signal to security indicator.
	HORN	Output signal to vehicle's horn relay.
	DSWH	Condition signal of hood courtesy switch.
	IG	Condition signal from ignition key switch.
	KSW	Signal indicating the presence or absence of a key in ignition key cylinder.
	BDSL	Lock signal from back door key cylinder.
	BDSU	Unlock signal from back door key cylinder.
	TRIG	Controls self-powered siren conditions.
	CTLS	Outputs signals to activate self-powered siren.
All ECU	MPX1,2	Multiplex Communication (BEAN)

2. Operation



Non-Alert State: When the security function is inactive.

Without having the ignition key in the key cylinder, if any one of the conditions listed below exists, the system transfers to the alert preparation state.

Condition (1)

When the doors and engine hood are all closed, the wireless door lock remote control system is used to lock all doors.

Alert Preparation State: a delay time until the alert state

The system transfers to the alert state if the condition (2) listed below is met, and to the non-alert state if one of the conditions (3) is met.

Condition (2)

When the doors and engine hood are all closed and locked, and 30 seconds have elapsed.

Condition (3)

- When one of the doors or engine hood is changed from “close” to “open” condition.
- When one of the doors or engine hood is changed from “lock” to “unlock” condition.
- When the ignition key is inserted in the key cylinder.
- When a terminal is disconnected from the battery and reconnected.

Alert State: a state in which attempted theft can be detected

The system transfers to the alarm state if any one of the conditions (4) listed below is met, or to the non-alert state if any one of the conditions (5) is met.

Condition (4)

- Any door or engine hood is opened.
- The wireless door lock remote control system other than the transmitter is used for unlocking.
- The engine hood is opened.
- A terminal is disconnected from the battery and reconnected.
- The wiring harness is directly connected as if to turn the ignition switch ON.

Condition (5)

The transmitter of the wireless door lock remote control system is used to unlock the doors.

Alarm State: a state in which attempted theft can be detected

- When an attempted theft is detected, the system sounds the vehicle's horn and self power siren flashes the hazard lights, and illuminates the interior light to alert the people in the area. If any one of the doors is unlocked, and the ignition key is not inserted in the ignition key cylinder, the system forcefully locks the doors once.
- The system transfers to the alert state if the condition (6) described below is met, or, when the system is in the alarm state, it transfers to the non-alert state if the condition (5) described above is met.

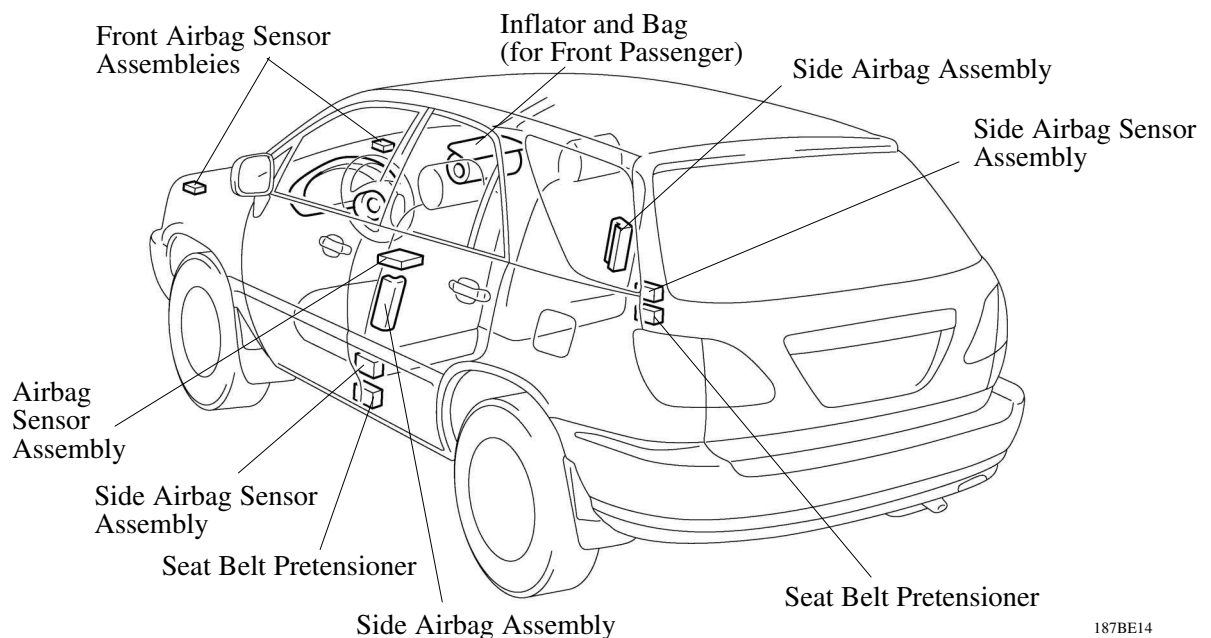
Condition (6)

- After approximately 27.5 seconds of the alarm time have elapsed.

■ SRS AIRBAG SYSTEM

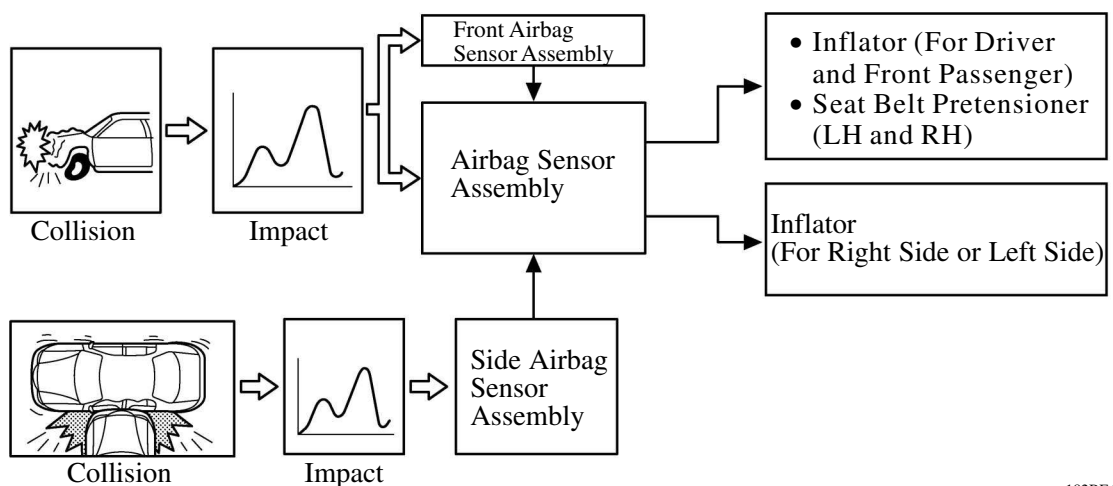
- The SRS (Supplemental Restraint System) airbags are provided for the driver and front passenger. The SRS airbags help to reduce injuries mainly to the driver's or front passenger's head or chest in the event of a frontal impact collision as supplements to the seat belts. This system is a 3-sensor type airbag system to detect the impact during a front collision using the airbag sensor assembly and front airbag sensor, and to make the airbag system and seat belt pretensioner operate as well.
- The SRS side airbags are provided for the driver and front passenger. The SRS side airbag help to reduce injuries mainly to the driver's or front passenger's chest in the event of a side collision. The driver side and the front passenger side are each provided with one sensor.
- The RX300 has adopted a fuel cut control that stops the fuel pump when the SRS driver's and front passenger's airbags are deployed.

► Layout of Components ◀



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► System Diagram ◀



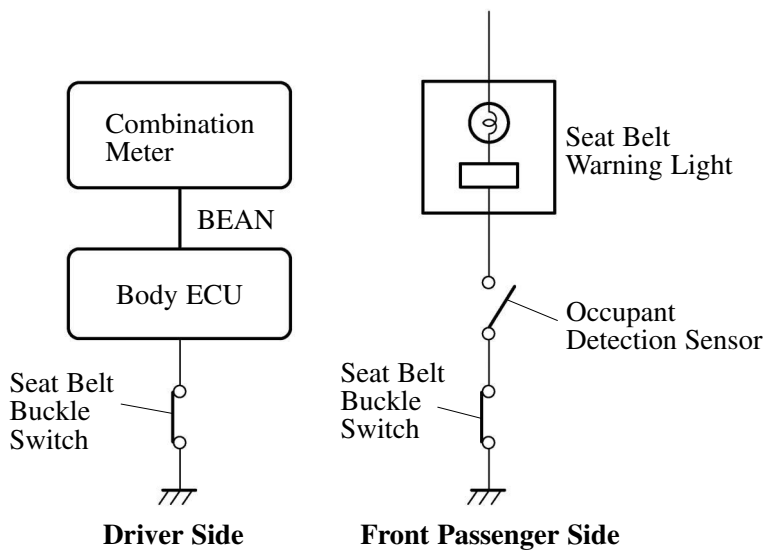
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■ SEAT BELT WARNING SYSTEM

1. General

The seat belt warning system illuminates the driver warning light and flashes the front passenger warning light to inform the driver and front passenger that the seat belt have not been fastened. When the ignition switch is turn ON, this system determines whether or not the seat belt is buckled by the ON or OFF condition of the switch that is provided in the seat belt buckle. The occupant detection sensor provided in the seat cushion of the front passenger seat determines whether or not an occupant is seated in the front passenger seat.

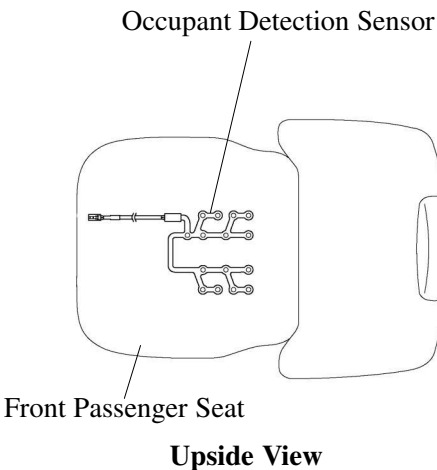
► System Diagram ◀



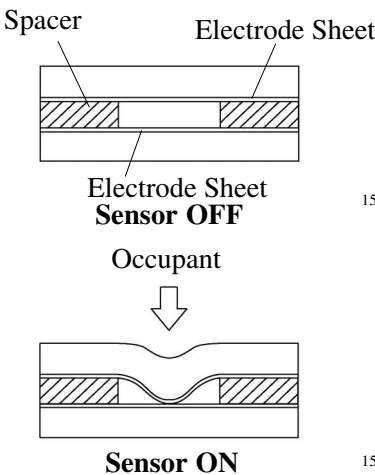
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2. Occupant Detection Sensor

The occupant detection sensor, which is enclosed in the seat cushion of the front passenger seat, is used to detect whether or not the front passenger seat is occupied. This sensor, which is shaped as illustrated below, consists of a construction in which two sheets of electrodes sandwich a spacer. When the occupant is seated, the electrode sheets come in contact with each other through the hole that is provided in the spacer portion, thus enabling the current to flow. Thus, the sensor detects whether or not an occupant is seated in the front passenger seat.



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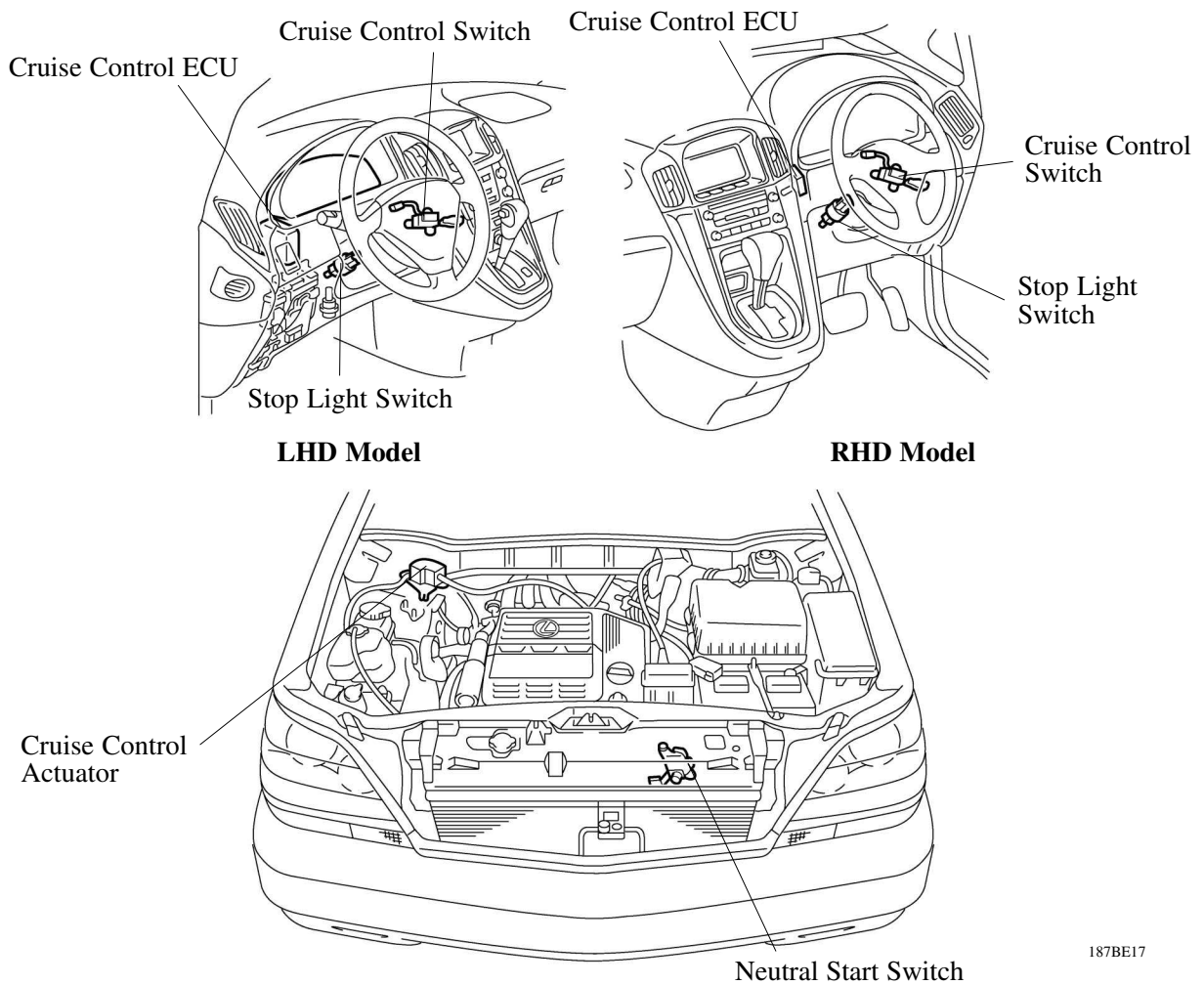
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■ CRUISE CONTROL SYSTEM

1. General

Once the system is set to a desired vehicle speed, the engine throttle position is adjusted automatically to maintain the vehicle speed at that speed without depressing the accelerator pedal.
This system is optional equipment.

2. Layout of Components



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3. Function

The cruise control ECU has the following functions.

► Functions ◀

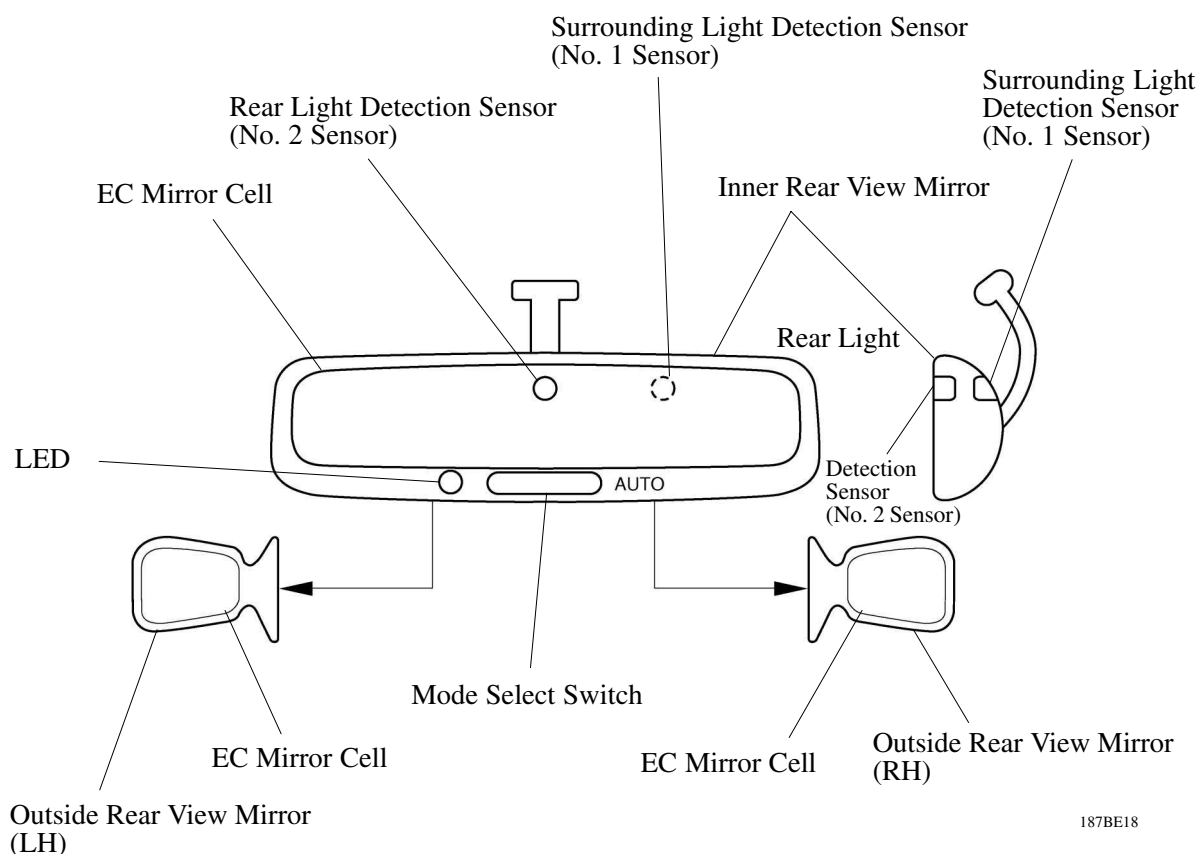
Function of cruise control ECU					
1	Constant Speed Control	6	Low Speed Limit Control	11	Magnetic Clutch Control
2	Set	7	High Speed Limit Control	12	Diagnosis
3	Coast	8	Automatic Transmission Control	13	Fail Safe
4	Accel	9	Manual Cancel	14	Tap-Down Control
5	Resume	10	Auto Cancel	15	Tap-Up Control

■ AUTOMATIC GLARE-RESISTANT EC MIRROR SYSTEM

1. General

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 headlamps of the vehicle driving behind. This system is optional equipment.

2. Layout and Function of Components



Components	Function
LED	Turns on to inform the driver that the mirror control mode is operating in the AUTO mode.
Mode Select Switch	Selects the inner and outside mirror control to AUTO or DAY mode.
EC Mirror Cell	Varies the reflection rate of the mirror through the function of electrochromic elements.
Surrounding Light Detection Sensor (No. 1 Sensor)	Detects the intensity of the light surrounding the vehicle.
Rear Light Detection Sensor (No. 2 Sensor)	Detects the intensity of the light entering the inner mirror from behind the vehicle.

■ POWER SEAT

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

A 2-stage seat heater is provided in the driver and passenger front seats optional equipment. The seat heater switch changes the output of the heating elements located in the seatback and seat cushion, to LO or HI. This is accomplished by changing the heating element to series (LO) or to parallel (HI) connection.

■ OUTSIDE REAR VIEW MIRROR

Electrical remote control type mirrors provided with an internal heater, which operates in conjunction with the rear window defogger, have been adopted. In addition, EC (electrochromic) mirrors that can automatically vary their reflection rate are offered as an option on the RX300.

■ MOON ROOF

This system is optional equipment. The moon roof system has the following functions.

Function	Outline
One touch tilt up-and-down function	The “tilt one-touch auto up-and-down” function enables the moon roof to be tilt up or down a touch of the tilt up switch or slide open switch.
One touch open and-close function	The “one-touch auto open-and-close” function enables the moon roof to be open or close a touch of the slide open switch or tilt up switch. The “one-touch auto open-and-close” function enables the moon roof to be opened or closed at a touch of the slide open switch or the tilt-up switch. However, this open function cannot operate the moon roof to its fully open position. To reduce the wind noise, this function automatically stops the moon roof approximately 50 mm before the fully open position. The moon roof can then be fully opened by pressing the switch again.
Key-linked operation function	A key-linked open function, which is linked to the driver door key cylinder operation, opens and closes the window of the driver's door.
Transmitter-linked open operation function	Keeping the “unlock” switch of the transmitter pressed longer than approximately 1.5 seconds, opens the moon roof while the switch is being pressed.

