

FOREWORD

To assist you in your sales and service activities, this manual explains the main characteristics of the 2003 model year vehicles, in particular providing a technical explanation of the construction and operation of new mechanisms and new technology used.

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.
<i>REFERENCE</i>	Explains the theory behind mechanisms and techniques.
NOTE	Notes or comments not included under the above 3 titles.

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.

TOYOTA MOTOR CORPORATION

MODEL CODE

MCX20

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P

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1	BASIC MODEL CODE
	MCX20: With 1MZ-FE Engine

5	GEAR SHIFT TYPE
	P: 4-Speed Automatic, Floor S: 4-Speed Automatic, Column

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	GRADE
	N: XL G: XLS

3	MODEL NAME
	B: AVALON

7	ENGINE SPECIFICATION
	K: DOHC and SFI

4	BODY TYPE
	E: 4-Door Sedan

8	DESTINATION
	A: U.S.A. K: Canada

MODEL LINE-UP

DESTINATION	ENGINE	BODY TYPE	GRADE	TRANSAXLE	
				4-Speed Automatic	
				Floor Shift	Column Shift
U.S.A.	1MZ-FE	4-Door Sedan	XL	MCX20L-AEPNKA	MCX20L-AESNKA
			XLS	MCX20L-AEPGKA	MCX20L-AESGKA
Canada			XL	MCX20L-AEPNKK	—
			XLS	MCX20L-AEPGKK	—

MODEL CODE

ACV30 L – A E M N K A

1 2 3 4 5 6 7 8

3

1	BASIC MODEL CODE
	ACV30: With 2AZ-FE Engine MCV30: With 1MZ-FE Engine

5	GEAR SHIFT TYPE
	M: 5-Speed Manual P: 4-Speed Automatic

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	GRADE
	N: LE G: XLE S: SE

3	MODEL NAME
	A: Camry (Produced TMC * ¹) C: Camry (Produced TMMK * ²)

7	ENGINE SPECIFICATION
	K: DOHC and SFI

4	BODY TYPE
	E: 4-Door Sedan

8	DESTINATION
	A: U.S.A. and Canada

*¹ TMC : Toyota Motor Corporation

*² TMMK : Toyota Motor Manufacturing, kentucky, Inc.

This Camry New Car Features Explains the features of Camrys manufactured by TMC. Specifications of Camrys manufactured TMMK are basically the same as those of TMC.

MODEL LINE-UP

DESTINA- TION	ENGINE	BODY TYPE	GRADE	TRANSAXLE		
				5-Speed Manual	4-Speed Automatic	
				E351	U241E	U140E
U S A and Canada	2AZ-FE	4-Door Sedan	LE	ACV30L-AEMNKA	ACV30L-AEPNKA ACV30L-CEPNKA	—
			XLE	—	ACV30L-AEPGKA ACV30L-CEPGKA	—
			SE	ACV30L-AEMSKA	ACV30L-AEPSKA ACV30L-CEPSKA	—
	1MZ-FE		LE	—	—	MCV30L-AEPNKA MCV30L-CEPNKA
			XLE	—	—	MCV30L-AEPGKA MCV30L-CEPGKA
			SE	—	—	MCV30L-AEPSKA MCV30L-CEPSKA

MODEL CODE

MCV20 L – G C P N K A

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8

1	BASIC MODEL CODE
	ACV20: With 2AZ-FE Engine MCV20: With 1MZ-FE Engine

5	GEAR SHIFT TYPE
	M: 5-Speed Manual, Floor P: 4-Speed Automatic, Floor

4

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	GRADE
	N: SE or SLE

3	MODEL NAME
	G: Camry Solara (Produced by TMMC)*

7	ENGINE SPECIFICATION
	K: DOHC and SFI

4	BODY TYPE
	C: 2-Door Coupe K: Convertible

8	DESTINATION
	A: U.S.A. K: Canada

* : TMMC (Toyota Motor Manufacturing, Canada, Inc.)

MODEL LINE-UP

DESTINATION	ENGINE	BODY TYPE	GRADE	TRANSAXLE			
				5-Speed Manual		4-Speed Automatic	
				E351	E153	U241E	A541E
U S A	2AZ-FE	2-Door Coupe	SE	ACV20L-GCMNKA	—	ACV20L-GCPNKA	—
	1MZ-FE		SE (SLE)	—	MCV20L-GCMNKA	—	MCV20L-GCPNKA
	2AZ-FE	Convertible	SE	—	—	ACV20L-GKPNKA	—
	1MZ-FE		SE (SLE)	—	—	—	MCV20L-GKPNKA
Canada	2AZ-FE	2-Door Coupe	SE	—	—	ACV20L-GCPNKK	—
	1MZ-FE		SE (SLE)	—	MCV20L-GCMNKK	—	MCV20L-GCPNKK
		Convertible		—	—	—	MCV20L-GKPNKK

(): Option for Automatic Transaxle Model

☐ : Discontinued

MODEL CODE

ZZT230 L – B L M S H A

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1	BASIC MODEL CODE
	ZZT230: With 1ZZ-FE Engine ZZT231: With 2ZZ-GE Engine

5	GEAR SHIFT TYPE
	M: 5-Speed Manual, Floor F: 6-Speed Manual, Floor P: 4-Speed Automatic, Floor

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	GRADE
	S: GT V: GT-S

3	MODEL NAME
	B: CELICA

7	ENGINE SPECIFICATION
	H: DOHC and SFI F: Sporty DOHC and SFI

4	BODY TYPE
	L: Liftback

8	DESTINATION
	A: U.S.A. and Canada

5

MODEL LINE-UP

DESTINA- TION	ENGINE	BODY TYPE	GRADE	TRANSAXLE			
				5-Speed Manual	6-Speed Manual	4-Speed Automatic	
				C56	C60	U240E	U341E
U S A and Canada	1ZZ-FE	Liftback	GT	ZZT230L- BLMSHA	—	—	ZZT230L- BLPSHA
	2ZZ-GE		GT-S	—	ZZT231L- BLFVFA	ZZT231L- BLPVFA	—

MODEL CODE

ZZW30

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1	BASIC MODEL CODE
	ZZW30: With 1ZZ-FE Engine

5	GEAR SHIFT TYPE
	M: 5-Speed Manual, Floor L: 6-Speed Sequential, Floor

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	GRADE
	Q: G

3	MODEL NAME
	A: MR2

7	ENGINE SPECIFICATION
	H: DOHC and SFI

4	BODY TYPE
	K: Convertible

8	DESTINATION
	A: U.S.A.

6

MODEL LINE-UP

DESTINA- TION	ENGINE	BODY TYPE	GRADE	TRANSAXLE		
				5-Speed Manual		6-Speed Manual
				Conventional Shift	Sequential Shift	
U S A	1ZZ-FE	Convertible	G	ZZW30L AKMQHA	ZZW30L AKGQHA	ZZW30L AKLQHA

 : New : Discontinued

MODEL CODE

NHW11 L - A E E E B A

1 2 3 4 5 6 7 8

1	BASIC MODEL CODE
	NHW11: With 1NZ-FXE Engine

5	GEAR SHIFT TYPE
	E: Automatic, Column

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	GRADE
	E: Standard

3	MODEL NAME
	A: Prius

7	ENGINE SPECIFICATION
	B: Atkinson

4	BODY TYPE
	E: 4-Door Sedan

8	DESTINATION
	A: U.S.A
	K: Canada

7

MODEL LINE-UP

DESTINATION	ENGINE	BODY TYPE	GRADE	TRANSAXLE
				Automatic
U S A	1NZ-FXE	4-Door Sedan	Standard	NHW11L-AEEEEBA
Canada				NHW11L-AEEEBK

MODEL CODE

RZN140

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1	BASIC MODEL CODE			
	CODE	DRIVE TYPE	ENGINE	WHEEL BASE
	RZN140	2WD	2RZ-FE	Short
	RZN150			Extra Long
	VZN150		5VZ-FE	Long
	RZN161	4WD	3RZ-FE	Short
	RZN171			Extra Long
	VZN170		5VZ-FE	Long
	RZN191	2WD (Pre Runner)	3RZ-FE	Short
	RZN196			Extra Long
	VZN195		5VZ-FE	Long

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

3	CAB TYPE
	T: Regular Cab C: Extra Cab P: Double Cab

4	DECK & TIRE TYPE
	R: Steel Low Deck (Single Tire)

5	GEAR SHIFT TYPE
	M: 5-Speed Manual, Floor S: 4-Speed Automatic, Floor

6	GRADE
	D: —, SR5, Limited or Sport

7	ENGINE SPECIFICATION
	K: DOHC and SFI

8	DESTINATION
	A: U.S.A. and Canada

9	PRODUCT
	B: NUMMI*

*: NUMMI (New United Motor Manufacturing, Inc.)

MODEL LINE-UP

DESTINATION	DRIVE TYPE	ENGINE	SEATING CAPACITY	WHEEL BASE	CAB TYPE	GRADE	TRANSMISSION			
							5 Speed Manual		4 Speed Automatic	
							W59	R150 (F)*1	A44D	A340 (F)*2
U S A and Canada	2WD	2RZ FE	3 (2)	Short	Regular Cab	— (SR5)	RZN140L TRMDKAB*3	—	RZN140L TRPDKAB*3	—
			5 (4)	Extra Long	Extra Cab		RZN150L CRMDKAB	—	RZN150L CRPDKAB	—
		5VZ FE				Sport	—	VZN150L CRMDKAB*3	—	—
	4WD	3RZ FE	3 (2)	Short	Regular Cab	— (SR5)	RZN161L TRMDKAB*3	—	—	RZN161L TRPDKAB*3
			5 (4)	Extra Long	Extra Cab		RZN171L CRMDKAB	—	—	RZN171L CRPDKAB
		5VZ FE				— (SR5) (Limited)	—	VZN170L CRMDKAB	—	VZN170L CRPDKAB
			5		Double Cab		—	—	—	VZN170L PRPDKAB
	2WD Pre Runner	3RZ FE	3 (2)	Short	Regular Cab	— (SR5)	—	—	—	RZN191L TRPDKAB*3
			5 (4)	Extra Long	Extra Cab		—	—	—	RZN196L CRPDKAB
			5		Double Cab		—	—	—	RZN196L PRPDKAB
		5VZ FE	5 (4)		Extra Cab		—	—	—	VZN195L CRPDKAB
			5		Double Cab		—	—	—	VZN195L PRPDKAB

(): Option

*1: 2WD : R150, 4WD : R150F

*2: 2WD : A340E, 4WD : A340F

*3: Model for U.S.A. only

MODEL CODE

NCP12 L – B D M R K A

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1	BASIC MODEL CODE
	NCP12: With 1NZ-FE Engine

5	GEAR SHIFT TYPE
	M: 5-Speed Manual, Floor P: 4-Speed Automatic, Floor

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	GRADE
	R: –

3	MODEL NAME
	B: ECHO

7	ENGINE SPECIFICATION
	K: DOHC and SFI

4	BODY TYPE
	D: 2-Door Sedan E: 4-Door Sedan

8	DESTINATION
	A: U.S.A. K: Canada

8

MODEL LINE-UP

DESTINA- TION	ENGINE	BODY TYPE	TRANSAXLE	
			5-Speed Manual	4-Speed Automatic
			C150	U340E
U S A	1NZ-FE	2-Door Sedan	NCP12L-BDMRKA	NCP12L-BDPRKA
		4-Door Sedan	NCP12L-BEMRKA	NCP12L-BEPRKA
Canada		2-Door Sedan	NCP12L-BDMRKK	NCP12L-BDPRKK
		4-Door Sedan	NCP12L-BEMRKK	NCP12L-BEPRKK

MODEL CODE

UZJ100 L – G N A E K A

12345678

1	BASIC MODEL CODE UZJ100: With 2UZ-FE Engine	5	GEAR SHIFT TYPE A: 5-Speed Automatic, Floor
2	STEERING WHEEL POSITION L: Left-Hand Drive	6	GRADE E: VX
3	BODY TYPE G: Station Wagon	7	ENGINE SPECIFICATION K: DOHC and SFI
4	BACK DOOR TYPE N: Lift-Up Back Door	8	DESTINATION A: U.S.A.

MODEL LINE-UP

DETI-NATION	ENGINE	BACK DOOR TYPE	GRADE	DRIVE TYPE	TRANSMISSION	
					4-Speed Automatic	5-Speed Automatic
U.S.A.	2UZ-FE	Lift-Up	VX	Full-Time 4WD	UZJ100L-GNPEKA	UZJ100L-GNAEKA

: New

: Discontinued

MODEL CODE

VCK30

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1	BASIC MODEL CODE		
	CODE	DRIVE TYPE	ENGINE
	VCK30	2WD	5VZ-FE
	VCK40	4WD	5VZ-FE
	UCK30	2WD	2UZ-FE
	UCK40	4WD	2UZ-FE

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

3	CAB TYPE
	T: Regular Cab A: Access Cab

4	DECK TYPE
	R: Standard Bed S: StepSide Bed

5	GEAR SHIFT TYPE
	M: 5-Speed Manual, Floor S: 4-Speed Automatic, Column

6	GRADE
	D: Base S: SR5 L: Limited

7	ENGINE SPECIFICATION
	K: DOHC and SFI

8	DESTINATION
	A: U.S.A. K: Canada

MODEL LINE-UP

Donated by Andrew Schauer cruisercult.com

DESTE NATION	CAB TYPE	DRIVE TYPE	ENGINE	SEATING CAPA CITY	GRADE	TRANSMISSION				
						5 Speed Manual		4 Speed Automatic		
						R150	R150F	A340E	A340F	
U S A	Standard	2WD	5VZ FE	3	Base	VCK30L TRMDKA	—	VCK30L TRSDKA	—	
		4WD		3	SR 5	—	VCK40L TRMSKA	—	—	
			—			—	—	VCK40L TRSSKA		
		2UZ FE	—	—		—	UCK40L TRSSKA			
	Access	2WD	5VZ FE	5		Limited	VCK30L ARMSKA	—	—	—
				6 (5)	—		—	VCK30L ARSSKA	—	
		4WD	5	SR 5	—	VCK40L ARMSKA	—	—		
					—	—	—	VCK40L ARSSKA		
			2WD	2UZ FE	6 (5)	SR 5	—	—	UCK30L ARSSKA	—
							—	—	UCK30L ASSSKA*	—
		4WD	Limited			—	—	UCK30L ARSLKA	—	
						—	—	UCK30L ASSLKA*	—	
		2WD	5VZ FE	5	SR 5	—	—	UCK40L ARSSKA	—	
						—	—	UCK40L ASSSKA*	—	
4WD	Limited	—	—	UCK40L ARSLKA	—					
		—	—	UCK40L ASSLKA*	—					
Canada	Standard	2WD	5VZ FE	5	Base	VCK30L TRMDKK	—	VCK30L TRSDKK	—	
		4WD				2UZ FE	—	—	—	VCK40L TRSDKK
		Access	2WD		5VZ FE	SR 5	—	—	—	VCK40L ARSSKK
							4WD	2UZ FE	—	—
	2WD		2UZ FE	6 (5)	Limited	—	—	UCK30L ARSLKK	—	
						4WD	—	—	—	UCK40L ARSSKK
	2WD	5VZ FE	5	Base	—	—	—	VCK40L TRSDKK		
					4WD	2UZ FE	—	—	—	UCK40L TRSDKK

(): Option

* : StepSide Bed

 : New

 : Discontinued

MODEL CODE

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1	BASIC MODEL CODE		
	CODE	DRIVE TYPE	ENGINE
	UCK35	2WD	2UZ-FE
	UCK45	4WD	

2	STEERING WHEEL POSITION	
	L: Left-Hand Drive	

3	MODEL NAME	
	G: SEQUOIA	

4	BODY TYPE	
	K: 5-Door Wagon	

5	GEAR SHIFT TYPE	
	S: 4-Speed Automatic, Column	

6	GRADE	
	S: SR5 L: Limited	

7	ENGINE SPECIFICATION	
	K: DOHC and SFI	

8	DESTINATION	
	A: U.S.A. and Canada	

MODEL LINE-UP

DESTINA- TION	DRIVE TYPE	ENGINE	GRADE	TRANSMISSION	
				4-Speed Automatic	
				A340E	A340F
U.S.A.	2WD	2UZ-FE	SR5	UCK35L-GKSSKA	—
			Limited	UCK35L-GKSLKA	—
U.S.A. and Canada	4WD		SR5	—	UCK45L-GKSSKA
			Limited	—	UCK45L-GKSLKA

MODEL CODE

MCU20 L – B W P N K A

1 2 3 4 5 6 7 8

1	BASIC MODEL CODE		
	CODE	DRIVE TYPE	ENGINE
	MCU20	2WD	1MZ-FE
	MCU25	4WD	
	ACU20	2WD	2AZ-FE
	MCU25	4WD	

5	GEAR SHIFT TYPE
	P: 4-Speed Automatic, Floor

6	GRADE
	N: STD

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

7	ENGINE SPECIFICATION
	K: DOHC and SFI

3	MODEL NAME
	B: HIGHLANDER

8	DESTINATION
	A: U.S.A. and Canada

4	BODY TYPE
	W: 5-Door Wagon

MODEL LINE-UP

DESTINATION	DRIVE TYPE	ENGINE	TRANSAXLE		
			4-Speed Automatic		
			2WD		4WD
			U241E	U140E	U140F
U S A and Canada	2WD	1MZ-FE	—	MCU20L-BWPNKA	—
	4WD		—	—	MCU25L-BWPNKA
	2WD	2AZ-FE	ACU20L-BWPNKA	—	—
	4WD		—	—	ACU25L-BWPNKA

MODEL CODE

MCL10 L – P F S D K A
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1	BASIC MODEL CODE
	MCL10: With 1MZ-FE Engine

5	GEAR SHIFT TYPE
	S: 4-Speed Automatic, Column

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	GRADE
	D: CE G: LE, XLE

3	BODY TYPE
	P: 5-Door Wagon

7	ENGINE SPECIFICATION
	K: DOHC and SFI

4	SEATING CAPACITY
	F: 7

8	DESTINATION
	A: U.S.A. K: Canada

MODEL LINE-UP

DESTINATION	ENGINE	BODY TYPE	GRADE	TRANSAXLE
				4-Speed Automatic
				A541E
U S A	1MZ-FE	5-Door Wagon	CE	MCL10L-PFSDKA
Canada			LE or XLE	MCL10L-PFSGKA
			CE	MCL10L-PFSDKK
			LE ro XLE	MCL10L-PFSGKK

MODEL CODE

ACA21 L – A W M N K A
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1	BASIC MODEL CODE		
	CODE	DRIVE TYPE	ENGINE
	ACA21	4WD	1AZ-FE
	ACA26	2WD	

5	GEAR SHIFT TYPE
	M: 5-Speed Manual, Floor P: 4-Speed Automatic, Floor

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	GRADE
	N: –

3	MODEL NAME
	A: RAV4

7	ENGINE SPECIFICATION
	K: DOHC and SFI

4	BODY TYPE
	W: Wagon

8	DESTINATION
	A: U.S.A. K: Canada

MODEL LINE-UP

DESTINA- TION	ENGINE	BODY TYPE	TRANSAXLE			
			5-Speed Manual		4-Speed Automatic	
			2WD	4WD	2WD	4WD
			E352	E352F	U241E	U140F
U S A	1AZ-FE	Wagon	ACA26L- AWMNKA	ACA21L- AWMNKA	ACA26L- AWPNKA	ACA21L- AWPNKA
Canada			—	ACA21L- AWMNKK	—	ACA21L- AWPNKK

MODEL CODE

BEA11 L – A W D H S A

12345678

1	BASIC MODEL CODE
	BEA11: With Motor

5	GEAR SHIFT TYPE
	D: Single Speed Automatic, Floor

2	STEERING WHEEL POSITION
	L: Left-Hand Drive

6	BATTERY CHARGE TYPE
	H: Inductive Type

3	MODEL NAME
	A: RAV4 EV

7	ENGINE SPECIFICATION
	S: Motor

4	BODY TYPE
	W: 4-Door Wagon

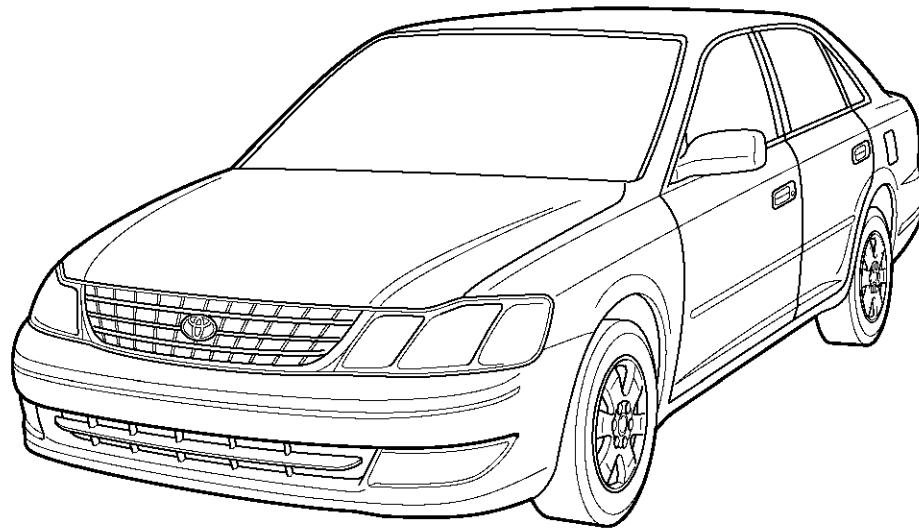
8	DESTINATION
	A: U.S.A.

MODEL LINE-UP

DESTINATION	ENGINE	BODY TYPE	BATTERY CHARGE TYPE	TRANSAXLE
				Single Speed Automatic Floor
U S A	Motor	4-Door Wagon	Inductive Type	BEA11L-AWDHSA

AVALON

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228AV12

AVALON

OUTLINE OF NEW FEATURES

The following changes have been made for the 2003 model year.

1. Exterior Color

- Total of 9 exterior colors – 6 carryover colors and 3 new colors (for U.S.A. model):
- Total of 6 exterior colors – 5 carryover colors and 1 new color (for Canada model):

Color	Color No.	Destination	
		U.S.A.	Canada
White Pearl Mica	051	Carryover	Carryover
Silver Metallic	1C8	Carryover	Carryover
Gray Mica Metallic	1E3	New	—
Black	202	Carryover	Carryover
Dark Red Mica	3Q7	New	—
Beige Mica Metallic	4Q2	Carryover	Carryover
Grayish Green Metallic	6M3	Carryover	New
Dark Green Mica	6S7	New	—
Dark Blue Mica	8Q0	Carryover	Carryover

2. 1MZ-FE Engine

The following chart describes the changes from 1MZ-FE engine on the '02 Avalon to 1MZ-FE engine on the '03 Avalon.

Item	Outline
Engine Control System	To comply with the OBD-II regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, see the 2003 General Features section.
Other	Configuration and structure are the same as 1MZ-FE engine on the '02 Avalon.

3. Brake

- VSC OFF switch has been discontinued. A TRAC OFF switch is established instead of VSC OFF switch. It is impossible to cut off the VSC.
- Along with the change of the switch, the software logic in the skid control ECU and the indicator light design (VSC OFF → TRAC OFF) have been changed.

No changes in the repair procedure or system have been made as a result of these changes.

4. Daytime Running Light System

DRL off switch is added on the U.S.A. model.

5. Wiper System

The wiper system with raindrop sensing function is added on the XLS grade as standard equipment. This function controls the wiping timing in accordance with the amount of raindrops when the wiper switch is in the AUTO position.

6. Air Conditioning

2

A clean air filter has been used as standard equipment on all models.

7. Multi Display

- A multi display is used on the models listed below.

Destination	Gear Shift Type	Grade	Equipment
U.S.A.	Floor Shift	XLS	Option
	Column Shift	XLS (only for G package)	Option
Canada	Floor Shift	XLS	Option

- This display contains the following screen functions: navigation, information (trip, maintenance, and calendar), adjustment, and diagnosis.

8. SRS Airbag System

- Dual-stage SRS airbag system is used for the driver and front passenger airbags. This system controls the optimum airbag inflating output by judging the extent of impact for front passenger airbag, and the extent of the impact, seat position and seat belt wearing condition for the driver airbag.
- The function for the airbag assembly to memorize the driver's and front passenger's seat belt wearing condition during airbag deployment is added.
- An active circuit is used in the SRS warning light circuit in order to illuminate the light when there is an open or short circuit in the wiring harness. For details, see page 28.

NEW FEATURES

■ WIPER SYSTEM

1. General

- The wiper system in the new '03 Avalon has the following function:

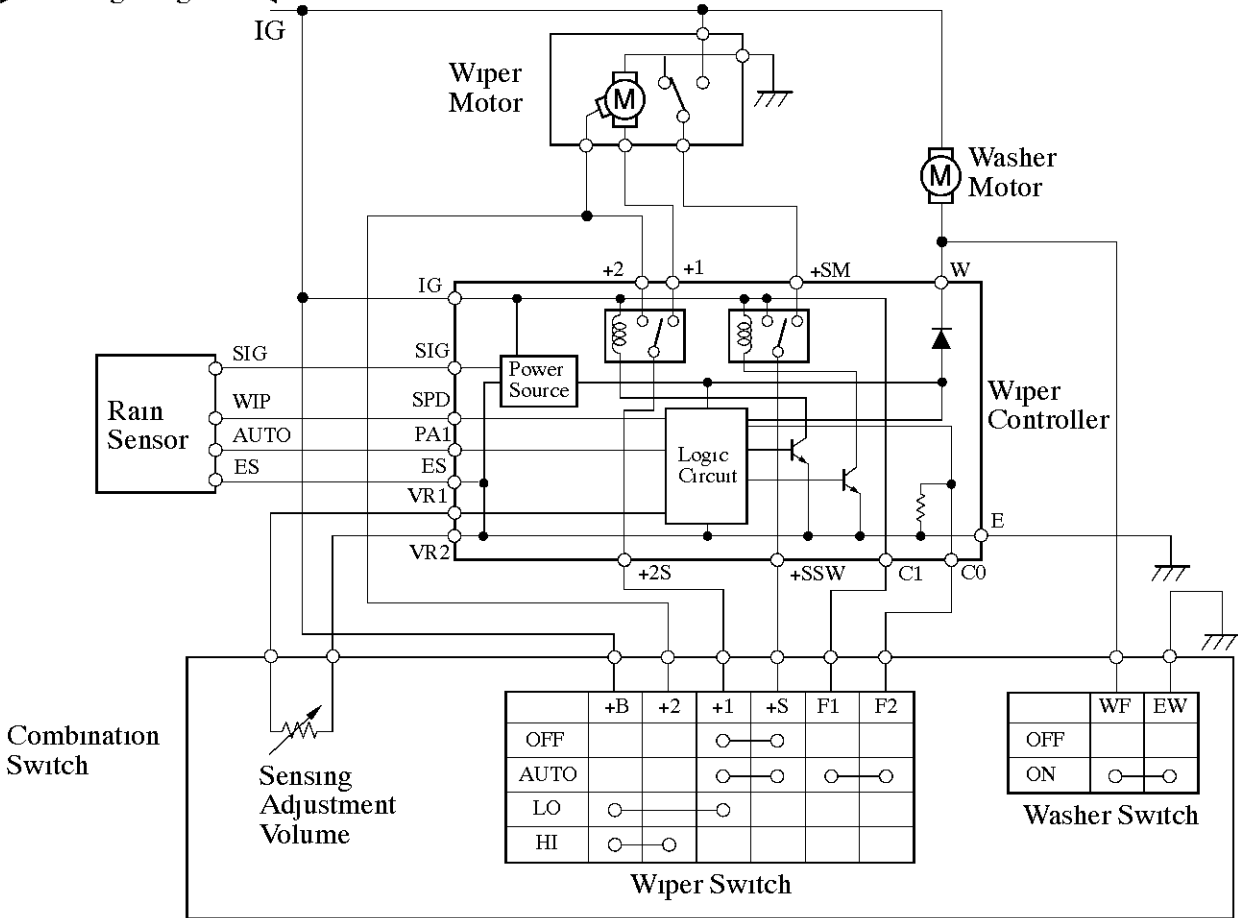
 : New

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Wiper Switch Position		Function	Outline
XL Grade	XLS Grade		
OFF	OFF	Washer-Linked	Operates the wipers a few times in unison with the washer.
INT	—	Washer-Linked	
		Intermittent	Operates the wipers intermittently in accordance with the INT time band.
—	AUTO	Washer-Linked	Operates the wipers a few times in unison with the washer.
		Raindrop Sensing	This function uses a rain sensor that is mounted on the front windshield glass to detect the amount of raindrops, and controls an optimal wiping timing accordingly.
LO	LO	Low Speed	Operates the wipers at a low speed.
HI	HI	High Speed	Operates the wipers at a high speed.

- The wiper system with raindrop sensing function includes a rain sensor and wiper controller. This system is controlled by the rain sensor and wiper controller.
- No changes have been made to the wiper system without the raindrop sensing function.

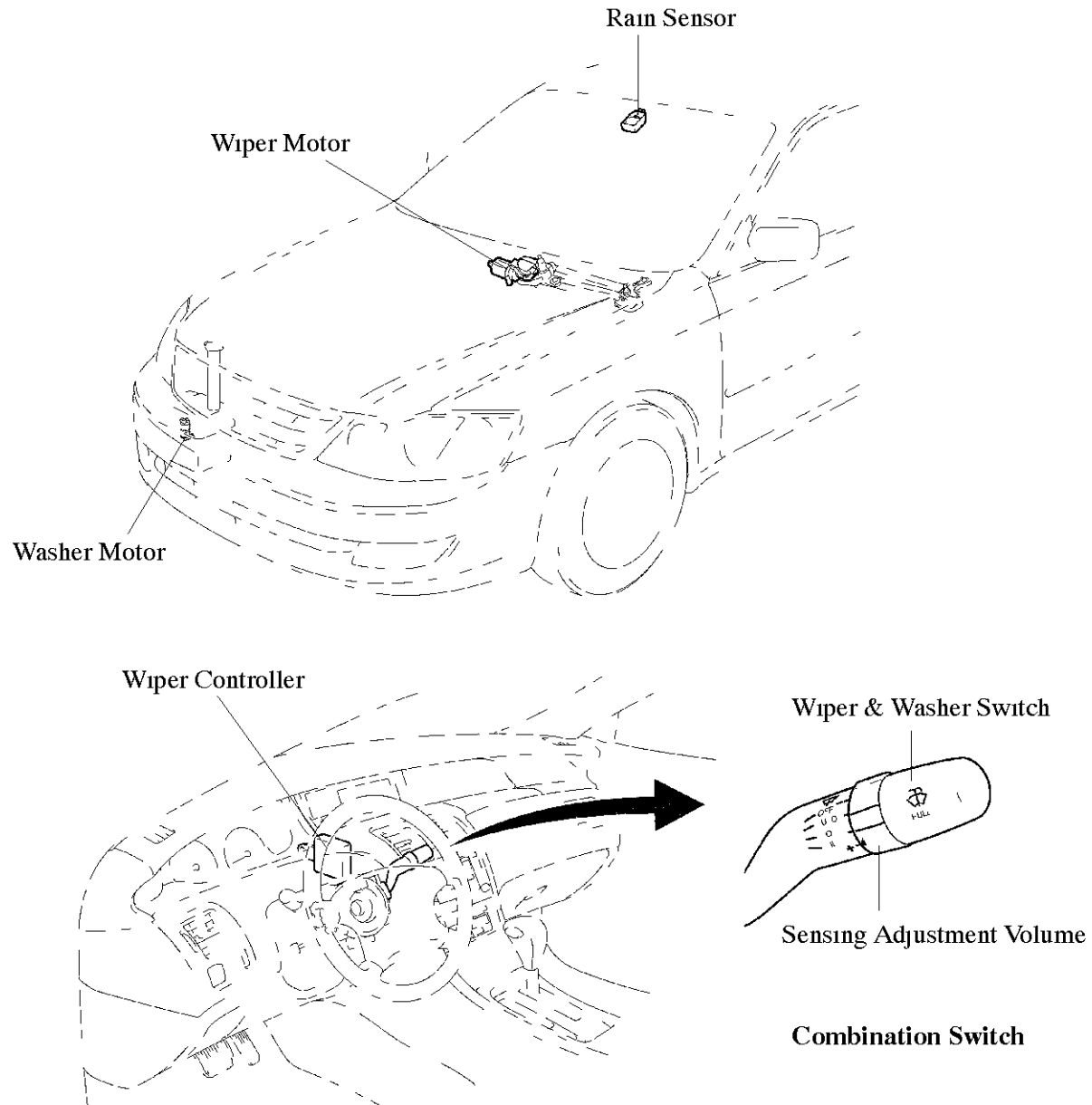
► Wiring Diagram ◀



2. Input and Output Table

Item	Mark	IN/OUT	Note
Rain Sensor	SIG	IN	Power Source
	AUTO	IN	Wiper Motor Position and Wiper Switch Position Signal (from Wiper Controller)
	WIP	OUT	Wiper Operation Request Signal (to Wiper Controller)
	ES	IN	Earth
Wiper Controller	IG	IN	Power Source (for Wiper Controller)
	+SM	IN	Wiper Motor Position Signal
	+1	OUT	Wiper Operation Output (Low)
	+2	OUT	Wiper Operation Output (High)
	SIG	OUT	Power Source (for Rain Sensor)
	SPD	IN	Wiper Operation Request Signal (from Rain Sensor)
	PA1	OUT	Wiper Motor Position and Wiper Switch Position Signal (to Wiper Controller)
	VR1	OUT	Rain Sensor Sensing Volume Signal
	VR2	IN	Rain Sensor Sensing Volume Signal
	C1	IN	AUTO Position Signal
	CO	IN	AUTO Position Signal
	+SSW	IN	Wiper Switch Signal
	+2S	IN	Wiper Switch Signal
	W	IN	Washer Switch Signal
	E	IN	Earth
	ES	OUT	Rain Sensor Ground

3. Layout of Component



2

228AV02

4. Function of Component

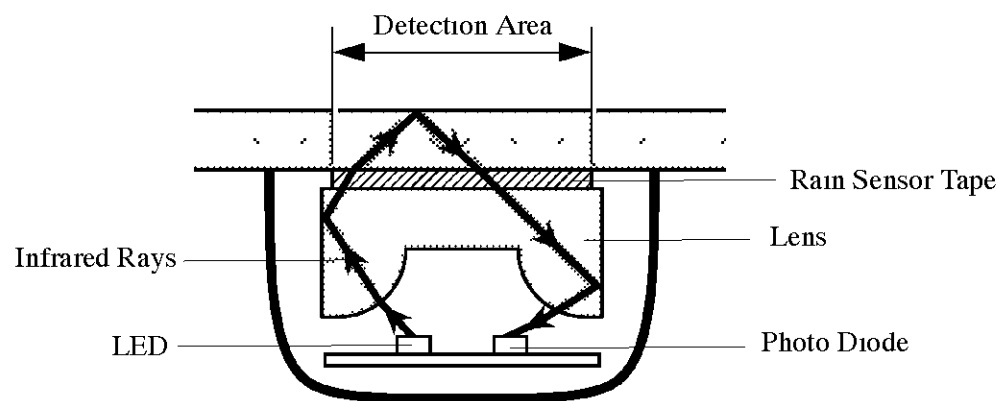
Item		Function
Rain Sensor		• Detects the amount of raindrops and outputs the wiper operation request signal. • Its sensitivity can be adjusted with the sensing adjustment volume.
Combination Switch	Wiper & Washer Switch	Inputs the switch position into the wiper controller.
	Sensing Adjustment Volume	Adjusts the sensitivity of the rain sensor.
Wiper Controller		• Operates the wipers in accordance with the rain sensor signals and the combination switch position. • Outputs the signals from the switches to the rain sensor.

5. Rain Sensor

- The rain sensor consists mainly of an LED (Lighting Emitting Diode) that emits infrared rays and photo diode that receives those rays, and rain sensor tape.

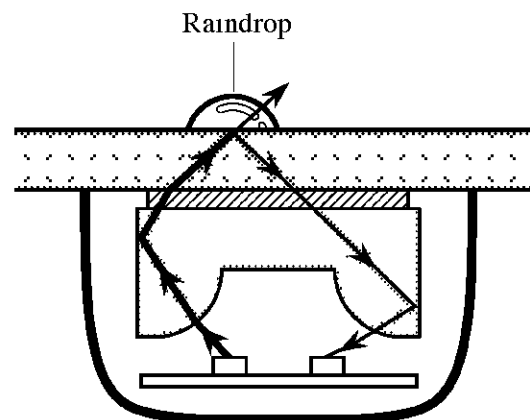
Service Tip

- The rain sensor tape is provided to eliminate the clearance (air gap) between the windshield glass and the lens. When there is a clearance (air gap), the air reflects the infrared rays, and this prevents the rain sensor from properly detecting the amount of raindrops.
 - If the rain sensor has been peeled during a windshield glass replacement, make sure to affix a new rain sensor tape. Failure to do so will lead to a system malfunction.
- For example, if no raindrops are present in the detection area, the infrared rays emitted by the LED are all reflected from the windshield glass and are received by the photo diode. If raindrops are present in the detection area, a portion of the emitted infrared rays penetrates with the change of index of reflection outward of the windshield glass via the raindrops, thus reducing the amount of infrared rays that are received by the photo diode. The amount of this reduction is then used to detect the amount of raindrops. Thus, this function controls the INT, LO, and HI operations in order to operate the wipers at an optimal wiping timing.



228AV03

If no raindrops are present

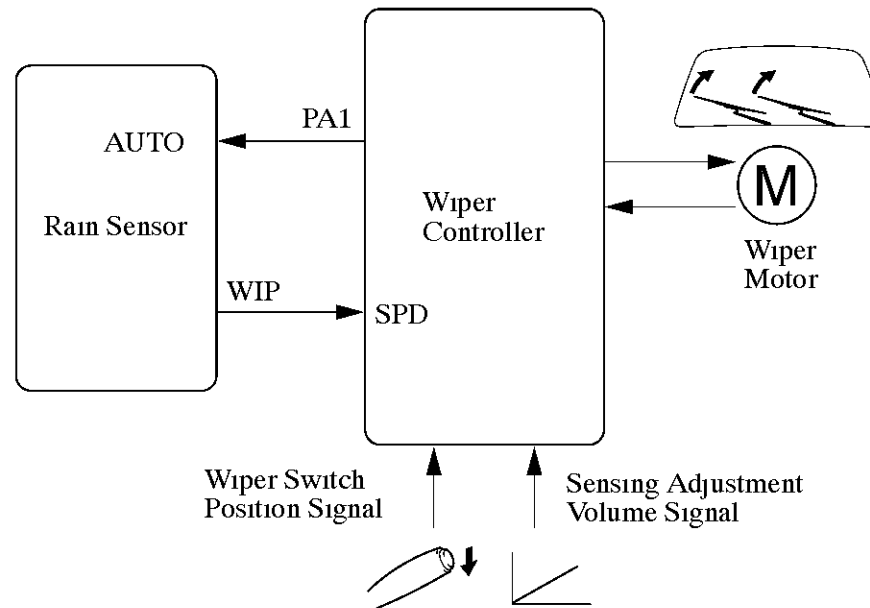


228AV04

If raindrops are present

6. Raindrop Function Control

This control is effected by the rain sensor based on the amount of raindrops and the input signals from the wiper controller.



2

7. Fail-Safe

If the wiper controller detects the conditions given below while operating the raindrop sensing function, it switches to the fail-safe mode.

Condition	Operate
• Rain Sensor Temp. < -10 °C (14 °F) • Rain Sensor Signal Malfunction	Changes to the intermittent operation in accordance with the rain sensor sensing volume.
• Rain Sensor Temp. > 90 °C (194 °F) • Wiper Motor Position Signal Malfunction	Stops the wiper operation. (Resumes operation as follows: wiper switch AUTO → except AUTO → AUTO)

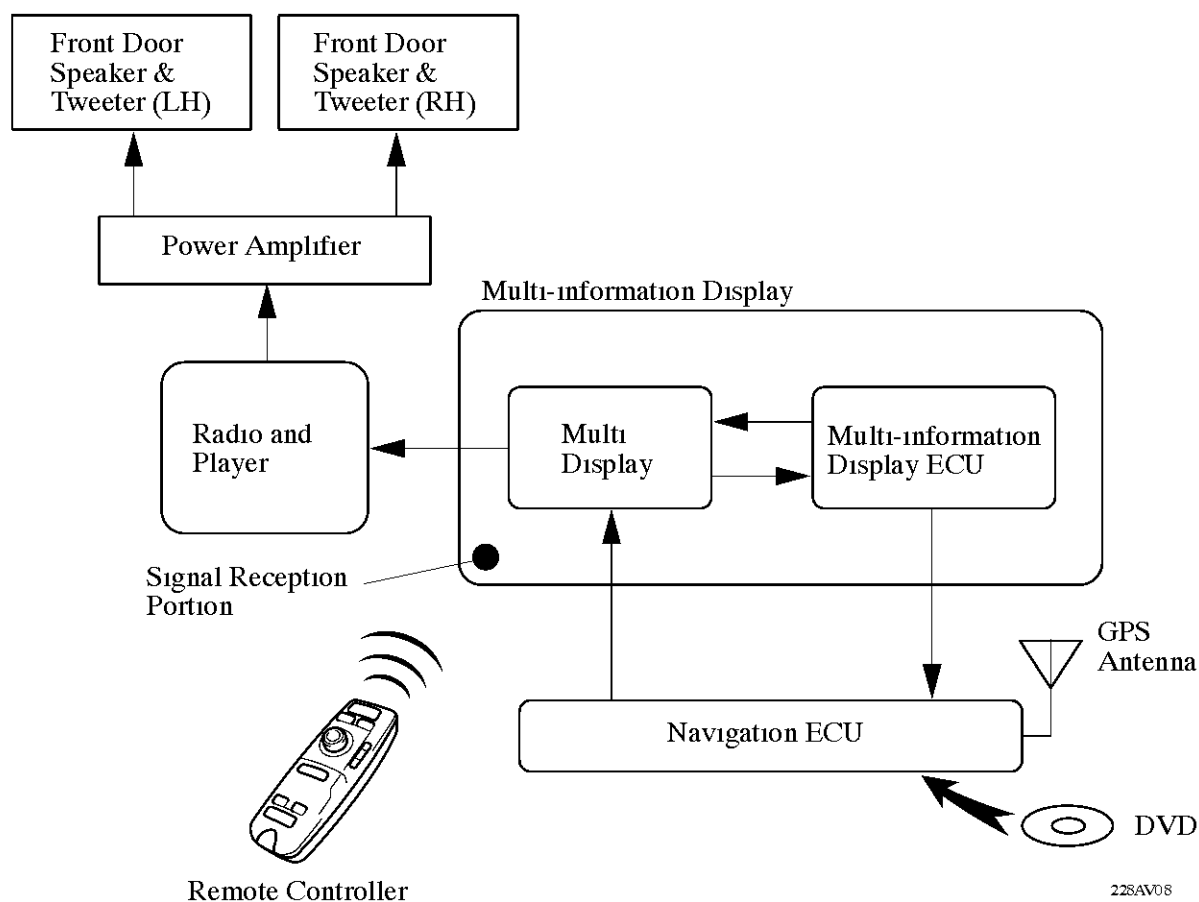
■ MULTI DISPLAY

1. General

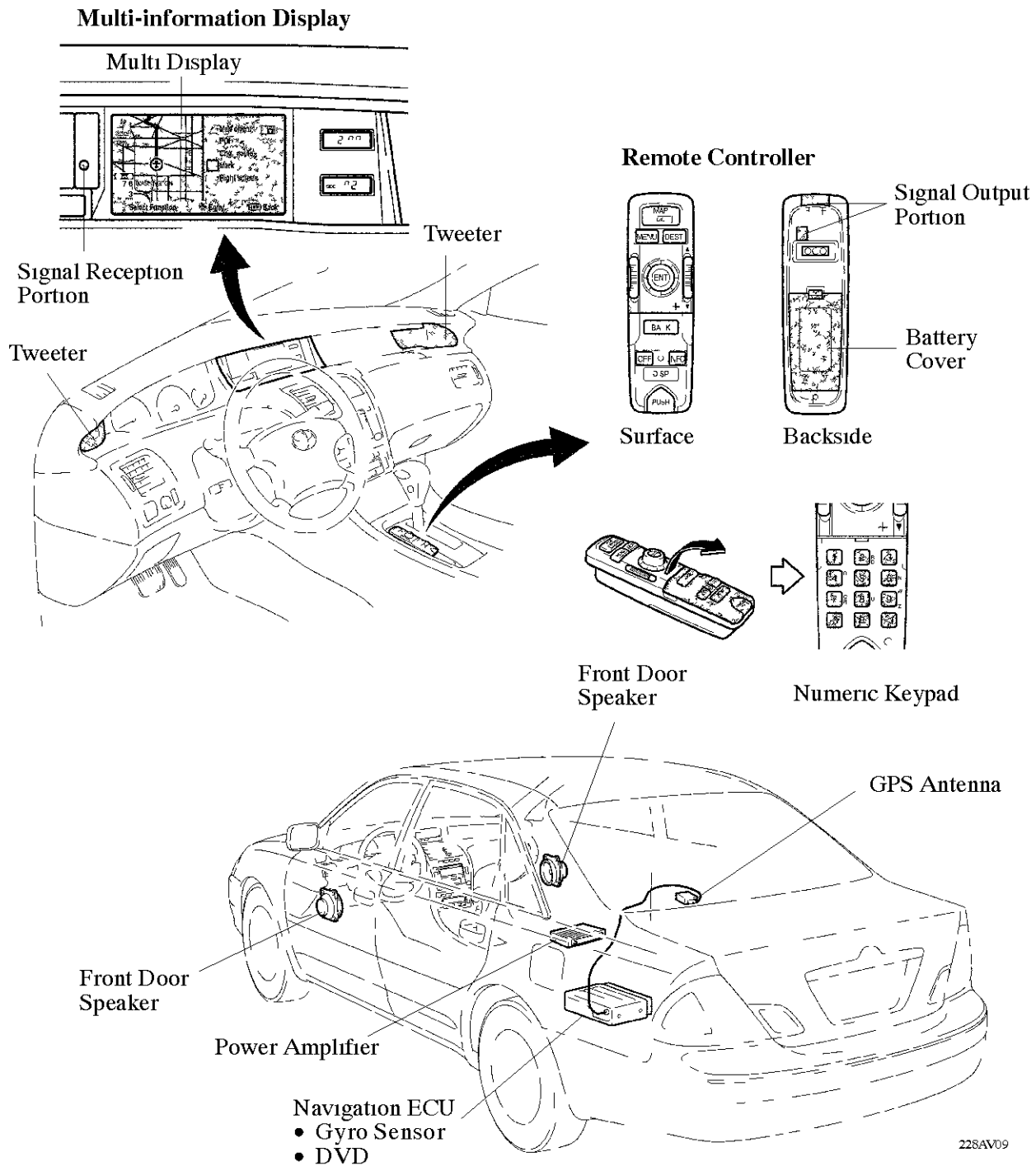
- The multi display is provided in the multi-information display. The multi display is controlled by the multi-information display ECU and the navigation ECU.
- The multi display can be operated with a remote control.
- Listed below are the main functions of the multi display.

Function	Outline
Adjustment Screen	• Image quality adjustment screen indication • Adjust clock
Trip-information Screen	• Display the outside temperature • Fuel consumption (current, after refueling, cruising range) • Cruise (average speed, distance)
GPS Voice Navigation Screen	• 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 some other functions
Diagnosis Screen	• Service check menu • Display check • Navigation check See the 2003 Avalon Repair Manual (Pub. No. RM953U) for detail of Diagnosis Screen Start-up procedure.

2. System Diagram



3. Layout of Component



► Specifications ◀

Display	• 7.0-inch TFT-LCD (Thin Film Transistor Liquid Crystal Display) • Dual Screen Display
Map Data Media	DVD (Digital Versatile Disc)
Antenna	GPS (Global Positioning System)
Gyro Sensor (Including in Navigation ECU)	Piezoelectric Ceramic Piece

4. GPS Voice Navigation Screen Display

- Based on the map data on the DVD, signal 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 the navigation display.
- The '03 Avalon has the GPS voice navigation system functions listed below:

	Item	Outline
Map Display	On-route Scroll	Scrolls the center of the cursor forward and reverse constantly along the route.
	Heading Up	Displays the map so that the direction of the route progression head up during route guidance.
	Map Color Change	Automatically changes the map display color by season.
	Front Wide	Displays a map in the direction of travel of the vehicle in an enlarged form. (Heading up only)
	Step-less Scale Display	Changes the scale of the map from the basic 13 steps to an even finer display.
	Multi-step Scale Display	Changes and displays the map scale in 13 stages.
	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 turn ON.
	Road Number Sign Board Display	Displays the road number on the map.
Destination Search	Last Destination Memory	Stores 20 locations of coordinates, names and times that have been set as destinations in the past.
	Hybrid Points-of-interest Search	Narrows the search by names of the points-of-interest, category, and area.
	Points-of-interest Pin Point Display	Pin points and displays the position of the point-of-interest.
	House Number Search	Searches for a house number.
	Special Memory Point	Sets a pre-registered point as a destination point while driving.
	Nearest Point-of-interest Search List Display	Searches nearest points-of-interest and displays a list.
	Intersection Search	By specifying two streets, the point at while they intersection is set as a destination point.
	Emergency Search	Performs a specific search for hospitals, police stations and dealers.
	Freeway Entrance/Exit Search	Searches for the destination by the name of the street that connects to the freeway entrance/ exit.
Route Search	Multiple Destination Setting	Sets multiple destinations. It can also rearrange the sequence of the destinations.
	Route Search	Searches for multiple routes.
	Search Condition Designation	Searches for the recommended, shortest, and other routes.
	Regulated Road Consideration	Performs search while considering regulated roads.
	Avoidance Area	Avoids a designated area and searches a route.

(Continued)

Item		Outline
Guidance	Destination Direction Arrow Display	Function to display the direction from the current position to the destination in case of being off the route during the guidance.
	Off-Route Arrow Display	Function to display the route ahead on the route guidance line in case of being off the route during the guidance.
	Rotary Guidance	Voice guidance to instruct the rotary way in/ way out.
	Right or Left Turn Guidance	Voice guidance to instruct the direction of travel to be taken.
	Freeway Direction of Travel Guidance	Voice guidance to instruct the direction of travel to take on the freeway.
	Distance Display Destination	Displays the distance from the present location to the destination.
	Freeway Branch Type Specimen Guidance	Type specimen for guidance to a freeway branch.
	Intersection Zoom-in Display	Zoom-in display when approaching an intersection.
	Turn List Display	Displays a turn list on the right side of the two-screen display when approaching an intersection.

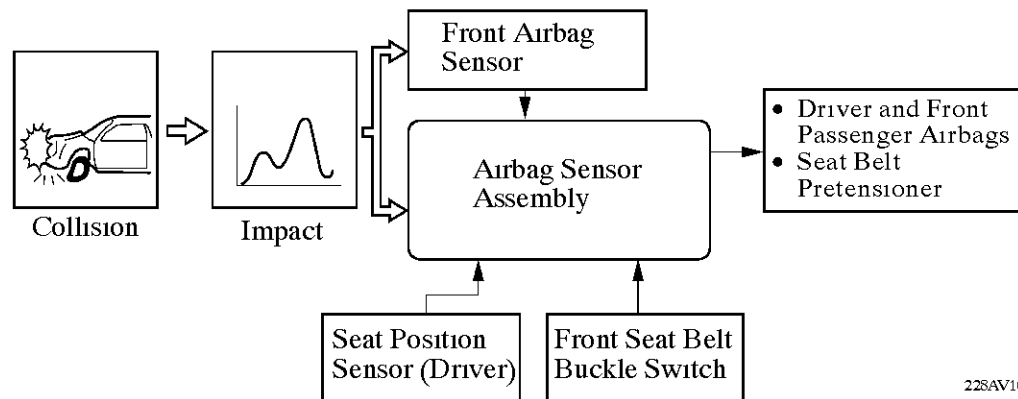
■ SRS AIRBAG SYSTEM

1. General

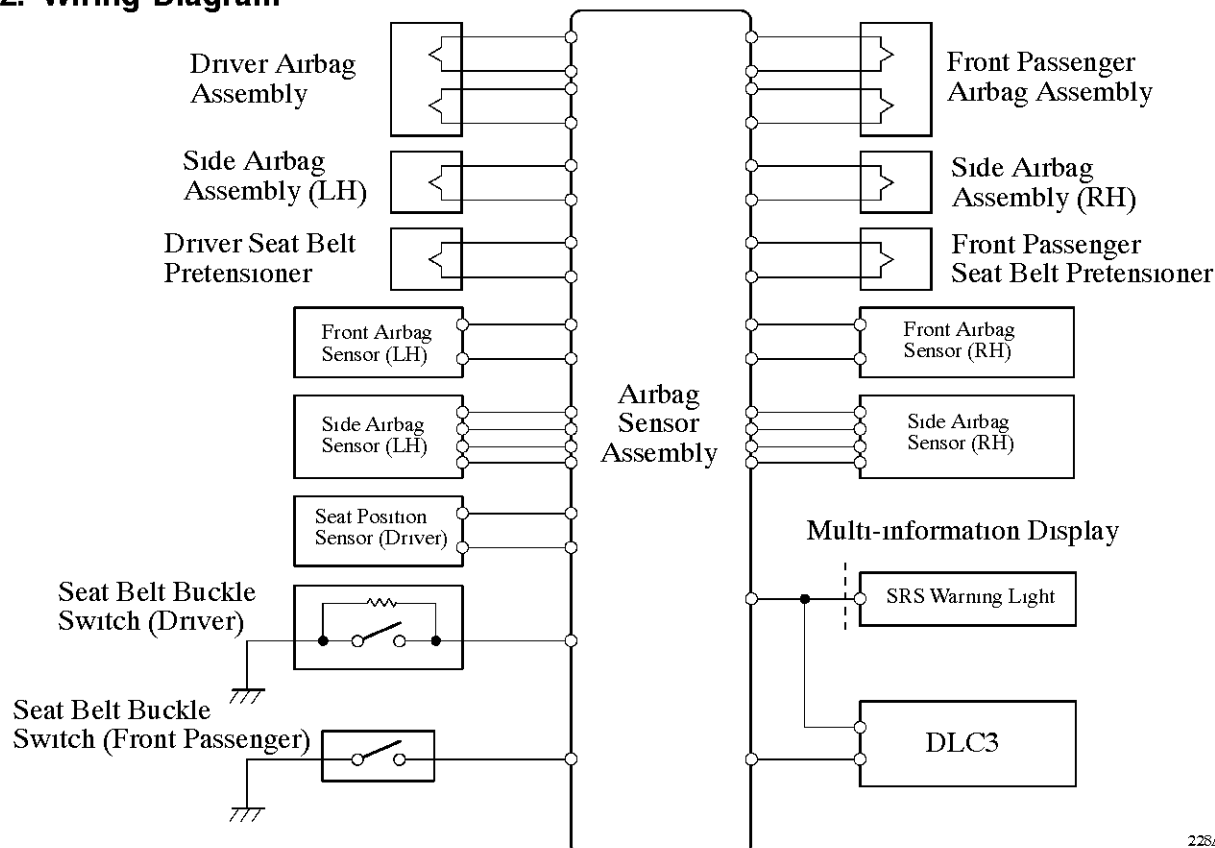
- A dual-stage SRS airbag system controls the airbag inflating output optimum by judging the extent of the impact for front passenger airbag, and the extent of the impact, seat position and whether or not the seat belt is fastened for the driver airbag.
- Along with the adoption of the dual-stage control, the front airbag sensor assembly, driver airbag assembly, front passenger airbag assembly, seat belt buckle switch (for driver seat) and the airbag sensor assembly have been changed, and a seat position sensor is added on the driver seat.
- An active circuit is used in the SRS warning light circuit in order to illuminate the light when there is an open or short circuit in the wiring harness.

Service Tip

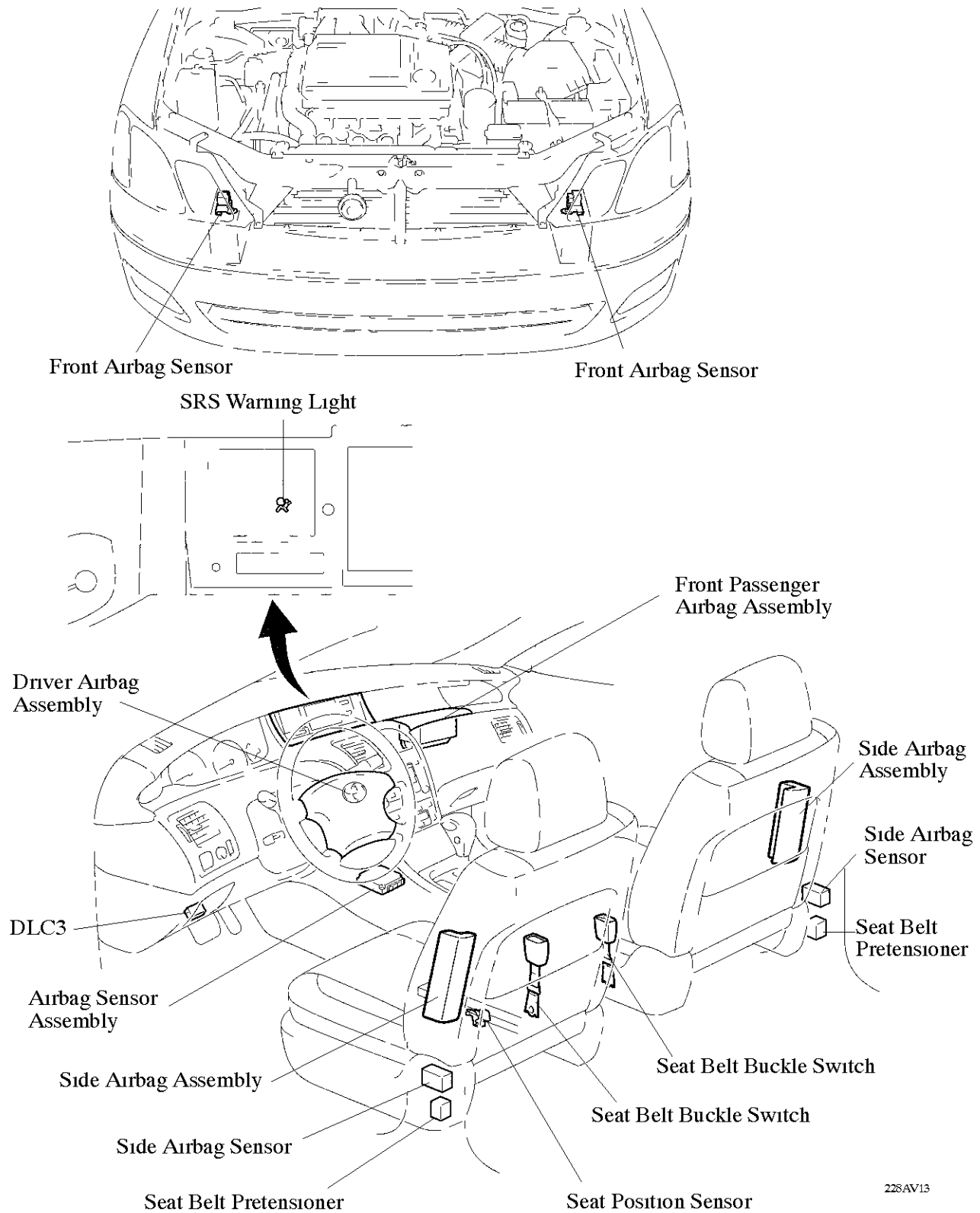
Because of the change in the driver and front passenger airbag assemblies on the '03 Avalon, a new SST (09082-00801) has been developed for scrapping the driver and front passenger airbag assemblies. For details, see the 2003 Avalon Repair Manual (Pub. No. RM953U).



2. Wiring Diagram



3. Layout of Component



4. Construction and Operation

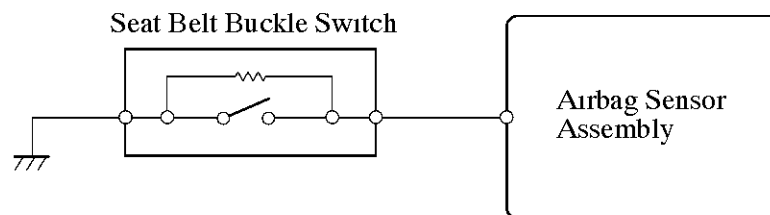
Front Airbag Sensor

- On the '03 Avalon, the previous mechanical type front airbag sensor (consisting of movable and stationary contact points) has been changed to an electrical (deceleration sensor) type front airbag sensor.
- The deceleration sensor is enclosed in the front airbag sensor. Based on the deceleration of the vehicle during a front collision, a distortion is created in the sensor and converted into an electrical signal. Accordingly, the extent of the initial collision can be detected in detail.

Seat Belt Buckle Switch (Driver)

This switch consists of a contact switch and a resistor. The contact switch detects whether the seat belt is ON or OFF, and the resistor is provided to enable the airbag sensor assembly to detect a malfunction in the switch circuit.

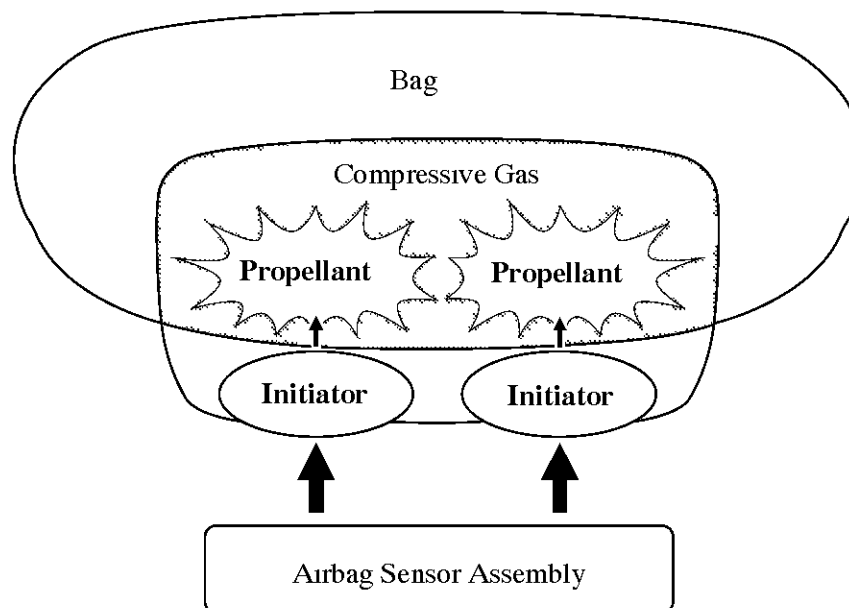
► Circuit Diagram ◀



228AV14

Driver and Front Passenger Airbag Assemblies

To support the dual-stage control, these airbag assemblies contain 2 sets of initiators and propellants. The airbag sensor assemblies optimize the airbag inflation output by delaying the inflation timing of these initiators.

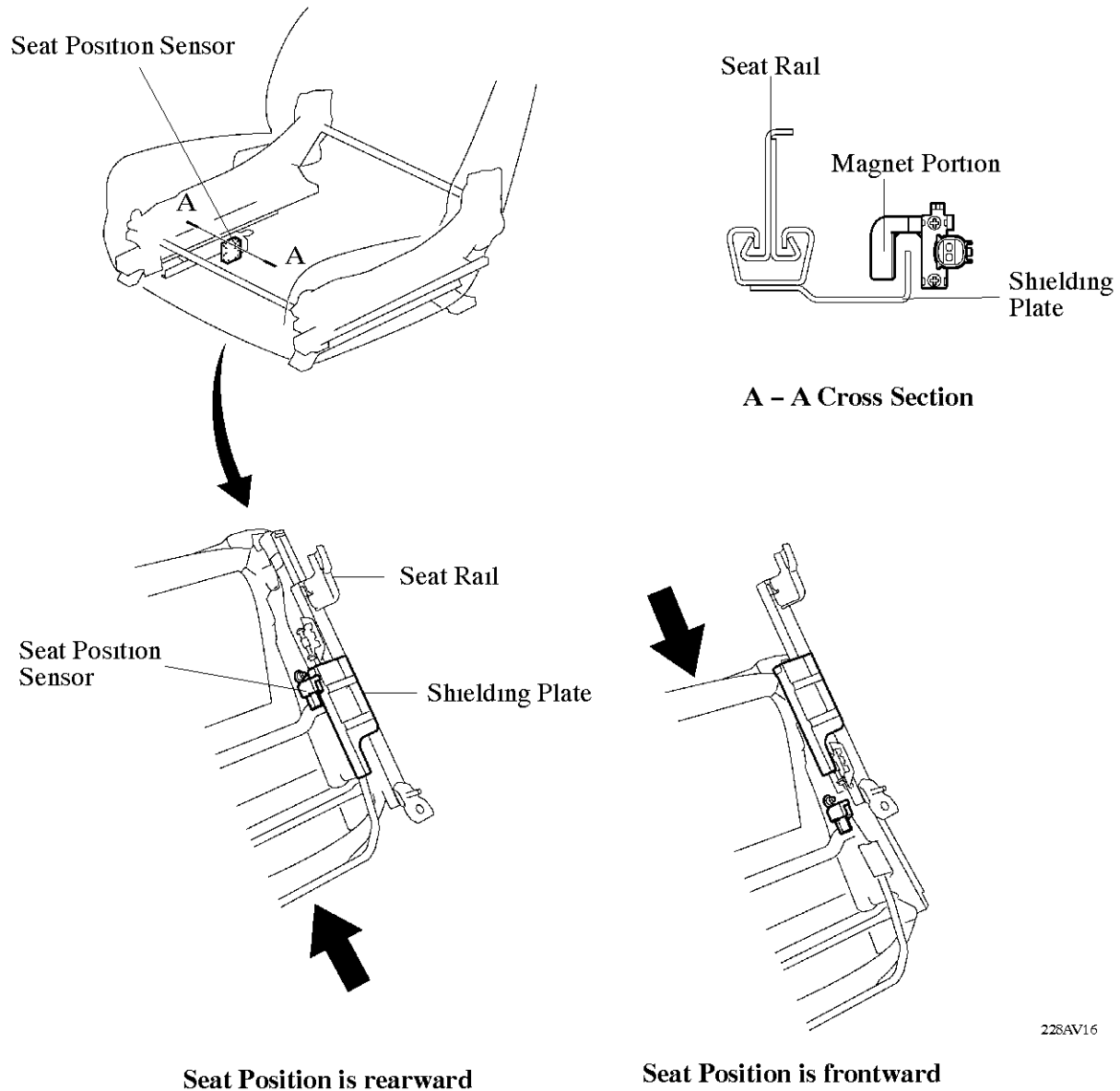


228AV15

Seat Position Sensor

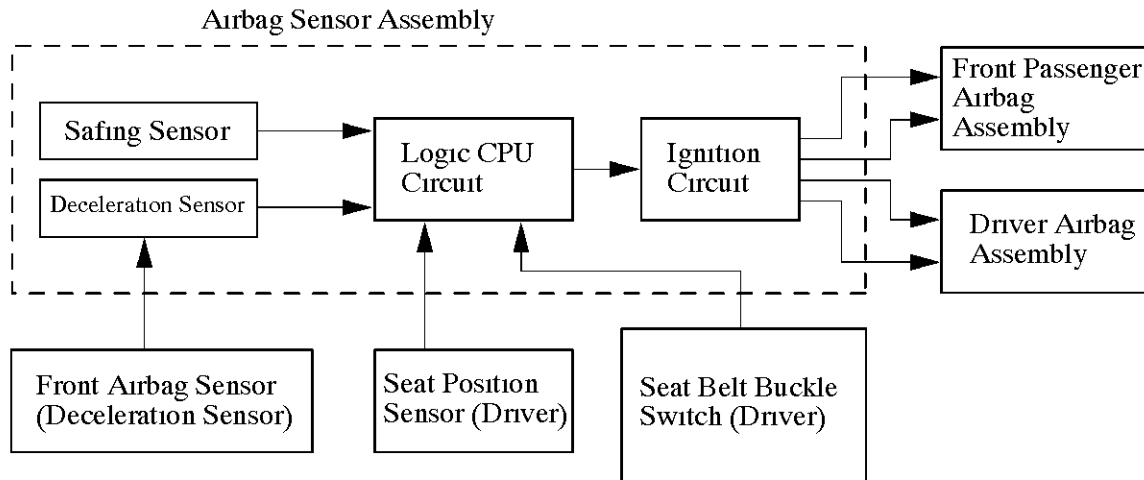
- The seat position sensor, which is attached to the seat rail of the driver seat, detects the sliding position of the seat.
- This sensor uses a Hall IC for its sensor and has the magnetic portion on its opposite side.
- The shielding plate to make the seat position sensor judge the seat position is installed on the seat rail.
- The seat position is judged to be rearward if the shielding plate is between the sensor, and forward if the shielding plate is not between the sensor.

2



Airbag Sensor Assembly

The front airbag control circuit of the airbag sensor assembly has been changed in order to effect dual-stage control.

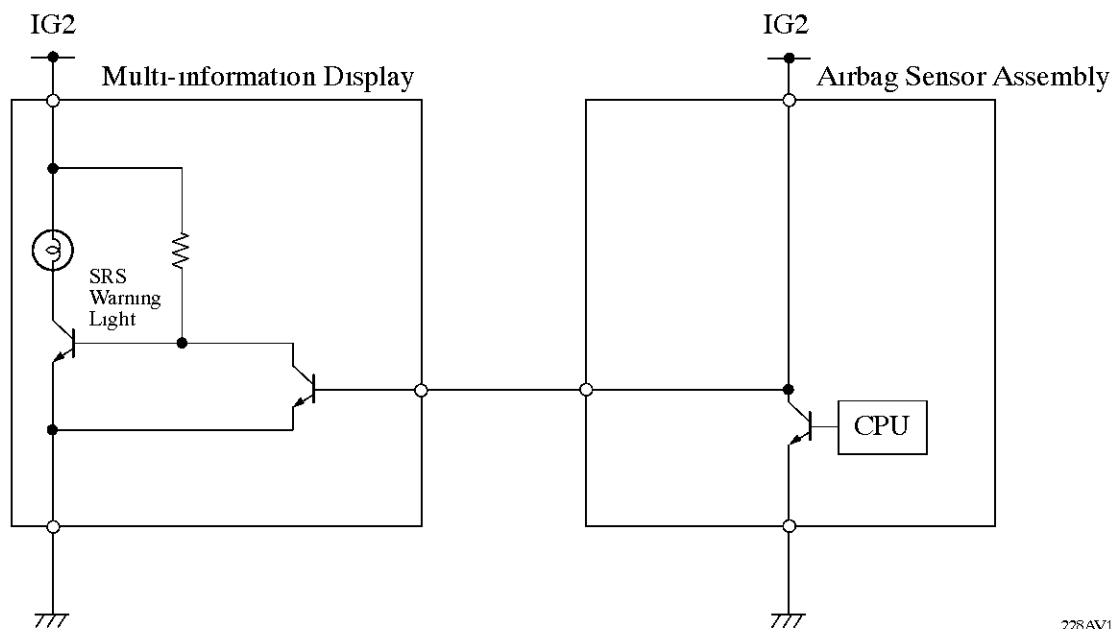


228AV17

SRS Warning Light

An active circuit is used in the SRS warning light circuit in order to illuminate the light when there is an open or short circuit in the wiring harness. Thus, the malfunction detection area has been expanded.

► Circuit Diagram ◀



228AV18

5. Self-Diagnosis Function

- If the airbag sensor assembly detects a malfunction in the SRS airbag system, the airbag sensor assembly stores the malfunction data in memory, in addition to illuminating the SRS warning light. The DTC (Diagnostic Trouble Code) can be accessed by connecting a hand-held tester to the DLC3 terminal or the SST (09843-18040) to the Tc and CG terminals of the DLC3 and reading the blinking of the SRS warning light. For details, see the 2003 Avalon Repair Manual (Pub. No. RM953U).
- The following DTC are added.

DTC No.	Detection Item	DTC No.	Detection Item
B1180/17	Short in D squib (2nd step) circuit	B0127/27	Seat belt buckle switch (LH) short circuit malfunction
B1181/18	Open in D squib (2nd step) circuit	B1187/55	Short in P squib (2nd step) circuit (to ground)
B1182/19	Short in D squib (2nd step) circuit (to ground)	B1188/56	Short in P squib (2nd step) circuit (to B+)
B1183/22	Short in D squib (2nd step) circuit (to B+)	B1185/57	Short in P squib (2nd step) circuit
B1153/25	Seat position sensor assembly malfunction	B1186/58	Open in P squib (2nd step) circuit
B0126/27	Seat belt buckle switch (LH) open circuit malfunction	—	—

MAJOR TECHNICAL SPECIFICATIONS

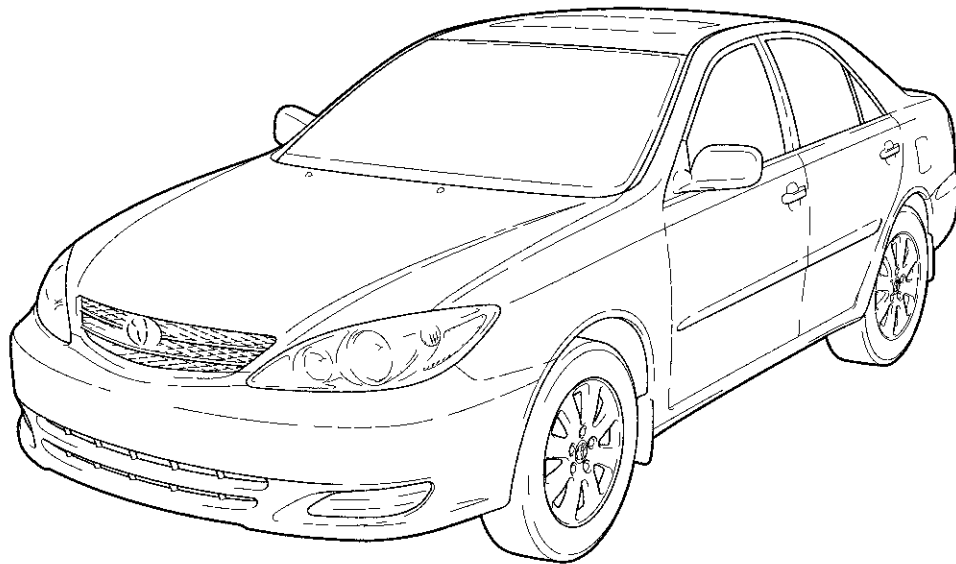
Item			Area		U S A			
Body Type			4 Door Sedan					
Vehicle Grade			XL	XLS	XL	XLS		
Model Code			MCX20L AEPNKA	MCX20L AEPGKA	MCX20L AESNKA	MCX20L AESGKA		
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	4875 (192.0)	4875 (192.0)	4875 (192.0)	4875 (192.0)	
		Width	mm (in.)	1820 (71.7)	1820 (71.7)	1820 (71.7)	1820 (71.7)	
		Height*	mm (in.)	1465 (57.7)* ¹	1465 (57.7)* ¹	1465 (57.7)* ¹	1465 (57.7)* ¹	
	Wheel Base		mm (in.)	2720 (107.0)	2720 (107.0)	2720 (107.0)	2720 (107.0)	
	Tread	Front	mm (in.)	1550 (61.0)	1550 (61.0)	1550 (61.0)	1550 (61.0)	
		Rear	mm (in.)	1525 (60.0)	1525 (60.0)	1525 (60.0)	1525 (60.0)	
	Effective Head Room	Front	mm (in.)	983 (38.7)	983 (38.7)	983 (38.7)	983 (38.7)	
		Rear	mm (in.)	963 (37.9)	963 (37.9)	963 (37.9)	963 (37.9)	
	Effective Leg Room	Front	mm (in.)	1060 (41.7)	1060 (41.7)	1060 (41.7)	1060 (41.7)	
		Rear	mm (in.)	1018 (40.1)	1018 (40.1)	1018 (40.1)	1018 (40.1)	
	Shoulder Room	Front	mm (in.)	1483 (58.4)	1483 (58.4)	1483 (58.4)	1483 (58.4)	
		Rear	mm (in.)	1475 (58.1)	1475 (58.1)	1475 (58.1)	1475 (58.1)	
	Overhang	Front	mm (in.)	945 (37.2)	945 (37.2)	945 (37.2)	945 (37.2)	
		Rear	mm (in.)	1210 (47.6)	1210 (47.6)	1210 (47.6)	1210 (47.6)	
	Min. Running Ground Clearance		mm (in.)	130 (5.1)	130 (5.1)	130 (5.1)	130 (5.1)	
	Angle of Approach		degrees	20°	20°	20°	20°	
	Angle of Departure		degrees	15°	15°	15°	15°	
	Curb Mass	Front	kg (lb)	955 (2105)	955 (2105)	955 (2105)	955 (2105)	
		Rear	kg (lb)	595 (1312)	605 (1334)	600 (1323)	600 (1323)	
		Total	kg (lb)	1550 (3417)	1560 (3439)	1555 (3428)	1555 (3428)	
Gross Vehicle Mass	Front	kg (lb)	1105 (2435)	1105 (2435)	1105 (2435)	1105 (2435)		
	Rear	kg (lb)	960 (2116)	960 (2116)	960 (2116)	960 (2116)		
	Total	kg (lb)	2065 (4550)	2065 (4550)	2065 (4550)	2065 (4550)		
Fuel Tank Capacity		L (U S gal Imp gal)	70 (18.5 15.4)	70 (18.5 15.4)	70 (18.5 15.4)	70 (18.5 15.4)		
Luggage Compartment Capacity		m ³ (cu ft)	0.45 (15.9)	0.45 (15.9)	0.45 (15.9)	0.45 (15.9)		
Performance	Max. Speed		km/h (mph)	210 (130)	210 (130)	210 (130)	210 (130)	
	Max. Cruising Speed		km/h (mph)	—	—	—	—	
	Acceleration	0 to 100 km/h	sec	—	—	—	—	
		0 to 400 m	sec	—	—	—	—	
	Max. Permissible Speed	1st Gear	km/h (mph)	76 (47)	76 (47)	76 (47)	76 (47)	
		2nd Gear	km/h (mph)	139 (86)	139 (86)	139 (86)	139 (86)	
		3rd Gear	km/h (mph)	—	—	—	—	
		4th Gear	km/h (mph)	—	—	—	—	
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)	12.1 (39.7)	12.1 (39.7)	12.1 (39.7)	12.1 (39.7)	
		Curb to Curb	m (ft)	11.5 (37.6)	11.5 (37.6)	11.5 (37.6)	11.5 (37.6)	
Engine	Engine Type		1MZ FE	1MZ FE	1MZ FE	1MZ FE		
	Valve Mechanism		24 Valve DOHC	24 Valve DOHC	24 Valve DOHC	24 Valve DOHC		
	Bore × Stroke		mm (in.)	87.5 × 83.0 (3.44 × 3.27)	87.5 × 83.0 (3.44 × 3.27)	87.5 × 83.0 (3.44 × 3.27)		
	Displacement		cm ³ (cu in.)	2995 (182.7)	2995 (182.7)	2995 (182.7)		
	Compression Ratio		10.5 : 1	10.5 : 1	10.5 : 1	10.5 : 1		
	Carburetor Type		SFI	SFI	SFI	SFI		
	Research Octane No.		RON	91 or more* ²	91 or more* ²	91 or more* ²		
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	156 / 5800 (210@5800)	156 / 5800 (210@5800)	156 / 5800 (210@5800)	156 / 5800 (210@5800)	
Engine Electrical	Max. Torque (SAE NET)		N m/rpm (lb ft@rpm)	298 / 4400 (220@4400)	298 / 4400 (220@4400)	298 / 4400 (220@4400)		
	Battery Capacity (5HR)		Voltage & Amp hr	12 55 12 48* ³	12 55 12 48* ³	12 55 12 48* ³		
	Alternator Output		Watts	1200	1200	1200		
Chassis	Starter Output		kW	1.4	1.4	1.4		
	Clutch Type		—	—	—	—		
	Transaxle Type		—	A541E	A541E	A541E		
	Transmission Gear Ratio	In First	—	2.810	2.810	2.810		
		In Second	—	1.549	1.549	1.549		
		In Third	—	1.000	1.000	1.000		
		In Fourth	—	0.753	0.753	0.753		
		In Fifth	—	—	—	—		
		In Reverse	—	2.296	2.296	2.296		
	Counter Gear Ratio		—	0.945	0.945	0.945		
	Differential Gear Ratio (Final)		—	3.625	3.625	3.625		
	Brake Type	Front	—	Ventilated Disc	Ventilated Disc	Ventilated Disc		
		Rear	—	Solid Disc	Solid Disc	Solid Disc		
	Parking Brake Type		—	Duo Servo Drum	Duo Servo Drum	Duo Servo Drum		
	Brake Booster Type and Size		in	Single 10.5	Single 10.5	Single 10.5		
	Proportioning Valve Type		—	—	—	—		
	Suspension Type	Front	—	MacPherson Strut	MacPherson Strut	MacPherson Strut		
		Rear	—	MacPherson Strut	MacPherson Strut	MacPherson Strut		
Stabilizer Bar	Front	—	STD	STD	STD			
	Rear	—	STD	STD	STD			
Steering Gear Type		—	Rack and Pinion	Rack and Pinion	Rack and Pinion			
Steering Gear Ratio (Overall)		—	17.4	17.4	17.4			
Power Steering Type		—	Integral Type	Integral Type	Integral Type			

*¹ Unladen Vehicle
*² 95 or more recommended
*³ Option

	Canada	
	4 Door Sedan	
	XL	XLS
	MCX20L AEPNKK	MCX20L AEPGKK
5	4875 (192 0)	4875 (192 0)
	1820 (71 7)	1820 (71 7)
	1465 (57 7)* ¹	1465 (57 7)* ¹
	2720 (107 0)	2720 (107 0)
	1550 (61 0)	1550 (61 0)
10	1525 (60 0)	1525 (60 0)
	983 (38 7)	983 (38 7)
	963 (37 9)	963 (37 9)
	1060 (41 7)	1060 (41 7)
	1018 (40 1)	1018 (40 1)
15	1483 (58 4)	1483 (58 4)
	1475 (58 1)	1475 (58 1)
	945 (37 2)	945 (37 2)
	1210 (47 6)	1210 (47 6)
	130 (5 1)	130 (5 1)
20	20°	20°
	15°	15°
	960 (211 6)	965 (212 7)
	600 (132 3)	605 (133 4)
	1560 (343 9)	1570 (346 1)
25	1105 (243 5)	1105 (243 5)
	960 (211 6)	960 (211 6)
	2065 (455 0)	2065 (455 0)
	70 (18 5 15 4)	70 (18 5 15 4)
	0 45 (15 9)	0 45 (15 9)
30	210 (130)	210 (130)
	—	—
	—	—
	—	—
	76 (47)	76 (47)
35	139 (86)	139 (86)
	—	—
	—	—
	121 (39 7)	121 (39 7)
	115 (37 6)	115 (37 6)
40	1MZ FE	1MZ FE
	24 Valve DOHC	24 Valve DOHC
	87.5 × 83.0 (3.44 × 3.27)	87.5 × 83.0 (3.44 × 3.27)
	2995 (182 7)	2995 (182 7)
	10.5 1	10.5 1
45	SFI	SFI
	91 or more* ²	91 or more* ²
	156 / 5800 (210@5800)	156 / 5800 (210@5800)
	298 / 4400 (220@4400)	298 / 4400 (220@4400)
	12 55	12 55
50	1200	1200
	14	14
	—	—
	A541E	A541E
	2 810	2 810
55	1 549	1 549
	1 000	1 000
	0 753	0 753
	—	—
	2 296	2 296
60	0 945	0 945
	3 625	3 625
	Ventilated Disc	Ventilated Disc
	Solid Disc	Solid Disc
	Duo Servo Drum	Duo Servo Drum
65	Single 10.5	Single 10.5
	—	—
	MacPherson Strut	MacPherson Strut
	MacPherson Strut	MacPherson Strut
	STD	STD
70	STD	STD
	Rack and Pinion	Rack and Pinion
	17 4	17 4
	Integral Type	Integral Type

CAMRY

3



228CM06

CAMRY

OUTLINE OF NEW FEATURES

The following changes have been made for the 2003 model year.

1. 2AZ-FE & 1MZ-FE Engines

To comply with the OBD-II regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them.

For details, see the 2003 General Features section.

2. Power Adjustable Pedals System (only for Automatic Transaxle Model)

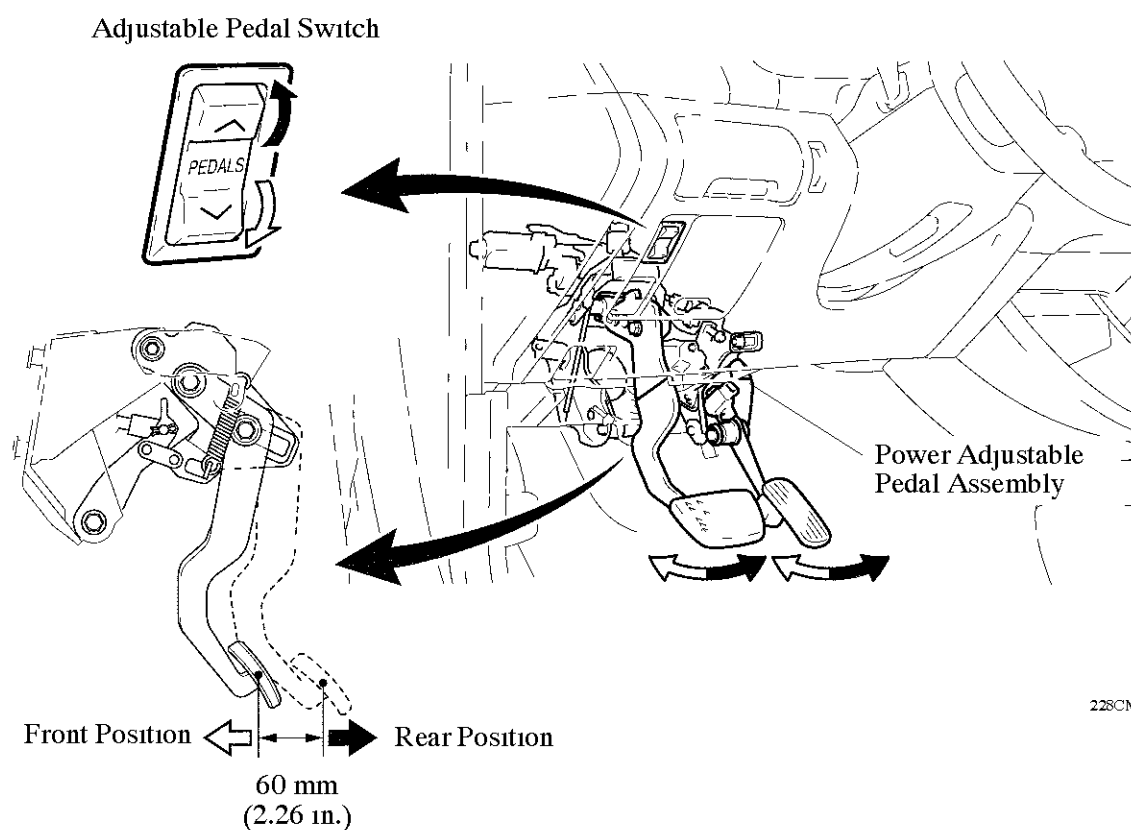
Power adjustable pedals system has been adopted as optional equipment for the automatic transaxle model.

NEW FEATURES

■ POWER ADJUSTABLE PEDALS SYSTEM

1. General

- This system enables the driver to adjust the position of the accelerator and brake pedals simply and simultaneously by using an adjustable pedal switch. The range is 60 mm (2.36 in.), thus, widening the range of driving position and improving the comfort.
- The brake pedal assembly is used a double-link type.
- This system will function when the following two condition are satisfied.
 - a) Ignition switch ON position
 - b) Shift position P

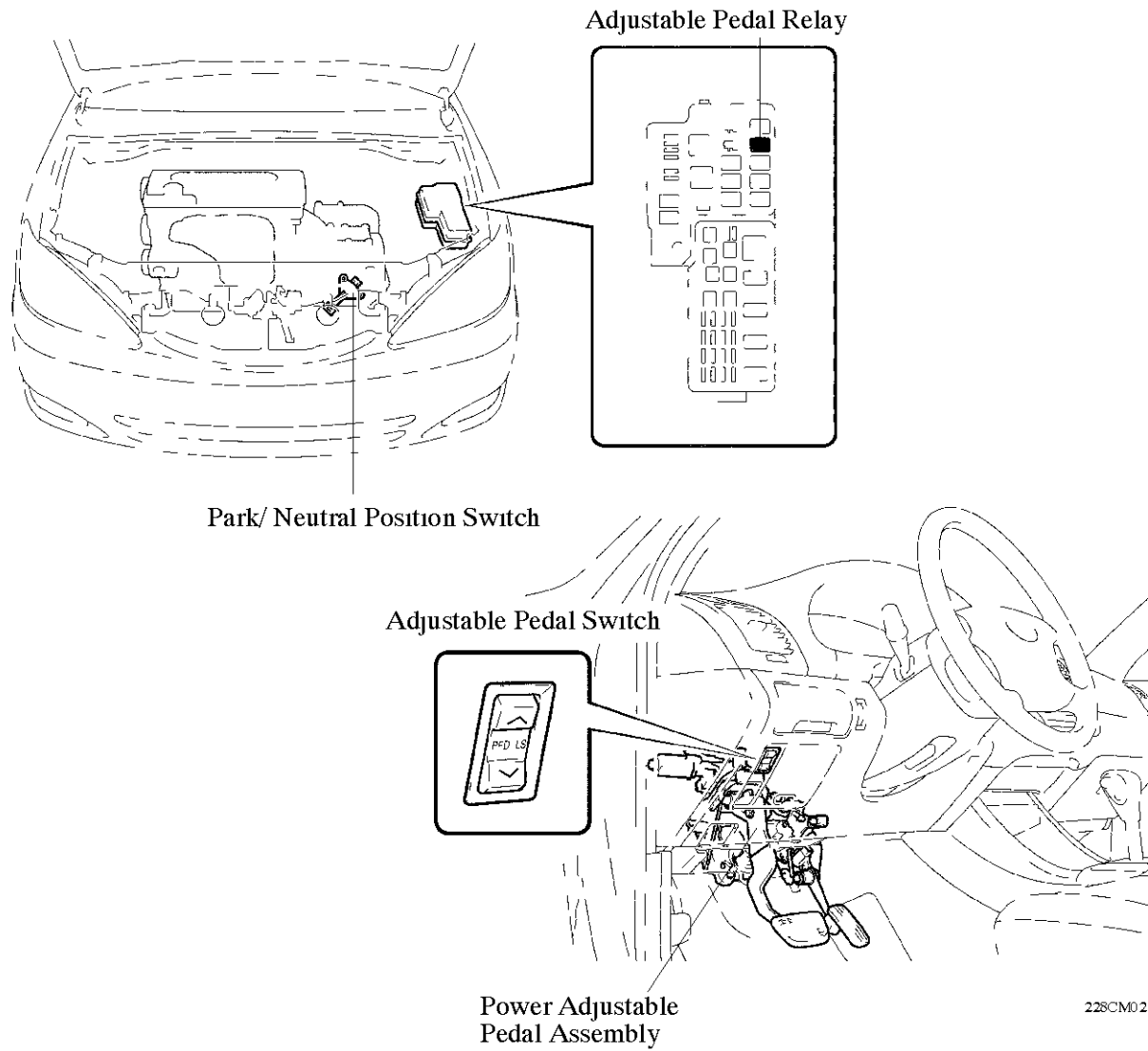


228CM01

Service Tip

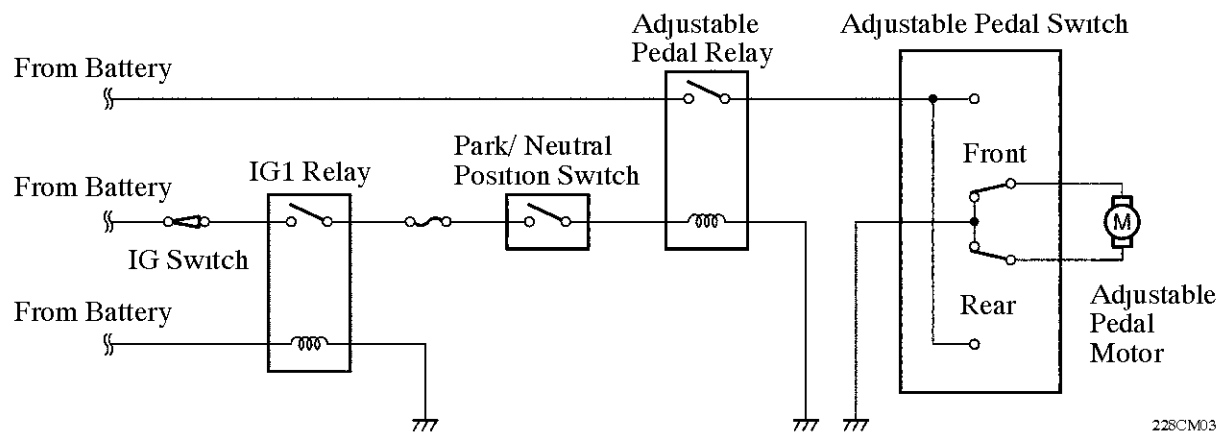
- Brake pedal position must be in front most position when measuring its height. Adjustment method is same as the usual fixed type brake pedal. For details, refer to 2003 Camry Repair Manual (Pub. No. RM972U).
- **Basic Brake Pedal Height from asphalt sheet: 144.1 – 154.1 mm (5.673 – 6.067 in.)**
- It is not possible to move the brake pedal and accelerator pedal separately.

2. Layout of Main Component



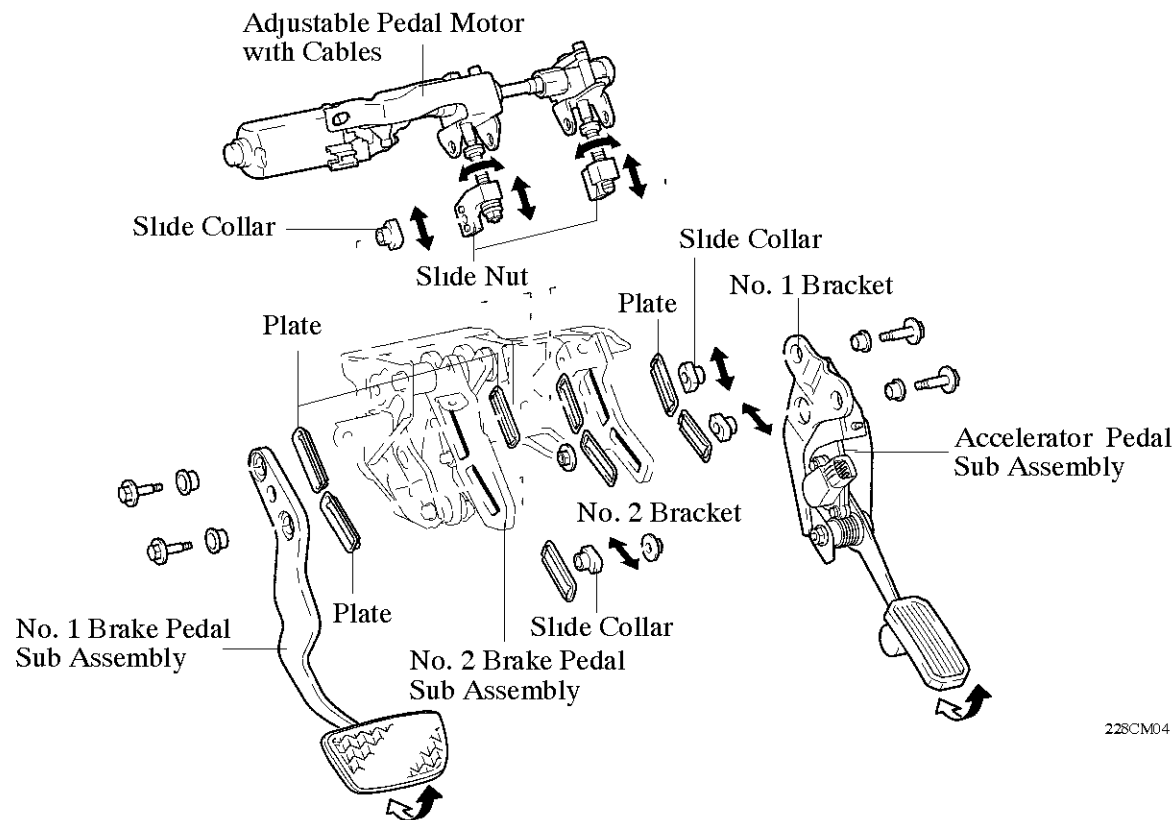
3

3. Wiring Diagram



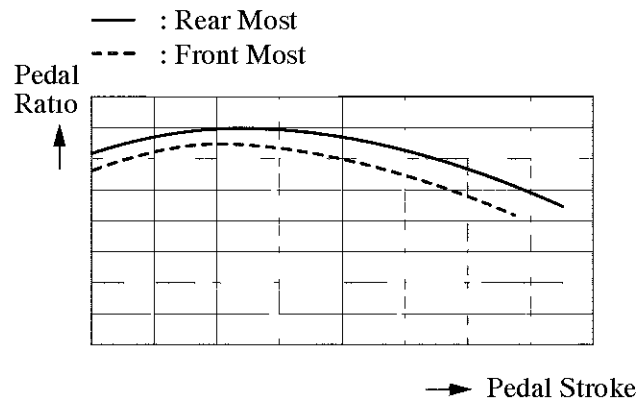
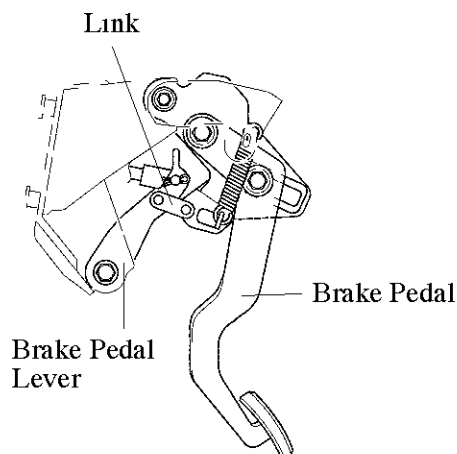
4. Construction and Operation

- Power adjustable pedal assembly mainly consists of the accelerator pedal assembly, brake pedal assembly and adjustable motor with cables.
- Brake pedal assembly consists of No.1 brake pedal sub assembly and No.2 brake pedal sub assembly. No.1 brake pedal sub assembly is assembled into No.2 brake pedal sub assembly through 4 plate and 2 slide collars.
- Accelerator pedal assembly consists of accelerator pedal sub assembly and 2 (No.1 and No.2) brackets.
- When the adjustable pedal motor rotates, the assembled slide nut moves up and down.



228CM04

- When the pedal stroke is small or medium, the lever ratio is increased in order to reduce the pedal effort.
- When the pedal stroke is large, the pedal ratio is decreased to provide ample pedal response.



228CM05

MAJOR TECHNICAL SPECIFICATIONS

Item		Area		U S A and Canada			
Body Type		Vehicle Grade		4 Door Sedan			
Model Code				LE	XLE	SE	
				ACV30L AEMNKA	ACV30L A (C) BPNKA	ACV30L A (C) EPGKA	ACV30L AEMSKA
Major Dimensions & Vehicle Weights	Overall	Length	mm (in)	4805 (189 2)	4805 (189 2)	4805 (189 2)	4805 (189 2)
		Width	mm (in)	1795 (70 7)	1795 (70 7)	1795 (70 7)	1795 (70 7)
		Height*	mm (in)	1490 (58 7)	1490 (58 7)	1490 (58 7)	1490 (58 7)
	Wheel Base		mm (in)	2720 (107 1)	2720 (107 1)	2720 (107 1)	2720 (107 1)
		Front	mm (in)	1545 (60 8)	1545 (60 8)	1545 (60 8)	1545 (60 8)
	Tread	Rear	mm (in)	1535 (60 4)	1535 (60 4)	1535 (60 4)	1535 (60 4)
		Front	mm (in)	995 (39 2)	995 (39 2)	995 (39 2)	995 (39 2)
	Effective Head Room	Rear	mm (in)	975 (38 4)	975 (38 4)	975 (38 4)	975 (38 4)
		Front	mm (in)	1055 (41 5)	1055 (41 5)	1055 (41 5)	1055 (41 5)
	Effective Leg Room	Rear	mm (in)	960 (37 8)	960 (37 8)	960 (37 8)	960 (37 8)
		Front	mm (in)	1460 (57 5)	1460 (57 5)	1460 (57 5)	1460 (57 5)
	Shoulder Room	Rear	mm (in)	1440 (56 7)	1440 (56 7)	1440 (56 7)	1440 (56 7)
		Front	mm (in)	945 (37 2)	945 (37 2)	945 (37 2)	945 (37 2)
	Overhang	Rear	mm (in)	1140 (44 9)	1140 (44 9)	1140 (44 9)	1140 (44 9)
		Min. Running Ground Clearance	mm (in)	150 (5 9)	150 (5 9)	150 (5 9)	150 (5 9)
	Angle of Approach	degrees		15 2°	15 2°	15 2°	15 2°
		Angle of Departure	degrees	16 6°	16 6°	16 6°	16 6°
	Curb Mass	Front	kg (lb)	825 (1819)	850 (1874)* ⁴ 855 (1885)* ^{4,5}	870 (1918)* ⁴ 875 (1929)* ^{4,5}	835 (1841)
		Rear	kg (lb)	585 (1290)	580 (1279)* ⁴ * ⁵	595 (1312)* ⁴ * ⁵	600 (1323)
		Total	kg (lb)	1410 (3108)	1430 (3153)* ⁴ 1435 (3164)* ⁵	1465 (3230)* ⁴ 1470 (3241)* ⁵	1435 (3164)
	Gross Vehicle Mass	Front	kg (lb)	960 (2116)	985 (2172)	995 (2194)	965 (2127)
		Rear	kg (lb)	920 (2028)	915 (2017)	925 (2039)	935 (2061)
		Total	kg (lb)	1880 (4145)	1900 (4189)	1920 (4233)	1900 (4189)
	Fuel Tank Capacity	L (U S gal Imp gal)		70 (18.5 15.4)	70 (18.5 15.4)	70 (18.5 15.4)	70 (18.5 15.4)
	Luggage Compartment Capacity	m ³ (cu ft)		14 1 (497 9)	14 1 (497 9)	14 1 (497 9)	14 1 (497 9)
Performance	Max. Speed	km/h (mph)		190 (118)	190 (118)	190 (118)	190 (118)
	Max. Cruising Speed	km/h (mph)		—	—	—	—
	Acceleration	0 to 100 km/h sec		9 1	9 9	9 9	9 1
		0 to 400 m sec		—	—	—	—
	Max. Permissible Speed	1st Gear km/h (mph)		52 (32)	64 (40)	65 (41)	53 (33)
		2nd Gear km/h (mph)		89 (55)	115 (71)	118 (73)	92 (57)
		3rd Gear km/h (mph)		137 (85)	—	—	141 (88)
		4th Gear km/h (mph)		189 (117)	—	—	194 (120)
	Turning Diameter (Outside Front)	Wall to Wall m (ft)		11 4 (37 4)	11 4 (37 4)	12 0 (39 4)	12 0 (39 4)
		Curb to Curb m (ft)		10 6 (34 8)	10 6 (34 8)	11 2 (36 7)	11 2 (36 7)
Engine	Engine Type			2AZ FE	2AZ FE	2AZ FE	2AZ FE
	Valve Mechanism			16 Valve DOHC	16 Valve DOHC	16 Valve DOHC	16 Valve DOHC
	Bore × Stroke	mm (in)		88 5 × 96 0 (3 48 × 3 78)	88 5 × 96 0 (3 48 × 3 78)	88 5 × 96 0 (3 48 × 3 78)	88 5 × 96 0 (3 48 × 3 78)
	Displacement	cm ³ (cu in)		2362 (144 2)	2362 (144 2)	2362 (144 2)	2362 (144 2)
	Compression Ratio			9 6 1	9 6 1	9 6 1	9 6 1
	Carburetor Type			SFI	SFI	SFI	SFI
	Research Octane No.	RON		96	96	96	96
	Max. Output (SAE NET)	kW/rpm (HP/rpm)		117 / 5600 (157@5600)	117 / 5600 (157@5600)	117 / 5600 (157@5600)	117 / 5600 (157@5600)
	Max. Torque (SAE NET)	N m/rpm (lb ft@rpm)		220 / 4000 (162@4000)	220 / 4000 (162@4000)	220 / 4000 (162@4000)	220 / 4000 (162@4000)
	Battery Capacity (5HR)	Voltage & Amp hr		12-48* ¹ 12 55* ²	12-48* ¹ 12 55* ²	12-48* ¹ 12 55* ²	12 48* ¹ 12 55* ²
Engine Electrical	Alternator Output	Watts		960	960	960	960
	Starter Output	kW		1 6	1 6	1 6	1 6
Chassis	Clutch Type			Dry Single Plate Diaphragm	—	—	Dry Single Plate Diaphragm
	Transaxle Type			E351	U241E	U241E	E351
	Transmission Gear Ratio	In First		3 538	3 943	3 943	3 538
		In Second		2 045	2 197	2 197	2 045
		In Third		1 333	1 413	1 413	1 333
		In Fourth		0 972	1 020	1 020	0 972
		In Fifth		0 731	—	—	0 731
		In Reverse		3 583	3 145	3 145	3 583
	Counter Gear Ratio			—	—	—	—
	Differential Gear Ratio (Final)			3 944	2 740	2 740	3 944
	Brake Type	Front		Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
		Rear		Drum	Drum	Solid Disc	Solid Disc
	Parking Brake Type			Leading Trailing	Leading Trailing	Duo Servo	Duo Servo
	Brake Booster Type and Size	in		Single10 5	Single10 5	Single10 5	Single10 5
	Proportioning Valve Type			Dual P Valve * ³	Dual P Valve * ³	—	Dual P Valve * ³
	Suspension Type	Front		MacPherson Strut	MacPherson Strut	MacPherson Strut	MacPherson Strut
		Rear		MacPherson Strut	MacPherson Strut	MacPherson Strut	MacPherson Strut
	Stabilizer Bar	Front		STD	STD	STD	STD
		Rear		STD	STD	STD	STD
	Steering Gear Type			Rack & Pinion	Rack & Pinion	Rack & Pinion	Rack & Pinion
	Steering Gear Ratio (Overall)			15 8 1	15 8 1	16 0 1	16 0 1
	Power Steering Type			Integral Type	Integral Type	Integral Type	Integral Type

*¹ Set Option without Cold Area Spec
 *² Set Option with Cold Area Spec
 *³ Without ABS

*⁴ Produced TMC
 *⁵ Produced TMMK

Item				Area				U.S.A. and Canada			
Body Type				4 Door Sedan							
Vehicle Grade				SE		LE		XLE		SE	
Model Code				ACV30L A (C) EPSKA		MCV30L A (C) EPNKA		MCV30L A (C) EPGKA		MCV30L A (C) EPSKA	
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	4805 (189.2)		4805 (189.2)		4805 (189.2)		4805 (189.2)	
		Width	mm (in.)	1795 (70.7)		1795 (70.7)		1795 (70.7)		1795 (70.7)	
		Height*	mm (in.)	1490 (58.7)		1490 (58.7)		1490 (58.7)		1490 (58.7)	
	Wheel Base		mm (in.)	2720 (107.1)		2720 (107.1)		2720 (107.1)		2720 (107.1)	
	Tread	Front	mm (in.)	1545 (60.8)		1545 (60.8)		1545 (60.8)		1545 (60.8)	
		Rear	mm (in.)	1535 (60.4)		1535 (60.4)		1535 (60.4)		1535 (60.4)	
	Effective Head Room	Front	mm (in.)	995 (39.2)		995 (39.2)		995 (39.2)		995 (39.2)	
		Rear	mm (in.)	975 (38.4)		975 (38.4)		975 (38.4)		975 (38.4)	
	Effective Leg Room	Front	mm (in.)	1055 (41.5)		1055 (41.5)		1055 (41.5)		1055 (41.5)	
		Rear	mm (in.)	960 (37.8)		960 (37.8)		960 (37.8)		960 (37.8)	
	Shoulder Room	Front	mm (in.)	1460 (57.5)		1460 (57.5)		1460 (57.5)		1460 (57.5)	
		Rear	mm (in.)	1440 (56.7)		1440 (56.7)		1440 (56.7)		1440 (56.7)	
	Overhang	Front	mm (in.)	945 (37.2)		945 (37.2)		945 (37.2)		945 (37.2)	
		Rear	mm (in.)	1140 (44.9)		1140 (44.9)		1140 (44.9)		1140 (44.9)	
	Min. Running Ground Clearance		mm (in.)	150 (5.9)		150 (5.9)		150 (5.9)		150 (5.9)	
	Angle of Approach		degrees	15.2°		15.2°		15.2°		15.2°	
	Angle of Departure		degrees	16.6°		16.6°		16.6°		16.6°	
	Curb Mass	Front	kg (lb)	860 (1896)* ⁴ 865 (1907)* ^{4,5}		920 (2028)* ⁴ 925 (2039)* ^{4,5}		935 (2061)* ⁴ 940 (2072)* ^{4,5}		930 (2050)* ⁴ 935 (2061)* ^{4,5}	
		Rear	kg (lb)	590 (1301)* ⁴ *5		580 (1279)* ⁴ *5		595 (1312)* ⁴ *5		590 (1301)* ⁴ *5	
		Total	kg (lb)	1450 (3197)* ⁴ 1455 (3208)* ^{4,5}		1500 (3307)* ⁴ 1505 (3318)* ^{4,5}		1530 (3373)* ⁴ 1535 (3384)* ^{4,5}		1520 (3351)* ⁴ 1525 (3362)* ^{4,5}	
	Gross Vehicle Mass	Front	kg (lb)	995 (2194)		1065 (2348)		1080 (2381)		1080 (2381)	
		Rear	kg (lb)	925 (2039)		920 (2028)		935 (2061)		935 (2061)	
		Total	kg (lb)	1920 (4233)		1985 (4376)		2015 (4442)		2015 (4442)	
	Fuel Tank Capacity		L (U.S. gal.) Imp. gal.	70 (18.5 15.4)		70 (18.5 15.4)		70 (18.5 15.4)		70 (18.5 15.4)	
	Luggage Compartment Capacity		m ³ (cu. ft.)	14.1 (497.9)		14.1 (497.9)		14.1 (497.9)		14.1 (497.9)	
Performance	Max. Speed		km/h (mph)	—		—		—		—	
	Max. Cruising Speed		km/h (mph)	—		—		—		—	
	Acceleration	0 to 100 km/h	sec	9.9		8.3		8.3		8.3	
		0 to 400 m	sec	—		—		—		—	
	Max. Permissible Speed	1st Gear	km/h (mph)	65 (41)		64 (40)		66 (41)		66 (41)	
		2nd Gear	km/h (mph)	118 (73)		116 (72)		119 (74)		119 (74)	
		3rd Gear	km/h (mph)	—		—		—		—	
		4th Gear	km/h (mph)	—		—		—		—	
	Turning Diameter (Outside Front)	Wall to Wall	m (ft.)	12.0 (39.4)		11.4 (37.4)		12.0 (39.4)		12.0 (39.4)	
		Curb to Curb	m (ft.)	11.2 (36.7)		10.6 (34.8)		11.2 (36.7)		11.2 (36.7)	
Engine	Engine Type		2AZ FE		1MZ FE		1MZ FE		1MZ FE		
	Valve Mechanism		16 Valve DOHC		24 Valve DOHC		24 Valve DOHC		24 Valve DOHC		
	Bore × Stroke		mm (in.)	88.5 × 96.0 (3.48 × 3.78)		87.5 × 83.0 (3.44 × 3.27)		87.5 × 83.0 (3.44 × 3.27)		87.5 × 83.0 (3.44 × 3.27)	
	Displacement		cm ³ (cu. in.)	2362 (144.2)		2995 (182.8)		2995 (182.8)		2995 (182.8)	
	Compression Ratio		9.6 : 1		10.5 : 1		10.5 : 1		10.5 : 1		
	Carburetor Type		SFI		SFI		SFI		SFI		
	Research Octane No.		RON	96		96		96		96	
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	117 / 5600 (157@5600)		143 / 5300 (192@5300)		143 / 5300 (192@5300)		143 / 5300 (192@5300)	
	Max. Torque (SAE NET)		N·m/rpm (lb ft@rpm)	220 / 4000 (162@4000)		283 / 4400 (209@4400)		283 / 4400 (209@4400)		283 / 4400 (209@4400)	
	Battery Capacity (5HR)		Voltage & Amp. hr	12-48* ¹ 12-55* ²		12-48* ¹ 12-55* ²		12-48* ¹ 12-55* ²		12-48* ¹ 12-55* ²	
Engine Electrical	Alternator Output		Watts	960		1200		1200		1200	
	Starter Output		kW	1.6		1.6		1.6		1.6	
Chassis	Clutch Type		—		—		—		—		
	Transaxle Type		U241E		U140E		U140E		U140E		
	Transmission Gear Ratio	In First	3.943		3.938		3.938		3.938		
		In Second	2.197		2.194		2.194		2.194		
		In Third	1.413		1.411		1.411		1.411		
		In Fourth	1.020		1.019		1.019		1.019		
		In Fifth	—		—		—		—		
		In Reverse	3.145		3.141		3.141		3.141		
	Counter Gear Ratio		—		—		—		—		
	Differential Gear Ratio (Final)		2.740		2.814		2.814		2.814		
	Brake Type	Front	Ventilated Disc		Ventilated Disc		Ventilated Disc		Ventilated Disc		
		Rear	Solid Disc		Solid Disc		Solid Disc		Solid Disc		
	Parking Brake Type		Duo Servo		Duo Servo		Duo Servo		Duo Servo		
	Brake Booster Type and Size		in	Single 10.5		Single 10.5		Single 10.5		Single 10.5	
	Proportioning Valve Type		Dual P Valve* ³		Dual P Valve* ³		—		—		
	Suspension Type	Front	MacPherson Strut		MacPherson Strut		MacPherson Strut		MacPherson Strut		
		Rear	MacPherson Strut		MacPherson Strut		MacPherson Strut		MacPherson Strut		
	Stabilizer Bar	Front	STD		STD		STD		STD		
		Rear	STD		STD		STD		STD		
	Steering Gear Type		Rack & Pinion		Rack & Pinion		Rack & Pinion		Rack & Pinion		
	Steering Gear Ratio (Overall)		16.0 : 1		15.8 : 1		16.0 : 1		16.0 : 1		
	Power Steering Type		Integral Type		Integral Type		Integral Type		Integral Type		

*1 Set Option without Cold Area Spec

*4 Produced TMC

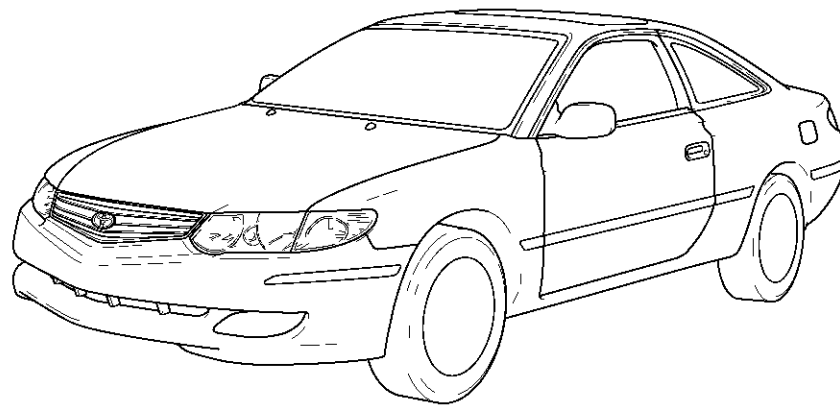
*2 Set Option with Cold Area Spec

*5 Produced TMMK

*3 Without ABS

CAMRY SOLARA

4



214CS02

CAMRY SOLARA

OUTLINE OF NEW FEATURES

The following changes have been made for the 2003 model year.

1. 2AZ-FE & 1MZ-FE Engines

To comply with the OBD-II regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them.

For details, see the 2003 General Features section.

MAJOR TECHNICAL SPECIFICATIONS

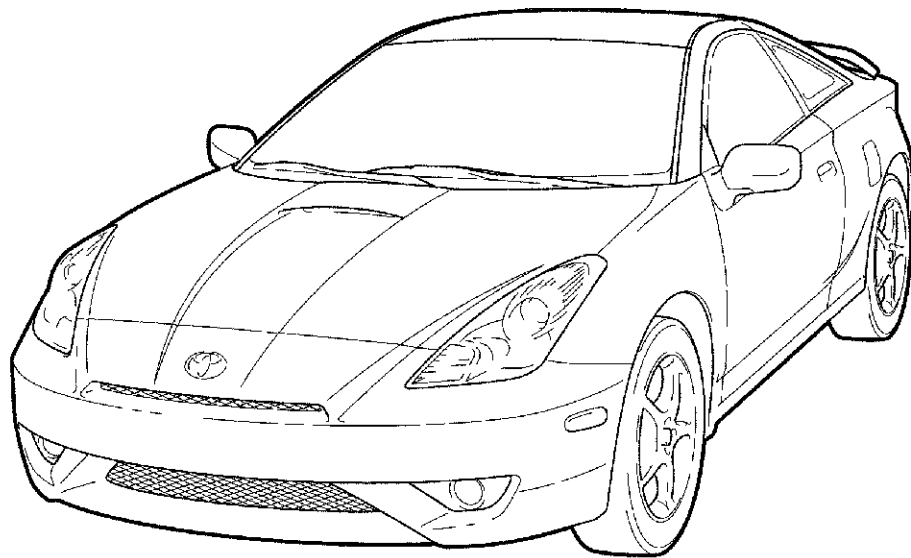
Item			Area		U S A			Canada
Body Type					2 Door Coupe			2 Door Coupe
Vehicle Grade					SE			SE
Model Code					SE SLE* ³			SE
					ACV20L GCMNKA	ACV20L GCPNKA	MCV20L GCPNKA	ACV20L GCPNKK
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)		4865 (191.5)	4865 (191.5)	4865 (191.5)	4865 (191.5)
		Width	mm (in.)		1805 (71.1)	1805 (71.1)	1805 (71.1)	1805 (71.1)
		Height*	mm (in.)		1400 (55.1)* ¹	1400 (55.1)* ¹	1400 (55.1)* ¹	1400 (55.1)* ¹
	Wheel Base		mm (in.)		2670 (105.1)	2670 (105.1)	2670 (105.1)	2670 (105.1)
	Tread	Front	mm (in.)		1545 (60.8)	1545 (60.8)	1545 (60.8)	1545 (60.8)
		Rear	mm (in.)		1520 (59.8)	1520 (59.8)	1520 (59.8)	1520 (59.8)
	Effective Head Room	Front	mm (in.)		952 (37.5)	952 (37.5)	952 (37.5)	952 (37.5)
		Rear	mm (in.)		916 (36.1)	916 (36.1)	916 (36.1)	916 (36.1)
	Effective Leg Room	Front	mm (in.)		1099.6 (43.3)	1099.6 (43.3)	1099.6 (43.3)	1099.6 (43.3)
		Rear	mm (in.)		893.5 (35.2)	893.5 (35.2)	893.5 (35.2)	893.5 (35.2)
	Shoulder Room	Front	mm (in.)		1405 (55.3)	1405 (55.3)	1405 (55.3)	1405 (55.3)
		Rear	mm (in.)		1344 (52.9)	1344 (52.9)	1344 (52.9)	1344 (52.9)
	Overhang	Front	mm (in.)		1030 (40.6)	1030 (40.6)	1030 (40.6)	1030 (40.6)
		Rear	mm (in.)		1165 (45.9)	1165 (45.9)	1165 (45.9)	1165 (45.9)
	Min. Running Ground Clearance		mm (in.)		135 (5.3)	135 (5.3)	135 (5.3)	135 (5.3)
	Angle of Approach		degrees		14.4°	14.4°	14.4°	14.4°
	Angle of Departure		degrees		16.0°	16.0°	16.0°	16.0°
	Curb Mass	Front	kg (lb)		840 (1852)	865 (1907)	920 (2028)	865 (1907)
		Rear	kg (lb)		555 (1224)	555 (1224)	550 (1213)	555 (1224)
		Total	kg (lb)		1395 (3075)	1420 (3131)	1470 (3241)	1420 (3131)
	Gross Vehicle Mass	Front	kg (lb)		994 (2191)	994 (2191)	1050 (2314)	994 (2191)
		Rear	kg (lb)		903 (1990)	903 (1990)	899 (1981)	903 (1990)
		Total	kg (lb)		1897 (4181)	1897 (4181)	1949 (4296)	1897 (4181)
	Fuel Tank Capacity		L (U S gal Imp gal)		70 (18.5 15.4)	70 (18.5 15.4)	70 (18.5 15.4)	70 (18.5 15.4)
	Luggage Compartment Capacity		m ³ (cu ft)		0.39 (13.8)	0.39 (13.8)	0.39 (13.8)	0.39 (13.8)
Performance	Max Speed		km/h (mph)		180 (112)	180 (112)	210 (130)	180 (112)
	Max Cruising Speed		km/h (mph)		—	—	—	—
	Acceleration	0 to 100 km/h	sec		9.1	9.9	8.2	9.9
		0 to 400 m	sec		—	—	—	—
	Max Permissible Speed	1st Gear	km/h (mph)		52 (32)	64 (40)	58 (36)	64 (40)
		2nd Gear	km/h (mph)		89 (55)	115 (71)	105 (65)	115 (71)
		3rd Gear	km/h (mph)		137 (85)	—	—	—
		4th Gear	km/h (mph)		189 (117)	—	—	—
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)		12.3 (40.4)	12.3 (40.4)	12.3 (40.4)	12.3 (40.4)
		Curb to Curb	m (ft)		11.6 (38.1)	11.6 (38.1)	11.6 (38.1)	11.6 (38.1)
Engine	Engine Type				2AZ FE	2AZ FE	1MZ FE	2AZ FE
	Valve Mechanism				16 Valve DOHC	16 Valve DOHC	24 Valve DOHC	16 Valve DOHC
	Bore × Stroke		mm (in.)		88.5 × 96.0 (3.48 × 3.78)	88.5 × 96.0 (3.48 × 3.78)	87.5 × 83.0 (3.44 × 3.27)	88.5 × 96.0 (3.48 × 3.78)
	Displacement		cm ³ (cu in.)		2362 (144.2)	2362 (144.2)	2995 (182.7)	2362 (144.2)
	Compression Ratio				9.6 : 1	9.6 : 1	10.5 : 1	9.6 : 1
	Carburetor Type				SFI	SFI	SFI	SFI
	Research Octane No		RON		91 or more	91 or more	91 or more* ²	91 or more
	Max Output (SAE NET)		kW/rpm (HP@rpm)		117 / 5600 (157@5600)	117 / 5600 (157@5600)	148 / 5200 (198@5200)	117 / 5600 (157@5600)
Engine Electrical	Max Torque (SAE NET)		N m/rpm (lb ft@rpm)		220 / 4000 (162@4000)	220 / 4000 (162@4000)	287 / 4400 (212@4400)	220 / 4000 (162@4000)
	Battery Capacity (5HR)		Voltage & Amp hr		12 55 12-48* ³	12 55 12-48* ³	12 55 12-48* ³	12 55
	Alternator Output		Watts		960	960	960	960
Chassis	Starter Output		kW		1.6	1.6	1.4	1.6
	Clutch Type				Dry Single Plate Diaphragm	—	—	—
	Transaxle Type				E351	U241E	A541E	U241E
	Transmission Gear Ratio	In First			3.538	3.943	2.810	3.943
		In Second			2.045	2.197	1.549	2.197
		In Third			1.333	1.413	1.000	1.413
		In Fourth			0.972	1.020	0.735	1.020
		In Fifth			0.731	—	—	—
		In Reverse			3.583	3.145	2.296	3.145
	Counter Gear Ratio				—	—	0.945	—
	Differential Gear Ratio (Final)				3.944	2.740	3.933	2.740
	Brake Type	Front			Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
		Rear			Leading Trailing Drum	Leading Trailing Drum	Solid Disc	Leading Trailing Drum
	Parking Brake Type				Leading Trailing Drum	Leading Trailing Drum	Duo Servo Drum	Leading Trailing Drum
	Brake Booster Type and Size		in		Tandem 8 + 9	Tandem 8 + 9	Tandem 8 + 9	Tandem 8 + 9
	Proportioning Valve Type				Dual P Valve	Dual P Valve	Dual P Valve	Dual P Valve
	Suspension Type	Front			MacPherson Strut	MacPherson Strut	MacPherson Strut	MacPherson Strut
		Rear			MacPherson Strut	MacPherson Strut	MacPherson Strut	MacPherson Strut
	Stabilizer Bar	Front			STD	STD	STD	STD
		Rear			STD	STD	STD	STD
	Steering Gear Type				Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion
	Steering Gear Ratio (Overall)				17.4	17.4	17.4	17.4
	Power Steering Type				Integral Type	Integral Type	Integral Type	Integral Type

*¹ Unloaded Vehicle*² 95 or more recommended*³ Without Cold Area Spec

	Canada	U S A		Canada
	2 Door Coupe	Convertible		
	SE SLE*3	SE	SE SLE*3	
	MCV20L GCPNKK	ACV20L GKPNKA	MCV20L GKPNKA	MCV20L GKPNKK
5	4865 (191.5)	4865 (191.5)	4865 (191.5)	4865 (191.5)
	1805 (71.1)	1805 (71.1)	1805 (71.1)	1805 (71.1)
	1400 (55.1)*1	1400 (55.1)*1	1400 (55.1)*1	1400 (55.1)*1
	2670 (105.1)	2670 (105.1)	2670 (105.1)	2670 (105.1)
	1545 (60.8)	1545 (60.8)	1545 (60.8)	1545 (60.8)
10	1520 (59.8)	1520 (59.8)	1520 (59.8)	1520 (59.8)
	952 (37.5)	943 (37.1)	943 (37.1)	943 (37.1)
	916 (36.1)	919 (36.2)	919 (36.2)	919 (36.2)
	1099.6 (43.3)	1099.6 (43.3)	1099.6 (43.3)	1099.6 (43.3)
	893.5 (35.2)	893.5 (35.2)	893.5 (35.2)	893.5 (35.2)
15	1405 (53.3)	1405 (53.3)	1405 (53.3)	1405 (53.3)
	1344 (52.9)	1344 (52.9)	1344 (52.9)	1344 (52.9)
	1030 (40.6)	1030 (40.6)	1030 (40.6)	1030 (40.6)
	1165 (45.9)	1165 (45.9)	1165 (45.9)	1165 (45.9)
	135 (5.3)	135 (5.3)	135 (5.3)	135 (5.3)
20	14.4°	14.4°	14.4°	14.4°
	16.0°	16.0°	16.0°	16.0°
	920 (2028)	910 (2006)	965 (2127)	965 (2127)
	550 (121.3)	615 (135.6)	610 (134.5)	610 (134.5)
	1470 (3241)	1525 (3362)	1575 (3472)	1575 (3472)
25	994 (2191)	1031 (2273)	1079 (2379)	1079 (2379)
	903 (1990)	894 (1970)	887 (1955)	887 (1955)
	1897 (4181)	1925 (4243)	1966 (4335)	1966 (4335)
	70 (18.5 15.4)	70 (18.5 15.4)	70 (18.5 15.4)	70 (18.5 15.4)
	0.39 (13.8)	0.25 (8.8)	0.25 (8.8)	0.25 (8.8)
30	210 (130)	180 (112)	210 (130)	210 (130)
	—	—	—	—
	8.2	10.9	8.9	8.9
	—	—	—	—
	58 (36)	64 (40)	58 (36)	58 (36)
35	105 (65)	115 (71)	105 (65)	105 (65)
	—	—	—	—
	—	—	—	—
	123 (40.4)	123 (40.4)	123 (40.4)	123 (40.4)
	11.6 (38.1)	11.6 (38.1)	11.6 (38.1)	11.6 (38.1)
40	1MZ FE	2AZ FE	1MZ FE	1MZ FE
	24 Valve DOHC	16 Valve DOHC	24 Valve DOHC	24 Valve DOHC
	87.5 × 83.0 (3.44 × 3.27)	88.5 × 96.0 (3.48 × 3.78)	87.5 × 83.0 (3.44 × 3.27)	87.5 × 83.0 (3.44 × 3.27)
	2995 (182.7)	2362 (144.2)	2995 (182.7)	2995 (182.7)
	10.5 1	9.6 1	10.5 1	10.5 1
45	SFI	SFI	SFI	SFI
	91 or more*2	91 or more	91 or more*2	91 or more*2
	143 / 5200 (192@5200)	117 / 5600 (157@5600)	143 / 5200 (192@5200)	143 / 5200 (192@5200)
	281 / 4400 (207@4400)	220 / 4000 (162@4000)	281 / 4400 (207@4400)	281 / 4400 (207@4400)
	12.55	12.55 12-48*3	12.55 12-48*3	12.55
50	960	960	960	960
	1.4	1.6	1.4	1.4
	—	—	—	—
	A541E	U241E	A541E	A541E
	2.810	3.943	2.810	2.810
55	1.549	2.197	1.549	1.549
	1.000	1.413	1.000	1.000
	0.735	1.020	0.735	0.735
	—	—	—	—
	2.296	3.145	2.296	2.296
60	0.945	—	0.945	0.945
	3.933	2.740	3.933	3.933
	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
	Solid Disc	Solid Disc	Solid Disc	Solid Disc
	Duo Servo Drum	Duo Servo Drum	Duo Servo Drum	Duo Servo Drum
65	Tandem 8 + 9	Tandem 8 + 9	Tandem 8 + 9	Tandem 8 + 9
	Dual P Valve	Dual P Valve	Dual P Valve	Dual P Valve
	MacPherson Strut	MacPherson Strut	MacPherson Strut	MacPherson Strut
	MacPherson Strut	MacPherson Strut	MacPherson Strut	MacPherson Strut
	STD	STD	STD	STD
70	STD	STD	STD	STD
	Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion
	17.4	17.4	17.4	17.4
	Integral Type	Integral Type	Integral Type	Integral Type

CELICA

5



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CELICA

OUTLINE OF NEW FEATURES

The following changes have been made for the 2003 model year.

1. Exterior and Interior

The exterior and interior have been changed in order to evolve into a cool and sport model and to emphasize the high quality. For details, refer to page 56.

2. 1ZZ-FE Engine

The following chart describes the changes from 1ZZ-FE engine on the '02 Celica to 1ZZ-FE engine on the '03 Celica.

Item	Outline
Engine Control System	To comply with the OBD-II regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, see the 2003 General Features section.
Other	Configuration and structure are the same as 1ZZ-FE engine on the '02 Celica.

3. 2ZZ-GE Engine

The following chart describes the changes from 2ZZ-GE engine on the '02 Celica to 2ZZ-GE engine on the '03 Celica.

Item	Outline
Intake System	• Change to the throttle body (integrated throttle position sensor, throttle control motor) • Discontinued of the throttle control cable
Engine Control System	• ETCS-1 control is used. • An accelerator pedal position sensor has been added. • Change to the ECM (16-bit → 32-bit) • Added DTCs (Diagnostic Trouble Codes) in ETCS-1 relation. • Added fail-safe for ETCS-1. • To comply with the OBD-II regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, see the 2003 General Features section.
Other	Configuration and structure are the same as 2ZZ-GE engine on the '02 Celica.

4. Suspension

Newly developed front and rear shock absorbers have been adopted to ensure the responsiveness of the damping force.

5. Brake

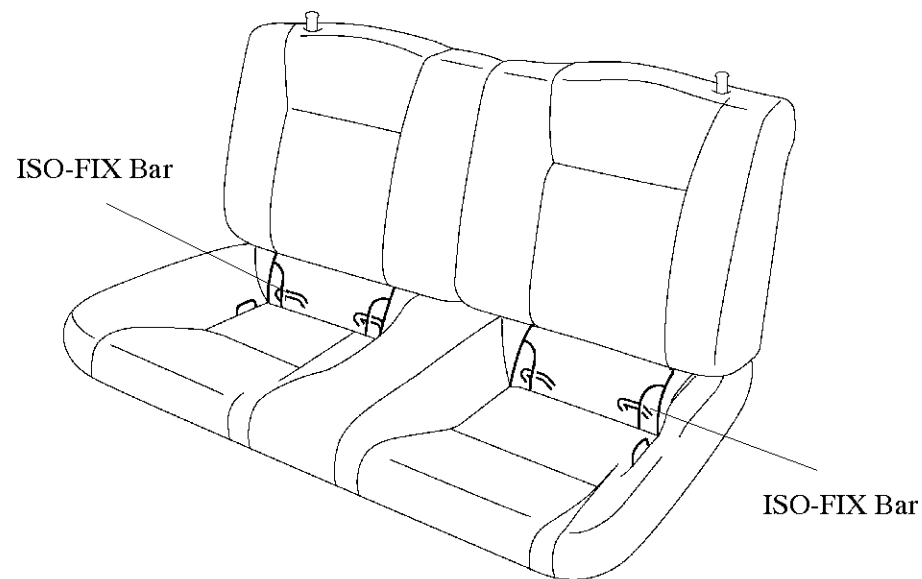
The brake actuator of the brake control system (ABS with EBD) is integrated with the skid control ECU, ABS solenoid relay and ABS motor relay.

6. Steering

- The main shaft support portion has been changed from a bushing to a needle bearing type. The needle bearing is used to reduce the friction that occurs during steering operation.
- The shape of the steering column bracket has been changed in order to ensure its mounting rigidity.

7. Rear Seat

ISO-FIX bar for securing child seats is used behind the seat cushion of the rear seat.



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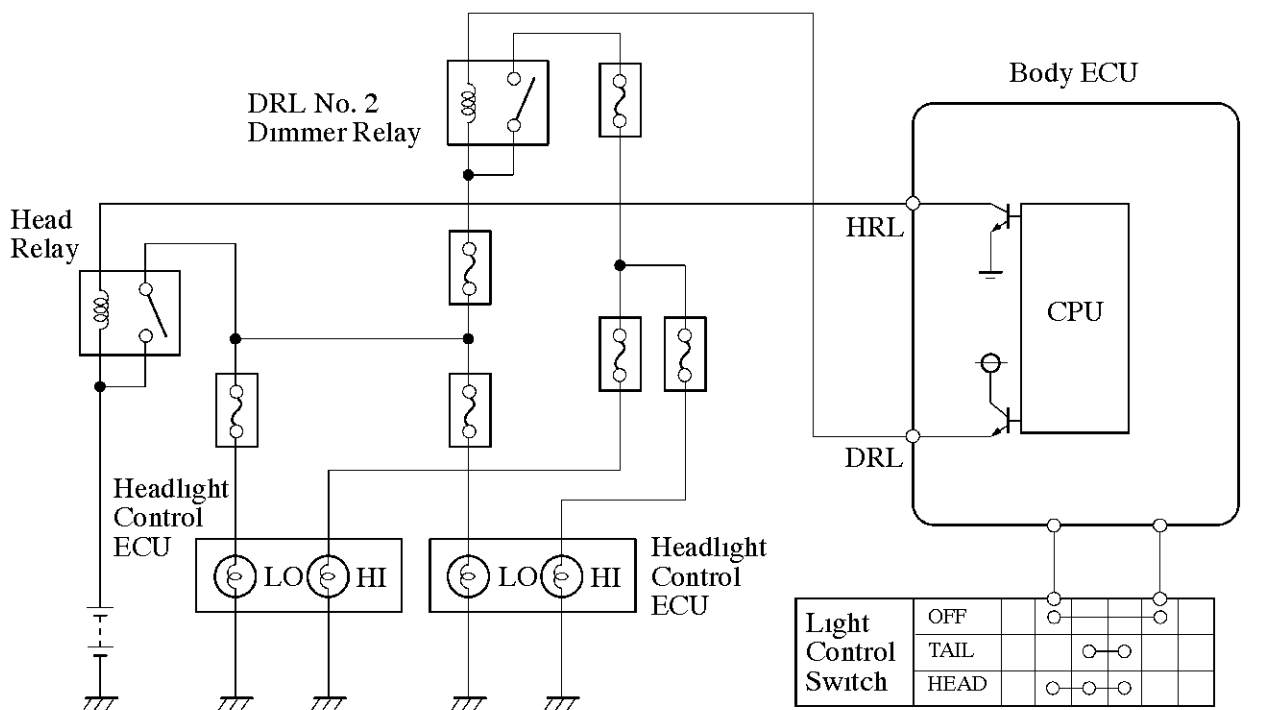
8. HID (High Intensity Discharge) Headlight System

HID headlight system is added as optional equipment for the low beams of all models in order to realize excellent visibility.

9. Daytime Running Light System (with HID Headlight Model)

The daytime running light system on the model with the HID headlights light on the high beams.

► Wiring Diagram ◀



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10. Headlight Beam Level Control System

A headlight beam level control system is used optional equipment on all models using the HID headlight system.

11. Cruise Control System (only for 2ZZ-GE Engine model)

The cruise control of the 2ZZ-GE engine model is performed with the ETCS-1 system. Accordingly, an actuator is used at the throttle motor, the cruise control ECU is integrated in the ECM, and the control cable and cruise control actuator have been discontinued.

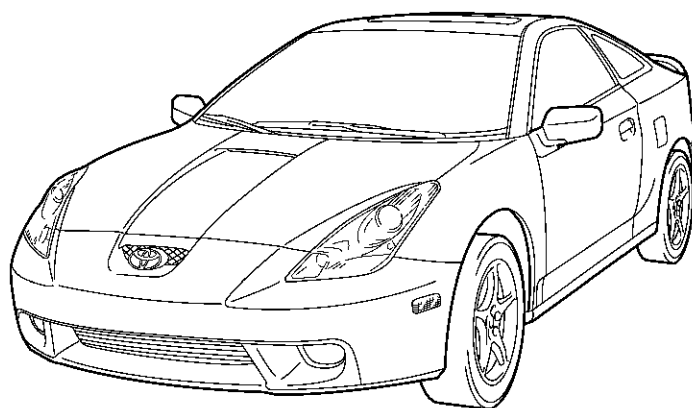
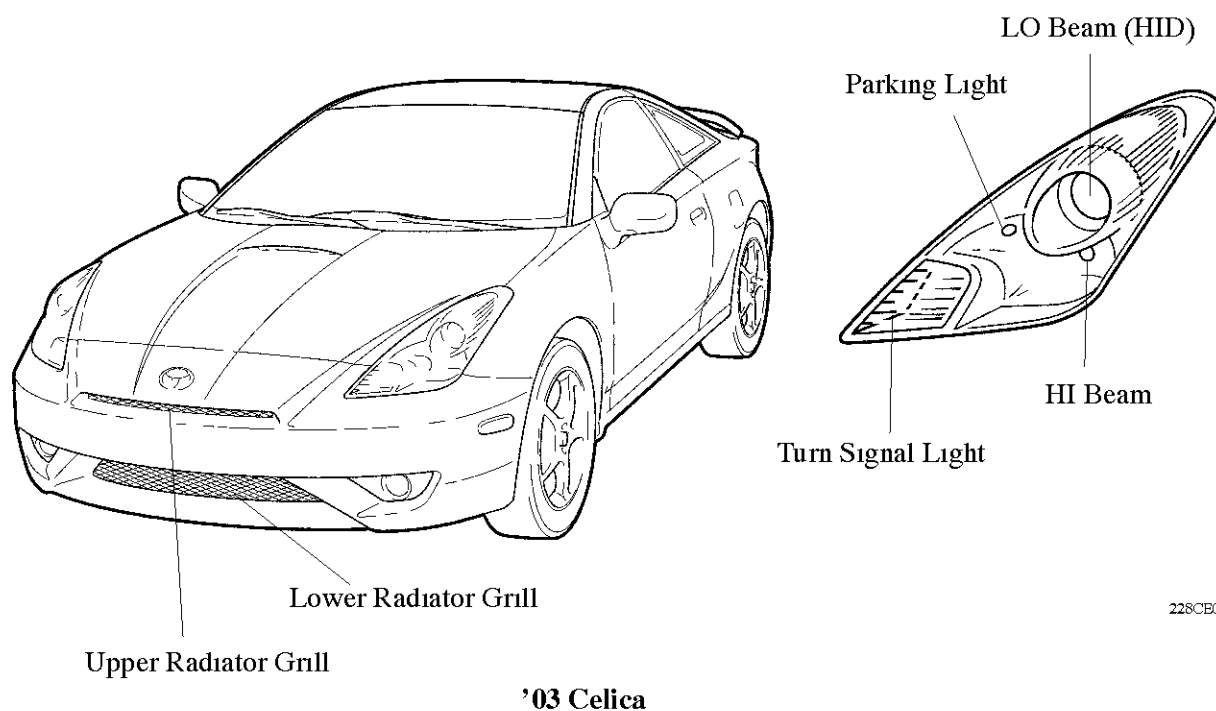
NEW FEATURES

■ EXTERIOR AND INTERIOR

1. Exterior

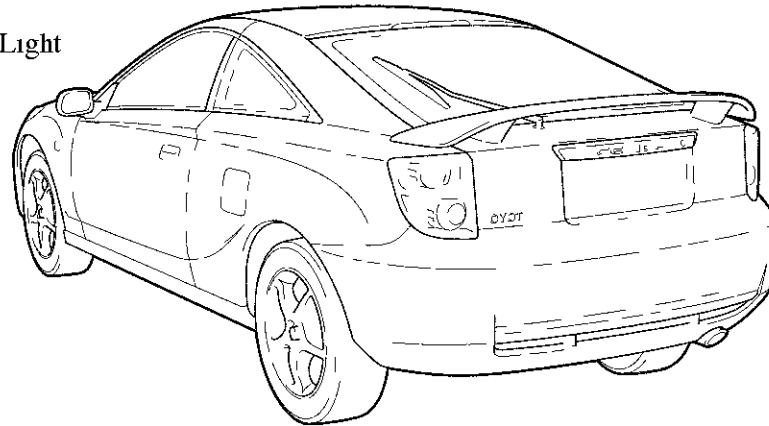
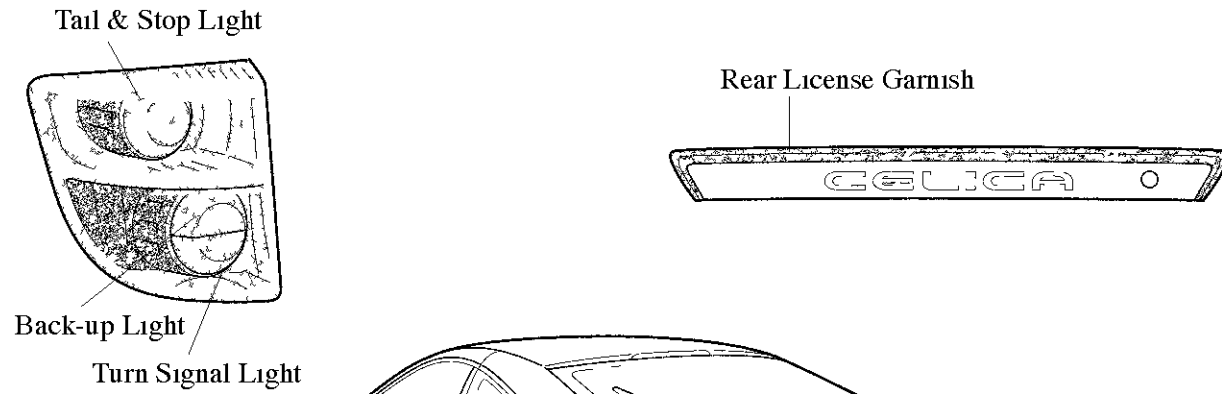
Front View

- The design of the upper and lower radiator grilles has been changed to emphasize the wideness and the low center of gravity.
- HID headlights are available as an option in order to enhance the high functionality image. Along with the installation of the HID headlights, the bulb replacement procedure has been changed. For details, see the 2003 Celica Repair Manual (Pub. No. RM976U).



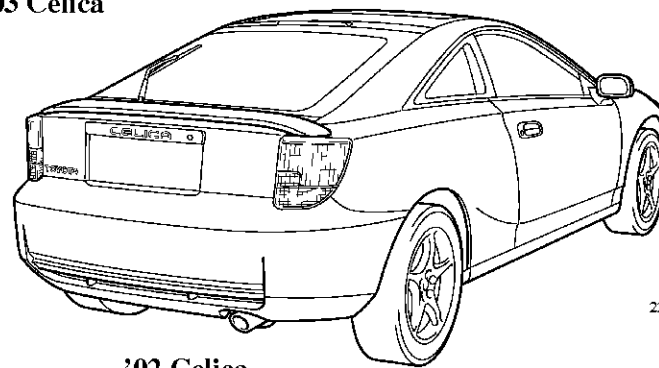
Rear View

- The design of the rear combination lights has been changed to emphasize the sporty and futuristic look.
- The rear license plate garnish has been changed to emphasize high quality.



'03 Celica

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'02 Celica

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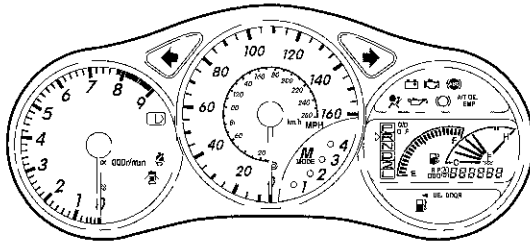
Exterior Color

Total of 8 exterior colors –6 carryover colors and 2 new colors:

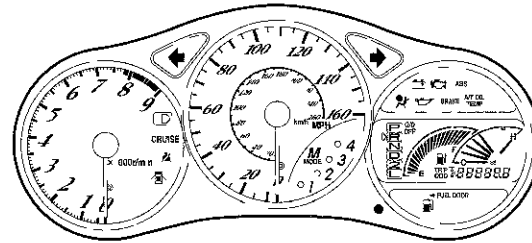
Color (Color No.)	Note
Super White II (040)	Carryover
Silver Mica Metallic (1E7)	New
Black Mica Color Clear (202)	Carryover
Blue Black Mica Color Clear (210)	Carryover
Super Red V (3P0)	Carryover
Super Bright Yellow (576)	Carryover
Blue Mica (8M6)	Carryover
Blue Metallic (8N0)	New

2. Interior

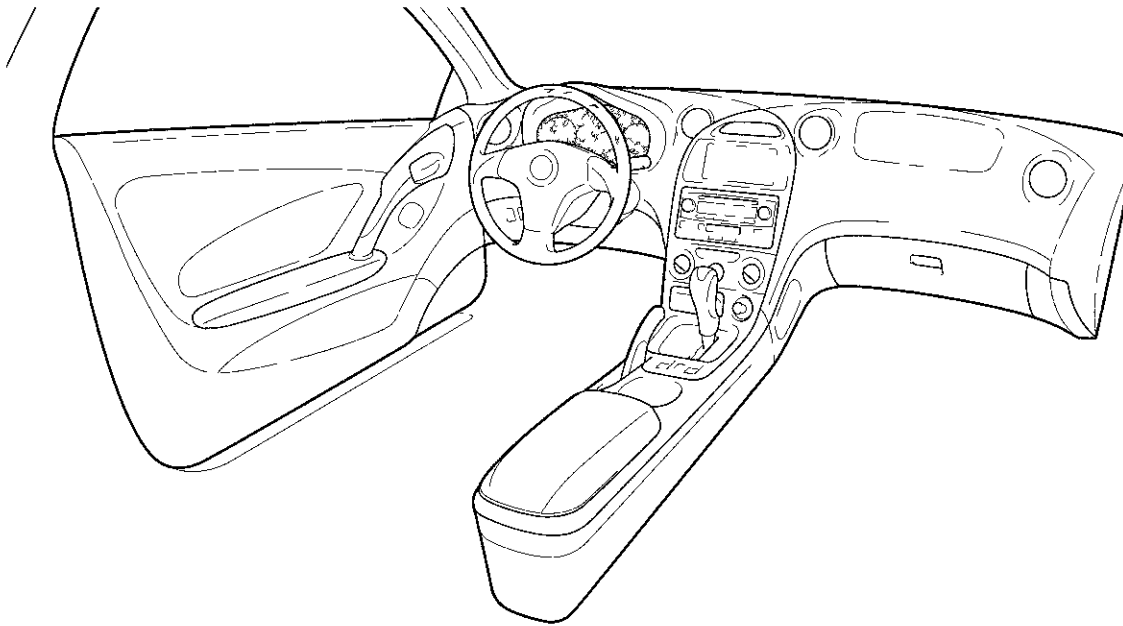
- The interior color (instrument panel, door trims, quarter trims, console box, and combination meter panel) has been changed to dark gray and the illumination color (audio, clock, heater control panel, and power window switch) has been changed to amber in order to create a chic and sporty look.
- The lettering and the graduation pitch on the dial of the speedometer and tachometer have been revised to enhance their readability.
- The LED (Light Emitting Diode) graduation pitch and layout of the fuel gauge and engine coolant temperature gauge have been revised to enhance their visibility.



'03 Celica



'02 Celica



■ 2ZZ-GE ENGINE

1. Major Difference

The following chart describes the changes from 2ZZ-GE engine on the '02 Celica to 2ZZ-GE engine on the '03 Celica.

Item	Outline
Intake System	• Change to the throttle body (integrated throttle position sensor, throttle control motor) • Discontinued throttle control cable
Engine Control System	• ETCS-1 control is used. • Change to the throttle position sensor. • An accelerator pedal position sensor has been added. • Change to the ECM (16-bit → 32-bit). • Added DTCs (Diagnostic Trouble Codes) for ETCS-1. • Added fail-safe for ETCS-1 • To comply with the OBD-II regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, see the 2003 General Features section.
Other	Configuration and structure are the same as 2ZZ-GE engine on the '02 Celica.

2. Engine Specification

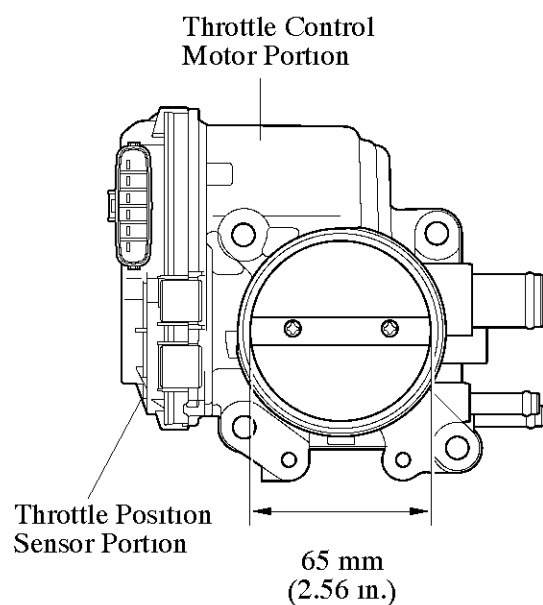
Model				'03 Celica	'02 Celica
No. of Cyls. & Arrangement				4-Cylinder, In-line	←
Valve Mechanism				16-Valve DOHC, Chain Drive (with VVTL-1)	←
Combustion Chamber				Pentroof Type	←
Manifolds				Cross-Flow	←
Fuel System				SFI	←
Ignition System				DIS	
Displacement		cm ³ (cu. in.)		1796 (109.7)	←
Bore × Stroke		mm (in.)		82.0 × 85.0 (3.23 × 3.35)	←
Compression Ratio				11.5 : 1	←
Max. Output		[SAE-NET]		134 kW @ 7600 rpm (180 HP @ 7600 rpm)	←
Max. Torque		[SAE-NET]		176 N·m @ 6800 rpm (130 ft·lbf @ 6800 rpm)	←
Valve Timing	IN	LO & Med Speed Range	Open	-10° ~ 33° BTDC	←
			Close	58° ~ 15° BTDC	←
		HI Speed Range	Open	15° ~ 58° ABDC	←
			Close	97° ~ 54° ABDC	←
	EX	LO & Med Speed Range	Open	34° BBDC	←
			Close	14° ATDC	←
		HI Speed Range	Open	60° ATDC	←
			Close	36° ATDC	←
Valve Lift	IN	LO & Med Speed Range		7.25 mm (0.29 in.)	←
		HI Speed Range		11.4 mm (0.45 in.)	←
	EX	LO & Med Speed Range		7.25 mm (0.29 in.)	←
		HI Speed Range		10.0 mm (0.39 in.)	←
Firing Order				1 – 3 – 4 – 2	←
Octane Rating				91 or more* ¹	←
Oil Grade				API SL-EC or ILSAC	API SJ- EC or ILSAC
Engine Service Mass (Reference)		kg (lb)		120 (265)* ²	←
*1: Use only premium unleaded gasoline					

*1: Use only premium unleaded gasoline

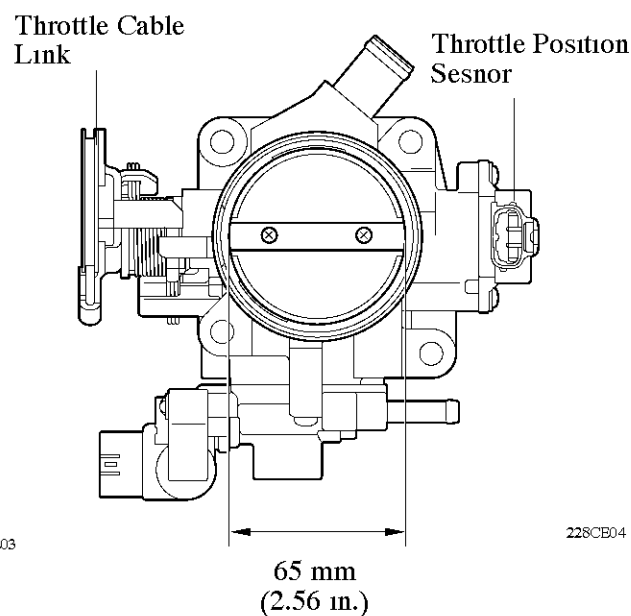
*2: for Automatic Transaxle Model

3. Intake System

- A linkless type throttle body (ETSC-1) in which the throttle position sensor and the throttle motor are integrated is used. It realizes excellent throttle valve control.
For details of ETCS-1 control, refer to see page 68.
- A DC motor with excellent response and minimal power consumption is used for the throttle control motor. The ECM performs the duty ratio control of the direction and the amperage of the current that flows to the throttle control motor in order to regulate the opening angle of the throttle valve.



'03 Celica



'02 Celica

4. Engine Control System

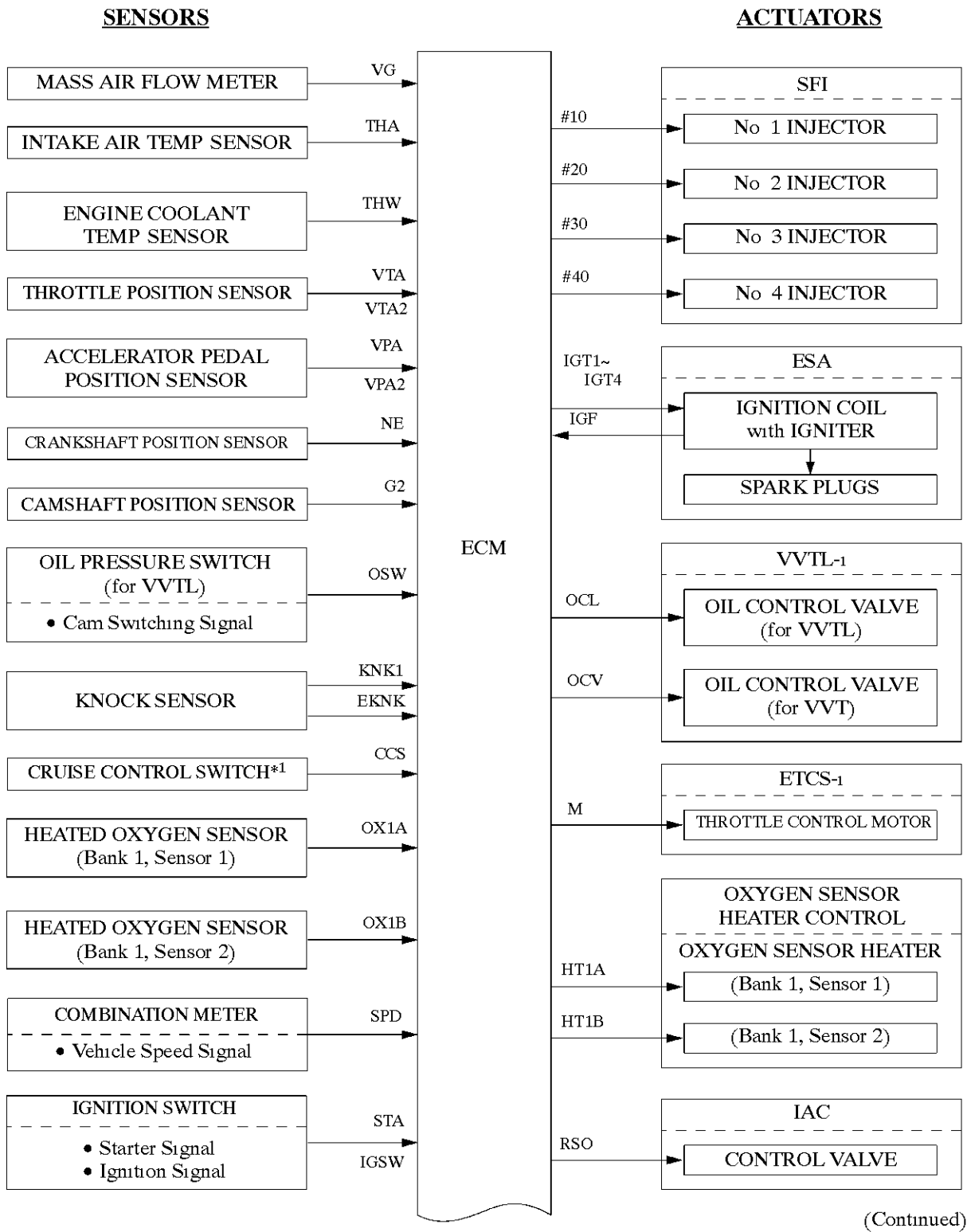
General

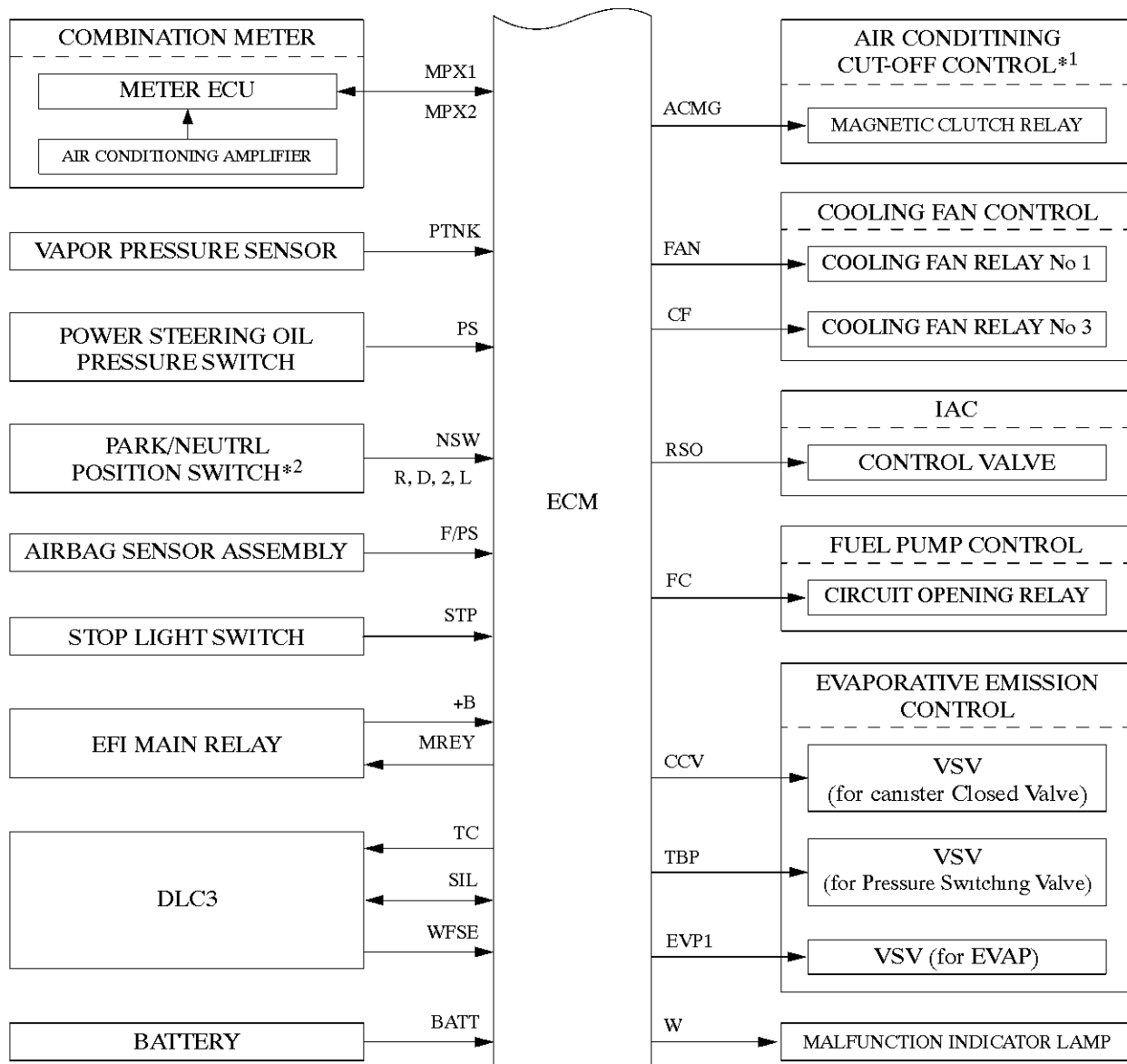
The engine control system for the 2ZZ-GE engine has following features.

System	Outline	'03	'02
SFI (Sequential Multiport Fuel Injection)	An L-type SFI system detects the intake air volume with a hot-wire type air flow meter	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.	○	○
IAC (Idle Air Control)	A rotary solenoid type IAC valve controls the fast idle and idle speeds.	—	○
VVT-i (Variable Valve Timing and Lift-intelligent)	Controls the VVT-i controller and the cam change over mechanism to realize an optimal valve timing and valve lift in accordance with the engine conditions.	○	○
ETCS-i (Electronic Throttle Control System-intelligent) [See page 68]	Optimally controls the throttle valve opening in accordance with the amount of accelerator pedal effort and the condition of engine and the vehicle.	○	—
Air Intake Control	The ECM controls the air intake valve based on the signals from the crankshaft position sensor and throttle position sensor.	○	○
Fuel Pump Control	- Fuel pump operation is controlled by signals from the ECM. - The fuel pump is stopped, when the SRS airbag is deployed in a front or side collision.	○	○
Oxygen Sensor Heater Control	Maintains the temperature of the oxygen sensors at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○
Evaporative Emission Control	- The ECM controls the purge flow of evaporative emissions (HC) in the charcoal canister in accordance with engine conditions. - Using 3 VSVs and a vapor pressure sensor, the ECM detects any evaporative emission leakage occurring between the fuel tank and charcoal canister through the changes in the fuel tank pressure.	○	○
Air Conditioning Cut-off Control	By turning the air conditioning compressor ON or OFF in accordance with the engine condition, drivability is maintained.	○	○
Cooling Fan Control	Cooling fan operation is controlled by signals from the ECM based on the engine coolant temperature sensor signal and the condition of the air conditioner operation.	○	○
Diagnosis	When the ECM detects a malfunction, the ECM diagnosis and memorizes the failed section.	○	○
	All DTC (Diagnostic Trouble Code) correspond to the SAE control codes. For details, see the 2003 General Features section.	○	—
Fail-Safe [See page 69]	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in memory.	○	○

Construction

The configuration of the engine control system in the 2ZZ-GE engine in the '03 Celica is as shown in the following chart.





*1 with Cruise Control Switch
 *2 Only for Automatic Transaxle

Main Component of Engine Control System

1) General

The main components for the 2ZZ-GE engine on the '03 Celica and '02 Celica are compared below:

Model	'03 Celica	'02 Celica
ECM	32-bit	16-bit
Mass Air Flow Meter	Hot-wire Type	←
Crankshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (36 – 2)	←
Camshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (3)	←
Throttle Position Sensor	Linear Type/2 signal output (Hall IC)	Linear Type/1 signal output (Variable Resistor & Contact Point)
Accelerator Pedal Position Sensor	Linear Type/2 signal output	—
Knock Sensor	Non-resonant/ Flat Type	←
Oxygen Sensor (Bank 1, Sensor 1 and 2)	with Heater	←
Injector	4-Hole Type	←
IAC Valve	—	Rotary Solenoid Type (1-coil Type)

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2) ECM

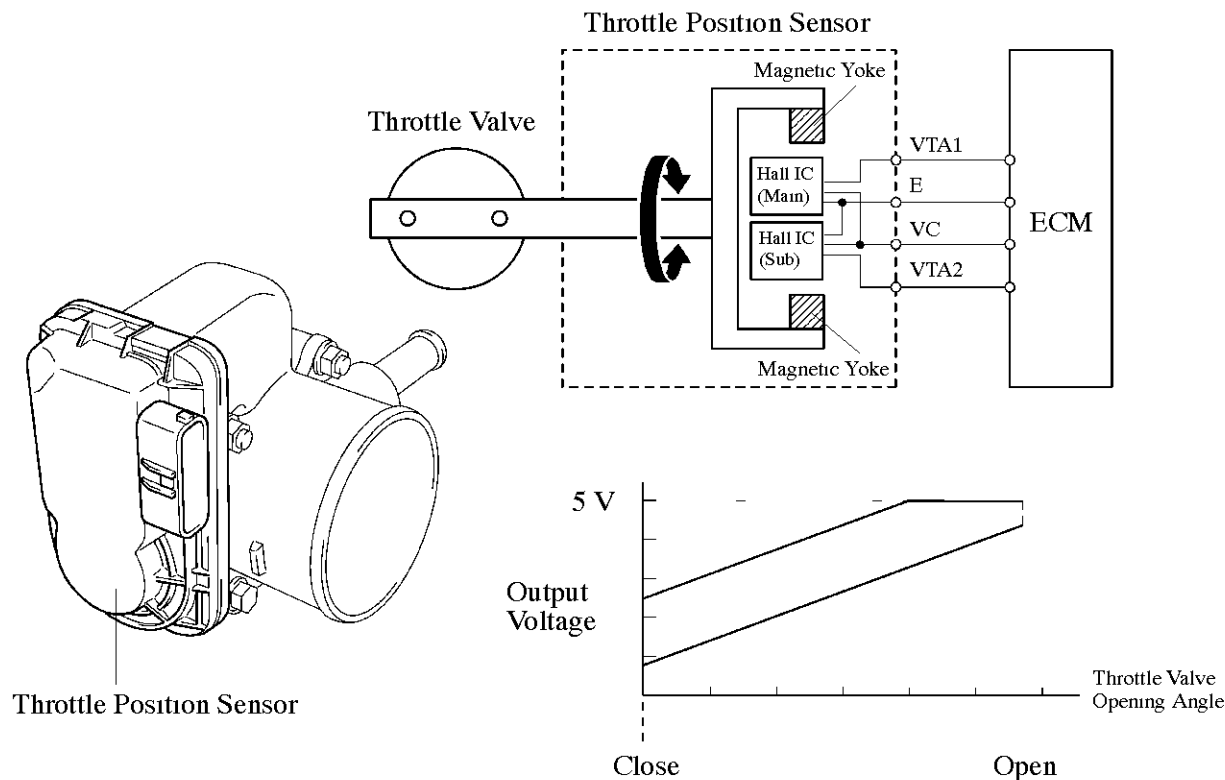
The 32-bit CPU of the ECM has been changed from the 16-bit CPU of the ECM to increase the speed for processing the signals.

Service Tip

The length of time to clear the DTC via the battery terminal has been changed from 10 seconds to 1 minute.

3) Throttle Position Sensor

- The throttle position sensor uses 2 Hall ICs. This sensor detects the throttle valve opening angle by converting into electrical signals the changes in magnetic flux density created when the 2 magnetic yoke revolves around the 2 Hall ICs.
- This sensor converts the throttle valve opening angles into electronic signals with two differing characteristics and outputs them to the ECM. One is the VTA (main) signal that linearly outputs the voltage along the entire range of the throttle valve opening angle. The other is the VTA2 (sub) signal that outputs an offset voltage.



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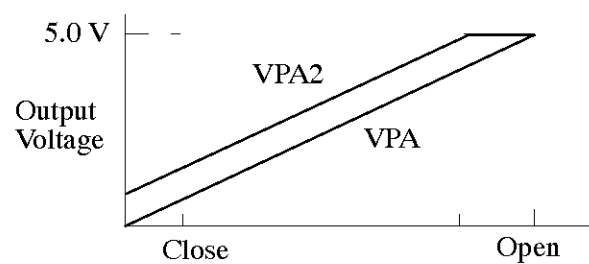
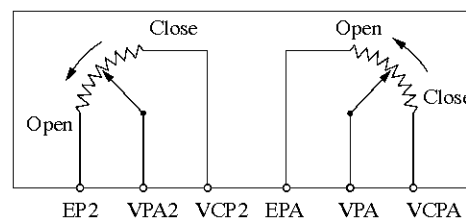
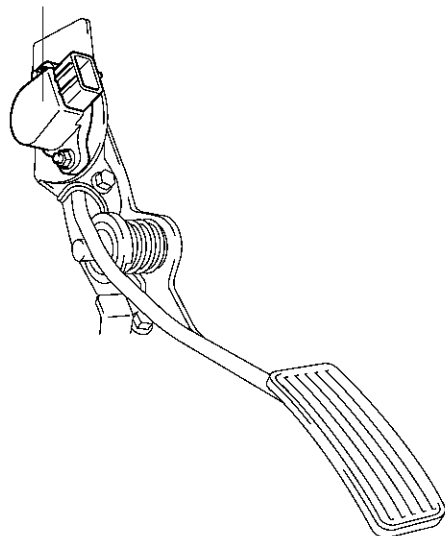
Service Tip

This sensor uses a Hall IC, so the inspection method differs from that of a conventional throttle position sensor. For details, refer to the 2003 Celica Repair Manual (Pub. No. RM976U).

4) Accelerator Pedal Position Sensor

This sensor converts the acceleration pedal depressing angles into electronic signals with two differing characteristics and outputs them to the ECM. One is the VPA signal that linearly outputs the voltage along the entire range of the throttle valve opening angle. The other is the VPA2 signal that outputs an offset voltage.

Accelerator Pedal Position Sensor

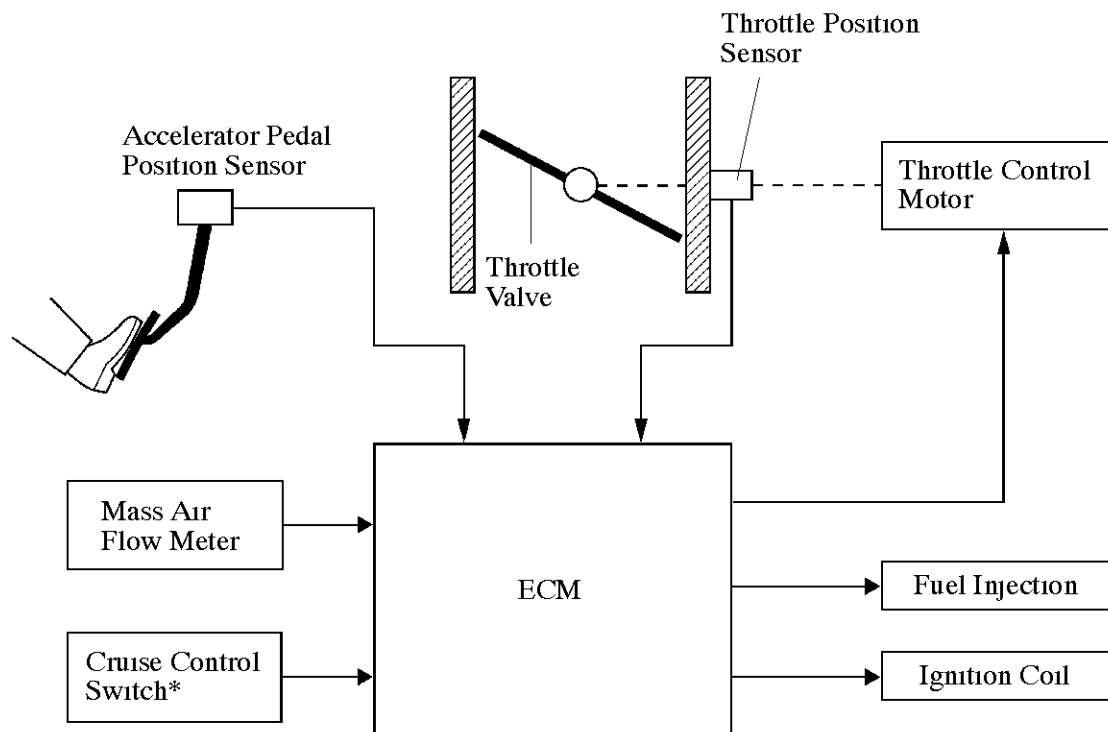


ETCS-i (Electronic Throttle Control System-intelligent)

1) General

- In the conventional throttle body, the throttle valve opening is determined invariably by the amount of the accelerator pedal effort. In contrast, ETCS-i uses the ECM to calculate the optimal throttle valve opening that is appropriate for the respective driving condition and uses a throttle control motor to control the opening.
- The accelerator cable and link have been discontinued, and an accelerator pedal position sensor has been provided on the accelerator pedal.

► System Diagram ◀



*: with Cruise Control System

228CB09

2) Operation

The ECM drives the throttle control motor by determining the target throttle valve opening in accordance with the respective vehicle operating condition.

Control	Outline
Idle Speed Control	Controls the throttle valve in order to constantly effect ideal idle speed control.
Shift Shock Reduction Control (only for Automatic Transaxle)	The throttle control is synchronized to the ECT (Electronically Controlled Transmission) control during the shifting of the transmission in order to reduce the shift shock.
Cruise Control (Option)	An ECM with an integrated cruise control ECU directly actuates the throttle valve to effect the operation of the cruise control.

Fail-Safe**1) General**

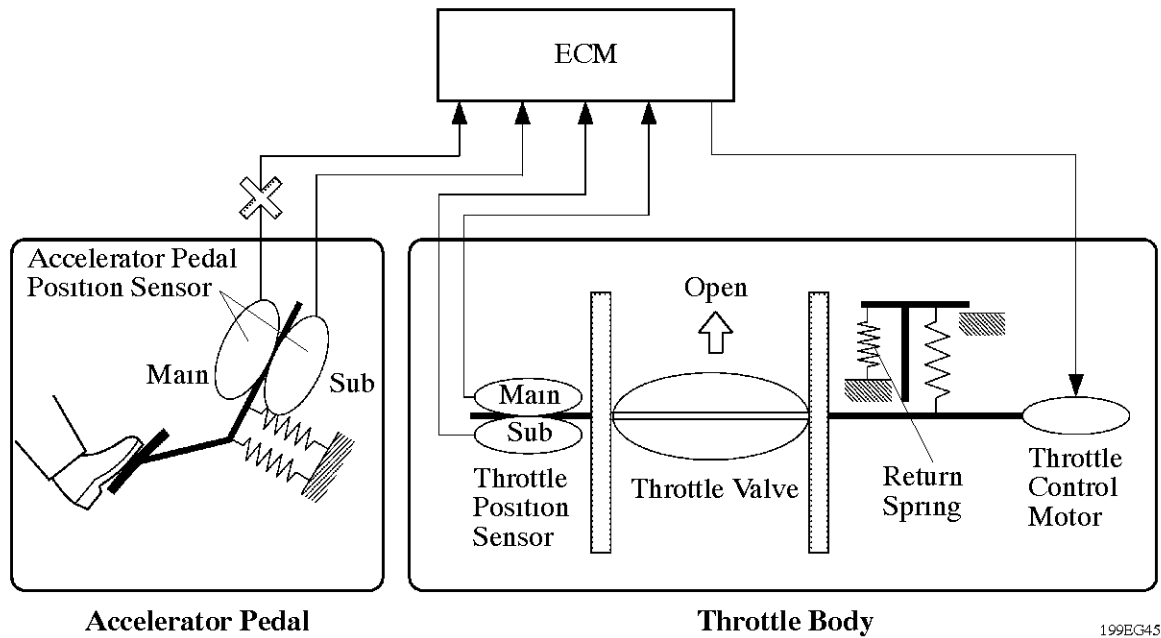
When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory as the following condition.

: Newly

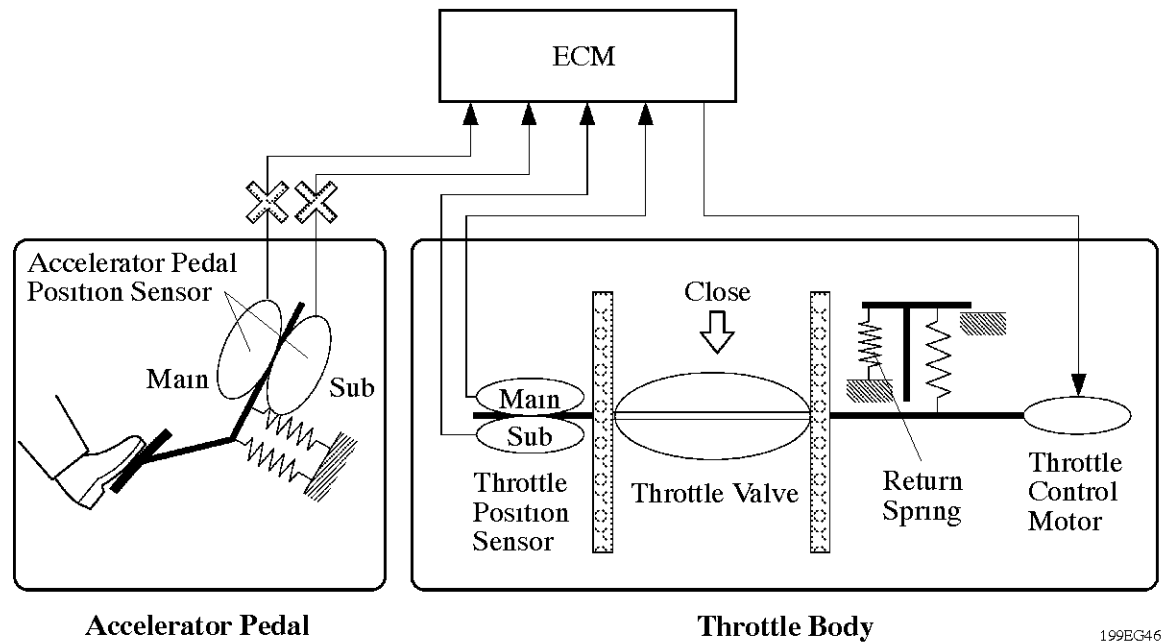
Location of Malfunction	Description of Control
Mass Air Flow Meter	In case of a signal malfunction, the engine could operate poorly or the catalyst could overheat if the sensor signals continue to control the operation of the engine. Therefore, the ECM calculates the forecasted intake air volume based on the engine speed and throttle opening angle, in order to control.
Accelerator Pedal Position Sensor (For details, see page 70)	In case of a signal malfunction, the ECM calculates the accelerator pedal opening angle that is limited by the dual system sensor value and continues effecting throttle valve control. If both system malfunction, the ECM considers that the accelerator pedal is fully closed.
Throttle Position Sensor (For details, see page 71)	In case of a signal malfunction, the ECM cuts off the current to the throttle control motor. The throttle valve returns to the prescribed opening by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue driving.
Intake Air Temp. Sensor and Engine Coolant Temp. Sensor	In case of a signal malfunction, the use of the values from the sensors will make the air-fuel ratio become too rich or too lean, which could cause the engine to stall or to run poorly during cold operation. Therefore, the ECM fixes the air-fuel ratio to the stoichiometric ratio and uses the constant value of 80 °C engine coolant temperature and 20 °C intake air temperature to perform the calculation.
Knock Sensor	In case of a malfunction in the knock sensor or in the knocking signal system (open or short circuit), the engine could become damaged if the timing is advanced despite the presence of knocking. Therefore, if a malfunction is detected in the knock sensor system, the ECM turns the timing retard correction of the knock sensor into the prescribed retard value.
Ignition Coil	In case of a malfunction in the ignition system, such as an open circuit in the ignition coil, the catalyst could become overheated due to engine misfire. Therefore, if the ignition signal (IGF) is not input twice or more in a row, the ECM determines that a malfunction has occurred in the ignition system. In this case, the ECM may stop the injection of fuel only into the cylinder with the malfunction.

2) Fail-Safe of Accelerator Pedal Position Sensor

- The accelerator pedal position sensor comprises two (main, sub) sensor circuits. If a malfunction occurs in either one of the sensor circuits, the ECM detects the abnormal signal voltage difference between these two sensor circuits and switches to the limp mode. In the limp mode, the remaining circuit is used to calculate the accelerator pedal opening, in order to operate the vehicle under limp mode control.

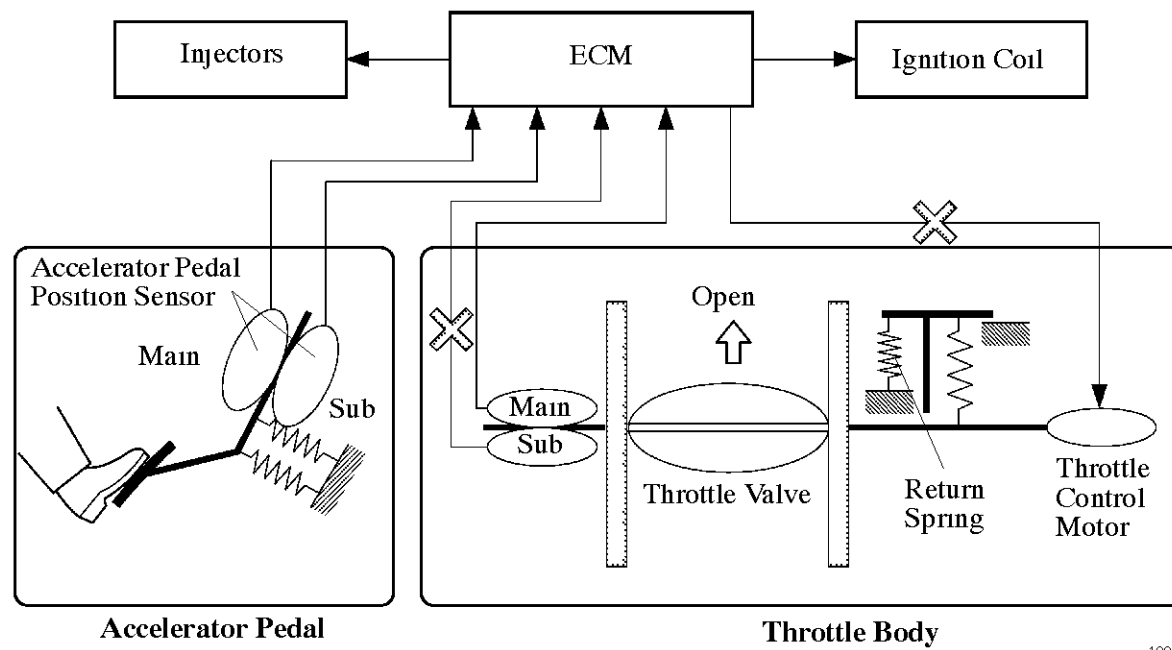


- If both circuits malfunction, the ECM detects the abnormal signal voltage between these two sensor circuits and regards that the opening angle of the accelerator pedal is fully opened and then continues the throttle control. At this time, the vehicle can be driven within its idling range.



3) Fail-Safe of Throttle Position Sensor

- The throttle position sensor comprises two (main, sub) sensor circuits. If a malfunction occurs in either one of the sensor circuits, the ECM detects the abnormal signal voltage difference between these two sensor circuits, cuts off the current to the throttle control motor, and switches to the limp mode. Then, the force of the return spring causes the throttle valve to return and stay at the prescribed opening. At this time, the vehicle can be driven in the limp mode while the engine output is regulated through the control of the fuel injection and ignition timing in accordance with the accelerator opening.
- The same control as above is effected if the ECM detects a malfunction in the throttle control motor system.



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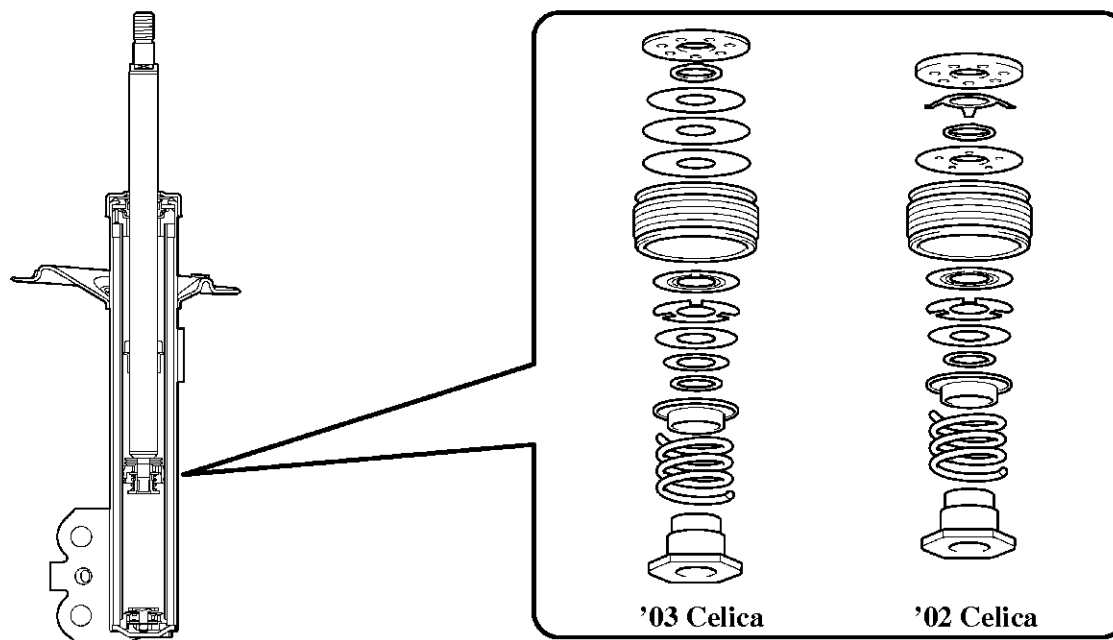
■ SHOCK ABSORBER

1. General

- This shock absorber generates the damping force in the extremely low piston speed range in order to realize a flat ride comfort.
- The responsiveness of the damping force has been increased to help ensure the vehicle's road tracking performance.

2. Construction

- To ensure the proper damping force in the extremely low piston speed range, the oil and the oil seal have been changed.
- To ensure the responsiveness of the damping force, the construction of the piston and base valve has been revised.



■ HID HEADLIGHT SYSTEM

1. General

- HID (High Intensity Discharge) headlight system is added as optional equipment for the low beams of all models in order to realize visibility.
- This system applies high voltage to the electrodes on the light bulb to discharge arcs, the metal atoms that are enclosed in the bulb to emit light.

2. Construction

The HID headlight system consists of metal halide bulb (for LO beam), HB3 bulb (for HI beam) and a light control ECU.

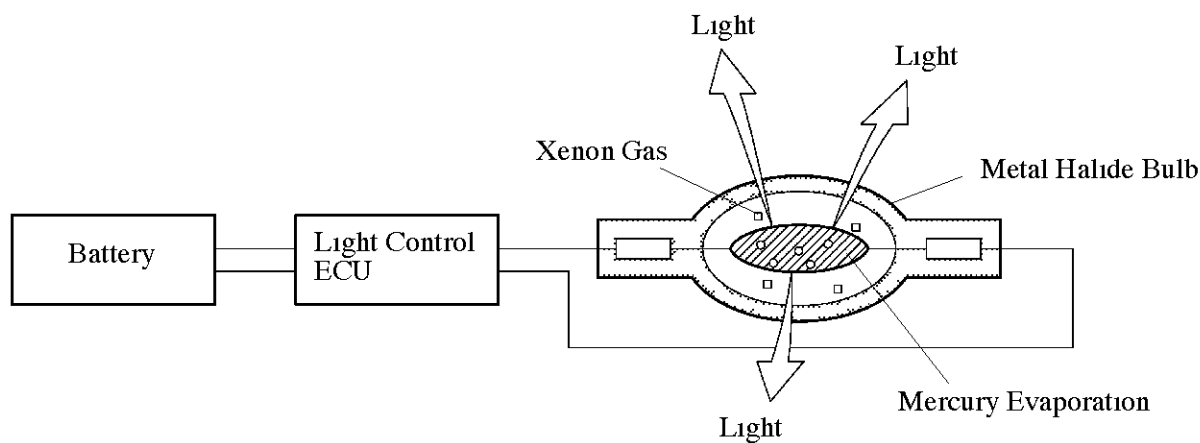
Service Tip

The metal halide bulb (for LO beam) and the HB3 bulb (for HI beam) are dedicated bulbs. Different bulbs may not be used in their place.

5

3. Metal Halide Bulb (for LO beam)

- The metal halide bulb contains xenon gas, mercury, and metal halide.
- When high voltage (approx. 20,000 volts) is applied to the electrodes of the metal halide bulb, the xenon gas in the bulb emits light.
- As the temperature in the bulb rises, the mercury evaporates and causes arcs to be discharged.
- As the temperature in the bulb rises, even further, the metal halide in the mercury arc separates into metal atoms and iodine atoms.
- The separated metal atoms discharge light, which causes the bulb to emit light.



151LBE15

CAUTION

The replacement of an HID (High Intensity Discharge) must be performed only by a TOYOTA dealer. Never touch the glass portion or the electrode portion of the bulb because high voltage that is generated at those areas is very dangerous.

4. Light Control ECU

General

The light control ECU is an electronic control unit, which is necessary for illuminating the metal halide bulb. A light control ECU is located under each headlight unit. This ECU provided the functions listed below.

- Generates the high voltage (approx. 20,000 volts), which is applied to the electrodes of the bulbs to enable the HID headlights to start to illuminate.
- Optimally controls the amperage and voltage in order to quickly provide and optimal amount of light immediately after the bulbs have been turned ON and to enable the bulbs to continue to illuminate in a stable manner.
- A fail-safe function is provided as a countermeasure against the high voltage that is generated in case that a problem occurs in the headlight system.

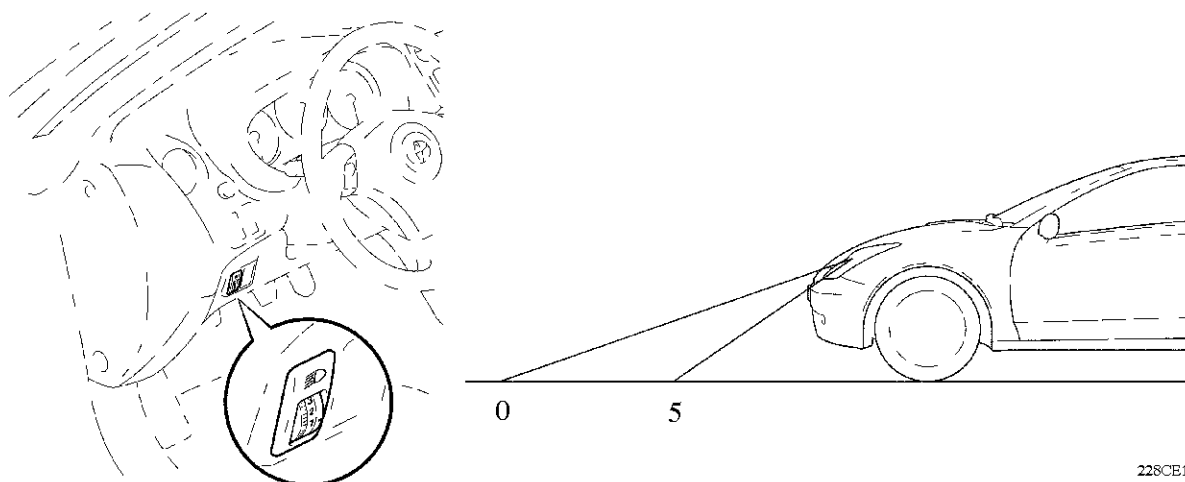
Fail-Safe Function

The light control ECU executes the fail-safe actions listed below in accordance with the item that has been detected.

Item	Outline
Detection of Abnormal Input Voltage	If the voltage that is input to the light control ECU deviates from the operating voltage (9 – 16 volts), the light control ECU stops illuminating the headlights, and resumes illuminating the headlights once the voltage reverts to the operating voltage range. However, if the input voltage decreases after the headlights have illuminated, the headlights will remain illuminated until the bulbs are extinguished.
Detection of Abnormal Output (Open Circuit or Short Circuit) or Flashing Bulb	If an abnormal condition (open or short) occurs in the voltage that is output by the light control ECU, or if the bulb flashes, the light control ECU stops illuminating the headlights and will maintain this state until the power is reinstated (by turning the headlight control switch from OFF to ON).
Detection of Bulb Open	If a bulb is not inserted in its socket, the light control ECU stops generating high voltage until the bulb is inserted correctly and the power is reinstated (by turning the headlight control switch from OFF to ON or turning the ignition switch from OFF to ON).

■ HEADLIGHT BEAM LEVEL CONTROL SYSTEM

- Headlight beam level control system is used on all models with the optional equipment HID headlight system.
- This system keeps the LO beam of the headlights adjusted to the appropriate level in accordance with the number (weight) of passengers and volume of luggage.
- When the driver operates the headlight beam level control switch, this system actuates the headlight leveling actuator that is integrated in the headlight unit, in order to change the headlight reflector angle.

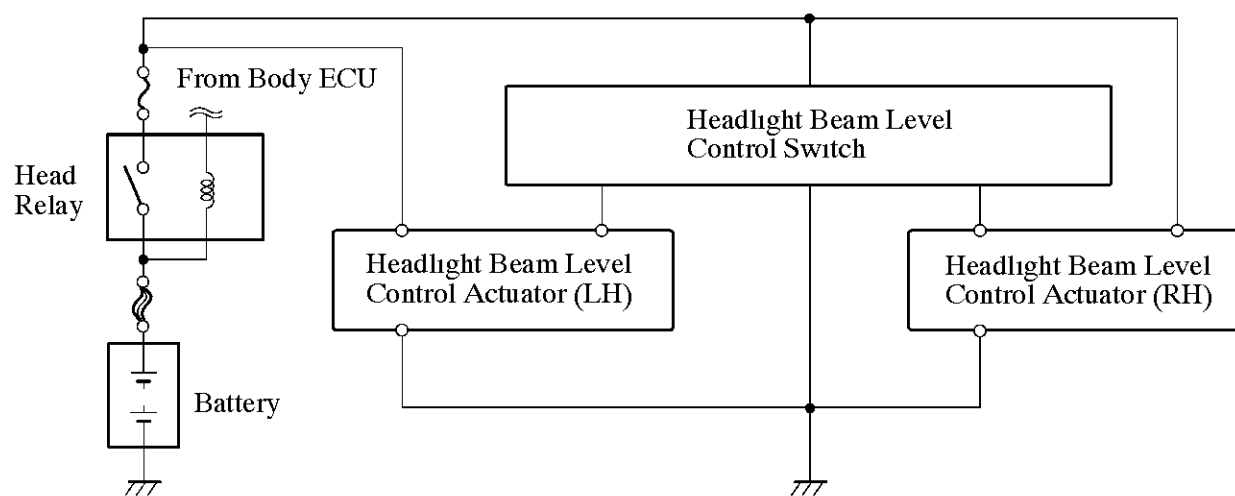


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Headlight Beam Level
Control Switch

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► Wiring Diagram ◀



228CE11

■ CRUISE CONTROL SYSTEM (Only for 2ZZ-GE Engine)

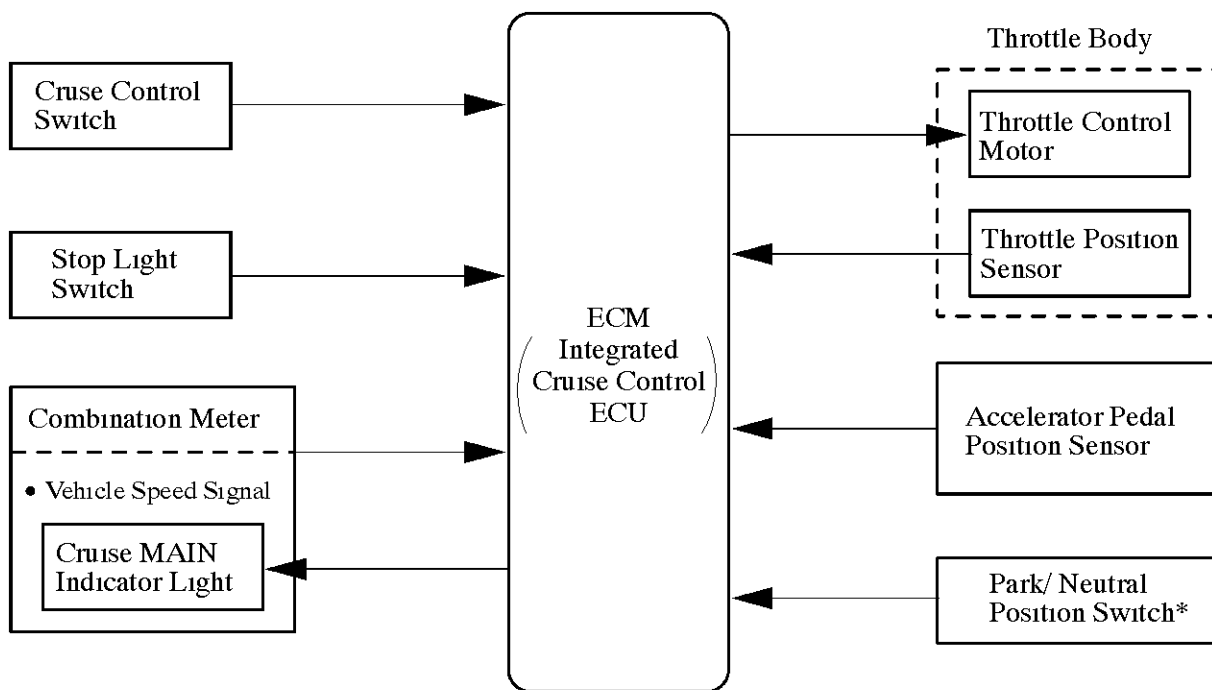
1. General

When the system is set to a desired vehicle speed, the throttle valve position is adjusted automatically to maintain the vehicle speed without depressing the accelerator pedal.

This system, which is available as an option on the 2ZZ-GE engine model of the '03 Celica, effects control through the ETCS-i system. As a result, some of the components have been changed as described below.

- Cruise control ECU is integrated in the ECM.
- Throttle control motor, throttle position sensor, and accelerator pedal position sensor are added.
- Cruise control actuator and control cable have been discontinued.

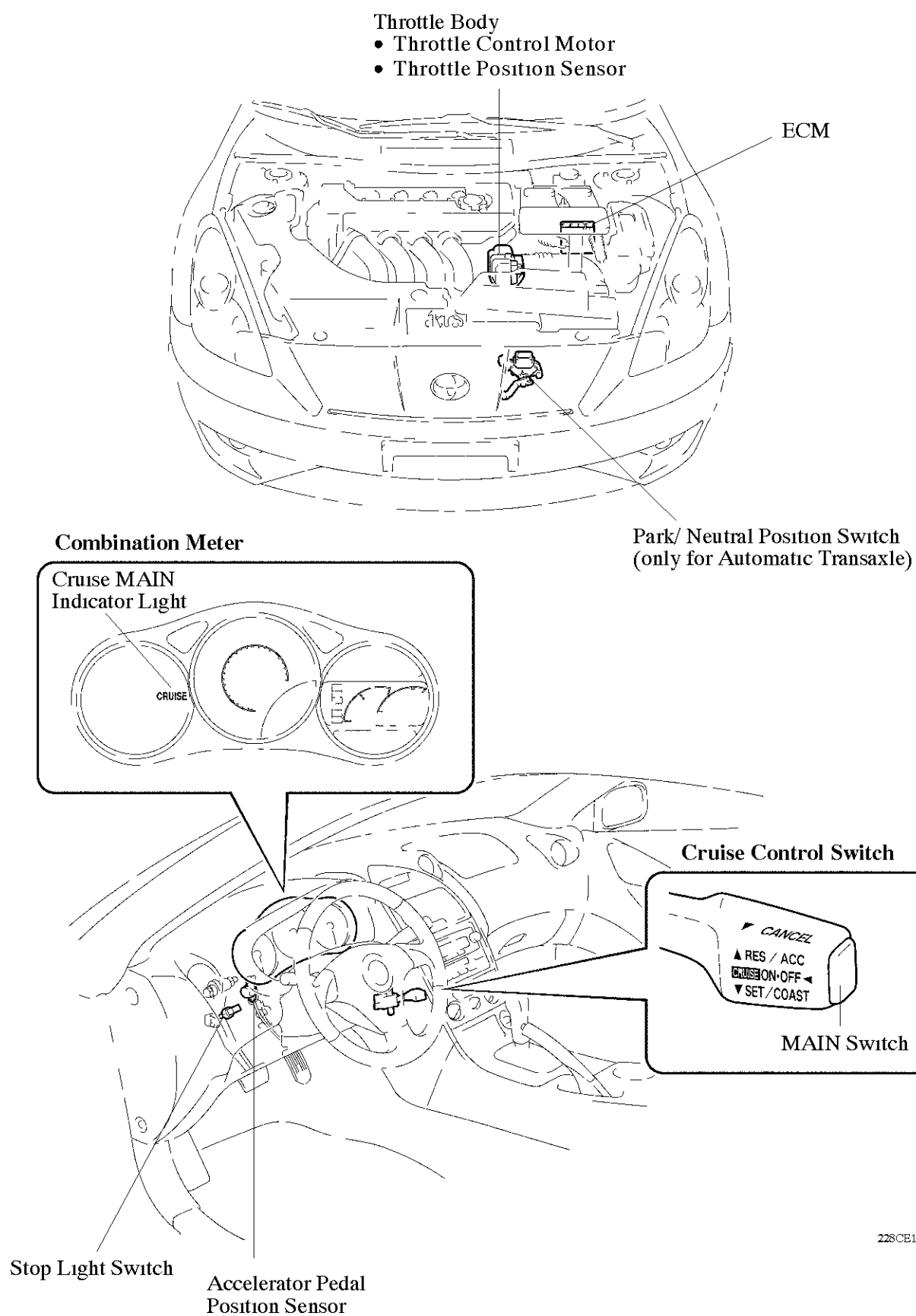
2. System Diagram



228CB12

*: Only for Automatic Transaxle Model

3. Layout of Component



4. Function

The cruise control has the following functions.

Function	Outline
Constant Speed Control	The ECM (integrated cruise control ECU) compares the actual vehicle speed and the set speed and if the vehicle speed is higher than the set speed, it activates the throttle control motor in the throttle closing direction. If the vehicle speed is lower than the set speed, it activates the throttle motor in the throttle opening direction.
Set Control	When the cruise control switch is pressed to the SET/COAST side and released while the vehicle is running within a cruising speed control range [approx. 25 mph (40 km/h) to 124 mph (200 km/h)] with the MAIN switch turned on, the ECM (integrated cruise control ECU) stores the vehicle speed and controls it at that speed constantly.
Low Speed Limit Control	The low speed limit is the lowest speed that cruise control can be set and is designed at approx. 25 mph (40 km/h). The cruise control cannot be set below that speed. If the vehicle speed drops below that speed while running in the cruise control mode, the cruise control is cancelled automatically and the set speed in the memory is cleared.
High Speed Limit Control	The high speed limit is the highest speed that cruise control can be set and is designed at approx. 124 mph (200 km/h). The cruise control cannot be set above that speed. The vehicle speed cannot be increased over that speed by ACCEL operation of the cruise control switch.
Accelerator Control	When the cruise control switch is kept pushed to the RES/ACC side while running in the cruise control mode, the throttle control motor is energized in the throttle opening direction. The vehicle keeps accelerating and the ECM (integrated cruise control ECU) stores the vehicle speed when the hand is released from the cruise control switch, and it becomes the new set speed.
Tap-Up Control	When the difference between the actual vehicle speed and the set speed is less than 3 mph (5 km/h), the set speed can be increased approx 1 mph (1.6 km/h) each time by operating the RES/ACC switch quickly within approx 0.5 seconds.
Coast Control	When the cruise control switch is kept pushed to the SET/COAST side while running in the cruise control mode, the throttle control motor is energized in the throttle closing direction. The vehicle keeps decelerating, and the ECM (integrated cruise control ECU) stores the vehicle speed when the hand is released from the cruise control switch, and it becomes the new set speed.
Tap-Down	When the difference between the actual vehicle speed and the set speed is less than 3 mph (5 km/h), the set speed can be lowered approx. 1 mph (1.6 km/h) each time by operating the SET/COAST switch quickly within approx. 0.5 seconds.
Resume Control	After the cruise control mode is cancelled by any of the cancel switches, the mode can be resumed and controlled at the set speed by operating the cruise control switch in the RES/ACC direction providing that the vehicle speed has not dropped below the low speed limit [approx. 25 mph (40 km/h)]. The mode cannot be resumed if the vehicle speed once drops below the low speed limit, because the speed in the memory is cleared.
Manual Cancel Control	If any of the following signals is sent to the ECM (integrated cruise control ECU) while the vehicle is running in the cruise control mode, the cruise control mode is cancelled accordingly. • Stop light switch ON signal (Depress the brake pedal) • D position circuit in Park/Neutral position switch OFF signal (Shift the transmission shift lever from D to N, 2, or L) • CANCEL switch ON signal • MAIN switch OFF signal

Automatic Cancel Control	When any of the following conditions occur during cruise control driving, the speed that is set in the memory is cleared to cancel the cruise control mode. Furthermore, the cruise main indicator light blinks until the MAIN switch is turned OFF, and the operation of the cruise control is disabled until the MAIN switch is turned ON again. • Stop light switch open or short circuit • The vehicle speed signal is not input for a predetermined period of time (approx. 140 msec) • ETCS-I malfunction
	When any of the following conditions occur during the cruise control driving, the speed that is set in the memory is cleared to cancel the cruise control mode. Furthermore, the cruise main indicator light blinks until the MAIN switch is turned OFF, and the operation of the cruise control is disabled until the ignition switch is turned OFF again. • Stop light switch input signal abnormal • Cruise control switch input signal abnormal
	When any of the following conditions occurs during the cruise control driving, the set speed in the memory is cleared to cancel the cruise control mode. Cruise control can be resumed at the set speed by operating the SET switch providing that the vehicle speed is above the lower speed limit [approx. 25 mph (40 km/h)]. • The vehicle speed falls below the low speed limit [approx. 25 mph (40 km/h)] • The vehicle speed drops more than 10 mph (16 km/h) below the set speed as in uphill driving
Automatic Transmission Control*	When the vehicle is cruising up hill, there is a case where the overdrive turns off depending on the ECT control. After that, when the ECM judges the end of cruising up from the throttle valve opening angle, the overdrive function will turn on again after about 3 seconds. Also, in case that the overdrive function turns off during accelerator or resume control, it will turn on after finishing accelerator or resume control.
Diagnosis	When the ECM (integrated cruise control ECU) does not receive a vehicle speed signal for a predetermined period of time during cruising, or when cruise control is cancelled (automatic cancel) by a malfunction in the cruise control switch, stop light switch or vehicle speed signal, the ECM (integrated cruise control ECU) immediately blinks the cruise main indicator light on the combination meter on and off five times to alert the driver of the system malfunction. The contents of malfunctions are coded and stored in the ECM (integrated cruise control ECU).

*: Only for Automatic Transaxle Model

5. Diagnosis

- When the ECM (integrated cruise control ECU) does not receive a vehicle speed signal for a predetermined period of time during cruising, or when cruise control is cancelled (automatic cancel) by a malfunction in the cruise control switch, stop light switch or vehicle speed signal, the ECM (integrated cruise control ECU) immediately blinks the cruise main indicator light on the combination meter on and off five times to alert the driver of the system malfunction. The contents of malfunctions are coded and stored in the ECM (integrated cruise control ECU).
- The DTC (Diagnostic Trouble Code) can be accessed by connecting a hand-held tester to DLC3 terminal or the SST (09843-18040) to the Tc and CG terminals of the DLC3 and reading the blinking of the cruise main indicator light.
A hand-held tester can be used to read 5-digit codes. With the SST, 2-digit codes can be read from the number of blinks of the cruise main indicator light. For details, see the 2003 Celica Repair Manual (Pub. No. RM976U).
- The DTC listed below have been used.

DTC No.	Detection Item	DTC No.	Circuit Inspection
5-digit		2-digit	
P0500	Vehicle Speed Sensor "A"	21	Vehicle Speed Sensor Circuit Open
P0503	Vehicle Speed Sensor "A" Intermittent/Erratic/High	23	Vehicle Speed Signal Abnormal
P0571	Brake Switch "A" Circuit	52	Stop Light Switch Circuit Open or Short
P0607	Control Module Performance	540	Input Signal Abnormal

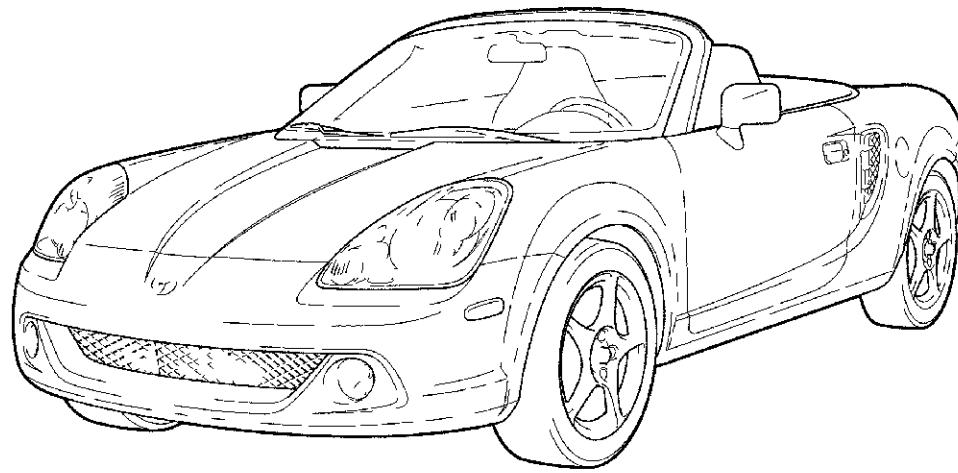
MAJOR TECHNICAL SPECIFICATIONS

Item		Area		U S A and Canada			
		Body Type		Liftback			
		Vehicle Grade		GT		GT S	
		Model Code		ZZT230L BLMSHA	ZZT230L BLPSHA	ZZT231L BLFVFA	ZZT231L BLPVFA
Major Dimensions & Vehicle Weights	Overall	Length	mm (in)	4330 (170.5)	4330 (170.5)	4330 (170.5)	4330 (170.5)
		Width	mm (in)	1735 (68.3)	1735 (68.3)	1735 (68.3)	1735 (68.3)
		Height*	mm (in)	1305 (51.4)	1305 (51.4)	1305 (51.4)	1305 (51.4)
		Wheel Base	mm (in)	2600 (102.4)	2600 (102.4)	2600 (102.4)	2600 (102.4)
	Tread	Front	mm (in)	1490 (58.7)	1490 (58.7)	1490 (58.7)	1490 (58.7)
		Rear	mm (in)	1480 (58.3)	1480 (58.3)	1480 (58.3)	1480 (58.3)
	Effective Head Room	Front	mm (in)	974.1 (38.4) 937.5 (36.9)*1	974.1 (38.4) 937.5 (36.9)*1	974.1 (38.4) 937.5 (36.9)*1	974.1 (38.4) 937.5 (36.9)*1
		Rear	mm (in)	888 (35.0)	888 (35.0)	888 (35.0)	888 (35.0)
	Effective Leg Room	Front	mm (in)	770.5 (30.3)	770.5 (30.3)	770.5 (30.3)	770.5 (30.3)
		Rear	mm (in)	645.3 (25.4)	645.3 (25.4)	645.3 (25.4)	645.3 (25.4)
	Shoulder Room	Front	mm (in)	1335.2 (52.6)	1335.2 (52.6)	1335.2 (52.6)	1335.2 (52.6)
		Rear	mm (in)	1285.7 (50.6)	1285.7 (50.6)	1285.7 (50.6)	1285.7 (50.6)
	Overhang	Front	mm (in)	910 (35.8)	910 (35.8)	910 (35.8)	910 (35.8)
		Rear	mm (in)	820 (32.3)	820 (32.3)	820 (32.3)	820 (32.3)
	Min. Running Ground Clearance		mm (in)	138.6 (5.5)	138.6 (5.5)	138.6 (5.5)	138.6 (5.5)
	Angle of Approach		degrees	14.5°	14.5°	14.5°	14.5°
	Angle of Departure		degrees	21.8°	21.8°	22.3°	22.3°
	Curb Mass	Front	kg (lb)	676 (708 (1490 1560))	692 (724 (1525 1595))	701 (733 (1545 1615))	738 (770 (1625 1695))
		Rear	kg (lb)	425 (456 (935 1005))	425 (456 (935 1005))	434 (466 (955 1025))	434 (466 (955 1025))
		Total	kg (lb)	1101 (1164 (2425 2565))	1117 (1180 (2640 2600))	1135 (1198 (2500 2640))	1171 (1235 (2580 2720))
	Gross Vehicle Mass	Front	kg (lb)	814 (1795)	814 (1795)	860 (1896)	860 (1896)
		Rear	kg (lb)	694 (1530)	694 (1530)	703 (1550)	703 (1550)
		Total	kg (lb)	1508 (3325)	1508 (3325)	1563 (3445)	1563 (3445)
	Fuel Tank Capacity	L (U S gal Imp gal)		55 (12.2)	55 (12.2)	55 (12.2)	55 (12.2)
	Luggage Compartment Capacity	m ³ (cu ft)		0.365 (12.9)	0.365 (12.9)	0.365 (12.9)	0.365 (12.9)
Performance	Max. Speed		km/h (mph)	205 (128)	195 (121)	215 (134)	200 (125)
	Max. Cruising Speed		km/h (mph)	—	—	—	—
	Acceleration	0 to 100 km/h	sec	8.5	9.5	7.0	8.6
		0 to 400 m	sec	16.0	16.9	15.0	16.3
	Max. Permissible Speed	1st Gear	km/h (mph)	56 (35)	67 (41)	60 (37)	70 (43)
		2nd Gear	km/h (mph)	92 (57)	124 (77)	93 (58)	125 (77)
		3rd Gear	km/h (mph)	126 (78)	—	128 (80)	—
		4th Gear	km/h (mph)	171 (106)	—	163 (101)	—
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)	10.4 (31.5)	10.4 (31.5)	10.4 (31.5)	10.4 (31.5)
		Curb to Curb	m (ft)	11.0 (36.3)	11.0 (36.3)	11.0 (36.3)	11.0 (36.3)
Engine	Engine Type			1ZZ FE	1ZZ FE	2ZZ GE	2ZZ GE
	Valve Mechanism			16 Valve DOHC	16 Valve DOHC	16 Valve DOHC	16 Valve DOHC
	Bore × Stroke	mm (in)		79.0 × 91.5 (3.1 × 3.6)	79.0 × 91.5 (3.1 × 3.6)	82.0 × 85.0 (3.2 × 3.3)	82.0 × 85.0 (3.2 × 3.3)
	Displacement	cm ³ (cu in)		1794 (109.4)	1794 (109.4)	1796 (109.5)	1796 (109.5)
	Compression Ratio			10.0 : 1	10.0 : 1	11.5 : 1	11.5 : 1
	Carburetor Type			SFI	SFI	SFI	SFI
	Research Octane No.	RON		91 or more	91 or more	95 or more	95 or more
	Max. Output (SAE NET)	kW/rpm (HP@rpm)		105 / 6400 (140@6400)	105 / 6400 (140@6400)	134 / 7600 (180@7600)	134 / 7600 (180@7600)
	Max. Torque (SAE NET)	N m/rpm (lb ft@rpm)		170 / 4200 (126@4200)	170 / 4200 (126@4200)	176 / 6800 (130@6800)	176 / 6800 (130@6800)
	Battery Capacity (5HR)	Voltage & Amp hr		12 40 12 48*2	12 40 12 48*2	12 40 12 48*2	12 40 12 48*2
Engine Electrical	Alternator Output	Watts		960	960	960	960
	Starter Output	kW		1.2 1.4*2	1.2 1.4*2	1.2 1.4*2	1.2 1.4*2
Chassis	Clutch Type			Dry Single Plate Diaphragm	—	Dry Single Plate Diaphragm	—
	Transaxle Type			C56	U341E	C60	U240E
	Transmission Gear Ratio	In First		3.166	2.847	3.166	3.943
		In Second		1.904	1.552	2.050	2.197
		In Third		1.392	1.000	1.481	1.413
		In Fourth		1.031	0.700	1.166	1.020
		In Fifth		0.815	—	0.916	—
		In Sixth		—	—	0.725	—
		In Reverse		3.250	2.343	3.250	3.145
	Counter Gear Ratio			—	—	—	—
	Differential Gear Ratio (Final)			4.312	3.942	4.529	3.120
	Brake Type	Front		Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
		Rear		Leading Tailing Drum	Leading Tailing Drum	Solid Disc	Solid Disc
	Parking Brake Type			Leading Tailing Drum	Leading Tailing Drum	Duo Servo Drum	Duo Servo Drum
	Brake Booster Type and Size	in		Single 9	Single 9	Single 9	Single 9
	Proportioning Valve Type			Dual P Valve —*3	Dual P Valve —*3	Dual P Valve —*3	Dual P Valve —*3
	Suspension Type	Front		MacPherson Strut	MacPherson Strut	MacPherson Strut	MacPherson Strut
		Rear		Double Wishbone	Double Wishbone	Double Wishbone	Double Wishbone
	Stabilizer Bar	Front		STD	STD	STD	STD
		Rear		STD	STD	STD	STD
	Steering Gear Type			Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion
	Steering Gear Ratio (Overall)			14.4	14.4	14.4	14.4
	Power Steering Type			Integral Type	Integral Type	Integral Type	Integral Type

*1 With Moon Roof
*2 Option
*3 With ABS

MR2

6



228MR10

MR2

OUTLINE OF NEW FEATURES

The following changes have been made for the 2003 model year.

1. Exterior and Interior

The exterior and interior have been changed to direct a new presence. For details, refer to page 88.

2. 1ZZ-FE Engine

- The soft logic of the ECM has been changed to match the adoption of the 6-speed sequential manual transaxle.
- To comply with the OBD-II regulations, all the DTCs (Diagnostic Trouble Codes) have been made to correspond to the SAE controlled codes. Some of the DTCs have been further divided into smaller detection areas than in the past, and new DTCs have been assigned to them. For details, see the 2003 General Features section.

3. Sequential Manual Transaxle

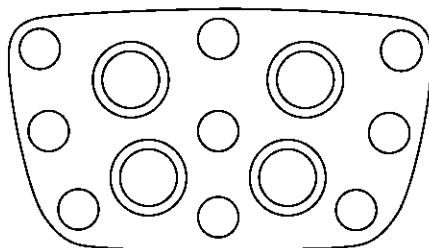
- On the '03 MR2, the C56M 5-speed sequential manual transaxle has been changed to the C65M 6-speed sequential manual transaxle.
- To comply with the OBD-II regulation, the DTCs (Diagnostic Trouble Codes) of the sequential manual transaxle have been changed to match the SAE control codes.

4. Suspension

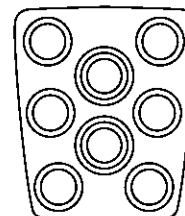
Newly developed front and rear shock absorbers have been adopted to ensure the responsiveness of the damping force.

5. Brake

- The brake actuator in the brake control system (ABS) is integrated with the skid control ECU, ABS solenoid relay and ABS motor relay.
- On the sequential manual transaxle model, the brake pedal size has been changed for easier pedal operation.



New



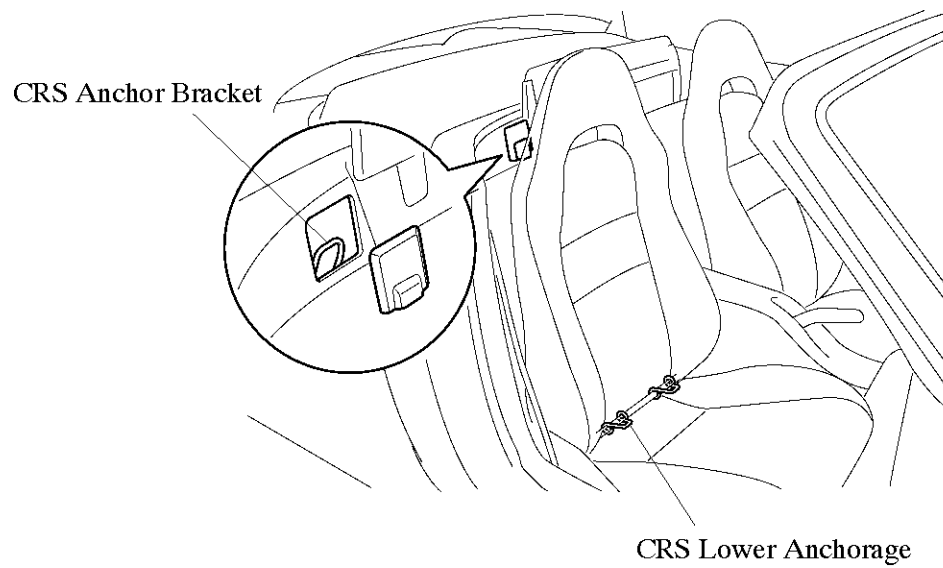
Previous

6. Steering

- The main shaft support portion has been changed from a bushing to a needle bearing type. The needle bearing is used to reduce the friction that occurs during steering operation.
- The shape of the steering column bracket has been changed in order to ensure its mounting rigidity.

7. Seat

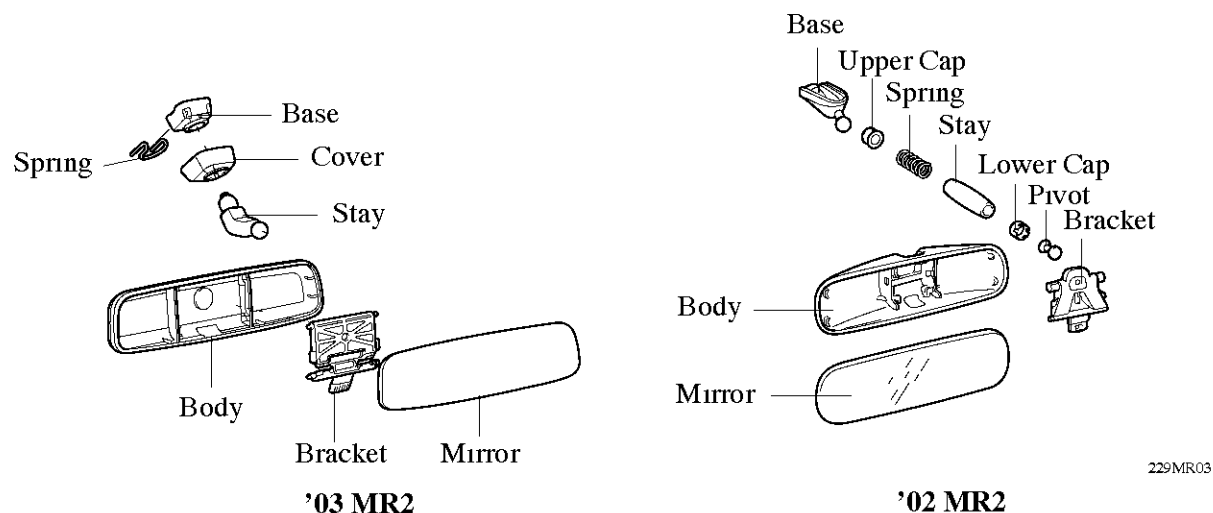
- CRS (Child Restraint System) lower anchorage for securing child seat has been provided behind the seat cushion of the front passenger seat.
- A CRS anchor bracket for securing a child seat has been provided above the luggage trim.



229MR02

8. Inside Rear View Mirror

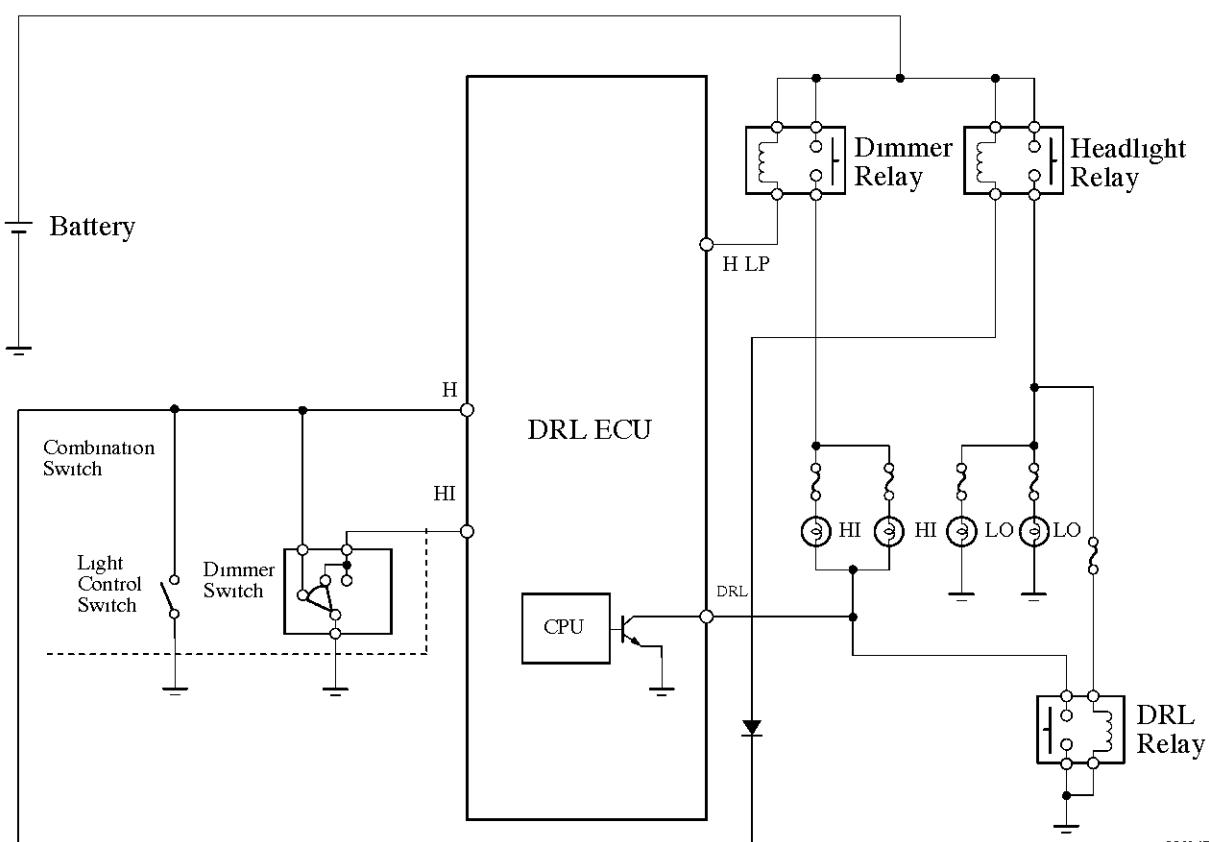
The construction of the inside rear view mirror has been simplified and the number of parts has been reduced. As a result, the mirror installation method has changed. For details, refer to the 2003 MR2 Repair Manual (Pub. No. RM967U).



9. Daytime Running Light System

System operation has changed from LO beam illumination to HI beam illumination. In this system are received by the DRL ECU in order to effect duty control on the HI beams. The system circuit has also changed as shown below. However, operating conditions have not changed.

► Wiring Diagram ◀



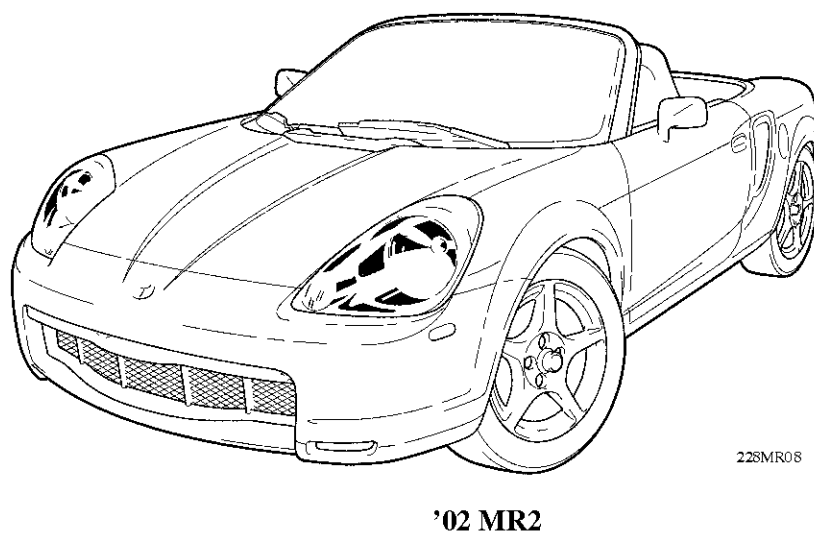
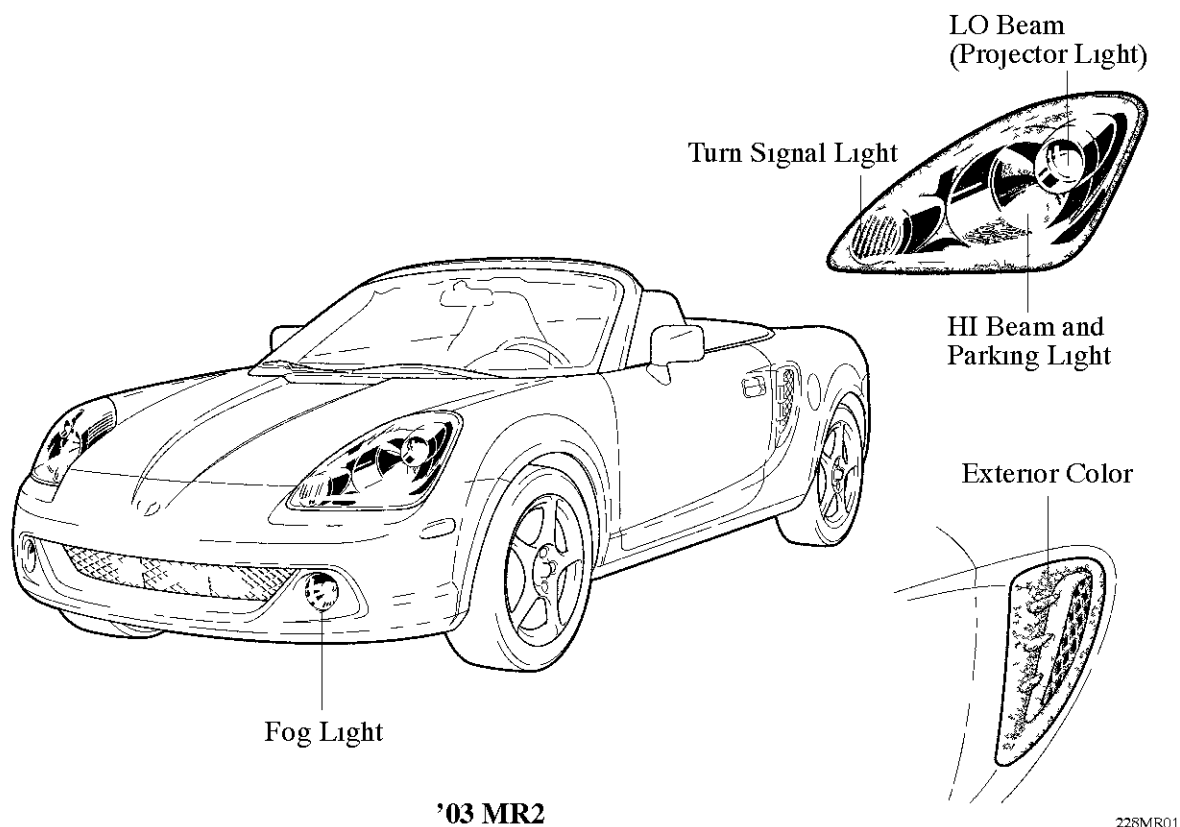
NEW FEATURES

■ EXTERIOR AND INTERIOR

1. Exterior

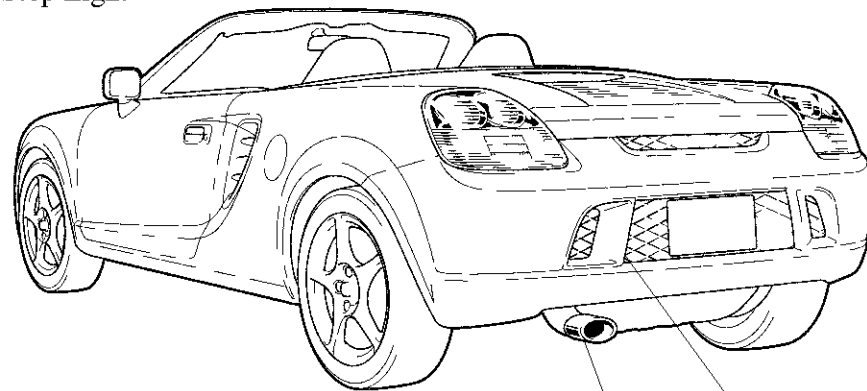
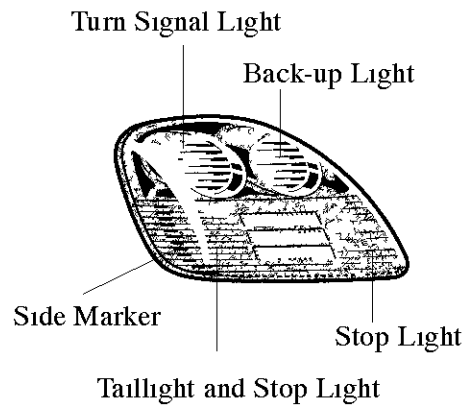
Front View

- The front bumper design has been changed to emphasize a feeling of width and low center of gravity. The round fog lights are integrated and enhance the sporty appearance.
- The headlights have been changed from the 2-light type to the 4-light type to accentuate the aggressive look. A projector light is used for the LO beam.
- The side air intake combines black with the exterior color to provide a unified feeling with the body.

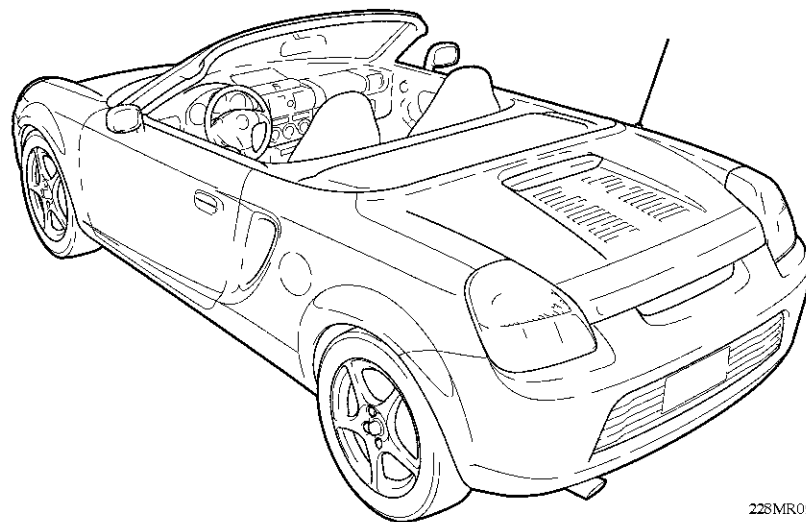


Rear View

- The design of the rear combination light has been changed to produce a solid feeling.
- The rear grill garnish heightens the feeling of quality from the combination of the mesh and the exterior color.
- The baffle on the exhaust tail pipe has been made larger to emphasize driving performance.



228MR02

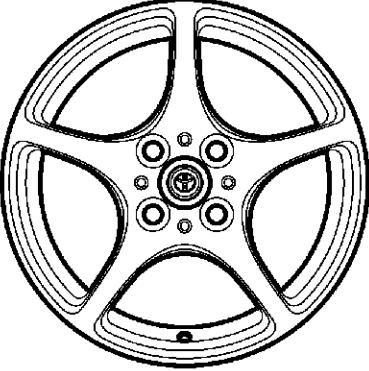
'03 MR2

228MR09

'02 MR2

Tire and Wheel

- The rear tire and disc wheel size have been changed to ensure driving performance.
- Brightness processing has been applied to the wheel surface for greater appeal.

Design  179MC06		
Tire Size	P185/55 R15 (Front)	P215/45 R16 (Rear)
Disc Wheel Size	15 × 6 JJ	16 × 7 JJ
P.C.D.* mm (in.)	100 (3.9)	100 (3.9)
Off Set mm (in.)	45 (1.8)	45 (1.8)
Material	Aluminum	Aluminum
Note	Carryover	New

*: P.C.D.: Pitch Circle Diameter

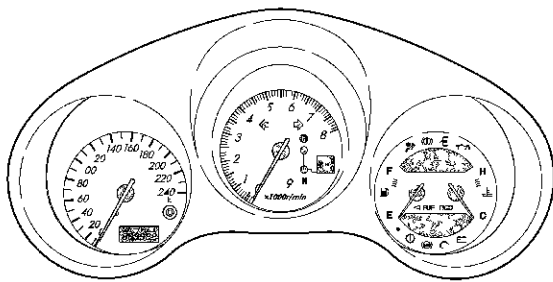
Exterior Color

Total of 8 exterior colors – 6 carryover colors and 2 new colors:

Color (Color No.)	Note
Super White II (040)	Carryover
Silver Mica Metallic (1E7)	New
Black (202)	Carryover
Super Red V (3P0)	Carryover
Super Bright Yellow (576)	Carryover
Dark Green Mica (6R4)	Carryover
Blue Mica (8M6)	Carryover
Light Blue Mica Metallic (8R2)	New

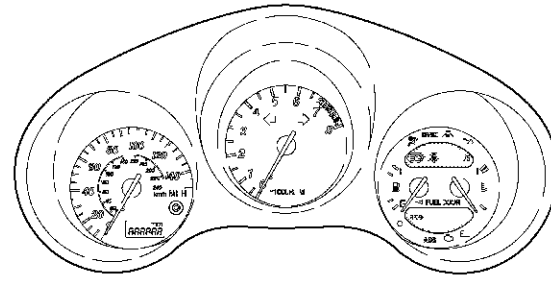
2. Interior

- The illumination color (audio, clock, heater control panel, power window switch) has been changed to amber for a more chic, sporty feeling.
- The door grip and air flow resistor knob have been plate.
- The figures and scales on the speedometer and tachometer have been changed to increase the feeling of quality.



'03 MR2

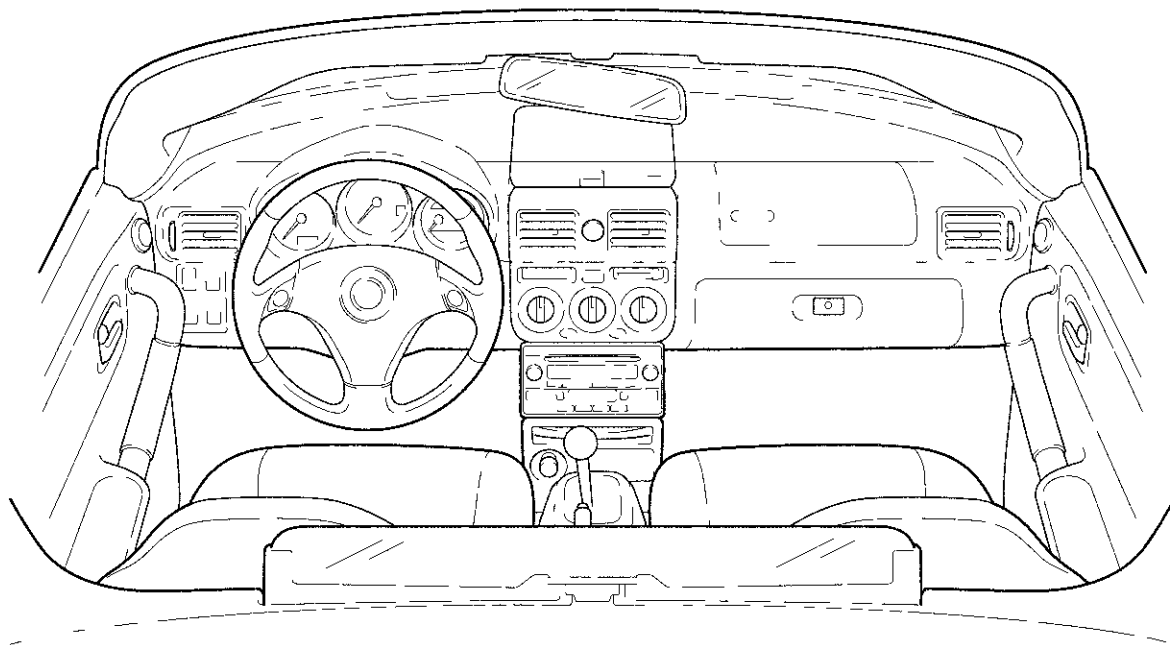
228MR04



'02 MR2

228MR03

6



228MR05

■ SEQUENTIAL MANUAL TRANSAXLE

1. General

In the new MR2 has been changed from the C56M 5-speed sequential manual transaxle to the C65M type 6-speed sequential manual transaxle. These sequential manual transaxles are based on the C56M type with a 6th gear added.

- The 6th gear is added to reduce noise when driving at high speed and increase fuel economy. The gear train part has the same basic construction and operation as the C56M 5-speed manual transaxle.
- Changes to the components of the sequential manual transaxle are shown below.

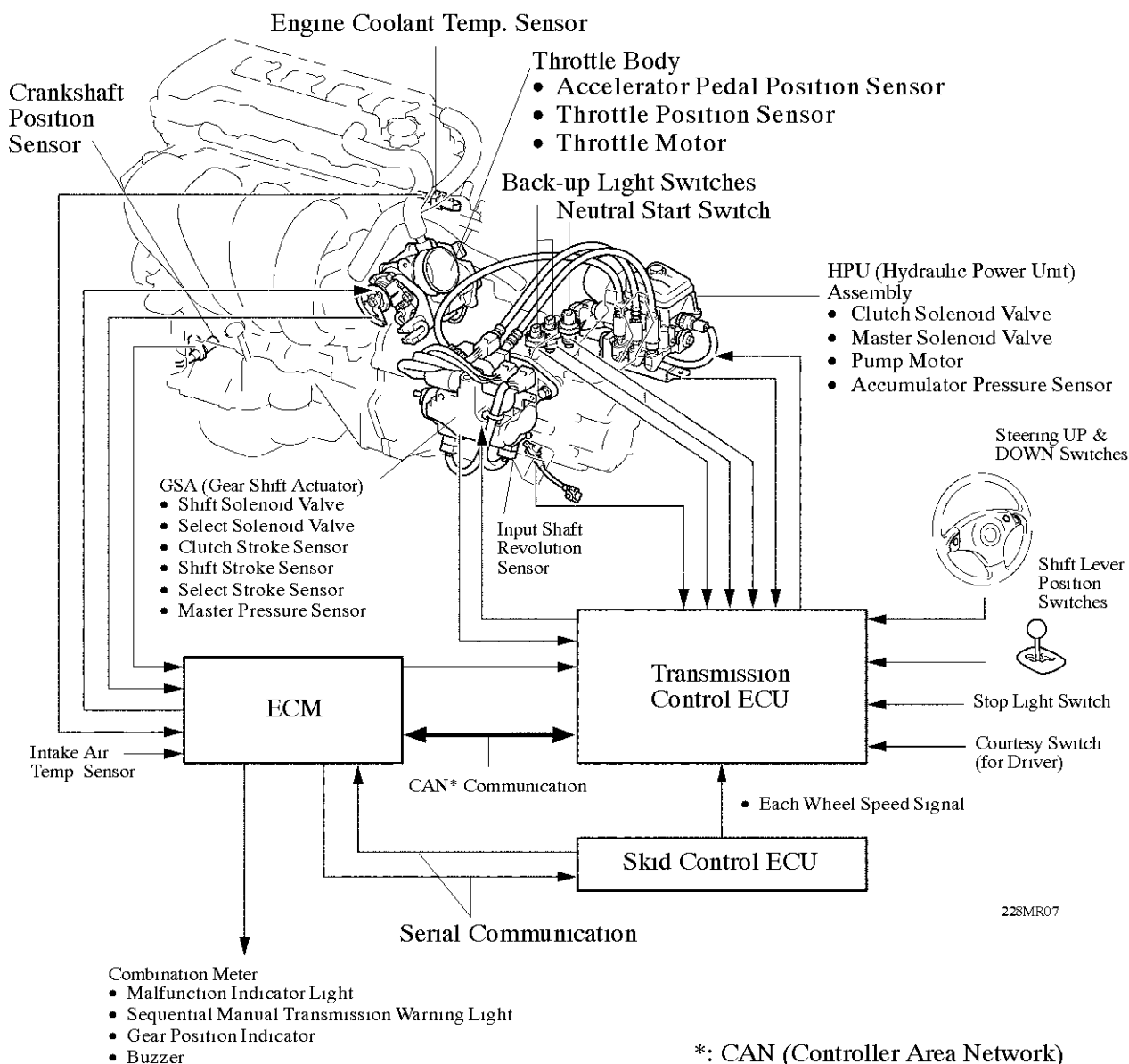
Component Parts	Changed
Shift and Select Mechanism	Comply with the 6-speed
Transmission Control ECU	• With the change to 6-speed, the soft logic of the transmission control ECU for shifting control of the gear shift actuator has been changed. • To increase drivability in low speed ranges, a 2nd coast down control has been added. • DTC (Diagnostic Trouble Code) is changed.
Others	Configuration and structure are the same as '02 MR2.

► Specification ◀

Model		'03 MR2	'02 MR2
Transaxle Type		C65M (6-speed)	C56M (5-speed)
Gear Ratio	1st	3.166	←
	2nd	1.904	←
	3rd	1.392	←
	4th	1.031	←
	5th	0.815	←
	6th	0.725	—
	Reverse	3.250	←
Differential Gear Ratio		4.312	
Oil Capacity Liters (US qts, Imp. qts)	without LSD	2.3 (2.4, 2.1)	1.9 (2.0, 1.7)
	with LSD	2.1 (2.2, 1.9)	1.8 (1.9, 1.6)
Oil Viscosity		SAE 75W-90	←
Oil Grade		API GL-4 or GL-5	←
Weight (Reference)* kg (lb)	without LSD	44.5 (98.0)	41.5 (91.5)
	with LSD	46.0 (101.4)	43.0 (94.8)

*: Weight shows the figure with the oil fully filled.

► System Diagram ◀



2. Transmission Control ECU

2nd Coast Control

The 2nd coast down control is a control to shift down to 2nd gear or 1st gear to ensure drivability when driving at a fixed vehicle speed as shown in the table below.

Gear Position	Vehicle Speed
6th → 2nd	18 mph (28 km/h) less than
5th → 2nd	15 mph (24 km/h) less than
4th → 2nd	11 mph (18 km/h) less than
3rd → 2nd	10 mph (16 km/h) less than
2nd → 1st	5 mph (8 km/h) less than

Self-Diagnosis

In order to comply with the OBD-II regulation, the DTC (Diagnostic Trouble Codes) of the sequential manual transaxle have been changed to match the SAE control codes.

DTC No		Detection Item	DTC No		Detection Item
New	Old		New	Old	
P0562	P1600	ECU BATT Malfunction	P0910	P1868	Select Solenoid Malfunction
P0703	P1520	Stop Light Switch Malfunction	P0915	P1882	Gear Shift Position Sensor Malfunction Output Error
P0715	P0715	Input Shaft Revolution Sensor Malfunction	P0916	P1870	Shift Stroke Sensor Malfunction/ Low Voltage
P0725	P0335	Engine Revolution Sensor Malfunction	P0917		Shift Stroke Sensor Malfunction/ High Voltage
P0807	P1855	Clutch Stroke Sensor Malfunction/ Low Voltage	P0919	P1873	Shift and Select Stroke Control System Malfunction
P0808		Clutch Stroke Sensor Malfunction/ High Voltage	P0920	P1866	Shift Solenoid Malfunction
P0810	P1857	Clutch Control System Malfunction	P0934	P1851	Accumulator Pressure Sensor Malfunction/ Low Voltage
P0812	P1881	Transmission Reverse Switch Malfunction	P0935		Accumulator Pressure Sensor Malfunction/ High Voltage
P0820	P1781	Shift Lever Switch Malfunction	P0942	P1880	HPU Pressure Control System Malfunction
P0847	P1860	Master Pressure Sensor Malfunction/ Low Voltage	P0945	P1854	Motor Relay Malfunction
P0848		Master Pressure Sensor Malfunction/ High Voltage	P1735	P1835	Right Front Wheel Speed Sensor Malfunction
P0850	P1780	Transmission Neutral Switch Malfunction	P1740	P1840	Left Front Wheel Speed Sensor Malfunction
P0863	P1810	CAN Communication Malfunction	P1839	P1839	Right Rear Wheel Speed Sensor Malfunction
P0896	P0780	Shift Change Malfunction	P1844	P1844	Left Rear Wheel Speed Sensor Malfunction
P0900	P1878	Clutch Solenoid Malfunction	P2716	P1853	Master Solenoid Malfunction
P0905	P1883	Gear Select Position Sensor Malfunction Output Error	droppe d	P1863	Master Pressure Control Malfunction
P0906	P1874	Select Stroke Sensor Malfunction/ Low Voltage	—	—	—
P0907		Select Stroke Sensor Malfunction/ High Voltage			

1. General

- ## 2. Construction

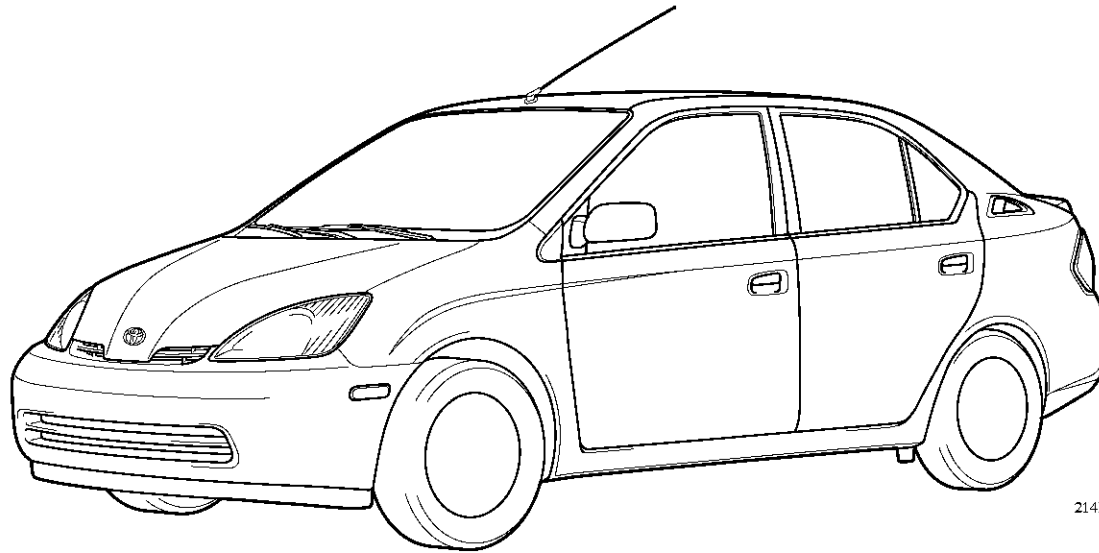
- [illegible]

MAJOR TECHNICAL SPECIFICATIONS

Item			Area		U S A		
Body Type			Convertible				
Vehicle Grade			G				
Model Code			ZZW30L AKMQHA		ZZW30L AKLQHA		
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	3885 (153 0)		3885 (153 0)	
		Width	mm (in.)	1695 (66 7)		1695 (66 7)	
		Height*	mm (in.)	1240 (48 8)* ¹		1240 (48 8)* ¹	
	Wheel Base		mm (in.)	2450 (96 5)		2450 (96 5)	
	Tread	Front	mm (in.)	1475 (58 1)		1475 (58 1)	
		Rear	mm (in.)	1460 (57 5)		1460 (57 5)	
	Effective Head Room	Front	mm (in.)	947 (37 3)		947 (37 3)	
		Rear	mm (in.)	—		—	
	Effective Leg Room	Front	mm (in.)	1072 (42 2)		1072 (42 2)	
		Rear	mm (in.)	—		—	
	Shoulder Room	Front	mm (in.)	1291 (50 8) 1285 (50 6)* ²		1291 (50 8) 1285 (50 6)* ²	
		Rear	mm (in.)	—		—	
	Overhang	Front	mm (in.)	765 (30 1)		765 (30 1)	
		Rear	mm (in.)	670 (26 4)		670 (26 4)	
	Min. Running Ground Clearance		mm (in.)	125 (4 9)		125 (4 9)	
Angle of Approach		degrees	16°		16°		
Angle of Departure		degrees	20°		20°		
Performance	Curb Mass	Front	kg (lb)	431 435 (950 960)		431 435 (950 960)	
		Rear	kg (lb)	585 587 (1290 1295)		589 601 (1320 1325)	
		Total	kg (lb)	1016 1023 (2240 2250)		1030 1036 (2270 2285)	
	Gross Vehicle Mass	Front	kg (lb)	515 (1135)		515 (1135)	
		Rear	kg (lb)	701 (1545)		714 (1575)	
		Total	kg (lb)	1215 (2680)		1230 (2710)	
	Fuel Tank Capacity		L (U S gal Imp gal.)	48 (12 7 10 6)		48 (12 7 10 6)	
	Luggage Compartment Capacity		m ³ (cu ft)	0 09 (3 18)		0 09 (3 18)	
	Max. Speed		km/h (mph)	210 (131 3)		210 (131 3)	
	Max. Cruising Speed		km/h (mph)	170 (106 3)		170 (106 3)	
Performance	Acceleration	0 to 100 km/h	sec	7 5		9 1	
		0 to 400 m	sec	15 2		16 7	
	Max. Permissible Speed	1st Gear	km/h (mph)	53 (33)		53 (33)	
		2nd Gear	km/h (mph)	87 (54)		87 (54)	
		3rd Gear	km/h (mph)	121 (75)		121 (75)	
		4th Gear	km/h (mph)	163 (101)		163 (101)	
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)	10 6 (34 8)		10 6 (34 8)	
		Curb to Curb	m (ft)	10 4 (34 2)		10 4 (34 2)	
Engine	Engine Type		1ZZ FE				
	Valve Mechanism		16 Valve DOHC				
	Bore × Stroke		mm (in.)	79 0 × 91 5 (3 11 × 3 60)		79 0 × 91 5 (3 11 × 3 60)	
	Displacement		cm ³ (cu in.)	1794 (109 5)		1794 (109 5)	
	Compression Ratio		10 0 1				
	Carburetor Type		SFI				
	Research Octane No.		RON	91 or more		91 or more	
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	103 / 6400 (138@6400)		103 / 6400 (138@6400)	
Engine Electrical	Max. Torque (SAE NET)		N m/rpm (lb ft@rpm)	170 / 4400 (125@4400)		170 / 4400 (125@4400)	
	Battery Capacity (SHR)		Voltage & Amp hr	12 36		12 36	
Engine Electrical	Alternator Output		Watts	960		960	
	Starter Output		kW	1 4		1 4	
Chassis	Clutch Type		Dry Single Plate Diaphragm				
	Transaxle Type		C56				
	Transmission Gear Ratio	In First	3 166		3 166		
		In Second	1 904		1 904		
		In Third	1 392		1 392		
		In Fourth	1 031		1 031		
		In Fifth	0 815		0 815		
		In Sixth	—		0 725		
		In Reverse	3 250		3 250		
	Counter Gear Ratio		—				
	Differential Gear Ratio (Final)		4 312				
	Brake Type	Front	Ventilated Disc		Ventilated Disc		
		Rear	Solid Disc		Solid Disc		
	Parking Brake Type		Disc				
	Brake Booster Type and Size		in	Single 8		Single 8	
Proportioning Valve Type		—					
Suspension Type	Front	MacPherson Strut		MacPherson Strut			
	Rear	MacPherson Strut		MacPherson Strut			
Stabilizer Bar	Front	STD		STD			
	Rear	STD		STD			
Steering Gear Type		Rack and Pinion					
Steering Gear Ratio (Overall)		13 6					
Power Steering Type		Integral Type					

*¹ Unladen Vehicle
*² With Leather Seat

PRIUS



7

214PR01

PRIUS

OUTLINE OF NEW FEATURES

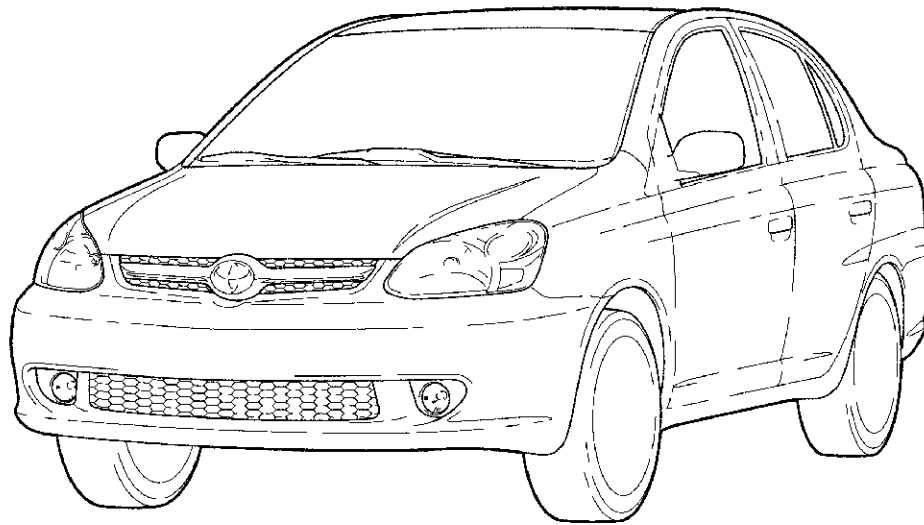
The 2003 model is basically a carry-over from the 2002 model year.

MAJOR TECHNICAL SPECIFICATIONS

Item				Area		U S A and Canada			
Body Type				4 Door Sedan					
Vehicle Grade				—					
Model Code				NHW11L AEBEBA		NHW11L AEBEBK			
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	4305 (169.6)		4305 (169.6)		5	
		Width	mm (in.)	1695 (66.7)		1695 (66.7)			
		Height*	mm (in.)	1465 (57.6)		1465 (57.6)			
	Wheel Base		mm (in.)	2550 (100.4)		2550 (100.4)			
	Tread	Front	mm (in.)	1475 (58.1)		1475 (58.1)		10	
		Rear	mm (in.)	1480 (58.2)		1480 (58.2)			
	Effective Head Room	Front	mm (in.)	985 (38.8)		985 (38.8)			
		Rear	mm (in.)	942 (37.1)		942 (37.1)			
	Effective Leg Room	Front	mm (in.)	1046 (41.2)		1046 (41.2)			
		Rear	mm (in.)	899 (35.4)		899 (35.4)			
	Shoulder Room	Front	mm (in.)	1342 (52.8)		1342 (52.8)		15	
		Rear	mm (in.)	1325 (52.2)		1325 (52.2)			
	Overhang	Front	mm (in.)	815 (32.1)		815 (32.1)			
		Rear	mm (in.)	940 (37.0)		940 (37.0)			
	Min. Running Ground Clearance			mm (in.)	125 (4.9)		125 (4.9)		20
	Angle of Approach			degrees	14°		14°		
	Angle of Departure			degrees	22°		22°		
	Curb Mass	Front	kg (lb)	770 (1700)		770 (1700)			
		Rear	kg (lb)	485 (1065)		485 (1065)			
		Total	kg (lb)	1255 (2765)		1255 (2765)			
	Gross Vehicle Mass	Front	kg (lb)	890 (1965)		890 (1965)		25	
		Rear	kg (lb)	750 (1650)		750 (1650)			
		Total	kg (lb)	1640 (3615)		1640 (3615)			
	Fuel Tank Capacity			L (U S gal Imp gal)	45 (11.9 9.9)*1		45 (11.9 9.9)*1		
	Luggage Compartment Capacity			m ³ (cu ft)	0.39 (11.8)		0.39 (11.8)		
Performance	Max. Speed		km/h (mph)	160 (99.4)		160 (99.4)		30	
	Max. Cruising Speed		km/h (mph)	160 (99.4)		160 (99.4)			
	Acceleration	0 to 100 km/h	sec	13.4		13.4			
		0 to 400 m	sec	19.0		19.0			
	Max. Permissible Speed	1st Gear	km/h (mph)	—		—		35	
		2nd Gear	km/h (mph)	—		—			
		3rd Gear	km/h (mph)	—		—			
		4th Gear	km/h (mph)	—		—			
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)	10.2 (33.5)		10.2 (33.5)		40	
		Curb to Curb	m (ft)	9.4 (30.8)		9.4 (30.8)			
Engine	Engine Type		1NZ-FXE				1NZ-FXE	40	
	Valve Mechanism		16 Valve DOHC				16 Valve DOHC		
	Bore × Stroke		mm (in.)	75.0 × 84.7 (2.95 × 3.33)		75.0 × 84.7 (2.95 × 3.33)			
	Displacement		cm ³ (cu in.)	1497 (91.4)		1497 (91.4)			
	Compression Ratio		13.0 : 1				13.0 : 1	45	
	Carburetor Type		SFI				SFI		
	Research Octane No.		RON 95 or more				95 or more		
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	52 / 4500 (70@4500)		52 / 4500 (70@4500)			
Engine Electrical	Max. Torque (SAE NET)		N·m/rpm (lb ft@rpm)	111 / 4200 (82@4200)		111 / 4200 (82@4200)			
	Battery Capacity (5HR)		Voltage & Amp·hr		12 28		12 28	50	
	Alternator Output		Watts		—		—		
Starter Output		kW		—		—			
Chassis	Clutch Type		—				—		
	Transaxle Type		P111				P111		
	Transmission Gear Ratio	In First	—				—	55	
		In Second	—				—		
		In Third	—				—		
		In Fourth	—				—		
		In Fifth	—				—		
	Counter Gear Ratio		—				—	60	
	Differential Gear Ratio (Final)		3.905				3.905		
	Brake Type	Front	Ventilated Disc				Ventilated Disc		
		Rear	Leading Trailing Drum				Leading Trailing Drum		
	Parking Brake Type			Leading Trailing Drum				Leading Trailing Drum	65
	Brake Booster Type and Size			in		Hydraulic		Hydraulic	
	Proportioning Valve Type			P Valve				P Valve	
	Suspension Type	Front	MacPherson Strut				MacPherson Strut	70	
		Rear	Torsion Beam				Torsion Beam		
	Stabilizer Bar	Front	STD				STD		
Rear		STD				STD			
Steering Gear Type			Rack & Pinion				Rack & Pinion		
Steering Gear Ratio (Overall)			16.4 : 18.3				16.4 : 18.3		
Power Steering Type			Electric Motor				Electric Motor		

*1 EPA / CARB ORVR Test conditions

ECHO



228BC09

ECHO

OUTLINE OF NEW FEATURES

1. Exterior

- The exterior design has been changed. For details, refer to page 106.
- Total of 9 exterior colors – 5 carryover colors and 4 new colors:

Color Name	Color No.	Note
White	068	Carryover
Silver Mica Metallic	1E7	New
Gray Mica Metallic	1E3	New
Black Mica	209	Carryover
Red Mica Metallic	3P1	New
Beige Metallic	4R0	New
Dark Green Mica	6R4	Carryover
Light Aqua Metallic Opal	761	New
Dark Blue Mica Metallic	8P4	Carryover

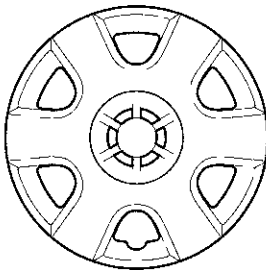
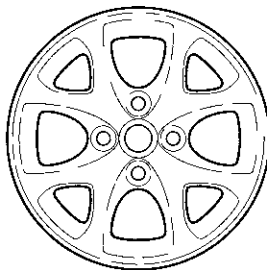
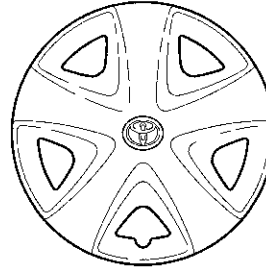
2. 1NZ-FE Engine

The following chart describes the changes from the 1NZ-FE engine on the '02 Echo to the 1NZ-FE engine on the '03 Echo.

Item	Outline
Engine Proper	Change of the piston shape
Exhaust System	Change of the TWC (Three-Way Catalytic Converter) construction
Engine Control System	• Change of the ECM (16-bit → 32-bit) • To comply with the OBD-II regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, see the 2003 General Features section.
Other	Configuration and structure are the same as 1NZ-FE engine on the '02 Echo.

3. Tire and Disc Wheel

15 in. disc wheels are available as optional equipment of all models.

Tire Size	P175/65 R14		P185/60 R15
Disc Wheel Size	14 × 5 1/2J	14 × 5 1/2JJ	15 × 5 J
P.C.D.* mm (in.)	100 (3.9)	100 (3.9)	100 (3.9)
Off Set mm (in.)	45 (1.8)	45 (1.8)	45 (1.8)
Material	Steel	Aluminum	Steel
Design	Full Wheel Cap  228EC01	Aluminum Wheel  228EC02	Full Wheel Cap  228EC03
Equipment	Standard	Option	Option
Note	Carryover		New

*: P.C.D.: Pitch Circle Diameter

8

4. Wheel Alignment

Along with the provision of the 15-inch disc wheels, the front wheel alignment specifications have been changed.

► Front Wheel Alignment Specification ◀

Tire Size		P185/60 R15	P175/65 R14
Vehicle Height		202 (7.95)	191 (7.52)
Tread* ¹		1441 (56.7)	←
Camber* ¹		-0°35'	-0°36'
Caster* ¹	P/S* ²	2°03'	2°01'
	M/S* ³	—	1°04'
degrees			
Toe-In		0	←
King Pin Inclination* ¹		10°05'	←
degrees			

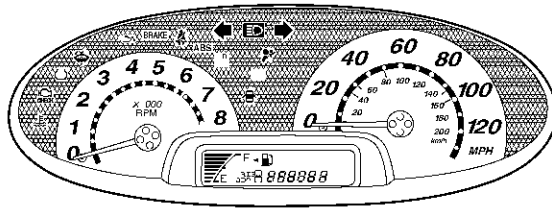
*¹: Unloaded Vehicle Condition

*²: P/S (Power Steering)

*³: M/S (Manual Steering)

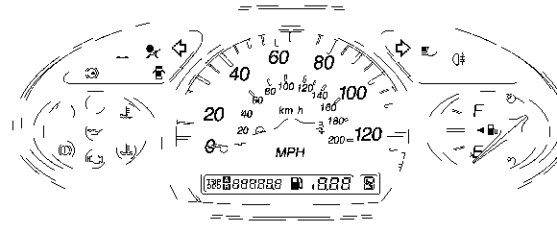
5. Combination Meter

A tachometer is added as optional equipment for U.S.A. models.



228BC04

with Tachometer



171BB01

without Tachometer

6. Outside Rear View Mirror

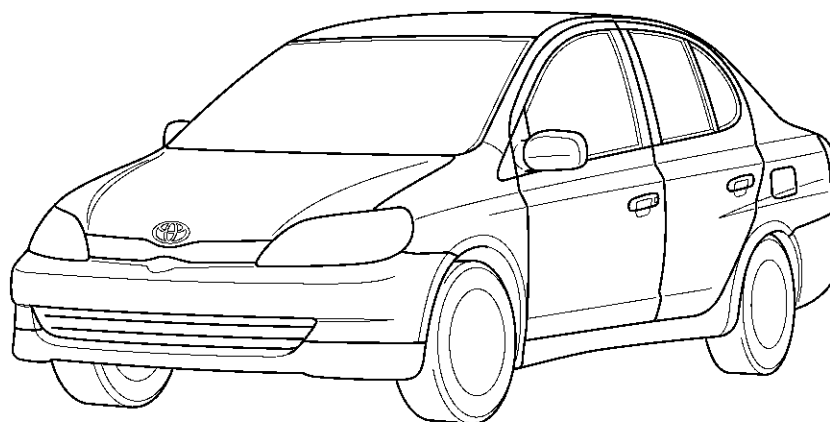
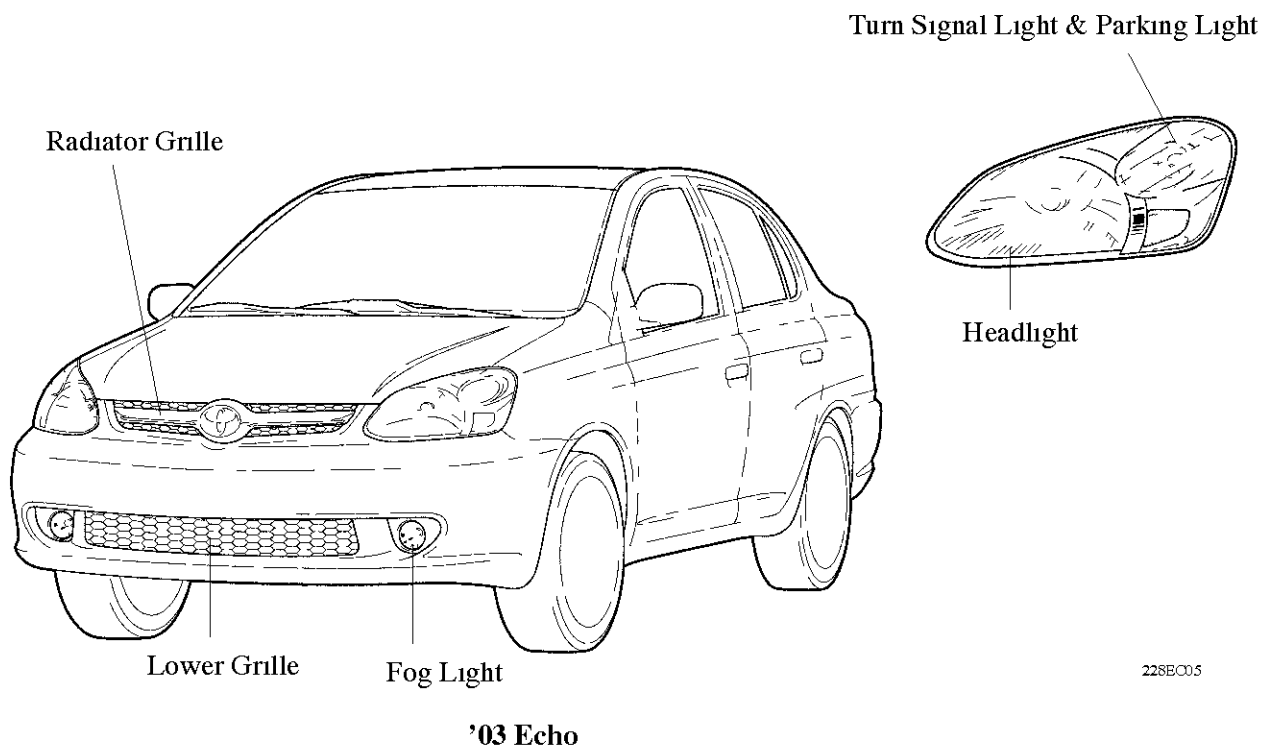
- Electrical remote control function is added as optional equipment of all models.
- When the mirror control switch is operated, this function moves the mirror surface vertically or laterally to enable the driver to attain an optimal mirror angle.

NEW FEATURES

■ EXTERIOR

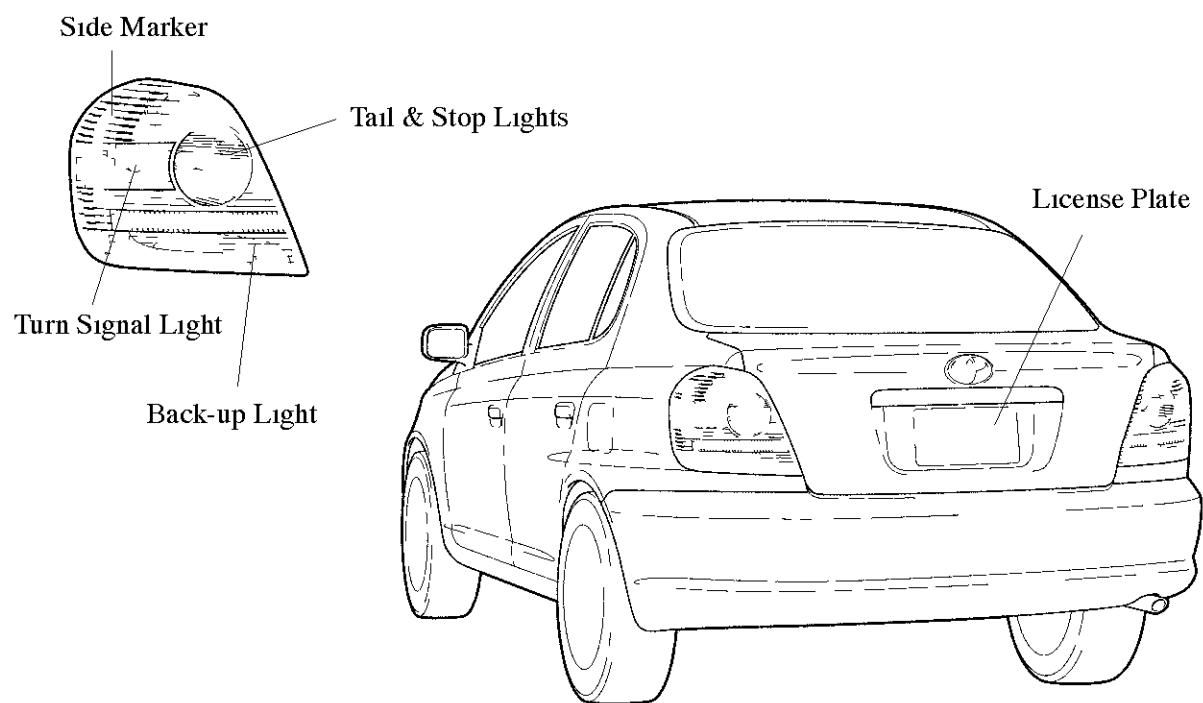
1. Front View

- The front portion of the engine hood has been changed to realize three-dimensionality and presence.
- The front bumper has been made larger to achieve an integrated look, and the lower grille has been designed to emphasize its sharp and wide look.
- The headlights are the 2-light type with a unique line to realize a relaxed appearance.
- Front fog lights are added as optional equipment of all models.
- The radiator grille is integrated with the bumper to achieve a powerful design.



2. Rear View

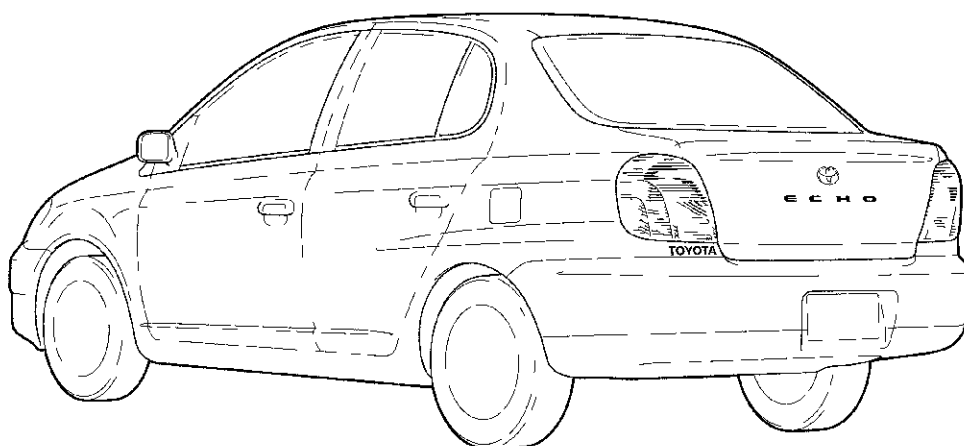
- The rear combination lights have a unique design to express individualism.
- The license plate is located on the trunk lid to express a stable rear view.



'03 Echo

228BC06

8

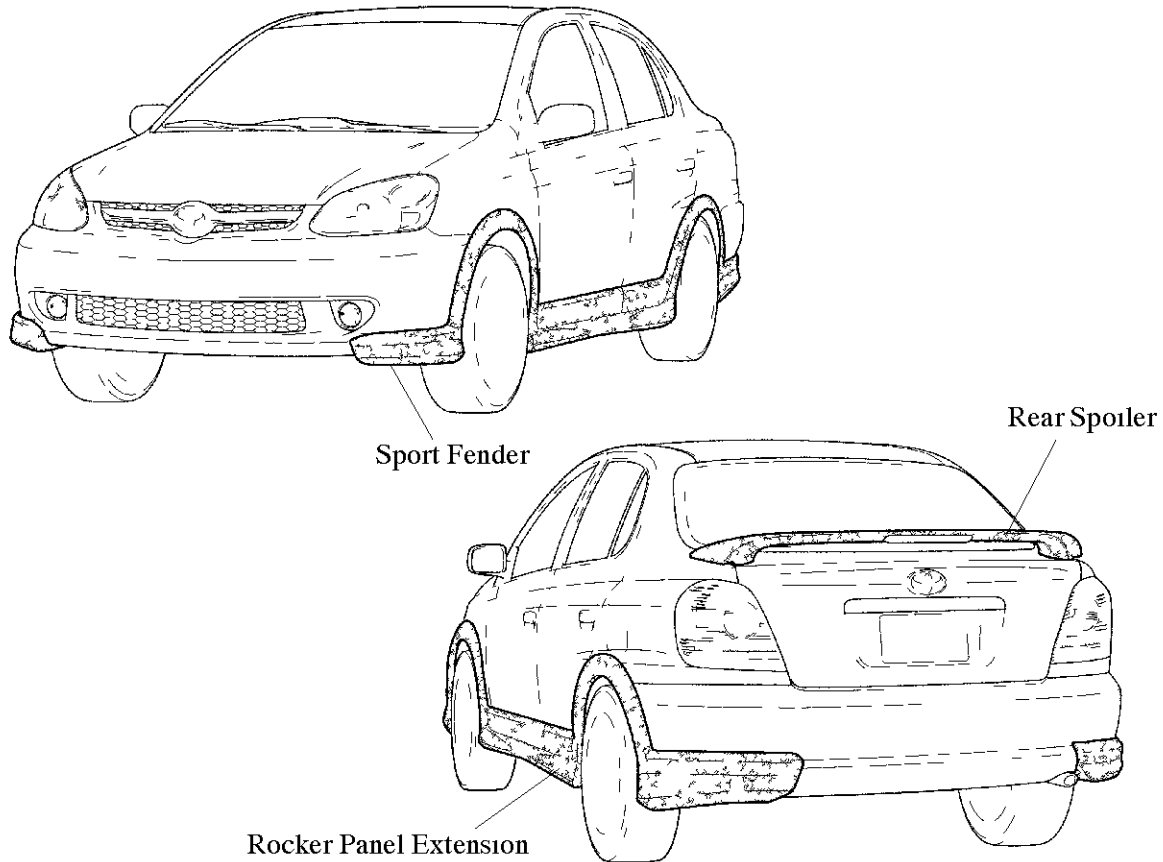


'02 Echo

228BC08

3. Aero Part

Aero parts (sports fender & rocker panel extension and rear spoiler) are added as optional equipment for all models.



228BC07

■ 1NZ-FE ENGINE

1. Main Difference

The following chart describes the changes from the 1NZ-FE engine on the '02 Echo to the 1NZ-FE engine on the '03 Echo.

Item	Outline
Engine Proper	Change of the piston shape
Exhaust System	Change of the TWC (Three-Way Catalytic Converter) construction
Engine Control System	- Change of the ECM (16-bit → 32-bit) - To comply with the OBD-II regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, see the 2003 General Features section.
Other	Configuration and structure are the same as 1NZ-FE engine on the '02 Echo.

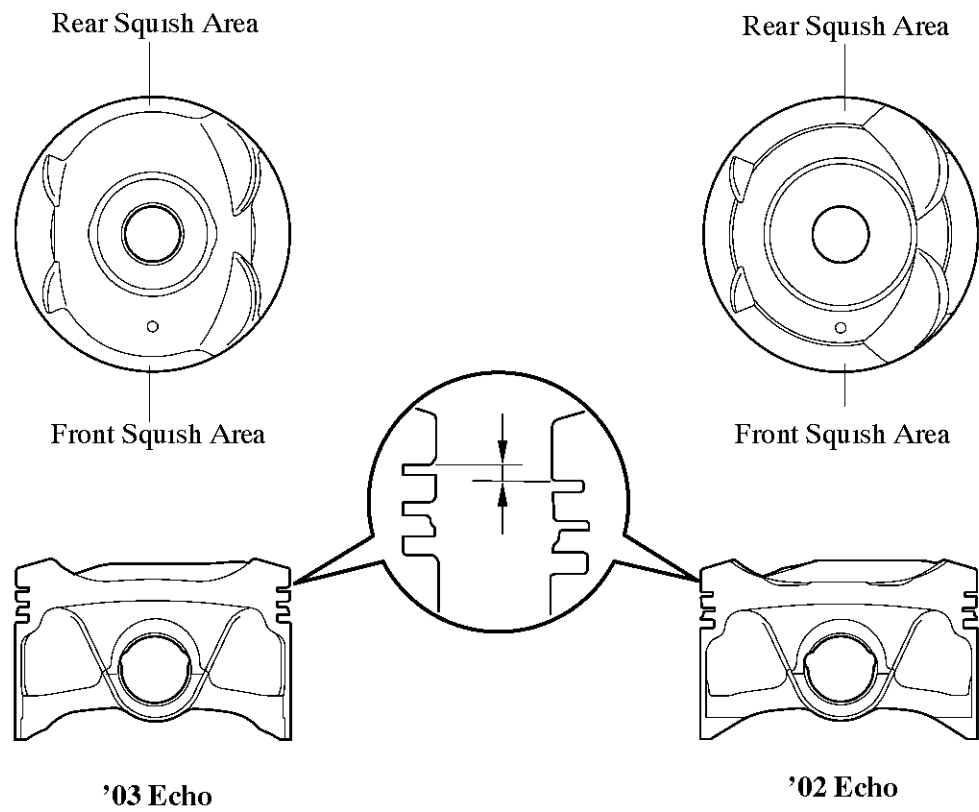
2. Engine Specification

Model			'03 Echo	'02 Echo
No. of Cyls. & Arrangement			4-Cylinder, In-line	←
Valve Mechanism			16-Valve DOHC, Chain Drive (with VVT-i)	←
Combustion Chamber			Pentroof Type	←
Manifolds			Cross-Flow	←
Fuel System			SFI	←
Ignition System			DIS	←
Displacement		cm ³ (cu. in.)	1497 (91.4)	←
Bore × Stroke		mm (in.)	75.0 × 84.7 (2.95 × 3.33)	←
Compression Ratio			10.5 : 1	←
Max. Output		[SAE-NET]	80 kW @ 6000 rpm (108 HP @ 6000 rpm)	←
Max. Torque		[SAE-NET]	142 N m @ 4200 rpm (105 ft lbf @ 4200 rpm)	←
Valve Timing	Intake	Open	-7° ~ 33° BTDC	←
		Close	52° ~ 12° ABDC	←
	Exhaust	Open	42° BBDC	←
		Close	2° ATDC	←
Firing Order			1 – 3 – 4 – 2	←
Octane Rating			91 or more	←
Emission Regulation			LEV	←
Oil Grade			API SL-EC or ILSAC	←
Engine Service Mass (Reference)* kg (lb)		M/T	94.2 (207.7)	←
		A/T	87.4 (192.7)	←

*: Weight shows the figure with the oil and engine coolant fully filled.

3. Piston

- The squish area in the front and rear direction of the piston head has been discontinued and the combustion chamber has been made shallower in order to further increase the combustion efficiency, thus increasing fuel economy.
- The position of the piston rings has been slightly raised in order to reduce the area in which unburned fuel is likely to accumulate during combustion.



229VS01

4. Exhaust System

To comply with the SFTP (Supplementary Federal Test Procedure), the internal construction of the TWC (Three-Way Catalytic Converter) has been changed in order to increase its emission performance during high-load conditions.

Model	'03 Echo	'02 Echo
Material	Ceramic	←
Cell	93 cell/cm ²	62 cell/cm ²

5. Engine Control System

General

The engine control system for the 1NZ-FE engine in the '03 Echo and '02 Echo are compared below.

System	Outline	Model	
		'03 Echo	'02 Echo
SFI (Sequential Multiport Fuel Injection)	An L-type SFI system detects the intake air volume with a hot-wire type air flow meter	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.	○	○
IAC (Idle Air Control)	A rotary solenoid type IAC valve controls the fast idle and idle speeds.	○	○
VVT-i (Variable Valve Timing-intelligent)	Controls the intake camshaft to optimal valve timing in accordance with the engine condition.	○	○
Fuel Pump Control	Fuel pump operation is controlled by signals from the ECM.	○	○
Oxygen Sensor Heater Control	Maintains the temperature of the oxygen sensors at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○
Evaporative Emission Control	- The ECM controls the purge flow of evaporative emissions (HC) in the charcoal canister in accordance with engine conditions. - Using 3 VSVs and a vapor pressure sensor, the ECM detects any evaporative emission leakage occurring between the fuel tank and the charcoal canister through the changes in the tank pressure.	○	○
Air Conditioner Cut-off Control*	By turning the air conditioner compressor ON or OFF in accordance with the engine condition, drivability is maintained.	○	○
Cooling Fan Control	Cooling fan operation is controlled by signals from the ECM based on the engine coolant temperature sensor signal and the condition of the air conditioner operation.	○	—
Diagnosis	When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section.	○	○
	All DTC (Diagnostic Trouble Code) correspond to the SAE control codes. For details, see the 2003 General Features section.	○	—
Fail-Safe	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in memory.	○	○

Main Component of Engine Control System

1) General

The main components for the 1NZ-FE engine on the '03 and '02 Echo are compared below:

Model	'03 Echo	'02 Echo
ECM	32-bit	16-bit
Air Flow Meter	Hot-wire Type	←
Crankshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (36 – 2)	←
Camshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (3)	←
Throttle Position Sensor	Linear Type	←
Knock Sensor	Built-in Piezoelectric Element Type	←
Oxygen Sensor (Bank 1, Sensor 1 and 2)	with Heater	←
Injector	12-Hole Type	←
IAC Valve	Rotary Solenoid Type (1-coil Type)	←

2) ECM

The 32-bit CPU of the ECM has been changed from the 16-bit CPU of the ECM to increase the speed for processing the signals.

Service Tip

The length of time clear the DTC via the battery terminal has been changed from 10 seconds to 1 minute.

MAJOR TECHNICAL SPECIFICATIONS

Item		Area		U S A			
Body Type				2 Door Sedan		4 Door Sedan	
Vehicle Grade				—		—	
Model Code				NCP12L BDMRKA		NCP12L BDPKKA	
				NCP12L BEMRKA		NCP12L BEPRKA	
Major Dimensions & Vehicle Weights	Overall	Length	mm (in)	4180 (164 6)	4180 (164 6)	4180 (164 6)	4180 (164 6)
		Width	mm (in)	1660 (65 4) 1690 (66 5)* ⁵	1660 (65 4) 1690 (66 5)* ⁵	1660 (65 4) 1690 (66 5)* ⁵	1660 (65 4) 1690 (66 5)* ⁵
		Height*	mm (in)	1510 (59 4) 1520 (59 8)* ²	1510 (59 4) 1520 (59 8)* ²	1510 (59 4) 1520 (59 8)* ²	1510 (59 4) 1520 (59 8)* ²
	Wheel Base		mm (in)	2370 (93 3)	2370 (93 3)	2370 (93 3)	2370 (93 3)
	Tread	Front	mm (in)	1440 (56 7)	1440 (56 7)	1440 (56 7)	1440 (56 7)
		Rear	mm (in)	1420 (55 9)	1420 (55 9)	1420 (55 9)	1420 (55 9)
	Effective Head Room	Front	mm (in)	1013 (39 9)	1013 (39 9)	1013 (39 9)	1013 (39 9)
		Rear	mm (in)	956 (37 6)	956 (37 6)	956 (37 6)	956 (37 6)
	Effective Leg Room	Front	mm (in)	1044 (41 1)	1044 (41 1)	1044 (41 1)	1044 (41 1)
		Rear	mm (in)	894 (35 2)	894 (35 2)	894 (35 2)	894 (35 2)
	Shoulder Room	Front	mm (in)	1327 (52 2)	1327 (52 2)	1317 (51 9)	1317 (51 9)
		Rear	mm (in)	1296 (51 0)	1296 (51 0)	1288 (50 7)	1288 (50 7)
	Overhang	Front	mm (in)	820 (32 3)	820 (32 3)	820 (32 3)	820 (32 3)
		Rear	mm (in)	990 (39 0)	990 (39 0)	990 (39 0)	990 (39 0)
	Min. Running Ground Clearance		mm (in)	140 (5 1)	140 (5 1)	140 (5 1)	140 (5 1)
	Angle of Approach		degrees	16°	16°	16°	16°
	Angle of Departure		degrees	21°	21°	21°	21°
	Curb Mass	Front	kg (lb)	565 (1245)	587 (1295)	565 (1245)	587 (1295)
		Rear	kg (lb)	367 (810)	368 (810)	372 (820)	372 (820)
		Total	kg (lb)	932 (2055)	955 (2105)	937 (2065)	959 (2115)
	Gross Vehicle Mass	Front	kg (lb)	694 (1530)	719 (1585)	694 (1530)	719 (1585)
		Rear	kg (lb)	628 (1385)	635 (1400)	633 (1395)	640 (1410)
		Total	kg (lb)	1322 (2915)	1354 (2985)	1327 (2925)	1359 (2995)
	Fuel Tank Capacity	L (U S gal Imp gal)		45 (9 9)	45 (9 9)	45 (9 9)	45 (9 9)
	Luggage Compartment Capacity	m ³ (cu ft)		0 385 (13 598)	0 385 (13 598)	0 385 (13 598)	0 385 (13 598)
Performance	Max. Speed	km/h (mph)		175 (109)	175 (109)	175 (109)	175 (109)
	Max. Cruising Speed	km/h (mph)		145 (90)	145 (90)	145 (90)	145 (90)
	Acceleration	0 to 100 km/h sec		—	—	—	—
		0 to 400 m sec		—	—	—	—
	Max. Permissible Speed	1st Gear km/h (mph)		54 (33)	60 (37)	54 (33)	60 (37)
		2nd Gear km/h (mph)		100 (62)	110 (69)	100 (62)	110 (69)
		3rd Gear km/h (mph)		146 (91)	—	146 (91)	—
		4th Gear km/h (mph)		—	—	—	—
	Turning Diameter (Outside Front)	Wall to Wall m (ft)		10 5 (34 5) 11 3 (37 1)* ⁴	10 5 (34 5) 11 3 (37 1)* ⁴	10 5 (34 5) 11 3 (37 1)* ⁴	10 5 (34 5) 11 3 (37 1)* ⁴
		Curb to Curb m (ft)		10 0 (32 8) 10 8 (35 4)* ⁴	10 0 (32 8) 10 8 (35 4)* ⁴	10 0 (32 8) 10 8 (35 4)* ⁴	10 0 (32 8) 10 8 (35 4)* ⁴
Engine	Engine Type			1NZ FE	1NZ FE	1NZ FE	1NZ FE
	Valve Mechanism			16 Valve DOHC	16 Valve DOHC	16 Valve DOHC	16 Valve DOHC
	Bore × Stroke	mm (in)		75 0 × 84 7 (2 95 × 3 33)	75 0 × 84 7 (2 95 × 3 33)	75 0 × 84 7 (2 95 × 3 33)	75 0 × 84 7 (2 95 × 3 33)
	Displacement	cm ³ (cu in)		1497 (91 4)	1497 (91 4)	1497 (91 4)	1497 (91 4)
	Compression Ratio			10 5 1	10 5 1	10 5 1	10 5 1
	Carburetor Type			SFI	SFI	SFI	SFI
	Research Octane No.	RON		87 or more	87 or more	87 or more	87 or more
	Max. Output (SAE NET)	kW/rpm (HP@rpm)		80 / 6000 (108@6000)	80 / 6000 (108@6000)	80 / 6000 (108@6000)	80 / 6000 (108@6000)
	Max. Torque (SAE NET)	N m/rpm (lb ft@rpm)		142 / 4200 (105@4200)	142 / 4200 (105@4200)	142 / 4200 (105@4200)	142 / 4200 (105@4200)
	Battery Capacity (5HR)	Voltage & Amp hr		12-40 12-48* ³	12-40 12-48* ³	12 40 12-48* ³	12 40 12-48* ³
Engine Electrical	Alternator Output	Watts		840 1080* ³ 960* ³	840 1080* ³ 960* ³	840 1080* ³ 960* ³	840 1080* ³ 960* ³
	Starter Output	kW		0 8 1 6* ³	0 8 1 6* ³	0 8 1 6* ³	0 8 1 6* ³
Chassis	Clutch Type			Dry Single Plate Diaphragm	—	Dry Single Plate Diaphragm	—
	Transaxle Type			C150	U340E	C150	U340E
	Transmission Gear Ratio	In First		3 545	2 847	3 545	2 847
		In Second		1 904	1 552	1 904	1 552
		In Third		1 310	1 000	1 310	1 000
		In Fourth		0 969	0 700	0 969	0 700
		In Fifth		0 815	—	0 815	—
		In Reverse		3 250	2 343	3 250	2 343
	Counter Gear Ratio			—	1 019	—	1 019
	Differential Gear Ratio (Final)			3 526	3 850	3 526	3 850
	Brake Type	Front		Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
		Rear		Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
	Parking Brake Type			Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
	Brake Booster Type and Size	in		Single 9	Single 9	Single 9	Single 9
	Proportioning Valve Type			P Valve	P Valve	P Valve	P Valve
	Suspension Type	Front		MacPherson Strut	MacPherson Strut	MacPherson Strut	MacPherson Strut
		Rear		Torsion Beam	Torsion Beam	Torsion Beam	Torsion Beam
	Stabilizer Bar	Front		STD	STD	STD	STD
		Rear		—	—	—	—
	Steering Gear Type			Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion
	Steering Gear Ratio (Overall)			19 5 17 5* ⁴	19 5 17 5* ⁴	19 5 17 5* ⁴	19 5 17 5* ⁴
	Power Steering Type			Integral Type	Integral Type	Integral Type	Integral Type

*1 Unloaded Condition

*2 185 / 60 R15 Tire

*3 Option

*4 Power Steering

*5 With Sports Fender & Rocker Panel Extensions

Item			Area		Canada							
Body Type					2 Door Sedan				4 Door Sedan			
Vehicle Grade					—							
Model Code					NCP12L BDMRKK		NCP12L BDPRKK		NCP12L BEMRKK		NCP12L BEPRKK	
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	4180 (164 6)		4180 (164 6)		4180 (164 6)		4180 (164 6)		5
		Width	mm (in.)	1660 (65 4) 1690 (66 5)* ⁴⁵		1660 (65 4) 1690 (66 5)* ⁴⁵		1660 (65 4) 1690 (66 5)* ⁴⁵		1660 (65 4) 1690 (66 5)* ⁴⁵		
		Height*	mm (in.)	1510 (59 4) 1520 (59 8)* ⁴²		1510 (59 4) 1520 (59 8)* ⁴²		1510 (59 4) 1520 (59 8)* ⁴²		1510 (59 4) 1520 (59 8)* ⁴²		
	Wheel Base		mm (in.)	2370 (93 3)		2370 (93 3)		2370 (93 3)		2370 (93 3)		
	Tread	Front	mm (in.)	1440 (56 7)		1440 (56 7)		1440 (56 7)		1440 (56 7)		
		Rear	mm (in.)	1420 (55 9)		1420 (55 9)		1420 (55 9)		1420 (55 9)		10
	Effective Head Room	Front	mm (in.)	1013 (39 9)		1013 (39 9)		1013 (39 9)		1013 (39 9)		
		Rear	mm (in.)	956 (37 6)		956 (37 6)		956 (37 6)		956 (37 6)		
	Effective Leg Room	Front	mm (in.)	1044 (41 1)		1044 (41 1)		1044 (41 1)		1044 (41 1)		
		Rear	mm (in.)	894 (35 2)		894 (35 2)		894 (35 2)		894 (35 2)		
	Shoulder Room	Front	mm (in.)	1327 (52.2)		1327 (52.2)		1317 (51 9)		1317 (51 9)		15
		Rear	mm (in.)	1296 (51 0)		1296 (51 0)		1288 (50 7)		1288 (50 7)		
	Overhang	Front	mm (in.)	820 (32.3)		820 (32.3)		820 (32.3)		820 (32.3)		
		Rear	mm (in.)	990 (39 0)		990 (39 0)		990 (39 0)		990 (39 0)		
	Min. Running Ground Clearance		mm (in.)	140 (5 1)		140 (5 1)		140 (5 1)		140 (5 1)		
	Angle of Approach		degrees	16°		16°		16°		16°		20
	Angle of Departure		degrees	21°		21°		21°		21°		
	Curb Mass	Front	kg (lb)	572 (1260)		594 (1310)		572 (1260)		594 (1310)		
		Rear	kg (lb)	367 (810)		367 (810)		372 (820)		372 (820)		
		Total	kg (lb)	939 (2070)		961 (2120)		944 (2080)		966 (2130)		
	Gross Vehicle Mass	Front	kg (lb)	692 (1525)		714 (1575)		692 (1525)		714 (1575)		25
		Rear	kg (lb)	626 (1380)		633 (1395)		630 (1390)		637 (1405)		
		Total	kg (lb)	1318 (2905)		1347 (2970)		1322 (2915)		1351 (2980)		
	Fuel Tank Capacity		L (U.S. gal Imp. gal)	45 (9 9)		45 (9 9)		45 (9 9)		45 (9 9)		
	Luggage Compartment Capacity		m ³ (cu ft)	0.385 (13.598)		0.385 (13.598)		0.385 (13.598)		0.385 (13.598)		
Performance	Max. Speed		km/h (mph)	175 (109)		175 (109)		175 (109)		175 (109)		30
	Max. Cruising Speed		km/h (mph)	145 (90)		145 (90)		145 (90)		145 (90)		
	Acceleration	0 to 100 km/h	sec	—		—		—		—		
		0 to 400 m	sec	—		—		—		—		
	Max. Permissible Speed	1st Gear	km/h (mph)	54 (33)		60 (37)		54 (33)		60 (37)		35
		2nd Gear	km/h (mph)	100 (62)		110 (69)		100 (62)		110 (69)		
		3rd Gear	km/h (mph)	146 (91)		—		146 (91)		—		
		4th Gear	km/h (mph)	—		—		—		—		
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)	10.5 (34.5) 11.3 (37.1)* ⁴⁴		10.5 (34.5) 11.3 (37.1)* ⁴⁴		10.5 (34.5) 11.3 (37.1)* ⁴⁴		10.5 (34.5) 11.3 (37.1)* ⁴⁴		
		Curb to Curb	m (ft)	10.0 (32.8) 10.8 (35.4)* ⁴⁴		10.0 (32.8) 10.8 (35.4)* ⁴⁴		10.0 (32.8) 10.8 (35.4)* ⁴⁴		10.0 (32.8) 10.8 (35.4)* ⁴⁴		
Engine	Engine Type		1NZ FE		1NZ FE		1NZ FE		1NZ FE		40	
	Valve Mechanism		16 Valve DOHC		16 Valve DOHC		16 Valve DOHC		16 Valve DOHC			
	Bore × Stroke		mm (in.)	75.0 × 84.7 (2.95 × 3.33)		75.0 × 84.7 (2.95 × 3.33)		75.0 × 84.7 (2.95 × 3.33)		75.0 × 84.7 (2.95 × 3.33)		
	Displacement		cm ³ (cu in.)	1497 (91.4)		1497 (91.4)		1497 (91.4)		1497 (91.4)		
	Compression Ratio		10.5 : 1		10.5 : 1		10.5 : 1		10.5 : 1			
	Carburetor Type		SFI		SFI		SFI		SFI		45	
	Research Octane No.		RON 87 or more		87 or more		87 or more		87 or more			
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	80 / 6000 (108@6000)		80 / 6000 (108@6000)		80 / 6000 (108@6000)		80 / 6000 (108@6000)		
Engine Electrical	Max. Torque (SAE NET)		N m/rpm (lb ft@rpm)	142 / 4200 (105@4200)		142 / 4200 (105@4200)		142 / 4200 (105@4200)		142 / 4200 (105@4200)		
	Battery Capacity (5HR)		Voltage & Amp hr	12 48		12 48		12-48		12-48		
	Alternator Output		Watts	1080		1080		1080		1080		50
Chassis	Starter Output		kW	1.6		1.6		1.6		1.6		
	Clutch Type		Dry Single Plate Diaphragm		—		Dry Single Plate Diaphragm		—			
	Transaxle Type		C150		U340E		C150		U340E			
	Transmission Gear Ratio	In First	3.545		2.847		3.545		2.847		55	
		In Second	1.904		1.552		1.904		1.552			
		In Third	1.310		1.000		1.310		1.000			
		In Fourth	0.969		0.700		0.969		0.700			
		In Fifth	0.815		—		0.815		—			
		In Reverse	3.250		2.343		3.250		2.343			
	Counter Gear Ratio		—		1.019		—		1.019		60	
	Differential Gear Ratio (Final)		3.526		3.850		3.526		3.850			
	Brake Type	Front	Ventilated Disc		Ventilated Disc		Ventilated Disc		Ventilated Disc			
		Rear	Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum			
	Parking Brake Type		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum			
	Brake Booster Type and Size		in	Single 9		Single 9		Single 9		Single 9		65
	Proportioning Valve Type		P Valve		P Valve		P Valve		P Valve			
	Suspension Type	Front	MacPherson Strut		MacPherson Strut		MacPherson Strut		MacPherson Strut			
		Rear	Torsion Beam		Torsion Beam		Torsion Beam		Torsion Beam			
	Stabilizer Bar	Front	STD		STD		STD		STD		70	
		Rear	—		—		—		—			
	Steering Gear Type		Rack and Pinion		Rack and Pinion		Rack and Pinion		Rack and Pinion			
	Steering Gear Ratio (Overall)		19.5 : 17.5* ⁴⁴		19.5 : 17.5* ⁴⁴		19.5 : 17.5* ⁴⁴		19.5 : 17.5* ⁴⁴			
	Power Steering Type		Integral Type		Integral Type		Integral Type		Integral Type			

*1 Unloaded Condition

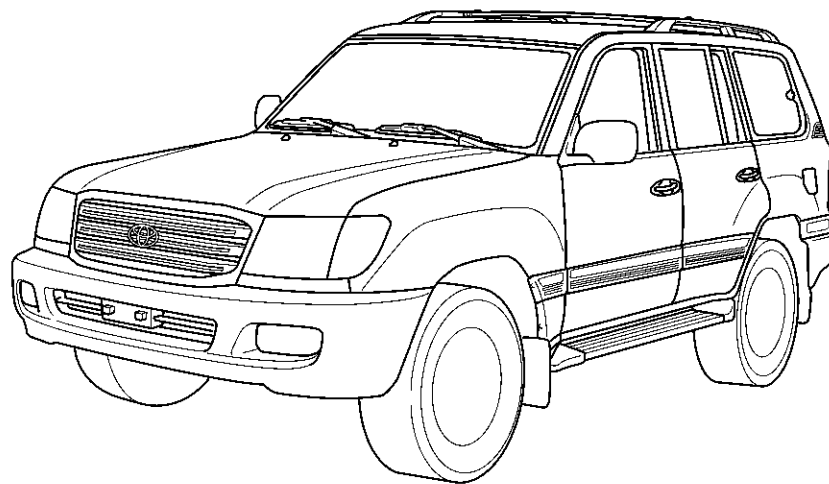
*2 185 / 60 R15 Tire

*3 Option

*4 Power Steering

*5 With Sports Fender & Rocker Panel Extensions

LAND CRUISER



LAND CRUISER

OUTLINE OF NEW FEATURES

The following changes are made for the 2003 model year.

1. Model Line-up

An A750F automatic transmission has been added, and the model code has been changed accordingly as follows:

- UZJ100L-GNPEKA → UZJ100L-GNAEKA

2. Exterior

- The designs of the front bumper and radiator grille have been changed.
- The outer lens color of the turn-signal lights in the rear combination lights has been changed from amber to clear.
- The design of the back door molding has been changed.
- The design of the side stripes, provided as an option, have been changed.
- The roof-rail has been adopted as optional equipment.
- 275/65R17 tires and newly designed 17x8JJ-60 wheels are provided as standard equipment.
- 275/60R18 tires and newly designed 18x8JJ-60 wheels are provided as optional equipment.
- The following exterior colors have been added:

Added Color No.	Added Color Name
4R3	Gold Mica Metallic
1E9	Dark Gray Mica Metallic
3Q2	Dark Red Mica Metallic

3. Interior

- The design of the center cluster has been changed.
- The design of the combination meter has been changed.
- The steering wheel with steering pad switch is used.
- The designs of the center pillar garnish and roof side portion have been changed.
- The design of the assist grip and coat hook has been changed on the model with the curtain shield airbags.

4. 2UZ-FE Engine

- The ETCS-1 (Electronic Control System-intelligent) continues to be used from the '02 model. However, on the '03 model, the accelerator cable has been discontinued and an accelerator position sensor has been provided on the accelerator pedal.
- A no-contact type throttle position sensor has been adopted on all models.
- The composition of the TWC (Three-Way Catalytic Converter) has been changed to comply with the SFTP (Supplementary Federal Test Procedure) regulations.
- Segment Conductor type alternator has been adopted.
- Cranking hold function has been adopted. Once the ignition switch is turned to the START position, this control continues to operate the starter until the engine starts.

5. A750F Automatic Transmission

- A newly developed A750F 5-speed automatic transmission [Super ECT (Electronically Controlled Transmission)] has been adopted.
- The gate type shift lever is used.

6. Transfer

The same HF2A type transfer that was used on the '02 model is used.

7. Propeller Shaft

Along with the adoption of the A750F automatic transmission, the construction of the front and rear propeller shafts has been changed as follows:

- All the joints of both the front and rear propeller shafts have been optimized and have been strengthened while maintaining the same shape as the previous model.
- The tube diameter of both the front and rear propeller shafts has been increased to improve their strength.

Propeller Tube Diameter	'03 Model (A750F)	'02 Model (A343F)
Front	65.0 mm (2.6 in.)	54.0 mm (2.1 in.)
Rear	75.0 mm (3.0 in.)	65.0 mm (2.6 in.)

8. Differential

The differential gear ratio has been optimized for use with the A750F automatic transmission.

Type	Gear Ratio (Front and Rear Diff.)
A750F	4.100

9. Brake Control System (ABS with EBD, Brake Assist, A-TRAC, and VSC System)

- The deceleration sensor that is provided for the brake control system (ABS with EBD, Brake Assist, A-TRAC, and VSC system) has been integrated in the yaw rate sensor.
- By changing the resistance value of the coil of the solenoid valves in the hydraulic brake booster established in A-TRAC as shown in the following table, the heat resistance has been improved. As a result, the consecutive operation time of this system has increased.

Solenoid Valve	New Model	Previous Model
SA3, SFRH, SFLH, SRRH, SRLH	Approx. 7.2 Ω	Approx. 5.0 Ω
STR, SA1, SA2	Approx. 4.3 Ω	Approx. 3.7 Ω

10. Steering

The construction and specifications of the steering gear box and the power steering pump have been changed.

11. Body

- Noise and vibration have been reduced through the adoption of the following features:
 - The urethane pad at the bottom of the center pillar has been changed to a foam material.
 - A sealing material has been provided on the door.
- Due to the adoption of a towing hitch as optional equipment, a dedicated rear cross member to which the towing hitch can be mounted has been adopted.

12. Body Electrical System Control

- The configuration of the BEAN (Body Electronics Area Network) has been changed in accordance with the addition of equipment.
- The instrument ECU is based on the previous model. On the new model, the body ECU provides additional control functions in order to comprehensively control the body electrical system.
- A customized body electronic system is used in order to set the control functions of the ECUs through the use of a hand-held tester.

13. Lighting

The construction of the light control sensor, which is provided in the automatic light control system, has been changed.

14. Combination Meter

The design and construction of the combination meter has been changed.

15. Air Conditioner

A seal and a baffle plate that prevent the detour of warm air from the engine compartment has been adopted to improve the cooling performance. Accordingly, the electric fan that was provided on the '02 model has been discontinued. As a result, a reduction in weight and fan noise has been achieved.

16. Multi Display

- A pressure sensitive touch panel has been adopted on the screen of the multi display of the U.S.A. model.
- The functions to display trip information and calendar have been added to the multi display.
- A voice recognition function has been adopted in the multi display to enable the operation of the GPS voice navigation.

17. Multi Information Display

The function to display trip information has been added to the multi-information display, which is provided above the audio head unit.

18. Power Window System

A correction function has been added to the jam protection function to prevent it from activating unintentionally while the vehicle is driven on rough roads.

19. Engine Immobiliser System

On '02 model, the ECM used to control the system. However, a change is made on '03 model that a transponder key ECU is newly adopted to control the system.

20. SRS Air Bag System

- The side and curtain shield airbags have been adopted as optional equipment.
- Roll sensing of curtain shield airbags control has been adopted in order to deploy the curtain shield airbags and the seat belt pretensioners for the driver and front passenger, in the event that the vehicle rolls over. A roll sensing of curtain shield airbags cutoff switch is provided on the driver side of the instrument panel to enable the driver to disable this system.
- A dual-stage SRS airbag system has been adopted for the driver and front passenger airbags.
- In accordance with the adoption of the dual-stage SRS airbag system, a seat position sensor has been established for the driver seat.
- On the '03 model, the previous mechanical type front airbag sensor assembly (consisting of movable and stationary contact points) has been changed to an electrical (deceleration sensor) type front airbag sensor assembly.
- Front passenger airbag door is made invisible. This means that without the airbag door, the airbag will be inflated by breaking to open the cleavage line stored in the instrument panel inflating.
- This system has adopted a fuel cut control that stops the fuel pump when the airbag is deployed.

21. Audio System

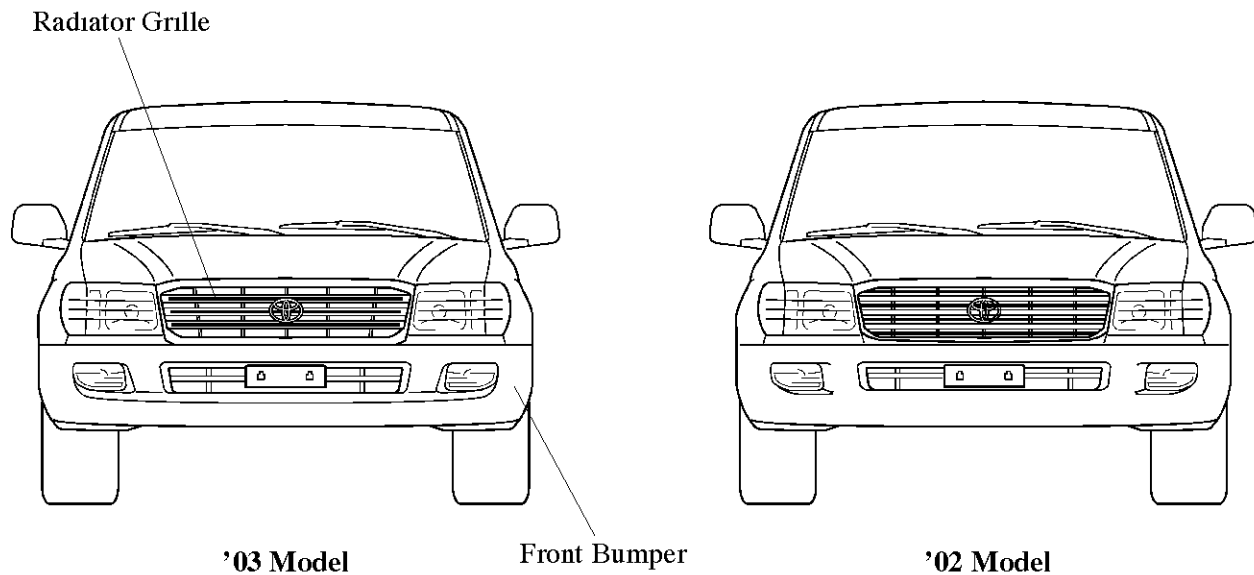
- An RSAS (Rear Seat Audio System) has been adopted as standard equipment.
- A steering wheel with a steering pad switch has been adopted as standard equipment.

NEW FEATURES

■ EXTERIOR

1. Front Design

The designs of the front bumper and radiator grille have been changed.

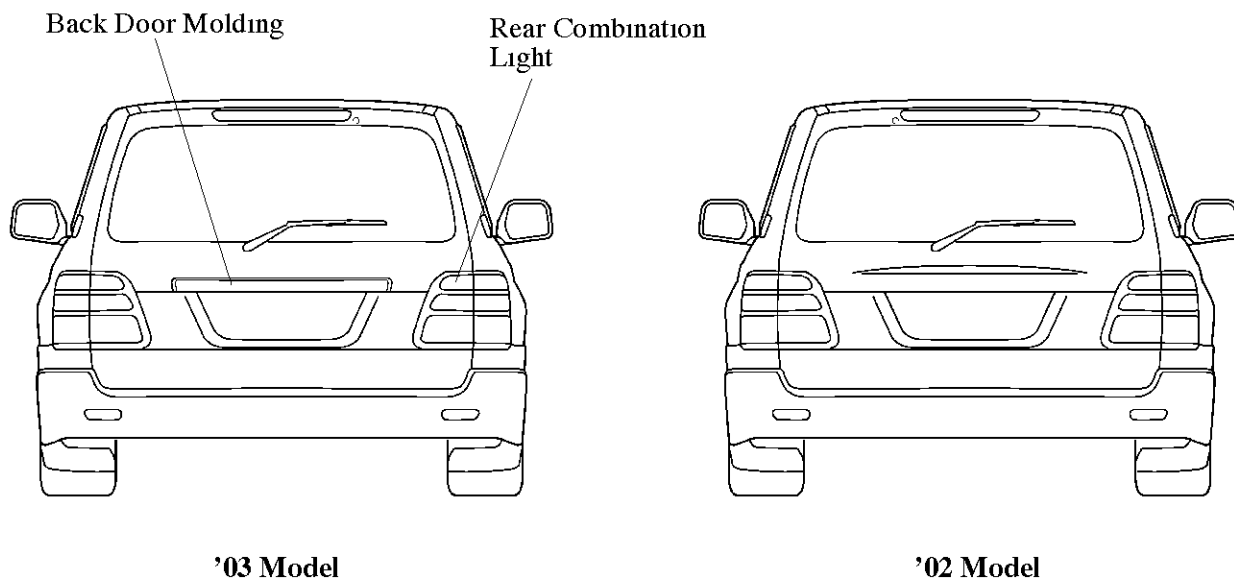


229LC101

2. Rear Design

- The outer lens color of the turn-signal lights in the rear combination lights has been changed from amber to clear.
- The design of the back door molding has been changed.

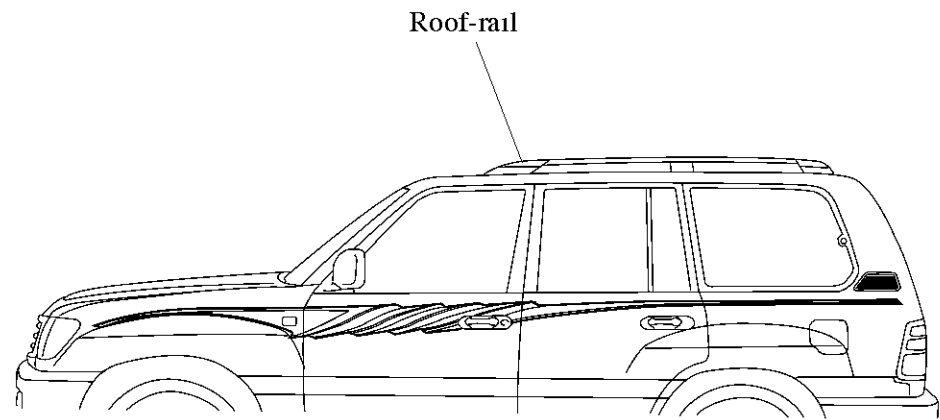
9



229LC102

3. Side Design

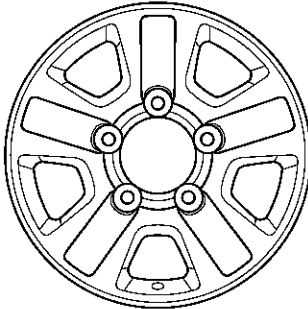
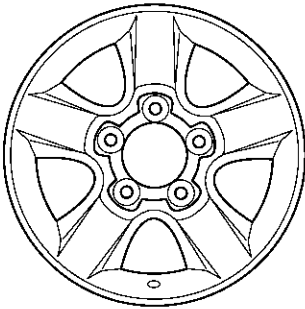
- The design of the side stripes, provided as an option, have been changed.
- The roof-rail has been adopted as optional equipment.



228LC02

4. Tire and Disc Wheel

- 275/65R17 tires and newly designed 17x8JJ-60 wheels are provided as standard equipment.
- 275/60R18 tires and newly designed 18x8JJ-60 wheels are provided as optional equipment.

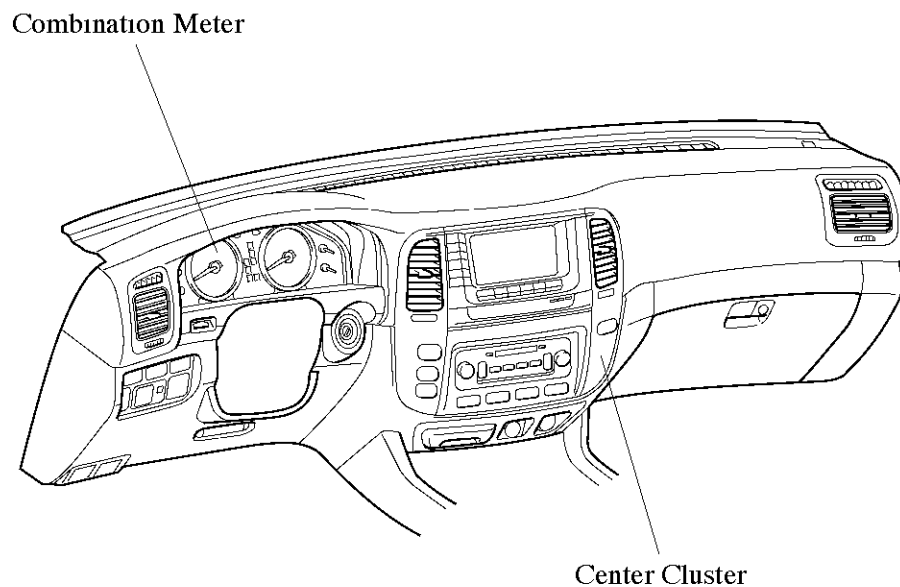
Tire Size		275/60R18	275/65R17
Disc Wheel Size		18 × 8JJ	17 × 8JJ
Disc Wheel Material		Aluminum	←
P.C.D.*	mm (in.)	150 (5.9)	←
Off Set	mm (in.)	60 (2.4)	←
Wheel Design  229LC105229LC104			

* : Pitch Circle Diameter

■ INTERIOR

1. Instrument Panel

- The design of the center cluster has been changed.
- The design of the combination meter has been changed.

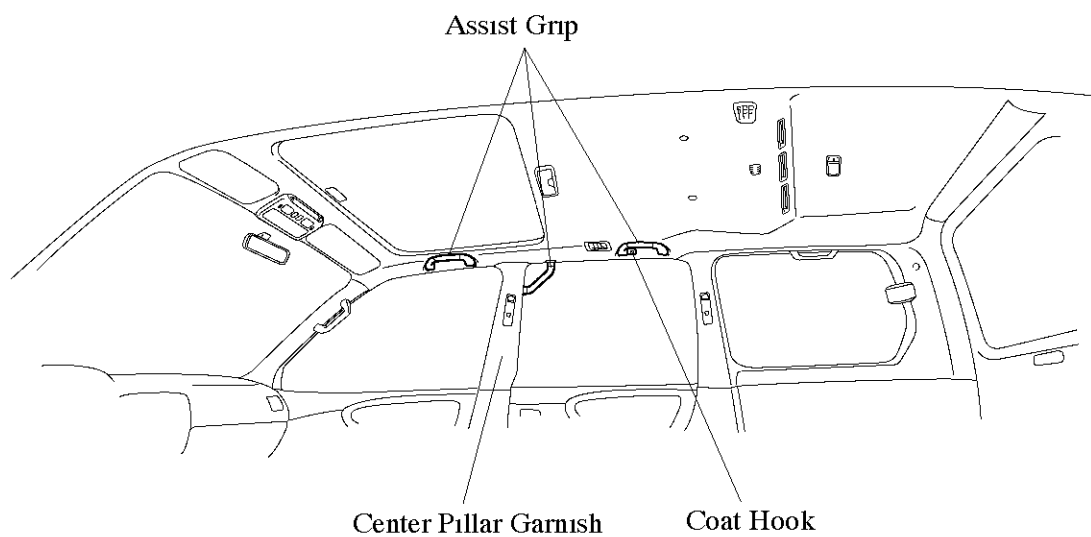


229LC106

2. Pillar Garnish and Roof Side Portion

- The designs of the center pillar garnish and roof side portion have been changed.
- The design of the assist grip and coat hook have been changed on the model with the curtain shield airbags.

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229LC107

■ 2UZ-FE ENGINE

1. General

The main features described below have been adopted on the '03 Land Cruiser. Refer to the "Major Differences" indicated on the next page for details on the changes.

- The ETCS-1 (Electronic Control System-intelligent) continues to be used from the '02 model. However, on the '03 model, the accelerator cable has been discontinued and an accelerator position sensor has been provided on the accelerator pedal.
- A no-contact type throttle position sensor has been adopted on all models.
- Cranking hold function has been adopted. Once the ignition switch is turned to the START position, this control continues to operate the starter until the engine starts.
- To comply with the SFTP (Supplementary Federal Test Procedure) regulations, the logic of engine management system that is associated with the air-fuel ratio of the ECM has been optimized. To address the increase in the exhaust gas temperature that results from this change, an ultra-high temperature resistant oxygen sensor has been adopted. Furthermore, the volume and the material of the TWC (Three-Way Catalytic Converter) have been changed.
- Segment Conductor type alternator has been adopted.
- The method for detecting evaporative emission leaks has been changed from the previous internal pressure monitor type to the vacuum type.

► Engine Specifications ◀

Model			'03 Land Cruiser	'02 Land Cruiser
No. of Cyls. & Arrangement			8-Cylinder, V Type	←
Valve Mechanism			32-Valve DOHC, Belt & Gear Drive	←
Combustion Chamber			Pentroof Type	←
Manifolds			Cross-Flow	←
Fuel System			SFI	←
Ignition System			DIS	←
Displacement	cm ³ (cu. in.)		4664 (284.5)	←
Bore × Stroke	mm (in.)		94.0 × 84.0 (3.70 × 3.31)	←
Compression Ratio			9.6 : 1	←
Max. Output	SAE-NET		175 kW @ 4800 rpm 235 HP @ 4800 rpm	172 kW @ 4800 rpm 230 HP @ 4800 rpm
Max. Torque	SAE-NET		434 N m @ 3400 rpm 320 ft lbf @ 3400 rpm	←
Valve Timing	Intake	Open	3° BTDC	←
		Close	36° ABDC	←
	Exhaust	Open	46° BBDC	←
		Close	3° ATDC	←
Firing Order			1-8-4-3-6-5-7-2	←
Research Octane Number			96	←
Emission Regulation			SFTP	—
Oil Grade			API SL-EC or ILSAC	←
Engine Service Mass	kg (lb)		229 (505)	←

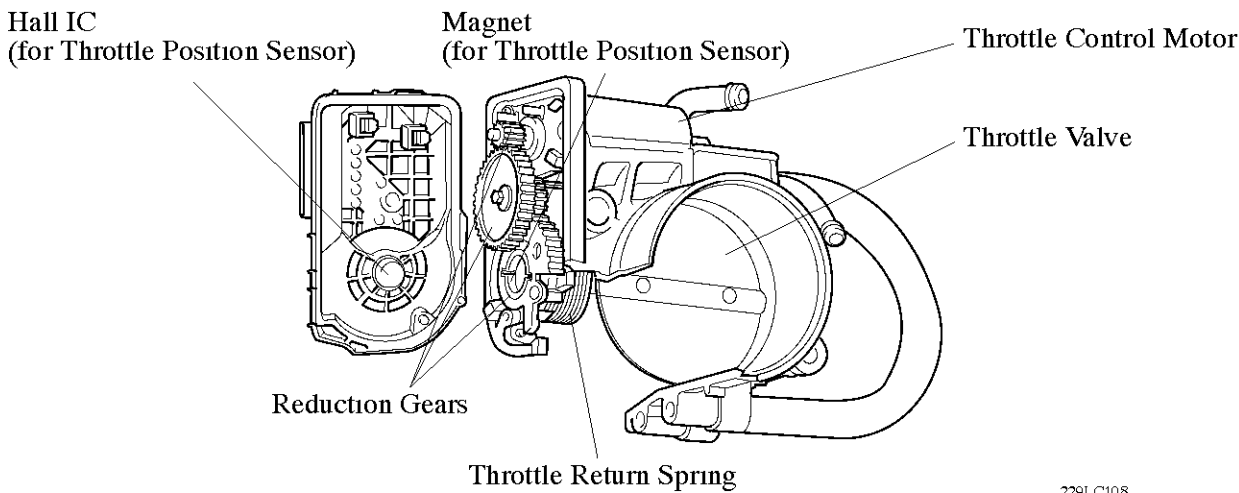
2. Major Difference

Item	Outline
Intake and Exhaust System (See Page 126)	• Adoption of the link-less type ETCS-1 • Changed composition of TWC
Cooling System (See Page 127)	Reduction of the fin pitch of the radiator core
Fuel System (See Page 127)	• Relocation of the charcoal canister • Changed capacity of charcoal canister
Charging System (See Page 128)	Adoption of the Segment Conductor type alternator
Engine Control System (See Page 131)	• Adoption of the ultra-high temperature resistant type heated oxygen sensor • Adoption of the no-contact type throttle position sensor • Accelerator pedal position sensor located on the accelerator pedal • Adoption of the cranking hold function • Changed fuel pump control • The method for detecting evaporative emission leaks has been changed from the previous internal pressure monitor type to the vacuum type. • Changed failsafe control of accelerator pedal position sensor and throttle position sensor • Correspondence of all DTC (Diagnostic Trouble Code) to SAE-controlled codes
Other	Configuration and structure are the same as the '02 model

3. Intake and Exhaust System

Throttle Body

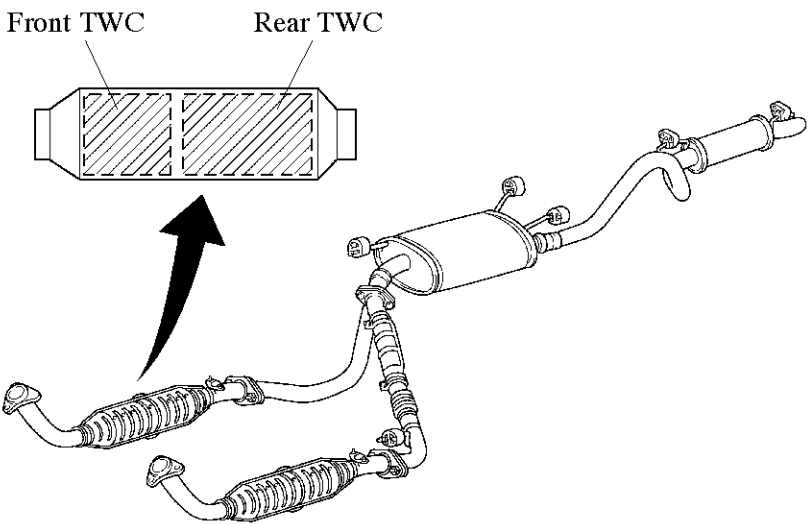
- The link-less type ETCS-1 is used, providing excellent throttle control. For details of ETCS-1 control, refer to see page 137.
- The no-contact type throttle position sensor has been adopted.



229LC108

TWC (Three-Way Catalytic Converter)

The construction of the TWC (Three-Way Catalytic Converter) has been changed to reduce exhaust gas emissions in order to comply with the SFTP (Supplementary Federal Test Procedure) regulations.



229LC109

► Specifications ◀

Location	'03 Model			'02 Model		
	Cell Density	Volume	Material	Cell Density	Volume	Material
Front × 2	62 cells / cm ² (400 cells / in. ²)	875 cm ³ (53.4 cu in.)	Ceramic	62 cells / cm ² (400 cells / in. ²)	697 cm ³ (42.5 cu in.)	Metallic
Rear × 2	62 cells / cm ² (400 cells / in. ²)	1083 cm ³ (66.1 cu in.)	Ceramic	62 cells / cm ² (400 cells / in. ²)	1291 cm ³ (78.8 cu in.)	Ceramic

4. Cooling System

The fin pitch of the radiator core has been reduced to improve the cooling performance.

► Specifications ◀

Item	New	Previous
Core Size W × H × L mm (in.)	703.8 × 510 × 48 (27.7 × 20.1 × 1.9)	←
Fin Pitch mm (in.)	3.0 mm (0.12 in.)	3.5 mm (0.14 in.)

5. Fuel System

- In conjunction with changing the method for detecting evaporative emission leaks, the location of the charcoal canister has been changed from the previous engine compartment to the under floor.
- The capacity of the charcoal canister has been increased to reduce evaporative emissions.

► Charcoal Canister Capacity ◀

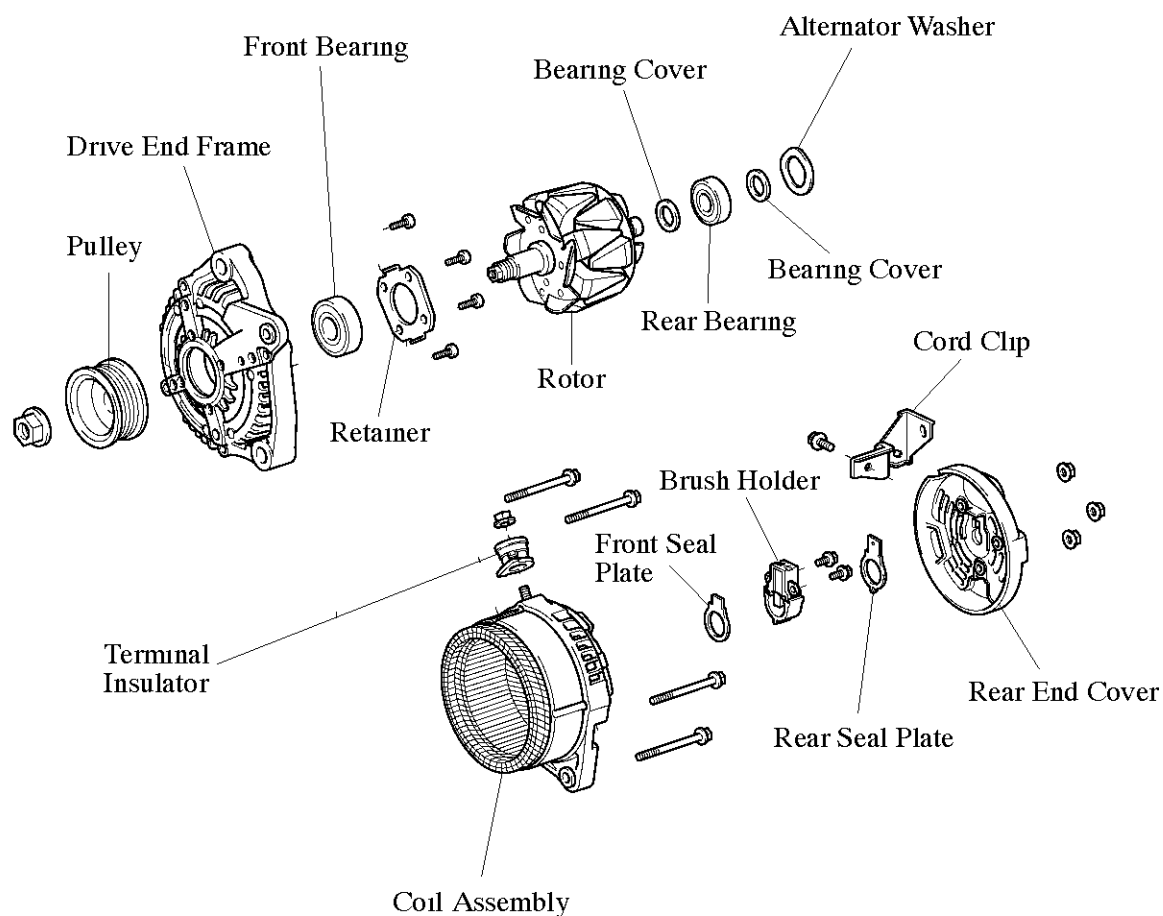
'03 Model	'02 Model
3.0 liters (3.17 US qts, 2.64 Imp. qts)	2.4 liters (2.54 US qts, 2.11 Imp. qts)

6. Charging System

General

A compact and lightweight Segment Conductor type alternator that generates high amperage output in a highly efficient manner has been adopted.

► Component of Segment Conductor type Alternator ◀

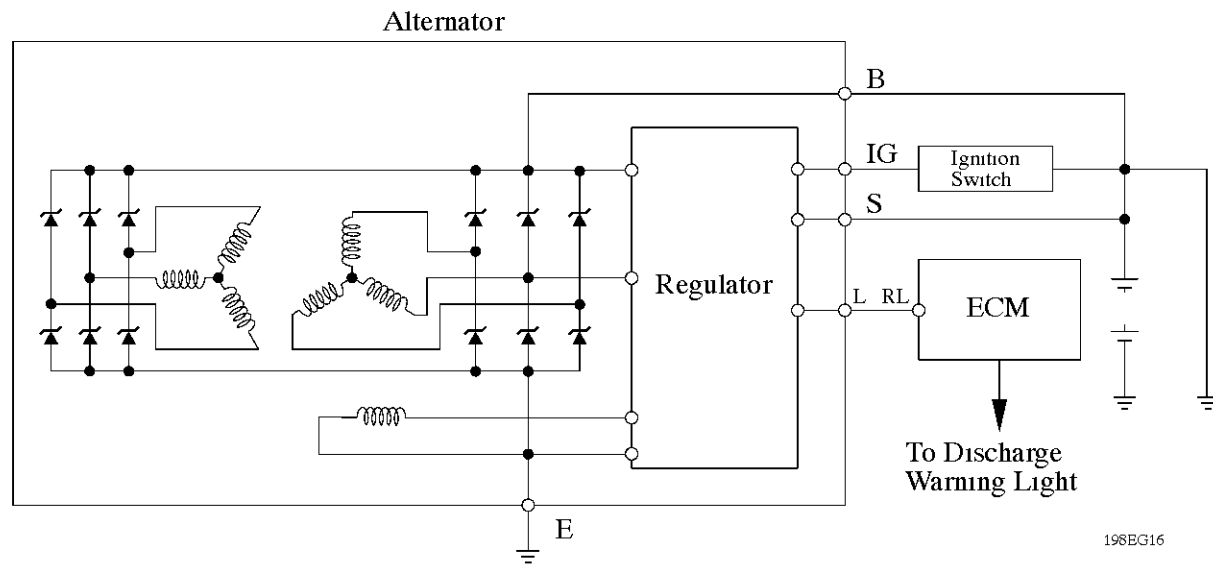


202EG03

Service Tip

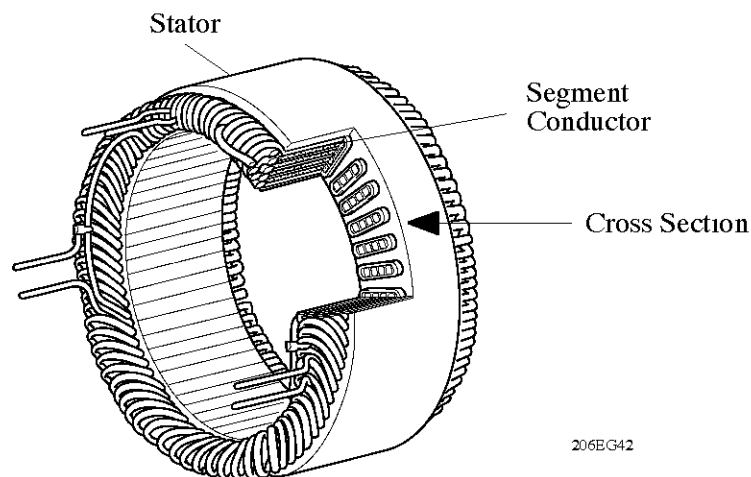
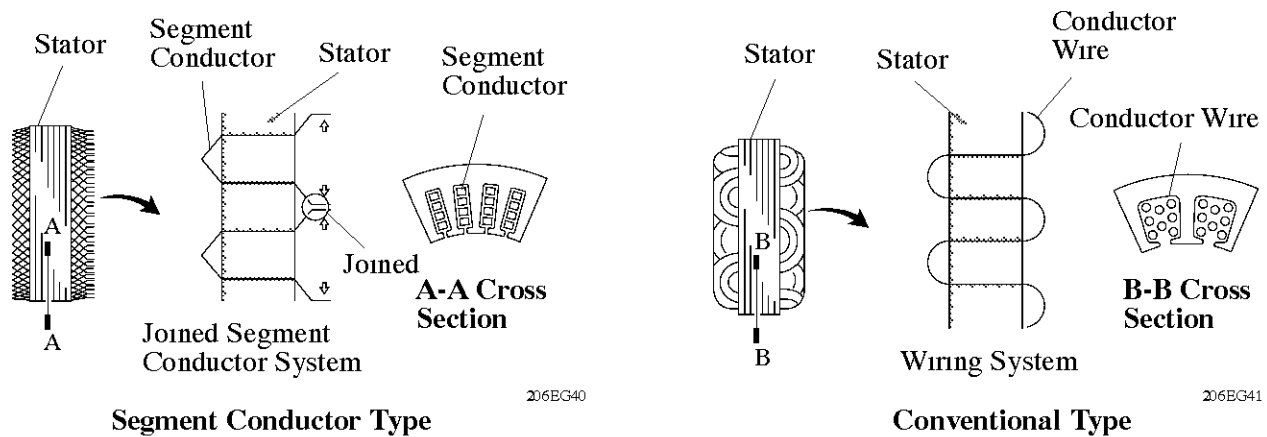
Although the charging circuit of a conventional alternator is checked through the F terminal, this check cannot be performed on the Segment Conductor type alternator through the use of the F terminal because the F terminal has been eliminated.
For details, refer to see the 2003 Land Cruiser Repair Manual (Pub. No. RM966U).

► Wiring Diagram ◀



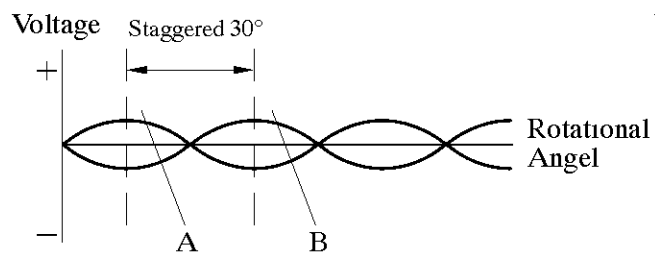
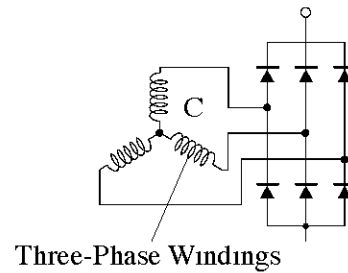
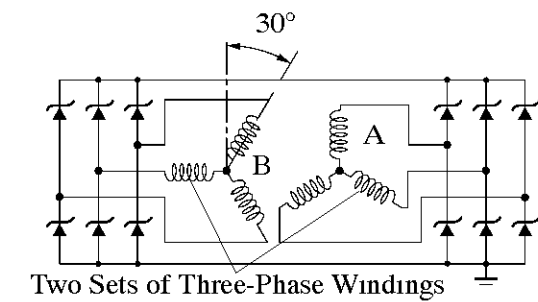
Construction and Operation

- This alternator has adopted a joined segment conductor system, in which multiple segment conductors are welded together to form the stator. Compared to the conventional winding system, the electrical resistance is reduced due to the shape of the segment conductors, and their arrangement helps to make the alternator more compact.



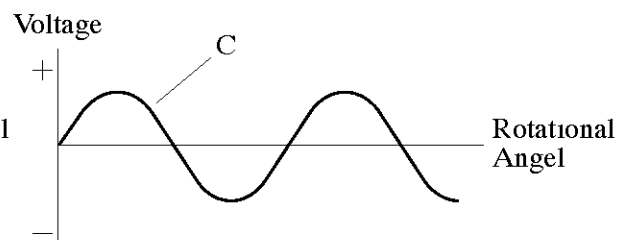
Stator of Segment Conductor type Alternator

- A dual winding system has been used. This system consists of two sets of three-phase windings whose phases are staggered 30° . Because the magnetic fluctuations of the respective windings cancel each other out, magnetic noise, radio frequency interference is reduced.



198EG14

Segment Conductor Type



198EG15

Conventional Type

7. Engine Control System

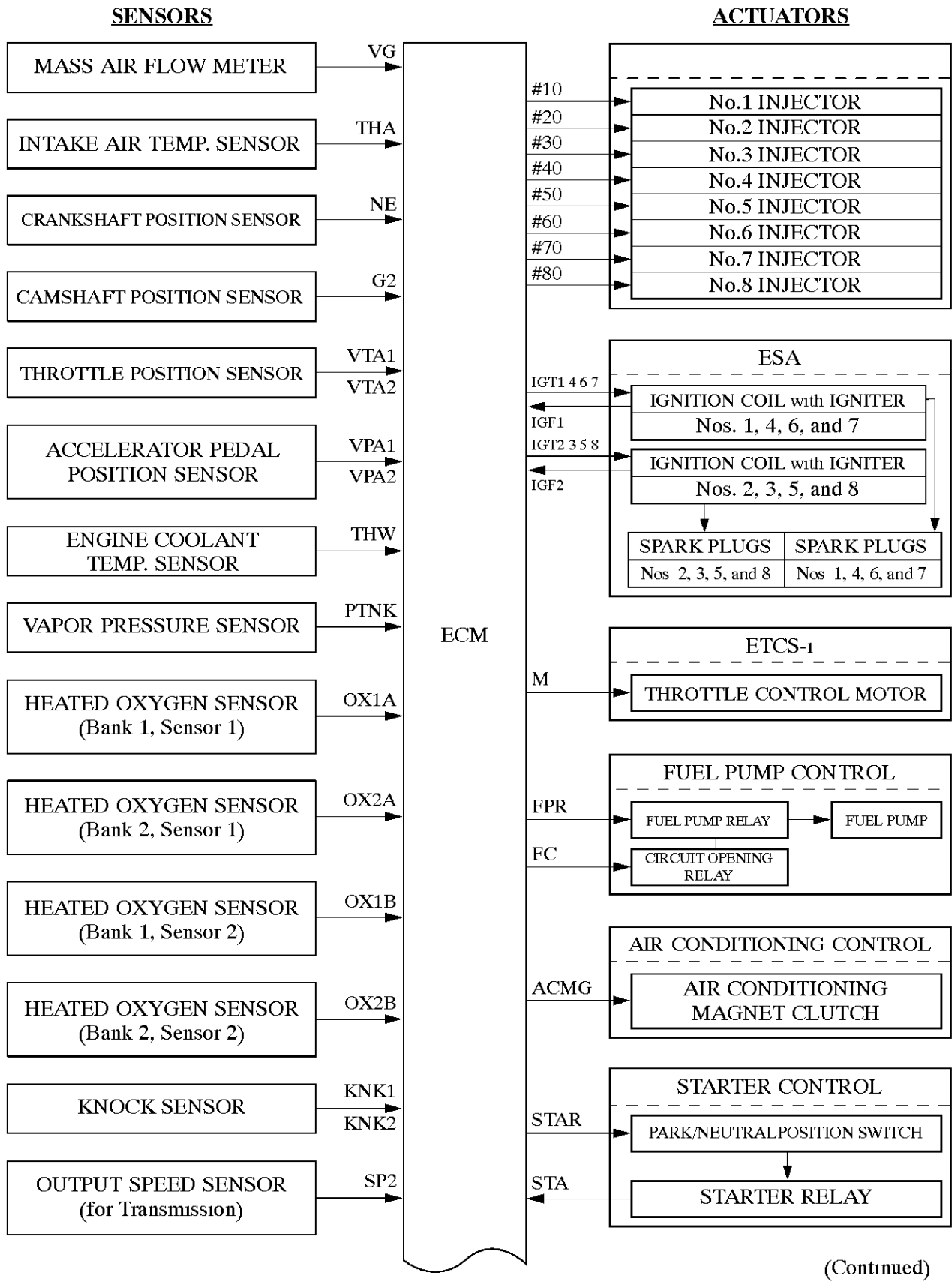
General

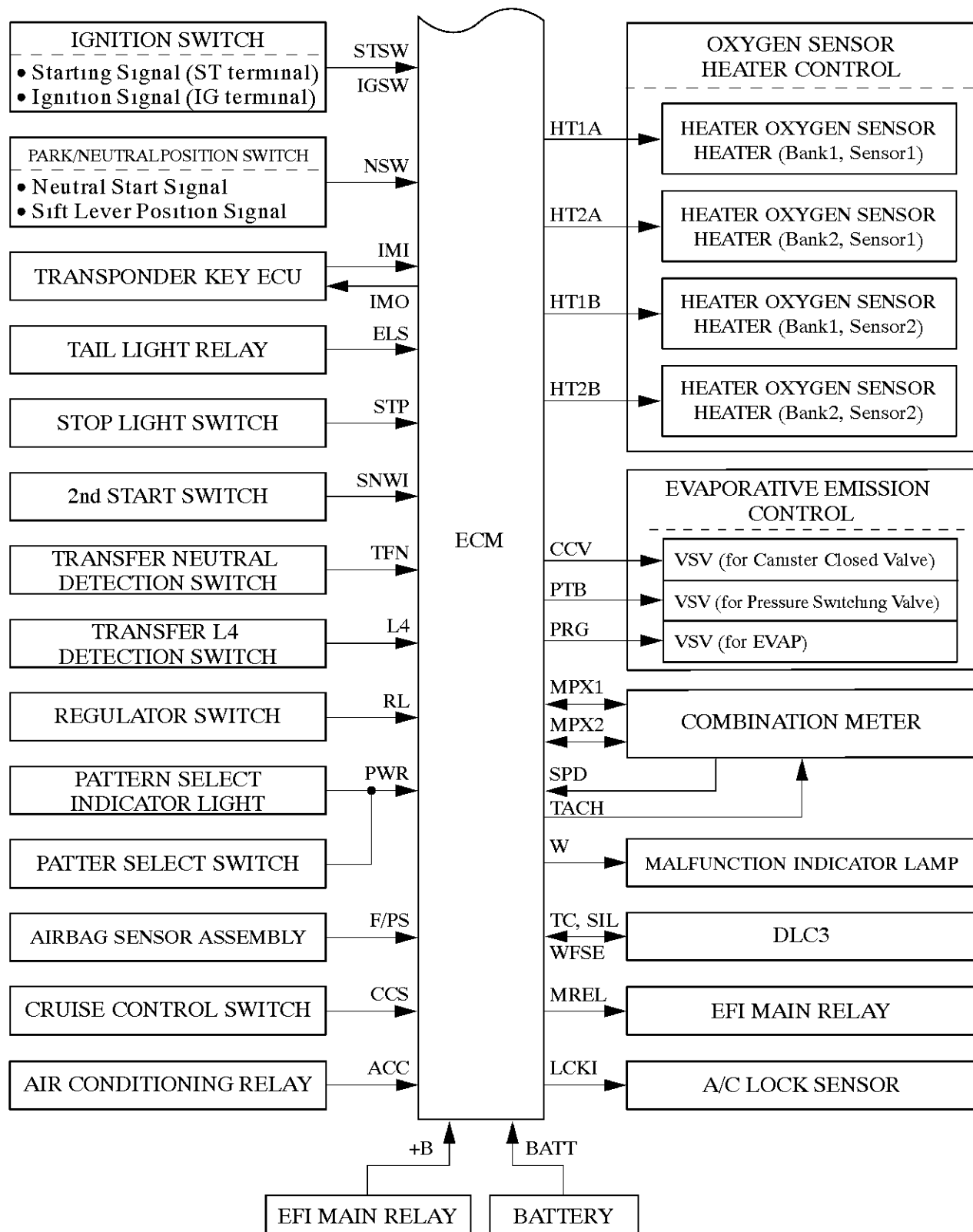
The engine control system of the 2UZ-FE engine on the '03 model and 2UZ-FE engine on the '02 model are compared below.

System	Outline	'03 Model	'02 Model
SFI (Sequential Multiport Fuel Injection)	An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.	○	○
ETCS-i (Electronic Throttle Control System-intelligent) (See page 137)	Optimally controls the throttle valve opening in accordance with the amount of accelerator pedal effort and the condition of the engine and the vehicle	○	○
	• A link less type is used, without an accelerator cable. • An accelerator pedal position sensor is provided on the accelerator pedal. • No-contact type throttle position sensor has been adopted.	○	—
Fuel Pump Control (See page 138)	The fuel pump ECU has been used to execute 3-step fuel pump speed control.	—	○
	The fuel pump speed is controlled by the fuel pump relay and the fuel pump resistor.	○	—
	A fuel cut control is adopted to stop the fuel pump when the airbag is deployed.	○	—
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.	○	○
Evaporative Emission Control (See page 139)	The ECM controls the purge flow of evaporative emission (HC) in the charcoal canister in accordance with engine conditions.	○	○
	Using 3 VSVs and a vapor pressure sensor, the ECM detects any evaporative emission leakage occurring between the fuel tank and the charcoal canister through the changes in the tank pressure.	○	—
Air Conditioning Cut-off Control	By turning the air conditioning compressor ON or OFF in accordance with the engine condition, drivability is maintained.	○	○
Engine Immobiliser	Prohibits fuel delivery and ignition if an attempt is made to start the engine with an invalid ignition key.	○	○
Starting System (See page 144)	Once the ignition switch is turned to the START position, this control continues to operate the starter until the engine starts.	○	—
Diagnosis (See page 146)	When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section.	○	○
	All the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes.	○	—
Fail-Safe (See page 146)	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.	○	○

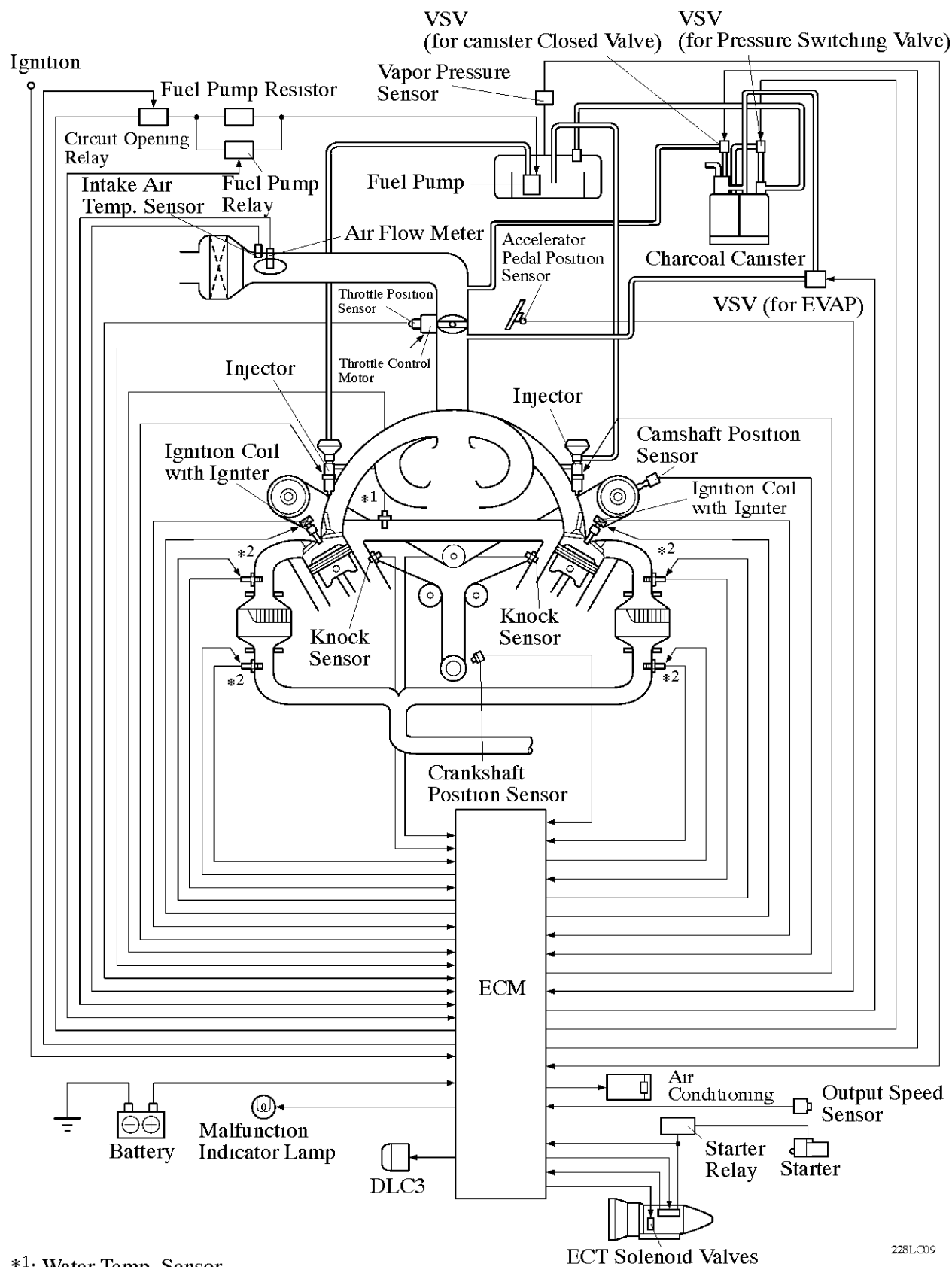
Construction

The configuration of the engine control system of the 2UZ-FE engine is as shown in the following chart.





Engine Control System Diagram



228L009

Main Component of Engine Control System

3) General

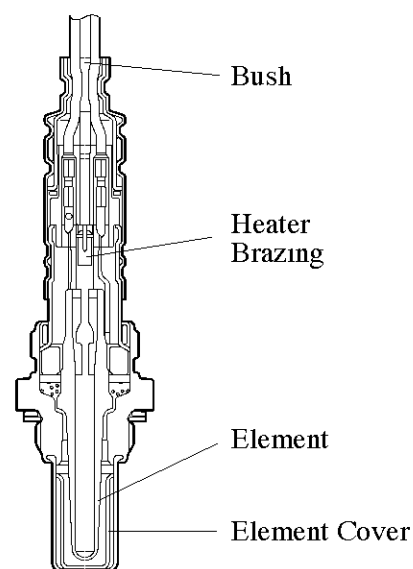
The following table compares the main components.

Model Type		New	Previous	
Component	Outline	Quantity	Outline	Quantity
ECM	32-bit CPU	1	←	
Air Flow Meter	Hot-wire Type	1	←	
Crankshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (36-2)	1	←	
Camshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (1)	1	←	
Accelerator Pedal Position Sensor	Linear Type (Mounted on accelerator pedal)	1	Linear Type (Mounted on throttle body)	1
Throttle Position Sensor	No-contact Type	1	Linear Type	1
Knock Sensor	Built-in Piezoelectric Type	2	←	
Oxygen Sensor (Bank 1, Sensor 1) (Bank 1, Sensor 2) (Bank 2, Sensor 1) (Bank 2, Sensor 2)	with Heater (Ultra-high temperature resistant type)	4	with Heater (High temperature resistant type)	4
Injector	4-Hole Type	8	←	

9

4) Oxygen Sensor

- To comply with the SFTP (Supplementary Federal Test Procedure) regulations, the engine management system that affects the air-fuel ratio of the ECM has been changed. To address the increase in the exhaust gas temperature that results from this change, an ultra-high temperature resistant oxygen sensor has been adopted.
- In contrast to the oxygen sensor on the '02 model, this sensor uses ultra-high temperature resistant materials in the following areas: the element, element cover, heater brazing, and bushing.

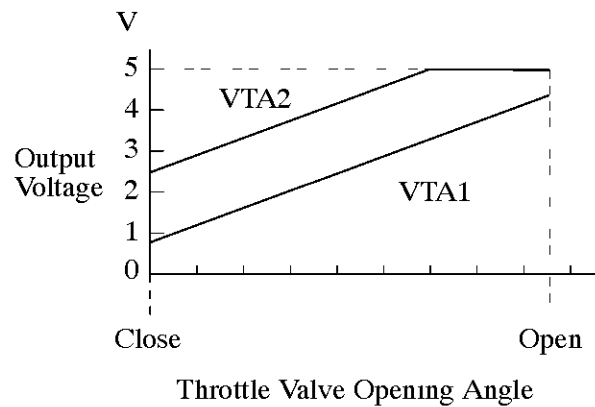
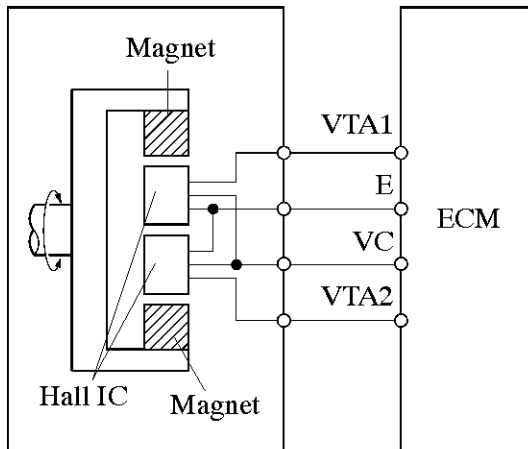


230LX09

5) Throttle Position Sensor (No-Contact Type)

To detect the opening angle of the throttle valve, the throttle position sensor converts the magnetic flux density into electric signals that change when the magnetic yoke (located on the same axis as the throttle shaft) rotates around the hall IC.

Throttle Position Sensor



230LX13

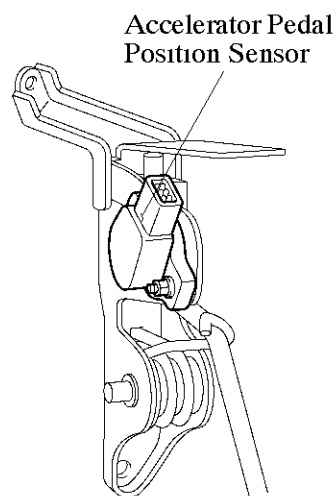
230LX12

Service Tip

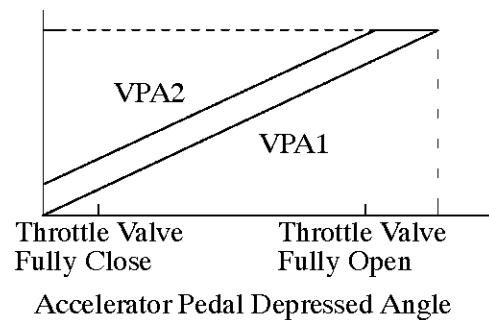
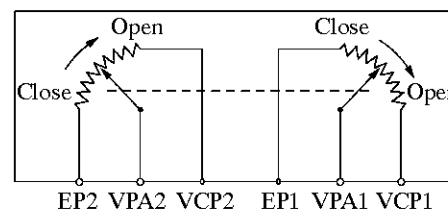
The inspection method differs from the conventional throttle position sensor because this sensor uses a hall IC. For details, refer to the 2003 Land Cruiser Repair Manual (Pub. No. RM966U.)

6) Accelerator Pedal Position Sensor

- This sensor converts the accelerator pedal depressed angles into electric signals with two differing characteristics, and outputs them to the ECM. One is the VPA signal that linearly outputs the voltage along the entire range of the accelerator pedal depressed angle. The other is the VPA2 signal that outputs on offset voltage.
- The accelerator pedal position sensor is attached to the accelerator pedal.



230LX14



199EG40

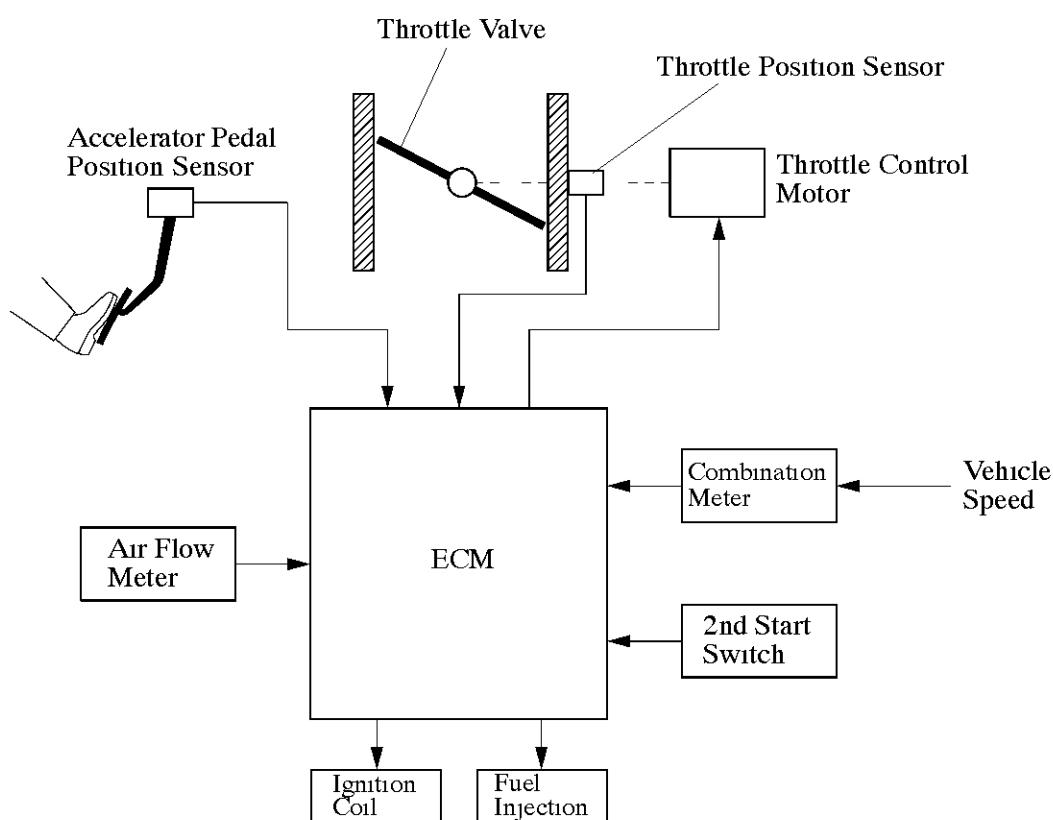
ETCS-i (Electronic Throttle Control System-intelligent)

In the conventional throttle body, the throttle valve opening is determined invariably by the amount of the accelerator pedal effort. In contrast, the ETCS-i uses the ECM to calculate the optimal throttle valve opening that is appropriate for the respective driving condition and uses a throttle control motor to control the opening.

In contrast to the ETCS-i on the '02 model, the following items have been changed on the '03 model:

- The accelerator cable and link have been discontinued, and an accelerator position sensor has been provided on the accelerator pedal.
- No-contact type throttle position sensor has been adopted.
- Accordingly, the limp-mode control, in the fail-safe mode, has been changed.

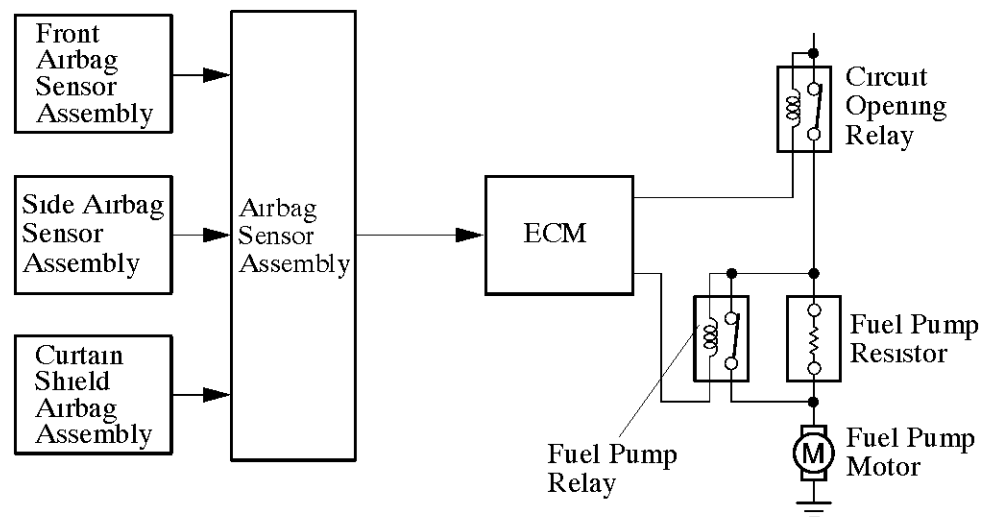
► System Diagram ◀



Fuel Pump Control

- On the '02 model, the fuel pump ECU effected 3-step fuel pump speed control. However, on '03 model, the control has been changed to 2-step fuel pump speed control, which is effected by the fuel pump relay and the fuel pump resistor.
- This control system increases the fuel pump output by switching the fuel pump speed to high if a large volume of fuel is required by the ECM. In normal operations where the engine speeds are low, the fuel pump rotates at low speed to reduce unnecessary consumption of electric power and to maintain fuel pump durability.
- A fuel cut control is adopted to stop the fuel pump when the airbag is deployed. In this system, the airbag deployment signal from the airbag sensor assembly is detected by the ECM, which turns OFF the circuit opening relay. After the fuel cut control has been activated, turning the ignition switch from OFF or ON cancels the fuel cut control, thus engine can be restarted.

► System Diagram ◀

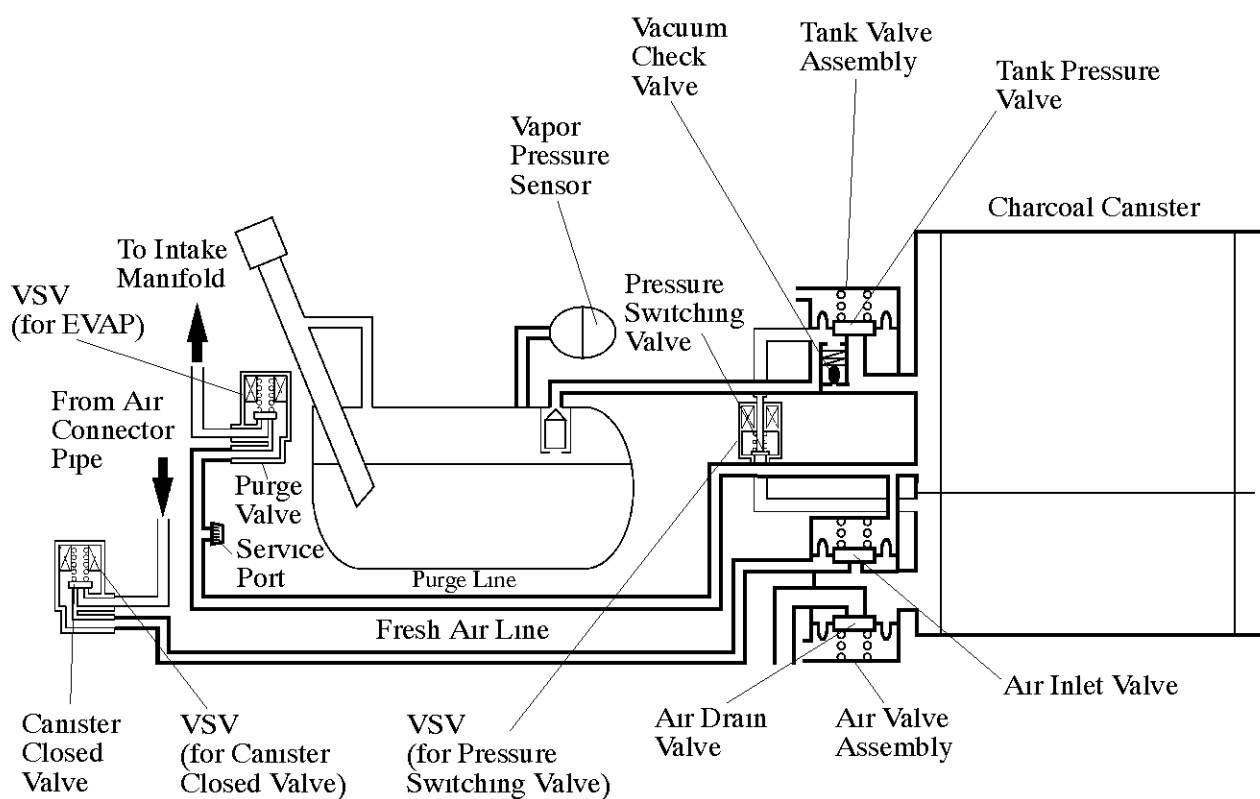


Evaporative Emission Control System

1) General

The vacuum type has been adopted on the '03 model to detect leaks in the evaporative emission control system. This vacuum type detects leaks by forcefully introducing the purge vacuum into the entire system and monitoring the changes in the pressure. It consists of the following main components:

- A VSV (for canister closed valve) that closes the fresh air line from the air cleaner to the charcoal canister has been adopted.
- The 3-way VSV (for vapor pressure sensor) has been discontinued, and a VSV (for pressure switching valve) that opens the evaporator line between the fuel tank and the charcoal canister has been adopted.
- Function to close the purge line from the air intake chamber to the charcoal canister for this system is added to the original functions of VSV (for EVAP).
- The sensing position of the vapor pressure sensor has been changed from the charcoal canister to the fuel tank in order to enhance the precision of the vapor pressure sensor.

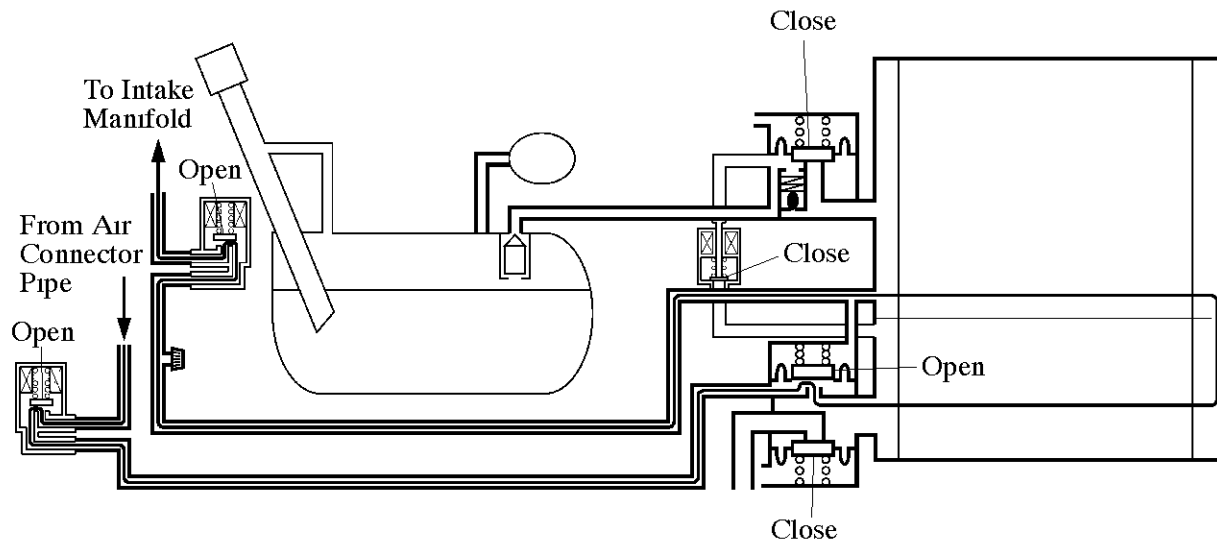


2) Operation

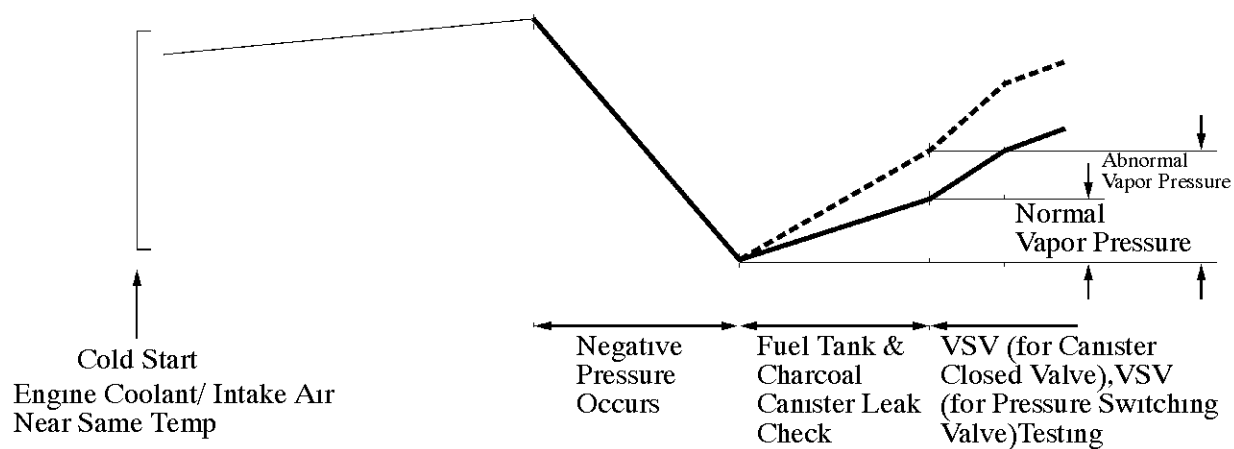
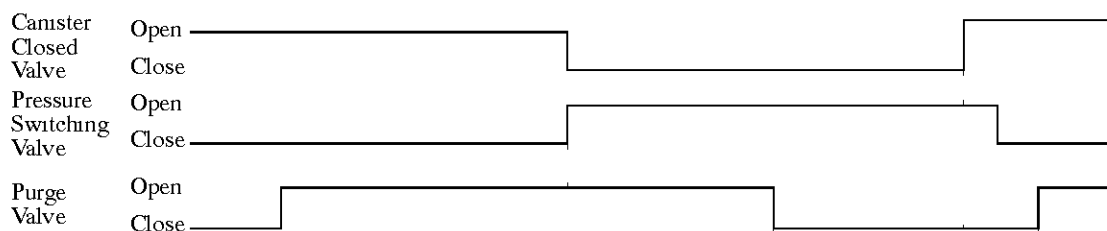
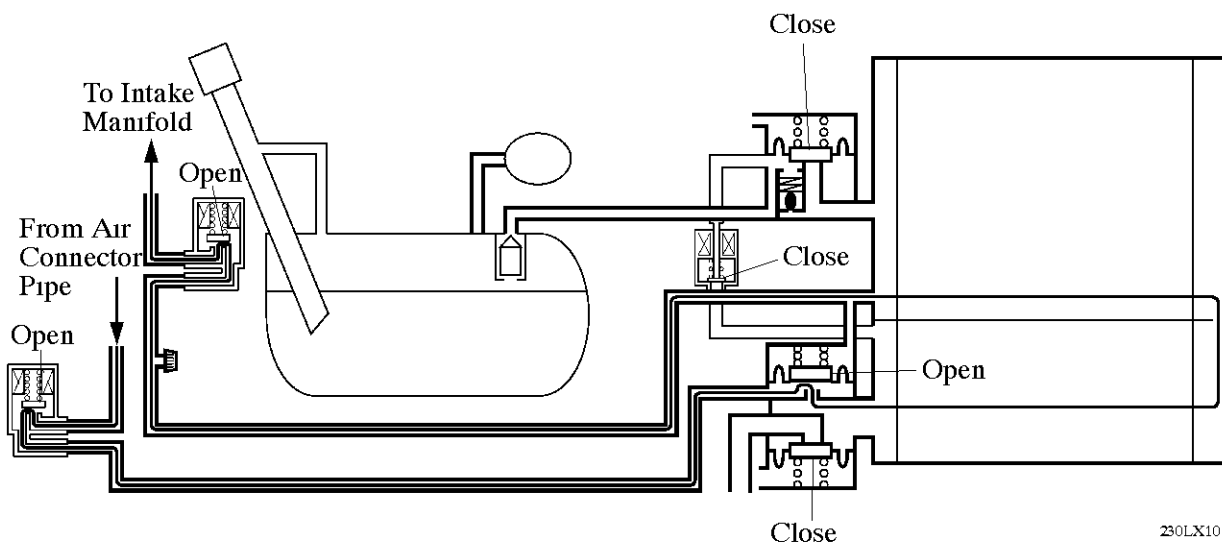
a. Purge Flow

When the engine has reached predetermined parameters (closed loop, engine coolant temp. above 74°C (165°F), etc.), stored fuel vapors are purged from the charcoal canister whenever the purge valve is opened by the ECM. At the appropriate time, the ECM will turn on the VSV (for EVAP).

The ECM will control the duty ratio cycle of the VSV (for EVAP) thus controlling purge flow volume. Purge flow volume is determined by manifold pressure and the duty ratio cycle of the VSV (for EVAP). Atmospheric pressure is allowed into the canister to ensure that purge flow is constantly maintained whenever purge vacuum is applied to the canister.



The monitor sequence begins with a cold engine start. The intake air temp. and engine coolant temp. sensors must have approximately the same temperature reading. The ECM is constantly monitoring fuel tank pressure. As the temperature of the fuel increases, pressure slowly rises. The ECM will purge the charcoal canister at the appropriate time. With VSV (for pressure switching valve) closed, pressure will continue to rise in fuel tank.

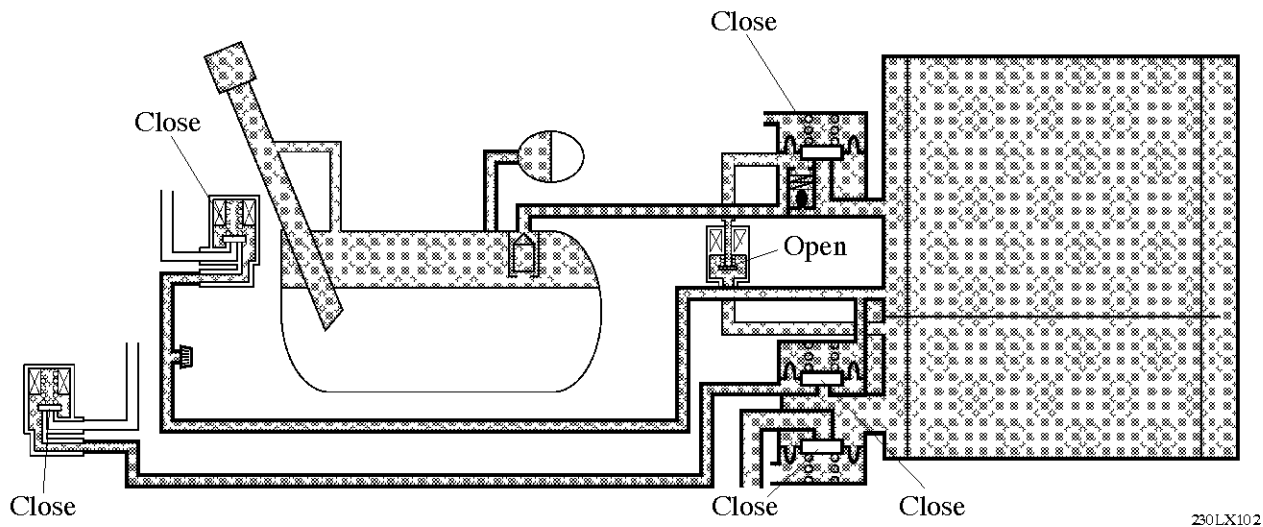


c. DTC P0440, P0442 (Evaporative Emission Control System Malfunction)

Initially, when the canister closed valve is closed, and the pressure switching valve and the purge valve are opened, a vacuum is applied to the purge line from the air intake to the charcoal canister and to the evaporator line from the charcoal canister to the fuel tank. Next, the purge valve is closed in order to maintain a vacuum from the VSV (for EVAP) to the inside of the fuel tank. Then, any subsequent changes in the pressure are monitored by the vapor pressure sensor in order to check for evaporative emission leaks.

If a leak is detected, the MIL (Malfunction Indicator Lamp) illuminates to inform the driver. Also, the DTC (Diagnostic Trouble Code) can be accessed through the use of a hand-held tester.

For details on the DTC, refer to the 2003 Land Cruiser Repair Manual (Pub. No. RM966U).

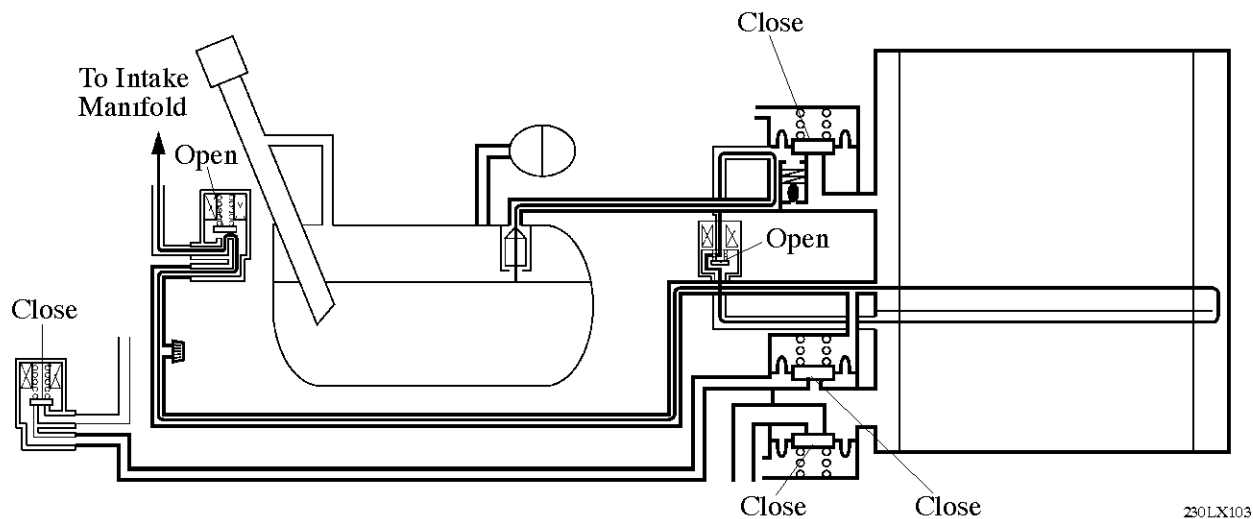


d. DTC P0441 (Evaporative Emission Control System Incorrect Purge Flow)

At a predetermined point, the ECM closed the canister closed valve and opens the pressure switching valve causing a pressure drop in the entire EVAP system. The ECM continues to operate the VSV (for EVAP) until the pressure is lowered to a specified point at which time the ECM closes the purge valve.

If the pressure did not drop, or if the drop in pressure increased beyond the specified limit, the ECM judges the VSV (for EVAP) and related components to be faulty and the MIL illuminates to inform the driver. Also, the DTC can be accessed through the use of a hand-held tester.

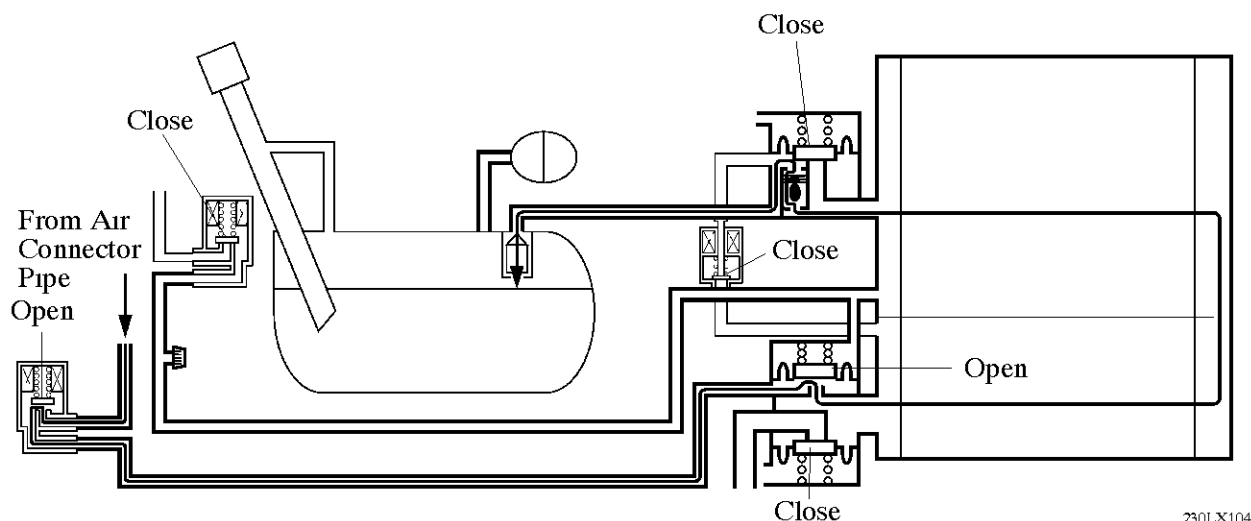
For details on the DTC, refer to the 2003 Land Cruiser Repair Manual (Pub. No. RM966U).



e. DTC P0446 (Evaporative Emission Control System Vent Control Malfunction)

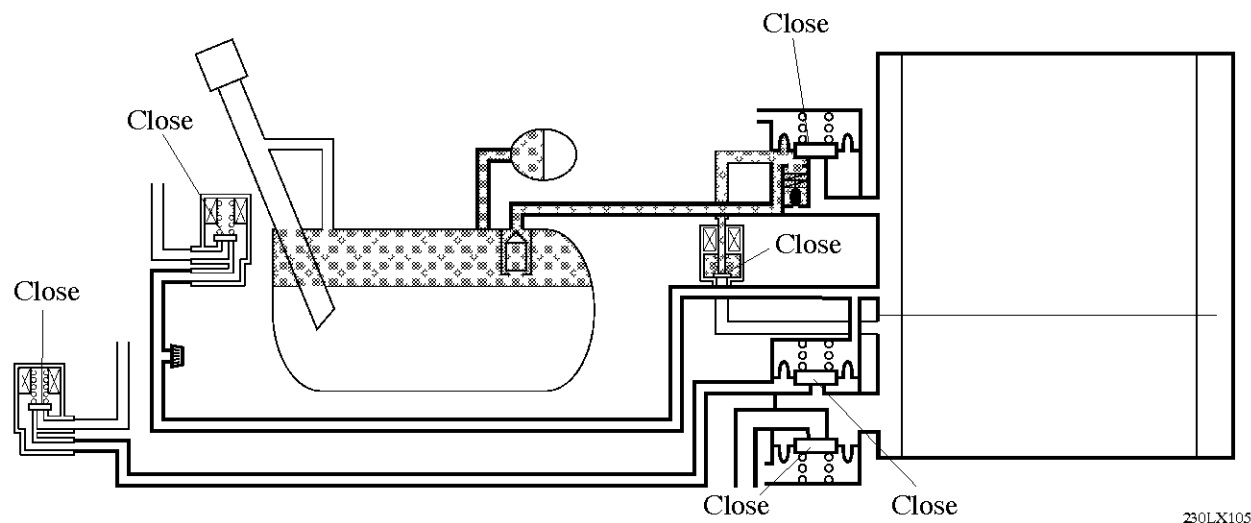
i) Canister Closed Valve

This stage checks the VSV (for canister closed valve) and vent (air inlet side) operation. When the vapor pressure rises to a specified point, the ECM opens the canister closed valve. Pressure will increase rapidly because of the air allowed into the system. No increase or an increase below specified rate of pressure increase indicates a restriction on the air inlet side. If a malfunction is detected, the MIL illuminates to inform the driver. Also, the DTC can be accessed through the use of a hand-held tester. For details on the DTC, refer to the 2003 Land Cruiser Repair Manual (Pub. No. RM966U).



ii) Pressure Switching Valve

The ECM closes the pressure switching valve. This action blocks air entering the tank side of the system. The pressure rise is no longer as great. If there was no change in pressure, the ECM will conclude the pressure switching valve did not close. If a malfunction is detected, the MIL illuminates to inform the driver. Also, the DTC can be accessed through the use of a hand-held tester. For details on the DTC, refer to the 2003 Land Cruiser Repair Manual (Pub. No. RM966U).

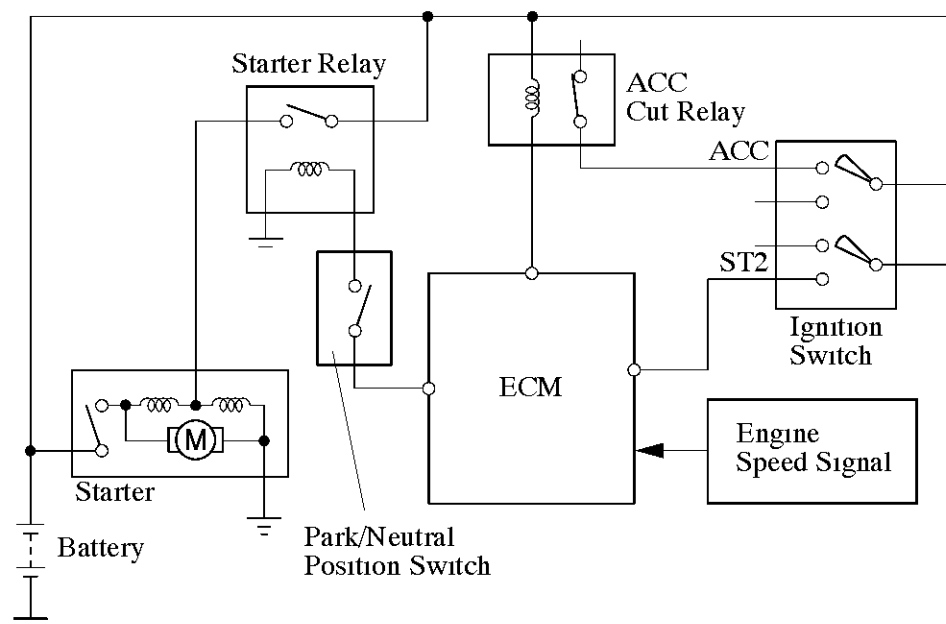


Cranking Hold Function

1) General

- The '03 model has adopted the cranking hold function. Once the ignition switch is turned to the START position, this control continues to operate the starter until the engine starts, without having to hold the ignition switch in the START position. This prevents starting failures and the engine from being cranked after it has started.
- When the ECM detects a start signal from the ignition switch, this system monitors the engine speed (NE) signal and continues to operate the starter until it has determined that the engine has started. Furthermore, even if the ECM detects a start signal from the ignition switch, it will not operate the starter if it has determined that the engine has already started.

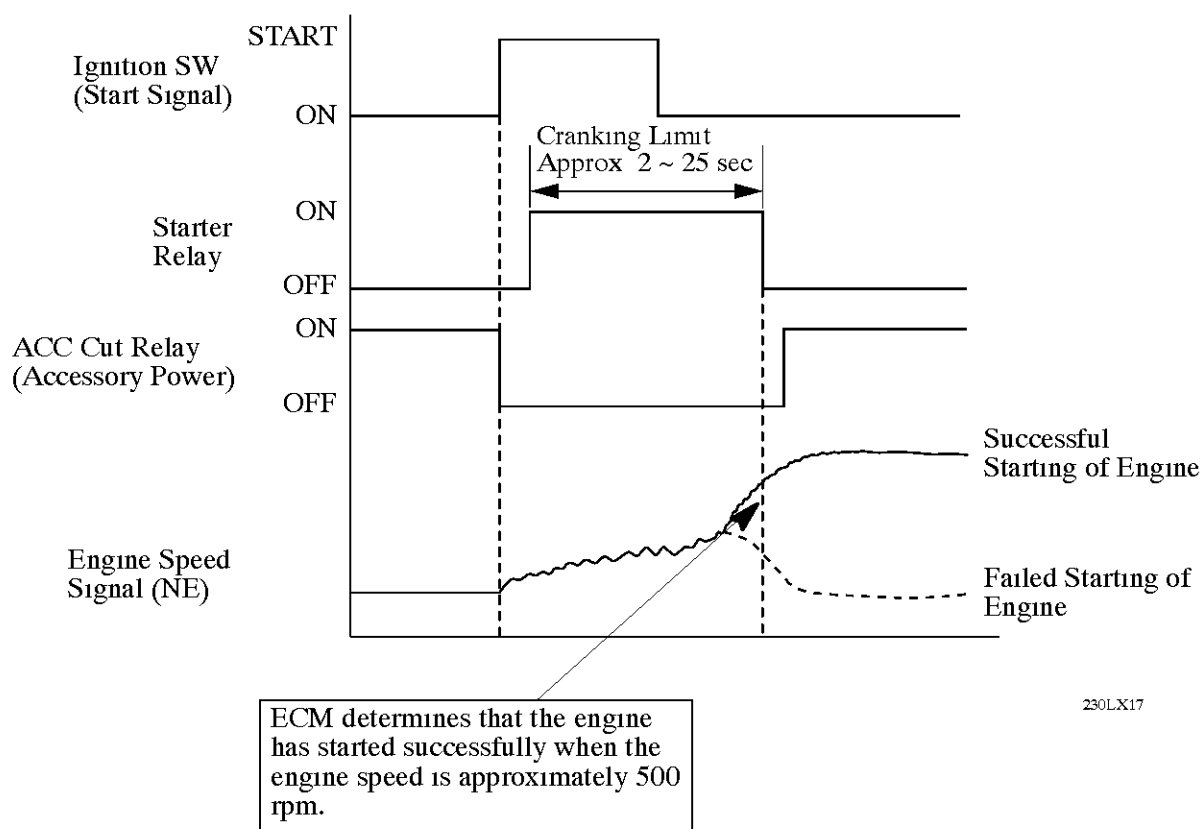
► System Diagram ◀



2) Operation

- As indicated in the timing chart shown below, when the ECM detects a start signal from the ignition switch, it energizes the starter relay to operate the starter. If the engine is already running, the ECM will not energize the starter relay.
- After the starter operates and the engine speed becomes higher than approximately 500 rpm, the ECM determines that the engine has started and stops the operation of the starter.
- If the engine has any failure and will not work, the starter operates as long as its maximum continuous operation time and stops automatically. The maximum continuous operation time is approximately 2 seconds through 25 seconds depending on the engine coolant temperature condition. When the engine coolant temperature is extremely low, it is approximately 25 seconds and when the engine is warmed up sufficiently, it is approximately 2 seconds.
- This system cuts off the current that powers the accessories while the engine is cranking to prevent the accessory illumination from operating intermittently due to the unstable voltage that is associated with the cranking of the engine.

► Timing Chart ◀



Diagnosis

- When the ECM detects a malfunction, the ECM makes a diagnosis and memorizes the failed section. Furthermore, the check engine warning light in the combination meter illuminates or blinks to inform the driver. The ECM will also store the DTC of the malfunctions. The DTC can be accessed the use of the hand-held tester or SST (09843-18040).
- All the DTCs (Diagnostic Trouble Codes) have been made to correspond to the SAE controlled codes. Some of the DTCs have been further divided into smaller detection areas than in the past, and new DTCs have been assigned to them. For details, see the 2003 General Features Section.

Fail-Safe

1) General

When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.

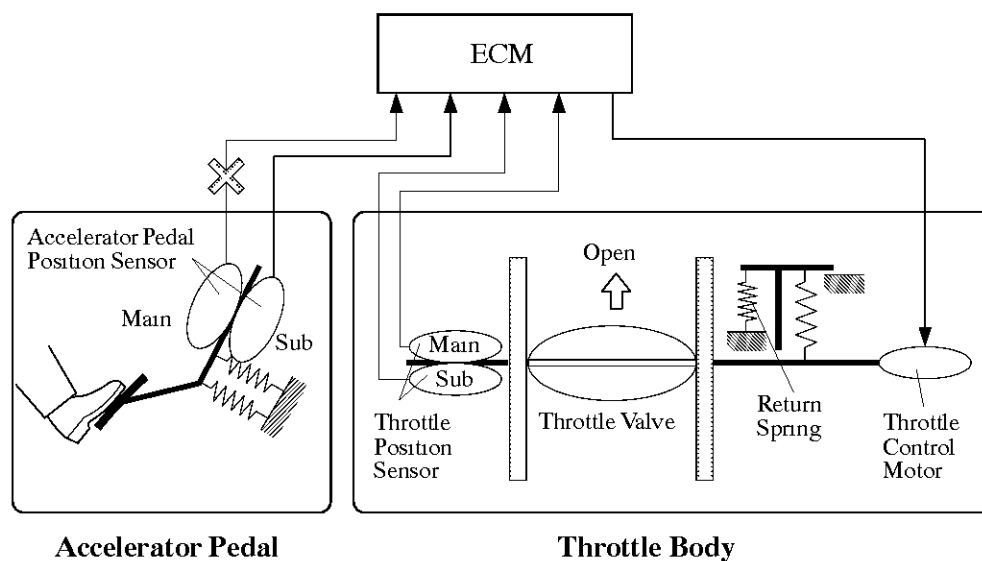
► Fail-Safe Control List ◀

☐: New

Location on Malfunction	Description Control
Air Flow Meter	In case of a signal malfunction, the engine could operate poorly or the catalyst could overheat if the engine continues to be controlled with the signals from the sensors. Therefore, the ECM effects control by using the values in the ECM or stops the engine.
Accelerator Pedal Position Sensor (For details, see page 147)	In case of a signal malfunction, the ECM calculates the accelerator pedal opening angle that is limited by the dual system sensor value and continues effecting throttle valve control. If both system malfunction, the ECM considers that the accelerator pedal is fully closed.
Throttle Position Sensor (For details, see page 148)	In case of a signal malfunction, the ECM cuts off the current to the throttle control motor. The throttle valve returns to the prescribed opening by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection and ignition timing in accordance with the <u>accelerator pedal opening angle to enable the vehicle to continue driving.</u>
Water Temp. Sensor and Intake Air Temp. Sensor	In case of a signal malfunction, the use of the values from the sensors will make the air-fuel ratio become too rich or too lean, which could causes the engine to stall or to run poorly during cold operation. Therefore, the ECM fixes the air-fuel ratio to the stoichiometric ratio and uses the constant values of 80°C water temperature and 20°C intake air temperature to perform the calculation.
Knock Sensor	In case of a malfunction in the knock sensor or in the knocking signal system (open or short circuit), the engine could become damaged if the timing is advanced despite the presence of knocking. Therefore, if a malfunction is detected in the knock sensor system, the ECM turns the timing retard correction of the knock sensor into the maximum retard value.
Ignition Coil (with Igniter)	In case of a malfunction in the ignition system, such as an open circuit in the ignition coil, the catalyst could be become overheated due to engine misfire. Therefore, if the (IGF) ignition signal is not input twice or more in a row, the engine ECU determines that a malfunction occurred in the ignition system and stops only the injection of fuel into the cylinder with the malfunction.

2) Fail-Safe of Accelerator Pedal Position Sensor

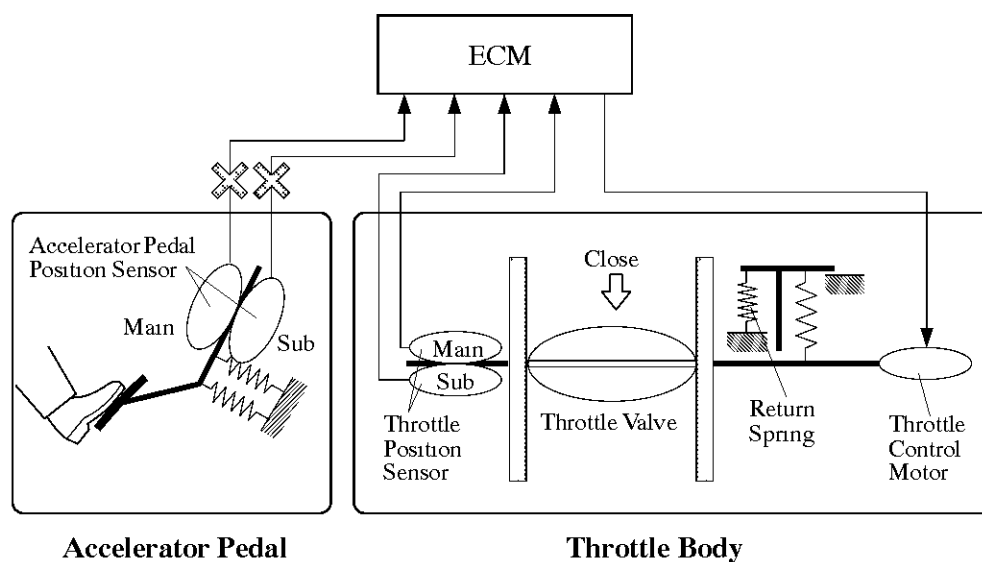
- The accelerator pedal position sensor comprises two (main, sub) sensor circuits. If a malfunction occurs in either one of the sensor circuits, the ECM detects the abnormal signal voltage difference between these two sensor circuits and switches to the limp mode. In the limp mode, the remaining circuit is used to calculate the accelerator pedal opening, in order to operate the vehicle under limp mode control.



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- If both system malfunction, the ECM detects the abnormal signal voltage between these two sensor circuits and regards that the opening angle of the accelerator pedal is fully opened and then continues the throttle control. At this time, the vehicle can be driven within its idling range.

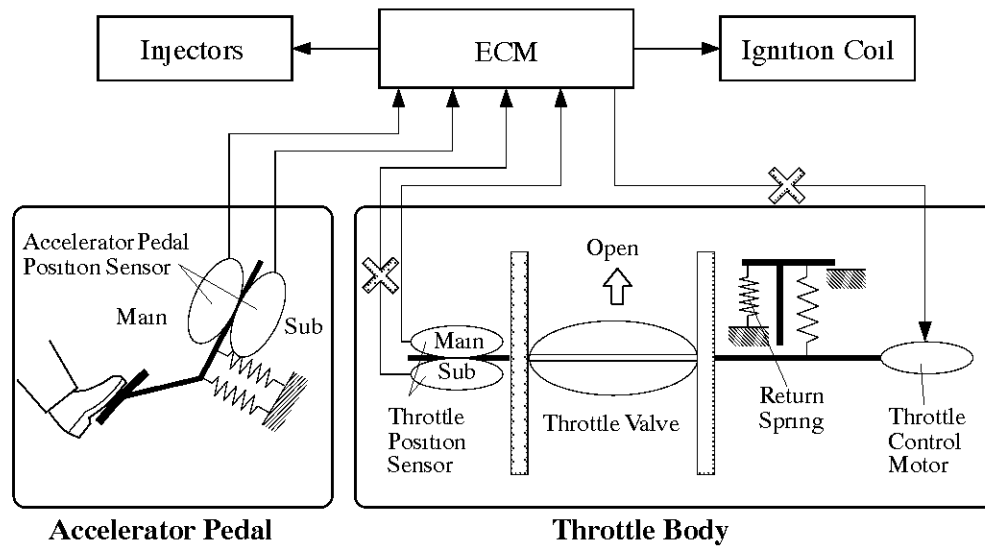
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3) Fail-Safe of Throttle Position Sensor

- The throttle position sensor comprises two (main, sub) sensor circuits. If a malfunction occurs in either one of the sensor circuits, the ECM detects the abnormal signal voltage difference between these two sensor circuits, cuts off the current to the throttle control motor, and switches to the limp mode. Then, the force of the return spring causes the throttle valve to return and stay at the prescribed opening. At this time, the vehicle can be driven in the limp mode while the engine output is regulated through the control of the fuel injection and ignition timing in accordance with the accelerator opening.
- The same control as above is effected if the ECM detects a malfunction in the throttle control motor system.

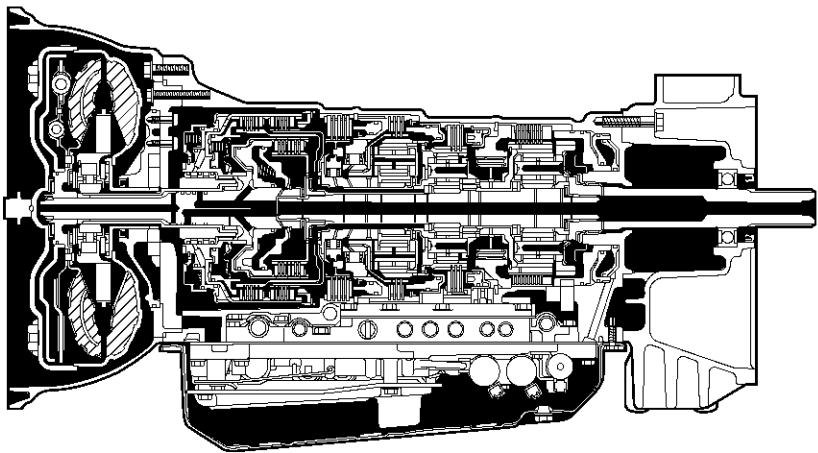


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■ **A750F AUTOMATIC TRANSMISSION**

1. General

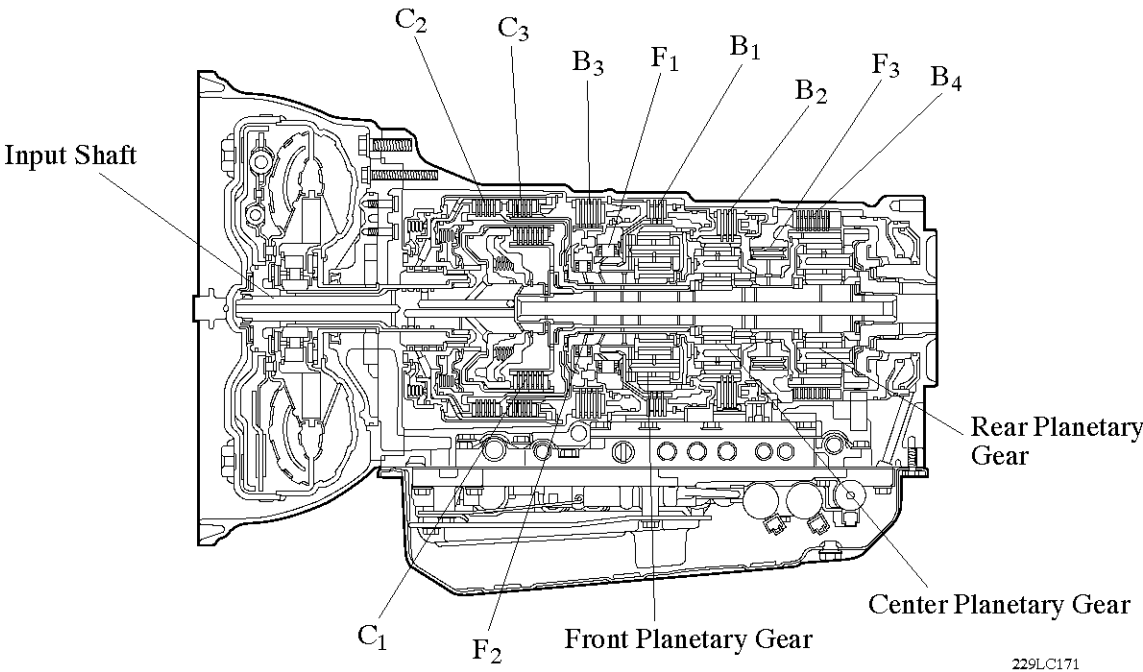
A newly developed A750F 5-speed automatic transmission [Super ECT (Electronically Controlled Transmission)] has been adopted.
In addition, the vehicle's fuel economy and driving performance have been improved by the change into a 5-speed.



229LC170

► **Specification** ◀

Model		'03 Model	'02 Model
Transmission Type		A750F	A343F
Gear Ratio	1st	3.520	2.804
	2nd	2.042	1.531
	3rd	1.400	1.000
	4th	1.000	0.754
	5th	0.716	—
	Reverse	3.224	2.393
Fluid Capacity Liters (US qts, Imp. qts)		10.8 (11.4, 9.5)	12.0 (12.7, 10.6)
Fluid Type		ATF Type T-IV	ATF D-II or equivalent
Dry Weight kg (lb)		79.9 (176.1)	78.6 (173.3)

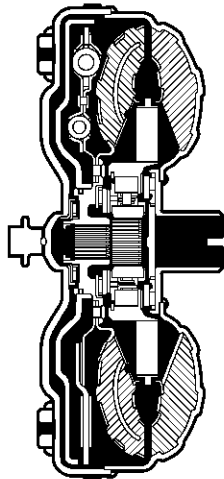


► Specification ◀

Model			A750F
C ₁	No.1 Clutch	The No. of Discs	6
C ₂	No.2 Clutch		5
C ₃	No.3 Clutch		5
B ₁	No.1 Brake		3
B ₂	No.2 Brake		3
B ₃	No.3 Brake		4
B ₄	No.4 Brake		8
F ₁	No.1 One-Way Clutch	The No. of Sprags	24
F ₂	No.2 One-Way Clutch		25
F ₃	No.3 One-Way Clutch		26
Front Planetary Gear	The No. of Sun Gear Teeth		40
	The No. of Pinion Gear Teeth	Inner	22
		Outer	21
	The No. of Ring Gear Teeth		91
Center Planetary Gear	The No. of Sun Gear Teeth		31
	The No. of Pinion Gear Teeth		23
	The No. of Ring Gear Teeth		77
Rear Planetary Gear	The No. of Sun Gear Teeth		25
	The No. of Pinion Gear Teeth		19
	The No. of Ring Gear Teeth		63

2. Torque Converter

- A compact, lightweight and high-capacity torque converter has been adopted.
- Compared to the '02 model, this torque converter offers improved transmission efficiency and a more compact and lightweight construction by optimizing the fluid passages and the impeller configuration.
- The torque converter clutch supports flex lock-up clutch control, thus improving the fuel economy.



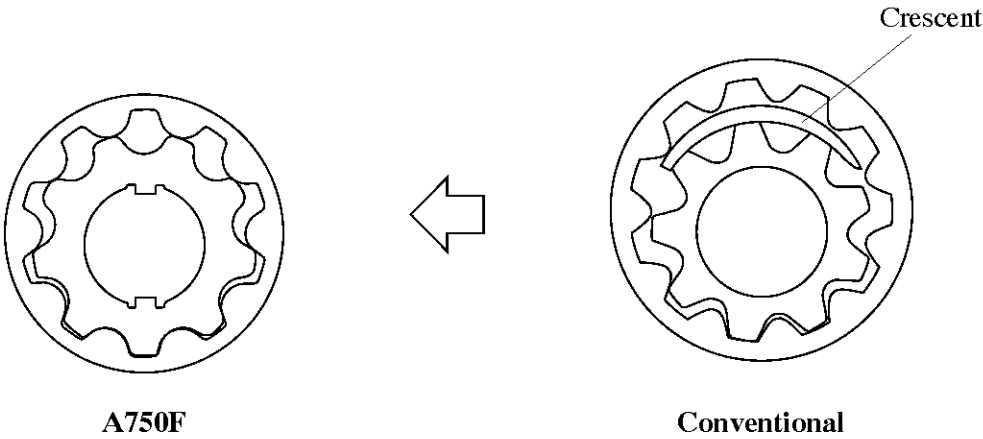
229LC172

► Specification ◀

Model	A750F	A343F
	2UZ-FE	2UZ-FE
Type	3-Element, 1-Step, 2-Phase	←
Stall Torque Ratio	1.80	←
Dry Weight	15.2 (33.5)	16.2 (35.7)
kg (lb)		

3. Oil Pump

A new type oil pump is used in which the shape of the teeth in the oil pump have been changed and the crescent has been discontinued. As a result, the oil pump has been made more compact, and the driving torque has been reduced, thus attaining excellent volumetric efficiency during low-speed operation.

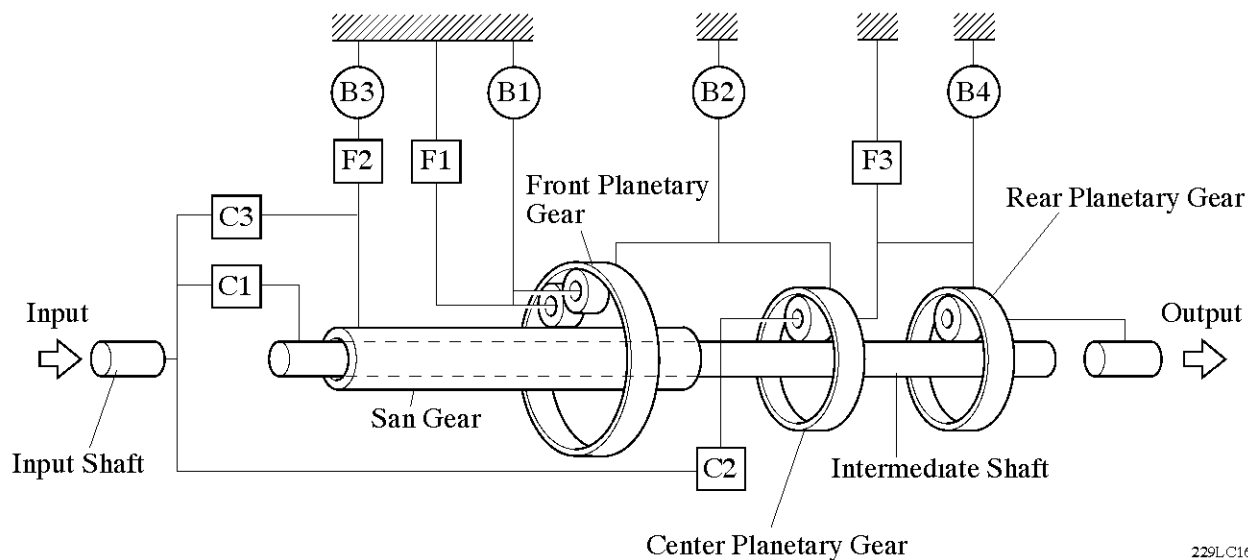


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4. Planetary Gear Unit

Construction

- The 5-speed configuration has been achieved without increasing the number of planetary gears, thus creating a 5-speed automatic transmission, practically the same as the previous 4-speed automatic transmission.
- The front planetary carrier is made of aluminum to reduce the weight.
- 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, from 3rd to 4th and from 4th to 5th. For details, refer to page 157.



229LC160

Function of Component

Component		Function
C ₁	No.1 Clutch	Connects input shaft and intermediate shaft.
C ₂	No.2 Clutch	Connects input shaft and center planetary carrier.
C ₃	No.3 Clutch	Connects input shaft and front sun gear.
B ₁	No.1 Brake	Prevents front planetary carrier from turning either clockwise or counterclockwise.
B ₂	No.2 Brake	Prevents front and center ring gear from turning either clockwise or counterclockwise.
B ₃	No.3 Brake	Prevents outer race of F2 from turning either clockwise or counterclockwise.
B ₄	No.4 Brake	Prevents rear ring gear from turning either clockwise or counterclockwise.
F ₁	No.1 One-Way Clutch	Prevents front planetary carrier from turning counterclockwise.
F ₂	No.2 One-Way Clutch	When B ₃ is operating, prevents planetary sun gear from turning counterclockwise.
F ₃	No.3 One-Way Clutch	Prevents center planetary carrier and rear ring gear from turning counterclockwise.
Planetary Gears		These gears change the route through which driving force is transmitted, in accordance with the operation of each clutch and brake, in order to increase or reduce the input and output speed.

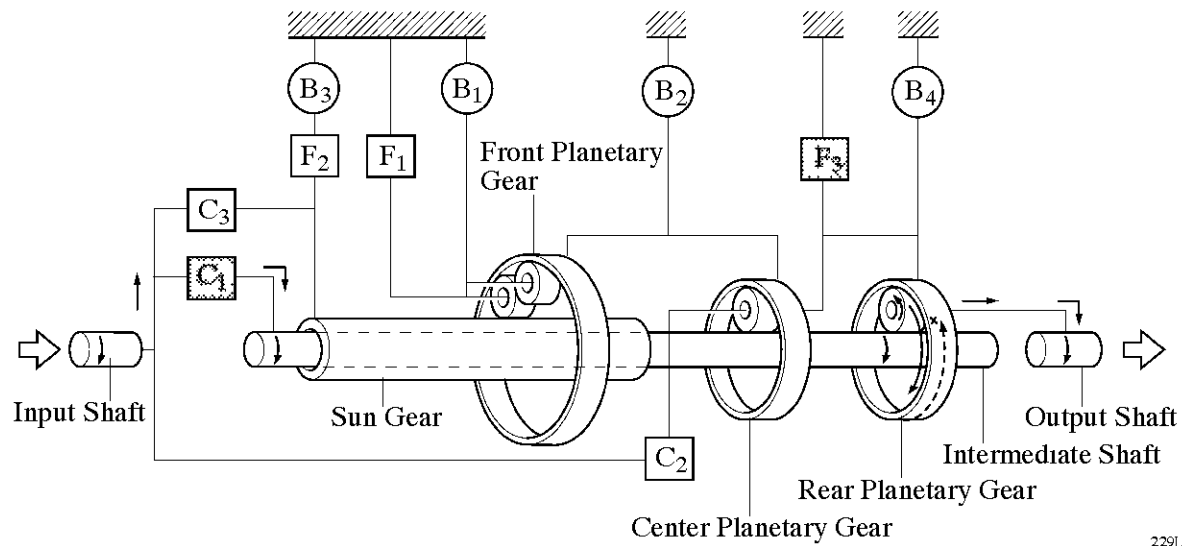
Transmission Power Flow

Shift Lever Position	Gear	Solenoid Valve						Clutch				Brake			One-way Clutch		
		S1	S2	SR	SL1	SL2	SLU	C ₁	C ₂	C ₃	B ₁	B ₂	B ₃	B ₄	F ₁	F ₂	F ₃
P	Park	ON				ON											
R	Reverse*	ON				ON				○	○			○	○		
N	Neutral	ON				ON											
D	1st	ON				ON		○									○
	2nd	ON	ON			ON		○					○		○	○	
	3rd		ON			ON		○		○		●		○			
	4th					ON	ON	○	○	●		●					
	5th			ON	ON		ON		○	○	○		●				
4	1st	ON				ON		○									○
	2nd	ON	ON			ON		○					○		○	○	
	3rd		ON			ON		○		○		●		○			
	4th					ON	ON	○	○	●		●					
3	1st	ON				ON		○									○
	2nd	ON	ON			ON		○					○		○	○	
	3rd*		ON					○		○	○		●				
2	1st	ON				ON		○									○
	2nd*	ON	ON	ON				○				○	○				
L	1st*	ON						○						○			

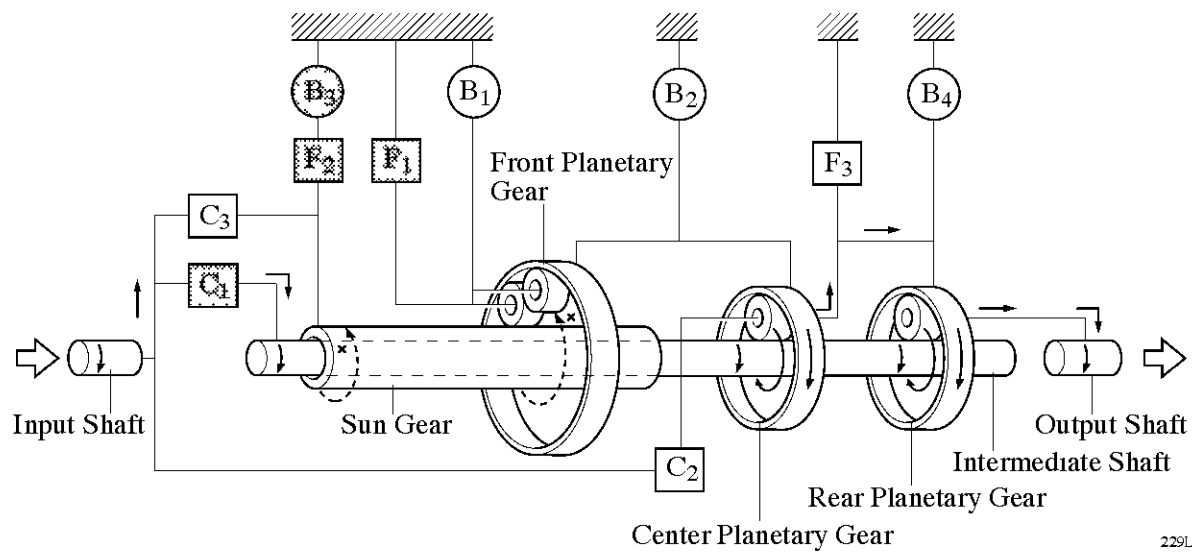
○: Operation

●: Operate but is not related to power transmission

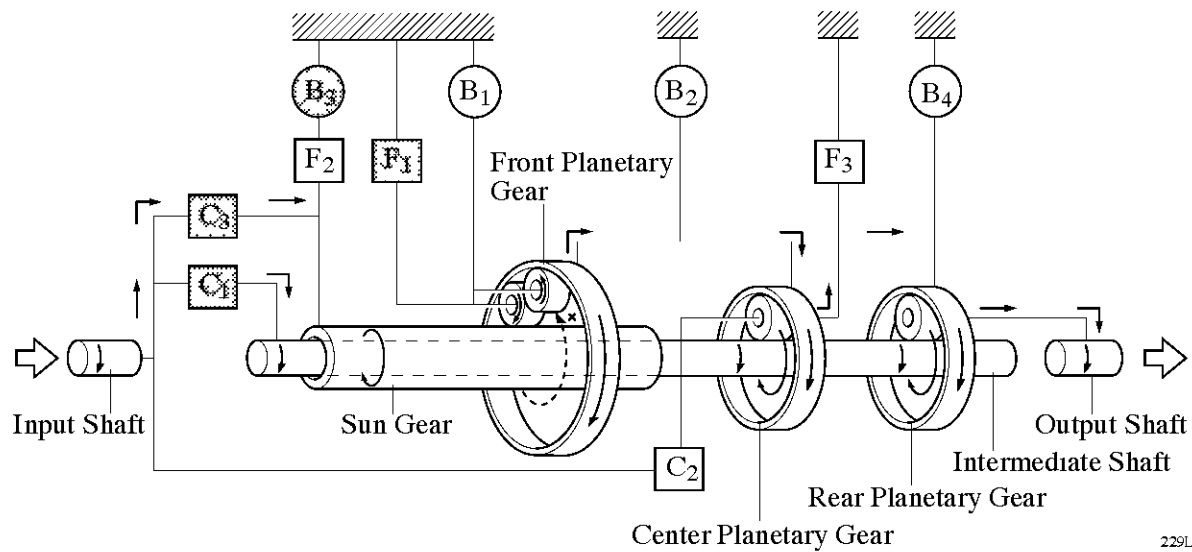
* : with Engine Brake

1st Gear (D, 4, 3 or 2 Position)

229LC174

2nd Gear (D, 4 or 3 Position)

229LC175

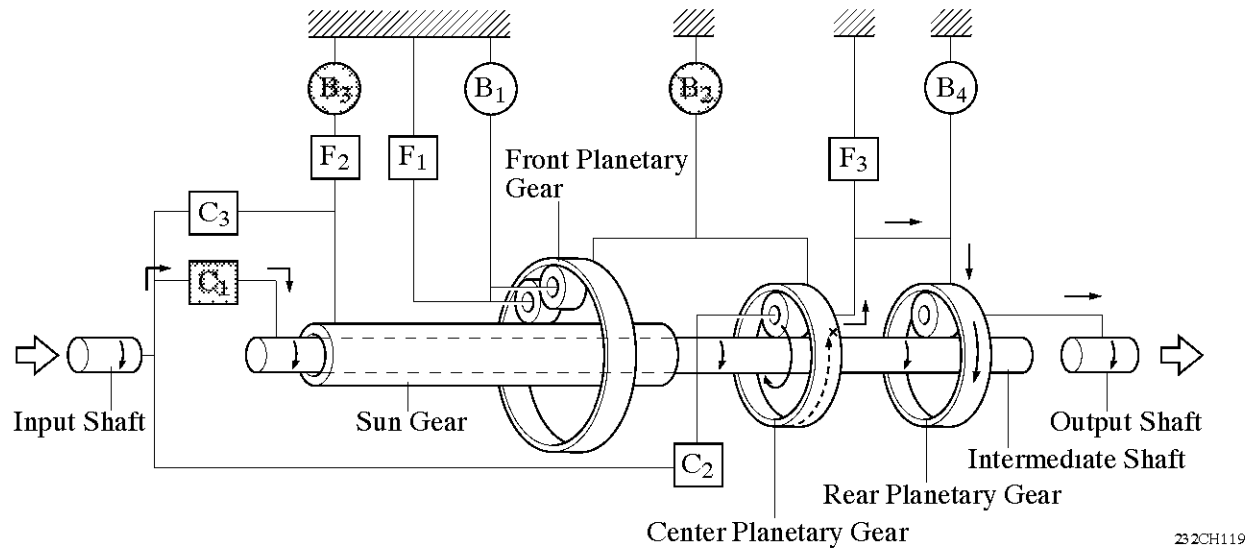
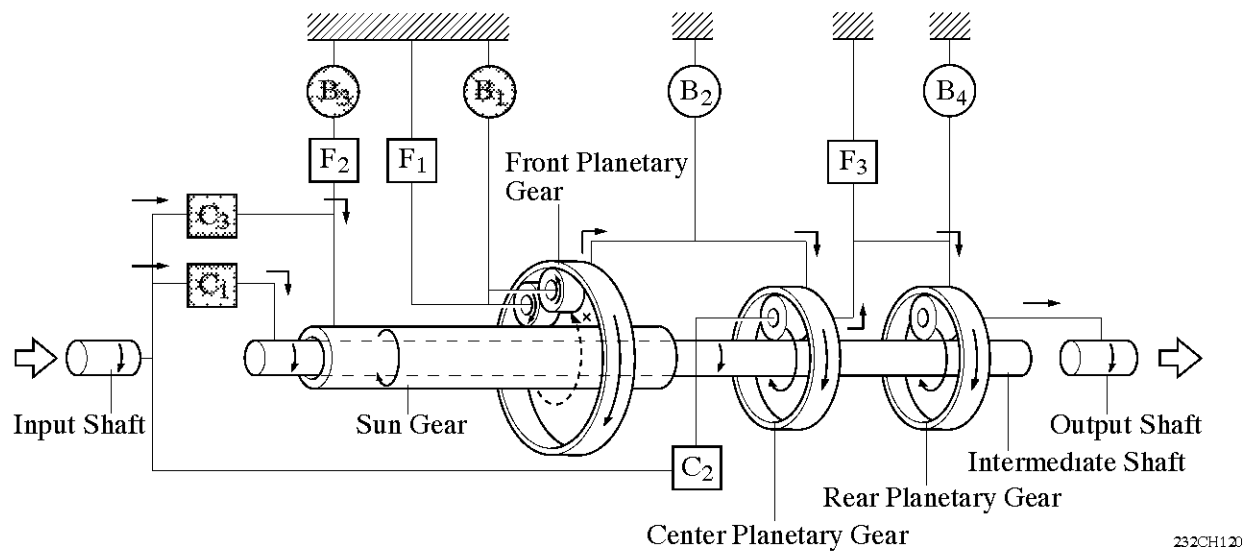
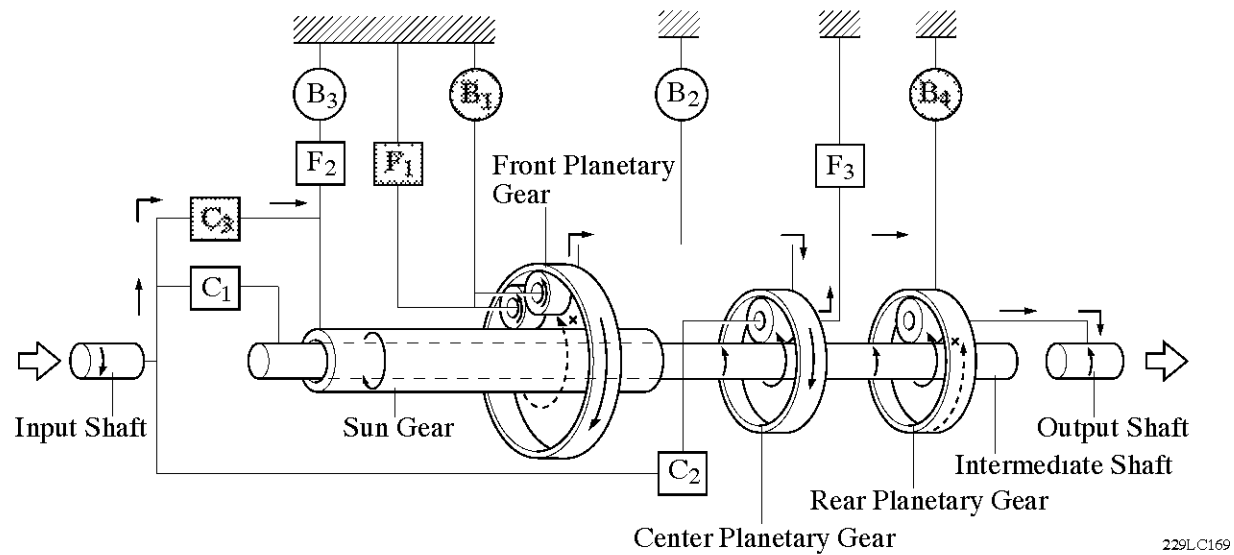
3rd Gear (D or 4 Position)

229LC176

The diagram illustrates a planetary gear system with the following components and labels:

- Input Shaft:** The shaft entering the system from the left.
- Sun Gear:** The central gear of the planetary system.
- Front Planetary Gear:** The first planetary gear set.
- Center Planetary Gear:** The middle planetary gear set.
- Rear Planetary Gear:** The second planetary gear set.
- Intermediate Shaft:** The shaft connecting the planetary gear sets.
- Output Shaft:** The shaft exiting the system to the right.
- Fixed Gears:** Four gears labeled B_1 , B_2 , B_3 , and B_4 are mounted on fixed supports.
- Other Labels:** F_1 , F_2 , F_3 , C_1 , C_2 , and C_3 are also present, likely representing specific components or states.

The diagram illustrates a planetary gear system with three stages: Front Planetary Gear, Center Planetary Gear, and Rear Planetary Gear. The system includes an Input Shaft, Intermediate Shaft, and Output Shaft. Various components are labeled: B₁, B₂, B₃, B₄ (bevel gears), F₁, F₂, F₃ (flanges), C₁, C₂, C₃ (couplers), and Sun Gear. Arrows indicate the flow of power and rotation.

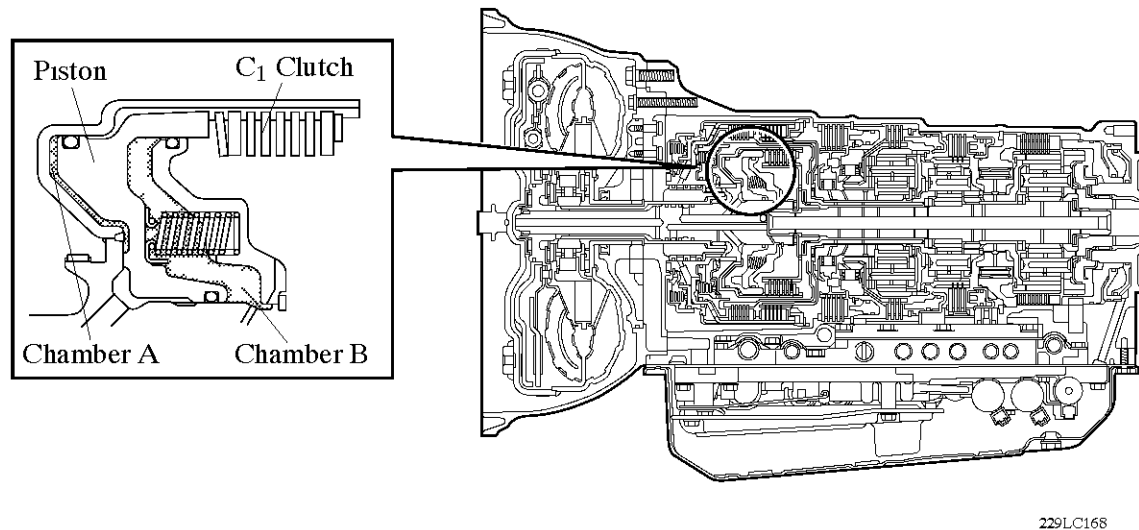
2nd Gear (2nd Position)**3rd Gear (3rd Position)****Reverse Gear (R Position)**

Centrifugal Fluid Pressure Canceling Mechanism

There are two reasons for improving the conventional clutch mechanism:

- To prevent the generation of pressure by centrifugal force applied to the fluid in the piston fluid pressure chamber (hereafter referred to as "chamber A") when the clutch is released, a check ball is provided. Therefore, before the clutch could be subsequently applied, it took time to fill chamber A.
- During shifting, in addition to the original clutch pressure that is controlled by the valve body, centrifugal pressure acts on the fluid in the chamber A exerting increased pressure depending on RPM.

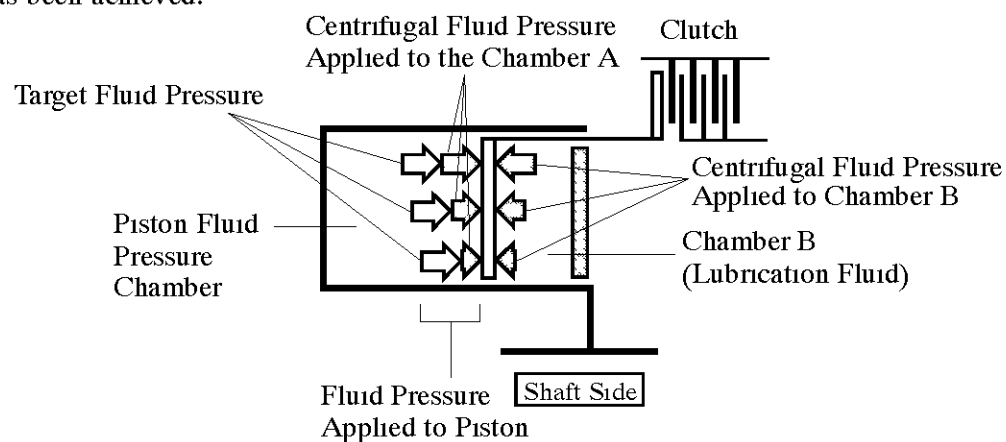
To address these two needs for improvement, a canceling fluid pressure chamber (hereafter referred to as "chamber B") has been provided opposite chamber A.



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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.



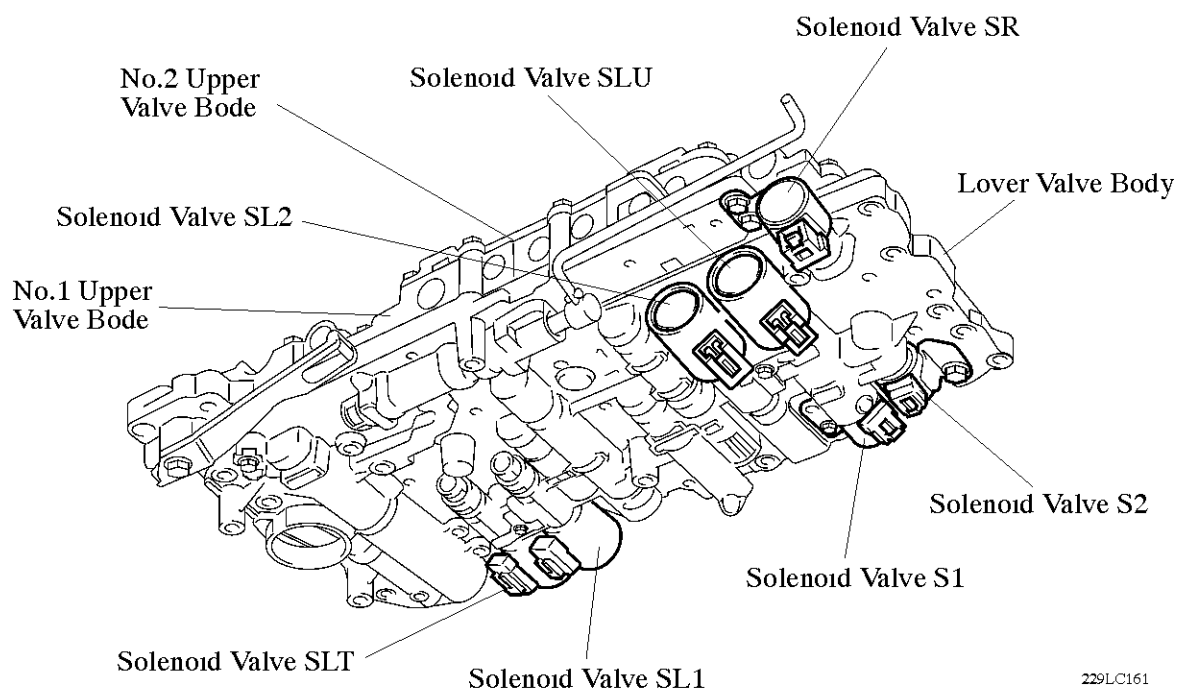
157CH17

$$\text{Fluid pressure applied to piston} - \text{Centrifugal fluid pressure applied to chamber B} = \text{Target fluid pressure (original clutch pressure)}$$

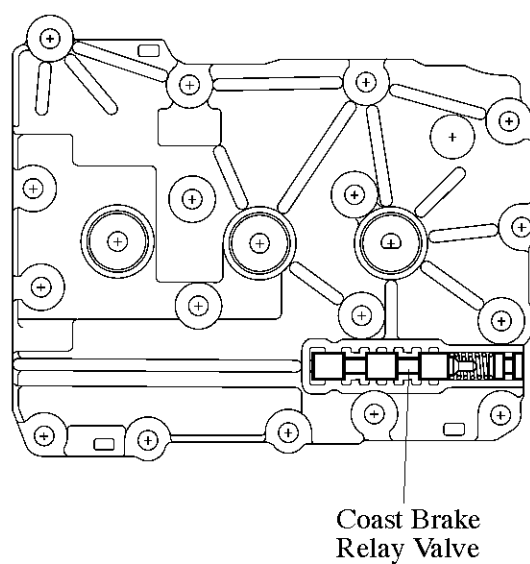
5. Valve Body Unit

General

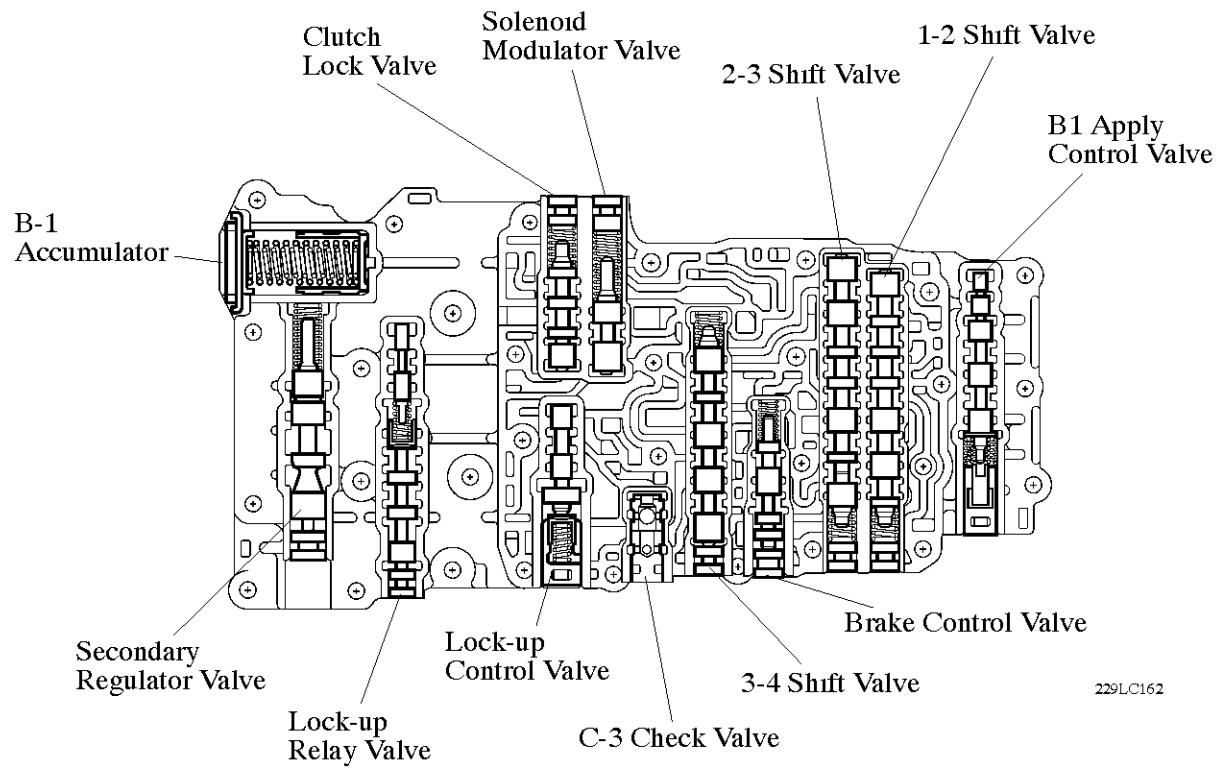
The valve body consists of the upper and lower valve bodies and 7 solenoid valves.



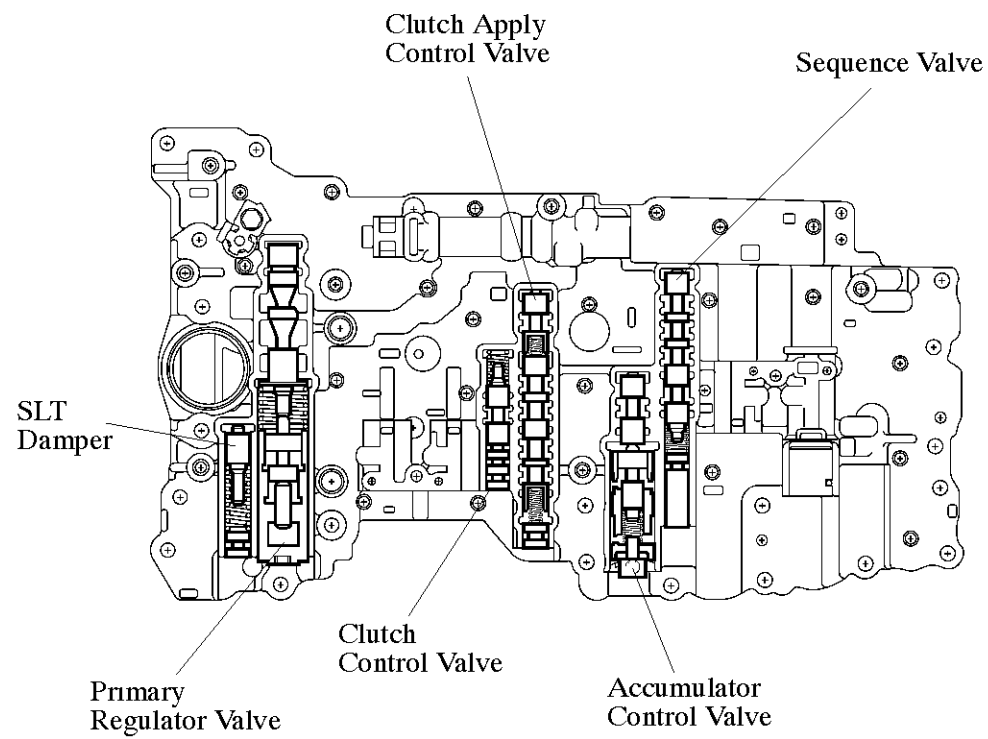
► No. 2 Upper Valve Body ◀



► No. 1 Upper Valve Body ◀



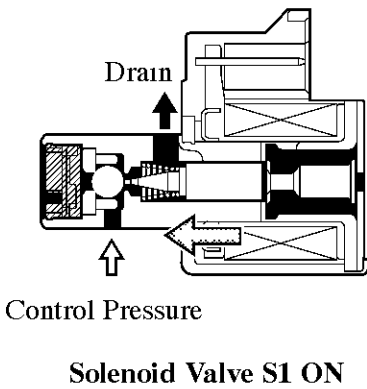
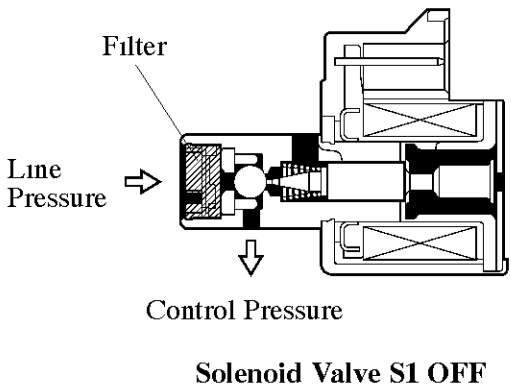
► Lower Valve Body ◀



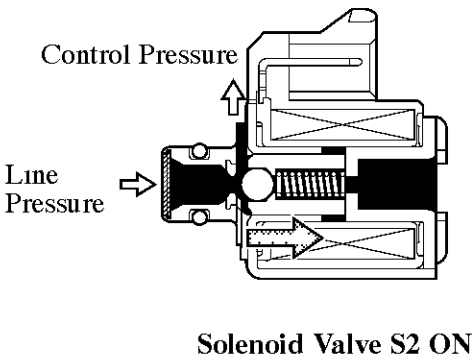
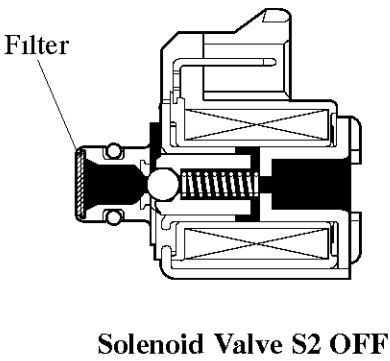
Solenoid Valve

1) Solenoid Valve S1, S2 and SR

- Solenoid valves S1 and SR use a 3-way solenoid valve.
- Solenoid valve S2 uses a 2-way solenoid valve.
- A filter has been provided at the tip of the solenoid valve to further improve operational reliability.



229LC165



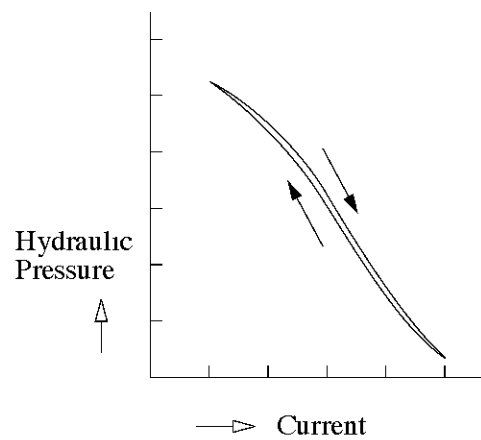
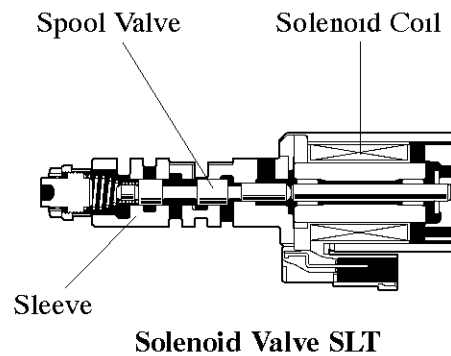
229LC166

► Function of Solenoid Valve S1, S2 and SR ◀

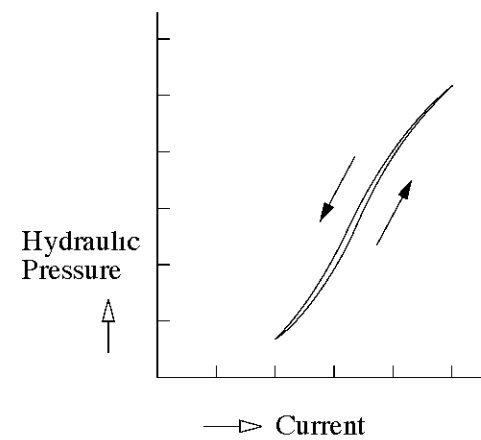
Solenoid Valve	Type	Function
S1	3-way	Switches the 2-3 shift valve.
S2	2-way	• Switches the 1-2 shift valve. • Switches the 3-4 shift valve.
SR	3-way	Switches the clutch apply control valve.

2) Solenoid Valve SL1, SL2, SLT and SLU

- In order to provide a hydraulic pressure that is proportion to current that flows to the solenoid coil, the solenoid valve SL1, SL2, SLT, and SLU linearly controls the line pressure and clutch and brake engagement pressure based on the signals it receives from the ECM.
- The solenoid valves SL1, SL2, SLT, and SLU have the same basic structure.



Solenoid Valve SL1, SL2 and SLT



Solenoid Valve SLU

229LC181

► Function of Solenoid Valve SL1, SL2, SLT and SLU ◀

Solenoid Valve	Function
SL1	• C₁ clutch pressure control • Accumulator back pressure control
SL2	B ₁ , B ₂ and B ₄ clutch pressure control
SLT	• Line pressure control • Accumulator back pressure control
SLU	• Lock-up clutch pressure control • Accumulator back pressure control

6. Electronic Control System

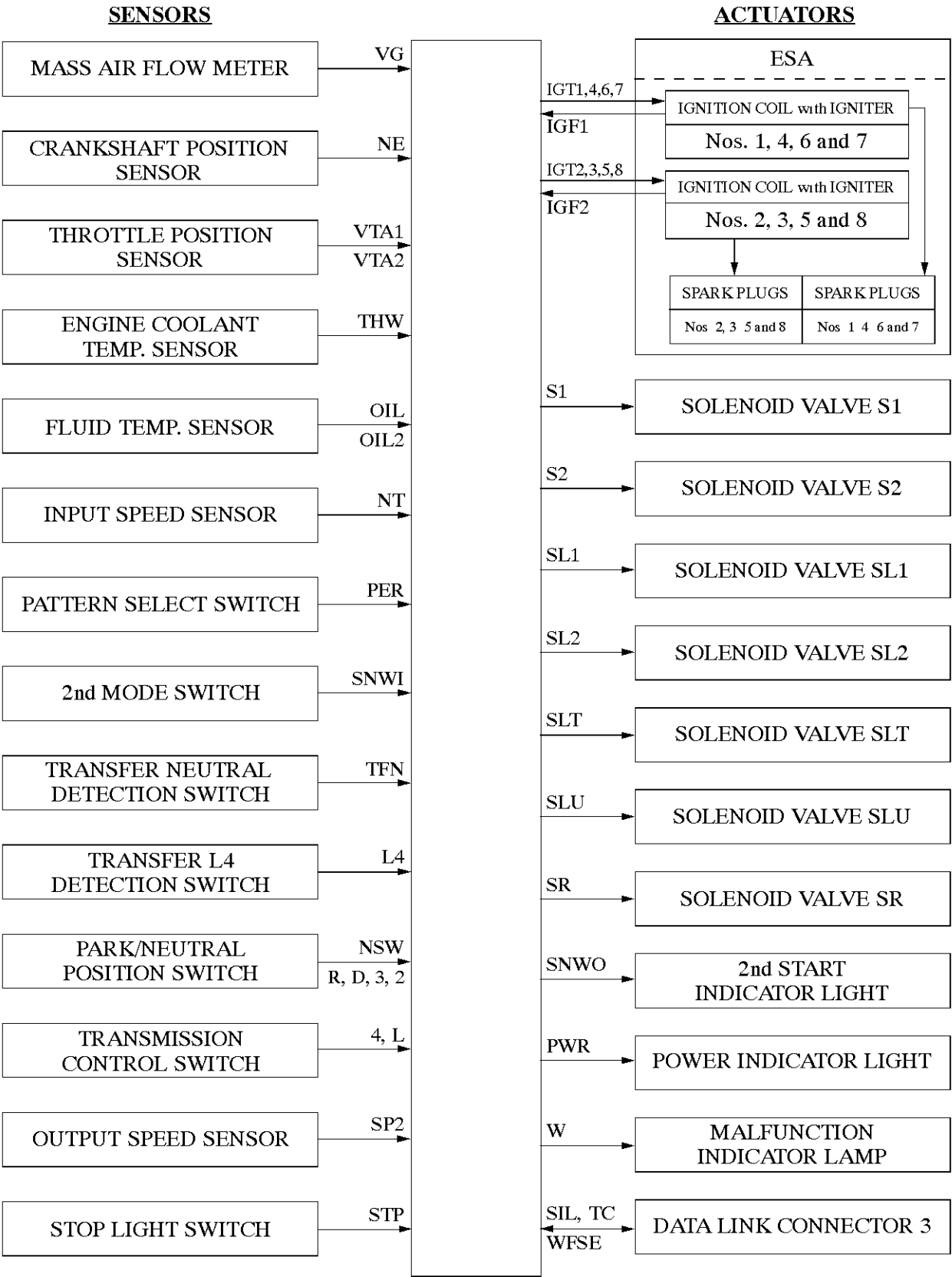
General

The electronic control system of the '03 model's A750F automatic transmission control and the '02 model's A343F are compared below.

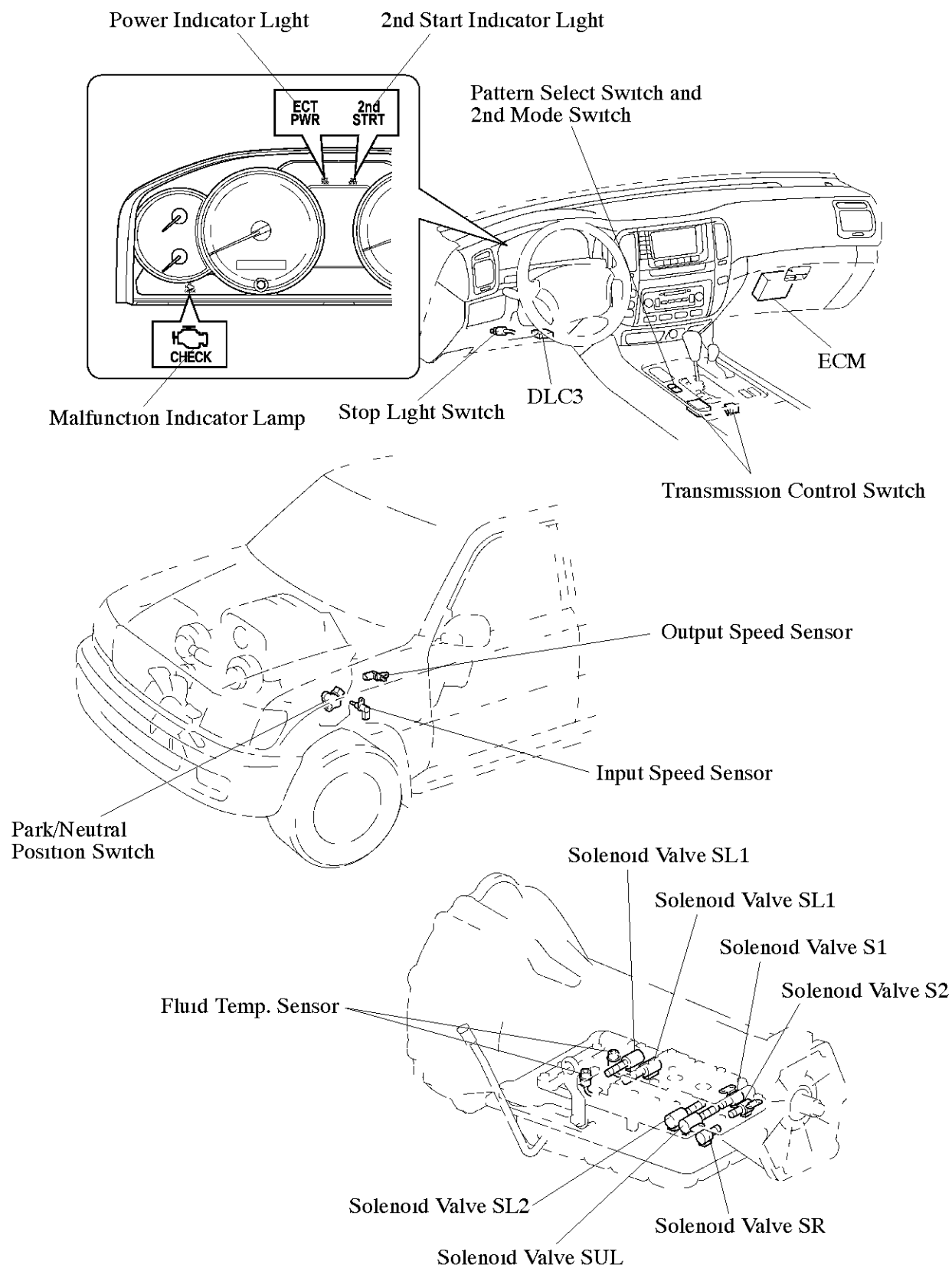
System	Function	'03 Model	'02 Model
		A750F	A343F
Clutch Pressure Control (See Page 166)	- Controls the pressure that is applied directly to B₁ brake and C₁ clutch by actuating the linear solenoid valves SL1 and SL2 in accordance with the ECM signals. - The solenoid valve SLT and SL1 minutely controls the clutch pressure in accordance with the engine output and driving conditions.	○	—
Line Pressure Optimal Control (See Page 167)	Actuates the solenoid valve SLT to control the line pressure in accordance with information from the ECM and the operating conditions of the transmission.	○	○
Engine Torque Control	Retards the engine ignition timing temporarily to improve shift feeling during up or down shifting.	○	○
Shift Timing Control	The ECM sends current to the solenoid valve S1, S2 and/or SR based on signals from each sensor and shifts the gear.	○	—
	The ECM sends current to the solenoid valve No.1 and/or No.2 based on signals from each sensor and shifts the gear.	—	○
Flex Lock-up Clutch Control (See Page 168)	Controls the solenoid valve SLU, provides an intermediate mode between the ON/OFF operation of the lock-up clutch, and increase the operating range of the lock-up clutch to improve fuel economy.	○	—
Lock-up Timing Control	The ECM sends current to the shift solenoid valve SLU based on signals from each sensor and engages or disengages the lockup clutch.	○	—
	The ECM sends current to the shift solenoid valve SL based on signals from each sensor and engages or disengages the lockup clutch.	—	○
"N" to "D" Squat Control	When the shift lever is shifted from "N" to "D" position, the gear is temporarily shifted to 2nd and then to 1st to reduce vehicle squat.	○	—
	When the shift lever is shifted from "N" to "D" position, the gear is temporarily shifted to 3rd and then to 1st to reduce vehicle squat.	—	○
2nd Start System	Enabling the vehicle to take off in the 2nd gear and thus make it easy to take off on snowy, sandy or muddy terrain.	○	○
AI (artificial Intelligence) -SHIFT (See Page 169)	Based on the signals from various sensors, the ECM determines the road conditions and the intention of the driver. Thus, the shift pattern is automatically regulated to an optimal level, thus improving drivability.	○	—
Diagnosis	When the ECM detects a malfunction, the ECM makes a diagnosis and memorizes the failed section.	○	○
	To increase the speed for processing the signals, the 32-bit CPU of the ECM has been adopted.	○	○
Fail-safe	Even if a malfunction is detected in the sensors or solenoids, the ECM effects fail-safe control to prevent the vehicle's drivability from being affected significantly.	○	○

Construction

The configuration of the electronic control system in the '03 model's A750F is as shown in the following chart.



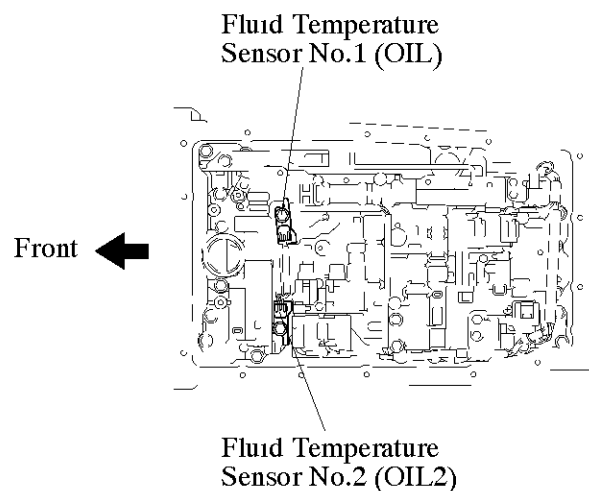
Layout of Component



Construction and Operation of Main Component

1) Fluid Temperature Sensor No.1 and No.2

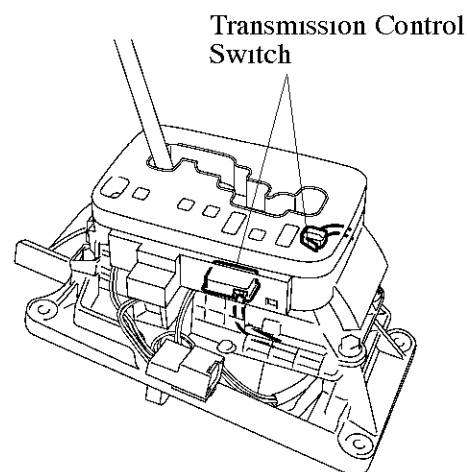
- Fluid temperature sensor No.1 (OIL) is used for hydraulic pressure control. This sensor is used for revision of clutches and brakes pressure to keep smooth shift quality every time.
- Fluid temperature sensor No.2 (OIL2) is used for the switching of the shift timing control of ECT when the fluid temperature is high and ATF temp. warning light control.



229LC132

2) Transmission Control Switch

The transmission control switch is installed inside shift lever assembly to detect the shift lever position ("4th" or "D" and "2nd" or "L") and to inform ECM the shift position indicator light in the combination meter.



229LC133

3) Output Speed Sensor and Input Speed Sensor

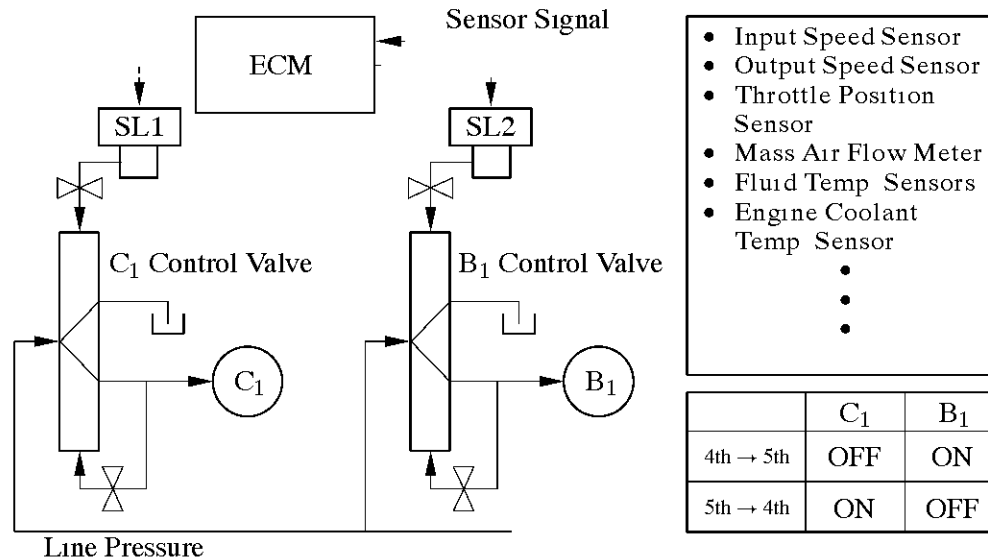
- A rotor is provided on the output shaft of the transmission, and the output speed sensor on the right side of the transmission case detects the speed and outputs it to the ECM.
- The input speed sensor detects the input speed of the transmission. The direct clutch drum is used as the timing rotor for this sensor.

Clutch Pressure Control

1) Clutch to Clutch Pressure Control

This control has been adopted for shifting from the 4th to 5th gear and from the 5th to 4th gear. Actuates solenoid valves SL1 and SL2 in accordance with the signals from the ECM, and guides this output pressure directly to the control valves B₁ and C₁ in order to regulate the line pressure that acts on the B₁ brake and C₁ clutches.

As a result, high response and excellent shift characteristics have been realized.

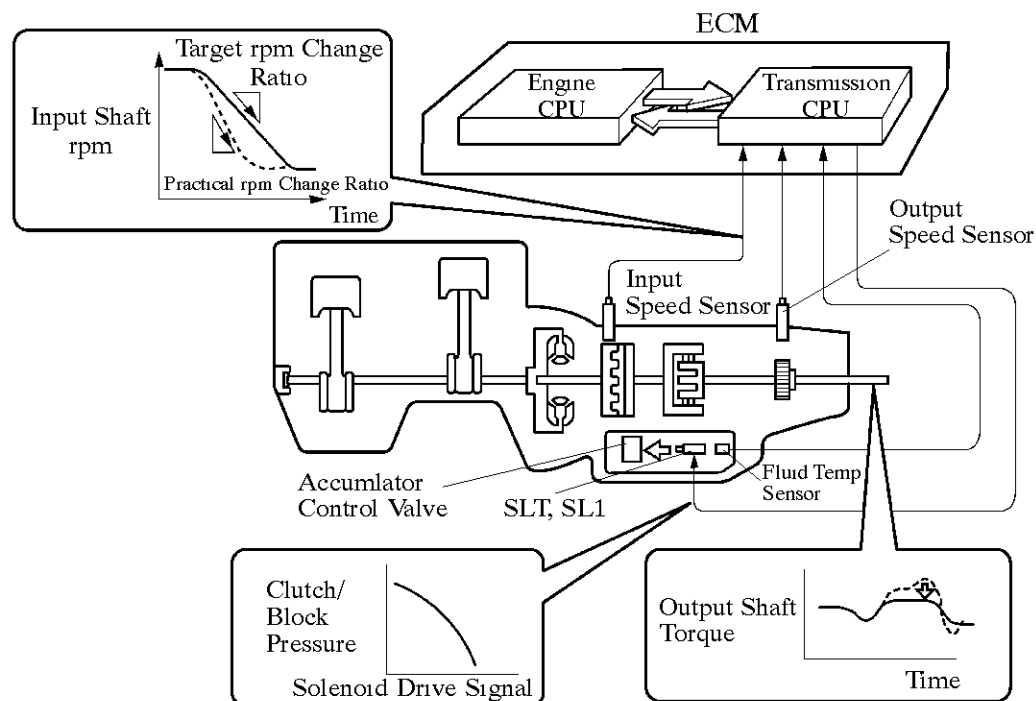


229LC134

2) Clutch Pressure Optimal Control

The ECM monitors the signals from various types of sensor such as the input turbine speed sensor, allowing shift solenoid valves SLT and SL1 to minutely control the clutch pressure in accordance with engine output and driving conditions.

As a result, smooth shift characteristics have been realized.

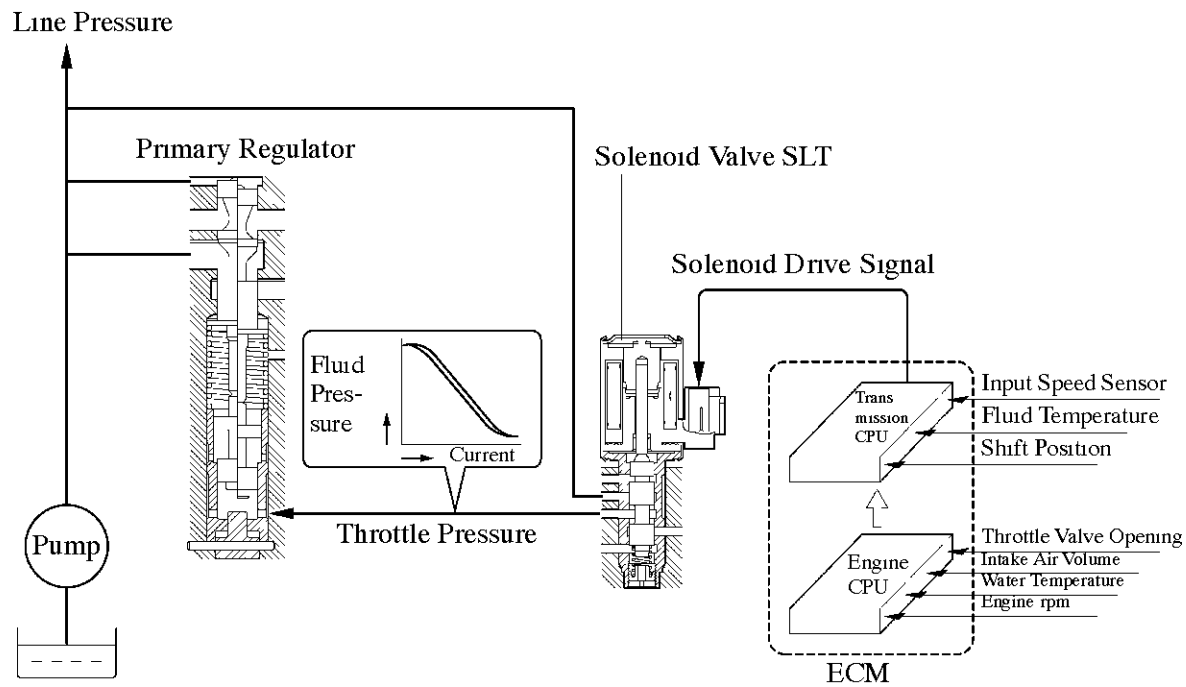


229LC135

Line Pressure Optimal Control

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 transmission.

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 in the oil pump.

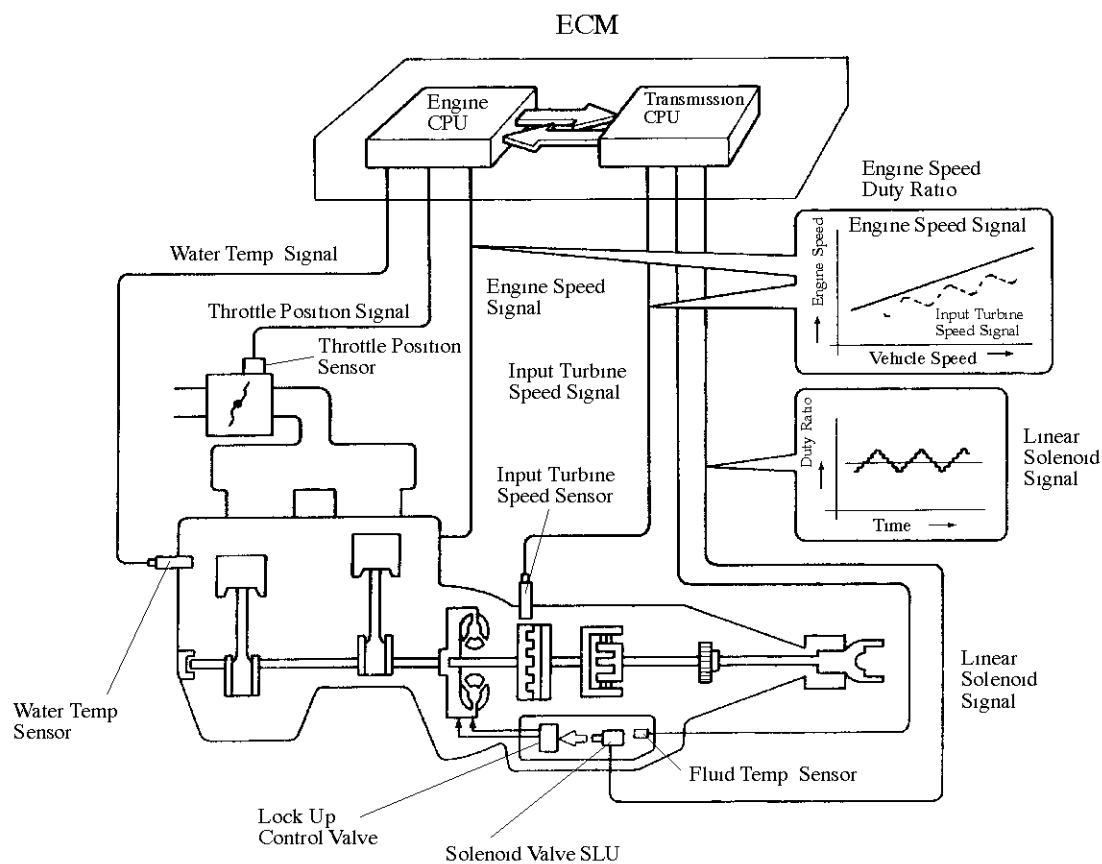


Flex Lock-up Clutch Control

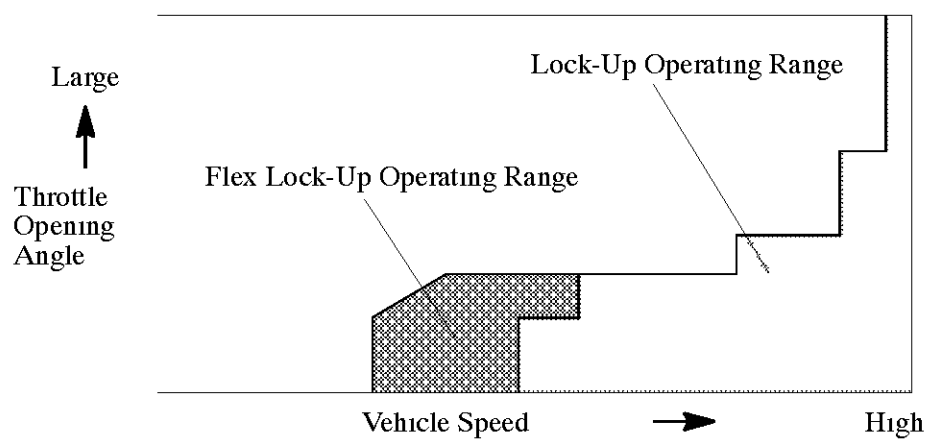
In addition to the conventional lock-up timing control, a flex lock-up clutch control is used.

In the low-to mid-speed range, this flex lock-up clutch control regulates the solenoid valve SLU to provide an intermediate mode between the ON/OFF operation of the lock-up clutch in order to improve the energy transmitting efficiency in this range.

As a result, the operating range of the lock-up clutch has been increased and fuel economy has been improved. The flex lock-up clutch control operates in the 4th and 5th gears in the D range and 4th gear in the 4 range.



189CH11

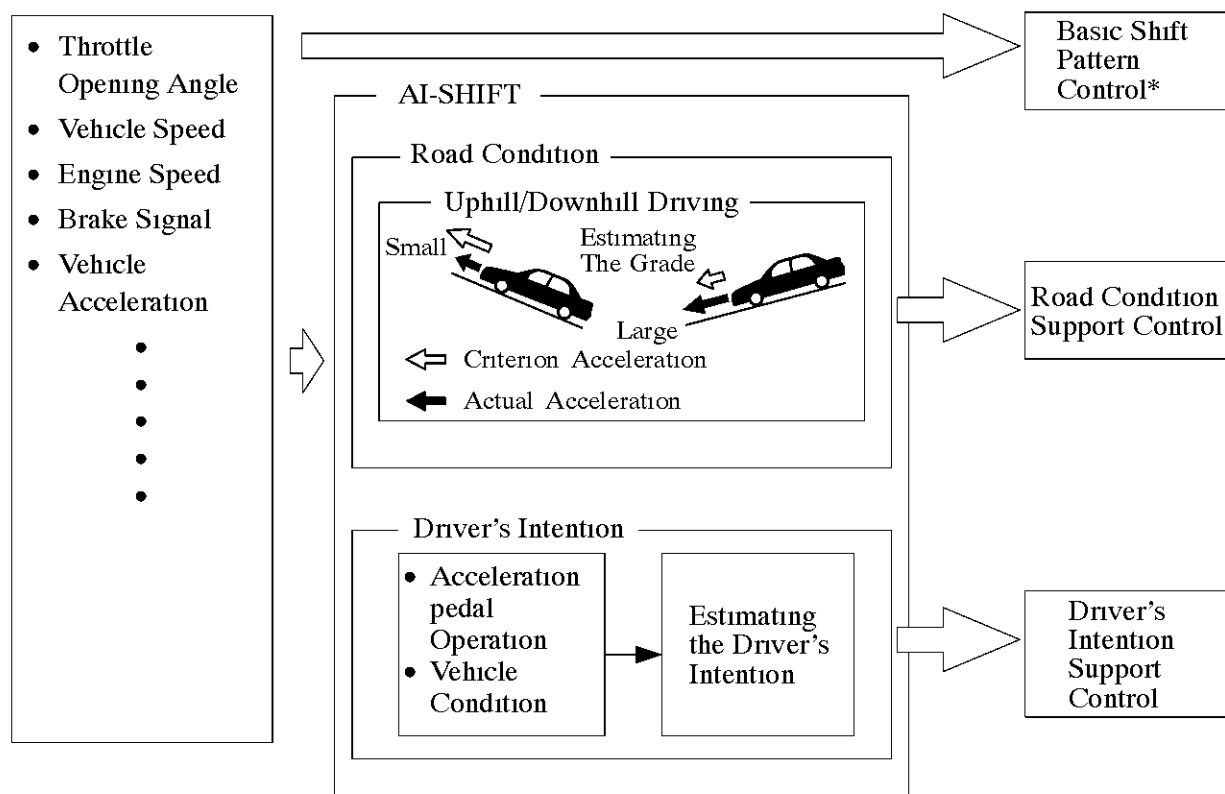


151CH26

AI (Artificial Intelligence)- SHIFT Control

1) General

In addition to the switching of the shift pattern through the pattern select switch, the AI- SHIFT control enables the ECM to estimate the road conditions and the driver's intention in order to automatically switch the optimal shift pattern. As a result, comfortable ride has been realized at high levels.



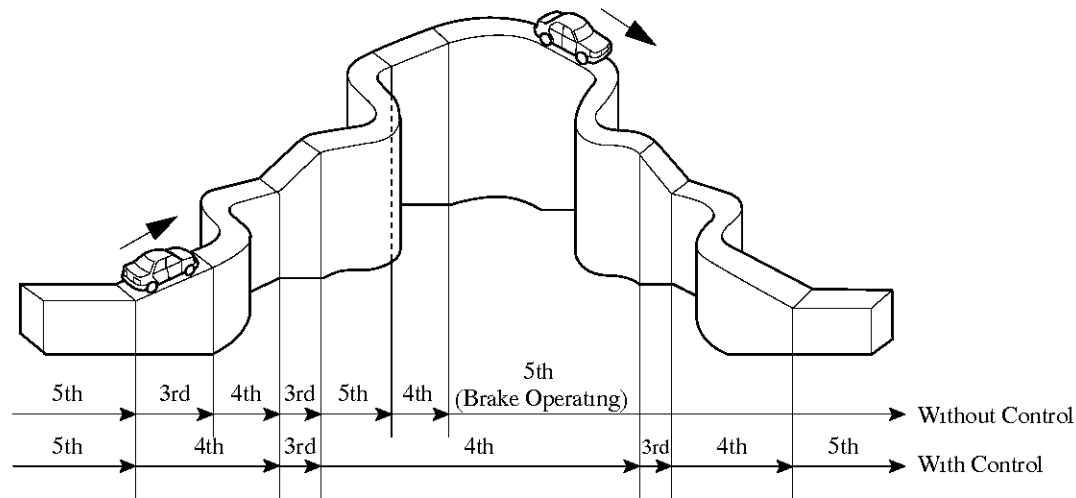
229LC182

*: Shift control that is determined by the PWR or 2nd mode that is selected by the pattern select switch, or by the normal mode.

2) Road Condition Support Control

Under road condition support control, the ECM determines throttle valve opening angle and the vehicle speed whether the vehicle is being driven uphill or downhill.

To achieve an optimal drive force while driving uphill, this control prevents the transmission from upshifting to the 4th or 5th gear. To achieve an optimal engine brake effect while driving downhill, this control automatically downshifts the transmission to the 4th or 3rd gear.



229LC183

3) Driver's Intention Support Control

Estimates the driver's intention based on the accelerator operation and vehicle condition to switch to a shift pattern that is well-suited to each driver, without the need to operate the shift pattern select switch.

Diagnosis

- When the ECM detects a malfunction, the ECM makes a diagnosis and memorizes the failed section. Furthermore, the MIL (Malfunction Indicator Lamp) in the combination meter illuminates or blinks to inform the driver.
- At the same time, the DTCs (Diagnosis Trouble Codes) are stored in memory. The DTCs can be read by the SST (09843-18040) between the Tc and CG terminals DLC3 and observing the blinking of the check engine warning light, or by connecting a hand-held tester.

Service Tip

The length of time to clear the DTC by the battery terminal disconnection has been changed from the previous 10 seconds to 1 minute.

Fail Safe

This function minimizes the loss of operability when any abnormality occurs in each sensor or solenoid.

► Fail-Safe Control List ◀

Malfunction Part	Function
Output Speed Sensor (SP2)	During a output speed sensor malfunction, shift control is effected through the input speed sensor signal.
Fluid Temp. Sensor	During a fluid temperature sensor No.1 malfunction, 5th upshift and flex lock-up clutch control are prohibited.
Solenoid Valve S1, S2 and SR	The current to the failed solenoid valve is cut off and control is effected by operating the other solenoid valves with normal operation. Shift control is effected depending on the failed solenoid as described in the table on the next page.
Solenoid Valve SL1 and SL2	During a solenoid valve SL1 or SL2 malfunction, 5th upshift is prohibited.
Solenoid Valve SLU	During a solenoid valve SLU malfunction, the current to the solenoid valve is stopped. Because this stops lock-up control and flex lock-up control, fuel economy decreases.
Solenoid Valve SLT	During a solenoid valve SLT malfunction, the current to the solenoid valve is stopped. Because this stops line pressure optimal control, the shift shock increases. However, shifting is effected through normal clutch pressure control.

Position	Normal					Shift Solenoid Valve S1 Malfunction						
	Shift Solenoid					Gear	Shift Solenoid					Gear
	S1	S2	SR	SL1	SL2		S1	S2	SR	SL1	SL2	
D	ON	OFF	OFF	OFF	ON	1st	×	OFF →ON	OFF	OFF	ON	4th→ 3rd
	ON	ON	OFF	OFF	ON	2nd	×	ON	OFF	OFF	ON	3rd
	OFF	ON	OFF	OFF	ON	3rd	×	ON	OFF	OFF	ON	3rd
	OFF	OFF	OFF	OFF	ON	4th	×	OFF	OFF	OFF	ON	4th
	OFF	OFF	ON	ON	OFF	5th	×	OFF	ON	ON	OFF	5th
4	ON	OFF	OFF	OFF	ON	1st	×	OFF →ON	OFF	OFF	ON	4th→ 3rd
	ON	ON	OFF	OFF	ON	2nd	×	ON	OFF	OFF	ON	3rd
	OFF	ON	OFF	OFF	ON	3rd	×	ON	OFF	OFF	ON	3rd
	OFF	OFF	OFF	OFF	ON	4th	×	OFF	OFF	OFF	ON	4th
3	ON	OFF	OFF	OFF	ON	1st	×	OFF →ON	OFF	OFF	ON→ OFF	3rd→ 3rd (E/B)
	ON	ON	OFF	OFF	ON	2nd	×	ON	OFF	OFF	ON→ OFF	3rd→ 3rd (E/B)
	OFF	ON	OFF	OFF	OFF	3rd (E/B)	×	ON	OFF	OFF	OFF	3rd (E/B)
2	ON	OFF	OFF	OFF	ON	1st	×	OFF	OFF	OFF	ON	1st
	ON	ON	ON	OFF	OFF	2nd (E/B)	×	ON	ON	OFF	OFF	3rd (E/B)
L	ON	OFF	OFF	OFF	OFF	1st (E/B)	×	OFF	OFF	OFF	OFF	1st (E/B)

Position	Shift Solenoid Valve S2 Malfunction					Shift Solenoid Valve SR Malfunction						
	Shift Solenoid					Gear	Shift Solenoid					Gear
	S1	S2	SR	SL1	SL2		S1	S2	SR	SL1	SL2	
D	ON	×	OFF	OFF	ON	1st	ON	OFF	×	OFF	ON	1st
	ON→ OFF	×	OFF	OFF	ON	1st→ 4th	ON	ON	×	OFF	ON	2nd
	OFF	×	OFF	OFF	ON	4th	OFF	ON	×	OFF	ON	3rd
	OFF	×	OFF	OFF	ON	4th	OFF	OFF	×	OFF	ON	4th
	OFF	×	ON	ON	OFF	5th	OFF	OFF	×	ON	OFF	4th
4	ON	×	OFF	OFF	ON	1st	ON	OFF	×	OFF	ON	1st
	ON→ OFF	×	OFF	OFF	ON	1st→ 4th	ON	ON	×	OFF	ON	2nd
	OFF	×	OFF	OFF	ON	4th	OFF	ON	×	OFF	ON	3rd
	OFF	×	OFF	OFF	ON	4th	OFF	OFF	×	OFF	ON	4th
3	ON	×	OFF	OFF	ON	1st	ON	OFF	×	OFF	ON	1st
	ON→ OFF	×	OFF	OFF	ON→ OFF	1st→ 3rd (E/B)	ON	ON	×	OFF	ON	2nd
	OFF	×	OFF	OFF	OFF	3rd (E/B)	OFF	ON	×	OFF	OFF→ ON	3rd (E/B) →3rd
2	ON	×	OFF	OFF	ON	1st	ON	OFF	×	OFF	ON	1st
	ON→ OFF	×	ON	OFF	OFF→ ON	2nd (E/B) →4th	ON	ON	×	OFF	OFF	2nd
L	ON	×	OFF	OFF	OFF	1st (E/B)	ON	OFF	×	OFF	OFF	1st (E/B)

E/B: Engine Brake

Donated by Andrew Schauer cruisercult.com

Position	Shift Solenoid Valve S1 and S2 Malfunction						Shift Solenoid Valve S1 and SR Malfunction					
	Shift Solenoid					Gear	Shift Solenoid					Gear
	S1	S2	SR	SL1	SL2		S1	S2	SR	SL1	SL2	
D	×	×	OFF	OFF	ON	4th	×	OFF →ON	×	OFF	ON	4th→ 3rd
	×	×	OFF	OFF	ON	4th	×	ON	×	OFF	ON	3rd
	×	×	OFF	OFF	ON	4th	×	ON	×	OFF	ON	3rd
	×	×	OFF	OFF	ON	4th	×	OFF	×	OFF	ON	4th
	×	×	ON	ON	OFF	5th	×	OFF	×	ON→ OFF	OFF →ON	4th
4	×	×	OFF	OFF	ON	4th	×	OFF →ON	×	OFF	ON	4th→ 3rd
	×	×	OFF	OFF	ON	4th	×	ON	×	OFF	ON	3rd
	×	×	OFF	OFF	ON	4th	×	ON	×	OFF	ON	3rd
	×	×	OFF	OFF	ON	4th	×	OFF	×	OFF	ON	4th
3	×	×	OFF	OFF	ON→ OFF	3rd→ 3rd (E/B)	×	OFF →ON	×	OFF	ON	3rd
	×	×	OFF	OFF	ON→ OFF	3rd→ 3rd (E/B)	×	ON	×	OFF	ON	3rd
	×	×	OFF	OFF	OFF	3rd (E/B)	×	ON	×	OFF	OFF →ON	3rd (E/B) →3rd
2	×	×	OFF	OFF	ON	1st	×	OFF	×	OFF	ON	1st
	×	×	ON	OFF	OFF →ON	4th	×	ON	×	OFF	OFF	2nd
L	×	×	OFF	OFF	OFF	1st (E/B)	×	OFF	×	OFF	OFF	1st (E/B)

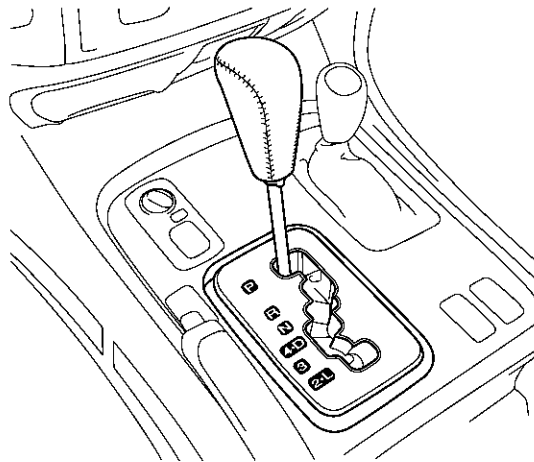
Position	Shift Solenoid Valve S2 and SR Malfunction						Shift Solenoid Valve S1, S2 and SR Malfunction					
	Shift Solenoid					Gear	Shift Solenoid					Gear
	S1	S2	SR	SL1	SL2		S1	S2	SR	SL1	SL2	
D	ON	×	×	OFF	ON	1st	×	×	×	OFF	ON	4th
	ON→ OFF	×	×	OFF	ON	1st→ 4th	×	×	×	OFF	ON	4th
	OFF	×	×	OFF	ON	4th	×	×	×	OFF	ON	4th
	OFF	×	×	OFF	ON	4th	×	×	×	OFF	ON	4th
	OFF	×	×	ON→ OFF	OFF →ON	4th	×	×	×	ON→ OFF	OFF →ON	4th
4	ON	×	×	OFF	ON	1st	×	×	×	OFF	ON	4th
	ON→ OFF	×	×	OFF	ON	1st→ 4th	×	×	×	OFF	ON	4th
	OFF	×	×	OFF	ON	4th	×	×	×	OFF	ON	4th
	OFF	×	×	OFF	ON	4th	×	×	×	OFF	ON	4th
3	ON	×	×	OFF	ON	1st	×	×	×	OFF	ON	3rd
	ON→ OFF	×	×	OFF	ON	1st→ 3rd	×	×	×	OFF	ON	3rd
	OFF	×	×	OFF	OFF →ON	3rd (E/B) →3rd	×	×	×	OFF	OFF →ON	3rd (E/B) →3rd
2	ON	×	×	OFF	ON	1st	×	×	×	OFF	ON	1st
	ON	×	×	OFF	OFF →ON	1st (E/B) →1st	×	×	×	OFF	OFF →ON	1st (E/B) →1st
L	ON	×	×	OFF	OFF	1st (E/B)	×	×	×	OFF	OFF	1st (E/B)

E/B: Engine Brake

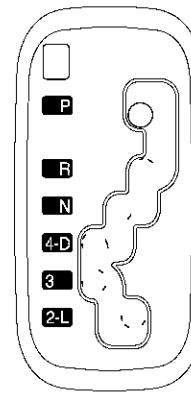
7. Shift Control Mechanism

General

- A gate type shift lever has is used in conjunction with the installation of the 5-speed automatic transmission. With the gate type, the shift lever button and the overdrive switch of the straight type shift lever have been discontinued. Similar functions are achieved through a single-shift operation (fore-aft and side-to-side).
- The shift lock system consists of the key interlock device and shift lock mechanism.



229LC136

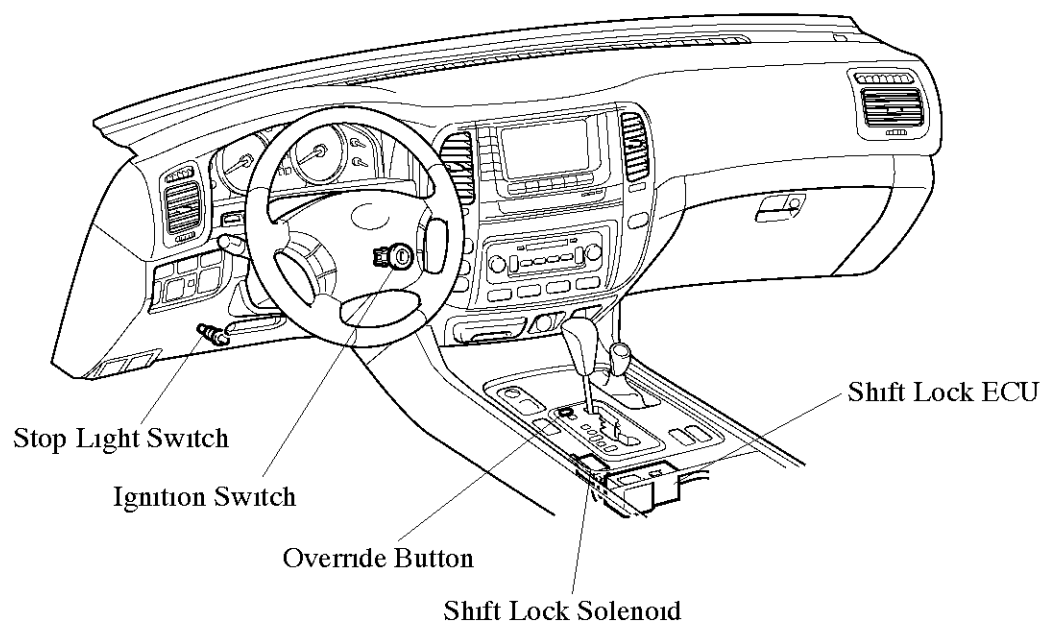


211CH23

Shift Lock System

1) General

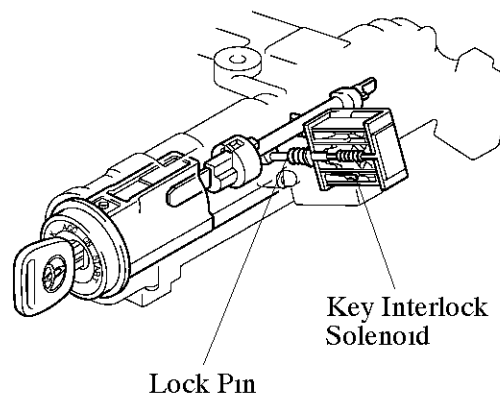
- A shift lock system with key interlock device and shift lock mechanism, that helps prevent the unintended operation of the shift lever has been provided.
- An electrical key interlock device and an electrical shift lock mechanism are used.



229LC137

2) Key Interlock Device

The activation of the key interlock solenoid, mounted on the upper column bracket, moves the lock pin to restrict the movement of the key cylinder. Therefore, if the shift lever is shifted to any position other than "P", the ignition key cannot be moved from "ACC" to the "LOCK" position.

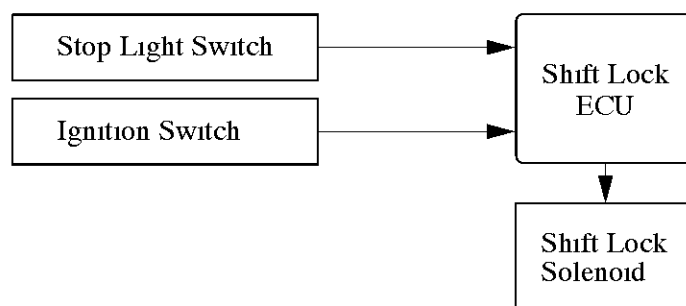


229LC138

3) Shift Lock Mechanism

- The shift lock mechanism prevents the shift lever from being shifted out of the "P" position to any other position unless the ignition switch is turned ON and the brake pedal is pressed.
- A shift lock override button, which manually overrides the shift lock mechanism, is provided.

► System Diagram ◀



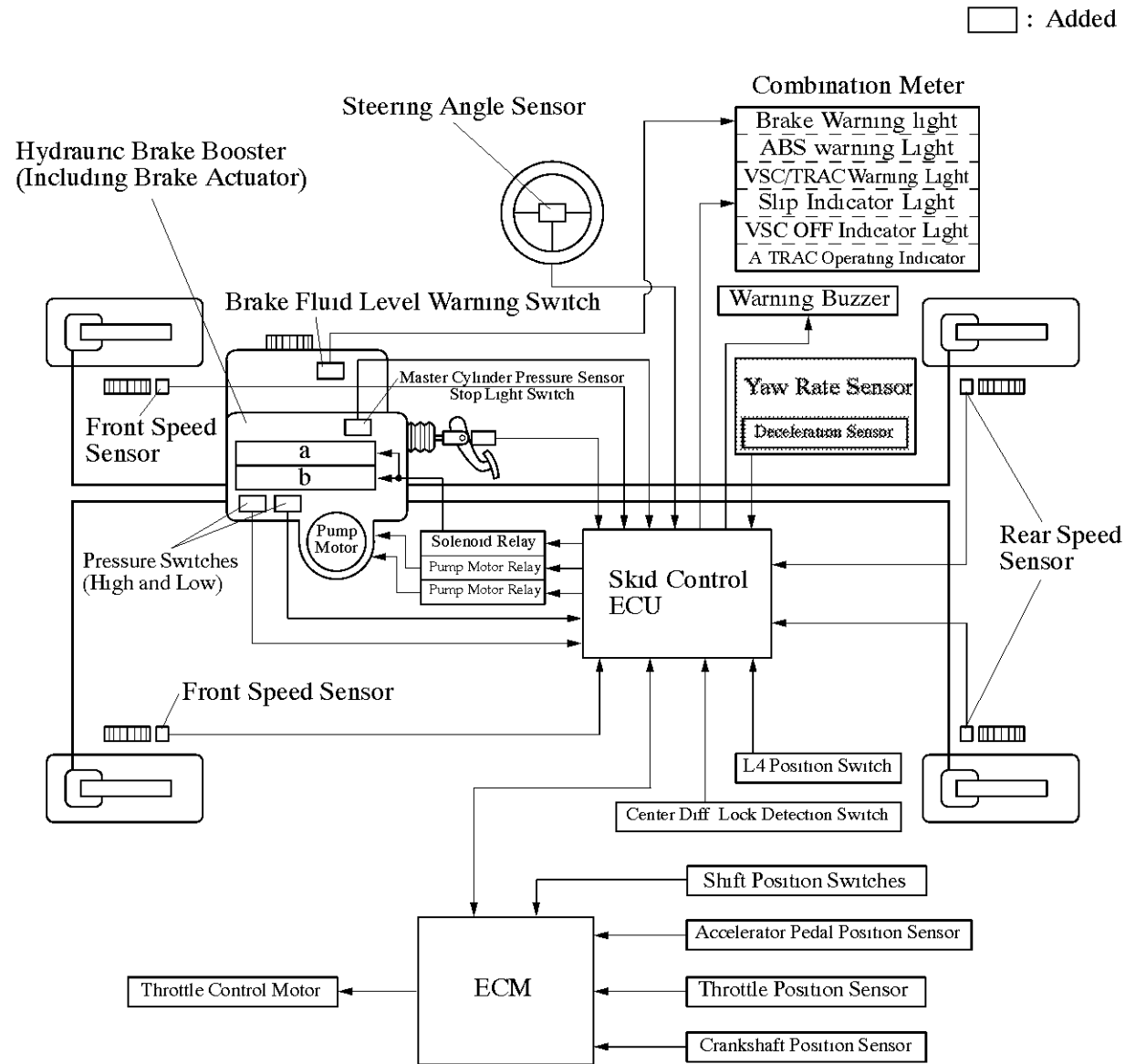
229LC139

■ BRAKE CONTROL SYSTEM

(ABS with EBD, Brake Assist, A-TRAC and VSC System)

The deceleration sensor that is provided for the brake control system (ABS with EBD, Brake Assist, A-TRAC, and VSC system) has been integrated in the yaw rate sensor.

► System Diagram ◀

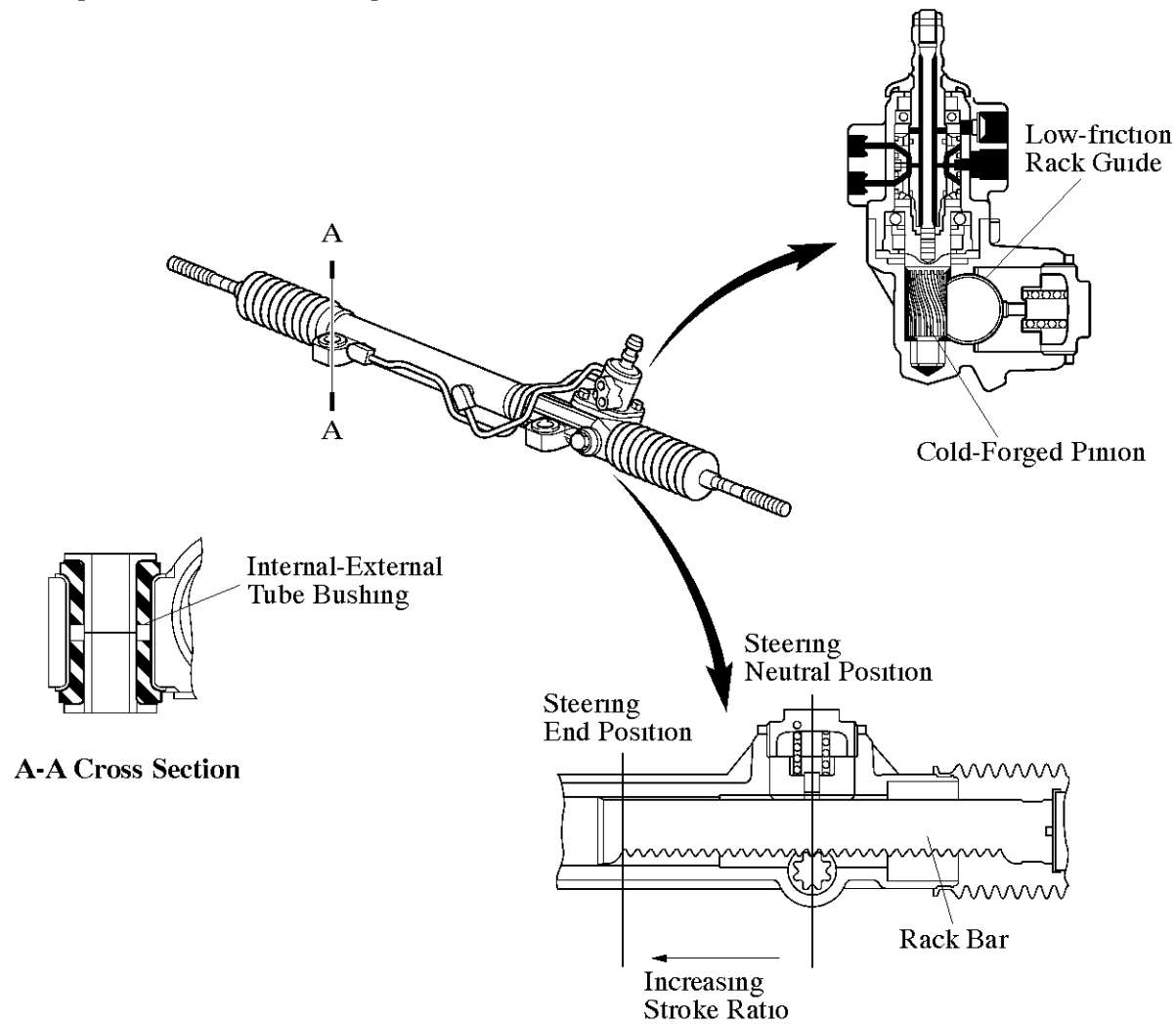


a: Switching Solenoid Valves
b: Control Solenoid Valve

■ STEERING

1. Steering Gear

- Internal-external tube bushings are now used to mount the steering gear assembly on the vehicle in order to facilitate a natural steering feel.
- A variable gear ratio type rack bar has been adopted. This rack bar its gear ratio established to increase the stroke ratio gradually as it changes from the steering neutral position to the end position. With this, steering maneuver will become reduced.
- A low friction rack guide and a cold-forged pinion are used in the power steering gear. A natural steering feeling has been achieved using these features.



9

230LX22

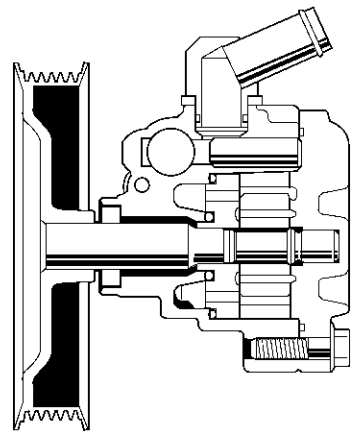
► Specifications ◀

Item	'03 Model	'02 Model
Gear Ratio (Overall)	17.3	19.8
No. of Turns Lock to Lock	3.3	3.8
Fluid Type	ATF Type DEXRON® II or III	←

2. Vane Pump

A compact and lightweight vane pump, which uses die-cast aluminum as the material for its housing, has been adopted.

By optimizing its internal construction, this vane pump has realized a low-friction operation, which leads to low fuel consumption. To match the characteristics of the engine that has been used in the '03 model, this vane pump differs slightly in construction, fluid discharge volume, and control flow volume.



230LX23

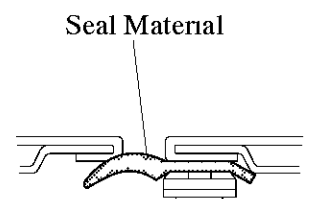
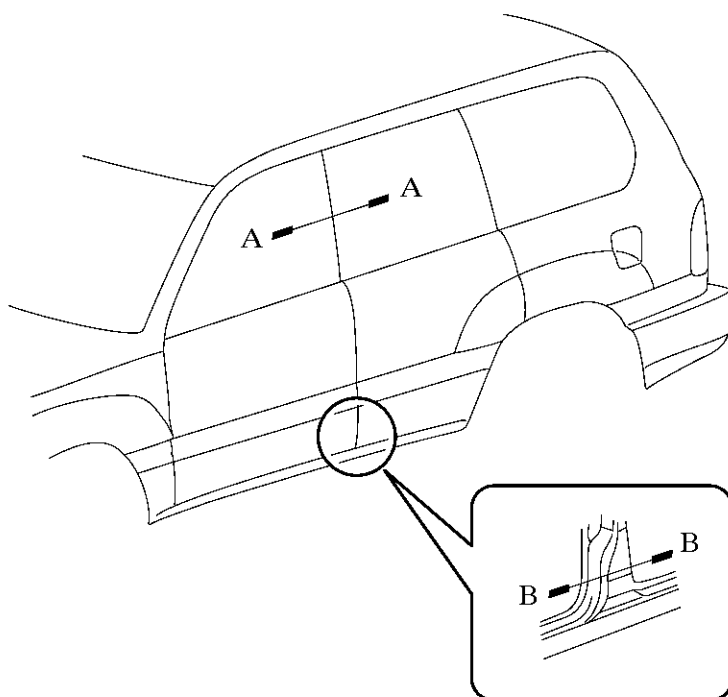
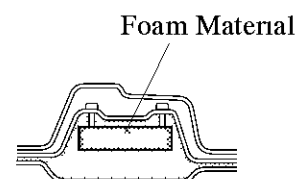
► Specifications ◀

Model		'03 Model	'02 Model
Operating Speed	rpm	500 – 7,000	←
Theoretical Discharge Rate	l / min	13*	←
Relief Pressure	MPa (kgf / cm ² , psi)	10 (102, 1450)	8.3 (85, 1204)

*: at 1,000 rpm

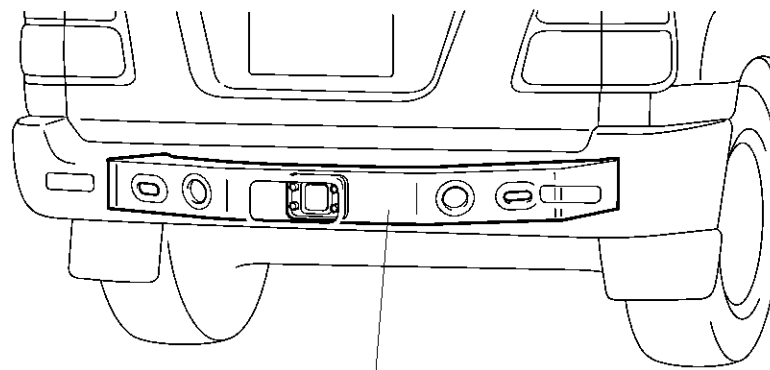
■ BODY**1. Low Vibration and Low Noise Body**

- The urethane pad at the bottom of the center pillar has been changed to a foam material. As a result, noise and vibration have been reduced.
- A sealing material has been provided on the door frame. As a result, noise and vibration have been reduced.

**A-A Cross Section****B-B Cross Section**

2. Towing Hitch

- Due to the adoption of a towing hitch as optional equipment, a dedicated rear cross member to which the towing hitch can be mounted has been adopted.
- This cross member has an opening in the center of the rear bumper so that a towing hitch can be installed by removing the plastic cover.



Cross Member

■ BODY ELECTRICAL SYSTEM CONTROL

1. Multiplex Communication System

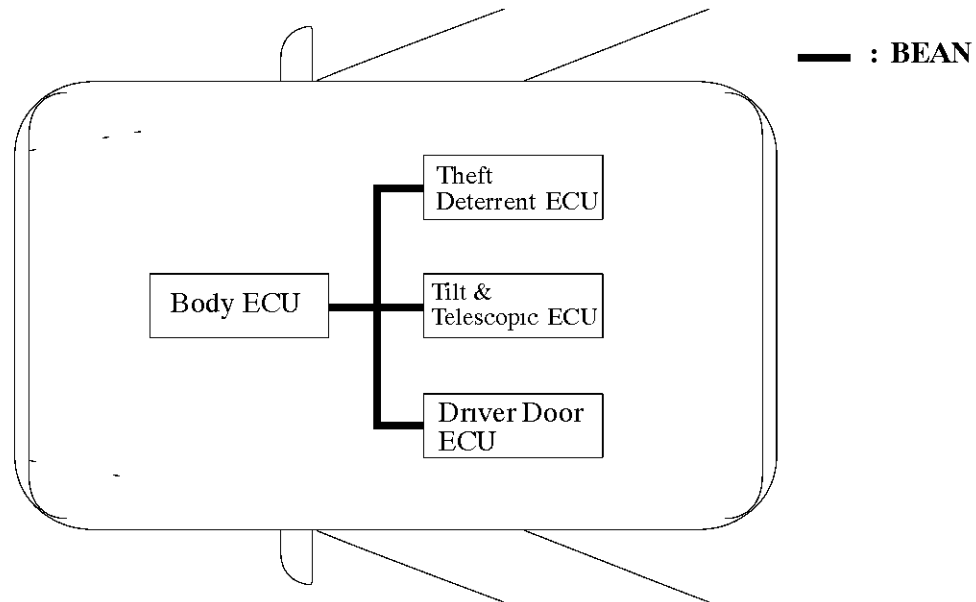
General

- The configuration of the BEAN (Body Electronics Area Network) has been changed in accordance with the addition of equipment. This system is divided into two buses: the bus in which communication is centered on the body ECU, and the bus in which communication is centered on the ECM.
- Based on the instrument ECU that is used on the previous model, the new model has adopted a body ECU that comprehensively controls the body electrical system through the addition of numerous control functions.
- The communication between the control signals related to the audio and visual systems and the gateway ECU is established via the AVC-LAN (Audio Visual Communication-Local Area Network). The transmission of the signals exchanged between BEAN and AVC-LAN is carried out by the gateway function of the gateway ECU.
- A customized body electronic system is used in order to set the control functions of the ECUs through the use of a hand-held tester.

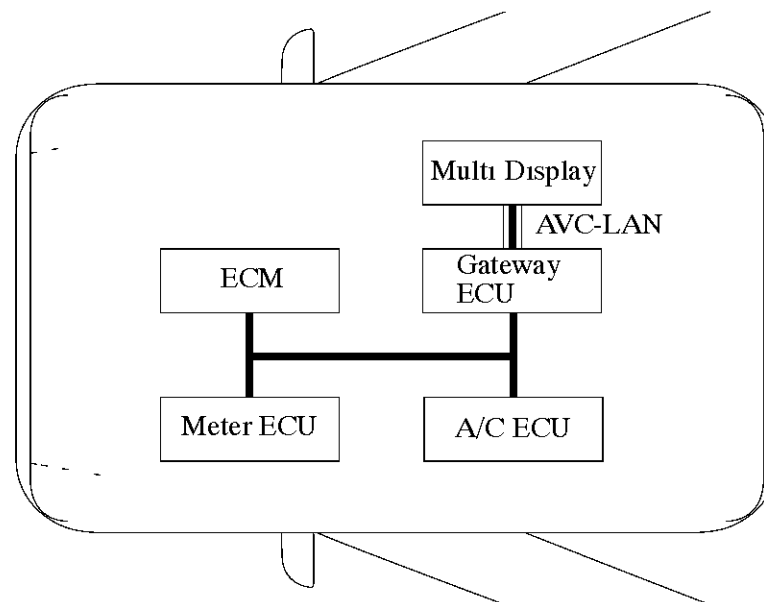
► ECUs that Support Multiplex Communication System ◀

Bus centered on body ECU		Bus centered on ECM	
Body ECU	○	ECM	○
Driver Door ECU	○	Meter ECU	○
Theft Deterrent ECU	○	A/C ECU	△
Tilt & Telescopic ECU	○	Gateway ECU	△
		Navigation ECU	△

○: Standard △: When EMV is installed

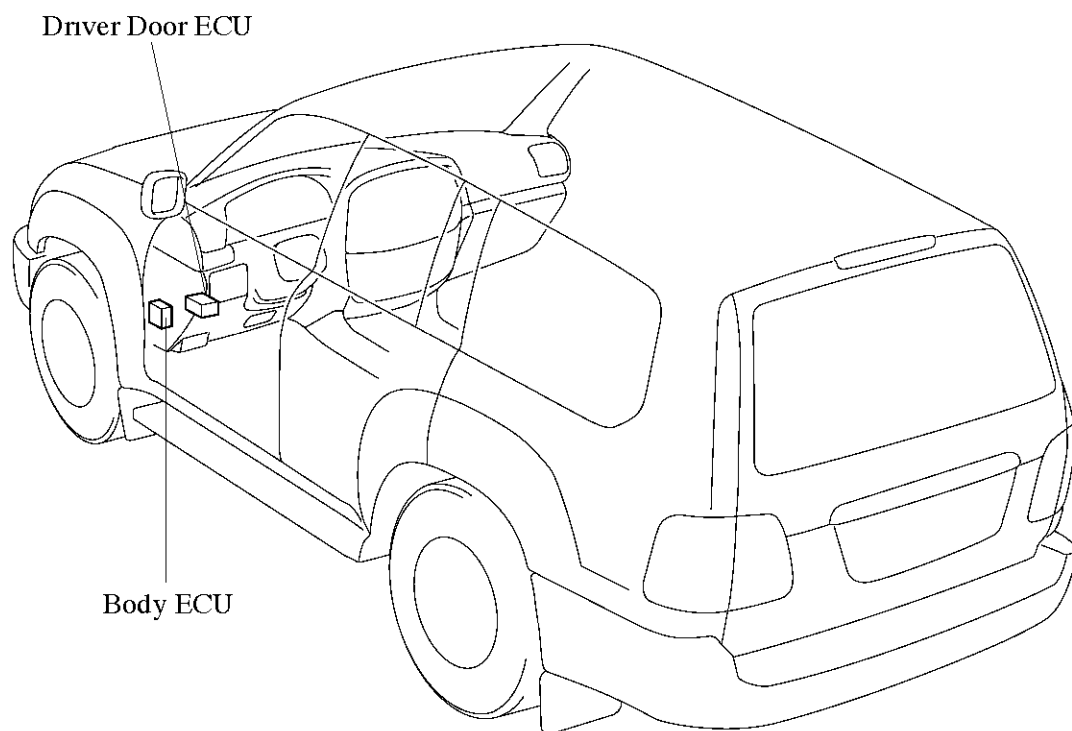
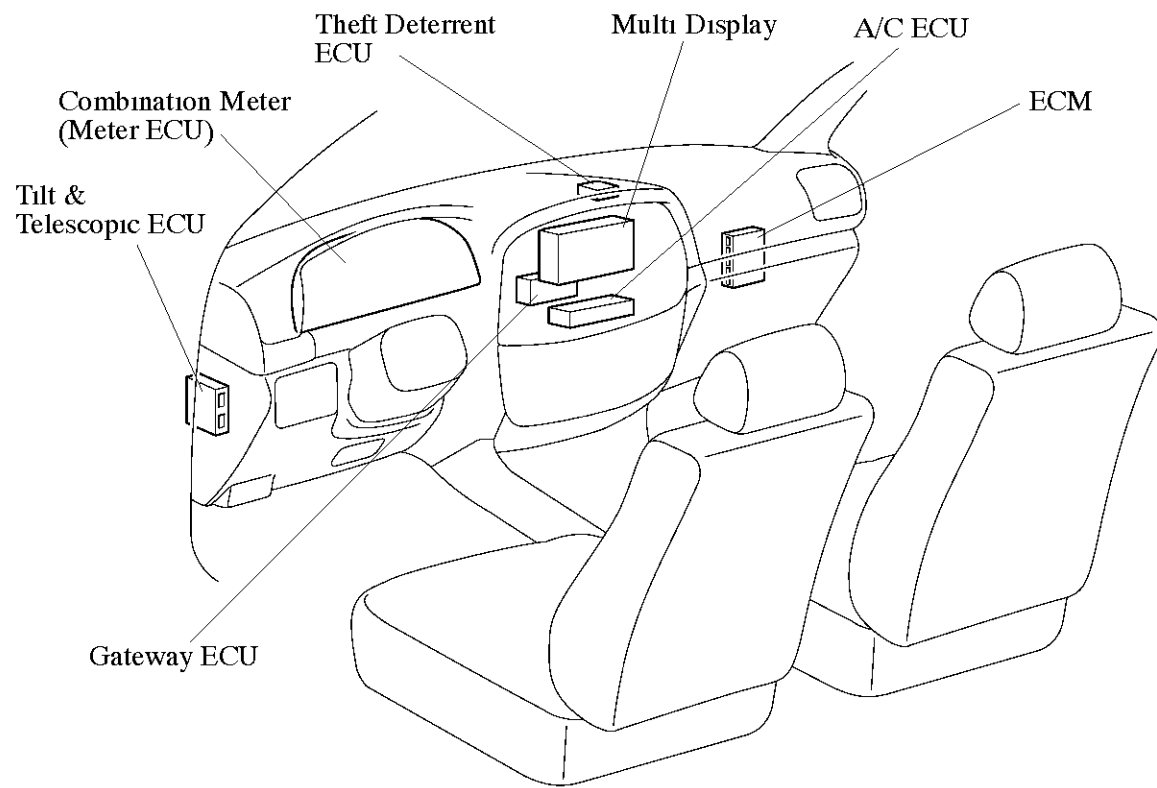
System Diagram**Bus Centered on Body ECU**

228LC04

**Bus Centered on ECM**

229LC143

Layout of Main Component



2. System Operation

General

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

	ECU	Function and System Control
Bus Centered on Body ECU	Body ECU	• Exterior Light Control • Interior Light Control • Warning Control • Door Lock Control • Passenger and Rear Power Window Control • Wireless Door Lock Remote Control • Theft Deterrent System Control • Customize
	Driver Door ECU	• Power Window System Control • Customize
	Theft Deterrent ECU	• Theft Deterrent System Control • Customize
	Tilt & Telescopic ECU	• Power Tilt and Telescopic Steering Column Control • Customize
Bus Centered on ECM	ECM	• Engine Control • A/T Control • Cruise Control
	Meter ECU	• Combination Meter Display • Buzzer System
	A/C ECU (for models with multi display)	Air Conditioner Control
	Gateway ECU (for models with multi display)	Gateway Function
	Multi Display (for models with multi display)	• Navigation System • Air Conditioner System Operation Function • Trip Information Function

Customized Body Electronics System

1) General

The customized body electronics system enables the control function settings of the ECUs to be changed through the use of a hand-held tester.

However, this system can change the settings of only the ECUs that belong to the bus in which communication is centered on the body ECU.

2) Operation

Operating a hand-held tester can change the specifications of the systems and functions.

The changed contents that are open to users are shown in the following list.

System	Hand Held Tester Display Content	Contents	Default	Selection
Wireless Door Lock Remote Control System	UNLOCK / 2 OPER (2 time operation wireless unlock)	Function to unlock the driver's door by pressing the unlock button of the transmitter once and to unlock all the doors by pressing it twice. In the OFF setting, pressing one time makes all the doors unlocked.	ON	ON/OFF
	AUTO LOCK DELAY (Auto lock time)	To change the time until re locking after unlocking with the wireless door lock function.	30 sec	30 sec / 60 sec
	HAZARD ANS BACK (Hazard answer back of the wireless)	Function to light up the all turn signal light once when pressing the transmitter lock button and twice when pressing the unlock button under the condition that the Engine Hood, and all the doors are closed.	ON	ON/OFF
	ALARM FUNCTION (Panic function)	Function to operate the theft deterrent system by keeping pressing the lock button of the transmitter for 2.5 seconds. If there is the panic button, press the panic button instead of the lock button.	ON	ON/OFF
	WIRELESS OPER (Wireless door lock control function)	ON / OFF of the wireless door lock function.	ON	ON/OFF
Door Lock Control System	AUTO LOCK (Auto lock)	Function to lock the door when the vehicle reaches to a certain speed.	OFF	ON/OFF
	AUTO LOCK / SHIFT (Auto lock / shift not P)	Function to lock the doors when shifting the lever from P range to the range other than P.	ON	ON/OFF
	UNLK / KEY TWICE (Unlock w / 2 times D key operation)	Function to unlock only the driver's door by doing the key operation once and to unlock all the doors by doing it twice. In the OFF setting, operating the key "UNLOCK" once makes all the doors unlocked.	ON	ON/OFF
Illuminated Entry System	I/L ON/UNLOCK (Interior light ON w/door key unlock)	Function to light up the interior light, ignition light and step light when unlocking with the door key cylinder.	ON	ON/OFF
	LIGHT CONTROL (Lighting time)	To change the lighting time after closing the door. (It will quickly fade out in case of turning the ignition ON.)	15 sec	7.5 sec. / 15 sec. / 30 sec.
	I/L ON/ACC OFF (Light the I/L when ACC OFF)	Function to light the interior light when the ignition switch is operated from "ACC" to "LOCK".	ON	ON/OFF
Light Control System	LIGHT OFF DELAY (Light auto OFF delay)	Function to keep on lighting the headlight for a certain period of time after closing all the doors with the ignition switch turned OFF from ON under the condition that the light control switch is at HEAD or AUTO with the headlight ON.	30 sec	OFF / 30 sec / 60 sec / 90 sec
	SENSITIVITY (Turn ON luminous intensity)	To adjust the sensitivity of the lighting illumination.	NORMAL	LIGHT 2 / LIGHT 1 / NORMAL / DARK1 / DARK2

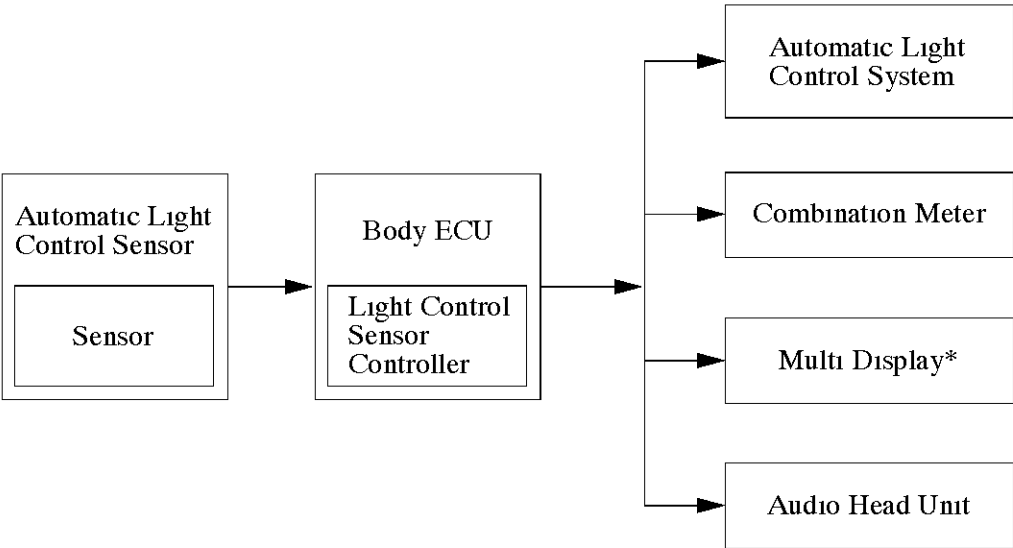
■ LIGHTING

Light Control Sensor

- The construction of the light control sensor that is used in the automatic light control system has been changed from the integrated sensor-and-controller unit to a separate sensor, with a controller enclosed in the body ECU. As a result, the information on the day-night judgment can now be used for controlling other systems.
- The table below indicates the controls that primarily use this information.

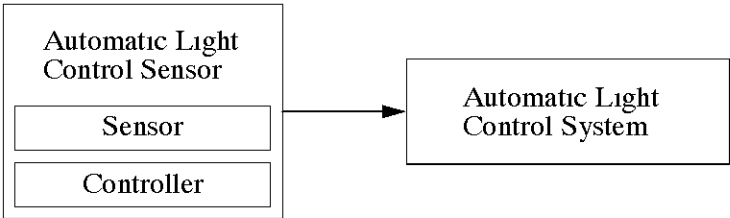
System	Function
Combination Meter, Multi Display*/ Audio Head Unit and Heater Control Panel Illumination Control	When the taillight switch is turned ON, the system initially determines that the surroundings of the vehicle have become dark and dims the illumination of the combination meter, multi display*, audio head unit and heater control panel to reduce the reflection on the windshield. Then, the system also verifies from the light control sensor signals whether the surroundings are actually dark to the extent that the illumination needs to be dimmed, and activates this control only if the surroundings are in fact dark.

* Only for Models with Multi Display



'03 Model

230LX47



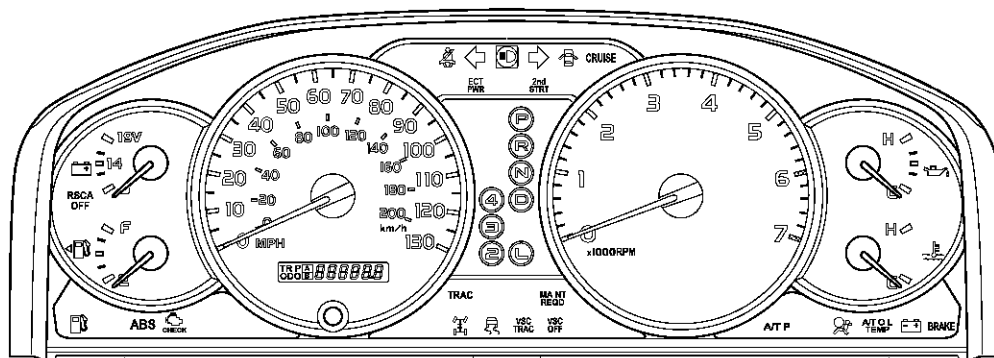
'02 Model

230LX48

■ COMBINATION METER

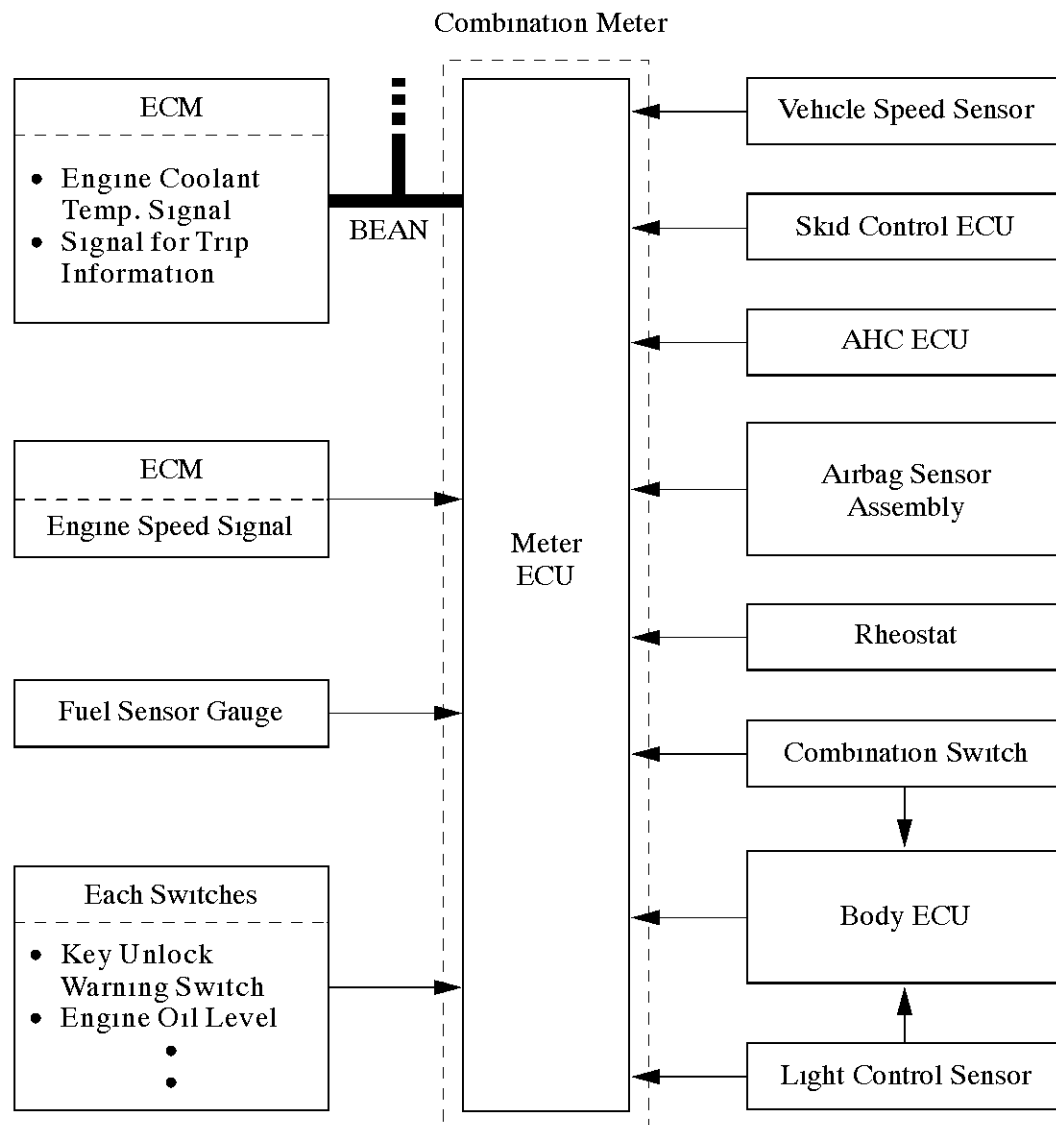
1. General

- The design of the combination meter has been changed.
- The movement for actuating the indicator of the speedometer and the tachometer has been changed from the cross-coil type of the previous model to a step-motor type.
- When the taillight switch is turned ON, the system initially determines that the surroundings of the vehicle have become dark and dims the illumination of the combination meter and heater control panel to reduce the reflection on the windshield. Then, the system also verifies from the light control sensor signals whether the surroundings are actually dark to the extent that the illumination needs to be dimmed, and activates this control only if the surroundings are in fact dark.



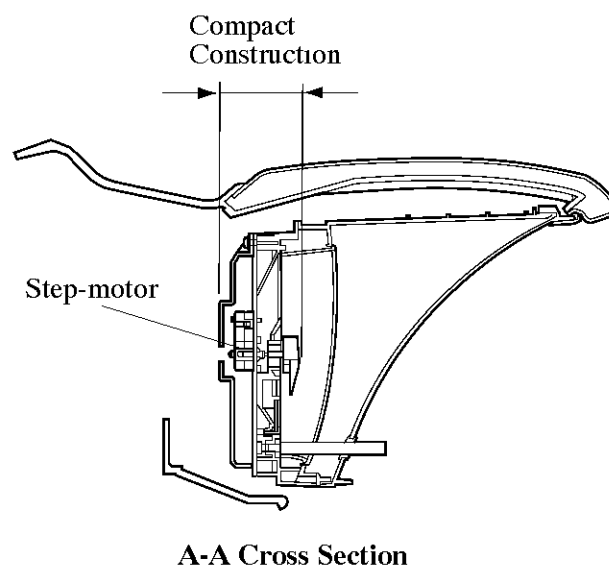
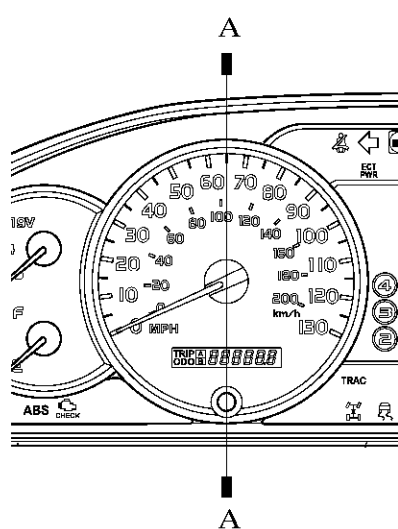
228L006

2. System Diagram



3. Construction

- The indicator actuation movement for the speedometer and the tachometer has been changed from the cross coil type to the step-motor type. This has resulted in a thinner indicator actuation movement, thus achieving a lightweight and compact construction.
- In the case of the step-motor type, when the power to the combination meter is turned ON through the reconnection of the battery terminal, the step-motor initializes once to recognize the zero point of the indicator in relation to the step-motor. However, if the ignition switch is turned ON after 60 seconds or more have elapsed after the initialization, the step-motor initializes again.



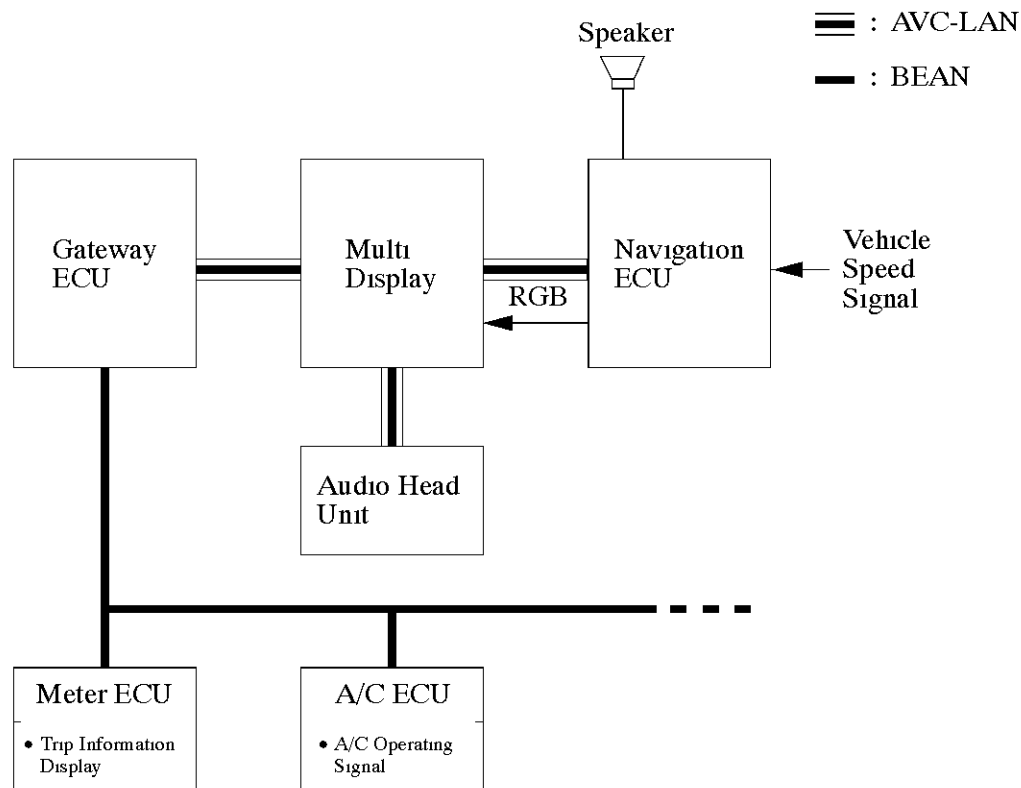
228LC11

■ MULTI DISPLAY

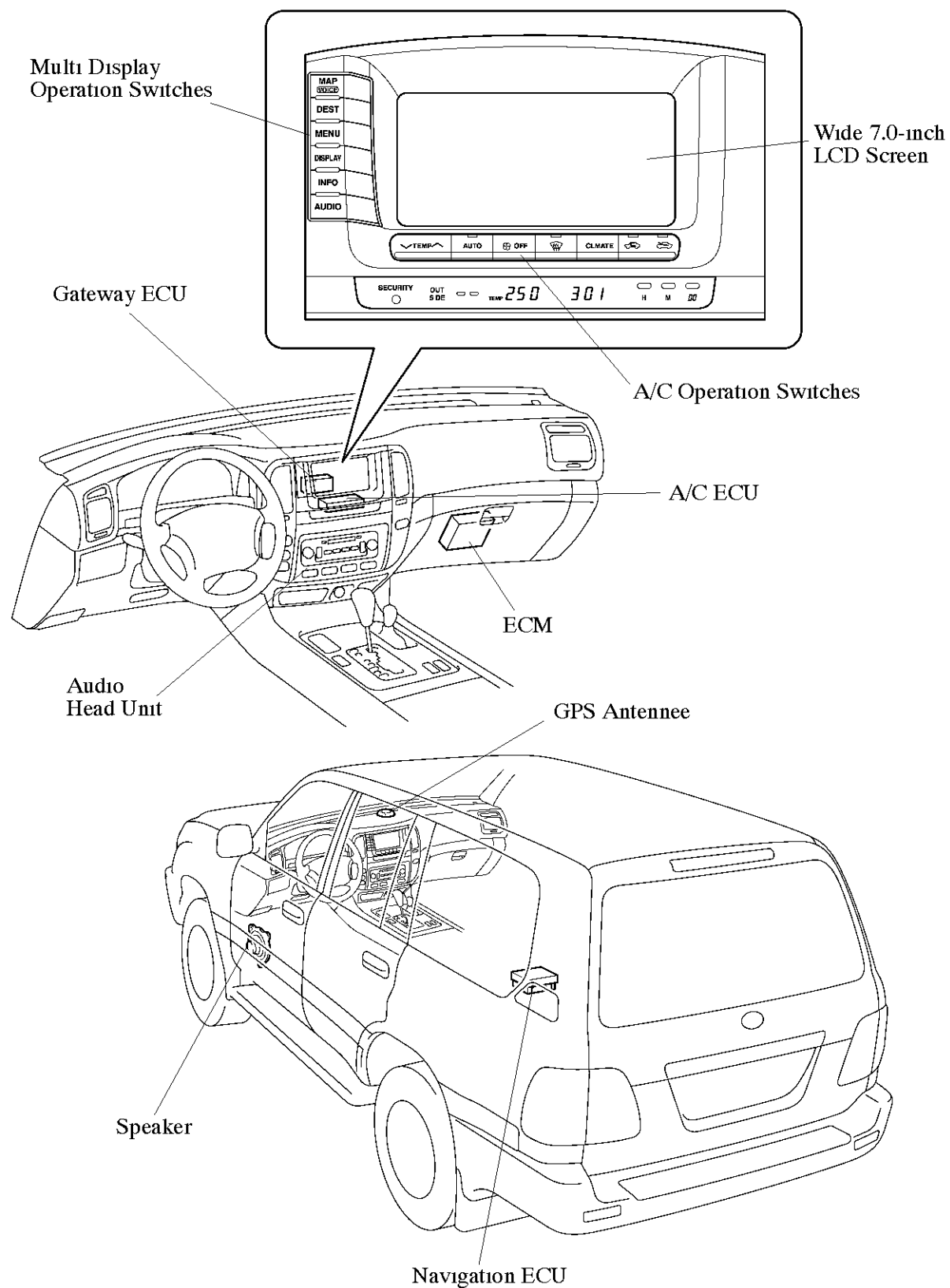
1. General

- A multi display has been provided on the center cluster panel as an option. The display, which consists of a wide 7.0-inch LCD (Liquid Crystal Display) screen with a pressure sensitive touch panel, offers improved ease of use.
- Through the use of the GPS (Global Positioning System) and 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.
- Upon receiving the vehicle information that is transmitted by the gateway ECU, the navigation information that is transmitted by the navigation ECU, the trip information that is transmitted by the meter ECU and the operation information from audio unit, multi display displays theses data on the display.

2. System Diagram



3. Layout of Main Component



4. Construction and Operation

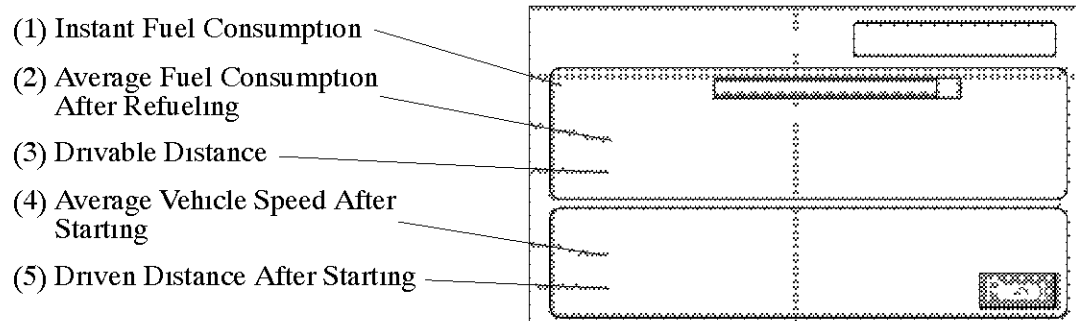
Multi Display

1) General

Listed below are the main functions 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 (See page 193)	• Instant Fuel Consumption. • Average Fuel Consumption after refueling. • Drivable Distance. • Average vehicle speed after starting • Driven distance after starting
Navigation Screen Display (See page 194)	• Language selector display. • 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
Diagnosis Screen Display (See page 195)	• Service Check Menu. • Display Check. • Navigation Check.

2) Trip Information Display



230LX56

Item		Outline
(1)	Instant Fuel Consumption	- Displays the value that has been calculated by the meter ECU, which is based on the driven distance and the fuel consumption volume (fuel injection signal from No. 1 injector), provided that the ignition switch is turned ON. - The display updates every 2 seconds.
(2)	Average Fuel Consumption After Refueling	- Displays the value that has been calculated by the meter ECU, which is based on the driven distance after refueling and the fuel consumption volume (fuel injection signal from No. 1 injector). - The meter ECU determines that the vehicle has been refueled in accordance with the signal from the fuel sender gauge. - The display updates every 10 seconds.
(3)	Drivable Distance	- Displays the value that has been calculated by the meter ECU, which is based on the fuel consumption data that the meter ECU continuously monitors and stores in its memory and the residual fuel volume data, provided that the ignition switch is turned ON. - The display updates every mile.
(4)	Average Vehicle Speed After Starting	- Displays the value that has been calculated by the meter ECU, which is based on the elapsed time and driven distance after the ignition switch has been turned ON or the RESET button has been pressed 0.8 seconds or longer. - The display updates every 10 seconds.
(5)	Driven Distance After Starting	- Displays the driven distance that is output by the meter ECU after the ignition switch has been turned ON or the RESET button has been pressed 0.8 seconds or longer. - The display updates every mile.

3) Navigation Screen Display

Based on the map data on the DVD, signal 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 the navigation display. This screen has the display functions listed below.

	Item	Function
Map Display	Linear Touch Scroll	Enables smooth scrolling by connecting the touch points on the screen
	On-route Scroll	Scrolls the center of the cursor forward and reverse constantly along the route.
	Heading Up	Displays the map so that the direction of the route progression head up during route guidance.
	Map Color Change	Automatically changes the map display color by season.
	Front Wide	Displays a map in the direction of travel of the vehicle in an enlarged form. (Heading up only)
	Step-less Scale Display	Changes the scale of the map from the basic 13 steps to an even finer display.
	Direct Scale Change	Directly selects and displays the map scale.
	Multi-step Scale Display	Changes and displays the map scale in 13 stages.
	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 number on the map.
Destination Search	Last Destination Memory	Stores 20 locations of coordinates, names and times that have been set as destinations in the past.
	Hybrid Points-of-interest Search	Narrows the search by names of the points-of-interest, category, and areas.
	Points-of-interest Pinpoint Display	Pinpoints and displays the position of the point-of-interest.
	House Number Search	Searches for a house number.
	Special Memory Point	Sets a pre-registered point as a destination point while driving.
	Nearest Point-of-interest Search List Display	Searches nearest points-of-interest and displays a list.
	Intersection Search	By specifying two streets, the point at which they intersection is set as the destination point.
	Motorway Entrance / Exit Search	Searches for the destination by the name of the street that connects to a motorway entrance / exit.
Route Search	Multiple Destination Setting	Sets multiple destinations. It can also rearrange the sequence of the destinations.
	Route Search	Searches for multiple routes.
	Search Condition Designation	Searches for the recommended, shortest, and other routes.
	Regulated Road Consideration	Performs search while considering regulated roads.
	Avoidance Area	Avoids a designated area and searches a route.

(Continued)

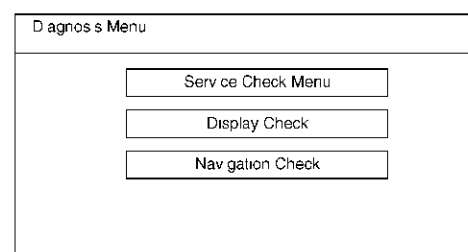
Item		Function
Guidance	Destination Direction Arrow Display	Function to display the direction from the current position to the destination in case of being off the route during the guidance.
	Off-Route Arrow Display	Function to display the route ahead on the route guidance line in case of being off the route during the guidance.
	Rotary Guidance	To guide with a special voice phrase in the rotary.
	Right or Left Turn Guidance	Voice guidance to instruct the direction of travel to be taken.
	Freeway Direction of Travel Guidance	Voice guidance to instruct the direction of travel to take on the freeway.
	Distance Display Destination	Displays the distance from the present location to the destination.
	Freeway Branch Type Specimen Guidance	Type specimen for guidance to a freeway branch.
	Intersection Zoom-in Display	Zoom-in display when approaching an intersection.
	Turn List Display	Displays a turn list on the right side of the two-screen display when approaching an intersection.
Others	Language Selector	The language of the text displayed on the navigation screen and of the voice guidance can be selected from 2 languages.
	Calendar	Enables calendar display until 2020 and memo registration.

4) Diagnosis Screen Display

The navigation display is equipped with a self-diagnosis system and can display the diagnosis menus shown on the right.

The diagnosis menu contains the following three items

- Service Check Menu
- Display Check
- Navigation Check



187BE37

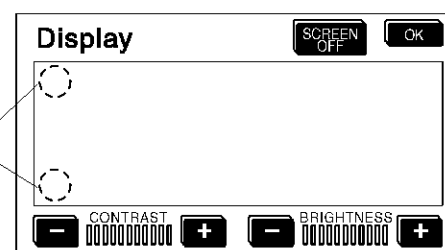
9

Service Tip

The diagnosis menu screen can be displayed according to the procedure given below.

- 1) Vehicle speed should be 0 km/h (0 mph).
- 2) Apply the parking brake.
- 3) Turn the ignition switch to ACC or ON.
- 4) Push the DISPLAY button.
- 5) Activate the screen adjustment screen.
- 6) Alternately touch the upper and lower bottom parts of the left end of the screen 3 times.

Concealed
Touch Switch



199BE404

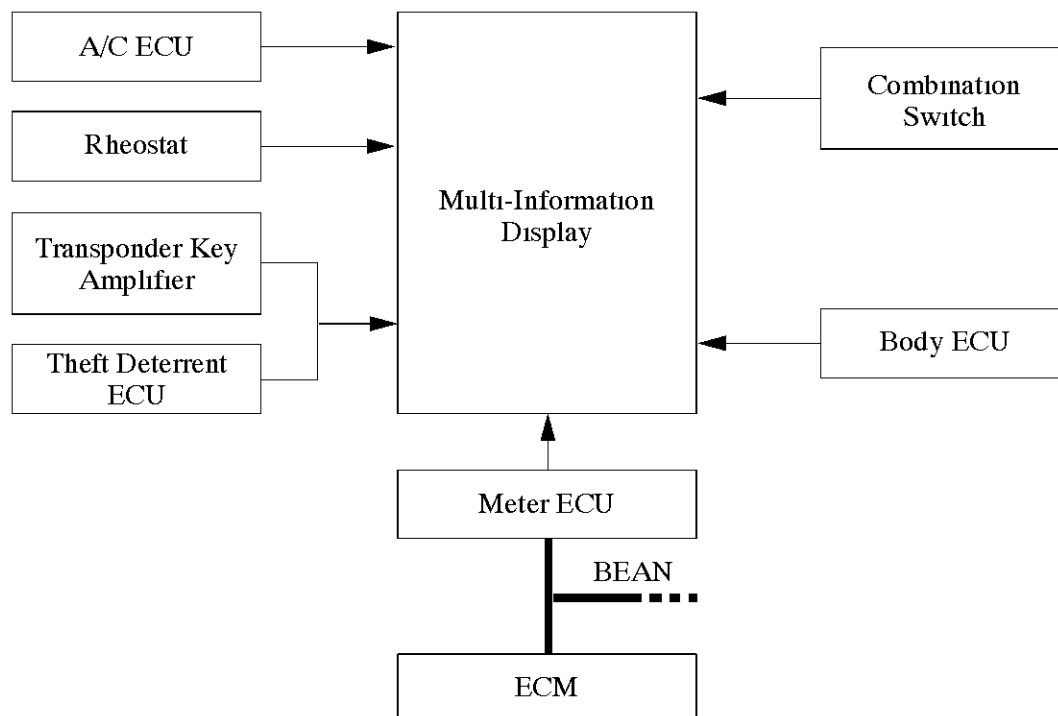
For details, refer to the 2003 Land Cruiser Repair Manual (Pub. No. RM966U).

■ MULTI-INFORMATION DISPLAY

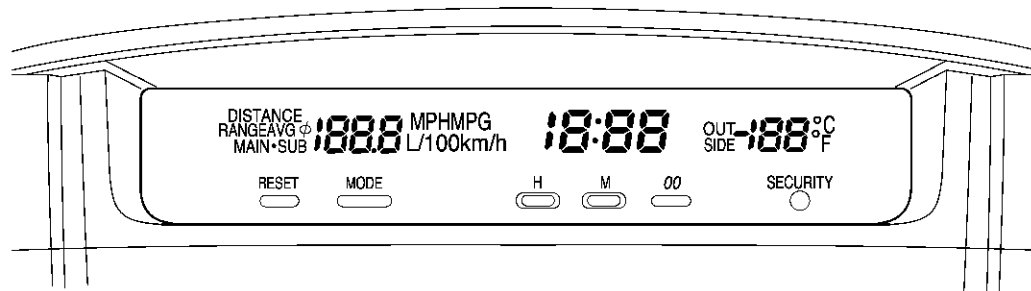
1. General

- The function to display trip information has been added to the multi-information display, which is provided above the audio head unit.
- The following pieces of information appear on the multi-information display: instant fuel consumption, average fuel consumption after refueling, drivable distance, average vehicle speed after starting, and driven distance after starting.
- The display functions can be switched by operating the MODE and RESET switches.
- In this system, the meter ECU calculates the contents to be displayed and the accessories meter ECU controls the displays.

► System Diagram ◀



2. Display Portion



230LX58

Item	Display Contents	Outline
Average Vehicle Speed After Starting	AVG 52.5 km/h 230LX59	- Displays the value that has been calculated by the meter ECU, which is based on the elapsed time and driven distance after the ignition switch has been turned ON or the RESET button has been pressed 0.8 seconds or longer. - The display updates every 10 seconds.
Average Fuel Consumption After Refueling	AVG 9.6 L/100km 230LX60	- Displays the value that has been calculated by the meter ECU, which is based on the driven distance after refueling and the fuel consumption volume (fuel injection signal from No. 1 injector). - The meter ECU determines that the vehicle has been refueled in accordance with the signal from the fuel sender gauge. - The display updates every 10 seconds.
Instant Fuel Consumption	9.2 L/100km 230LX61	- Displays the value that has been calculated by the meter ECU, which is based on the driven distance and the fuel consumption volume (fuel injection signal from No. 1 injector), provided that the ignition switch is turned ON. - The display updates every 2 seconds.
Driven Distance After Starting	DISTANCE 270 km 230LX62	- Displays the driven distance that is output by the meter ECU after the ignition switch has been turned ON or the RESET button has been pressed 0.8 seconds or longer. - The display updates every kilometer or mile.
Drivable Distance	RANGE 536 km 230LX63	- Displays the value that has been calculated by the meter ECU, which is based on the fuel consumption data that the meter ECU continuously monitors and stores in its memory and the residual fuel volume data, provided that the ignition switch is turned ON. - The display updates every kilometer or mile.

3. Switch

Switch	Function
MODE	- Pressing MODE switch changes the contents of the multi-information display in the following sequence: <pre> graph TD A[Average Vehicle Speed After Starting] --> B[Driven Distance After Starting] B --> C[Drivable Distance] C --> D[Average Fuel Consumption After Refueling] D --> E[Instant Fuel Consumption] E --> A </pre> - If the MODE switch is pressed 1.7 seconds or longer while the ignition switch is ON, the display changes into the display unit switching mode (by blinking the display unit). By pressing the RESET switch at this time, a display unit that matches the destination of the vehicle can be selected.
RESET	Pressing the RESET switch 0.8 seconds or longer resets the display contents of each mode.

■ SRS AIRBAG SYSTEM

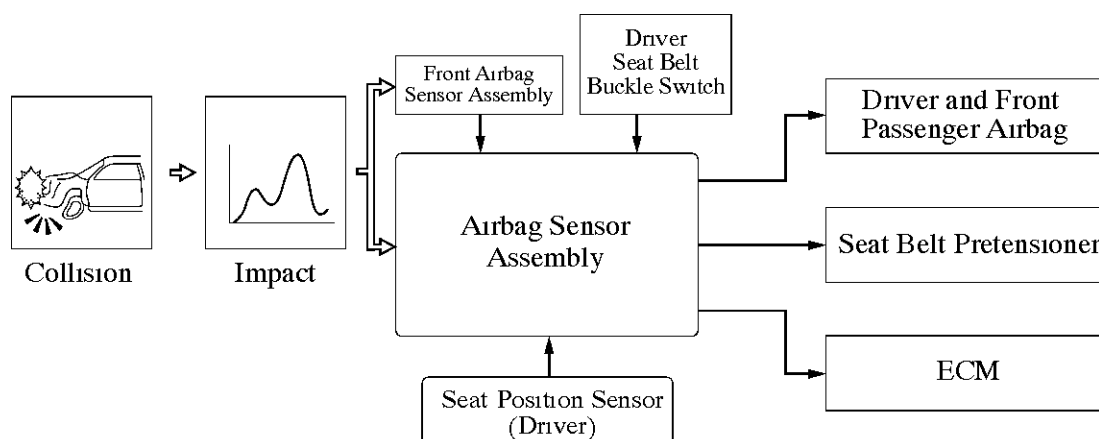
1. General

- On the '03 model, a curtain shield airbag system that helps reduce the impact applied to the front and rear seat occupants with a single curtain shield airbag has been adopted as optional equipment. In conjunction with this system, a side and curtain shield airbag sensor assembly has been provided at the bottom of the center pillar and a curtain shield airbag sensor assembly at the bottom of the rear pillar.
- In this system, a front side collision is detected by the side and curtain shield airbag sensor assembly in order to simultaneously deploy the side and curtain shield airbags. A rear side collision is detected by the curtain shield airbag sensor assembly and the airbag sensor assembly in order to deploy only the curtain shield airbag.
- Roll sensing of curtain shield airbags control has been adopted in order to deploy the curtain shield airbags and the seat belt pretensioners for the driver and front passenger, in the event that the vehicle rolls over. A roll sensing of curtain shield airbags cutoff switch is provided on the driver side of the instrument panel to enable the driver to disable this system.
- Dual-stage SRS airbags system, that controls the airbag inflating output optimum by judging the extent of impact and seat position, has been adopted for the driver and front passenger airbags as standard equipment.
- In accordance with the adoption of the dual-stage SRS airbag system, a seat position sensor has been established for the driver seat.
- On the new model, the previous mechanical type front airbag sensor assembly (consisting of movable and stationary contact points) has been changed to an electrical (deceleration sensor) type front airbag sensor assembly.
- Front passenger airbag door is made invisible. This means that without the airbag door, the airbag will be inflated by breaking to open the cleavage line stored in the instrument panel inflating.
- This system has adopted a fuel cut control that stops the fuel pump when the airbag is deployed.
- Along with the aforementioned changes, new DTC (Diagnostic Trouble Code) have been added.

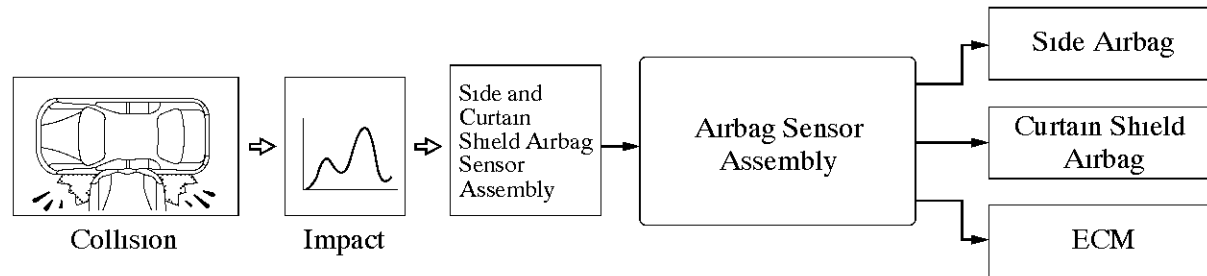
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2. System Diagram

► Front Airbag Operation ◀

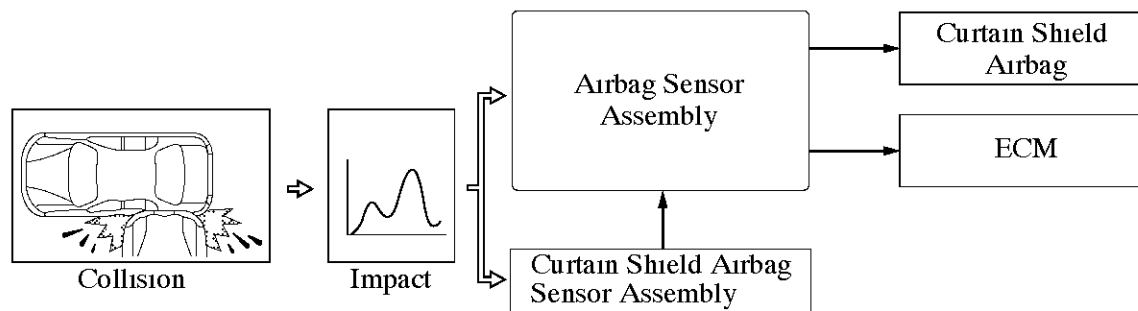


► Side and Curtain Shield Airbag Operation ◀



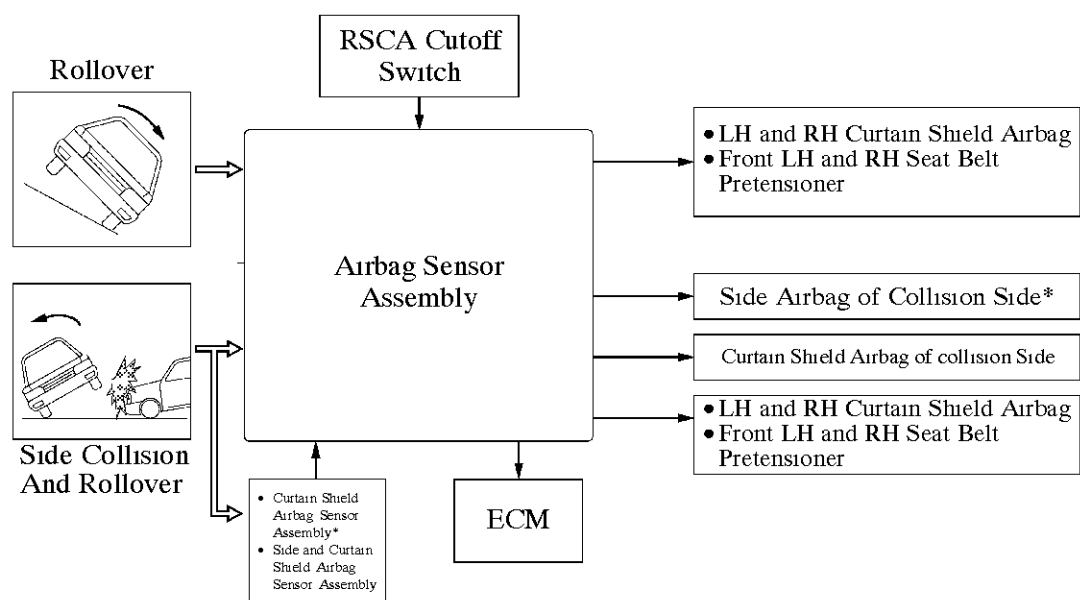
231LX13

► Curtain Shield Airbag Operation ◀



231LX14

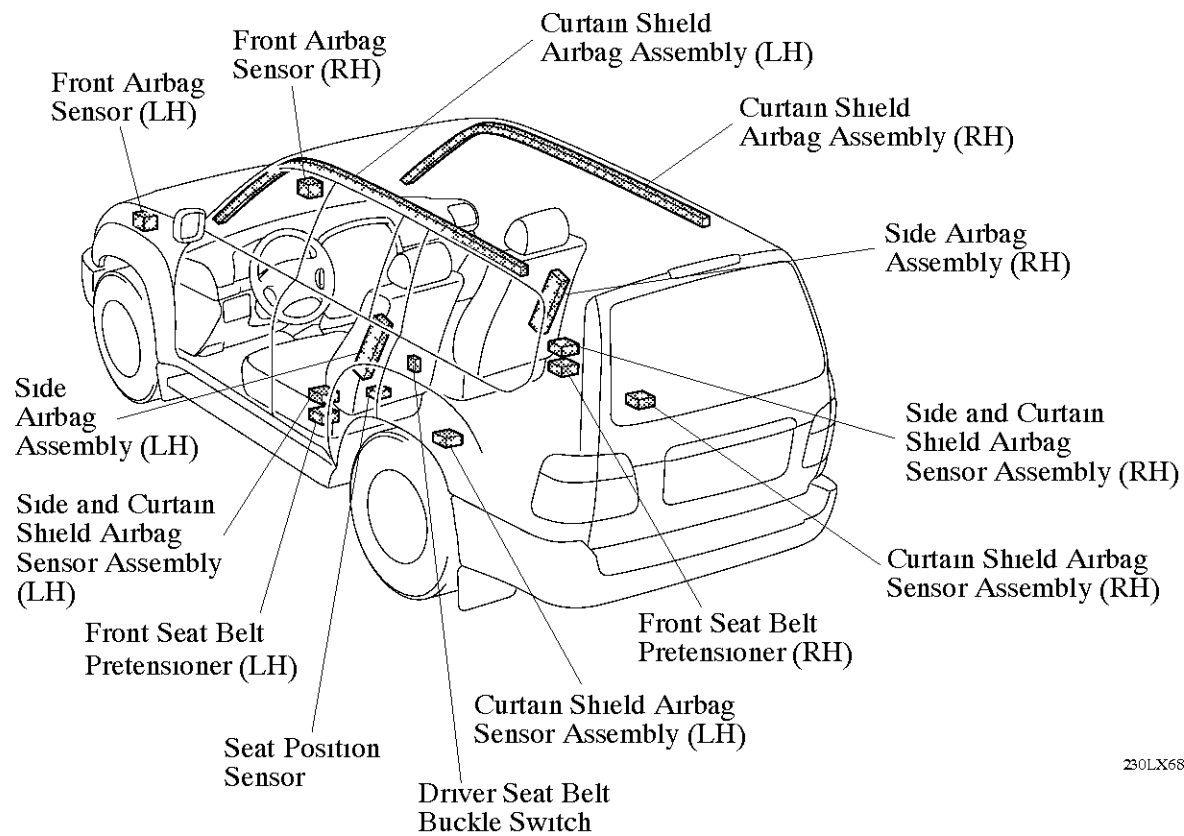
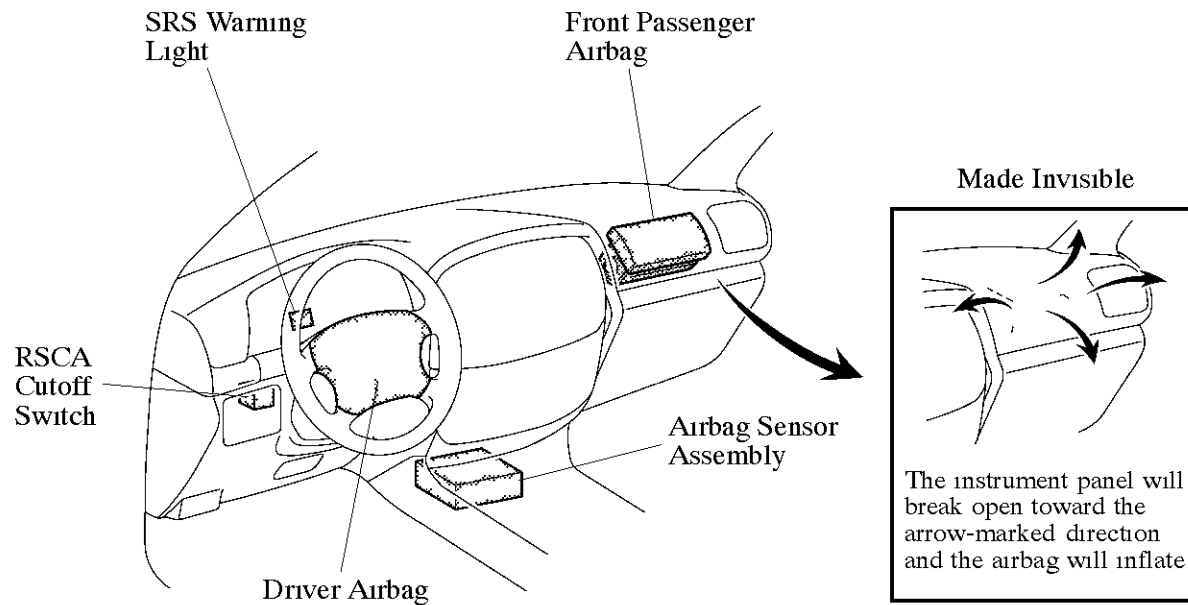
► Roll Sensing of Curtain Shield Airbags Operation ◀



231LX15

* : Activates depending on the condition of the collision.

3. Layout of Main Components



4. Construction and Operation

Dual-stage SRS Airbags System

1) General

In this system, when the front airbag sensors and airbag sensor assembly detect the front collision, the airbag sensor assembly judges the extent of impact and seat position, Thus making the airbag inflating output optimum by delaying the inflating timing of the 2nd initiator and the 1st initiator.

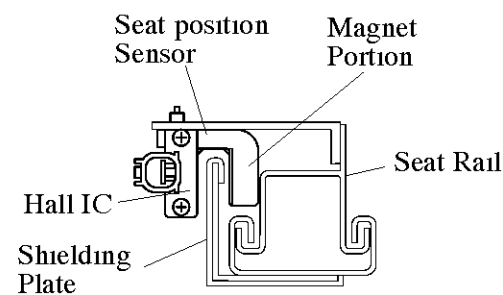
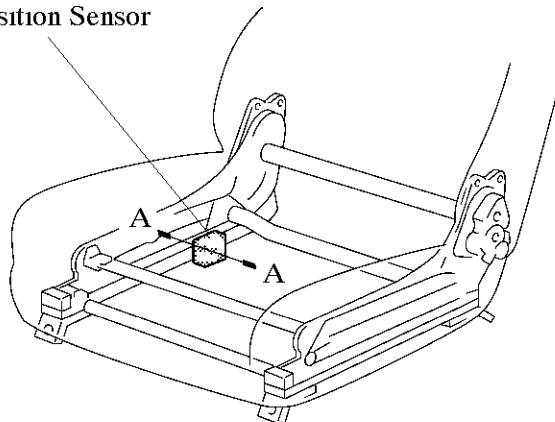
Service Tip

In accordance with the structure change of the driver and front passenger inflators on '03 Land Cruiser, a SST (09082-00800) used for scrapping driver and front passenger airbag assemblies of the vehicle has been newly established.

2) Seat Position Sensor

- The seat position sensor, which is attached to the seat rail of the driver seat, detects the sliding position of the seat. In addition, the shielding plate to make the seat position sensor judge the seat position is installed on this seat rail.
- The seat position sensor use a Hall IC for its sensor and has magnet portion on its opposite side.

Seat position Sensor



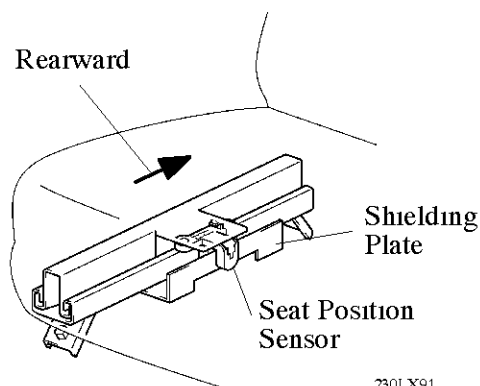
A-A Cross Section

230LX69

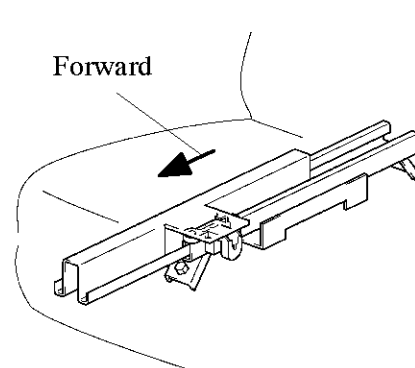
- The seat position detection by the seat position sensor judges that the seat position is rearward if the shielding plate is between the sensor and the seat position is forward if the shielding plate is not between the sensor.

► Seat position is rearward ◄

► Seat position is forward ◄



230LX91



230LX92

Roll Sensing of Curtain Shield Airbags Control

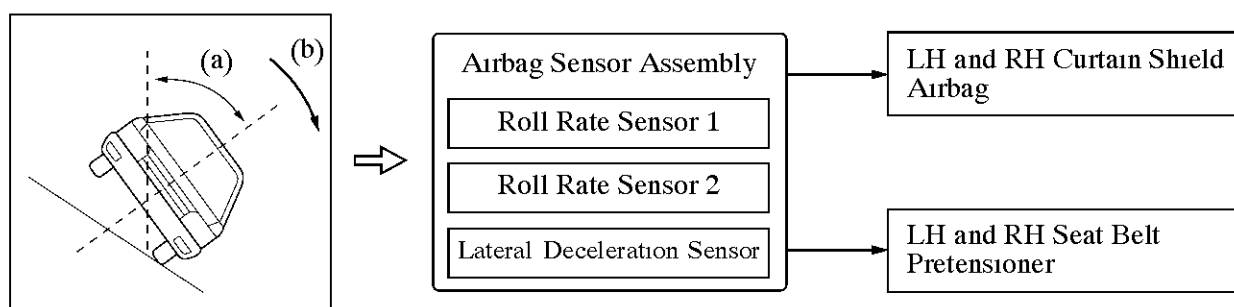
1) General

- In this system, the airbag sensor assembly contains a roll rate sensor 1 and roll rate sensor 2 (that determine the inclination angle of the vehicle) and a lateral deceleration sensor (that determine the lateral force that is applied to the vehicle). These sensors detect the vehicle's roll angle (a), rotational speed (b), and lateral acceleration speed (c).
- Based on the information obtained from the sensors, the airbag sensor assembly makes an overall judgment of the vehicle's roll angle (a), rotational speed (b), and lateral acceleration speed (c). If the airbag sensor assembly determines that the vehicle has rolled over due to a cause other than the side collision, it deploys the right and left curtain shield airbags and the front right and left seat belt pretensioners.

If the airbag sensor assembly determines that the vehicle has rolled over due to a cause such as a side collision, it deploys the side and curtain shield airbags on the side of the vehicle that has sustained the collision, as well as the curtain shield airbag of the opposite side and the front right and left seat belt pretensioners.

- This system provides a roll sensing of curtain shield airbags cutoff switch on the driver side of the instrument panel with which the driver can stop the operation of the function. However, by operating this cutoff switch and while the roll sensing of the curtain shield airbag control is OFF, and when the airbag sensor assembly judges to operate the side and curtain shield airbag system in the event of side collision, it is no need to prohibit this operation.

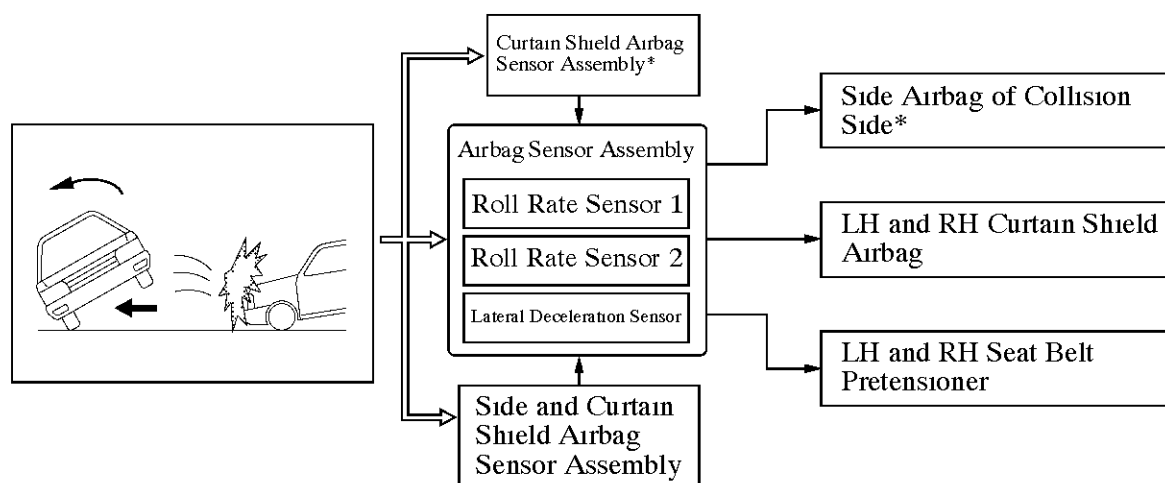
► Rollover Detection ◀



9

230LX71

► Side Collision and Rollover Detection ◀

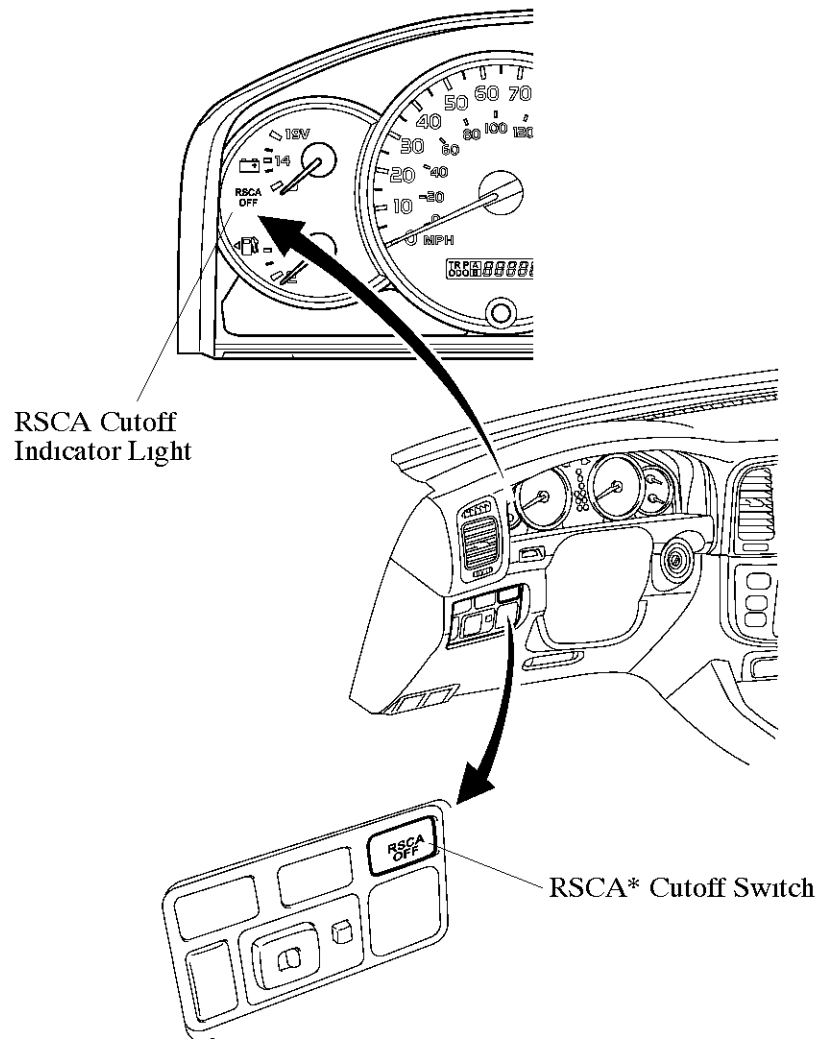


* : Activates depending on the condition of the collision.

230LX72

2) Roll Sensing of Curtain Shield Airbags Cutoff Switch

- The roll sensing of curtain shield airbags cutoff switch is mounted on the driver side of the instrument panel.
- Pressing this switch longer than 2 seconds, it enables to cut off the operation of the roll sensing of the curtain shield airbags control.
- This switch is a momentary type. Each time when the ignition switch is turned ON, in spite of the condition selected previously, roll sensing of the curtain shield airbags control will return to ON condition.
- When this switch is turned ON, an indicator light in the combination meter illuminates to inform the driver that the operation of the roll sensing of curtain shield airbags control has been disabled.



228LC14

*: RSCA (Roll Sensing of Curtain Shield Airbag)

Front Airbag Sensor Assembly

- The front airbag sensor assembly is mounted on the radiator support.
- The deceleration sensor is enclosed in the front airbag sensor assembly based on the deceleration of the vehicle that occurs during a front collision. The distortion that is created in the sensor is converted into an electric signal. Accordingly, the extent of the initial collision can be detected in detail.

Diagnosis Function

The following DTC is newly added.

DTC No.	Detection Item	DTC No.	Detection Item
B1180 / 17	Short in D squib (2nd step) circuit	B0111 / 44	Open in side squib (RH) circuit
B1181 / 18	Open in D squib (2nd step) circuit	B0117 / 45	Short in side squib (LH) circuit (to ground)
B1182 / 19	Short in D squib (2nd step) circuit (to ground)	B0118 / 46	Short in side squib (LH) circuit (to B+)
B1183 / 22	Short in D squib (2nd step) circuit (to B+)	B0115 / 47	Short in side squib (LH) circuit
B1153 / 25	Seat position sensor assembly malfunction	B0116 / 48	Open in side squib (LH) circuit
B0126 / 27	Seat belt buckle switch (LH) malfunction	B1187 / 55	Short in P squib (2nd step) circuit (to ground)
B0127 / 27	Seat belt buckle switch (LH) malfunction	B1188 / 56	Short in P squib (2nd step) circuit (to B+)
B1628 / 29	RSCA* cutoff indicator light malfunction	B1185 / 57	Short in P squib (2nd step) circuit
B1140 / 32	Side airbag sensor assembly (RH) malfunction	B1186 / 58	Open in P squib (2nd step) circuit
B1141 / 33	Side airbag sensor assembly (LH) malfunction	B1162 / 81	Short in curtain shield airbag (RH) circuit (to ground)
B1148 / 36	Front airbag sensor (RH) malfunction	B1163 / 82	Short in curtain shield airbag (RH) circuit (to B+)
B1149 / 37	Front airbag sensor (LH) malfunction	B1160 / 83	Short in curtain shield airbag (RH) squib circuit
B1154 / 38	Curtain shield airbag sensor assembly (RH) malfunction	B1161 / 84	Open in curtain shield airbag (RH) squib circuit
B1155 / 39	Curtain shield airbag sensor assembly (LH) malfunction	B1167 / 85	Short in curtain shield airbag (LH) circuit (to ground)
B0112 / 41	Short in side squib (RH) circuit (to ground)	B1168 / 86	Short in curtain shield airbag (LH) circuit (to B+)
B0113 / 42	Short in side squib (RH) circuit (to B+)	B1165 / 87	Short in curtain shield airbag (LH) squib circuit
B0100 / 43	Short in side squib (RH) circuit	B1166 / 88	Open in curtain shield airbag (LH) squib circuit

*: RSCA (Roll sensing of curtain shield airbags)

■ AUDIO SYSTEM

1. RSAS (Rear Seat Audio System)

General

- An RSAS (Rear Seat Audio System) has been adopted as standard equipment.
- In this system, a rear audio control panel is provided behind the center console. By using headphones on this panel, the rear seat occupants can listen to an audio mode different from the one that is currently selected in the front head unit.
- The table below shows the modes that can be selected with this system.

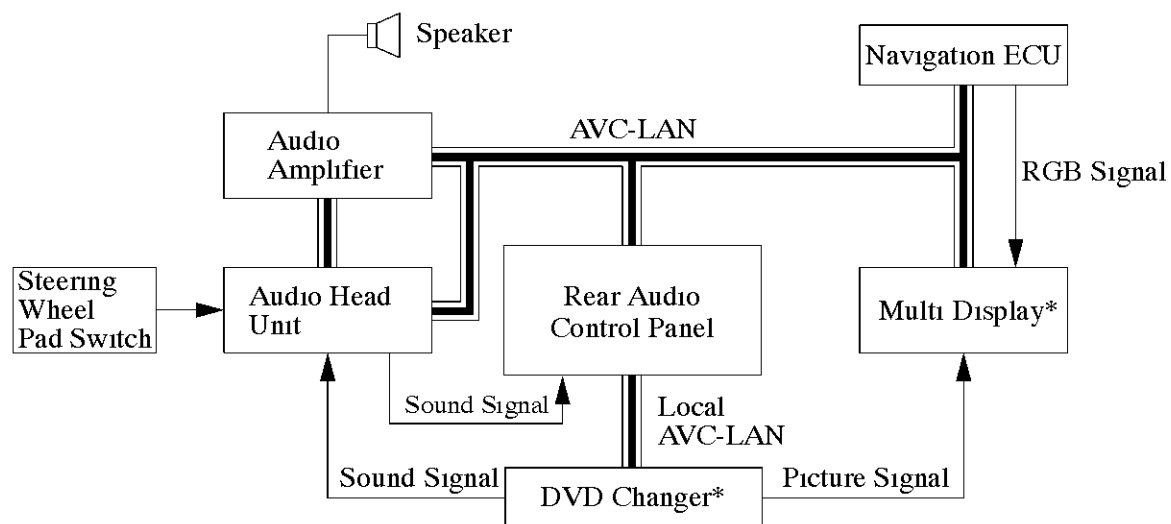
Front	Rear	OFF	Radio		Cassette	DVD Changer* ¹ , * ²
			AM	FM		
OFF		○	○	○	○	○
Radio	AM	○	○* ³	—	○	○
	FM	○	—	○* ³	○	○
Cassette		○	○	○	○	○
DVD Changer* ¹		○	○	○	○	○

*¹: Optional Equipment

*²: Audio Only

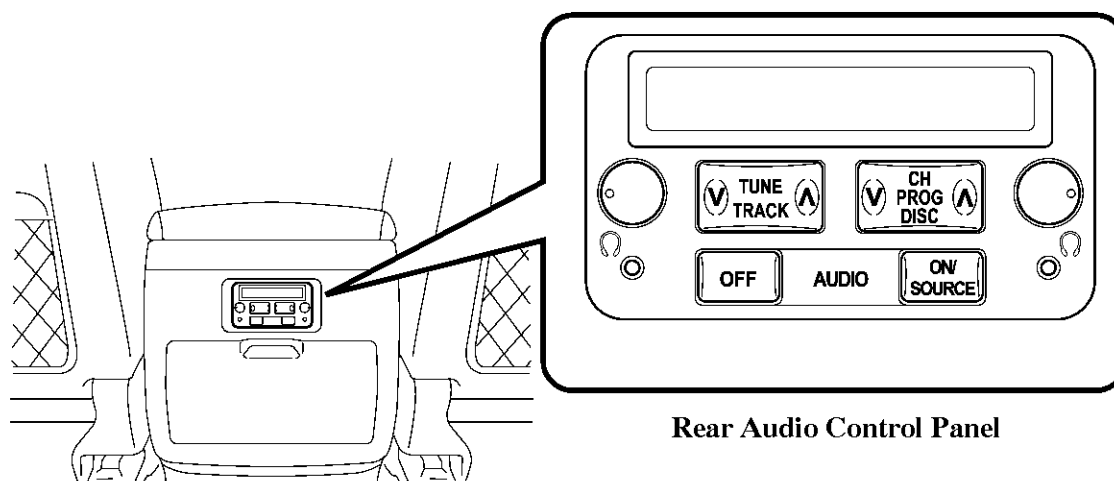
*³: It is not possible to tune to a different radio station between the front and rear seats.

System Diagram



*: Optional Equipment

Layout of Main Component



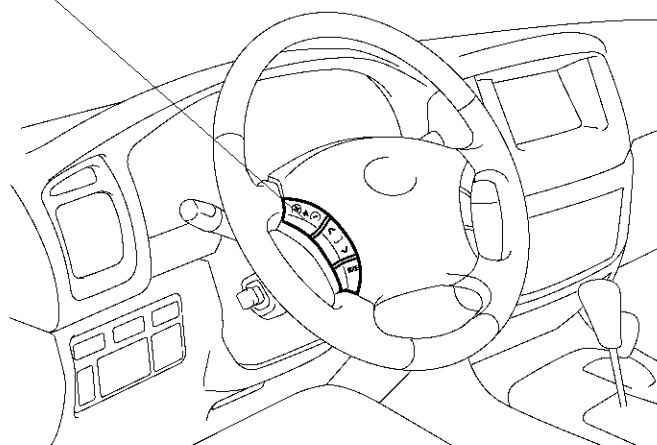
229LC158

2. Steering Pad Switch

- The steering wheel with steering pad switch has been adopted as standard equipment.
- The audio control switches with a high use frequency have located on the steering pad in the form of steering pad switches to improve the ease of use.

9

Steering Pad Switch



230LX90

MAJOR TECHNICAL SPECIFICATIONS

Item		Area		U S A	
Body Type				Wagon	
Vehicle Grade				—	
Model Code				UZJ100L GNAEKA	
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	4890 (192.5)	5
		Width	mm (in.)	1940 (76.4)	
		Height	mm (in.)	1875 (73.8)	
	Wheel Base		mm (in.)	2850 (112.2)	
	Tread	Front	mm (in.)	1620 (63.8)	10
		Rear	mm (in.)	1615 (63.6)	
	Effective Head Room	Front	mm (in.)	993 (39.1)	
		Rear	mm (in.)	987 (39.9) 979 (38.5)*2	
	Effective Leg Room	Front	mm (in.)	1074 (42.3)	
		Rear	mm (in.)	870 (34.3) 752 (29.6)*2	
	Shoulder Room	Front	mm (in.)	1558 (61.3)	15
		Rear	mm (in.)	1552 (61.1)	
	Cargo Space	Length	mm (in.)	1009 (39.7)	
		Width	mm (in.)	1081 (42.6)	
		Height	mm (in.)	1005 (39.6)	
	Overhang	Front	mm (in.)	895 (35.2)	20
		Rear	mm (in.)	1145 (45.1)	
	Min. Running Ground Clearance		mm (in.)	250 (9.8)	
	Angle of Approach		degrees	31°	
	Angle of Departure		degrees	24°	
	Curb Mass	Front	kg (lb)	1265 (2789)	25
		Rear	kg (lb)	1180 (2601)	
		Total	kg (lb)	2445 (5390)	
	Gross Vehicle Mass	Front	kg (lb)	—	30
		Rear	kg (lb)	—	
		Total	kg (lb)	3110 (6860)	
	Fuel Tank Capacity L (U.S. gal Imp. gal.)			96 (25.4 21.1)	
	Luggage Compartment Capacity m ³ (cu. ft.)			—	
Performance	Max. Speed		km/h (mph)	180 (112)	
	Max. Cruising Speed		km/h (mph)	144 (89.5)	
	Max. Permissible Speed	1st Gear	km/h (mph)	19 (11.8)*3 47 (29.2)*4	35
		2nd Gear	km/h (mph)	33 (20.5)*3 81 (50.3)*4	
		3rd Gear	km/h (mph)	48 (29.8)*3 118 (73.3)*4	
		4th Gear	km/h (mph)	67 (41.6)*3 165 (102.5)*4	
	Turning Diameter (Outside Front)	Wall to Wall	m (ft.)	12.7 (41.7)	40
		Curb to Curb	m (ft.)	12.1 (39.7)	
Engine	Engine Type			2UZ-FE	
	Valve Mechanism			32 Valve DOHC	
	Bore × Stroke		mm (in.)	94.0 × 84.0 (3.70 × 3.31)	
	Displacement		cm ³ (cu. in.)	4664 (284.5)	45
	Compression Ratio			9.6 : 1	
	Carburetor Type			SFI	
	Research Octane No.		RON	96	
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	175/4800 (235@4800)	
	Max. Torque (SAE NET)		N·m/rpm (lb·ft@rpm)	434/3400 (320@3400)	
Engine Electrical	Battery Capacity (5HR) Voltage & Amp. hr			12 64	50
	Alternator Output		Watts	1560	
	Starter Output		kW	2.0	
Chassis	Clutch Type			—	
	Transmission Type			A750F	
	Transmission Gear Ratio	In First		3.520	55
		In Second		2.042	
		In Third		1.400	
		In Fourth		1.000	
		In Fifth		0.716	
		In Reverse		3.224	
	Transfer Gear Ratio H4/L4			1.000/2.488	60
	Differential Gear Ratio (Front/Rear)			4.100/4.100	
	Differential Gear Size (Front/Rear)		in	8 / 9.5	
	Brake Type	Front		Ventilated Disc	65
		Rear		Ventilated Disc	
	Parking Brake Type			Duo Servo Drum	
	Brake Booster Type and Size		in	Hydraulic	
	Proportioning Valve Type			—	
	Suspension Type	Front		Double Wishbone	70
		Rear		4 Link with Lateral Rod	
	Stabilizer Bar	Front		STD	
		Rear		STD	
	Steering Gear Type			Rack and Pinion	
	Steering Gear Ratio (Overall)			19.8	
	Power Steering Type			Integral Type	75

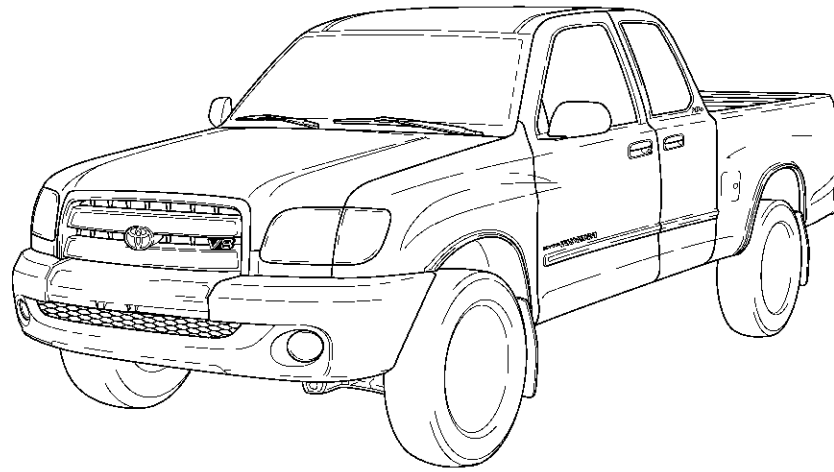
*1 Unladen Vehicle

*2 Center Seat

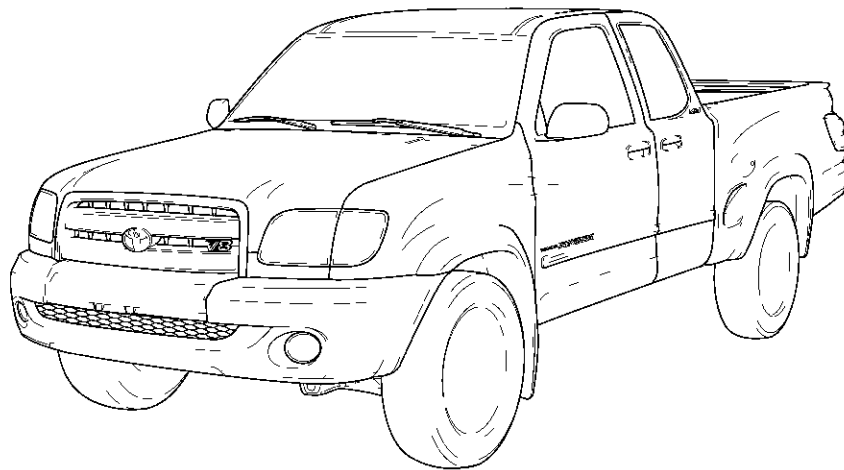
*3 Transfer in Low

*4 Transfer in High

TOYOTA **TUNDRA**



228TU01



228TU02

TOYOTA TUNDRA

OUTLINE OF NEW FEATURES

The following changes are made for the 2003 model year.

1. Model Line-up

- On the models for the U.S.A., a StepSide bed model has been created by adopting a new deck design.
- Four models for the U.S.A. have been discontinued.
- Four models for Canada have been discontinued.

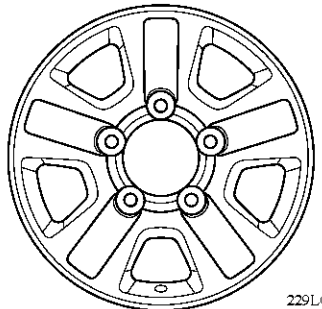
Item	New	Discontinued	
Destination	North America	North America	Canada
Model Code	UCK30L-ASSSKA -ASSLKA UCK40L-ASSSKA -ASSLKA	VCK30L-ARSLKA VCK40L-TRMSKA -TRSSKA -ARSLKA	VCK30L-TRMDKK UCK30L-ARSLKK VCK40L-TRSDKK -ARSSKK

2. Exterior

- The exterior design has been changed to integrate strength and sophistication and emphasize uniqueness. For details, refer to page 218.
- The lineup of exterior colors consists of 3 new colors and 5 carryover colors as indicated below.

Color (Color No.)	Note
Dark Gray Mica Metallic (1E3)	New
Dark Red MicaMetallic (3Q3)	
Dark Blue Mica (8Q0)	
White (056)	Carry Over
Silver Metallic (1D6)	
Black (202)	
Beige Mica Metallic (4Q2)	
Dark Green Mica (6Q7)	Carry Over

- A new design 17 x 7 1/2 JJ size disc wheel and 265/65R17 size tire have been adopted as optional equipment for access cab model with 2UZ-FE engine.

Tire Size	265/65R17
Disc Wheel Size	17 × 7 1/2JJ
Disc Wheel Material	Aluminum
P.C.D.* mm (in.)	139.7 (5.5)
Off Set mm (in.)	15.0 (0.59)
Wheel Design	

*: Pitch Circle Diameter

3. Interior

The interior design has been changed to one that offers a more SUV-like (Sports Utility Vehicle) elegance and utility. For details, refer to page 220.

4. 5VZ-FE Engine

- The '03 model complies with the LEV (Low Emission Vehicle) and SFTP (Supplementary Federal Test Procedure) emission regulations and LEV-II (Low Emission Vehicle II) evaporative emission regulation.
- The '03 model uses the same link type ETCS-1 (Electronic Throttle Control System-intelligent) that is used on the '02 model with the 2UZ-FE engine.
- Segment Conductor type alternator has been adopted.
- To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, refer to 2003 General Features section.

5. 2UZ-FE Engine

- The '03 model complies with the ULEV (Ultra Low Emission Vehicle) and SFTP emission regulations and LEV-II evaporative emission regulation.
- The ETCS-1 (Electronic Control System-intelligent) continues to be used from the '02 model. However, on the '03 model, the accelerator cable has been discontinued and an accelerator position sensor has been provided on the accelerator pedal. A no-contact type throttle position sensor has been adopted on all models.
- Cranking hold function has been adopted. Once the ignition switch is turned to the START position, this control continues to operate the starter until the engine starts.
- Segment Conductor type alternator has been adopted.
- To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, refer to 2003 General Features section.

6. A340E and A340F Automatic Transmission

- The line pressure control using a linear solenoid valve (SLT), which was adopted on the '02 model with the 2UZ-FE engine, has also been adopted on the '03 model with the 5VZ-FE engine. Accordingly, the shape of the valve body and the logic of the ECM have been changed.
- The previous mechanical control, which consisted of a throttle cable, cam, and throttle valve, has been changed to an electronic control system that uses a solenoid valve SLT.
- The automatic transmission fluid of all models has been changed from the D-II type ATF to the T-IV type ATF.

7. Suspension

The following changes have been made to the '03 model:

Access Cab Sport Suspension Package Model	• The front and rear suspensions have adopted blue painted Tokico shock absorbers with optimized damping force characteristics. • The front coil spring rate has been increased. • The rear leaf spring rate has been optimized. • The front stabilizer bar diameter has been increased. • The rear stabilizer bar has been adopted.
Access Cab Standard Model	• The damping force characteristics of the front and rear shock absorbers have been optimized. • The front coil spring rate has been increased. • The rear leaf spring rate has been optimized. (Only for 2WD model) • The front stabilizer bar size has been increased. (Only for 2WD model)
Standard Cab Model	Configuration and structure are the same the '02 model

8. Brake

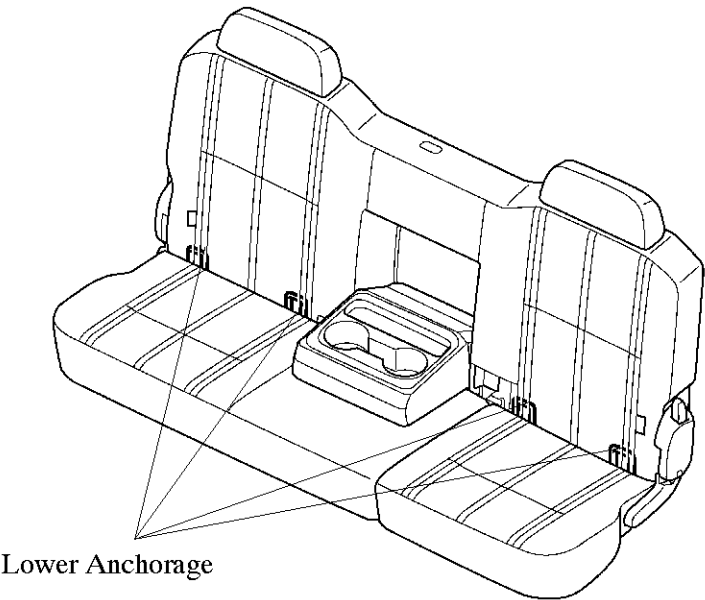
The ABS brake control system, which was optional equipment on the '02 model, is now standard equipment on all models.

9. Body

- To reduce body vibration, the floor has been reinforced, the mounts have been changed, and mass dampers have been adopted.
- On the models with a plastic bumper, a front cross member has been adopted to ensure body rigidity.

10. Seat

CRS (Child Restrain System) lower anchorages for securing child seats have been provided behind the seat cushion of the seat



Access Cab Rear Seat

228TU04

	Regular Cab	Access Cab	
	Front Seat	Front Seat	Rear Seat
LH Side	—	—	○
RH Side	○	—	○

11. Air Conditioning

The air conditioning system in the '03 Toyota Tundra has the following features:

- The size of the heater core has been increased to improve the heating capacity.
- A rear foot duct has been provided to guide the warm air from the heater unit to the feet of the rear seat occupants. As a result, the heating comfort of the rear seats has been improved.
- An airflow restrictor door, which increases the airflow that is directed to the occupants' feet when the heater is in the FOOT or FOOT/DEF mode has been provided in the heater unit to improve heating comfort.
- A multi-tank, super-slim structure evaporator has been adopted.

► Performance ◀

Model			'03 Toyota Tundra	'02 Toyota Tundra
Heater	Heat Output	W (Kcal/h)	5200 (4472)	5130 (4412)
	Air Flow Volume	m ³ /h	305	330
	Power Consumption	W	150	←
Air Conditioning	Cooling Capacity	W (Kcal/h)	5400 (4644)	←
	Air Flow Volume	m ³ /h	480	←
	Power Consumption	W	200	←

► Specifications ◀

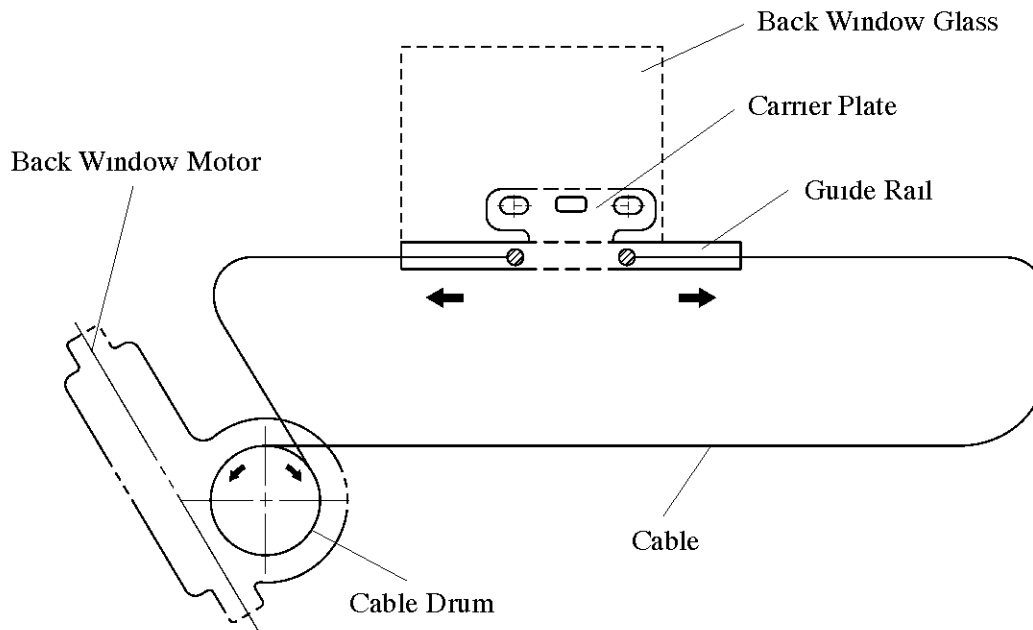
Model			'03 Toyota Tundra	'02 Toyota Tundra
Ventilation and Heater Core	Heater Core	Type	U-turn Flow	←
		Size W × H × L	168.3 × 220 × 36 (6.6 × 8.7 × 1.4)	155.7 × 220 × 27 (6.1 × 8.7 × 1.1)
		Fin Pitch	1.8 (0.07)	1.6 (0.06)
	Blower	Motor Type	S70F14T	←
		Fan Size Dia. × H	150 × 75 (5.9 × 3.0)	←
Air Conditioning	Condenser	Type	Multi-flow	←
		Size W × H × L	690 × 321 × 16 (27.2 × 12.6 × 0.6)	←
		Fin Pitch	3.2 (0.13)	←
	Evaporator	Type	Drawn Cup (Multi-tank, Super-slim Structure)	Drawn Cup (Single-tank)
		Size W × H × L	252.8 × 205 × 58 (10.0 × 8.1 × 2.3)	264 × 210 × 90 (10.4 × 8.3 × 3.5)
		Fin Pitch	3.0 (0.12)	3.5 (0.14)
	Compressor	Type	10PA15*1 10S17*2	←

*1: 5VZ-FE Engine Model

*2: 2UZ-FE Engine Model

12. Power Slide Back Window

- A power slide back window has been adopted on the Access cab model.
- By operating the power slide back window switch that is provided at the driver seat, this system enables the back window to be opened and closed.
- The basic movement of this system is the same as the power window system. The drive force of the back window motor is transmitted via a window regulator cable to laterally move the carrier plate, which opens and closes the back window.



228TU05

13. Theft Deterrent System and Wireless Door Lock Remote Control System

In place of the RS3000 type TVIP (Toyota Vehicle Instruction Protection) and the wireless door lock control system that were used on the '02 model, the '03 model has adopted an RS3200 type TVIP and a wireless door lock control system.

14. Cruise Control System (Only for 5VZ-FE Engine Model)

As with the 2UZ-FE engine model, the cruise control of the 5VZ-FE engine model is controlled by the ETCS-1. Accordingly, the components of the system have been changed as follows:

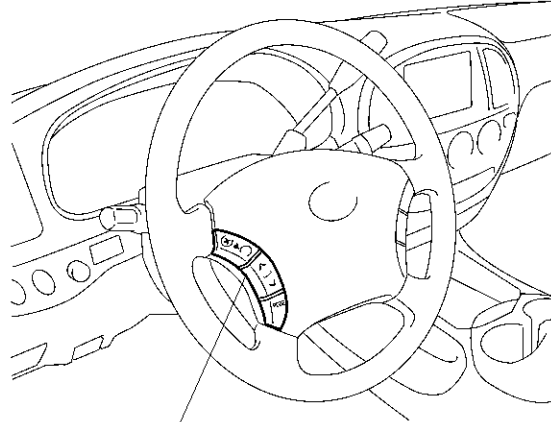
- Cruise control ECU is integrated in the ECM.
- Cruise control actuator and control cable has been discontinued.
- Throttle control motor, throttle position sensor and accelerator pedal position sensor has been adopted.

15. Mirror Heater

- This system is standard equipment on the Limited grade for Canada and optional equipment on the other models.
- Mirror heater is activated when the mirror heater switch is turn ON. This switch is provided with a timer function to keep the mirror heater ON for approximately 15 minutes.

16. Steering Pad Switch

- A steering wheel with steering pad switches is standard equipment on the Limited grade.
- The audio control switches with a high use frequency have located on the steering pad in the form of steering pad switches to improve the ease of use.



Steering Pad Switch

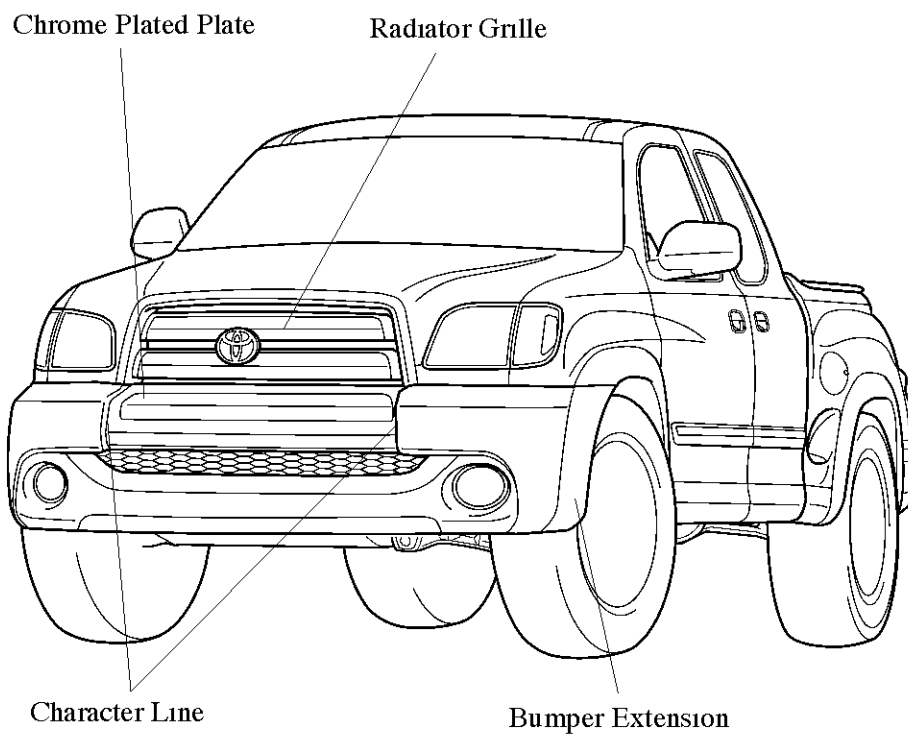
228TU06

NEW FEATURES

■ EXTERIOR

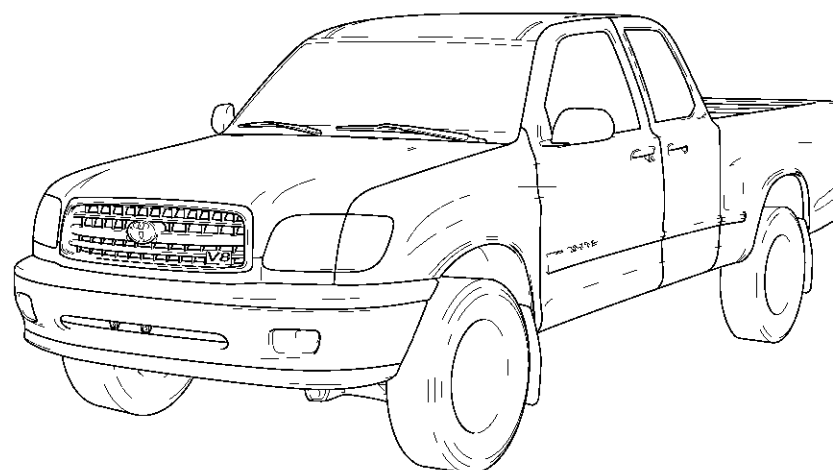
1. Front Design

- The design with a bulky and dignified appearance has been adopted for the radiator grille and front bumper on all models. Also, for the front bumper, a character line continued from the radiator grille is provided in result of unifying with the radiator grille, thus made the front design give thickness and strength.
- The front bumper of SR5 grade model has emphasized the unity with the radiator grille by arranging the chrome plated plate for the character line in addition to the above change.
- For the front bumper side on SR5 and Limited grade models, a bumper extension is provided to make the front bumper have the wideness.



'03 Model

228TU07

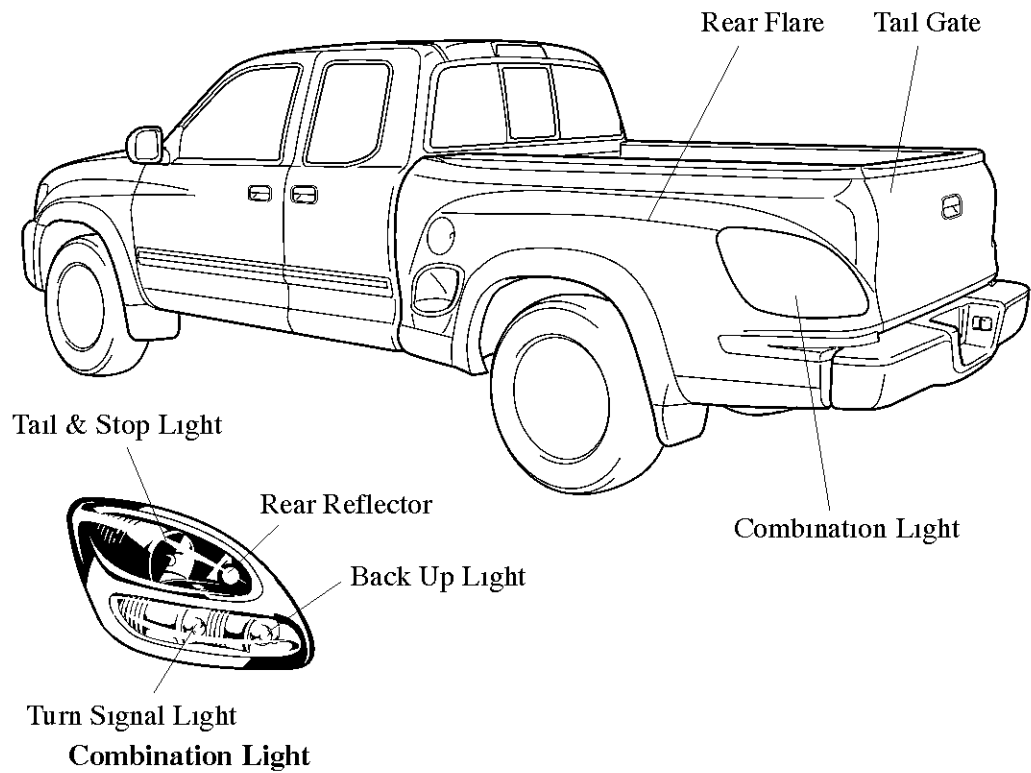


'02 Model

191TU01

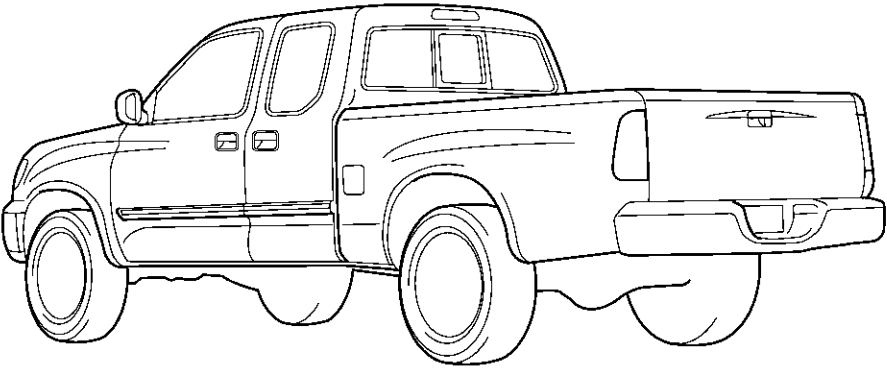
2. Rear Design

- On the StepSide Bed model, a rear body design to round the tailgate from the real flare has been adopted, thus made the design unique and bulky.
- The rear combination light on the StepSide Bed model has a combination of solid and bulky outer lens shapes and the inner lens with unique cylinder-type shapes, thus expressing sporty image.
- Models other than the StepSide Bed models have no rear design changes.



StepSide Bed Model

228TU08

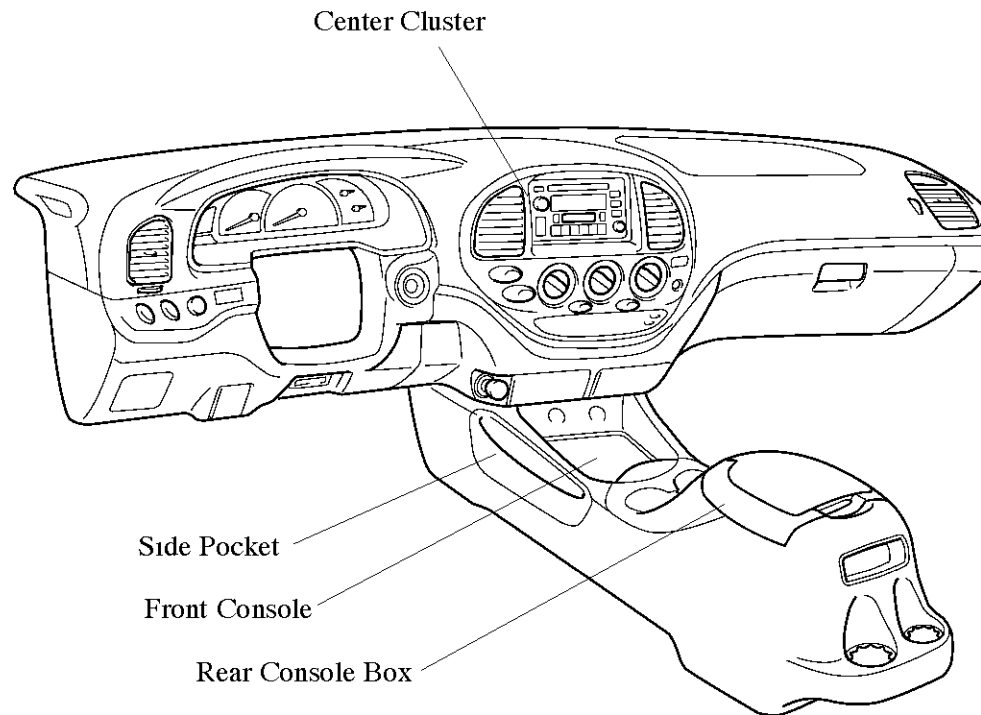


Other Models

228TU09

■ INTERIOR

- On all models, the design of the center cluster has been changed.
- For the front console of the Captain Seat model on the Access Cab, the bulky curved design has been adopted for the front and rear consoles, thus making the interior design attractive.
- For the front console of the Captain Seat model on the Access Cab, a side pockets, center tray and a big-volume (15L) rear console box have been adopted, thus improving the serviceability.



Captain Seat Model on Access Cab

228TU10

■ 5VZ-FE ENGINE

1. General

- The composition of the TWC (Three-Way Catalytic Converter) has been changed to comply with the LEV (Low Emission Vehicle) and SFTP (Supplementary Federal Test Procedure) emission regulations.
- The construction and operation of the evaporative emission control system have been changed to comply with the LEV-II (Low Emission Vehicle-II) evaporative emission regulations.
- The '03 model uses the same link type ETCS-1 (Electronic Throttle Control System-intelligent) that is used on the '02 model with the 2UZ-FE engine.
- Segment Conductor type alternator has been adopted.
- To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, refer to 2003 General Features section.

► Engine Specifications ◀

Model			'03 Model	'02 Model
No. of Cyls. & Arrangement			6-Cylinder, V Type	←
Valve Mechanism			24-Valve DOHC, Belt & Gear Drive	←
Combustion Chamber			Pentroof Type	←
Manifolds			Cross-Flow	←
Fuel System			SFI	←
Ignition System			DIS	←
Displacement		cm ³ (cu. in.)	3378 (206.1)	←
Bore × Stroke		mm (in.)	93.5 × 82.0 (3.68 × 3.23)	←
Compression Ratio			9.6 : 1	←
Max. Output		SAE-NET	142 kW @ 4800 rpm 190 HP @ 4800 rpm	←
Max. Torque		SAE-NET	298 N m @ 3600 rpm 220 ft lbf @ 3600 rpm	←
Valve Timing	Intake	Open	4° BTDC	←
		Close	42° ABDC	←
	Exhaust	Open	46° BBDC	←
		Close	4° ATDC	←
Firing Order			1-2-3-4-5-6	←
Research Octane Number			91 or more	←
Emission Regulation			LEV and SFTP	—
Oil Grade			API SL-EC or ILSAC	←
Engine Service Mass		kg (lb)	M/T: 189 (416.7) A/T: 179 (394.6)	←

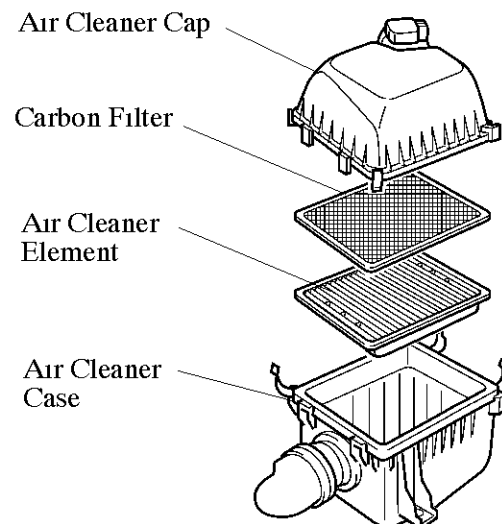
2. Major Difference

Item	Outline
Engine Proper	The material of the intake and exhaust valve seats has been changed to one that excels in heat resistance.
Intake and Exhaust System (See Page 223)	• Adoption of a carbon filter for adsorbing HC (hydrocarbons) in the air cleaner cap • Adoption of the ETCS-1 • Changed composition of TWC
Fuel System (See Page 224)	• Adoption of fuel hoses made of conductive multilayer nylon. • Adoption of the quick turn type fuel cap • Changed location of the charcoal canister and charcoal canister capacity • Changed evaporative emission control system
Charging System (See Page 224)	Adoption of the Segment Conductor type alternator.
Engine Control System (See Page 225)	• Changed engine ECU to 32-bit type • Provided a linear type accelerator pedal position sensor in the throttle body • Changed fuel cut control • Changed evaporative emission control • Addition of failsafe functions related to ETCS-1. • Correspondence of all DTC (Diagnostic Trouble Code) to SAE-controlled codes
Other	Configuration and structure are the same as '02 model

3. Intake and Exhaust System

Air Cleaner

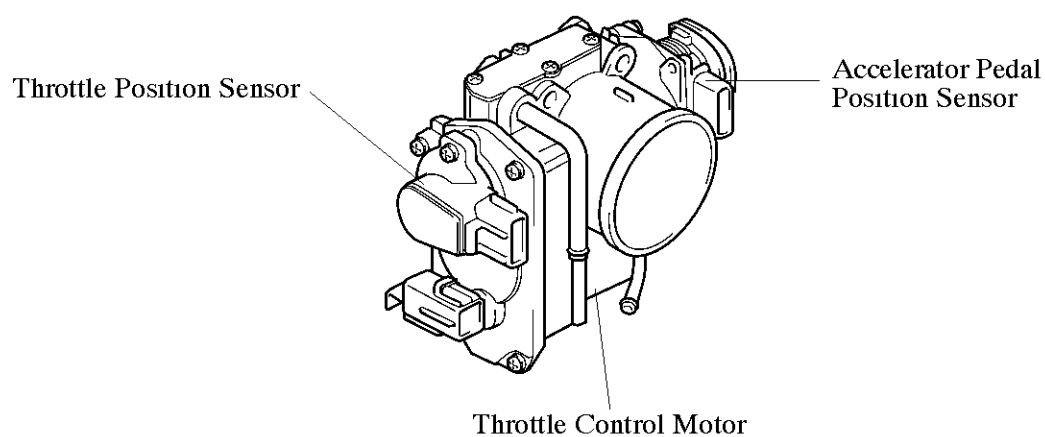
A carbon filter, which adsorbs the HC (hydrocarbons) that remain in the intake system when the engine is stopped, has been adopted in the air cleaner cap to reduce evaporative emissions. This filter is maintenance-free.



228TU11

Throttle Body

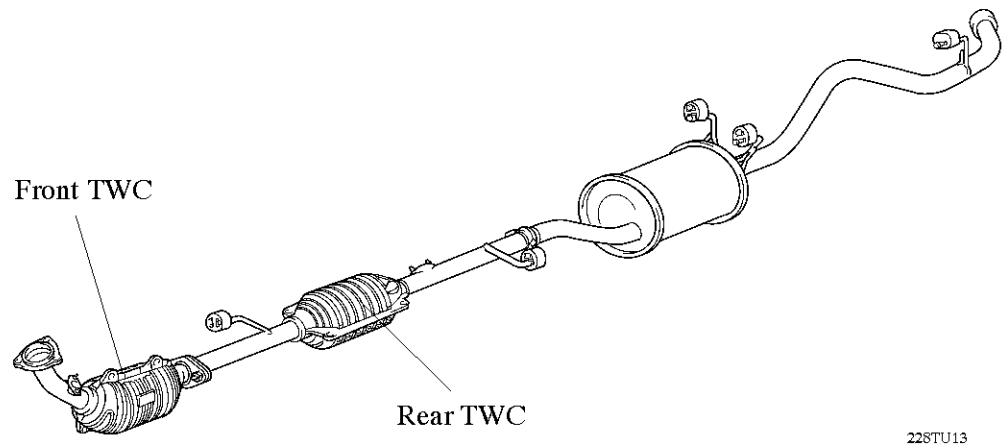
The link type ETCS-1 has adopted and it providing excellent throttle control. For details of ETCS-1 control, refer to see page 231.



228TU12

TWC (Three-Way Catalytic Converter)

In place of the metallic type front TWC that was used on the '02 model, the '03 model has adopted an ultra thin-wall ceramic type front TWC to improve exhaust gas reduction performance and comply with the LEV and SFTP regulations.



228TU13

4. Fuel System

To reduce evaporative emissions, the following features have been adopted in the fuel system:

- Fuel hoses that are made of conductive multilayer nylon, which excel in inhibiting fuel permeation, have been adopted.
- A quick-turn type fuel cap has been adopted to prevent the user from leaving the fuel cap untightened.
- In conjunction with changing the method for detecting evaporative emission leaks, the location of the charcoal canister has been changed from the engine compartment to the under floor.
- The capacity of the charcoal canister has been increased.

► Charcoal Canister Capacity ◀

'03 Model	'02 Model
3.0 liters (3.17 US qts, 2.64 Imp. qts)	2.4 liters (2.54 US qts, 2.11 Imp. qts)

5. Charging System

- A compact and lightweight Segment Conductor type alternator that generates high amperage output in a highly efficient manner has been adopted.
- The basic construction and operation are same as '03 Land Cruiser. For details, refer to page 128.

► Specifications ◀

Model	'03 Model	'02 Model
Type	SE08	K3BME
Output	80A	80A
Length	134 mm (5.28 in.)	143 mm (5.63 in.)
Weight	4250 g (9.37 lb.)	4850 g (10.69 lb.)

6. Engine Control System

General

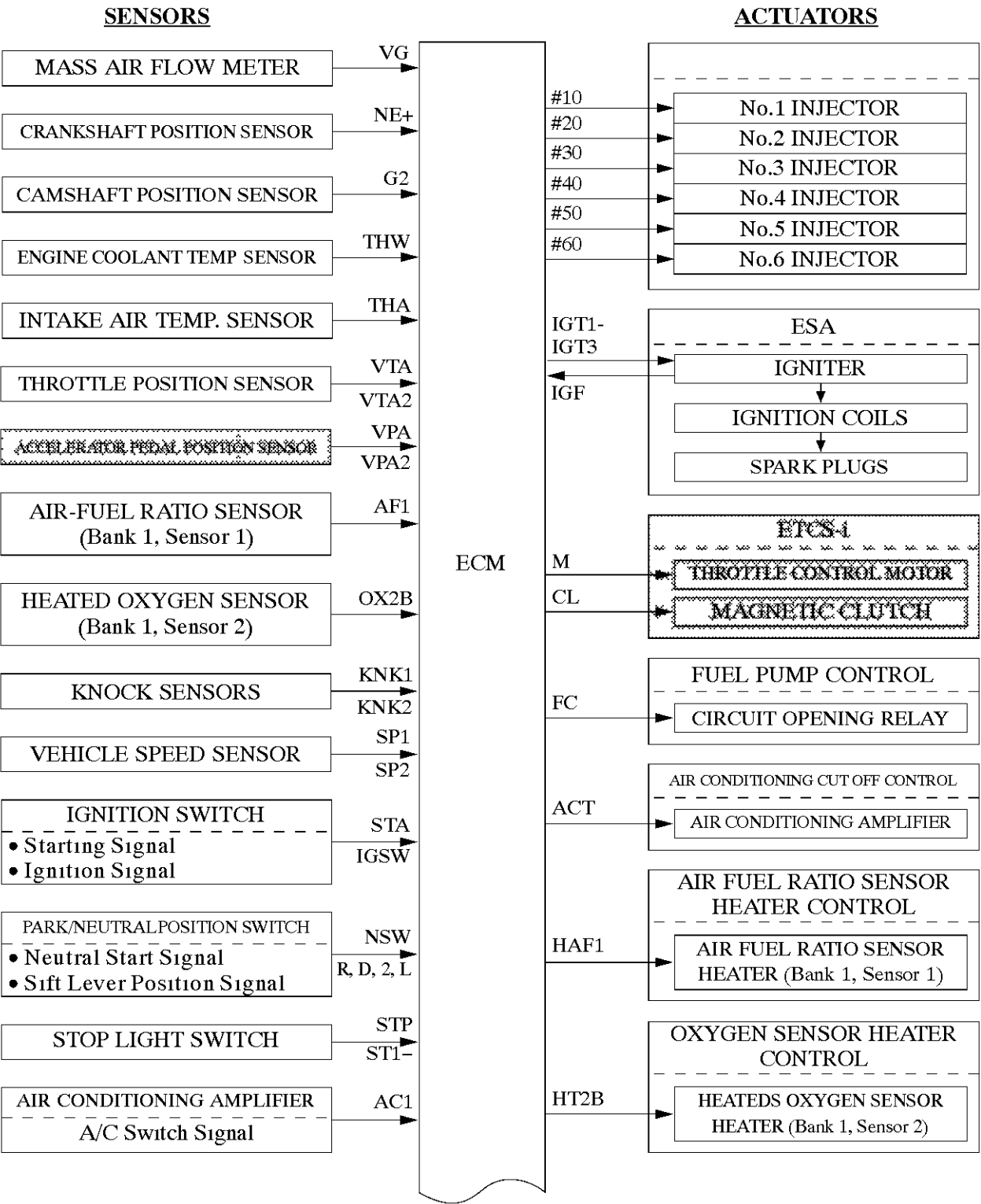
The engine control system of the 5VZ-FE engine on the '03 model and 5VZ-FE engine on the '02 model are compared below.

System	Outline	'03 Model	'02 Model
SFI (Sequential Multiport Fuel Injection)	An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.	○	○
IAC (Idle Air Control)	A rotary solenoid type IAC valve controls the fast idle and idle speeds.	—	○
ETCS-1 (Electronic Throttle Control System-intelligent) (See page 231)	Optimally controls the throttle valve opening in accordance with the amount of accelerator pedal effort and the condition of the engine and the vehicle, and comprehensively controls the ISC, and cruise control.	○	—
Fuel Pump Control	The fuel pump operation is controlled by signals from the ECM based on the engine speed signal.	○	○
	A fuel cut control is adopted to stop the fuel pump when the airbag is deployed at the front or side collision.	○	—
Oxygen Sensor/Air Fuel Ratio Sensor Heater Control	Maintains the temperature of the oxygen sensor/air fuel ratio sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○
Evaporative Emission Control (See page 233)	The ECM controls the purge flow of evaporative emission (HC) in the charcoal canister in accordance with engine conditions.	○	○
	System construction and control logic have been made to comply with LEV-II evaporative emission regulation.	○	—
Air Conditioning Cut-off Control	By turning the air conditioning compressor ON or OFF in accordance with the engine condition, drivability is maintained.	○	○
Diagnosis (See page 243)	When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section.	○	○
	All the DTC (Diagnostic Trouble Codes) have been made to correspond to the SAE controlled codes.	○	—
Fail-Safe (See page 243)	When the engine ECU detects a malfunction, the engine ECU stops or controls the engine according to the data already stored in the memory.	○	○

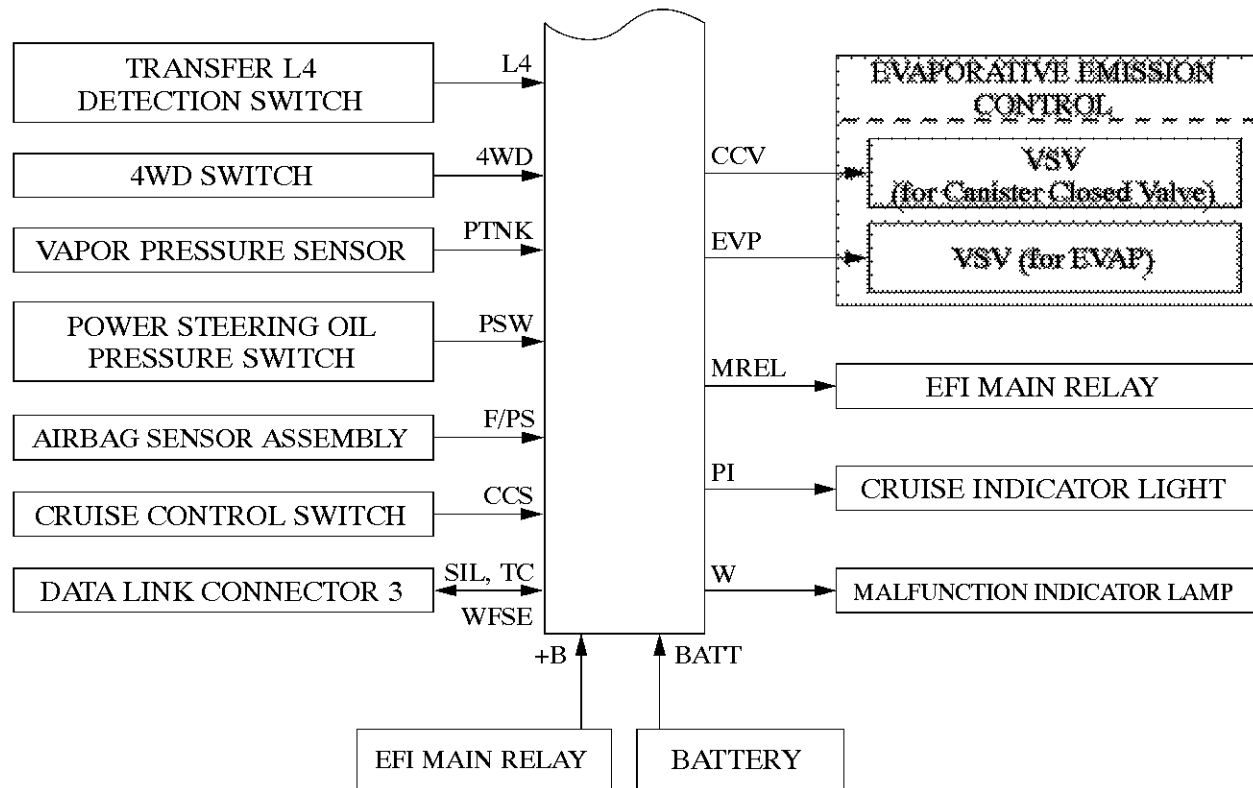
Construction

The configuration of the engine control system of the 5VZ-FE engine is as shown in the following chart.

 : New

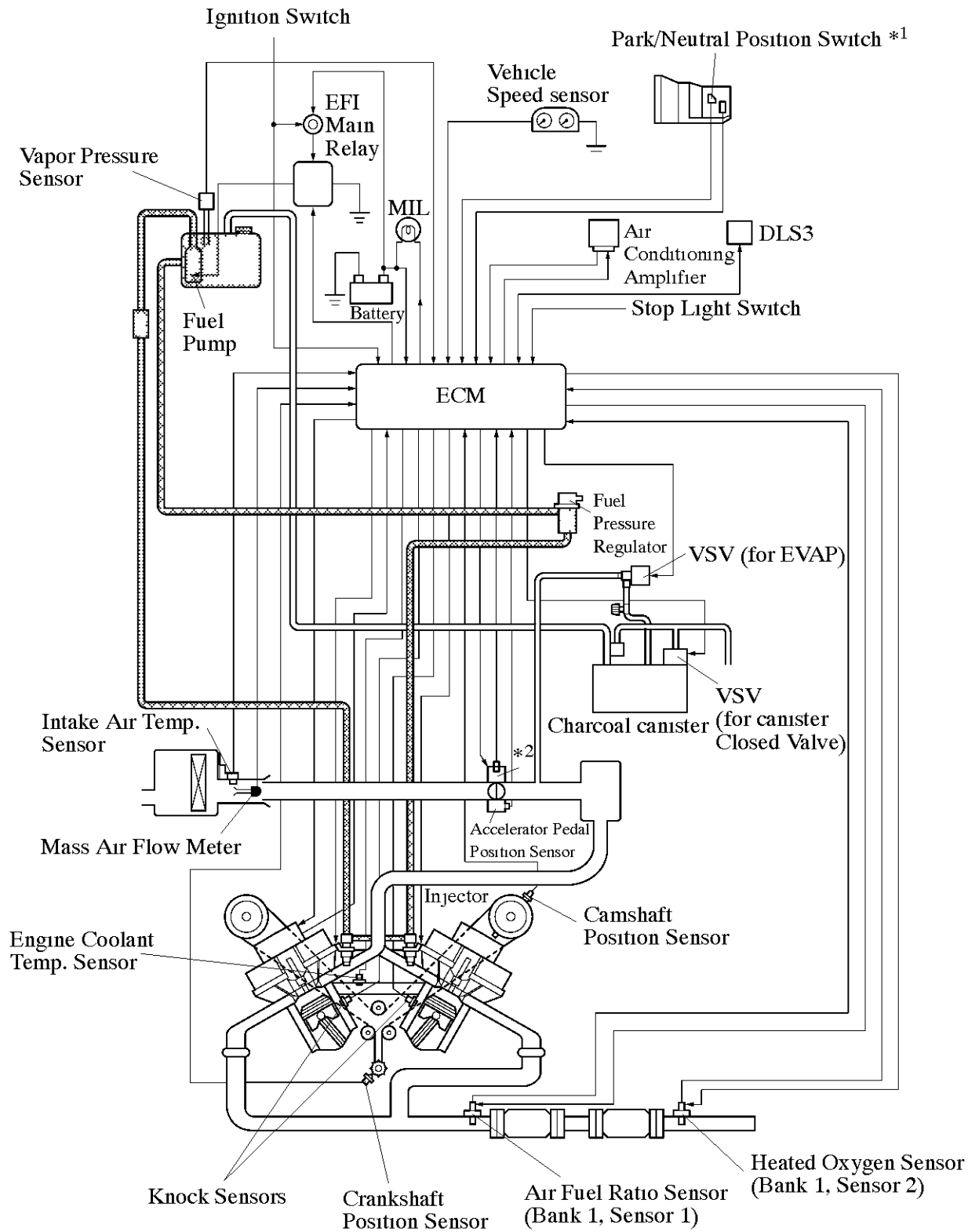


(Continued)



228TU15

Engine Control System Diagram



Main Component of Engine Control System

1) General

The following table compares the main components.

Model Type	'03 Model		'02 Model	
Component	Outline	Quantity	Outline	Quantity
ECM	32-bit CPU	1	16-bit CPU	1
Air Flow Meter	Hot-wire Type	1	←	
Crankshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (36-2)	1	←	
Camshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (1)	1	←	
Accelerator Pedal Position Sensor	Linear Type	1	—	
Throttle Position Sensor	Linear Type	1	←	
Knock Sensor	Built-in Piezoelectric Type	2	←	
Air Fuel Ratio Sensor (Bank 1, Sensor 1)	with Heater	1	←	
Oxygen Sensor (Bank 1, Sensor 2)	with Heater	1	←	
Injector	4-Hole Type	6	←	
IAC Valve			Rotary Solenoid Type	1

2) ECM

The 32-bit CPU of the ECM is used to increase the speed for processing the signals.

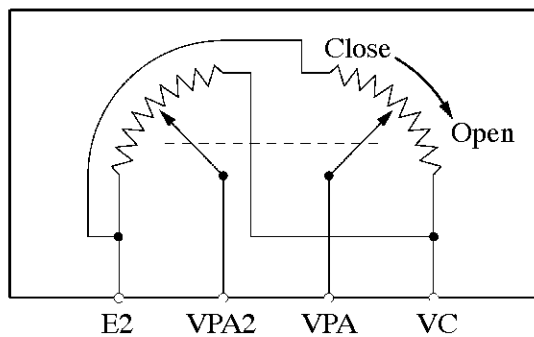
10

Service Tip

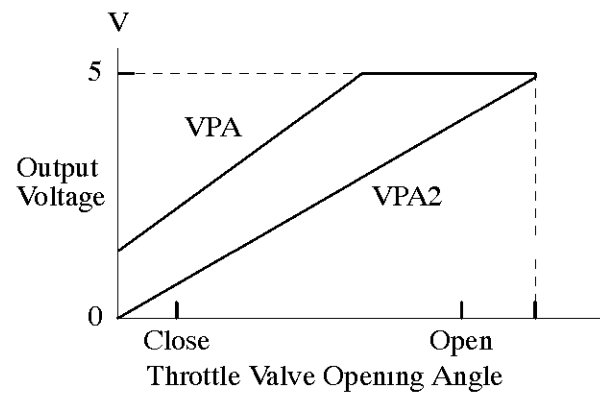
The length of time to clear the DTC via the battery terminal has been changed from 10 seconds to 1 minute.

3) Accelerator Pedal Position Sensor

- The accelerator pedal position sensor, which is mounted on the throttle body, is integrated with the throttle lever, which is connected to the cable that extends from the accelerator pedal.
- This sensor converts the throttle valve opening angles into electronic signals with two differing characteristics and outputs them to the ECM. One is the VPA signal that linearly outputs the voltage along the entire range of the throttle valve opening angle. The other is the VPA 2 signal that outputs an offset voltage.



150EG40



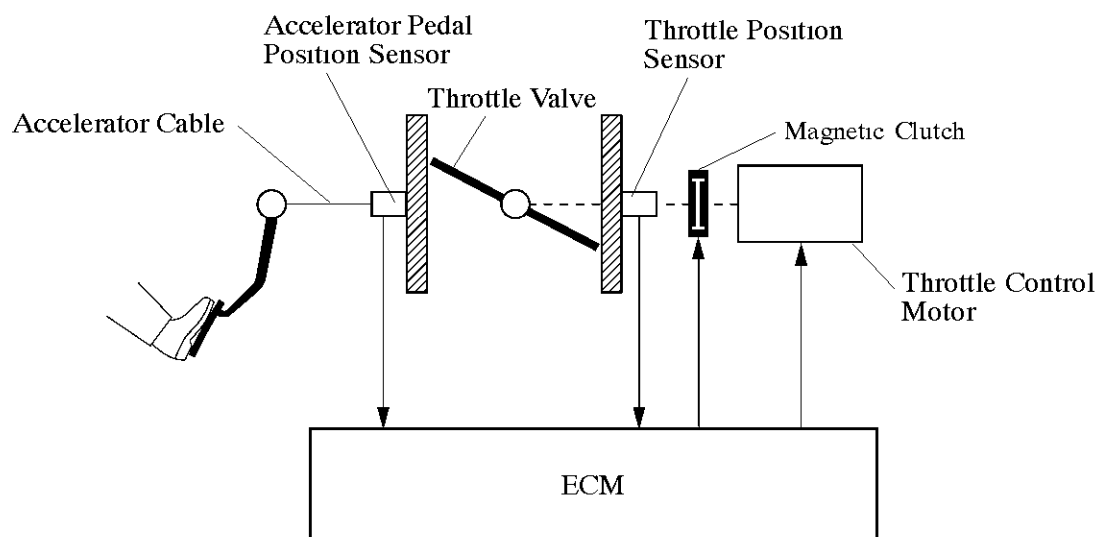
150EG39

ETCS-i (Electronic Throttle Control System-intelligent)

1) General

- The ETCS-1 system, which provides excellent throttle control in all the operating ranges, has been adopted.
- In the conventional throttle body, the throttle valve opening is determined invariably by the amount of the accelerator pedal effort. In contrast, the ETCS-1 uses the ECM to calculate the optimal throttle valve opening that is appropriate for the respective driving condition and uses a throttle control motor to control the opening.
- The ETCS-1 controls the ISC (Idle Speed Control) system and the cruise control system.
- A duplicate system is provided to ensure a high level of reliability, and the system shuts off in case of an abnormal condition. Even when the system is shut off, the accelerator pedal can be used to operate the vehicle in the limp mode.

► System Diagram ◀



2) Operation

The ECM drives the throttle control motor by determining the target throttle valve opening in accordance with the respective operating condition.

- Non-Linear Control
- Idle Speed Control
- Cruise Control

a. Non-Linear Control

Controls the throttle to an optimal throttle valve opening that is appropriate for the driving condition such as the amount of the accelerator pedal effort and the engine speed in order to provide excellent throttle control and comfort in all operating range.

b. Idle Speed Control

Previously, IAC valve was used to perform idle speed control such as fast idle during cold operating conditions and idle-up. In conjunction with the adoption of the ETCS-i, idle speed control is now performed by the throttle control motor, which controls the throttle valve opening.

c. Cruise Control

Previously, the vehicle speed was controlled by the cruise control actuator, which opened and closed the throttle valve. Along with the adoption of the ETCS-i, the vehicle speed is now controlled by the throttle control motor, which controls the throttle valve.

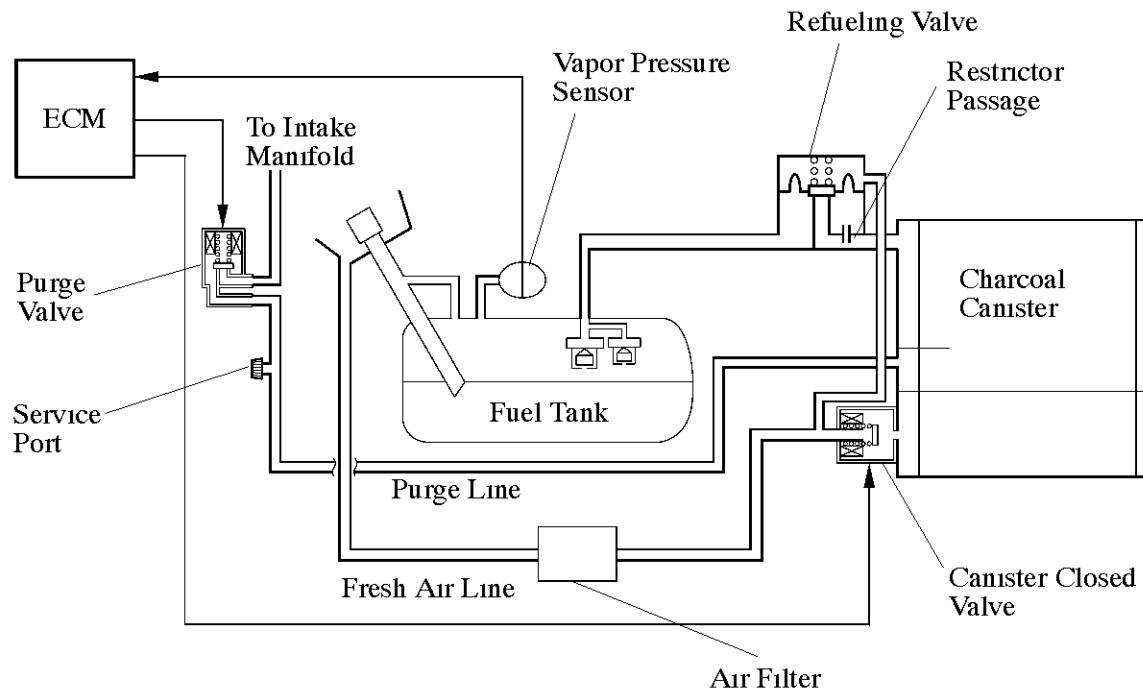
Evaporative Emission Control System

1) General

- The construction of the evaporative emission control system has been changed to comply with the LEV-II (Low Emission Vehicle-II) evaporative emission regulation which is belong to CARB (California Air Resources Board). Along with this change, the amount of vapor gas that is discharged outside of the vehicle while the vehicle is parked has been reduced considerably. Because of this construction, which is simpler than the previous, the reliability of the system has been improved.
- This system consists primarily of a canister closed valve, purge valve, charcoal canister, vapor pressure sensor, refueling valve, and ECM.
- In this system, the ECM monitors the system for malfunctions and outputs DTCs (Diagnostic Trouble Codes) in the event of a malfunction. The detection method is basically the same as the conventional vacuum type that is used on other models. A vacuum is introduced into the system, and the amount of increase in the internal pressure of the fuel tank is monitored in order to detect any leakage in the system.
- Listed below are the construction differences between this system and the conventional vacuum type:
 - a. The air drain valve has been discontinued. The air that has been cleaned through the charcoal canister is discharged through the fresh air line. Accordingly, the fresh air inlet has been moved from the air cleaner to a location near the fuel inlet. Furthermore, the pipe diameter of the fresh air line and the flow rate of the canister closed valve have been increased.
 - b. An ORVR (Onboard Refueling Vapor Recovery) function has been provided in the refueling valve.
 - c. A restrictor passage has been provided in the refueling valve to prevent the large amount of vacuum during purge operation or system monitoring operation from affecting the pressure in the fuel tank. As a result of this construction, the pressure switching valve has been discontinued.
 - d. An air filter* has been added to the fresh air line.

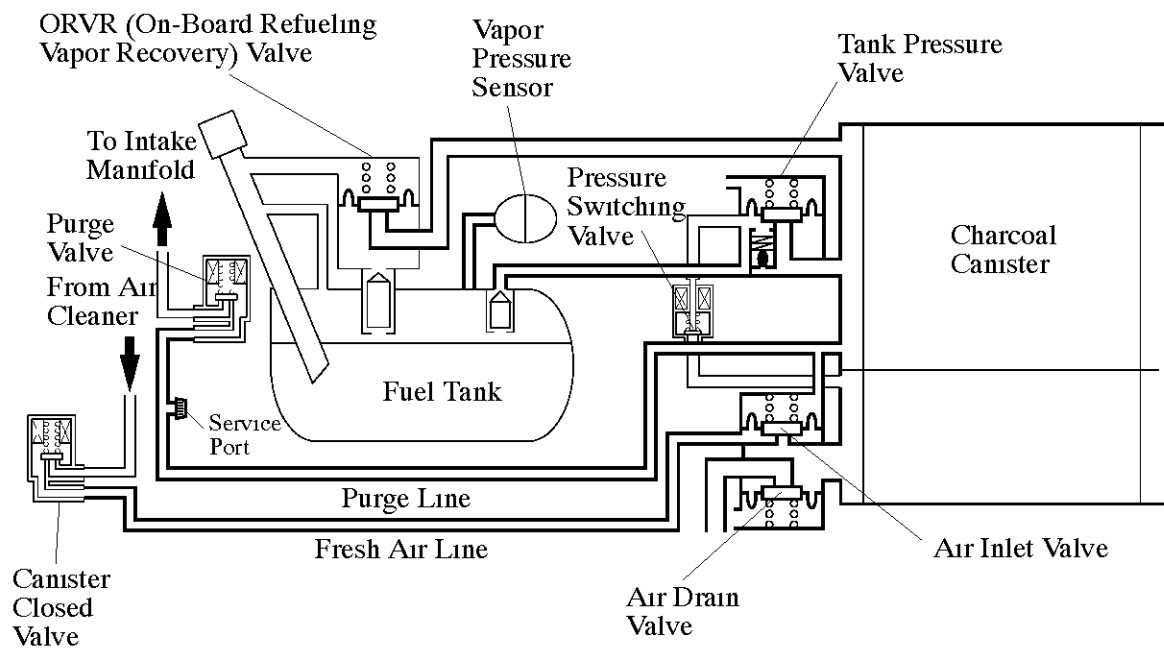
*: The air filter is maintenance-free. If the filter becomes clogged, the ECM will illuminate the MIL (Malfunction Indicator Lamp) and record the DTC number P0446 in its memory.

► System Diagram ◀



228TU100

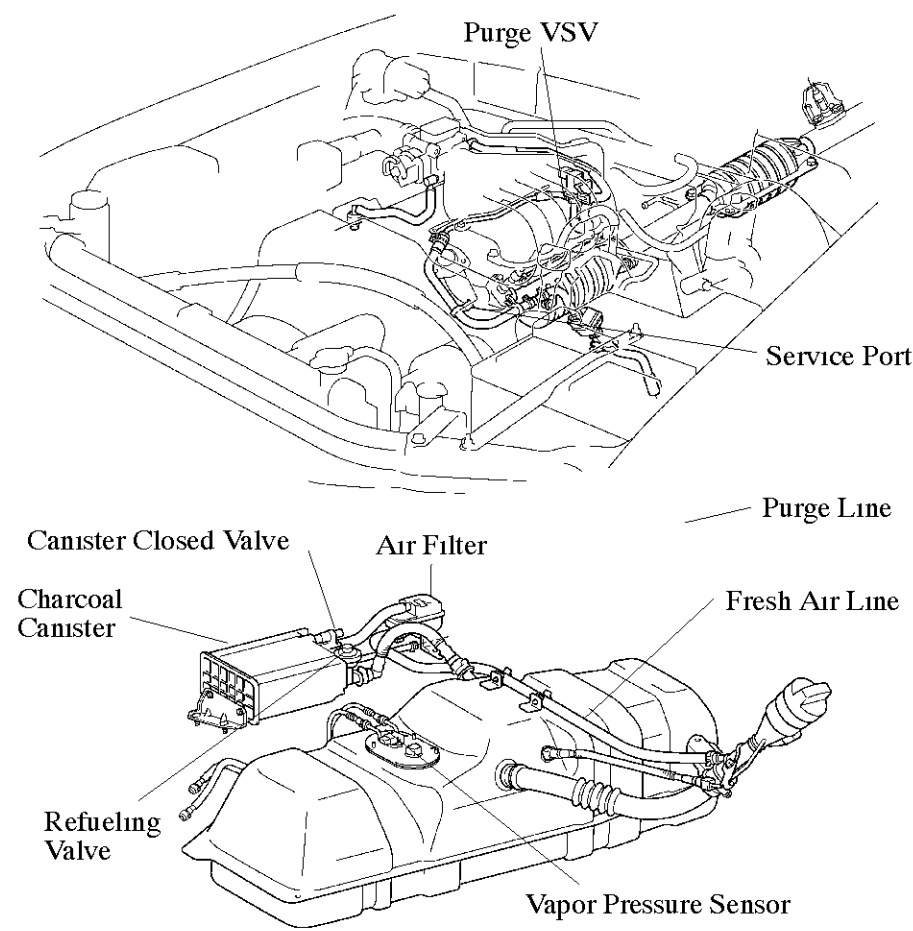
'03 Toyota Tundra



189EG31

Conventional Vacuum Type

2) Layout of Main Component



228TU107

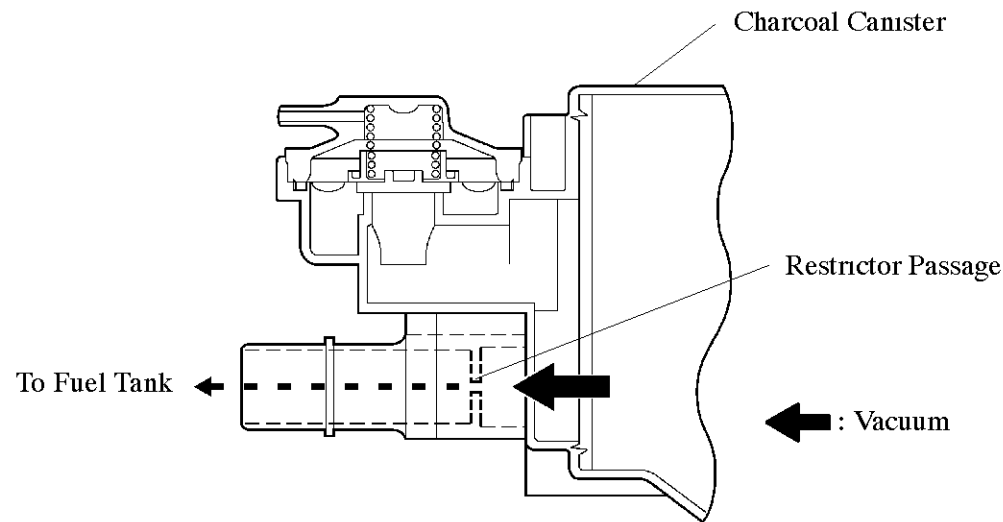
3) Function of Main Component

Components	Function
Canister Closed Valve	Opens and closes the fresh air line in accordance with the signals from the ECM in order to introduce fresh air and control the pressure relief if the internal pressure in the fuel tank increases.
Purge Valve	Opens in accordance with the signals from the ECM when the system is purging, in order to send the vapor gas that was absorbed by the charcoal canister into the intake manifold. During the system monitoring mode, this valve controls the introduction of the vacuum into the fuel tank.
Charcoal Canister	Contains activated charcoal to absorb the vapor gas that is created in the fuel tank.
Vapor Pressure Sensor	Detects the pressure in the fuel tank and sends the signals to the ECM.
Refueling Valve	Controls the flow rate of the vapor gas from the fuel tank to the charcoal canister when the system is purging or during refueling.
Air Filter	Prevents dust and debris in the fresh air from entering the system.
Service Port	This port is used for connecting a vacuum gauge for inspecting the system.
ECM	Controls the canister closed valve and the purge valve in accordance with the signals from various sensors, in order to achieve a purge volume that suits the driving conditions. In addition, the ECM monitors the system for any leakage and outputs a DTC if a malfunction is found.

4) Construction and Operation

a. Refueling Valve

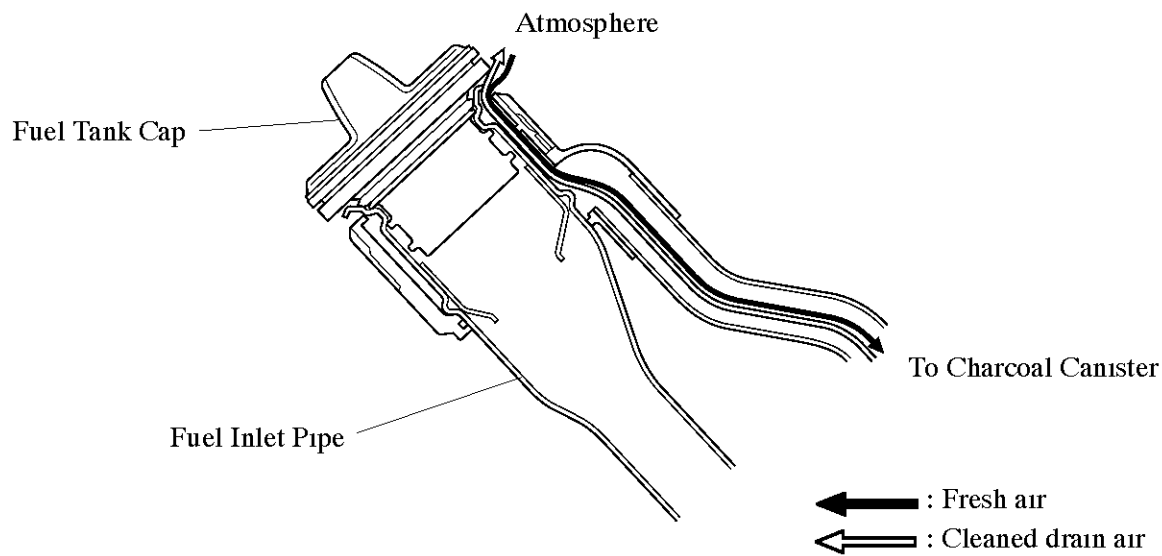
A restrictor passage has been provided in the tank pressure valve. The restrictor passage prevents the large amount of vacuum that is created during purge operation or system monitoring operation from entering the fuel tank, and limits the flow of the vapor gas from the fuel tank to the charcoal canister. If a large volume of vapor gas recirculates into the intake manifold, it will affect the air-fuel ratio control of the engine. Therefore, the role of the restrictor passage is to prevent this from occurring.



228TU117

b. Fuel Inlet (Fresh Air Inlet)

In accordance with the change of structure of the evaporative emission control system, the location of a fresh air line inlet has been changed from the air cleaner section to near fuel inlet. The fresh air from the atmosphere and drain air cleaned by the charcoal canister will go in and out to the system through the passage shown below.



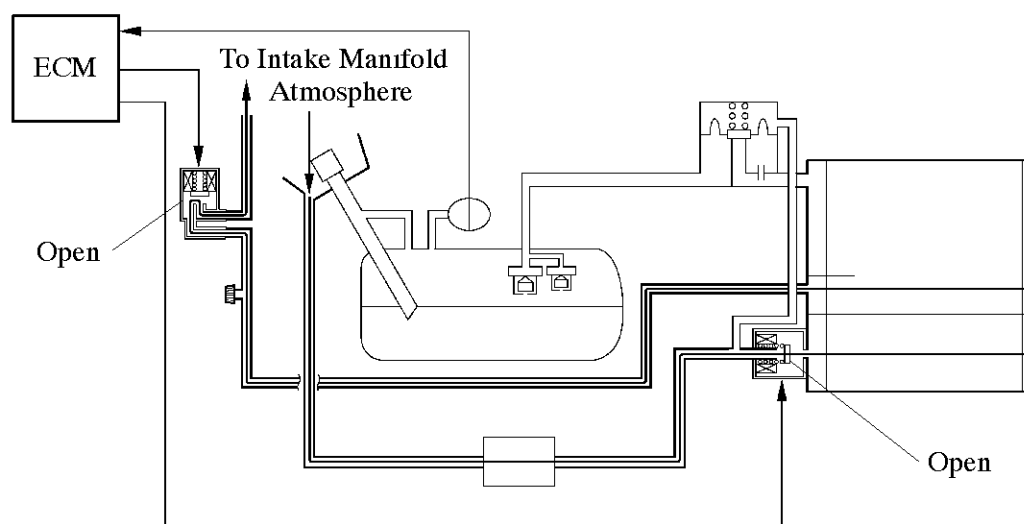
228TU119

5) System Operation

a. Purge Flow Control

When the engine has reached predetermined parameters (closed loop, engine coolant temp. above 75°C (167°F) , etc), stored fuel vapors are purged from the charcoal canister whenever the purge valve is opened by the ECM.

The ECM will change the duty ratio cycle of the purge valve thus controlling purge flow volume. Purge flow volume is determined by intake manifold pressure and the duty ratio cycle of the purge valve. Atmospheric pressure is allowed into the charcoal canister to ensure that purge flow is constantly maintained whenever purge vacuum is applied to the charcoal canister.

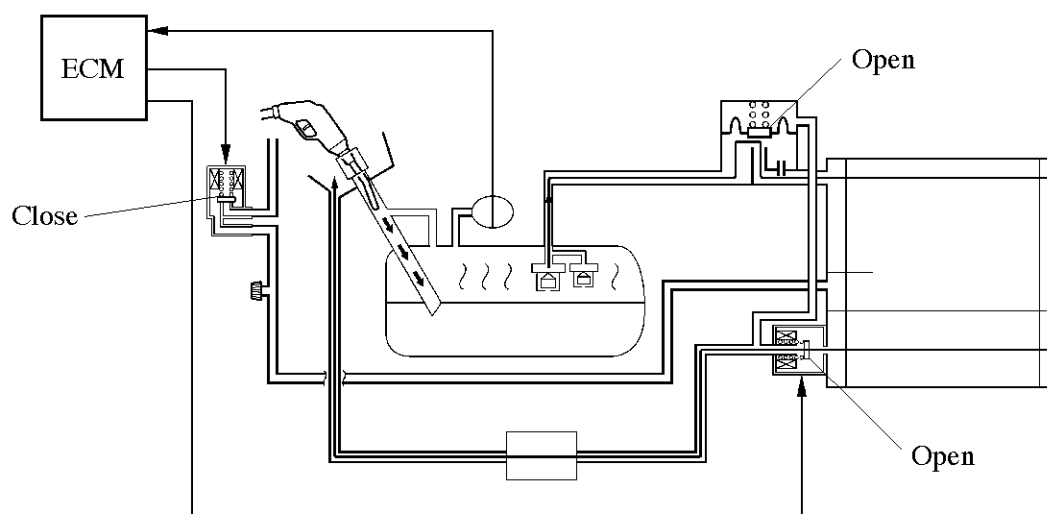


228TU101

b. ORVR (On-Board Refueling Vapor Recovery)

When the internal pressure of the fuel tank increases during refueling, this pressure causes the diaphragm in the refueling valve to lift up, allowing the fuel vapors to enter the charcoal canister. Because the canister closed valve is always open (even when the engine is stopped) when the system is in a mode other than the monitoring mode, the air that has been cleaned through the charcoal canister is discharged outside of the vehicle via the fresh air line. If the vehicle is refueled during the system monitoring mode, the ECM will recognize the refueling by way of the vapor pressure sensor, which detects the sudden pressure increase in the fuel tank, and will open the canister closed valve.

10



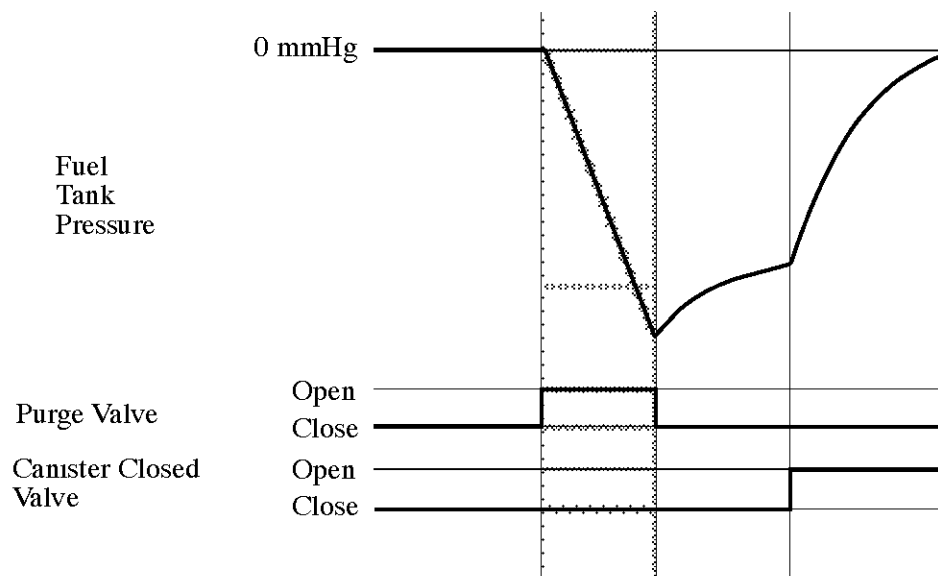
228TU118

c. System Monitoring

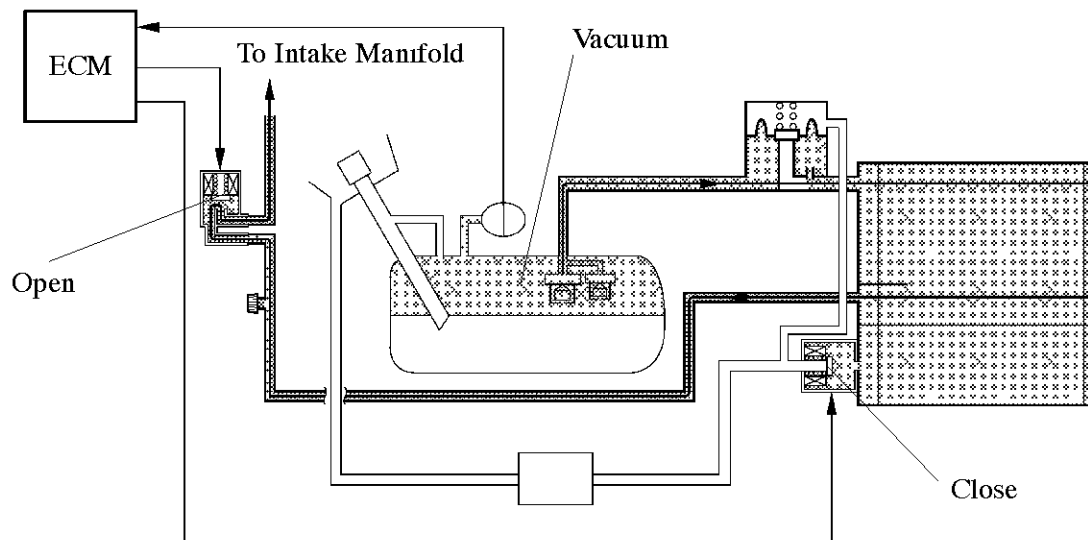
When the initial conditions {low engine temperature (low engine coolant temperature and, engine coolant temperature and intake air temperature being nearly the same) at the engine starting, constant vehicle speed (including idling), and so on.} are met, the ECM introduces a vacuum into the system and monitors the amount of pressure increase in the fuel tank in order to determine if there is any leakage in the system. At the same time, the ECM determines if there is any malfunction in the canister closed valve and the purge valve.

Step1

The ECM opens the purge valve and introduces a vacuum into the fuel tank.

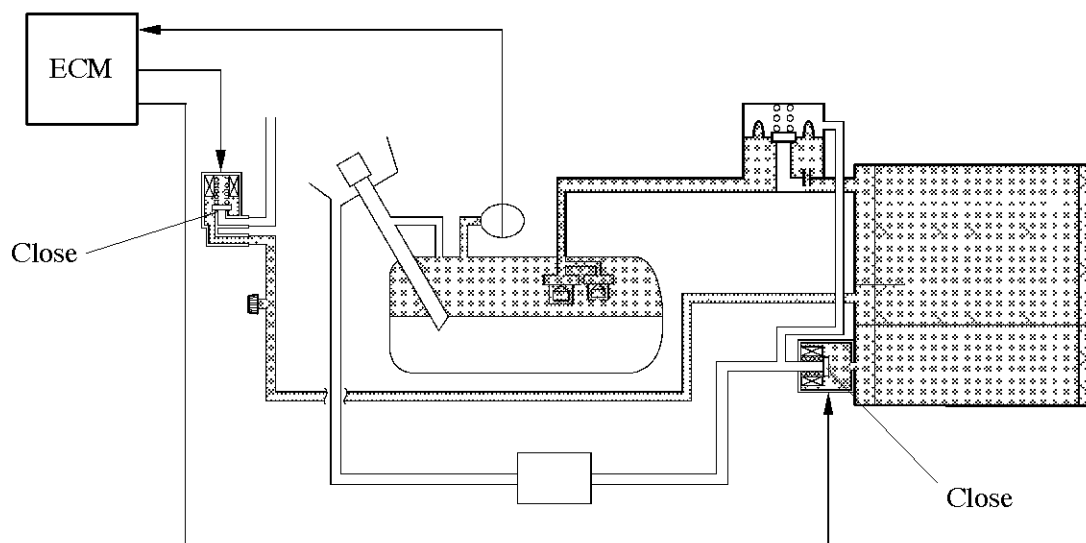
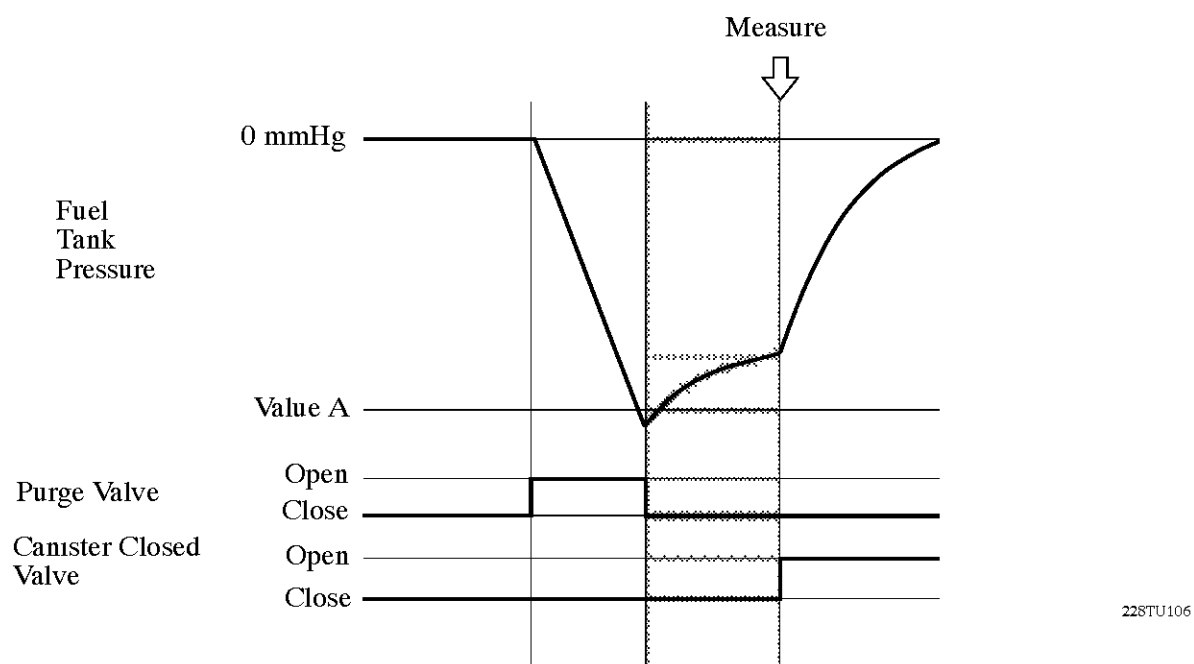


228TU104



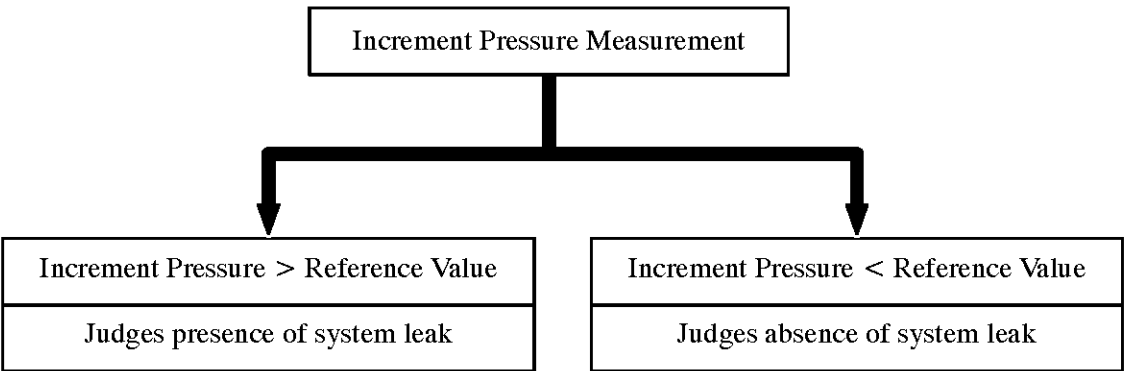
228TU105

When the pressure in the fuel tank decreases below value A, the ECM closes the purge valve again. The ECM measures the amount of pressure increase in the tank.



System Leak Judgment

The ECM determines whether there is a leakage in the system by the increment amount of fuel tank pressure at Step2 in the previous page. If the increment amount of the fuel tank pressure is greater than the reference value, the ECM judges that there is a system leak.



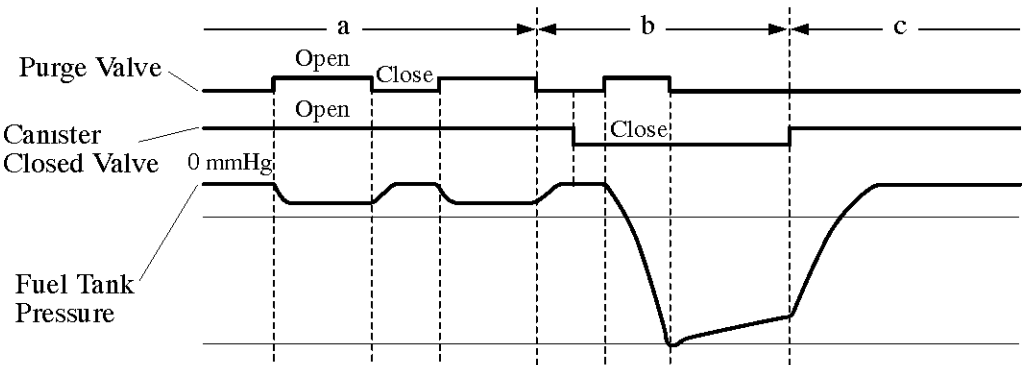
- If the ECM judges that there is no system leak, it ends the system monitoring mode and transfers to the normal system control. (Both the purge valve and canister closed valve are opened.)
- If the ECM determines that there is a system leak, it illuminates the MIL and stores the following DTCs in its memory:

Level of Leak	DTC
Very small, small or medium leak	P0442 and/or P0456
Large leak	P0441, P0442 and P0446

VSV (Vacuum Switching Valve) Monitoring

i) Normal Condition

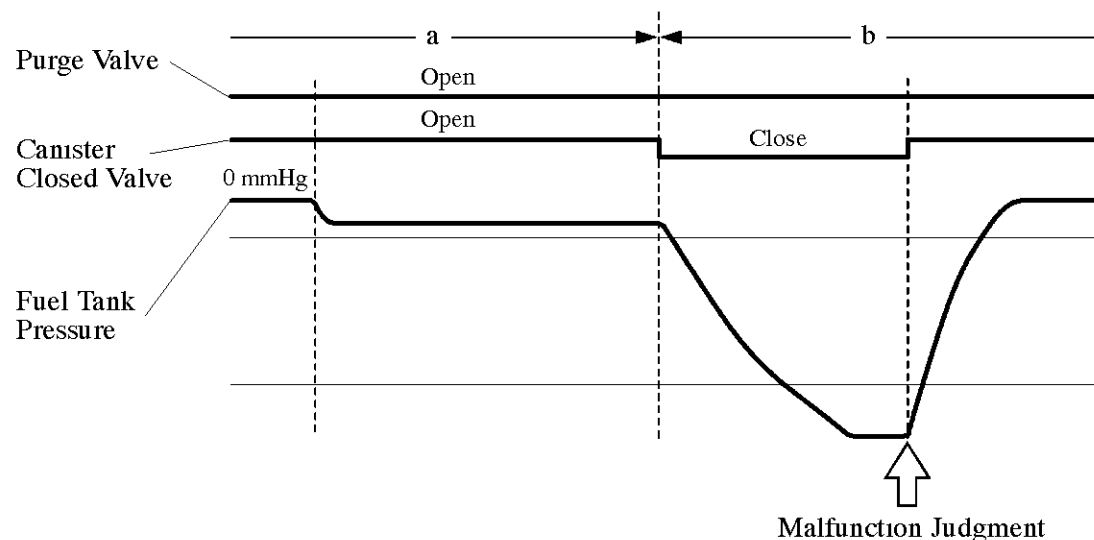
- During purging, the ECM opens the purge valve, and this creates a slight vacuum in the fuel tank.
- During the system monitoring mode, the ECM opens the purge valve and closes the canister closed valve to introduce a vacuum into the fuel tank.
- After the ECM has performed a system leak judgment, it opens the canister closed valve to introduce fresh air into the system. As a result, the atmospheric pressure is reinstated rapidly in the fuel tank.



ii) Purge Valve Open Malfunction

- The fuel tank remains in a constant, slight vacuum state regardless of whether the ECM sends an open or close signal to the purge valve.
- The pressure in the fuel tank drops rapidly regardless of the close signal that the ECM is sending to the purge valve.

When the ECM detects an open malfunction of the purge valve, it illuminates the MIL and stores the DTC number P0441 in its memory.

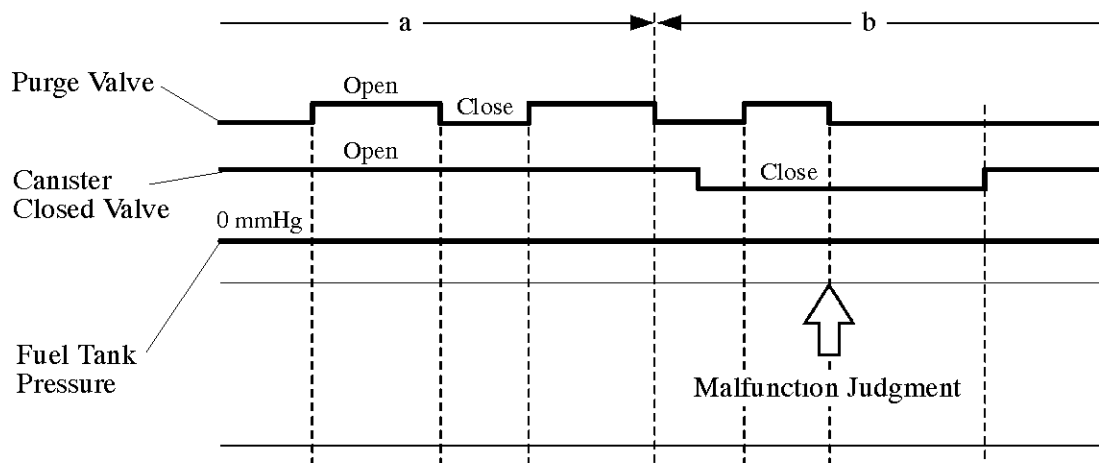


228TU112

iii) Purge Valve Close Malfunction

- The pressure in the fuel tank does not change regardless of whether the ECM sends an open or close signal to the purge valve.
- Even if the ECM closes the canister closed valve in order to transfer to the system monitoring mode, no vacuum is introduced into the fuel tank.

When the ECM detects a close malfunction of the purge valve, it illuminates the MIL and stores the DTC numbers P0441, P0442, and P0446 in its memory.

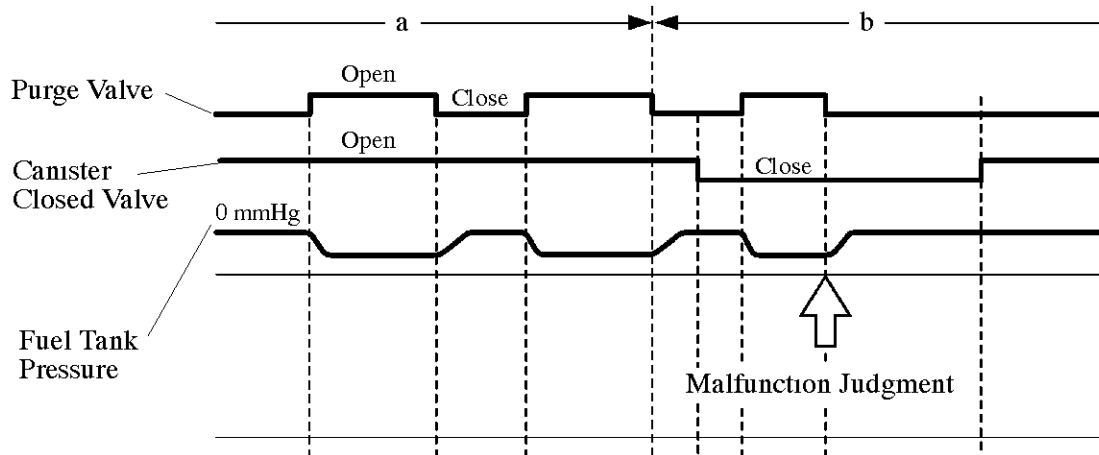


228TU113

iv) Canister Closed Valve Open Malfunction

- a. As the ECM opens the purge valve, a slight vacuum is created in the fuel tank.
- b. Even if the ECM sends a close signal to the canister closed valve in order to transfer to the system monitoring mode, it is not possible to completely introduce a vacuum into the fuel tank.

When the ECM detects an open malfunction of the canister close valve, it illuminates the MIL and stores the DTC numbers P0441, P0442, and P0446 in its memory.

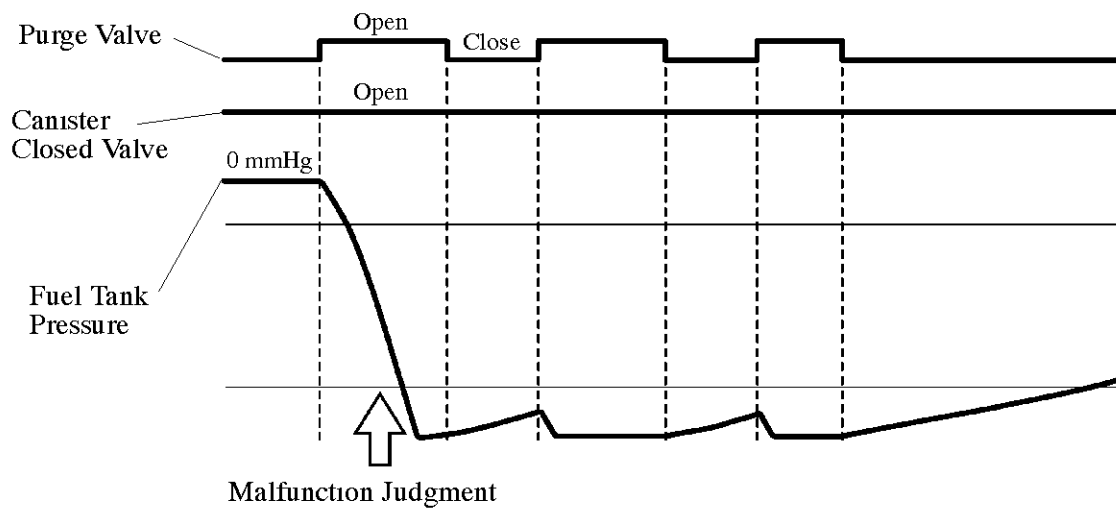


228TU114

v) Canister Closed Valve Close Malfunction

During purging, a large amount of vacuum is introduced into the fuel tank regardless of the open signal that the ECM sends to the canister closed valve. Even if the purge valve closes, the atmospheric pressure is not reinstated in the fuel tank.

When the ECM detects a close malfunction of the canister close valve, it illuminates the MIL and stores the DTC number P0446 in its memory.



228TU115

Diagnosis

- When the ECM detects a malfunction, the ECM makes a diagnosis and memorizes the failed section. Furthermore, the malfunction indicator lamp in the combination meter illuminates or blinks to inform the driver. The ECM will also store the DTC of the malfunctions. The DTC can be accessed the use of the hand-held tester or SST (09843-18040).
- To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, refer to 2003 General Features section.

Fail-Safe

1) General

When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.

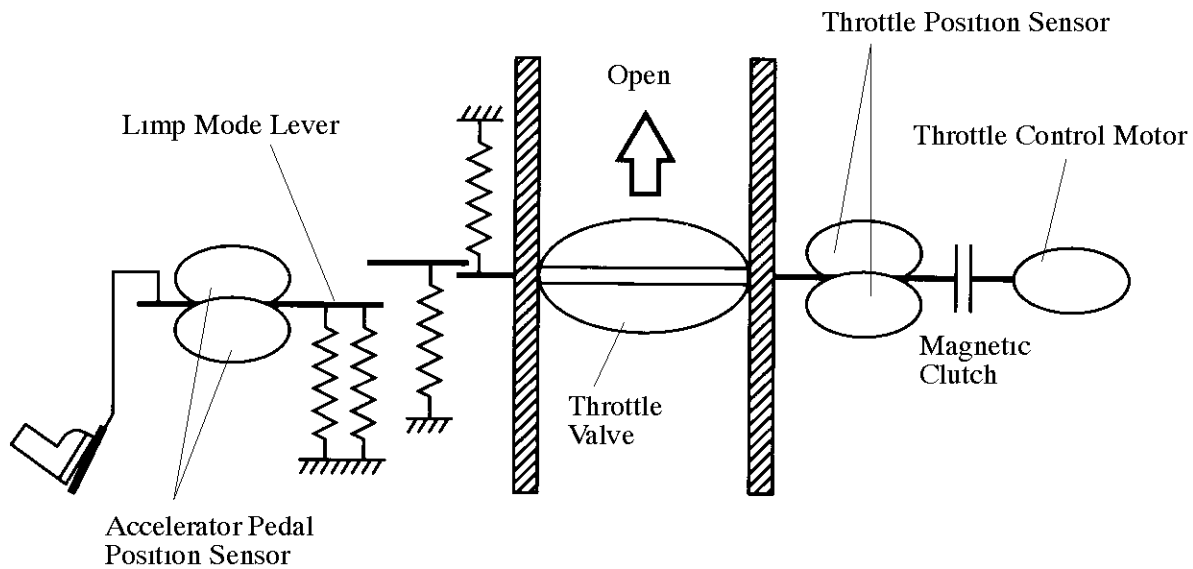
► Fail-Safe Control List ◀

☐: New

Location on Malfunction	Description Control
Air Flow Meter	In case of a signal malfunction, the engine could operate poorly or the catalyst could overheat if the engine continues to be controlled with the signals from the sensors. Therefore, the ECM effects control by using the values in the ECM or stops the engine.
Accelerator Pedal/ Throttle Position Sensor	In case of a signal malfunction, the ECM shuts down the power for the throttle control motor and the magnetic clutch, and the throttle valve is fully closed by the return spring. However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.
Water Temp. Sensor and Intake Air Temp. Sensor	In case of a signal malfunction, the use of the values from the sensors will make the air-fuel ratio become too rich or too lean, which could causes the engine to stall or to run poorly during cold operation. Therefore, the ECM fixes the air-fuel ratio to the stoichiometric ratio and uses the constant values of 80°C water temperature and 20°C intake air temperature to perform the calculation.
Knock Sensor	In case of a malfunction in the knock sensor or in the knocking signal system (open or short circuit), the engine could become damaged if the timing is advanced despite the presence of knocking. Therefore, if a malfunction is detected in the knock sensor system, the ECM turns the timing retard correction of the knock sensor into the maximum retard value.
Ignition Coil (with Igniter)	In case of a malfunction in the ignition system, such as an open circuit in the ignition coil, the catalyst could be become overheated due to engine misfire. Therefore, if the (IGF) ignition signal is not input twice or more in a row, the engine ECU determines that a malfunction occurred in the ignition system and stops only the injection of fuel into the cylinder with the malfunction.

2) Fail-Safe of ETCS-i

- If an abnormal condition occurs with the ETCS-i, the malfunction indicator lamp illuminates to alert the driver. At the same time, the current to the throttle control motor and magnetic clutch are cut off in order not to operate the ETCS-i. This enables the return spring to close the throttle valve.
- Even in this situation, the accelerator pedal can be used to operate the limp mode lever, which operates the throttle valve to enable the vehicle to be driven in the limp mode.



■ 2UZ-FE ENGINE

1. General

- The composition of the TWC (Three-Way Catalytic Converter) has been changed to comply with the ULEV (Ultra Low Emission Vehicle) and SFTP (Supplementary Federal Test Procedure) emission regulations.
- The construction and operation of the evaporative emission control system have been changed to comply with the LEV-II (Low Emission Vehicle-II) evaporative emission regulation. The basic construction and operation are the same as 5VZ-FE engine model. For details, refer to page 233.
- The ETCS-1 (Electronic Control System-intelligent) continues to be used from the '02 model. However, on the '03 model, the accelerator cable has been discontinued and an accelerator position sensor has been provided on the accelerator pedal.
- A no-contact type throttle position sensor has been adopted on all models.
- Cranking hold function has been adopted. Once the ignition switch is turned to the START position, this control continues to operate the starter until the engine starts.
The basic construction and operation are same as '03 Land Cruiser. For details refer to page 144.
- Segment Conductor type alternator has been adopted.
- To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, refer to 2003 General Features section.

► Engine Specifications ◀

Model			'03 Model	'02 Model
No. of Cyls. & Arrangement			8-Cylinder, V Type	←
Valve Mechanism			32-Valve DOHC, Belt & Gear Drive	←
Combustion Chamber			Pentroof Type	←
Manifolds			Cross-Flow	←
Fuel System			SFI	←
Ignition System			DIS	←
Displacement	cm ³ (cu. in.)		4664 (284.5)	←
Bore × Stroke	mm (in.)		94.0 × 84.0 (3.70 × 3.31)	←
Compression Ratio			9.6 : 1	←
Max. Output	SAE-NET		179 kW @ 4800 rpm 240 HP @ 4800 rpm	183/179* kW @ 4800 rpm 245/240* HP @ 4800 rpm
Max. Torque	SAE-NET		427 N m @ 3400 rpm 315 ft lbf @ 3400 rpm	←
Valve Timing	Intake	Open	3° BTDC	←
		Close	36° ABDC	←
	Exhaust	Open	46° BBDC	←
		Close	3° ATDC	←
Firing Order			1-8-4-3-6-5-7-2	←
Research Octane Number			91 or more	←
Emission Regulation			SFTP and ULEV	—
Oil Grade			API SL-EC or ILSAC	←
Engine Service Mass	kg (lb)		223 (492)	←

*: California Specification Model

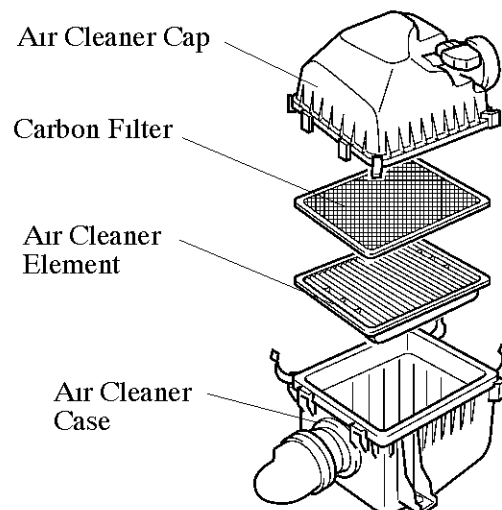
2. Major Difference

Item	Outline
Intake and Exhaust System (See Page 247)	• Adoption of a carbon filter for adsorbing HC (hydrocarbons) in the air cleaner cap • Adoption of the link-less type ETCS-1 • Changed composition of TWC
Fuel System (See Page 248)	• Adoption of fuel hoses made of conductive multilayer nylon. • Adoption of the quick turn type fuel cap • Changed location of the charcoal canister and charcoal canister capacity • Changed evaporative emission control system
Charging System (See Page 249)	Adoption of the Segment Conductor type alternator.
Engine Control System (See Page 250)	• Adoption of the no-contact type throttle position sensor and accelerator pedal position sensor. • Provision of accelerator pedal position sensor on accelerator pedal • Changed fuel cut control. • Adoption of the cranking hold function • Changed evaporative emission control • Changed failsafe control of accelerator pedal position sensor and throttle position sensor • Correspondence of all DTC (Diagnostic Trouble Code) to SAE-controlled codes
Other	Configuration and structure are the same as '02 model

3. Intake and Exhaust System

Air Cleaner

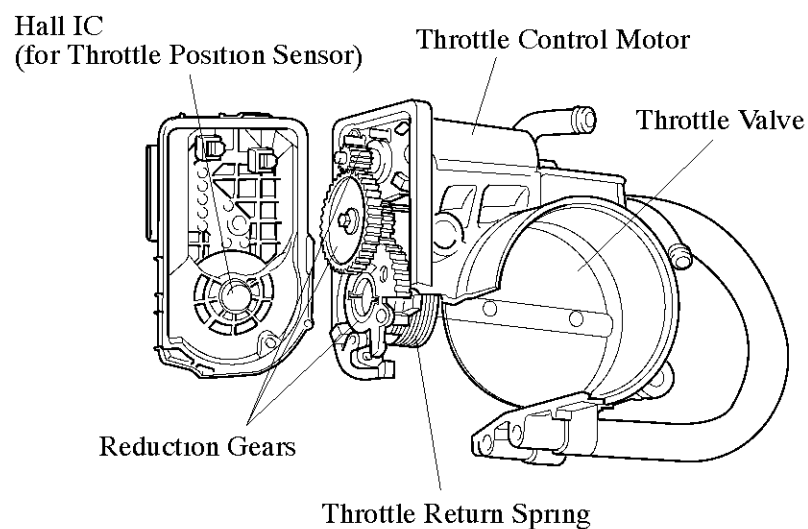
A carbon filter, which adsorbs the HC (hydrocarbons) that remain in the intake system when the engine is stopped, has been adopted in the air cleaner cap to reduce evaporative emissions. This filter is maintenance-free



228TU18

Throttle Body

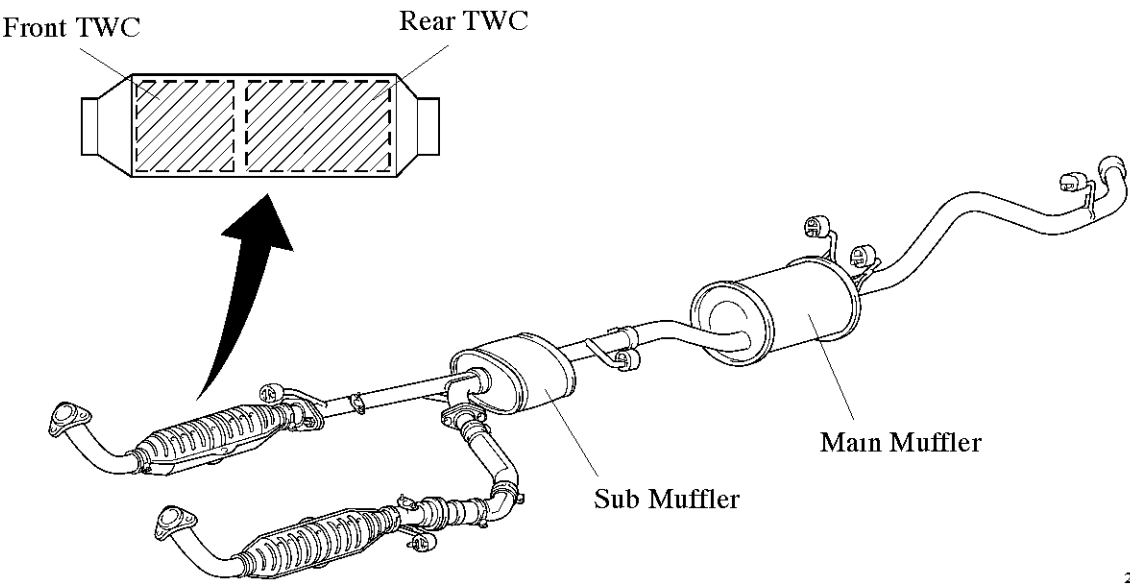
- The link-less type ETCS-1 has adopted and it realizes excellent throttle control. For details of ETCS-1 control, refer to see page 256.
- The no-contact type throttle position sensor has been adopted.



229LC108

TWC (Three-Way Catalytic Converter)

On the '03 model, the configuration of the TWC has been changed as shown in the table below to improve its exhaust gas reduction performance and comply with the SFTP and ULEV requirements.



228tu19

► Specifications ◀

Location	'03 Model				'02 Model			
	Cell Density	Volume		Material	Cell Density	Volume		Material
Front	62 cells / cm ² (400 cells / in ²)	875 cm ³ (53.4 cu in)	×2	Ceramic	62 cells / cm ² (400 cells / in ²)	863 cm ³ (52.7 cu in)	×2	Metal
Rear	62 cells / cm ² (400 cells / in ²)	1083 cm ³ (66.1 cu in)	×2	Ceramic	62 cells / cm ² (400 cells / in ²)	1306 cm ³ (79.7 cu in)	×1*	Ceramic

*: Only for California Specification Model

4. Fuel System

To reduce evaporative emissions, the following features have been adopted in the fuel system:

- Fuel hoses that are made of conductive multilayer nylon, which excel in inhibiting fuel permeation, have been adopted.
- A quick-turn type fuel cap has been adopted to prevent the user from leaving the fuel cap untightened.
- In conjunction with changing the method for detecting evaporative emission leaks, the location of the charcoal canister has been changed from the previous engine compartment to the under floor.
- The capacity of the charcoal canister has been increased.

► Charcoal Canister Capacity ◀

'03 Model	'02 Model
3.0 liters (3.17 US qts, 2.64 Imp. qts)	2.4 liters (2.54 US qts, 2.11 Imp. qts)

5. Charging System

- A compact and lightweight Segment Conductor type alternator that generates high amperage output in a highly efficient manner has been adopted.
- The basic construction and operation are same as '03 Land Cruiser. For details, refer to page 128.

► Specifications ◀

Model	'03 Model		'02 Model
	Standard	Option	Standard
Type	SE08	SC1	L3BME
Output	80A	130A	100A
Length	134 mm (5.28 in.)	132 mm (5.20 in.)	148 mm (5.83 in.)
Weight	4250 g (9.37 lb.)	5600 g (12.35 lb.)	6100 g (13.45 lb.)

6. Engine Control System

General

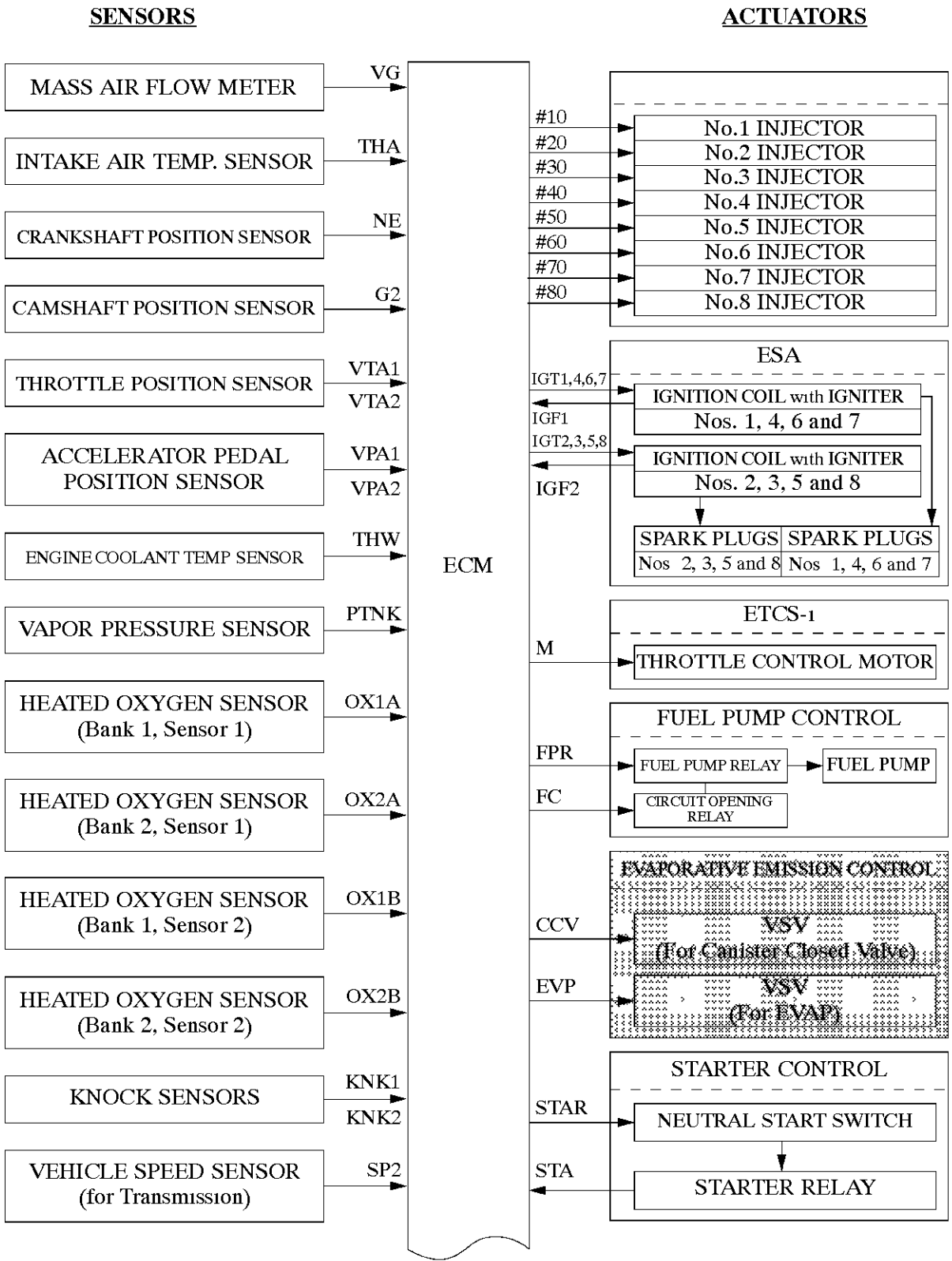
The engine control system of the 2UZ-FE engine on the '03 model and 2UZ-FE engine on the '02 model are compared below.

System	Outline	'03 Model	'02 Model
SFI (Sequential Multiport Fuel Injection)	An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.	○	○
ETCS-1 (Electronic Throttle Control System-intelligent (See page 256))	Optimally controls the throttle valve opening in accordance with the amount of accelerator pedal effort and the condition of the engine and the vehicle.	○	○
	• A link less type is used, without an accelerator cable. • No-contact type accelerator pedal position sensor is provided on the accelerator pedal. • No-contact type throttle position sensor has been adopted.	○	—
Fuel Pump Control	The fuel pump speed is controlled by the fuel pump relay and the fuel pump resistor.	○	○
	A fuel cut control is adopted to stop the fuel pump when the airbag is deployed at the front collision.	○	—
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.	○	○
Evaporative Emission Control	The ECM controls the purge flow of evaporative emission (HC) in the charcoal canister in accordance with engine conditions.	○	○
	System construction and control logic have been made to comply with LEV-II evaporative emission regulation.	○	—
Air Conditioning Cut-off Control	By turning the air conditioning compressor ON or OFF in accordance with the engine condition, drivability is maintained.	○	○
Starting System	Once the ignition switch is turned to the START position, this control continues to operate the starter until the engine fires.	○	—
Diagnosis	When the engine ECU detects a malfunction, the engine ECU diagnoses and memorizes the failed section.	○	○
	All the DTC (Diagnostic Trouble Codes) have been made to correspond to the SAE controlled codes.	○	—
Fail-Safe (See page 257)	When the engine ECU detects a malfunction, the engine ECU stops or controls the engine according to the data already stored in the memory.	○	○

Construction

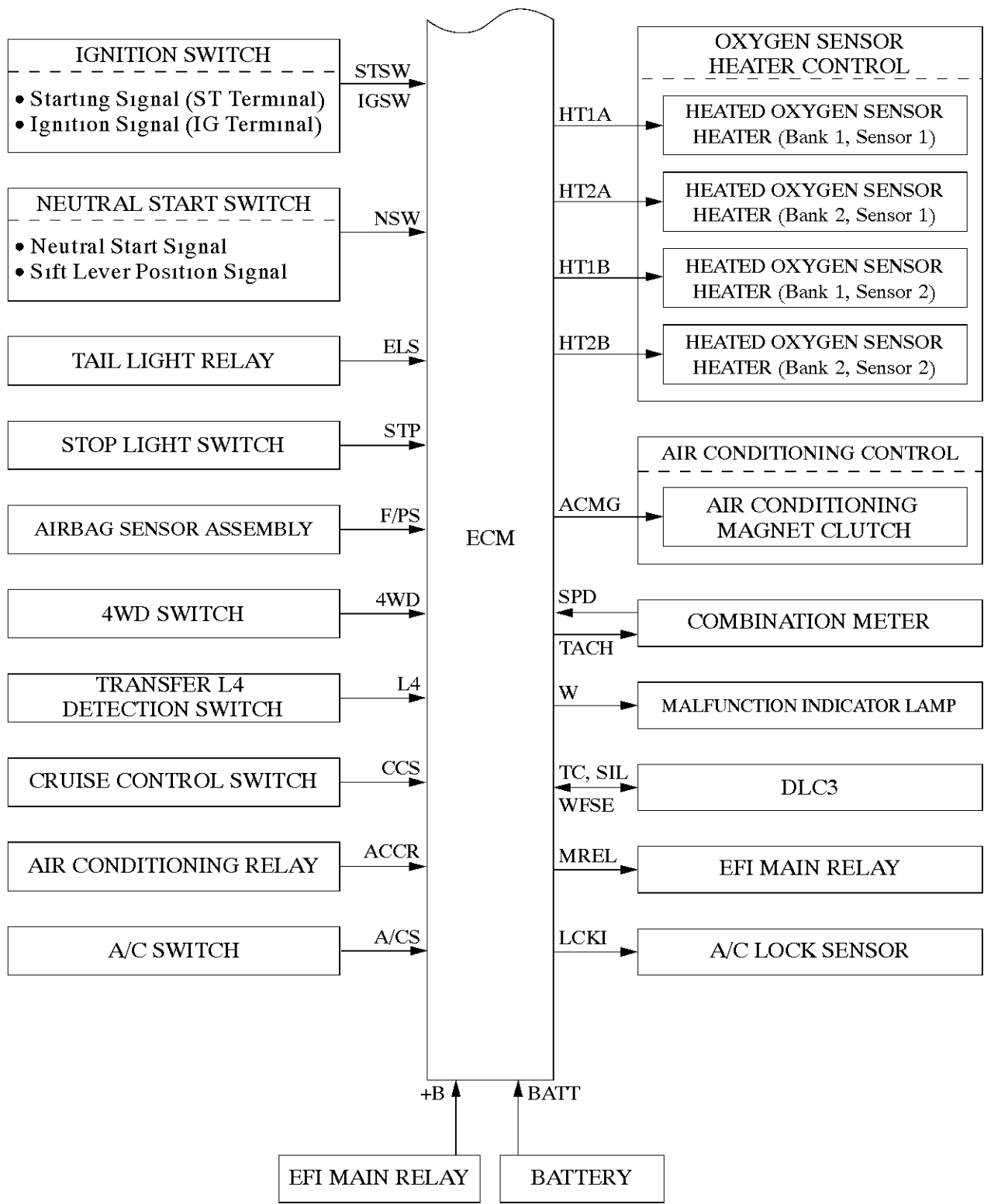
The configuration of the engine control system of the 2UZ-FE engine is as shown in the following chart.

 : New

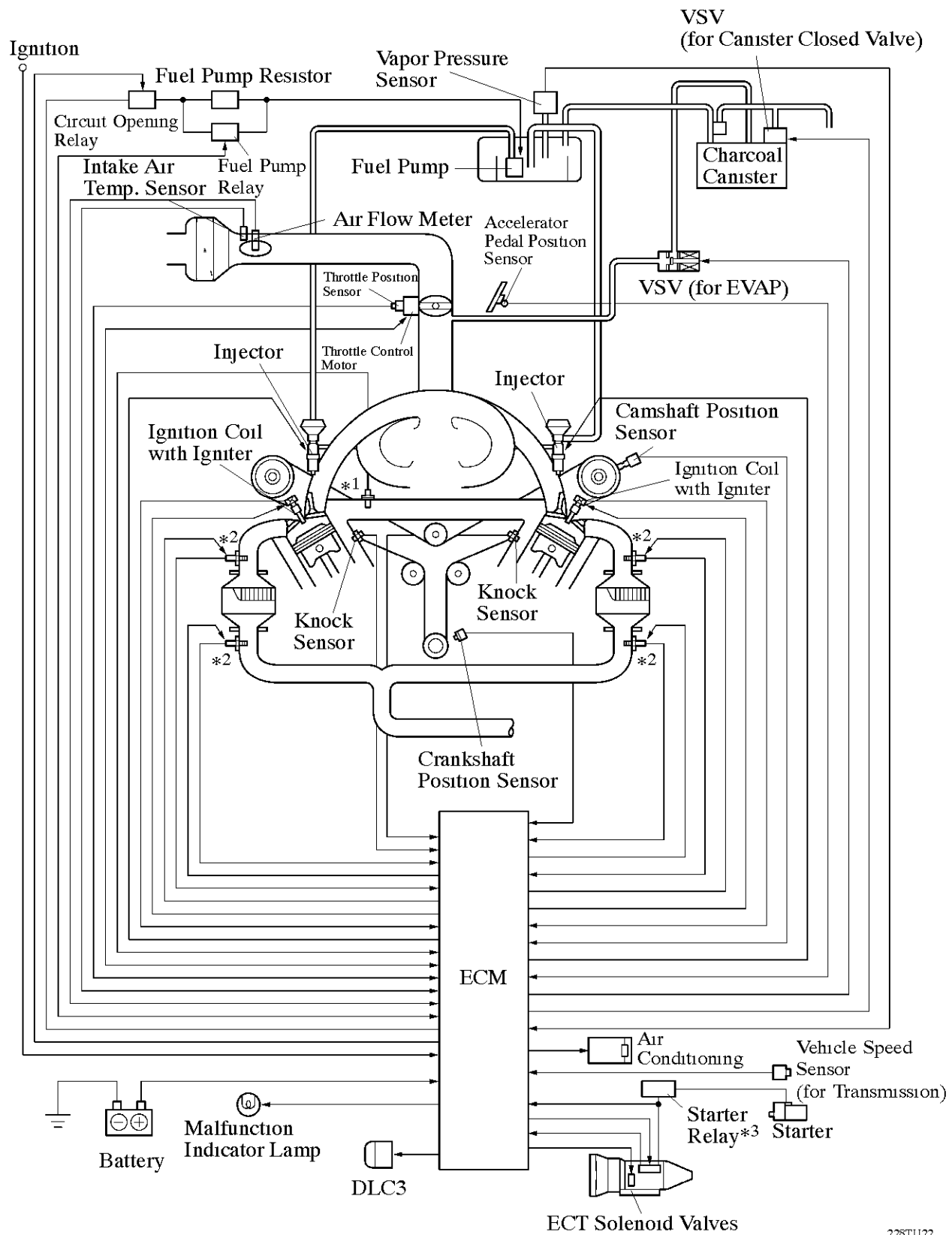


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(Continued)



Engine Control System Diagram



Main Component of Engine Control System

1) General

The following table compares the main components.

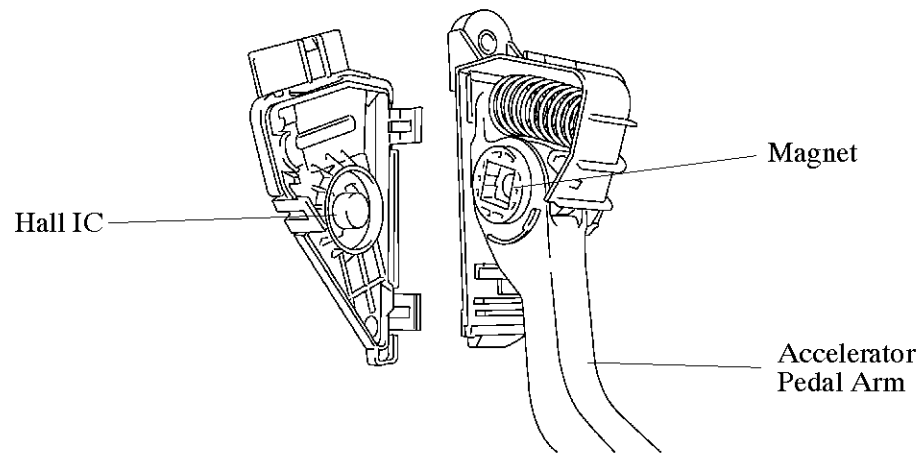
Model Type	'03 Model		'02 Model	
Component	Outline	Quantity	Outline	Quantity
ECM	32-bit CPU	1	←	
Air Flow Meter	Hot-wire Type	1	←	
Crankshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (36-2)	1	←	
Camshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (1)	1	←	
Accelerator Pedal Position Sensor	No-contact Type (Mounted on accelerator pedal)	1	Linear Type (Mounted on throttle body)	1
Throttle Position Sensor	No-contact Type	1	Linear Type	1
Knock Sensor	Built-in Piezoelectric Type	2	←	
Oxygen Sensor (Bank 1, Sensor 1) (Bank 1, Sensor 2) (Bank 2, Sensor 1) (Bank 2, Sensor 2)	with Heater	4	←	
Injector	4-Hole Type	8	←	

2) Throttle Position Sensor (No-contact type)

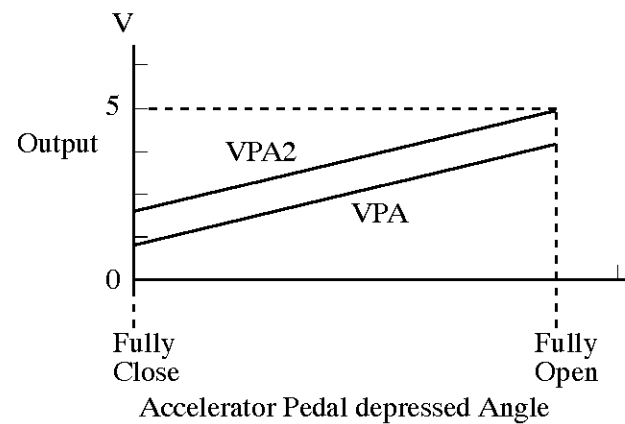
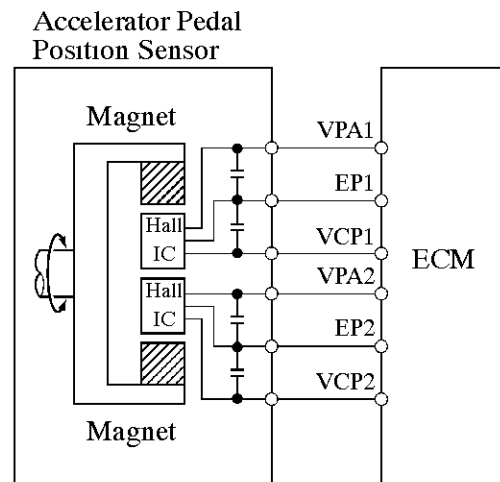
No-contact type throttle position sensor has been adopted. The basic construction and operation are same as '03 Land Cruiser. For details, refer to page 136.

3) Accelerator Pedal Position Sensor (No-contact type)

The magnetic yoke that is mounted at the base of the accelerator pedal arm rotates around the Hall IC in accordance with the amount of effort that is applied to the accelerator pedal. The Hall IC converts the changes in the magnetic flux that occur at that time into electrical signals, and outputs them in the form of accelerator pedal effort to the ECM.



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Service Tip

The inspection method differs from the conventional accelerator pedal position sensor because this sensor uses a hall IC. For details, refer to the 2003 Toyota Tundra Repair Manual (Pub. No. RM956U).

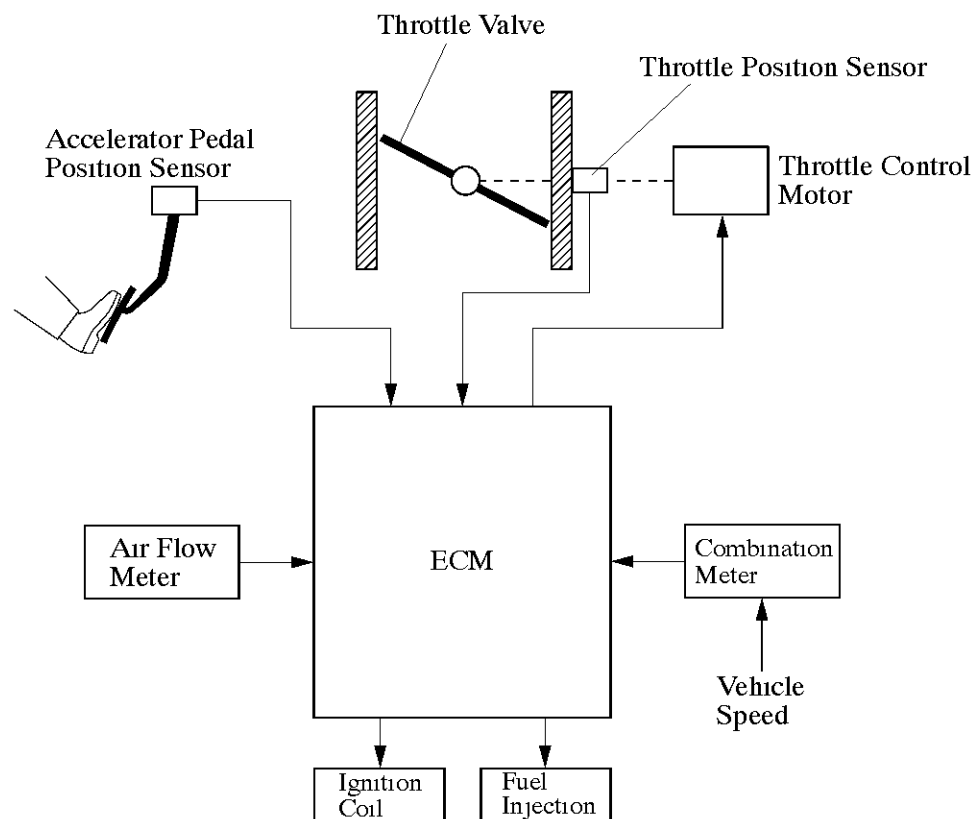
ETCS-i (Electronic Throttle Control System-intelligent)

In the conventional throttle body, the throttle valve opening is determined invariably by the amount of the accelerator pedal effort. In contrast, the ETCS-i uses the ECM to calculate the optimal throttle valve opening that is appropriate for the respective driving condition and uses a throttle control motor to control the opening.

In contrast to the ETCS-i on the previous model, the following items have been changed on the new model:

- The accelerator cable and link have been discontinued, and no-contact type accelerator pedal position sensor has been provided on the accelerator pedal.
- No-contact type throttle position sensor has been adopted.
- Accordingly, the limp-mode control during the fail-safe mode has been changed.

► System Diagram ◀



Fail-Safe

When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.

► Fail-Safe Control List ◀

☐: New

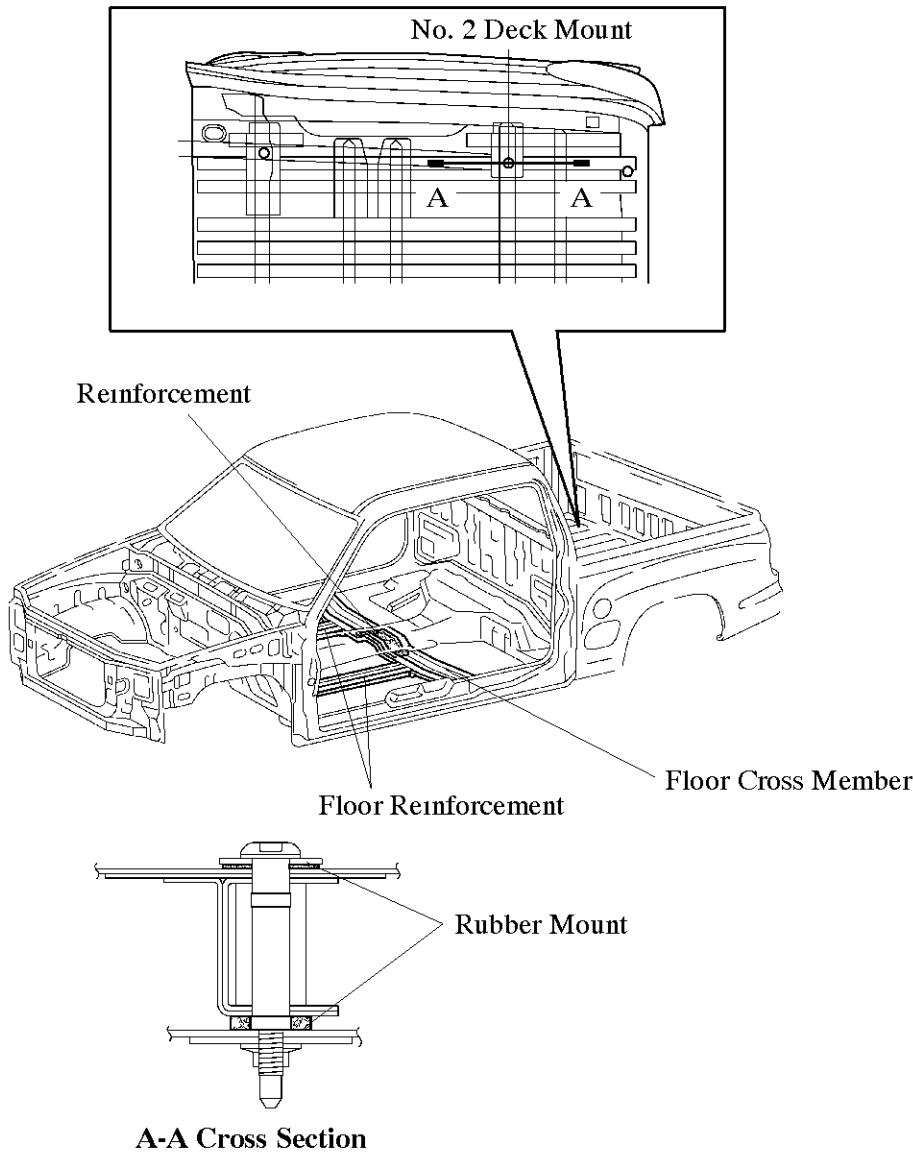
Location on Malfunction	Description Control
Air Flow Meter	In case of a signal malfunction, the engine could operate poorly or the catalyst could overheat if the engine continues to be controlled with the signals from the sensors. Therefore, the ECM effects control by using the values in the ECM or stops the engine.
Accelerator Pedal Position Sensor (For details, see page 147)	In case of a signal malfunction, the ECM calculates the accelerator pedal opening angle that is limited by the dual system sensor value and continues effecting throttle valve control. If both system malfunction, the ECM considers that the accelerator pedal is fully closed.
Throttle Position Sensor (For details, see page 148)	In case of a signal malfunction, the ECM cuts off the current to the throttle control motor. The throttle valve returns to the prescribed opening by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue driving.
Water Temp. Sensor and Intake Air Temp. Sensor	In case of a signal malfunction, the use of the values from the sensors will make the air-fuel ratio become too rich or too lean, which could causes the engine to stall or to run poorly during cold operation. Therefore, the ECM fixes the air-fuel ratio to the stoichiometric ratio and uses the constant values of 80°C water temperature and 20°C intake air temperature to perform the calculation.
Knock Sensor	In case of a malfunction in the knock sensor or in the knocking signal system (open or short circuit), the engine could become damaged if the timing is advanced despite the presence of knocking. Therefore, if a malfunction is detected in the knock sensor system, the ECM turns the timing retard correction of the knock sensor into the maximum retard value.
Ignition Coil (with Igniter)	In case of a malfunction in the ignition system, such as an open circuit in the ignition coil, the catalyst could be become overheated due to engine misfire. Therefore, if the (IGF) ignition signal is not input twice or more in a row, the ECM determines that a malfunction occurred in the ignition system and stops only the injection of fuel into the cylinder with the malfunction.

BODY

1. Body Shell

Body vibration has been reduced through the adoption of the following items:

- Addition of a reinforcement in the center of the floor cross member
- Joining of the floor cross member and the floor reinforcement
- Adoption of a floating type No. 2 deck mounts that use rubber mounts (only on the StepSide Bed model)
- Adoption of a mass damper below the rear combination (only on the StepSide Bed model)



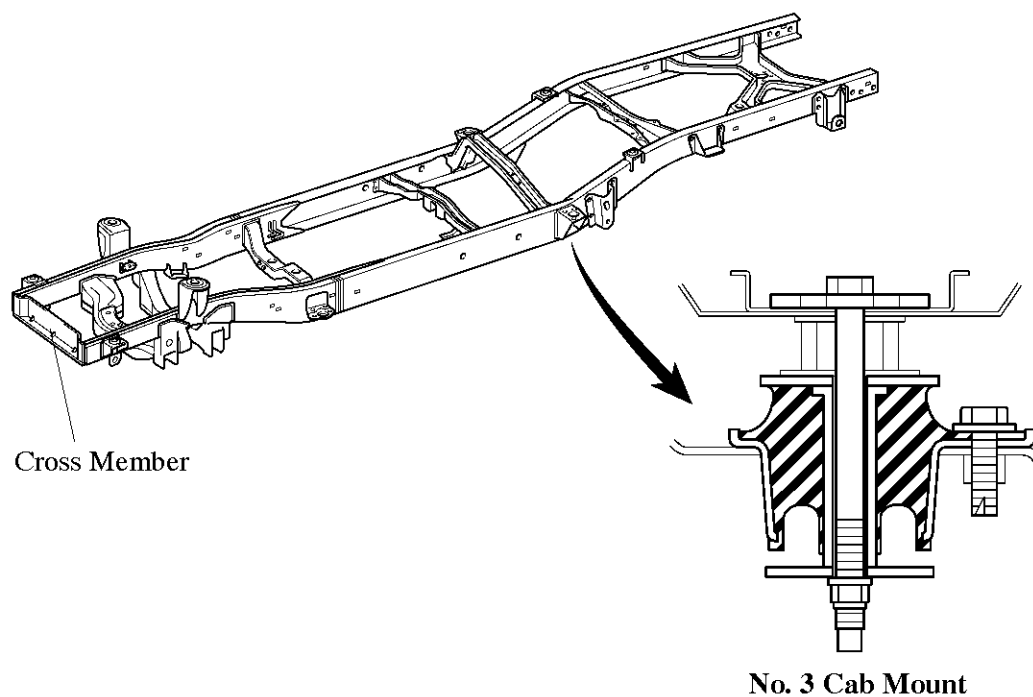
228TU27

► Deck Inner Size for StepSide Bed Model ◀

Deck Inner Size		
Length	mm (in.)	1862 (73.3)
Wide	mm (in.)	1367 (53.8)
Height	mm (in.)	485 (19.1)
Volume	m ³ (cu.ft.)	1.23 (43.6)

2. Frame

- The characteristics of the No. 3 cab mounts have been optimized to reduce body vibration.
- On the models with a plastic bumper, a cross member has been provided at the front end of the frame to ensure body rigidity.



228TU28

MAJOR TECHNICAL SPECIFICATIONS

Item				Area		U S A							
Body Type				Regular Cab (2WD)				Access Cab (2WD)					
Vehicle Grade				STD				SR5					
Model Code				VCK30L TRMDKA		VCK30L TRSDKA		VCK30L ARMSKA		VCK30L ARSSKA			
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	5545 (218.3)	5525 (217.5)*1	5545 (218.3)	5525 (217.5)*1	5545 (218.3)	5525 (217.5)*1	5545 (218.3)	5525 (217.5)*1		
		Width	mm (in.)	1910 (75.2)		1910 (75.2)		1910 (75.2)*2 3		1910 (75.2)*2 3			
		Height*4	mm (in.)	1795 (70.7)		1795 (70.7)		1790 (70.5)	1800 (70.9)*5	1790 (70.5)	1800 (70.9)*5		
	Wheel Base		mm (in.)	3260 (128.3)		3260 (128.3)		3260 (128.3)		3260 (128.3)			
	Tread	Front	mm (in.)	1680 (66.1)		1680 (66.1)		1680 (66.1)		1680 (66.1)			
		Rear	mm (in.)	1648 (64.9)		1648 (64.9)		1648 (64.9)		1648 (64.9)			
	Effective Head Room	Front	mm (in.)	1002 (39.4)		1002 (39.4)		1004 (39.5)		1004 (39.5)			
		Rear	mm (in.)	—		—		964 (38.0)		964 (38.0)			
	Effective Leg Room	Front	mm (in.)	1053 (41.5)		1053 (41.5)		1053 (41.5)		1053 (41.5)			
		Rear	mm (in.)	—		—		727 (28.6)		727 (28.6)			
	Shoulder Room	Front	mm (in.)	1584 (62.4)		1584 (62.4)		1584 (62.4)		1584 (62.4)			
		Rear	mm (in.)	—		—		1609.2 (63.4)		1609.2 (63.4)			
	Cargo Space	Length	mm (in.)	—		—		—		—			
		Width	mm (in.)	—		—		—		—			
		Height	mm (in.)	—		—		—		—			
	Overhang	Front	mm (in.)	945 (37.2)	920 (36.2)*1	945 (37.2)	920 (36.2)*1	945 (37.2)	920 (36.2)*1	945 (37.2)	920 (36.2)*1		
		Rear	mm (in.)	1225 (48.2)		1225 (48.2)		1225 (48.2)		1225 (48.2)			
	Min. Running Ground Clearance		mm (in.)	265 (10.4)		265 (10.4)		270 (10.4)		270 (10.4)			
	Angle of Approach		degrees	26°		26°		27°		27°			
	Angle of Departure		degrees	23°		23°		23°		23°			
	Curb Mass	Front	kg (lb)	1002 (2210)		1016 (2240)		1023 (2255)		1043 (2300)			
		Rear	kg (lb)	778 (1715)		778 (1715)		864 (1905)		864 (1905)			
		Total	kg (lb)	1780 (3925)		1794 (3955)		1887 (4160)		1907 (4205)			
	Gross Vehicle Mass	Front	kg (lb)	—		—		—		—			
		Rear	kg (lb)	—		—		—		—			
		Total	kg (lb)	2495 (5500)		2495 (5500)		2586 (5700)		2586 (5700)			
	Fuel Tank Capacity		L (U S gal) Imp gal	100 (26.4 22.0)		100 (26.4 22.0)		100 (26.4 22.0)		100 (26.4 22.0)			
	Luggage Compartment Capacity		m³ (cu ft)	—		—		—		—			
Performance	Max. Speed		km/h (mph)	165 (102)		165 (102)		165 (102)		165 (102)			
	Max. Cruising Speed		km/h (mph)	150 (93)		150 (93)		150 (93)		150 (93)			
	Max. Permissible Speed	1st Gear	km/h (mph)	45 (28)		60 (37)		45 (28)		60 (37)			
		2nd Gear	km/h (mph)	85 (53)		115 (71)		85 (53)		115 (71)			
		3rd Gear	km/h (mph)	125 (78)		—		125 (78)		—			
		4th Gear	km/h (mph)	—		—		—		—			
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)	14.2 (46.6)		14.2 (46.6)		14.2 (46.6)		14.2 (46.6)			
		Curb to Curb	m (ft)	13.7 (44.9)		13.7 (44.9)		13.7 (44.9)		13.7 (44.9)			
Engine	Engine Type			5VZ FE		5VZ FE		5VZ FE		5VZ FE			
	Valve Mechanism			24 Valve DOHC		24 Valve DOHC		24 Valve DOHC		24 Valve DOHC			
	Bore × Stroke		mm (in.)	93.5 × 82.0 (3.68 × 3.23)		93.5 × 82.0 (3.68 × 3.23)		93.5 × 82.0 (3.68 × 3.23)		93.5 × 82.0 (3.68 × 3.23)			
	Displacement		cm³ (cu in.)	3378 (206.1)		3378 (206.1)		3378 (206.1)		3378 (206.1)			
	Compression Ratio			9.6 : 1		9.6 : 1		9.6 : 1		9.6 : 1			
	Carburetor Type			SFI		SFI		SFI		SFI			
	Research Octane No.		RON	91 or more		91 or more		91 or more		91 or more			
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	142 / 4800 (190@4800)		142 / 4800 (190@4800)		142 / 4800 (190@4800)		142 / 4800 (190@4800)			
	Max. Torque (SAE NET)		N m/rpm (lb ft@rpm)	298 / 3600 (220@3600)		298 / 3600 (220@3600)		298 / 3600 (220@3600)		298 / 3600 (220@3600)			
Engine Electrical	Battery Capacity (5HR)		Voltage & Amp hr	12 48 12 55*8		12 48 12 55*8		12 48 12 55*8		12 48 12 55*8			
	Alternator Output		Watts	960		960		960		960			
Starter Output		kW	1.2 1.4*8		1.4 1.8*8		1.2 1.4*8		1.4 1.8*8				
Chassis	Clutch Type			Dry Single Plate Diaphragm		—		Dry Single Plate Diaphragm		—			
	Transmission Type			R150		A340E		R150		A340E			
	Transmission Gear Ratio	In First		3.830		2.804		3.830		2.804			
		In Second		2.062		1.531		2.062		1.531			
		In Third		1.436		1.000		1.436		1.000			
		In Fourth		1.000		0.705		1.000		0.705			
		In Fifth		0.838		—		0.838		—			
		In Reverse		4.220		2.393		4.220		2.393			
	Transfer Gear Ratio H4/L4			—		—		—		—			
	Differential Gear Ratio (Front/Rear)			— / 4.083		— / 4.083		— / 4.083		— / 4.083			
	Differential Gear Size (Front/Rear)		in	— / 8		— / 8		— / 8		— / 8			
	Brake Type	Front		Ventilated Disc		Ventilated Disc		Ventilated Disc		Ventilated Disc			
		Rear		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum			
	Parking Brake Type			Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum			
	Brake Booster Type and Size		in	Single 10		Single 10		Single 10		Single 10			
	Proportioning Valve Type			LSP and BV		LSP and BV		LSP and BV		LSP and BV			
	Suspension Type	Front		Double Wishbone Coil		Double Wishbone Coil		Double Wishbone Coil		Double Wishbone Coil			
Rear			Rigid Leaf		Rigid Leaf		Rigid Leaf		Rigid Leaf				
Stabilizer Bar	Front		STD		STD		STD		STD				
	Rear		—		—		—		—				
Steering Gear Type			Rack and Pinion		Rack and Pinion		Rack and Pinion		Rack and Pinion				
Steering Gear Ratio (Overall)			18.6		18.6		18.6		18.6				
Power Steering Type			Integral Type		Integral Type		Integral Type		Integral Type				

*1 With Steel Bumper
 *2 With Wheel Arch Moulding +35 (1.4)
 *3 With Over Fender +105 (4.1)

*4 Unladen Vehicle
 *5 With P265 / 70R16 or P265 / 65R17 tires
 *6 Low mode

*7 High mode
 *8 Cold Area Spec
 *9 Option

*10 With Off Road Package

Donated by Andrew Schauer cruisercult.com

U S A						
Access Cab (4WD)			Access Cab (2WD)			
SR5		SR5	Limited	SR5	Limited	
VCK40L ARMSKA	VCK40L ARSSKA	UCK30L ARSSKA	UCK30L ARSLKA	UCK30L ASSSKA	UCK30L ASSLKA	
5545 (218 3) 5525 (217 5)* ¹	5545 (218 3) 5525 (217 5)* ¹	5545 (218 3) 5525 (217 5)* ¹	5545 (218 3)	5545 (218 3) 5525 (217 5)* ¹	5545 (218 3)	
1910 (75 2)* ^{2 3}	1910 (75 2)* ^{2 3}	1910 (75 2)* ^{2 3}	2015 (79 3)	2000 (78 7)	2000 (78 7)	
1810 (71 3) 1820 (71 7)* ⁵	1810 (71 3) 1820 (71 7)* ⁵	1790 (70 5) 1800 (70 9)* ⁵	1800 (70 9)	1790 (70 5)	1790 (70 5)	
3260 (128 3)	3260 (128 3)	3260 (128 3)	3260 (128 3)			
1675 (65 9)	1675 (65 9)	1680 (66 1)	1680 (66 1)	1680 (66 1)	1680 (66 1)	
1648 (64 9)	1648 (64 9)	1648 (64 9)	1648 (64 9)	1648 (64 9)	1648 (64 9)	
1004 (39 5)	1004 (39 5)	1004 (39 5)	1004 (39 5)	1004 (39 5)	1004 (39 5)	
964 (38 0)	964 (38 0)	964 (38 0)	964 (38 0)	964 (38 0)	964 (38 0)	
1053 (41 5)	1053 (41 5)	1053 (41 5)	1053 (41 5)	1053 (41 5)	1053 (41 5)	
727 (28 6)	727 (28 6)	727 (28 6)	727 (28 6)	727 (28 6)	727 (28 6)	
1584 (62 4)	1584 (62 4)	1584 (62 4)	1584 (62 4)	1584 (62 4)	1584 (62 4)	
1609 2 (63 4)	1609 2 (63 4)	1609 2 (63 4)	1609 2 (63 4)	1609 2 (63 4)	1609 2 (63 4)	
—	—	—	—	—	—	
—	—	—	—	—	—	
—	—	—	—	—	—	
945 (37 2) 920 (36 2)* ¹	945 (37 2) 920 (36 2)* ¹	945 (37 2) 920 (36 2)* ¹	945 (37 2)	945 (37 2) 920 (36 2)* ¹	945 (37 2)	
1225 (48 2)	1225 (48 2)	1225 (48 2)	1225 (48 2)	1225 (48 2)	1225 (48 2)	
290 (11 4)	290 (11 4)	265 (10 4)	275 (10 8)	265 (10 4)	265 (10 4)	
28°	28°	26°	26°	26°	26°	
23°	23°	23°	23°	23°	23°	
1125 (2480)	1145 (2525)	1116 (2460)	1120 (2470)	1123 (2475)	1120 (2470)	
887 (1955)	887 (1955)	903 (1990)	875 (1930)	916 (2020)	880 (1940)	
2012 (4435)	2032 (4480)	2019 (4450)	1995 (4400)	2039 (4495)	2000 (4410)	
—	—	—	—	—	—	
—	—	—	—	—	—	
2722 (6000)	2722 (6000)	2812 (6200)	2812 (6200)	2726 (6010)	2726 (6010)	
100 (26 4 220)	100 (26 4 220)	100 (26 4 220)	100 (26 4 220)	100 (26 4 220)	100 (26 4 220)	
—	—	—	—	—	—	
165 (102)	165 (102)	165 (102)	165 (102)	165 (102)	165 (102)	
150 (93)	150 (93)	150 (93)	150 (93)	150 (93)	150 (93)	
15 (9)* ⁶ / 45 (28)* ⁷	20 (12)* ⁶ / 60 (37)* ⁷	65 (40)	65 (40)	65 (40)	65 (40)	
30 (18)* ⁶ / 85 (53)* ⁷	40 (24)* ⁶ / 110 (68)* ⁷	120 (75)	120 (75)	120 (75)	120 (75)	
45 (28)* ⁶ / 125 (78)* ⁷	—	—	—	—	—	
—	—	—	—	—	—	
14 1 (46 3)	14 1 (46 3)	14 2 (46 6)	14 2 (46 6)	14 2 (46 6)	14 2 (46 6)	
13 5 (44 3)	13 5 (44 3)	13 7 (44 9)	13 7 (44 9)	13 7 (44 9)	13 7 (44 9)	
5VZ FE	5VZ FE	2UZ FE	2UZ FE	2UZ FE	2UZ FE	
24 Valve DOHC	24 Valve DOHC	32 Valve DOHC	32 Valve DOHC	32 Valve DOHC	32 Valve DOHC	
93 5 × 82.0 (3 68 × 3 23)	93 5 × 82.0 (3 68 × 3 23)	94 0 × 84 0 (3 70 × 3 31)	94 0 × 84 0 (3 70 × 3 31)	94 0 × 84 0 (3 70 × 3 31)	94 0 × 84 0 (3 70 × 3 31)	
3378 (206 1)	3378 (206 1)	4664 (284 5)	4664 (284 5)	4664 (284 5)	4664 (284 5)	
9 6 1	9 6 1	9 6 1	9 6 1	9 6 1	9 6 1	
SFI	SFI	SFI	SFI	SFI	SFI	
91 or more	91 or more	91 or more	91 or more	91 or more	91 or more	
142 / 4800 (190@4800)	142 / 4800 (190@4800)	179 / 4800 (240@4800)	179 / 4800 (240@4800)	179 / 4800 (240@4800)	179 / 4800 (240@4800)	
298 / 3600 (220@3600)	298 / 3600 (220@3600)	427 / 3400 (315@3400)	427 / 3400 (315@3400)	427 / 3400 (315@3400)	427 / 3400 (315@3400)	
12 48 12 55* ⁸	12 48 12 55* ⁸	12 55 12 64* ⁸	12 55 12 64* ⁸	12 55 12 64* ⁸	12 55 12 64* ⁸	
960	960	960 1560* ⁹	960 1560* ⁹	960 1560* ⁹	960 1560* ⁹	
1 4	1 4 1 8* ⁸	1 4	1 4	1 4	1 4	
Dry Single Plate Diaphragm	—	—	—	—	—	
R150F	A340F	A340E	A340E	A340E	A340E	
3 830	2 804	2 804	2 804	2 804	2 804	
2 062	1 531	1 531	1 531	1 531	1 531	
1 436	1 000	1 000	1 000	1 000	1 000	
1 000	0 705	0 705	0 705	0 705	0 705	
0 838	—	—	—	—	—	
4 220	2 393	2 393	2 393	2 393	2 393	
1 000 / 2 566	1 000 / 2 566	—	—	—	—	
4 100 / 4 100	4 300 / 4 300	— / 3 916	— / 3 916	— / 3 916	— / 3 916	
7 5 / 8	7 5 / 8	— / 8	— / 8	— / 8	— / 8	
Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc	
Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	
Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	
Single 10	Single 10	Single 10	Single 10	Single 10	Single 10	
LSP and BV	LSP and BV	LSP and BV	LSP and BV	LSP and BV	LSP and BV	
Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil	
Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf	
STD	STD	STD	STD	STD	STD	
—	—	—	—	—	—	
Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion	
18 6	18 6	18 6	18 6	18 6	18 6	
Integral Type	Integral Type	Integral Type	Integral Type	Integral Type	Integral Type	

Item				Area		USA					
Body Type				Regular Cab (4WD)		Access Cab (4WD)					
Vehicle Grade				SR5		Limited					
Model Code				UCK40L TRSSKA		UCK40L ARSSKA		UCK40L ARSLKA		UCK40L ASSSKA	
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	5545 (218.3)	5525 (217.5)* ¹	5545 (218.3)	5525 (217.5)* ¹	5545 (218.3)	5545 (218.3)	5525 (217.5)* ¹	5
		Width	mm (in.)	1910 (75.2)* ^{2, 3}		1910 (75.2)* ^{2, 3}		2015 (79.3)		2000 (78.7)	
		Height* ⁴	mm (in.)	1805 (71.1)	1815 (71.5)* ⁵	1810 (71.3)	1820 (71.7)* ⁵	1820 (71.7)	1810 (71.3)		
	Wheel Base		mm (in.)	3260 (128.3)		3260 (128.3)		3260 (128.3)		3260 (128.3)	
	Tread	Front	mm (in.)	1675 (65.9)		1675 (65.9)		1675 (65.9)		1675 (65.9)	
		Rear	mm (in.)	1648 (64.9)		1648 (64.9)		1648 (64.9)		1648 (64.9)	
	Effective Head Room	Front	mm (in.)	1002 (39.4)		1004 (39.5)		1004 (39.5)		1004 (39.5)	
		Rear	mm (in.)	—		964 (38.3)		964 (38.3)		964 (38.3)	
	Effective Leg Room	Front	mm (in.)	1053 (41.5)		1053 (41.5)		1053 (41.5)		1053 (41.5)	
		Rear	mm (in.)	—		727 (28.6)		727 (28.6)		727 (28.6)	
	Shoulder Room	Front	mm (in.)	1584 (62.4)		1584 (62.4)		1584 (62.4)		1584 (62.4)	
		Rear	mm (in.)	—		1609.2 (63.4)		1609.2 (63.4)		1609.2 (63.4)	
	Cargo Space	Length	mm (in.)	—		—		—		—	
		Width	mm (in.)	—		—		—		—	
		Height	mm (in.)	—		—		—		—	
	Overhang	Front	mm (in.)	945 (37.2) 920 (36.2)* ¹		945 (37.2) 920 (36.2)* ¹		945 (37.2)		945 (37.2) 920 (36.2)* ¹	
		Rear	mm (in.)	1225 (48.2)		1225 (48.2)		1225 (48.2)		1225 (48.2)	
	Min. Running Ground Clearance		mm (in.)	285 (11.2)		285 (11.2)		295 (11.6)		285 (11.2)	
	Angle of Approach		degrees	28°		28°		29°		28°	
	Angle of Departure		degrees	23°		23°		24°		23°	
	Curb Mass	Front	kg (lb)	1193 (2630)		1211 (2670)		1218 (2685)		1213 (2675)	
		Rear	kg (lb)	844 (1860)		932 (2055)		903 (1990)		937 (2065)	
		Total	kg (lb)	2037 (4490)		2143 (4725)		2121 (4675)		2150 (4740)	
	Gross Vehicle Mass	Front	kg (lb)	—		—		—		—	
		Rear	kg (lb)	—		—		—		—	
		Total	kg (lb)	2812 (6200)		2812 (6200)		2812 (6200)		2726 (6010)	
	Fuel Tank Capacity		L (U.S. gal.) Imp. gal.)	100 (26.4 22.0)		100 (26.4 22.0)		100 (26.4 22.0)		100 (26.4 22.0)	
	Luggage Compartment Capacity		m ³ (cu. ft.)	—		—		—		—	
Performance	Max. Speed		km/h (mph)	165 (102)		165 (102)		165 (102)		165 (102)	
	Max. Cruising Speed		km/h (mph)	150 (93)		150 (93)		150 (93)		150 (93)	
	Max. Permissible Speed	1st Gear	km/h (mph)	25 (15)* ⁶ / 65 (40)* ⁷		25 (15)* ⁶ / 65 (40)* ⁷		25 (15)* ⁶ / 65 (40)* ⁷		25 (15)* ⁶ / 65 (40)* ⁷	
		2nd Gear	km/h (mph)	45 (28)* ⁶ / 120 (75)* ⁷		45 (28)* ⁶ / 120 (75)* ⁷		45 (28)* ⁶ / 120 (75)* ⁷		45 (28)* ⁶ / 120 (75)* ⁷	
		3rd Gear	km/h (mph)	—		—		—		—	
		4th Gear	km/h (mph)	—		—		—		—	
	Turning Diameter (Outside Front)	Wall to Wall	m (ft.)	14.1 (46.3)		14.1 (46.3)		14.1 (46.3)		14.1 (46.3)	
Curb to Curb		m (ft.)	13.5 (44.3)		13.5 (44.3)		13.5 (44.3)		13.5 (44.3)		
Engine	Engine Type		2UZ FE		2UZ FE		2UZ FE		2UZ FE		
	Valve Mechanism		32 Valve DOHC		32 Valve DOHC		32 Valve DOHC		32 Valve DOHC		
	Bore × Stroke		mm (in.)	94.0 × 84.0 (3.70 × 3.31)		94.0 × 84.0 (3.70 × 3.31)		94.0 × 84.0 (3.70 × 3.31)		94.0 × 84.0 (3.70 × 3.31)	
	Displacement		cm ³ (cu. in.)	4664 (284.5)		4664 (284.5)		4664 (284.5)		4664 (284.5)	
	Compression Ratio		9.6 : 1		9.6 : 1		9.6 : 1		9.6 : 1		
	Carburetor Type		SFI		SFI		SFI		SFI		
	Research Octane No.		RON	91 or more		91 or more		91 or more		91 or more	
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	179 / 4800 (240@4800)		179 / 4800 (240@4800)		179 / 4800 (240@4800)		179 / 4800 (240@4800)	
	Max. Torque (SAE NET)		N·m/rpm (lb. ft@rpm)	427 / 3400 (315@3400)		427 / 3400 (315@3400)		427 / 3400 (315@3400)		427 / 3400 (315@3400)	
Engine Electrical	Battery Capacity (5HR)		Voltage & Amp. hr	12 55 12 64* ⁸		12 55 12 64* ⁸		12 55 12 64* ⁸		12 55 12 64* ⁸	
	Alternator Output		Watts	960 1560* ⁹		960 1560* ⁹		960 1560* ⁹		960 1560* ⁹	
Chassis	Starter Output		kW	1.4		1.4		1.4		1.4	
	Clutch Type		—		—		—		—		
	Transmission Type		A340F		A340F		A340F		A340F		
	Transmission Gear Ratio	In First	2.804		2.804		2.804		2.804		
		In Second	1.531		1.531		1.531		1.531		
		In Third	1.000		1.000		1.000		1.000		
		In Fourth	0.705		0.705		0.705		0.705		
		In Fifth	—		—		—		—		
		In Reverse	2.393		2.393		2.393		2.393		
	Transfer Gear Ratio H4/L4		1.000 / 2.566		1.000 / 2.566		1.000 / 2.566		1.000 / 2.566		
	Differential Gear Ratio (Front/Rear)		3.909 / 3.909		3.909 / 3.909		3.909 / 3.909		3.909 / 3.909		
	Differential Gear Size (Front/Rear)		in	7.5 / 8		7.5 / 8		7.5 / 8		7.5 / 8	
	Brake Type	Front	Ventilated Disc		Ventilated Disc		Ventilated Disc		Ventilated Disc		
		Rear	Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		
	Parking Brake Type		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		
	Brake Booster Type and Size		in	Single 10		Single 10		Single 10		Single 10	
	Proportioning Valve Type		LSP and BV		LSP and BV		LSP and BV		LSP and BV		
	Suspension Type	Front	Double Wishbone Coil		Double Wishbone Coil		Double Wishbone Coil		Double Wishbone Coil		
		Rear	Rigid Leaf		Rigid Leaf		Rigid Leaf		Rigid Leaf		
	Stabilizer Bar	Front	STD		STD		STD		STD		
		Rear	—		—		—		—		
	Steering Gear Type		Rack and Pinion		Rack and Pinion		Rack and Pinion		Rack and Pinion		
	Steering Gear Ratio (Overall)		18.6		18.6		18.6		18.6		
Power Steering Type		Integral Type		Integral Type		Integral Type		Integral Type			

*¹ With Steel Bumper
 *² With Wheel Arch Moulding +35 (1.4)
 *³ With Over Fender +105 (4.1)

*⁴ Unladen Vehicle
 *⁵ With P265 / 70R16 or P265 / 65R17 tires
 *⁶ Low mode

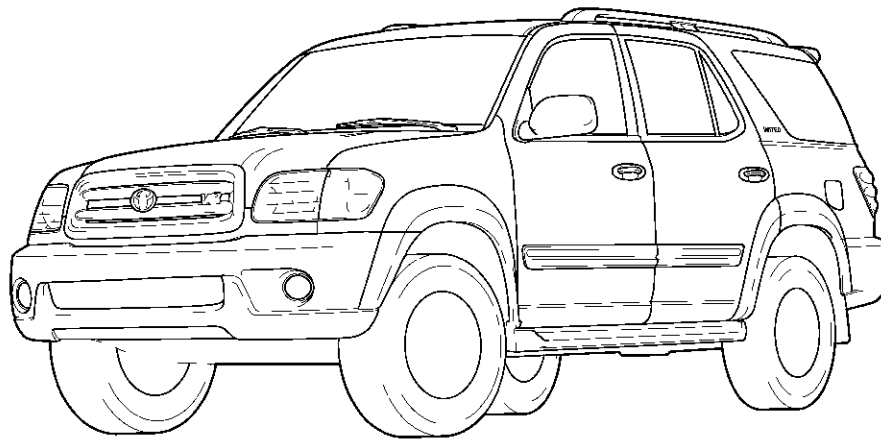
*⁷ High mode
 *⁸ Cold Area Spec
 *⁹ Option

*¹⁰ With Off Road Package

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	U S A		Canada			
	Access Cab (4WD)	Regular Cab (2WD)	Access Cab (2WD)	Regular Cab (4WD)	Access Cab (4WD)	
	Limited	STD		SR5		Limited
	UCK40L ASSLKA	VCK30L TRSDKK	UCK30L ARSSKK	UCK40L TRSDKK	UCK40L ARSSKK	UCK40L ARSLKK
5	5545 (218 3)	5545 (218 3) 5525 (217 5)* ¹	5545 (218 3) 5525 (217 5)* ¹	5545 (218 3) 5525 (217 5)* ¹	5545 (218 3) 5525 (217 5)* ¹	5545 (218 3)
	2000 (78 7)	1910 (75 2)* ^{2 3}	1910 (75 2)* ^{2 3}	1910 (75 2)* ^{2 3}	1910 (75 2)* ^{2 3}	2015 (79 3)
	1810 (71 3)	1795 (70 7)	1790 (70 5)	1805 (71 1) 1815 (71 5)* ⁵	1810 (71 3) 1820 (71 7)* ⁵	1820 (71 7)
	3260 (128 3)	3260 (128 3)	3260 (128 3)	3260 (128 3)	3260 (128 3)	3260 (128 3)
	1680 (66 1)	1680 (66 1)	1680 (66 1)	1675 (65 9)	1675 (65 9)	1675 (65 9)
10	1648 (64 9)	1648 (64 9)	1648 (64 9)	1648 (64 9)	1648 (64 9)	1648 (64 9)
	1004 (39 5)	1002 (39 4)	1004 (39 5)	1002 (39 4)	1004 (39 5)	1004 (39 5)
	964 (38 3)	—	964 (38 3)	—	964 (38 3)	964 (38 3)
	1053 (41 5)	1053 (41 5)	1053 (41 5)	1053 (41 5)	1053 (41 5)	1053 (41 5)
	727 (28 6)	—	727 (28 6)	—	727 (28 6)	727 (28 6)
15	1584 (62 4)	1584 (62 4)	1584 (62 4)	1584 (62 4)	1584 (62 4)	1584 (62 4)
	1609 2 (63 4)	—	1609 2 (63 4)	—	1609 2 (63 4)	1609 2 (63 4)
	—	—	—	—	—	—
	—	—	—	—	—	—
	—	—	—	—	—	—
20	945 (37 2)	945 (37 2) 920 (36 2)* ¹	945 (37 2) 920 (36 2)* ¹	945 (37 2) 920 (36 2)* ¹	945 (37 2) 920 (36 2)* ¹	945 (37 2)
	1225 (48 2)	1225 (48 2)	1225 (48 2)	1225 (48 2)	1225 (48 2)	1225 (48 2)
	285 (11 2)	265 (10 4)	265 (10 4)	285 (11 2)	285 (11 2)	295 (11 6)
	28°	26°	26°	27°	28°	29°
	23°	23°	23°	24°	23°	24°
25	1218 (2685)	1009 (2225)	1123 (2475)	1186 (2615)	1218 (2685)	1225 (2700)
	907 (2000)	778 (1715)	903 (1990)	844 (1860)	932 (2055)	903 (1990)
	2125 (4685)	1787 (3940)	2026 (4465)	2030 (4475)	2150 (4740)	2128 (4690)
	—	—	—	—	—	—
	—	—	—	—	—	—
30	2726 (6010)	2495 (5500)	2812 (6200)	2812 (6200)	2812 (6200)	2812 (6200)
	100 (26 4 220)	100 (26 4 220)	100 (26 4 220)	100 (26 4 220)	100 (26 4 220)	100 (26 4 220)
	—	—	—	—	—	—
	165 (102)	165 (102)	165 (102)	165 (102)	165 (102)	165 (102)
	150 (93)	150 (93)	150 (93)	150 (93)	150 (93)	150 (93)
35	25 (15)* ⁶ / 65 (40)* ⁷	60 (37)	65 (40)	25 (15)* ⁶ / 65 (40)* ⁷	25 (15)* ⁶ / 65 (40)* ⁷	25 (15)* ⁶ / 65 (40)* ⁷
	45 (28)* ⁶ / 120 (75)* ⁷	115 (71)	120 (75)	45 (28)* ⁶ / 120 (75)* ⁷	45 (28)* ⁶ / 120 (75)* ⁷	45 (28)* ⁶ / 120 (75)* ⁷
	—	—	—	—	—	—
	—	—	—	—	—	—
	14 1 (46 3)	14 2 (46 6)	14 2 (46 6)	14 1 (46 3)	14 1 (46 3)	14 1 (46 3)
40	13 5 (44 3)	13 7 (44 9)	13 7 (44 9)	13 5 (44 3)	13 5 (44 3)	13 5 (44 3)
	2UZ FE	5VZ FE	2UZ FE	2UZ FE	2UZ FE	2UZ FE
	32 Valve DOHC	24 Valve DOHC	32 Valve DOHC	32 Valve DOHC	32 Valve DOHC	32 Valve DOHC
	94 0 × 84 0 (3 70 × 3 31)	93 5 × 82 0 (3 68 × 3 23)	94 0 × 84 0 (3 70 × 3 31)	94 0 × 84 0 (3 70 × 3 31)	94 0 × 84 0 (3 70 × 3 31)	94 0 × 84 0 (3 70 × 3 31)
	4664 (284 5)	3378 (206 1)	4664 (284 5)	4664 (284 5)	4664 (284 5)	4664 (284 5)
45	9 6 1	9 6 1	9 6 1	9 6 1	9 6 1	9 6 1
	SFI	SFI	SFI	SFI	SFI	SFI
	91 or more	91 or more	91 or more	91 or more	91 or more	91 or more
	179 / 4800 (240@4800)	142 / 4800 (190@4800)	179 / 4800 (240@4800)	183 / 4800 (245@4800)	179 / 4800 (240@4800)	179 / 4800 (240@4800)
	427 / 3400 (315@3400)	298 / 3600 (220@3600)	427 / 3400 (315@3400)	427 / 3400 (315@3400)	427 / 3400 (315@3400)	427 / 3400 (315@3400)
50	12 55 12 64* ⁸	12 55	12 64	12 64	12 64	12 64
	960 1560* ⁹	960	960 1560* ⁹	960 1560* ⁹	960 1560* ⁹	960 1560* ⁹
	1 4	1 8	2 0	2 0	2 0	2 0
	—	—	—	—	—	—
	A340F	A340E	A340E	A340F	A340F	A340F
55	2 804	2 804	2 804	2 804	2 804	2 804
	1 531	1 531	1 531	1 531	1 531	1 531
	1 000	1 000	1 000	1 000	1 000	1 000
	0 705	0 705	0 705	0 705	0 705	0 705
	—	—	—	—	—	—
60	2 393	2 393	2 393	2 393	2 393	2 393
	1 000 / 2 566	—	—	1 000 / 2 566	1 000 / 2 566	1 000 / 2 566
	3 909 / 3 909	— / 4 083	— / 3 916	3 909 / 3 909	3 909 / 3 909	3 909 / 3 909
	7 5 / 8	— / 8	— / 8	7 5 / 8	7 5 / 8	7 5 / 8
	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
65	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
	Single 10	Single 10	Single 10	Single 10	Single 10	Single 10
	LSP and BV	LSP and BV	LSP and BV	LSP and BV	LSP and BV	LSP and BV
	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil
70	Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf
	STD	STD	STD	STD	STD	STD
	—	—	—	—	—	—
	Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion
	18 6	18 6	18 6	18 6	18 6	18 6
75	Integral Type	Integral Type	Integral Type	Integral Type	Integral Type	Integral Type

SEQUOIA



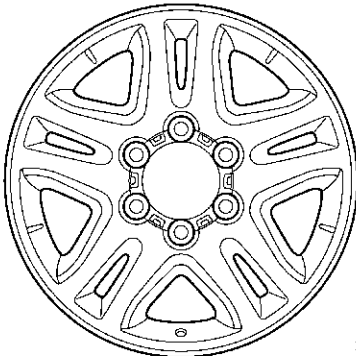
SEQUOIA

OUTLINE OF NEW FEATURES

The following changes are made for the 2003 model year.

1. Tire and Disc Wheel

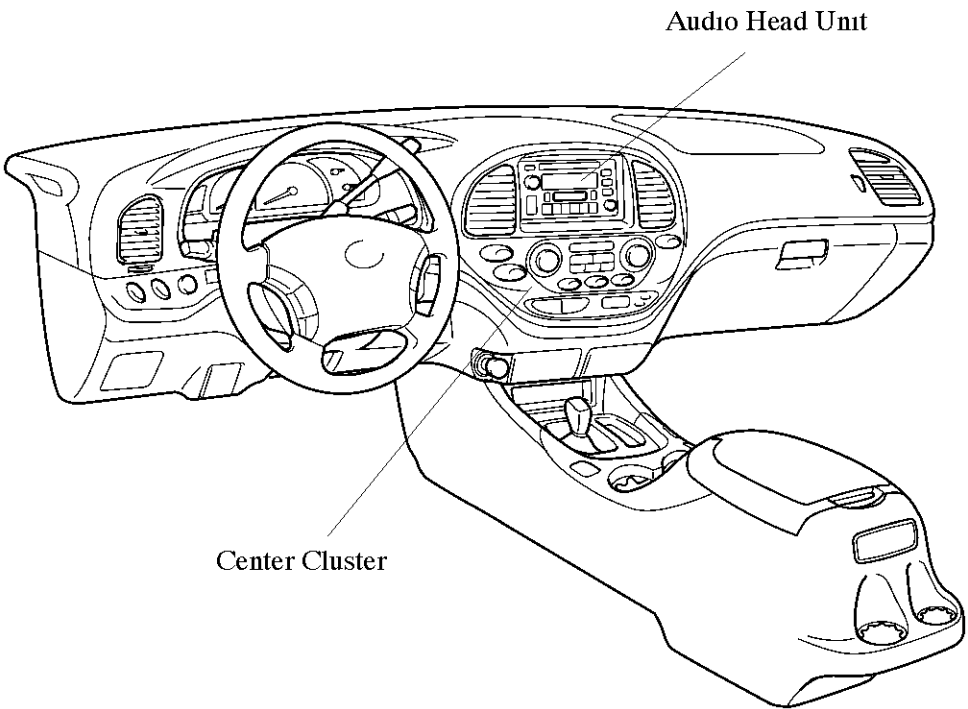
A new design 17 × 7 1/2 JJ size disc wheel and 265/65R17 size tire have been adopted as standard equipment for Limited grade model.

Tire Size		265/65R17
Disc Wheel Size		17 x 7 1/2JJ
Disc Wheel Material		Aluminum
P.C.D.*	mm (in.)	139.7 (5.5)
Off Set	mm (in.)	15.0 (0.59)
Wheel Design		

* : Pitch Circle Diameter

2. Interior

The design of the center cluster and audio head unit has been changed.



3. 2UZ-FE Engine

- The ETCS-1 (Electronic Throttle Control System-intelligent) continues to be used from the '02 model. However, on the '03 model, the accelerator cable has been discontinued and an accelerator position sensor has been provided on the accelerator pedal. A no-contact type throttle position sensor has been adopted on all models.
- Cranking hold function has been adopted. Once the ignition switch is turned to the START position, this control continues to operate the starter until the engine starts.
- Segment Conductor type alternator has been adopted.
- The basic construction and operation for the aforementioned 3 items are the same as the '03 Toyota Tundra. For details, refer to the 2UZ Engine Section of the '03 Toyota Tundra New Features.
- The logic of the ECM for detecting evaporative emission leakage has been changed to increase the detection range from the '02 model. In conjunction with this change, the DTC (Diagnostic Trouble Code) P0442 has been added.
No changes have been made to the system configuration.
- To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, refer to 2003 General Features section.

4. A340E and A340F Automatic Transmission

The automatic transmission fluid of all models has been changed from the D-II type ATF to the T-IV type ATF.

5. Transfer (Only for 4WD Model)

The automatic center differential lock function has been discontinued. It has been changed to a manual center differential lock function that is operated with a center differential lock switch.

6. Rear Load Leveling Suspension

- Rear load leveling suspension equipped with a vehicle height adjustment mechanism have been adopted in the rear suspension as optional equipment.
- The configuration and structure of the front shock absorbers are the same as '02 model.

11

7. Brake Control System (ABS with EBD, Brake Assist, A-TRAC/TRAC and VSC System)

- A Brake Assist system has been adopted.
- A pedal stroke speed sensor has been newly adopted for brake assist control.
- The deceleration sensor that is provided for the brake control system (ABS with EBD, Brake Assist, A-TRAC/TRAC and VSC system) has been integrated in the yaw rate sensor.
- The VSC OFF switch that was used on the 4WD model has been discontinued. Due to this, cancellation of VSC system using VSC OFF switch is not available. However, in case of locking the center differential, VSC system will be cancelled automatically.

8. Body

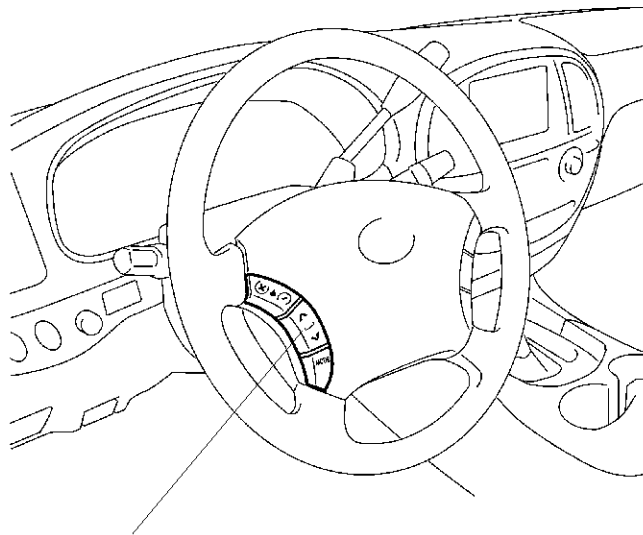
No.2 cab mount characteristic has been optimized to reduce body vibration.

9. Automatic Glare-Resistant EC Mirror

An automatic glare-resistant EC (electrochromic) mirror has been adopted for the inside rearview mirror as standard equipment.

10. Audio System

- The RSAS (Rear Seat Audio System) has been adopted as optional equipment.
- The RSES (Rear Seat Entertainment System) has been adopted as optional equipment.
- A steering wheel with steering pad switches is standard equipment on the Limited grade and optional equipment on the SR5 grade. The audio control switches used most frequently have been located on the steering pad in the form of steering pad switches to improve the ease of use.



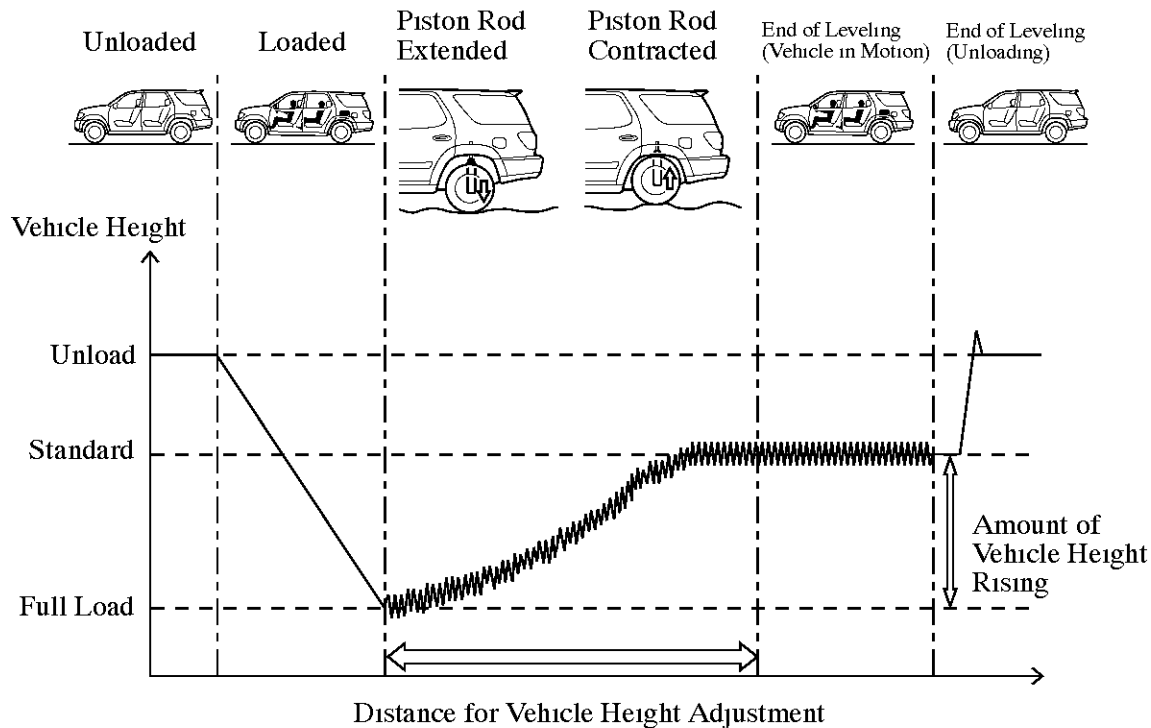
Steering Pad Switch

NEW FEATURES

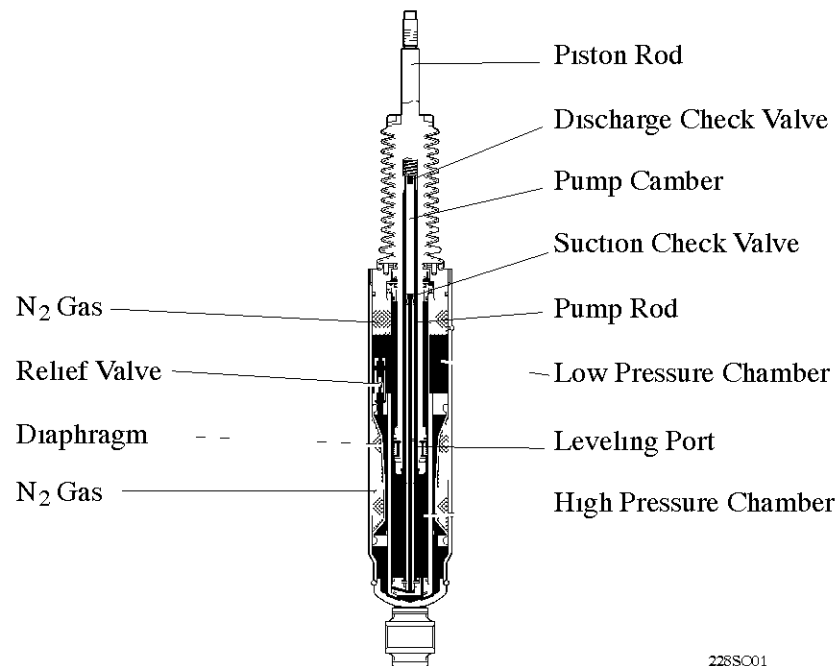
■ REAR LOAD LEVELING SUSPENSION

1. General

- The rear load leveling suspension utilizes the pumping action from the sliding movement of its piston rod while the vehicle is in motion, in order to mechanically adjust the rear vehicle height in the shock absorber to the target height. This inhibits the reduction of the shock absorber stroke, which is associated with the dipping of the rear end while the vehicle is carrying a load or towing. As a result, excellent driving stability and ride comfort have been achieved.
- The target vehicle height of the rear load leveling suspension is set to the standard vehicle height. Because it is set only to a predetermined target vehicle height value, the vehicle height cannot be adjusted to a position as desired.
- Because the self-leveling function uses the pumping action of the piston rod, it does not operate when the vehicle is stopped.



2. Construction and Function of Main Component



Component	Function
Pump Chamber	The sliding movement of the piston rod causes the oil to be sent from the low-pressure chamber to the high-pressure chamber.
High Pressure Chamber	Stores the oil that has been sent from the pump chamber through the sliding movement of the piston rod.
Low Pressure Chamber	Filled with N ₂ gas and oil that is used for vehicle height adjustment control.
Suction Check Valve	Opens and closes in accordance with the internal pressure of the pump chamber in order to control the oil passage from the low-pressure chamber to the pump chamber.
Discharge Check Valve	Opens and closes in accordance with the internal pressure of the pump chamber in order to control the oil passage from the pump chamber to the high-pressure chamber.
Relief Valve	During vehicle height adjustment, this valve prevents the internal pressure in the high-pressure chamber from rising abnormally.
Leveling Port	Prevents the vehicle height from rising abnormally upon the completion of the loading condition.

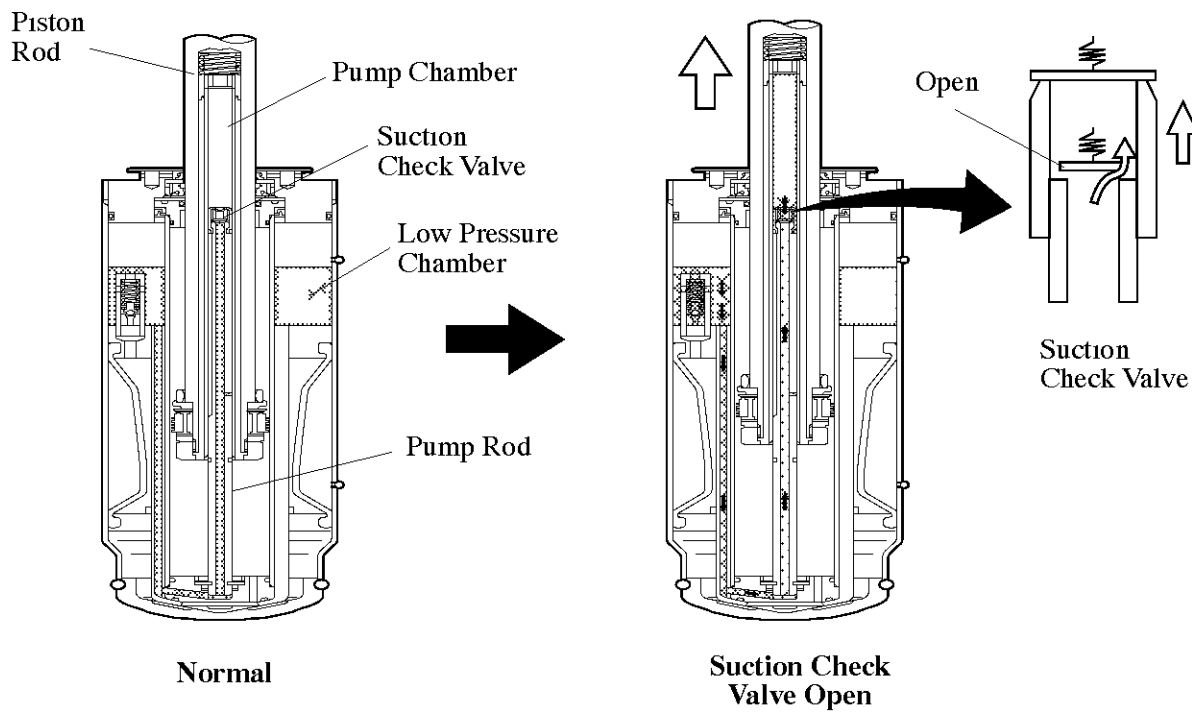
Service Tip

To prevent hazardous conditions, make sure to empty the gas from the shock absorber before discarding a N₂ gas sealed shock absorber. For details, refer to the 2003 Sequoia Repair Manual (Pub. No. RM959U)

3. Operation

Piston Rod Extended

Because the capacity of the pump chamber in the piston rod increases when the piston rod is extended, the internal pressure of the pump chamber becomes lower than the internal pressure of the low-pressure chamber (oil tank), which is separated by the suction check valve. As a result, the suction check valve opens, allowing the oil in the low-pressure chamber to flow through the oil passage in the pump rod, and enter the pump chamber.



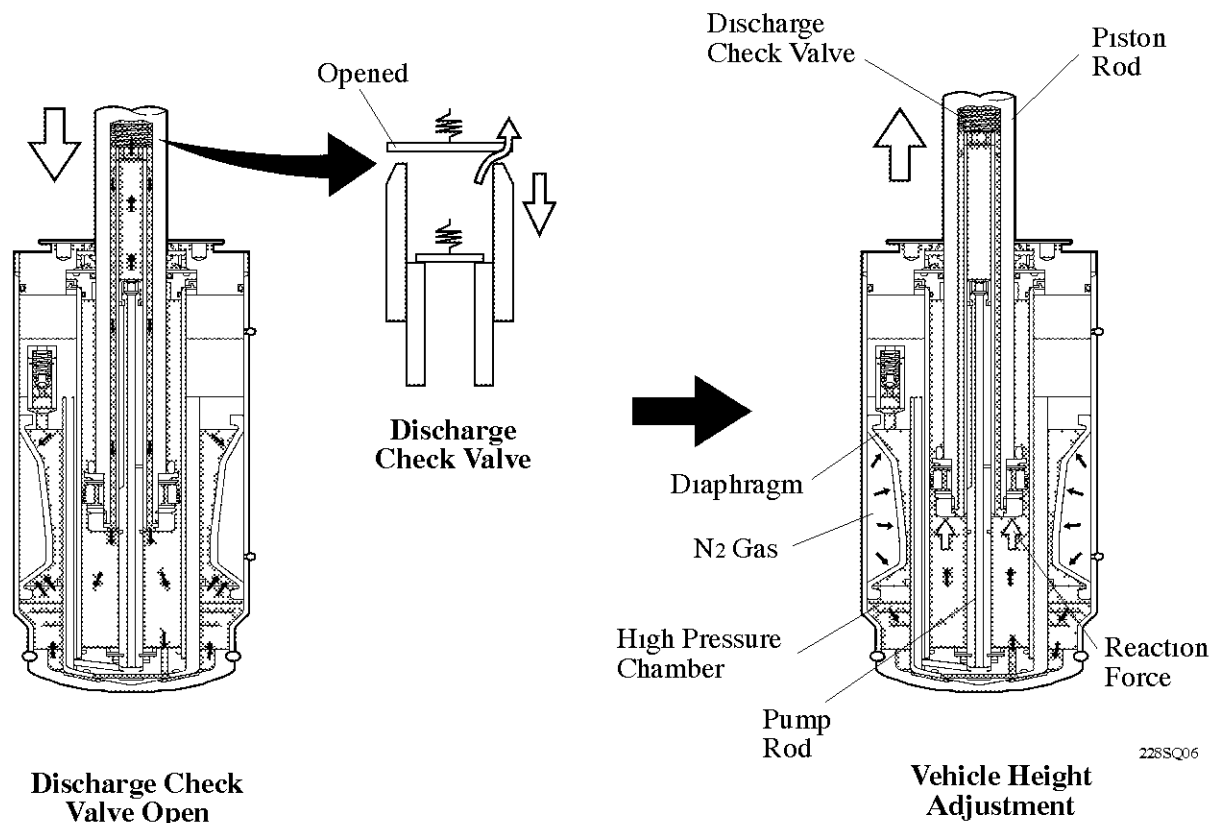
228SQ02

► Oil Flow ◀

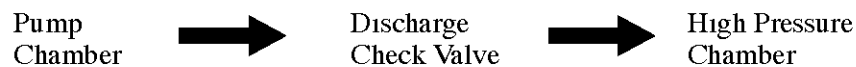


Piston Rod Contracted

- The oil that was drawn into the pump chamber during the extension of the piston rod becomes compressed during the contraction of the piston rod, due to the reduction of the pump chamber capacity. Thus, the internal pressure of the pump chamber becomes higher than the internal pressure of the high-pressure chamber, which is separated by the discharge check valve. As a result, this pressure opens the discharge check valve, allowing the oil in the pump chamber to flow through the oil passage in the piston rod, and enter the high-pressure chamber.
- The oil that is sent to the high-pressure chamber compresses the N₂ gas via the diaphragm in the high-pressure chamber. At the same time, a force to push it back (reaction force) is generated in the high-pressure chamber. This reaction force acts on the piston via the oil, to push the piston and piston rod position upward. This action is repeated, and the vehicle height that had dipped due to a load or towing returns to the standard vehicle height.

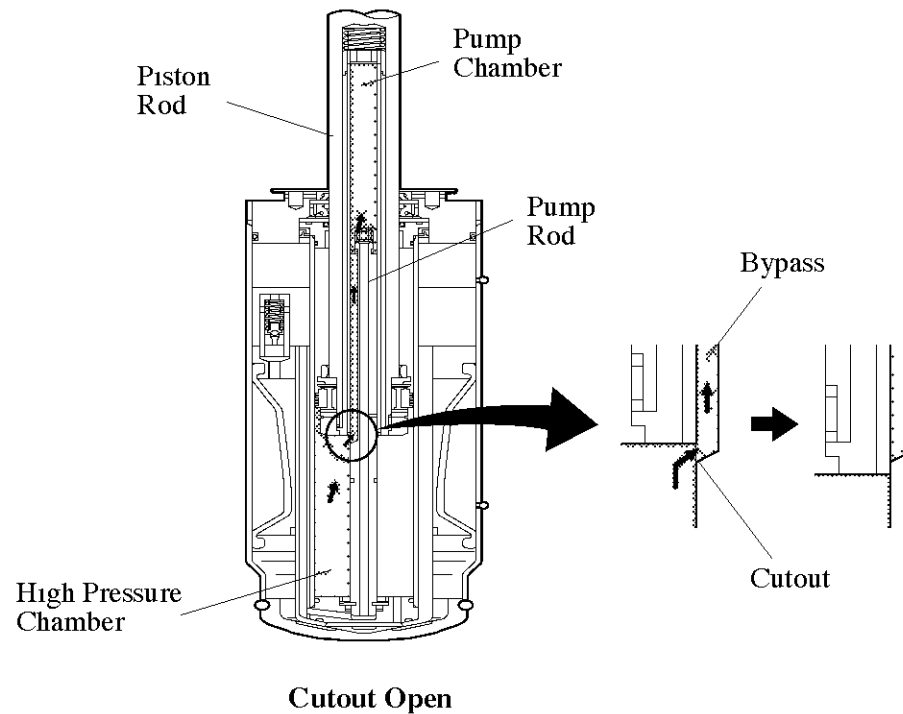


► Oil Flow ◀

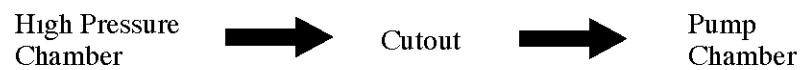


Vehicle Height Adjustment Completion (Vehicle in Motion)

When the position of the piston rod reaches the standard vehicle height, the lower end of the pump cylinder reaches the cutout in the pump rod, thus forming a bypass between the pump chamber and the high-pressure chamber. Thus, the oil that is sent from the pump chamber to the high-pressure chamber during the contraction of the piston rod flows through the bypass and returns to the pump chamber. Therefore, the internal pressure in the pump chamber and the internal pressure in the high-pressure chamber become equal, thus preventing the vehicle height from increasing further.

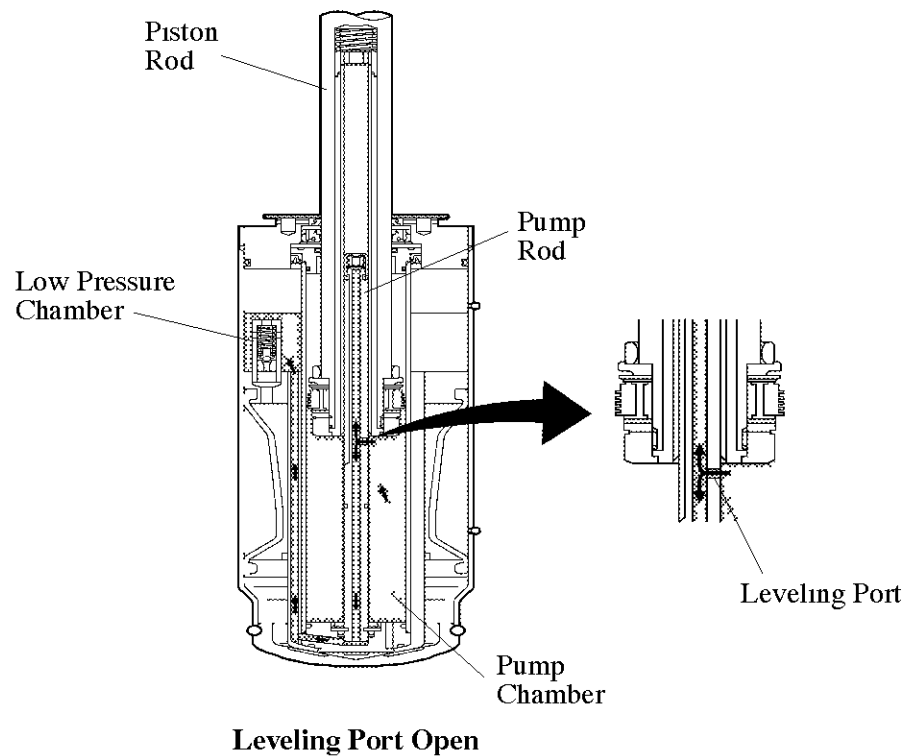


228SQ07

► Oil Flow ◀

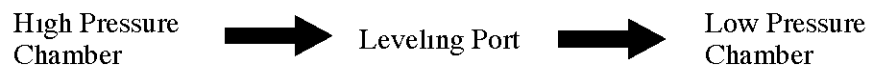
Vehicle Height Adjustment Completion (Unloading)

- After the occupants exit the vehicle, or the unloading of cargo or towing is completed, the piston rod initially moves up in an attempt to raise the vehicle height. However, because the upward movement of the piston rod causes the leveling port in the pump rod to connect to the high-pressure chamber, the oil in the high-pressure chamber flows through the leveling port and returns to the low-pressure chamber. As a result, the vehicle height is prevented from rising.
- When the piston rod moves downward along with the lowering of the vehicle height, thus closing the leveling port, the oil in the high-pressure chamber will not return to the low-pressure chamber. Therefore, the vehicle height will not lower further.



22SSQ08

► Oil Flow ◀



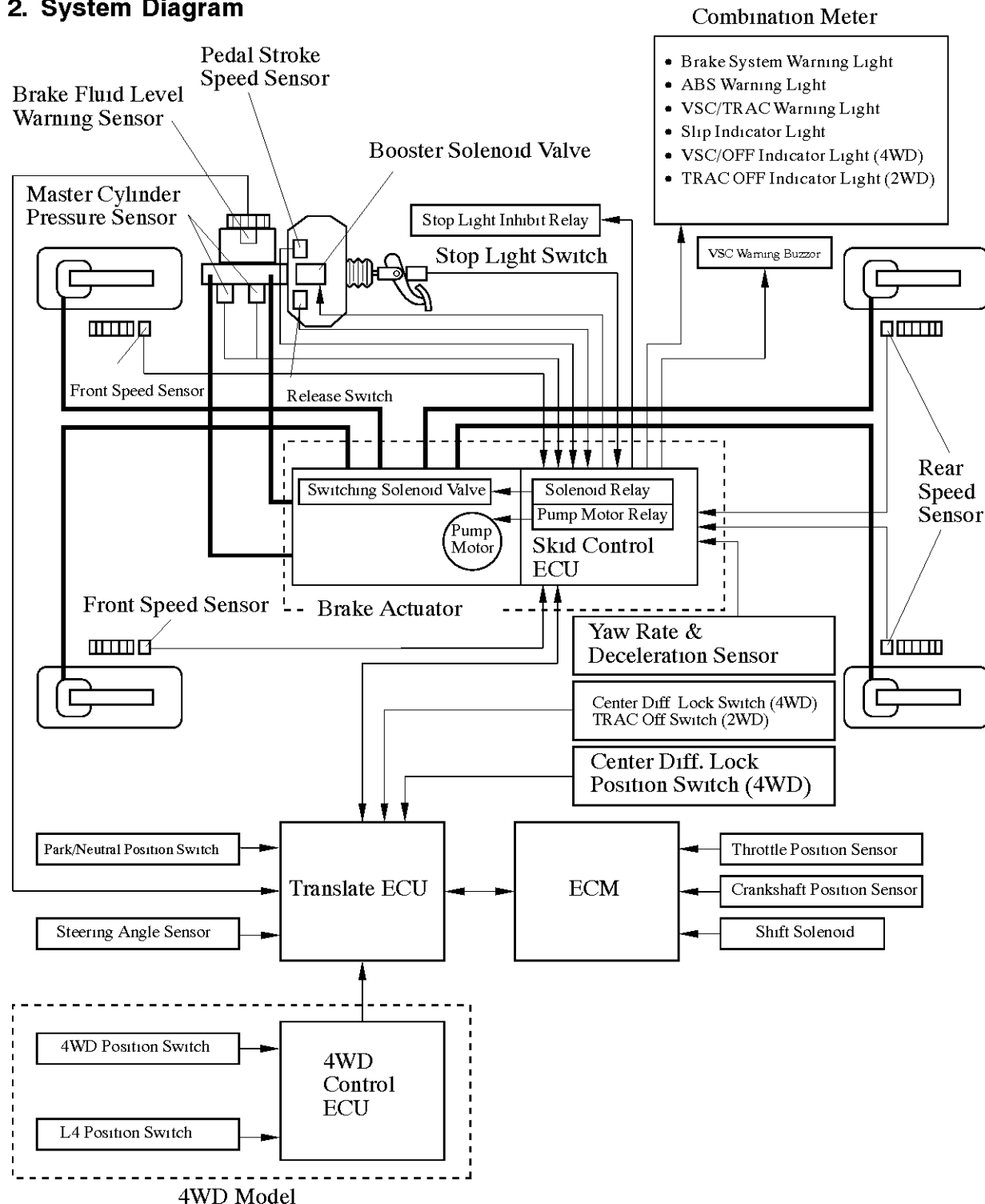
■ BRAKE CONTROL SYSTEM

(ABS with EBD, Brake Assist, A-TRAC/ TRAC and VSC System)

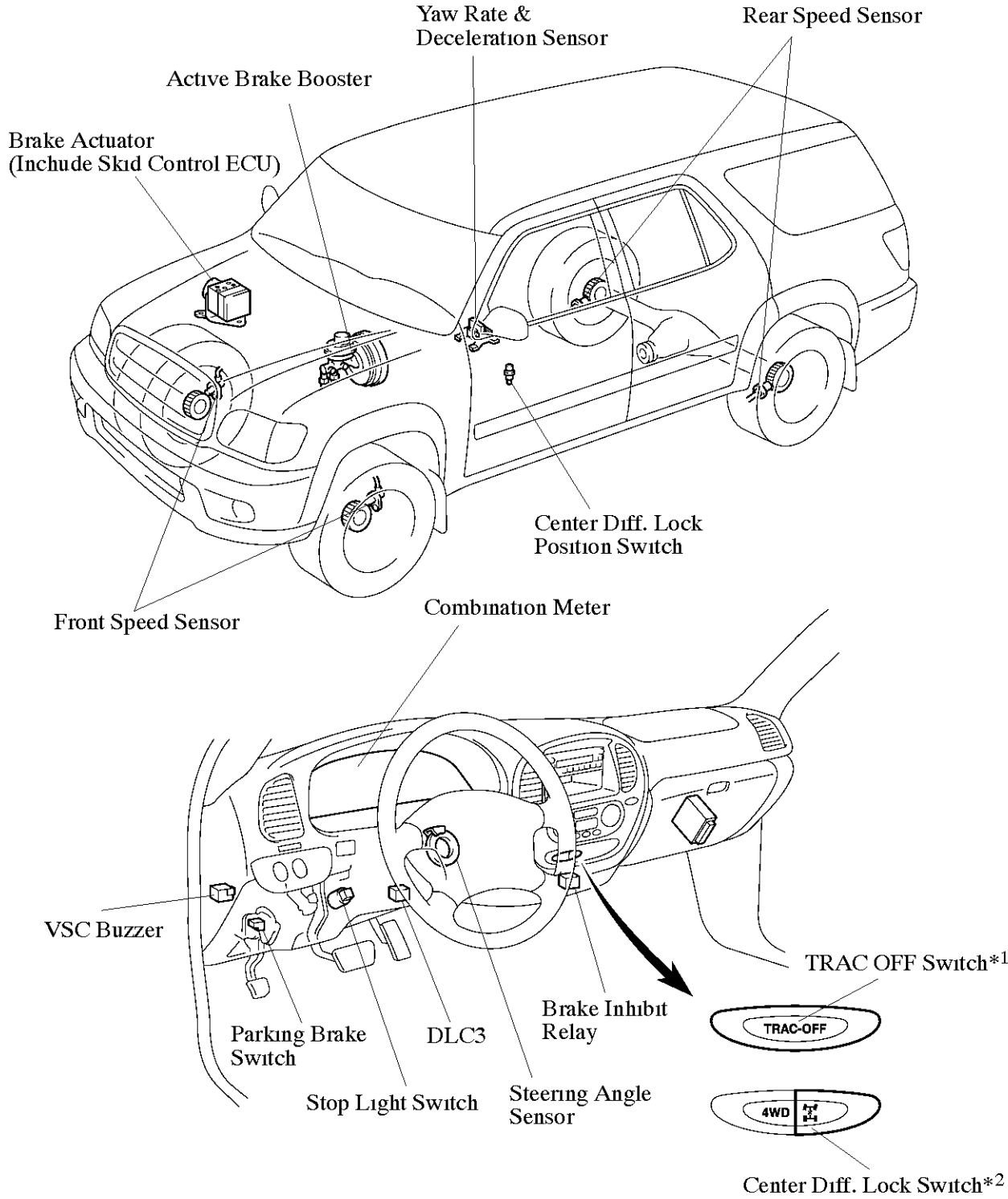
1. General

- Brake Assist system has been adopted.
- The pedal stroke speed sensor has been adopted for brake assist control.
- The deceleration sensor that is provided for the brake control system (ABS with EBD, Brake Assist, A-TRAC/TRAC, and VSC system) has been integrated in the yaw rate sensor.
- The VSC OFF switch that was used on the 4WD model has been discontinued. Due to this, cancellation of VSC system using VSC OFF switch is not available. However, in case of locking the center differential, VSC system will be cancelled automatically.

2. System Diagram



3. Layout of Main Components



*2: Only for 2WD Model
*1: Only for 4WD Model

4. Outline of Brake Assist System

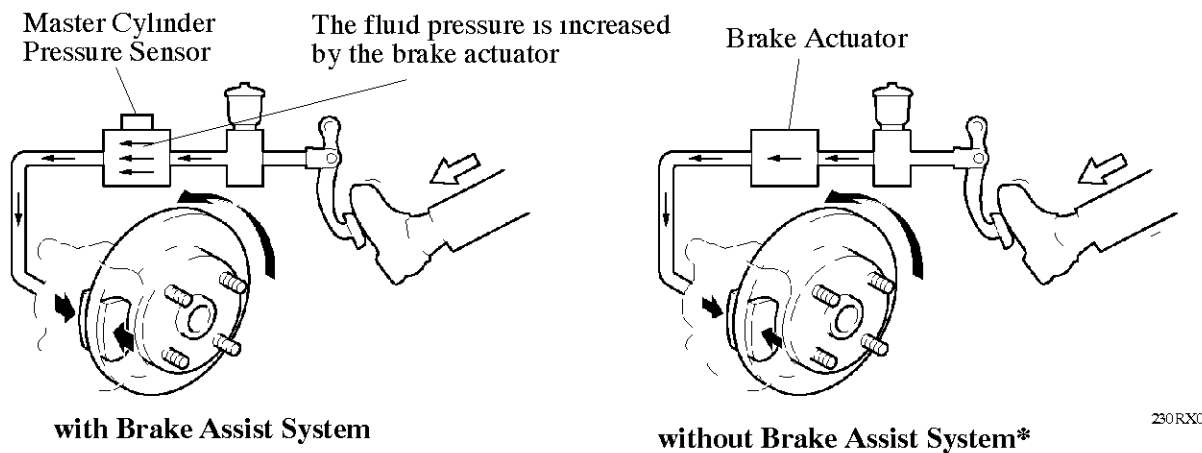
- The Brake Assist System interprets a quick push of the brake pedal as emergency braking and supplements the braking power applied if the driver has not stepped hard enough on the brake pedal. In emergencies, drivers, especially inexperienced ones, often panic and do not apply sufficient pressure on the brake pedal.

Based on the signals from the master cylinder pressure sensor, the skid control ECU calculates the speed and the amount of the brake pedal application and then determines the intention of the driver to make an emergency braking. If the skid control ECU determines that the driver intends emergency braking, the system activates the brake actuator to increase the brake fluid pressure, which increases the braking force.

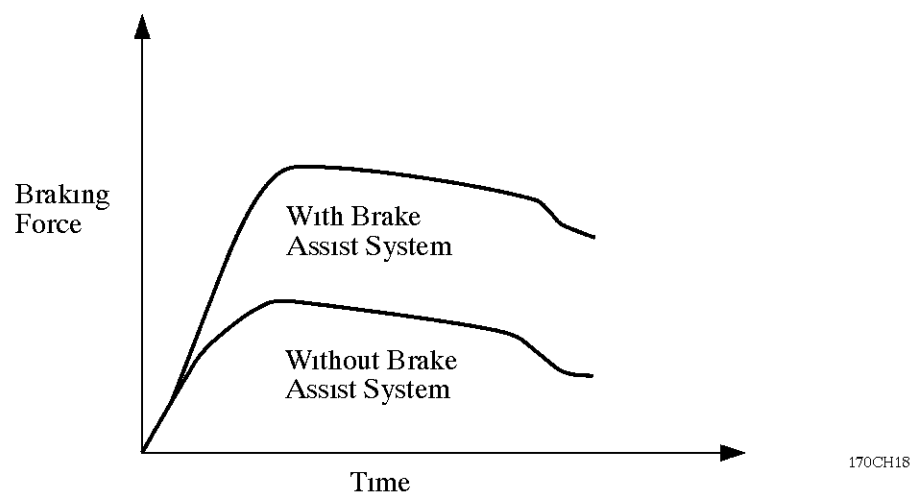
The Brake Assist System in combination with ABS helping draw the vehicle's brake performance.

A key feature of Brake Assist system is that the timing and 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 reduces the amount of assistance it provides.

► In case that the driver's depressing force is small when applying emergency braking ◀



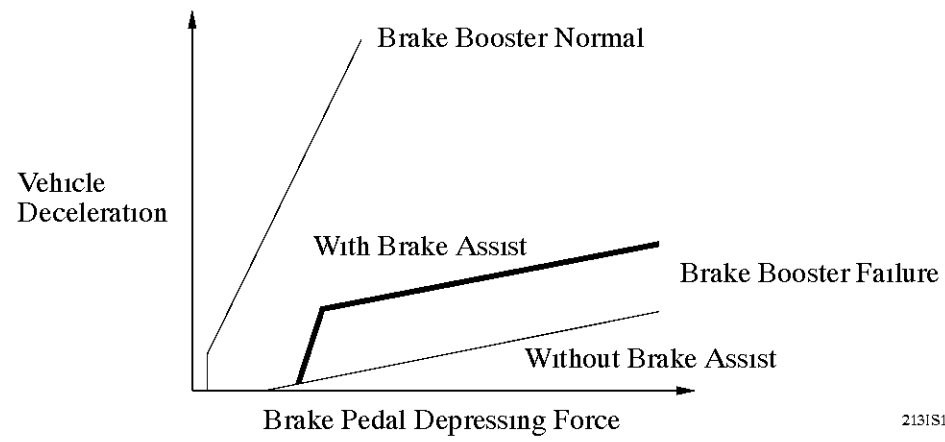
* The basic performance of the brake is the same as of the model with the brake assist system



Service Tip

When this system is activated, the brake pedal could shudder, which is a normal occurrence of the system in operation and should not be considered a malfunction.

- If worst comes to worst and the brake booster has failed, it is necessary for a driver to apply more brake depressing force than usual. However, in this system, the skid control ECU detects the failure of the brake booster and actuates the brake actuator to assist the driver's brake depressing force.

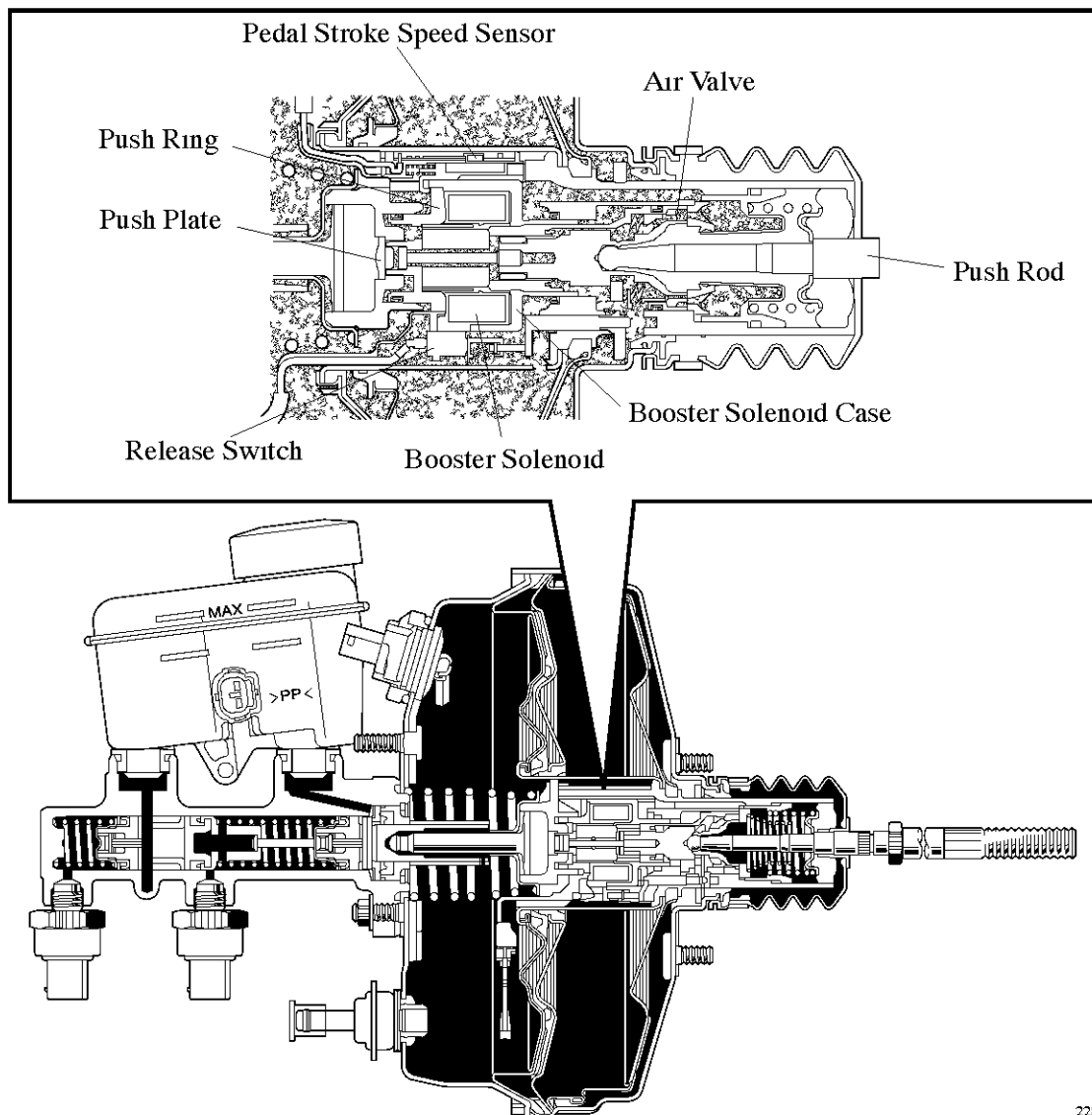


5. Construction and Operation

Active Brake Booster

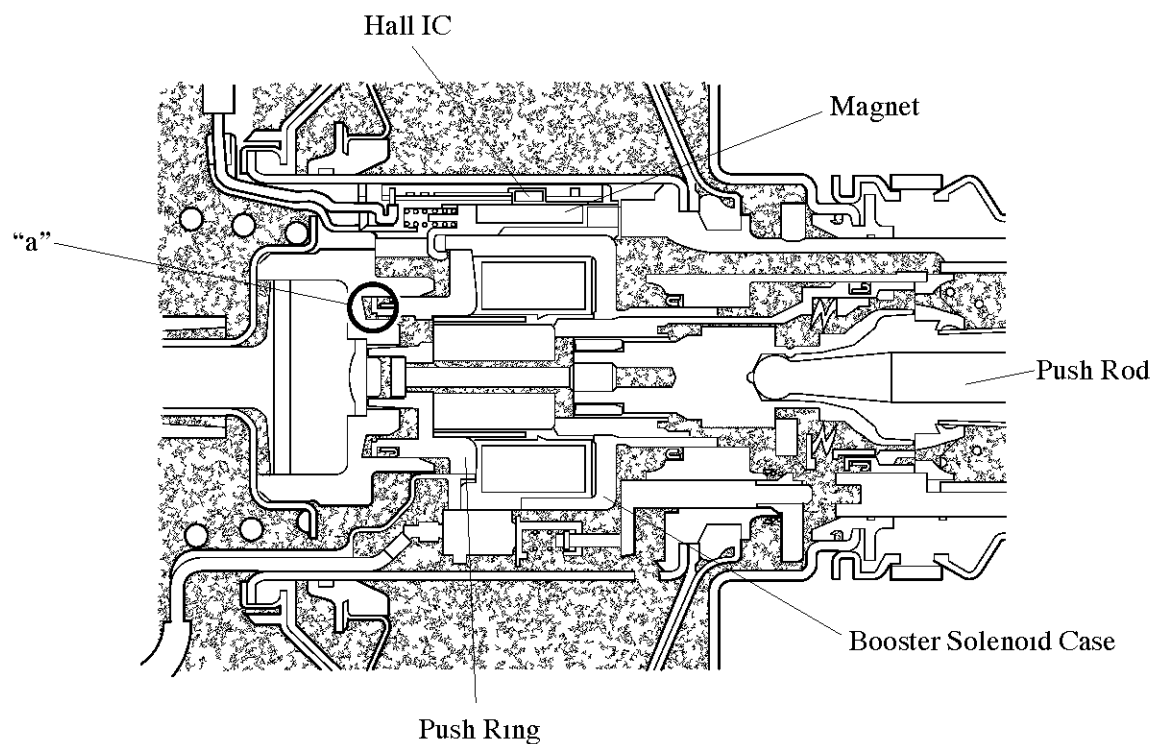
1) General

- The active brake booster is used.
- The basic construction and operation are the same as the '02 model. However, along with the additional function of the brake assist system, a pedal stroke speed sensor that detects the stroke of the push rod of the active brake booster, has been newly adopted.
- This sensor detects a failure in the active brake booster to activate the brake assist system, which assists the braking force.



2) Pedal Stroke Speed Sensor

- This sensor consists of one magnet that act in unison with the movement of the push rod, and a Hall IC that is fixed in place. The Hall IC detects the changes in the magnetic flux density that are caused by the movement of the magnets (movement of the push rod) and outputs them to the skid control ECU. As a result, the skid control ECU detects the distance “a” indicated in the diagram below.
- The skid control ECU determines the failure of the brake booster based on the distance “a” and the master cylinder pressure value.
Zero “a” distance + low master cylinder pressure = brake booster failure

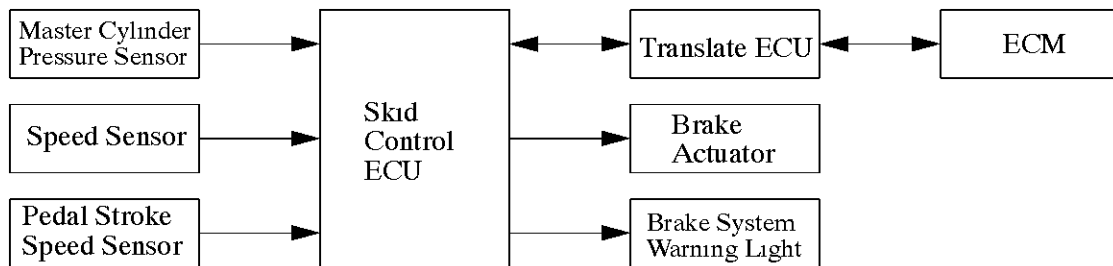


2131S12

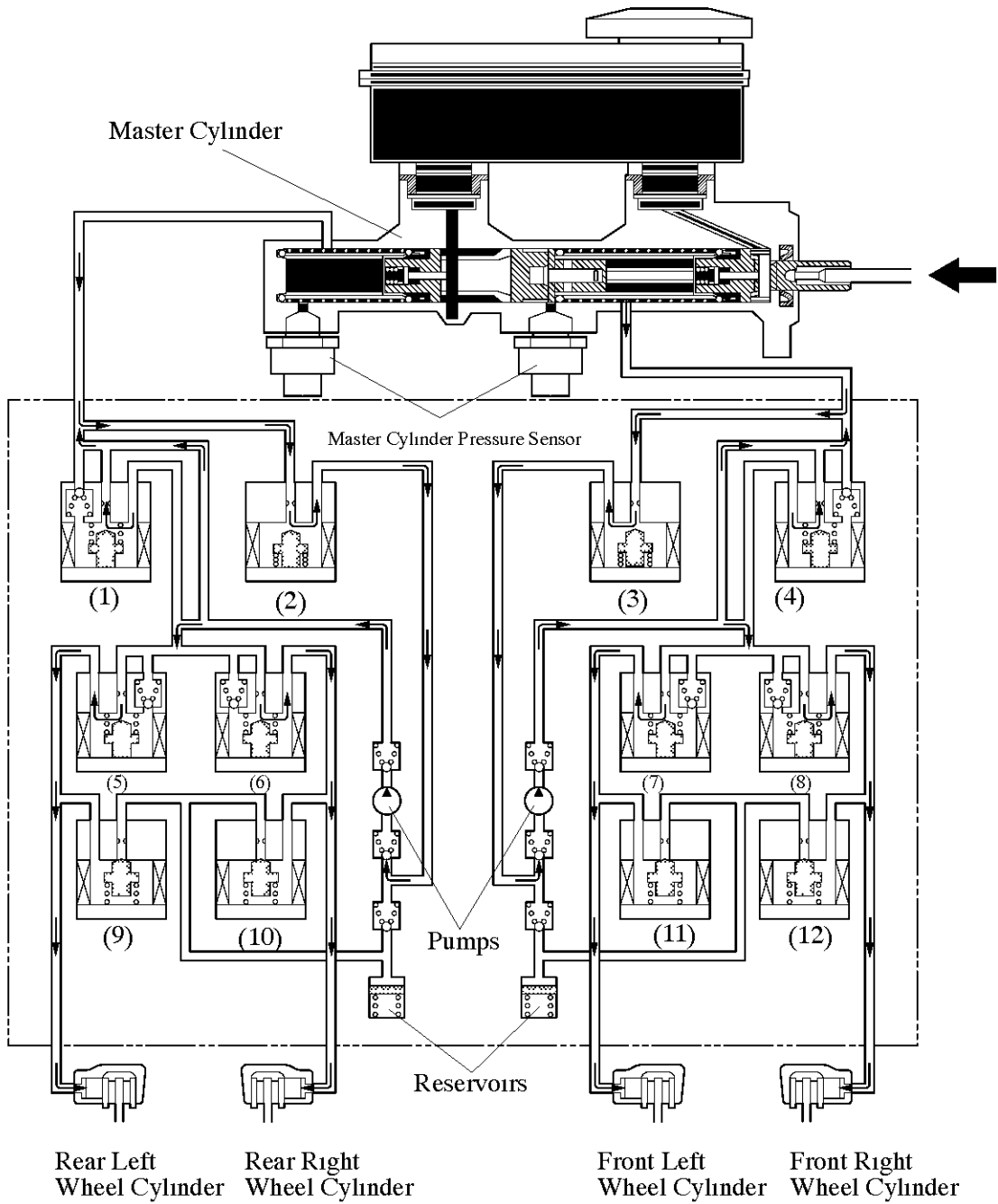
Brake Assist Operation

- 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.
- Even if the brake booster fails, the skid control ECU activates the pump in the brake actuator and applies a greater fluid pressure than the master cylinder in order to achieve a greater braking force.

► System Diagram ◀



228SQ13



228SQ14

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

Skid Control ECU

1) Self-Diagnosis

- If the skid control ECU detects a malfunction in the Brake Control System (ABS with EBD, Brake Assist, A-TRAC/TRAC and VSC system), the ABS, brake system, VSC/TRAC warning lights and VSC OFF indicator light or TRAC OFF indicator light that corresponds to the function in which the malfunction has been detected indicates or lights up, as indicated in the table below, to alert the driver of the malfunction.

○: Light ON — : Light OFF

Item	ABS	EBD	Brake Assist	A-TRAC/TRAC	VSC	Skid Control ECU
ABS Warning Light	○	○	—	—	—	○
Brake System Warning Light	—	○	○	—	—	○
VSC OFF Indicator Light*1	○	○	○	○	○	○
TRAC OFF Indicator Light*2	○	○	○	○	○	○
VSC/TRAC Warning Light	○	○	○	○	○	○

*1: Only for 4WD Model

*2: Only for 2WD Model

- At the same time, the DTC (Diagnosis Trouble Codes) are stored in memory. The DTCs can be read by connecting the SST (09843-18040) between the Tc and CG terminals DLC3 and observing the blinking of the ABS warning light, brake system warning light and VSC/TRAC warning light, or by connecting a hand-held tester.
- The following DTC have been added to the Brake Control System (ABS with EBD, BRAKE ASSIST, A-TRAC/TRAC and VSC system):

Output by blinking ABS warning light		Output by blinking VSC/TRAC warning light	
DTC No.	Detection Item	DTC No.	Detection Item
C1244 / 44	Open or short circuit in deceleration sensor circuit	C1207 / 37	Reverse gear signal failure
C1247 / 47	Malfunction in delta S sensor (pedal stroke speed sensor)	C1335 / 35	Malfunction in steering angle sensor communication circuit

2) Fail-Safe

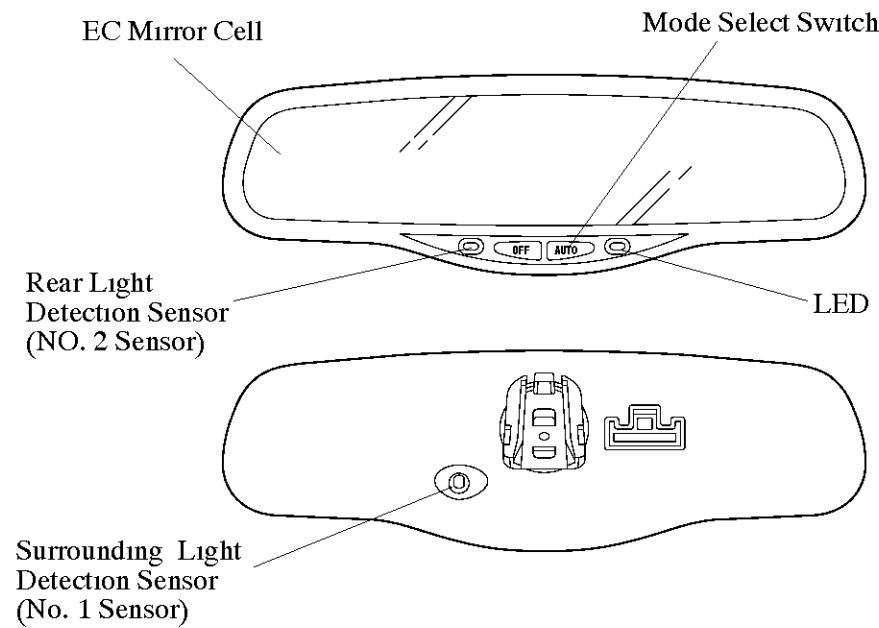
- In the event of a malfunction in the A-TRAC/TRAC and/or VSC, the skid control ECU prohibits the A-TRAC/TRAC and VSC operations.
- In the event of a malfunction in the ABS and/or Brake Assist, the skid control ECU prohibits the ABS with EBD, Brake Assist, A-TRAC/TRAC, and VSC operations.
- In the event of the malfunction in the EBD control, skid control ECU prohibits the EBD control. Thus, the brake and throttle valve opening angle control will be opened in the same condition as in the condition without the ABS with EBD, Brake Assist, A-TRAC/TRAC, VSC.

■ **AUTOMATIC GLARE-RESISTANT EC MIRROR**

1. General

- An automatic glare-resistant EC (electrochromic) mirror has been adopted for the inside rearview mirror as standard equipment.
- This system uses 2 sensors that are attached onto the inside rear view mirror to detect the difference between the intensity of light entering the inside rear view mirror from the rear of the vehicle, and of the light surrounding the vehicle.
- During nighttime driving, if a large difference in intensity exists between the surrounding light and the light entering the inside rear view mirror from the headlights of the vehicle driving behind, this system automatically reduce the reflection rate of the inside rear view mirror and thus dampens the glare on the mirror.

2. Function of Components



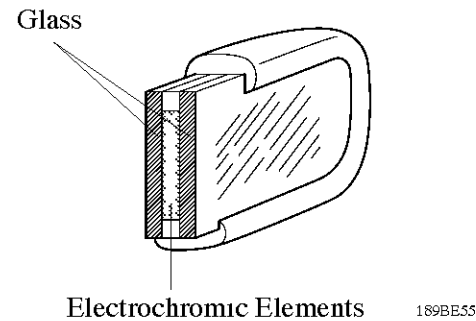
228SQ15

Components	Function
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 inside rear view mirror from behind the vehicle.
LED	Turns on to inform the driver that the mirror control mode is operating in the AUTO mode.
Mode Select Switch	Selects the inside rear view mirror control to AUTO or DAY mode.
EC Mirror Cell	Varies the reflection rate of the mirror through the function of EC elements.

3. EC Mirror Cell

An EC mirror cell consists of 2 layers of glass which sandwich the EC elements in the middle.

The EC elements control coloring and discoloring characteristics through their electro-chemical oxidation reduction reaction. These characteristics are utilized to electronically vary the mirror's reflection rate.

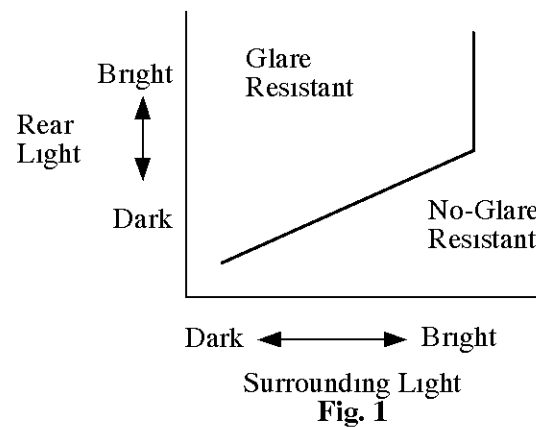


4. Operation

General

The EC mirror system provides 2 types of control modes, the AUTO and DAY modes, which can be selected using the mode select switch.

In the AUTO mode, the system switches (Fig. 1) the inside rear view mirror's glare resistant and non-glare resistant functions in accordance with the difference in intensity between the surrounding and rear lights and automatically varies the reflection rate of the inside and outside rear view mirrors. When the mode select switch is fixed to the DAY mode, the reflection rate of the inside and outside rear view mirrors are fixed to maximum reflection (DAY mode) regardless of the intensity of the surrounding or rear light. This system, when selected to the AUTO mode, is activated only when the ignition switch is ON.



189BE56

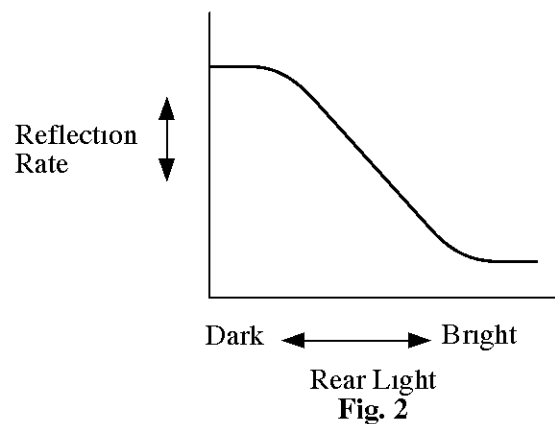
Auto Mode

During daytime driving, the inside and outside rear view mirrors remain in the DAY mode.

The automatic glare-resistant circuit detects the surrounding light through its No. 1 sensor, the rear light through its No. 2 sensor, and determines whether it is day or night through the intensity of the surrounding light. At the same time, the intensity of the glare from the rear is determined through the difference in intensity between the surrounding and rear light.

When the automatic glare-resistant circuit determines that the rear light is too bright, the EC drive circuit applies voltage to the inside and outside rear view mirror cells to vary their reflection rate.

In accordance with the intensity of the rear light, the inside rear view mirror's reflection rate varies steplessly (Fig. 2).



189BE57

AUDIO SYSTEM

1. RSAS (Rear Seat Audio System)

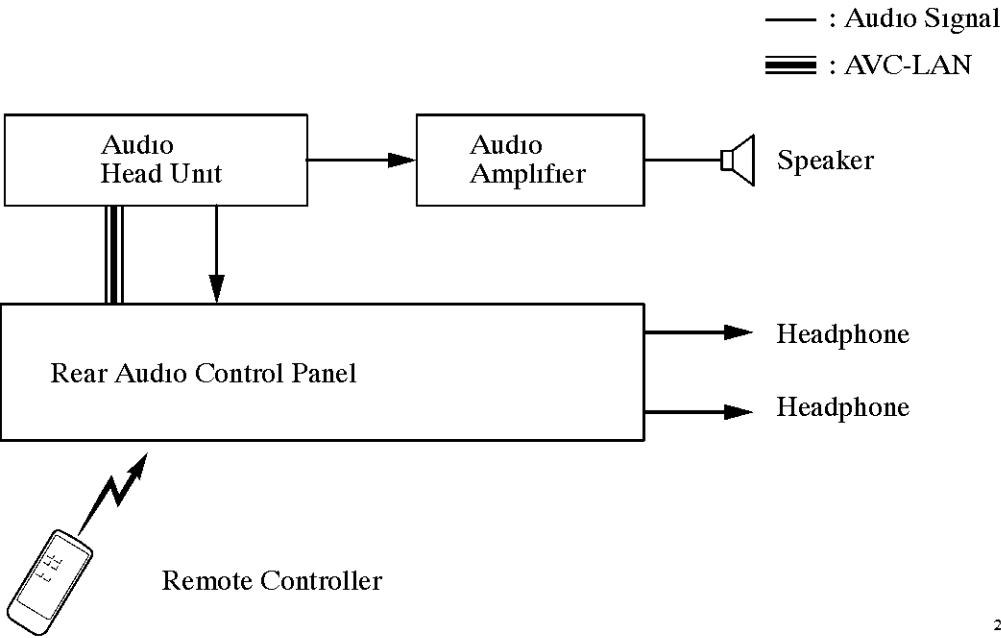
General

- RSAS (Rear Seat Audio System) has been adopted as optional equipment.
- This system, which consists of a rear audio control panel that is provided under the rear ceiling and a remote controller, enables the rear seat occupants to use headphones to listen simultaneously to a different audio mode than the one that is selected in the front audio head unit.
- The table below shows the audio modes that can be selected in the RSAS.

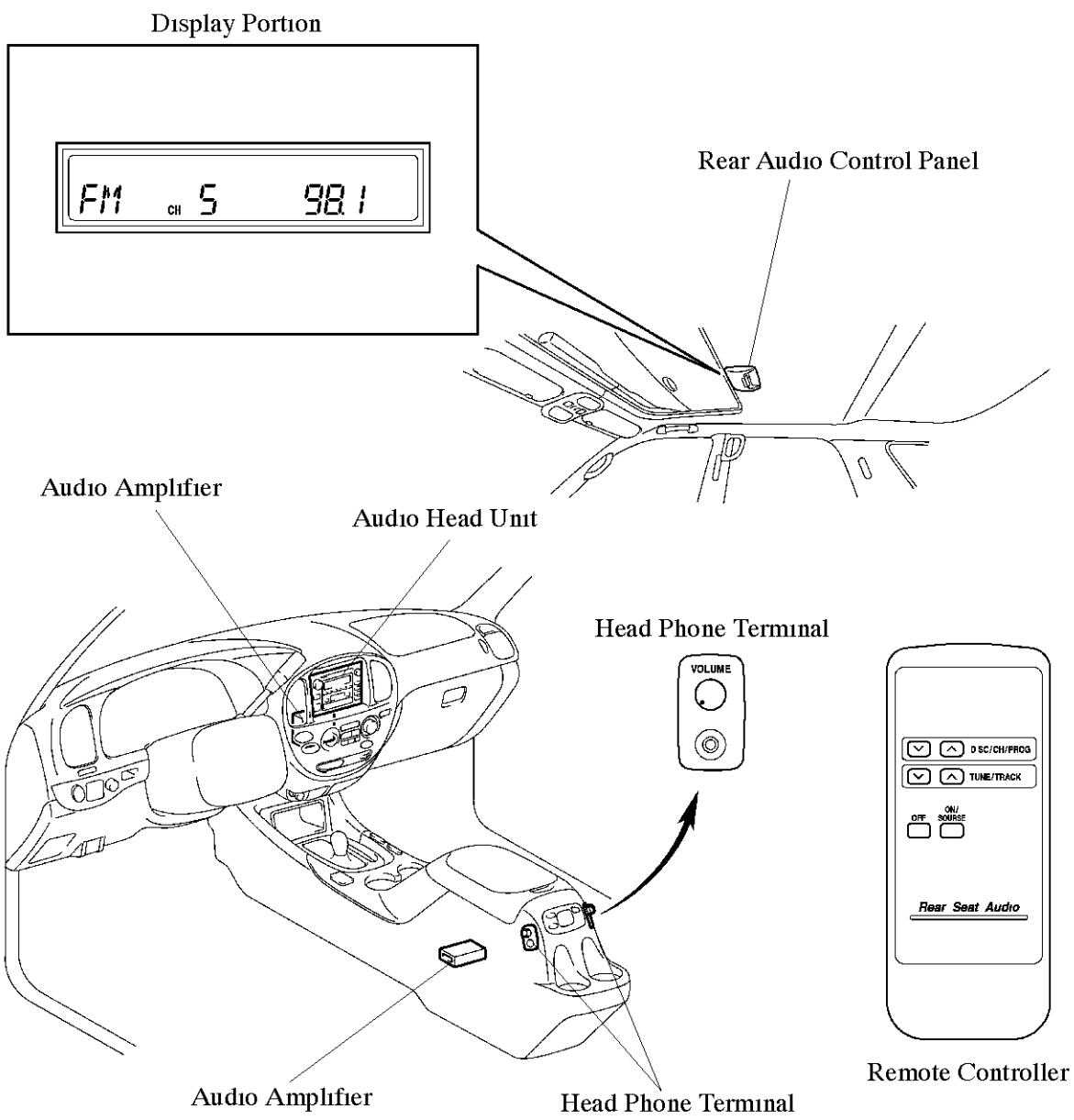
Front \ Rear		OFF	Radio		Cassette	CD Changer
			AM	FM		
OFF		○	○	○	○	○
Radio	AM	○	○*	—	○	○
	FM	○	—	○*	○	○
Cassette		○	○	○	○	○
CD Changer		○	○	○	○	○

*: It is not possible to tune to a different radio station between the front and rear seats.

System Diagram



Layout of Main Component



2. RSES (Rear Seat Entertainment System)

General

- RSES (Rear Seat Entertainment System) has been adopted as optional equipment.
- As a unique feature of this system, the front and rear seat occupants can enjoy different audio-visual modes at the same time. Thus, this system offers enhanced entertainment to the rear seat occupants.
- The table below shows the audio-visual modes that can be selected in the RSES.

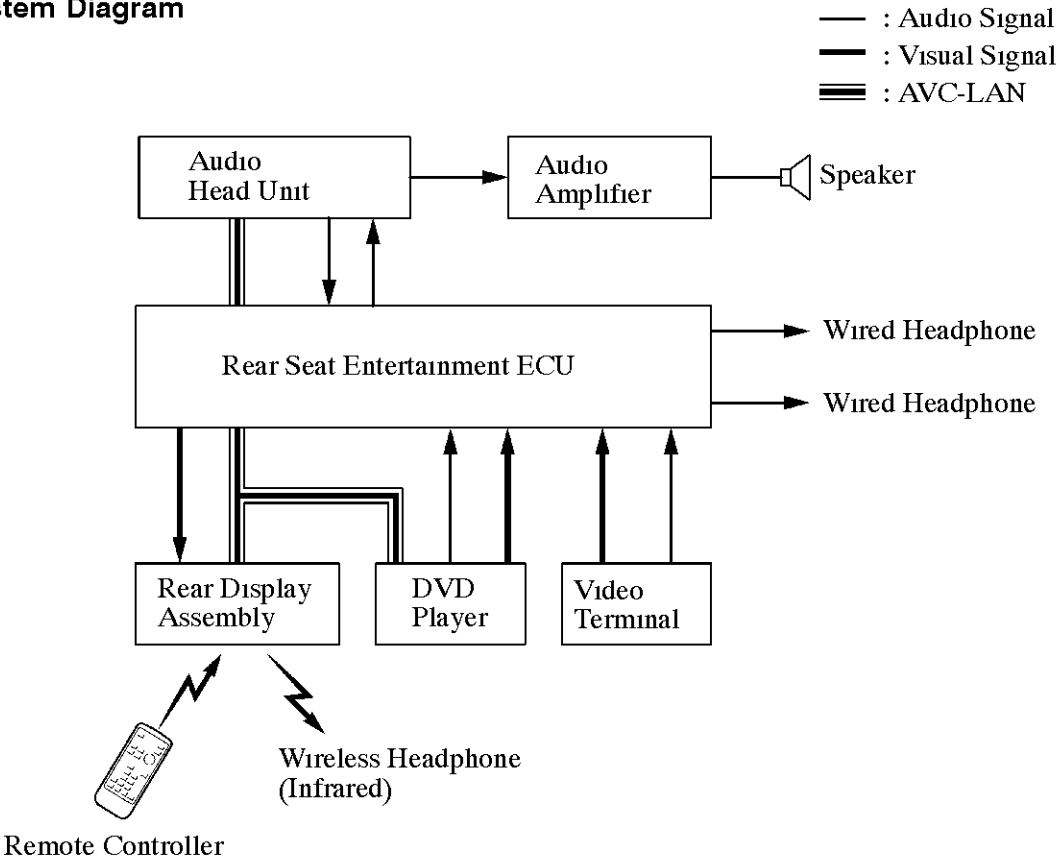
Front \ Rear		OFF	Audio				Visual	
			Radio		Cassette	CD Changer	DVD Player	Video Terminal
			AM	FM				
OFF		○	○	○	○	○	○	○
Radio	AM	○	○*2	—	○	○	○	○
	FM	○	—	○*2	○	○	○	○
Cassette		○	○	○	○	○	○	○
CD Changer		○	○	○	○	○	○	○
DVD Player*1		○	○	○	○	○	○	○

*1: Audio only

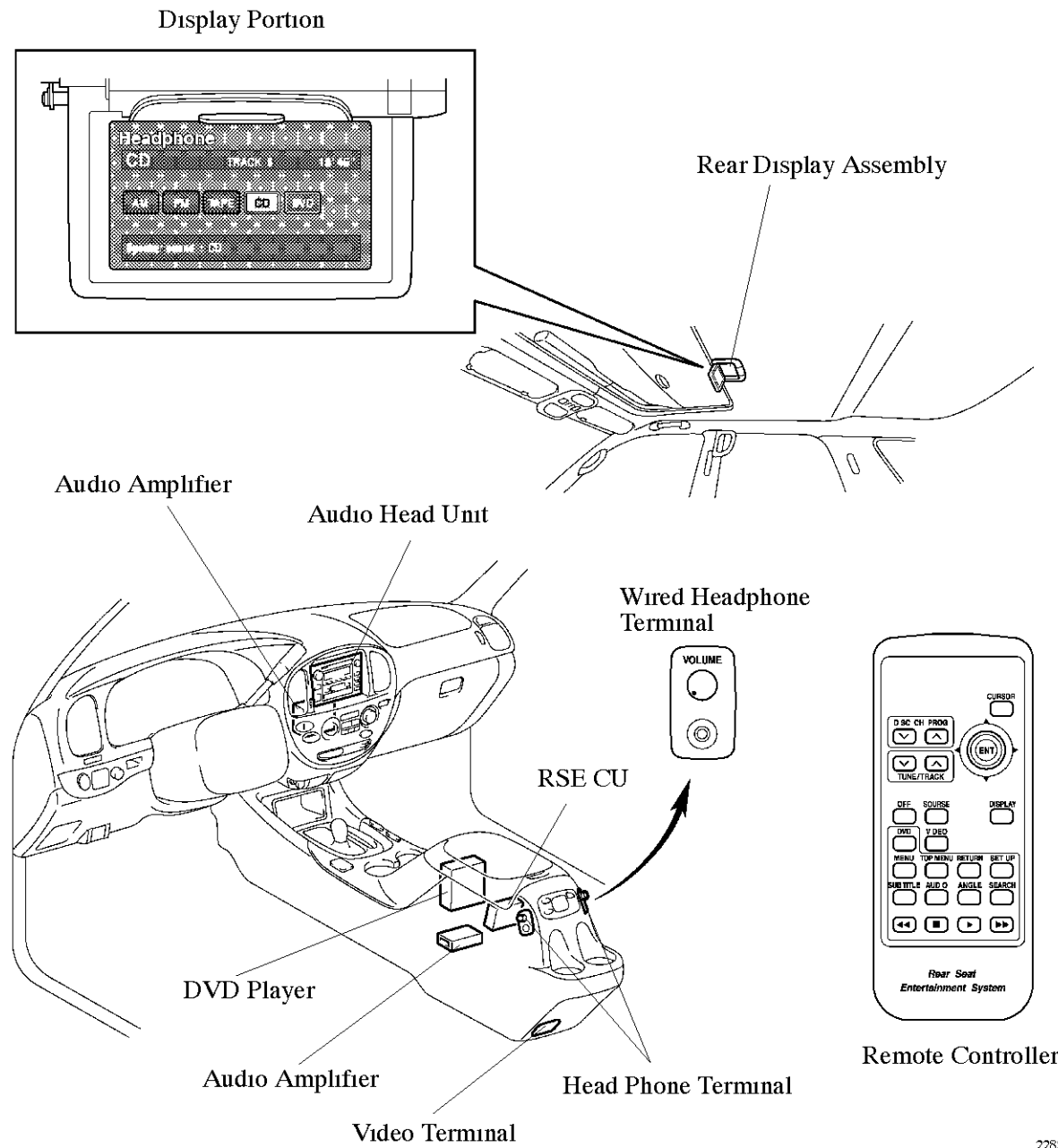
*2: It is not possible to tune to a different radio station between the front and rear seats.

- This system consists of a rear display assembly, remote controller assembly, audio head unit, audio amplifier, DVD (Digital Versatile Disc) player, video terminal, and RSE ECU.
- The rear seat occupants can control the audio-visual modes with the remote controller, and listen to audio by using wired or wireless headphones.
- The RSES is controlled by the RSE ECU, and the communication among the audio head unit, rear display assembly, and DVD player is established via an AVC-LAN (Audio Visual Communication-Local Area Network).

System Diagram



Layout of Main Component



Function of Main Component

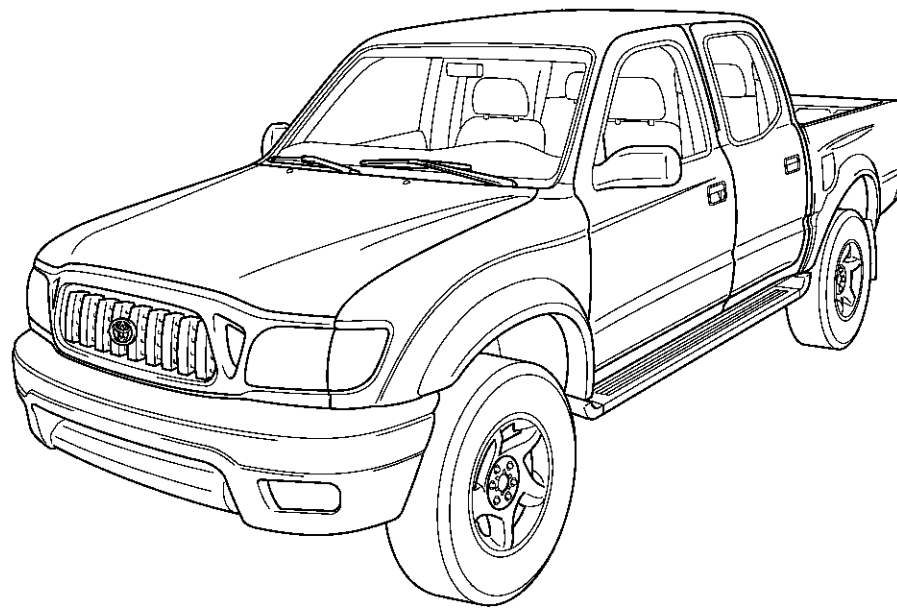
Component	Function
Rear Display Assembly	• Displays DVD and video images in accordance with video signals from the RSE ECU. • Receives signals from the remote controller and outputs them to the RSE ECU. • Outputs audio signals to the wireless headphones in the form of infrared signals. • Displays the audio-visual control screen. • Displays the adjustment screen. • Displays the diagnosis screen. • The diagnosis screen appears when the diagnosis mode is started on the audio head unit. For details, refer to the 2003 Sequoia Repair Manual (Pub. No. RM959U).
Audio Head Unit	• Outputs audio signals to the RSE ECU and the audio amplifier. • Outputs a request to the RSE ECU to start the diagnosis mode.
RSE ECU	• Processes video and audio signals from the DVD player and video player and audio signals from the audio head unit, and outputs them to the rear display assembly and headphone terminals. • Controls the distribution of the audio-visual mode to the front (audio head unit) and the rear (RSES)
Remote Controller	Outputs various control signals of the RSES to the rear display assembly in the form of infrared signals.
Wireless Headphone	• Receives the audio signals from the rear display assembly in the form of infrared signals. • Volume adjustment of the wireless headphone can be done by using the volume equipped on the wireless headphone.
Headphone Terminal	• Outputs audio signals to the wired headphones that are connected. • Adjusts the volume of the wired headphones in accordance with volume control.
Video Terminal	This terminal is for connecting the video player's video and audio output terminals.

MAJOR TECHNICAL SPECIFICATIONS

Item			Area		U S A and Canada		U S A	
Body Type					Wagon			
Vehicle Grade					SR5		Limited	
Model Code					UCK45L GKSSKA		UCK45L GKSLKA	
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)		5180 (203 9)	5180 (203 9)	5180 (203 9)	5180 (203 9)
		Width	mm (in.)		1980 (78 0)	1980 (78 0)	1940 (76 4)	1980 (78 0)* ¹
		Height	mm (in.)		1870 (73 6) 1925 (75 6)* ¹	1925 (75 6)	1880 (72 9) 1883 (73 0)* ⁴ 1893 (75 0)* ² 1910 (75 2)* ³	1910 (75 2)
	Wheel Base		mm (in.)		3000 (118 1)	3000 (118 1)	3000 (118 1)	3000 (118 1)
	Tread	Front	mm (in.)		1672 (65 8)	1672 (65 8)	1674 (65 9)	1674 (65 9)
		Rear	mm (in.)		1680 (66 1)	1680 (66 1)	1680 (66 1)	1680 (66 1)
	Effective Head Room		mm (in.)		1045 (41 1) 1026 (40 4)* ⁴	1045 (41 1) 1026 (40 4)* ⁴	1045 (41 1) 1026 (40 4)* ⁴	1045 (41 1) 1026 (40 4)* ⁴
	Effective Leg Room	Front	mm (in.)		1032 (40 6) 985 (38 8)* ⁴	1032 (40 6) 985 (38 8)* ⁴	1032 (40 6) 985 (38 8)* ⁴	1032 (40 6) 985 (38 8)* ⁴
		Rear	mm (in.)		1057 (41 6)	1057 (41 6)	1057 (41 6)	1057 (41 6)
	Shoulder Room	Front	mm (in.)		984 (38 7)	984 (38 7)	984 (38 7)	984 (38 7)
		Rear	mm (in.)		1578 (62 1)	1578 (62 1)	1578 (62 1)	1578 (62 1)
	Cargo Space	Length	mm (in.)		1580 (62 2)	1580 (62 2)	1580 (62 2)	1580 (62 2)
		Width	mm (in.)		1433 (56 4)	1433 (56 4)	1433 (56 4)	1433 (56 4)
		Height	mm (in.)		1231 (48 5)	1231 (48 5)	1231 (48 5)	1231 (48 5)
	Overhang	Front	mm (in.)		1085 (42 7)	1085 (42 7)	1085 (42 7)	1085 (42 7)
		Rear	mm (in.)		950 (37 4)	950 (37 4)	950 (37 4)	950 (37 4)
	Min. Running Ground Clearance		mm (in.)		1230 (48 4)	1230 (48 4)	1230 (48 4)	1230 (48 4)
	Angle of Approach		degrees		270 (10 6)	270 (10 6)	255 (10 0) 265 (10 4)* ²	265 (10 4)
	Angle of Departure		degrees		28°	28°	27°	27°
	Curb Mass		kg (lb)		20°	19°	20°	20°
Performance	Curb Mass	Front	kg (lb)		1243 (2740)	1250 (2755)	1175 (2590)	1186 (2615)
		Rear	kg (lb)		1152 (2540)	1163 (2565)	1134 (2500)	1145 (2525)
		Total	kg (lb)		2395 (5280)	2413 (5320)	2309 (5090)	2332 (5140)
	Gross Vehicle Mass	Front	kg (lb)		—	—	—	—
		Rear	kg (lb)		—	—	—	—
		Total	kg (lb)		—	—	—	—
	Fuel Tank Capacity		L (U S gal) Imp. gal		2994 (6600)	2994 (6600)	2948 (6500)	2948 (6500)
	Luggage Compartment Capacity		m ³ (cu ft)		98 5 (26 1 21 7)	98 5 (26 1 21 7)	98 5 (26 1 21 7)	98 5 (26 1 21 7)
	Max. Speed		km/h (mph)		—	—	—	—
	Max. Cruising Speed		km/h (mph)		160 (99)	160 (99)	160 (99)	160 (99)
Engine	Max. Permissible Speed	1st Gear	km/h (mph)		128 (79)	128 (79)	128 (79)	128 (79)
		2nd Gear	km/h (mph)		25 (15)* ³ 60 (37)* ⁶	25 (15)* ³ 60 (37)* ⁶	60 (37)	60 (37)
		3rd Gear	km/h (mph)		45 (28)* ³ 110 (68)* ⁶	45 (28)* ³ 110 (68)* ⁶	110 (68)	110 (68)
		4th Gear	km/h (mph)		160 (99)	160 (99)	160 (99)	160 (99)
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)		—	—	—	—
		Curb to Curb	m (ft)		6 7 (22 0)	6 7 (22 0)	6 7 (22 0)	6 7 (22 0)
	Engine Type				6 4 (21 0)	6 4 (21 0)	6 4 (21 0)	6 4 (21 0)
	Valve Mechanism				2UZ FE	2UZ FE	2UZ FE	2UZ FE
	Bore × Stroke		mm (in.)		32 Valve DOHC	32 Valve DOHC	32 Valve DOHC	32 Valve DOHC
	Displacement		cm ³ (cu in.)		94 0 × 84 0 (37 0 × 3 3 1)	94 0 × 84 0 (37 0 × 3 3 1)	94 0 × 84 0 (37 0 × 3 3 1)	94 0 × 84 0 (37 0 × 3 3 1)
Chassis	Compression Ratio				4664 (284 5)	4664 (284 5)	4664 (284 5)	4664 (284 5)
	Carburetor Type				9 6 1	9 6 1	9 6 1	9 6 1
	Research Octane No.				SFI	SFI	SFI	SFI
	Max. Output (SAE NET)		kW/rpm (HP@rpm)		91 or more	91 or more	91 or more	91 or more
	Max. Torque (SAE NET)		N m/rpm (lb ft@rpm)		179 / 4800 (240@4800)	179 / 4800 (240@4800)	179 / 4800 (240@4800)	179 / 4800 (240@4800)
	Battery Capacity (5HR)		Voltage & Amp hr		427 / 3400 (315@3400)	427 / 3400 (315@3400)	427 / 3400 (315@3400)	427 / 3400 (315@3400)
	Alternator Output		Watts		12 64	12 64	12 64	12 64
	Starter Output		kW		1200	1200	1200	1200
	Clutch Type				2 0	2 0	2 0	2 0
	Transmission Type				—	—	—	—
Chassis	Transmission Gear Ratio	In First			A340F	A340F	A340E	A340E
		In Second			2.804	2.804	2.804	2.804
		In Third			1.531	1.531	1.531	1.531
		In Fourth			1.000	1.000	1.000	1.000
		In Fifth			0.705	0.705	0.705	0.705
		In Reverse			—	—	—	—
	Transfer Gear Ratio H4/H2				2.393	2.393	2.393	2.393
	Differential Gear Ratio (Front/Rear)				1 000 / 2 566	1 000 / 2 566	—	—
	Differential Gear Size (Front/Rear)				4 100 / 4 100	4 100 / 4 100	— / 4 100	— / 4 100
	Brake Type				7 5 / 8	7 5 / 8	— / 8	— / 8
Chassis	Brake Type	Front			Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
		Rear			Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
	Parking Brake Type				Duo Servo Drum	Duo Servo Drum	Duo Servo Drum	Duo Servo Drum
	Brake Booster Type and Size				Single 10	Single 10	Single 10	Single 10
	Proportioning Valve Type				—	—	—	—
	Suspension Type	Front			Double Wishbone	Double Wishbone	Double Wishbone	Double Wishbone
		Rear			4 Link with Lateral Rod	4 Link with Lateral Rod	4 Link with Lateral Rod	4 Link with Lateral Rod
	Stabilizer Bar	Front			STD	STD	STD	STD
		Rear			STD	STD	STD	STD
	Steering Gear Type				Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion
	Steering Gear Ratio (Overall)				18 6	18 6	18 6	18 6
Chassis	Power Steering Type				Integral Type	Integral Type	Integral Type	Integral Type

*¹ With Roof Rack *³ With Roof Rack P265 / 70 R16 Tire *⁵ Low mode
*² With P265 / 70 R16 Tire *⁴ With Moon Roof *⁶ High mode

TOYOTA TACOMA



228TA03

TOYOTA TACOMA

OUTLINE OF NEW FEATURES

The following changes are made for the 2003 model year.

1. 2RZ-FE and 3RZ-FE Engine

To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. For details, refer to 2003 General Features section.

2. 5VZ-FE Engine

- The composition of the TWC (Three-Way Catalytic Converter) has been changed to comply with the LEV (Low Emission Vehicle) and SFTP (Supplementary Federal Test Procedure) emission regulations.
- The same link type ETCS-1 (Electronic Throttle Control System-intelligent) that is used on the '03 Toyota Tundra with the 5VZ-FE engine has been adopted on the models other than Sport grade model.
- To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, refer to 2003 General Features section.

3. A340E and A340F Automatic Transmission

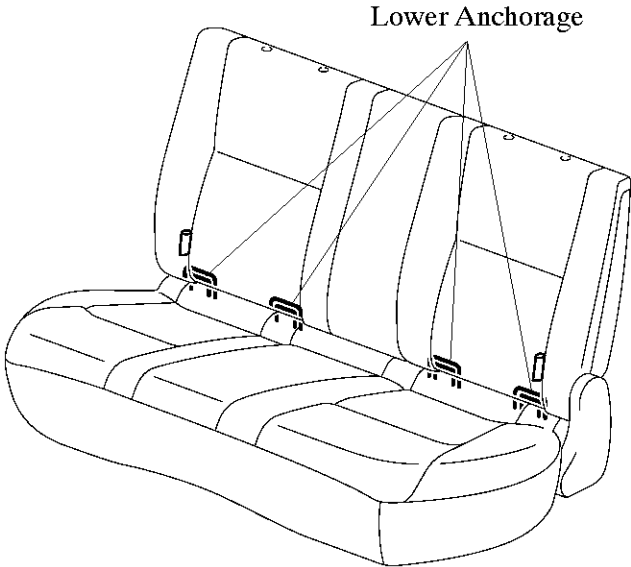
- The line pressure control using a linear solenoid valve (SLT), which was adopted on the '02 Toyota Tundra with the 2UZ-FE engine, has also been adopted on the '03 Toyota Tacoma with the 5VZ-FE engine. Accordingly, the shape of the valve body and the logic of the ECM have been changed.
- The previous mechanical control, which consisted of a throttle cable, cam, and throttle valve, has been changed to an electronic control system that uses a solenoid valve SLT.
- The automatic transmission fluid of 3RZ-FE and 5VZ-FE engine model has been changed from the D-II type ATF to the T-IV type ATF.

4. Brake

- The ABS brake control system, which was optional equipment on the '02 model, is now standard equipment on all models.
- The brake actuator with skid control ECU has been changed from the one made by Continental Teves on the '02 model to one made by ADVICS. However, the basic construction and operation are the same as the '02 model.
- In place of the pendulum type deceleration sensor used previously in the ABS brake control system of the 4WD and Prerunner models, a semiconductor type deceleration sensor has been adopted.
- The incremental type hydraulic auto adjuster to automatically adjust the clearance between the shoes and drum has been adopted on rear brake for 4WD and Prerunner models.

5. Seat

CRS (Child Restrain System) lower anchorage for securing child seats is provided behind the seat cushion of the front or rear seat



Double Cab Model Rear Seat

228TA01

○ : available — : not available

	Front Seat			Rear Seat	
	Regular Cab	Extra Cab	Double Cab	Extra Cab	Double Cab
LH Side	—	—	—	—	○
RH Side	○	○	—	—	○

6. Cruise Control System

- On the models with the 5VZ-FE engine other than Sport grade model, the cruise control has been changed to one that is controlled by the ETCS-1. Accordingly, the components of the system have been changed as follows:
 - Cruise control ECU is integrated in the ECM.
 - Cruise control actuator and control cable has been discontinued.
 - Throttle control motor, throttle position sensor and accelerator pedal position sensor have been adopted.
- The basic construction and operation are the same as '03 Celica. For details, refer to page 76.

NEW FEATURES

■ 5VZ-FE ENGINE

1. General

- The composition of the TWC (Three-Way Catalytic Converter) has been changed to comply with the LEV (Low Emission Vehicle) and SFTP (Supplementary Federal Test Procedure) emission regulations.
- The same link type ETCS-1 (Electronic Throttle Control System-intelligent) that is used on the '03 Toyota Tundra with the 5VZ-FE engine has been adopted on the models other than Sport grade model. For details of ETCS-1 control, refer to page 231.
- To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. Some of the DTC have been further divided into smaller detection areas than in the past, and new DTC have been assigned to them. For details, refer to 2003 General Features section.

► Engine Specifications ◀

Model			'03 Model	'02 Model
No. of Cyls. & Arrangement			6-Cylinder, V Type	←
Valve Mechanism			24-Valve DOHC, Belt & Gear Drive	←
Combustion Chamber			Pentroof Type	←
Manifolds			Cross-Flow	←
Fuel System			SFI	←
Ignition System			DIS	←
Displacement		cm ³ (cu. in.)	3378 (206.1)	←
Bore × Stroke		mm (in.)	93.5 × 82.0 (3.68 × 3.23)	←
Compression			9.6 : 1	←
Max. Output		SAE-NET	142 kW @ 4800 rpm (190 HP @ 4800 rpm)	←
Max. Torque		SAE-NET	298 Nm @ 3600 rpm (220 ft lbf @ 3600 rpm)	←
Valve Tim- ing	Intake	Open	4° BTDC	←
		Close	42° ABDC	←
	Exhaust	Open	46° BBDC	←
		Close	4° ATDC	←
Firing Order			1-2-3-4-5-6	←
Research Octane Number			91 or more	←
Emission Regulation			LEV and SFTP	—
Oil Grade			API SL-EC or ILSAC	←
Engine Service Mass		kg (lb)	M/T : 189 (416.7) A/T : 179 (394.6)	←

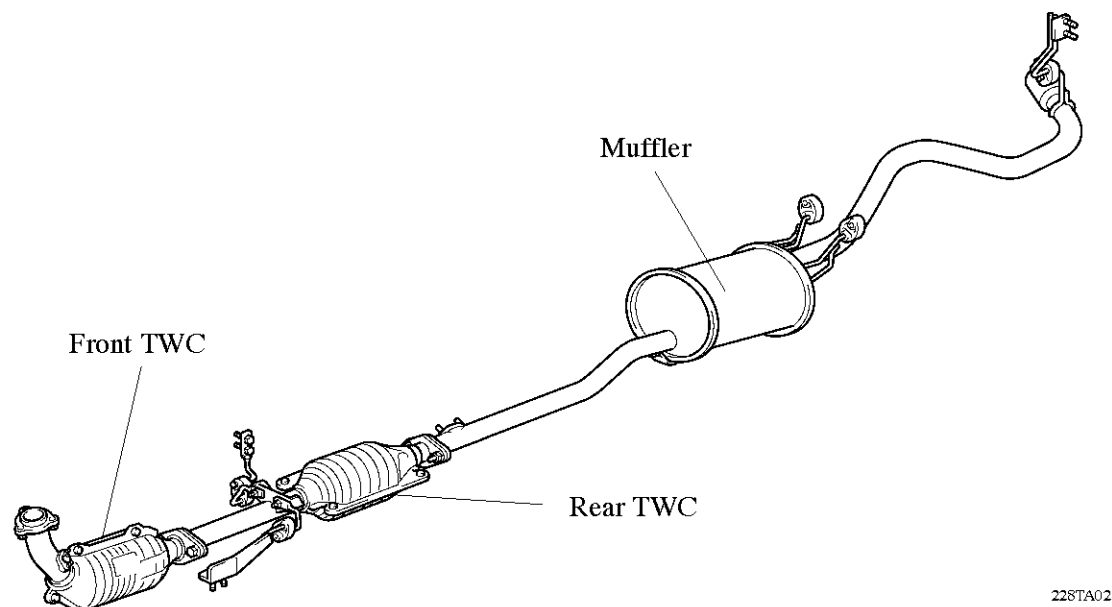
2. Major Difference

Item	Outline
Engine Proper	The material of the intake and exhaust valve seats has been changed to one that excels in heat resistance.
Intake and Exhaust System	• Adoption of the ETCS-1* • Changed composition of TWC
Engine Control System	• Provided a linear type accelerator pedal position sensor in the throttle body* • Addition of failsafe functions related to ETCS-1*. • Correspondence of all DTC (Diagnostic Trouble Code) to SAE-controlled codes
Other	Configuration and structure are the same as '02 model

*: except Sport grade model

3. TWC (Three-Way Catalytic Converter)

In place of the metallic type front TWC that was used on the '02 model, the '03 model has adopted an ultra thin-wall, ceramic type front TWC to improve exhaust gas reduction performance and comply with the LEV and SFTP emission regulations.



228TA02

MAJOR TECHNICAL SPECIFICATIONS

Item			Area		U S A and Canada							
Body Type			Regular Cab (2WD)				Extra Cab (2WD)					
Vehicle Grade			— SR5 ^{*5}									
Model Code			RZN140L TRMDKAB		RZN140L TRPDKAB		RZN150L CRMDKAB		RZN150L CRPDKAB			
Major Dimensions & Vehicle Weights	Overall	Length	run (in.)	4540 (178 7)	4685 (184 4)* ³	4540 (178 7)	4685 (184 4)* ³	5010 (197 2)	5155 (203 0)* ³	5010 (197 2)	5155 (203 0)* ³	5
		Width	run (in.)	1690 (66 5)		1690 (66 5)		1690 (66 5)		1690 (66 5)		
		Height	run (in.)	1630 (64 0)* ¹	1620 (63 8)* ^{1 *2}	1625 (64 0)* ¹	1615 (63 6)* ^{1 *2}	1615 (63 6)* ¹	1605 (63 2)* ^{1 *2}	1615 (63 6)* ¹	1605 (63 2)* ^{1 *2}	
	Wheel Base		run (in.)	2625 (103 3)		2625 (103 3)		3095 (121 9)		3095 (121 9)		
	Tread	Front	run (in.)	1450 (57 1)		1450 (57 1)		1450 (57 1)		1450 (57 1)		
		Rear	run (in.)	1455 (57 3)		1455 (57 3)		1455 (57 3)		1455 (57 3)		10
	Effective Head Room	Front	run (in.)	979 (38 5)		979 (38 5)		984 (38 7)	971 (38 2)* ⁴	984 (38 7)	971 (38 2)* ⁴	
		Rear	run (in.)	—		—		884 (34 8)		884 (34 8)		
	Effective Leg Room	Front	run (in.)	1059 (41 7)		1059 (41 7)		1088 (42 8)		1088 (42 8)		
		Rear	run (in.)	—		—		690 (27 2)		690 (27 2)		
	Shoulder Room	Front	run (in.)	1369 (53 9)		1369 (53 9)		1371 (54 0)		1371 (54 0)		15
		Rear	run (in.)	—		—		1329 (52 3)		1329 (52 3)		
	Cargo Space	Length	run (in.)	—		—		—		—		
		Width	run (in.)	—		—		—		—		
		Height	run (in.)	—		—		—		—		
	Overhang	Front	run (in.)	820 (32 3)		820 (32 3)		820 (32 3)		820 (32 3)		20
		Rear	run (in.)	1095 (43 1)	1240 (48 8)* ³	1095 (43 1)	1240 (48 8)* ³	1095 (43 1)	1240 (48 8)* ³	1095 (43 1)	1240 (48 8)* ³	
	Min. Running Ground Clearance		run (in.)	215 (8 5)	205 (8 1)* ²	215 (8 5)	205 (8 1)* ²	215 (8 5)	205 (8 1)* ²	215 (8 5)	205 (8 1)* ²	
	Angle of Approach		degrees	24°	23°* ²	24°	23°* ²	24°	23°* ²	24°	23°* ²	
	Angle of Departure		degrees	28°	20°* ³	28°	20°* ³	26°	19°* ³	26°	19°* ³	
	Curb Mass	Front	kg (lb)	728 (1605)		737 (1625)		778 (1715)		787 (1735)		25
		Rear	kg (lb)	530 (1170)		531 (1170)		572 (1260)		572 (1260)		
		Total	kg (lb)	1259 (2775)		1268 (2795)		1349 (2975)		1359 (2995)		
	Gross Vehicle Mass	Front	kg (lb)	—		—		—		—		
		Rear	kg (lb)	—		—		—		—		
		Total	kg (lb)	1925 (4250)		1925 (4250)		2040 (4500)		2040 (4500)		30
Fuel Tank Capacity		L (U S gal.) Imp. gal.)	60 6 (160 13 3)		60 6 (160 13 3)		60 6 (160 13 3)		60 6 (160 13 3)			
Luggage Compartment Capacity		m ³ (cu. ft.)	—		—		—		—			
Performance	Max. Speed		km/h (mph)	165 (103)		165 (103)		165 (103)		165 (103)		
	Max. Cruising Speed		km/h (mph)	—		—		—		—		
	Max. Permissible Speed	1st Gear	km/h (mph)	48 (30)		64 (40)		48 (30)		64 (40)		35
		2nd Gear	km/h (mph)	89 (55)		122 (76)		89 (55)		122 (76)		
		3rd Gear	km/h (mph)	137 (85)		165 (103)		137 (85)		165 (103)		
		4th Gear	km/h (mph)	165 (103)		—		165 (103)		—		
	Turning Diameter (Outside Front)	Wall to Wall	m (ft.)	11 6 (38 1)		11 6 (38 1)		13 2 (43 3)		13 2 (43 3)		40
Curb to Curb		m (ft.)	11 2 (36 7)		11 2 (36 7)		12 7 (41 7)		12 7 (41 7)			
Engine	Engine Type			2RZ FE		2RZ FE		2RZ FE		2RZ FE		
	Valve Mechanism			16 Valve DOHC		16 Valve DOHC		16 Valve DOHC		16 Valve DOHC		
	Bore × Stroke		run (in.)	95 0 × 86 0 (3 74 × 3 39)		95 0 × 86 0 (3 74 × 3 39)		95 0 × 86 0 (3 74 × 3 39)		95 0 × 86 0 (3 74 × 3 39)		
	Displacement		cm ³ (cu. in.)	2438 (148 8)		2438 (148 8)		2438 (148 8)		2438 (148 8)		
	Compression Ratio			9 5 : 1		9 5 : 1		9 5 : 1		9 5 : 1		45
	Carburetor Type			SFI		SFI		SFI		SFI		
	Research Octane No.		RON	91 or more		91 or more		91 or more		91 or more		
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	106 / 5000 (142@5000)		106 / 5000 (142@5000)		106 / 5000 (142@5000)		106 / 5000 (142@5000)		
Max. Torque (SAE NET)		N·m/rpm (lb. ft@rpm)	217 / 4000 (160@4000)		217 / 4000 (160@4000)		217 / 4000 (160@4000)		217 / 4000 (160@4000)			
Engine Electrical	Battery Capacity (5HR)		Voltage & Amp. hr	12 48 12 55* ⁵		12 48 12 55* ⁵		12 55		12 55		50
	Alternator Output		Watts	960		960		960		960		
	Starter Output		kW	1 4		1 4		1 4		1 4		
Chassis	Clutch Type			Dry Single Diaphragm		—		Dry Single Diaphragm		—		
	Transmission Type			W59		A44D		W59		A44D		
	Transmission Gear Ratio	In First		3 954		2 826		3 954		2 826		55
		In Second		2 141		1 493		2 141		1 493		
		In Third		1 384		1 000		1 384		1 000		
		In Fourth		1 000		0 688		1 000		0 688		
		In Fifth		0 810		—		0 810		—		
		In Reverse		4 091		2 703		4 091		2 703		60
	Transfer Gear Ratio H4/H2			—		—		—		—		
	Differential Gear Ratio (Front/Rear)			/ 3 583		/ 3 727		/ 3 583		/ 3 727		
	Differential Gear Size (Front/Rear)		in	/ 7 5		/ 7 5		/ 7 5		/ 7 5		
	Brake Type	Front		Ventilated Disc		Ventilated Disc		Ventilated Disc		Ventilated Disc		
		Rear		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		65
	Parking Brake Type			Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		
	Brake Booster Type and Size		in	Single 10		Single 10		Single 10		Single 10		
	Proportioning Valve Type			LSP and BV		LSP and BV		LSP and BV		LSP and BV		
	Suspension Type	Front		Double Wishbone coil		Double Wishbone coil		Double Wishbone coil		Double Wishbone coil		
		Rear		Rigid Leaf		Rigid Leaf		Rigid Leaf		Rigid Leaf		70
	Stabilizer Bar	Front		STD		STD		STD		STD		
		Rear		—		—		—		—		
	Steering Gear Type			Rack and Pinion		Rack and Pinion		Rack and Pinion		Rack and Pinion		
	Steering Gear Ratio (Overall)			22 3 20 4* ⁷		22 3 20 4* ⁷		22 3 20 4* ⁷		22 3 20 4* ⁷		75
	Power Steering Type			Integral Type		Integral Type		Integral Type		Integral Type		

^{*1} Unladen Vehicle ^{*3} With Rear Bumper ^{*5} Option ^{*7} With Power Steering
^{*2} With P235 / 70 R16 Tire ^{*4} With Moon Roof ^{*6} With ABS ^{*8} With P265 / 70 R16 Tire

Donated by Andrew Schauer cruisercult.com

U.S.A. and Canada					
Extra Cab (2WD)	Regular Cab (4WD)		Extra Cab (4WD)		
Sport	— SR5 ^{*5} Limited ^{*5}				
VZN150L CRMDKAB	RZN161L TRMDKAB	RZN161L TRPDKAB	RZN171L CRMDKAB	RZN171L CRPDKAB	VZN170L CRMDKAB
5155 (203 0)	4685 (184 4)	4685 (184 4)	5155 (203 0)	5155 (203 0)	5155 (203 0)
1765 (69 5)	1690 (66 5) 1785 (70 3) ^{*5}	1690 (66 5) 1785 (70 3) ^{*5}	1690 (66 5) 1785 (70 3) ^{*5}	1690 (66 5) 1785 (70 3) ^{*5}	1690 (66 5) 1785 (70 3) ^{*5}
1590 (62 6) ^{*1}	1720 (67 7) ^{*1} 1750 (68 9) ^{*1 *8}	1720 (67 7) ^{*1} 1750 (68 9) ^{*1 *8}	1715 (67 5) ^{*1} 1745 (68 7) ^{*1 *8}	1715 (67 5) ^{*1} 1745 (68 7) ^{*1 *8}	1715 (67 5) ^{*1} 1745 (68 7) ^{*1 *8}
3095 (121 9)	2625 (103 3)	2625 (103 3)	3095 (121 9)	3095 (121 9)	3095 (121 9)
1430 (57 1)	1460 (57 5) 1500 (59 1) ^{*5}	1460 (57 5) 1500 (59 1) ^{*5}	1460 (57 5) 1500 (59 1) ^{*5}	1460 (57 5) 1500 (59 1) ^{*5}	1460 (57 5) 1500 (59 1) ^{*5}
1455 (57 3)	1455 (57 3) 1495 (58 9) ^{*5}	1455 (57 3) 1495 (58 9) ^{*5}	1455 (57 3) 1495 (58 9) ^{*5}	1455 (57 3) 1495 (58 9) ^{*5}	1455 (57 3) 1495 (58 9) ^{*5}
984 (38 7) 971 (38 2) ^{*4}	979 (38 5)	979 (38 5)	984 (38 7) 971 (38 2) ^{*4}	984 (38 7) 971 (38 2) ^{*4}	984 (38 7) 971 (38 2) ^{*4}
884 (34 8)	—	—	884 (34 8)	884 (34 8)	884 (34 8)
1088 (42 8)	1059 (41 7)	1059 (41 7)	1088 (42 8)	1088 (42 8)	1088 (42 8)
690 (27 2)	—	—	690 (27 2)	690 (27 2)	690 (27 2)
1371 (54 0)	1369 (53 9)	1369 (53 9)	1371 (54 0)	1371 (54 0)	1371 (54 0)
1329 (52 3)	—	—	1329 (52 3)	1329 (52 3)	1329 (52 3)
—	—	—	—	—	—
—	—	—	—	—	—
—	—	—	—	—	—
820 (32 3)	820 (32 3)	820 (32 3)	820 (32 3)	820 (32 3)	820 (32 3)
1240 (48 8)	1240 (48 8)	1240 (48 8)	1240 (48 8)	1240 (48 8)	1240 (48 8)
195 (7 7)	280 (11 0) 305 (12 0) ^{*8}	280 (11 0) 305 (12 0) ^{*8}	275 (10 8) 305 (12 0) ^{*8}	275 (10 8) 305 (12 0) ^{*8}	275 (10 8) 305 (12 0) ^{*8}
23°	32° 35° ^{*8}	32° 35° ^{*8}	32° 35° ^{*8}	32° 35° ^{*8}	32° 35° ^{*8}
19°	24° 26° ^{*8}	24° 26° ^{*8}	24° 26° ^{*8}	24° 26° ^{*8}	24° 26° ^{*8}
814 (1795)	885 (1950)	898 (1980)	932 (2055)	946 (2085)	957 (2110)
615 (1355)	624 (1375)	624 (1375)	658 (1450)	658 (1450)	653 (1440)
1429 (3150)	1508 (3325)	1522 (3355)	1590 (3505)	1603 (3535)	1610 (3550)
—	—	—	—	—	—
—	—	—	—	—	—
2040 (4500)	2315 (5100)	2315 (5100)	2315 (5100)	2315 (5100)	2315 (5100)
60 6 (160 13 3)	70 0 (18 5 15 4)	70 0 (18 5 15 4)	70 0 (18 5 15 4)	70 0 (18 5 15 4)	70 0 (18 5 15 4)
—	—	—	—	—	—
180 (112)	165 (103)	165 (103)	165 (103)	165 (103)	165 (103)
—	—	—	—	—	—
54 (34)	46 (29)	62 (39)	46 (29)	62 (39)	47 (29)
101 (63)	85 (53)	113 (70)	85 (53)	113 (70)	88 (55)
146 (91)	132 (82)	165 (103)	132 (82)	165 (103)	127 (79)
180 (112)	165 (103)	—	165 (103)	—	165 (103)
13 2 (43 3)	11 2 (36 7)	11 2 (36 7)	12 9 (42 3)	12 9 (42 3)	12 9 (42 3)
12 7 (41 7)	10 5 (34 4)	10 5 (34 4)	12 2 (40 0)	12 2 (40 0)	12 2 (40 0)
5VZ FE	3RZ FE	3RZ FE	3RZ FE	3RZ FE	5VZ FE
24 Valve DOHC	16 Valve DOHC	16 Valve DOHC	16 Valve DOHC	16 Valve DOHC	24 Valve DOHC
93 5 × 82 0 (3 68 × 3 23)	95 0 × 95 0 (3 74 × 3 74)	95 0 × 95 0 (3 74 × 3 74)	95 0 × 95 0 (3 74 × 3 74)	95 0 × 95 0 (3 74 × 3 74)	93 5 × 82 0 (3 68 × 3 23)
3378 (206 1)	2694 (164 3)	2694 (164 3)	2694 (164 3)	2694 (164 3)	3378 (206 1)
9 6 1	9 5 1	9 5 1	9 5 1	9 5 1	9 6 1
SFI	SFI	SFI	SFI	SFI	SFI
91 or more	91 or more	91 or more	91 or more	91 or more	91 or more
142 / 4800 (190@4800)	112 / 4800 (150@4800)	112 / 4800 (150@4800)	112 / 4800 (150@4800)	112 / 4800 (150@4800)	142 / 4800 (190@4800)
298 / 3600 (220@3600)	240 / 4000 (177@4000)	240 / 4000 (177@4000)	240 / 4000 (177@4000)	240 / 4000 (177@4000)	298 / 3600 (220@3600)
12 55	12 55	12 55	12 55	12 55	12 55
960	960	960	960	960	960
1 4	1 4 2 0 ^{*5}	1 4 2 0 ^{*5}	1 4 2 0 ^{*5}	1 4 2 0 ^{*5}	1 4
Dry Single Plate Diaphragm	Dry Single Plate Diaphragm	—	Dry Single Plate Diaphragm	—	Dry Single Plate Diaphragm
R150	W59	A340F	W59	A340F	R150F
3 830	3 954	2 804	3 954	2 804	3 830
2 062	2 141	1 531	2 141	1 531	2 062
1 436	1 384	1 000	1 384	1 000	1 436
1 000	1 000	0 705	1 000	0 705	1 000
0 838	0 810	—	0 810	—	0 838
4 220	4 091	2 393	4 091	2 393	4 220
—	1000 / 2 566	1000 / 2 566	1000 / 2 566	1000 / 2 566	1000 / 2 566
/ 3 153	3 909 / 3 909 4 300 / 4 300 ^{*8}	4 100 / 4 100 4 555 / 4 555 ^{*8}	3 909 / 3 909 4 300 / 4 300 ^{*8}	4 100 / 4 100 4 555 / 4 555 ^{*8}	3 909 / 3 909 4 100 / 4 100 ^{*8}
/ 8	7 5 / 8	7 5 / 8	7 5 / 8	7 5 / 8	7 5 / 8
Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
Single 10	Single 10	Single 10	Single 10	Single 10	Single 10
LSP and BV	LSP and BV	LSP and BV	LSP and BV	LSP and BV	LSP and BV
Double Wishbone coil	Double Wishbone coil	Double Wishbone coil	Double Wishbone coil	Double Wishbone coil	Double Wishbone coil
Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf
STD	STD	STD	STD	STD	STD
—	—	—	—	—	—
Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion
20 4	19 4	19 4	19 4	19 4	19 4
Integral Type	Integral Type	Integral Type	Integral Type	Integral Type	Integral Type

Area			U.S.A. and Canada			
Body Type			Extra Cab (4WD)	Double Cab (4WD)	Regular Cab (Pre Runner)	Extra Cab (Pre Runner)
Vehicle Grade			— SR5 ^{*5}	Limited ^{*5}	— SR5 ^{*5}	
Model Code			VZN170L CRPDKAB	VZN170L PRPDKAB	RZN191L TRPDKAB	RZN196L CRPDKAB
Major Dimensions & Vehicle Weights	Overall	Length mm (in.)	5155 (203 0)	5155 (203 0)	4685 (184 4)	5155 (203 0)
		Width mm (in.)	1690 (66 5) 1785 (70 3) ^{*5}	1785 (70 3)	1690 (66 5) 1785 (70 3) ^{*5}	1690 (66 5) 1785 (70 3) ^{*5}
		Height mm (in.)	1715 (67 5) ^{*1} 1745 (68 7) ^{*1 *8}	1715 (67 5) ^{*1} 1745 (68 7) ^{*1 *8 *9}	1720 (67 7) ^{*1} 1750 (68 9) ^{*1 *8}	1715 (67 5) ^{*1} 1745 (68 7) ^{*1 *8}
	Wheel Base	mm (in.)	3095 (121 9)	3095 (121 9)	2625 (103 3)	3095 (121 9)
	Tread	Front mm (in.)	1460 (57 5) 1500 (59 1) ^{*5}	1460 (57 5) 1500 (59 1) ^{*5}	1460 (57 5) 1500 (59 1) ^{*5}	1460 (57 5) 1500 (59 1) ^{*5}
		Rear mm (in.)	1455 (57 3) 1495 (58 9) ^{*5}	1455 (57 3) 1495 (58 9) ^{*5}	1455 (57 3) 1495 (58 9) ^{*5}	1455 (57 3) 1495 (58 9) ^{*5}
	Effective Head Room	Front mm (in.)	984 (38 7) 971 (38 2) ^{*4}	988 (38 9) 981 (38 6) ^{*1}	979 (38 5)	984 (38 7) 971 (38 2) ^{*4}
		Rear mm (in.)	884 (34 8)	961 (37 8)	—	884 (34 8)
	Effective Leg Room	Front mm (in.)	1088 (42 8)	1088 (42 8)	1059 (41 7)	1088 (42 8)
		Rear mm (in.)	690 (27 2)	858 (33 8)	—	690 (27 2)
	Shoulder Room	Front mm (in.)	1371 (54 0)	1371 (54 0)	1369 (53 9)	1371 (54 0)
		Rear mm (in.)	1329 (52 3)	1360 (53 5)	—	1329 (52 3)
	Cargo Space	Length mm (in.)	—	—	—	—
		Width mm (in.)	—	—	—	—
		Height mm (in.)	—	—	—	—
	Overhang	Front mm (in.)	820 (32 3)	820 (32 3)	820 (32 3)	820 (32 3)
		Rear mm (in.)	1240 (48 8)	1240 (48 8)	1240 (48 8)	1240 (48 8)
	Min. Running Ground Clearance	mm (in.)	275 (10 8) 305 (12 0) ^{*8}	255 (10 0) 285 (11 2)	280 (11 0) 305 (12 0) ^{*8}	275 (10 8) 305 (12 0) ^{*8}
	Angle of Approach	degrees	32° 35° ^{*8}	30° 33° ^{*8}	32° 35° ^{*8}	32° 35° ^{*8}
	Angle of Departure	degrees	24° 26° ^{*8}	23° 25° ^{*8}	24° 26° ^{*8}	24° 26° ^{*8}
	Curb Mass	Front kg (lb)	968 (2135)	996 (2195)	807 (1780)	853 (1880)
		Rear kg (lb)	653 (1440)	701 (1545)	612 (1350)	646 (1425)
		Total kg (lb)	1622 (3575)	1696 (3740)	1420 (3130)	1499 (3505)
	Gross Vehicle Mass	Front kg (lb)	—	—	—	—
		Rear kg (lb)	—	—	—	—
		Total kg (lb)	2315 (5100)	2315 (5100)	2315 (5100)	2315 (5100)
	Fuel Tank Capacity	L (U.S. gal.) Imp. gal.	70 0 (18 5 15 4)	70 0 (18 5 15 4)	70 0 (18 5 15 4)	70 0 (18 5 15 4)
	Luggage Compartment Capacity	m ³ (cu. ft.)	—	—	—	—
Performance	Max. Speed	km/h (mph)	165 (103)	165 (103)	165 (103)	165 (103)
	Max. Cruising Speed	km/h (mph)	—	—	—	—
	Max. Permissible Speed	1st Gear km/h (mph)	65 (40)	65 (40)	65 (40)	62 (39)
		2nd Gear km/h (mph)	119 (74)	119 (74)	119 (74)	113 (70)
		3rd Gear km/h (mph)	165 (103)	165 (103)	165 (103)	165 (103)
		4th Gear km/h (mph)	—	—	—	—
	Turning Diameter (Outside Front)	Wall to Wall m (ft.)	12.9 (42.3)	12.9 (42.3)	11.2 (36.7)	12.9 (42.3)
		Curb to Curb m (ft.)	12.2 (40.0)	12.2 (40.0)	10.5 (34.4)	12.2 (40.0)
Engine	Engine Type		5VZ FE	5VZ FE	3RZ FE	3RZ FE
	Valve Mechanism		24 Valve DOHC	24 Valve DOHC	16 Valve DOHC	16 Valve DOHC
	Bore × Stroke	mm (in.)	93.5 × 82.0 (3.68 × 3.23)	93.5 × 82.0 (3.68 × 3.23)	95.0 × 95.0 (3.74 × 3.74)	95.0 × 95.0 (3.74 × 3.74)
	Displacement	cm ³ (cu. in.)	3378 (206 1)	3378 (206 1)	2694 (164 3)	2694 (164 3)
	Compression Ratio		9.6 : 1	9.6 : 1	9.5 : 1	9.5 : 1
	Carburetor Type		SFI	SFI	SFI	SFI
	Research Octane No.	RON	91 or more	91 or more	91 or more	91 or more
	Max. Output (SAE NET)	kW/rpm (HP@rpm)	142 / 4800 (190@4800)	142 / 4800 (190@4800)	112 / 4800 (150@4800)	112 / 4800 (150@4800)
	Max. Torque (SAE NET)	N·m/rpm (lb·ft@rpm)	298 / 3600 (220@3600)	298 / 3600 (220@3600)	240 / 4000 (177@4000)	240 / 4000 (177@4000)
	Battery Capacity (5HR)	Voltage & Amp. hr	12 55	12 55	12 55	12 55
Engine Electrical	Alternator Output	Watts	960	960	960	960
	Starter Output	kW	1.4 1.8 ^{*5}	1.4 1.8 ^{*5}	1.4 2.0 ^{*5}	1.4 2.0 ^{*5}
Chassis	Clutch Type		—	—	—	—
	Transmission Type		A340F	A340F	A340E	A340E
	Transmission Gear Ratio	In First	2.804	2.804	2.804	2.804
		In Second	1.531	1.531	1.531	1.531
		In Third	1.000	1.000	1.000	1.000
		In Fourth	0.705	0.705	0.705	0.705
		In Fifth	—	—	—	—
		In Reverse	2.393	2.393	2.393	2.393
	Transfer Gear Ratio H4/H2		1.000 / 2.566	1.000 / 2.566	—	—
	Differential Gear Ratio (Front/Rear)		3.909 / 3.909 4.100 / 4.100 ^{*8}	3.909 / 3.909 4.100 / 4.100 ^{*8}	/ 3.909 4.300 ^{*8}	/ 4.100 4.555 ^{*8}
	Differential Gear Size (Front/Rear)	in	7.5 / 8	7.5 / 8	/ 8	/ 8
	Brake Type	Front	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
		Rear	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
	Parking Brake Type		Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
	Brake Booster Type and Size	in	Single 10	Single 10	Single 10	Single 10
	Proportioning Valve Type		LSP and BV	LSP and BV	LSP and BV	LSP and BV
	Suspension Type	Front	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil
		Rear	Rigid Leaf	Rigid Leaf	Rigid Leaf	Rigid Leaf
	Stabilizer Bar		STD	STD	STD	STD
	Steering Gear Type		Rack and Pinion	Rack and Pinion	Rack and Pinion	Rack and Pinion
	Steering Gear Ratio (Overall)		19.4	19.4	19.4	19.4
	Power Steering Type		Integral Type	Integral Type	Integral Type	Integral Type

*1 Unladen Vehicle

*2 With P235 / 70 R16 Tire

*3 With Rear Bumper

*4 With Moon Roof

*5 Option

*6 With ABS

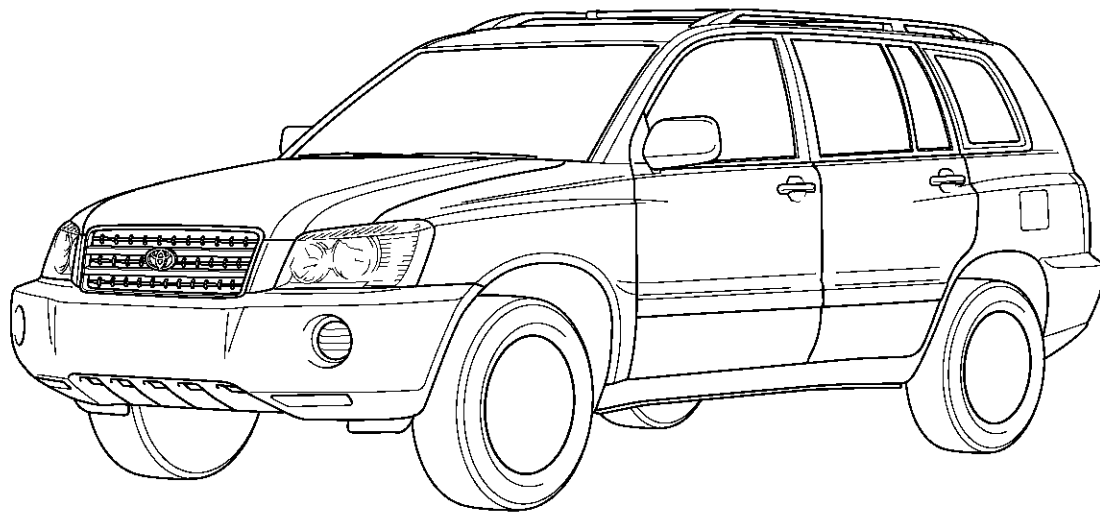
*7 With Power Steering

*8 With P265 / 70 R16 Tire

*9 With Roof Rack +65 mm (2.6 in.)

U S A and Canada			
Double Cab (Pre Runner)		Extra Cab (Pre Runner)	Double Cab (Pre Runner)
— SR5*5			
RZN196L PRPKAB		VZN195L CRPKAB	VZN195L PRPKAB
5	5155 (203 0)	5155 (203 0)	5155 (203 0)
	1785 (70 3)	1690 (66 5) 1785 (70 3)*5	1785 (70 3)
	1715 (67 5)*1 *9 1745 (68 7)*1 *8 *9	1720 (67 7)*1 1750 (68 9)*1 *8	1715 (67 5)*1 *9 1745 (68 7)*1 *8 *9
	3095 (121 9)	3095 (121 9)	3095 (121 9)
	1460 (57 5) 1500 (59 1)*5	1460 (57 5) 1500 (59 1)*5	1460 (57 5) 1500 (59 1)*5
10	1455 (57 3) 1495 (58 9)*5	1455 (57 3) 1495 (58 9)*5	1455 (57 3) 1495 (58 9)*5
	998 (38 9) 981 (38 6)*4	984 (38 7) 971 (38 2)*4	988 (38 9) 981 (38 6)*4
	961 (37 8)	884 (34 8)	961 (37 8)
	1088 (42 8)	1088 (42 8)	1088 (42 8)
	858 (33 8)	690 (27 2)	858 (33 8)
15	1371 (54 0)	1371 (54 0)	1371 (54 0)
	1360 (53 5)	1329 (52 3)	1360 (53 5)
	—	—	—
	—	—	—
	—	—	—
20	820 (32 3)	820 (32 3)	820 (32 3)
	1240 (48 8)	1240 (48 8)	1240 (48 8)
	255 (10 0) 285 (11 2)*8	275 (10 8) 305 (12 0)*8	255 (10 0) 285 (11 2)*8
	30° 33°*8	32° 35°*8	30° 33°*8
	23° 25°*8	24° 26°*8	23° 25°*8
25	878 (1935)	878 (1935)	902 (1990)
	694 (1530)	642 (1415)	689 (1520)
	1572 (3465)	1520 (3350)	1592 (3510)
	—	—	—
	—	—	—
30	2315 (5100)	2315 (5100)	2315 (5100)
	70 0 (18 5 15 4)	70 0 (18 5 15 4)	70 0 (18 5 15 4)
	—	—	—
	165 (103)	165 (103)	165 (103)
	—	—	—
35	62 (39)	65 (40)	65 (40)
	113 (70)	119 (74)	119 (74)
	165 (103)	165 (103)	165 (103)
	—	—	—
	12 9 (42 3)	12 9 (42 3)	12 9 (42 3)
40	12 2 (40 0)	12 2 (40 0)	12 2 (40 0)
	3RZ FE	5VZ FE	5VZ FE
	16 Valve DOHC	24 Valve DOHC	24 Valve DOHC
	93 0 × 95 0 (3 74 × 3 74)	93 5 × 82 0 (3 68 × 3 23)	93 5 × 82 0 (3 68 × 3 23)
	2694 (164 3)	3378 (206 1)	3378 (206 1)
45	9 5 1	9 6 1	9 6 1
	SFI	SFI	SFI
	91 or more	91 or more	91 or more
	112 / 4800 (150@4800)	142 / 4800 (190@4800)	142 / 4800 (190@4800)
	240 / 4000 (177@4000)	298 / 3600 (220@3600)	298 / 3600 (220@3600)
50	12 55	12 55	12 55
	960	960	960
	1 4 2 0*5	1 4 1 8*5	1 4 1 8*5
	—	—	—
	A340E	A340E	A340E
55	2 804	2 804	2 804
	1 531	1 531	1 531
	1 000	1 000	1 000
	0 705	0 705	0 705
	—	—	—
60	2 393	2 393	2 393
	—	—	—
	/ 4 100 4 555*8	/ 3 900 4 100*2	/ 3 900 4 100*2
	/ 8	/ 8	/ 8
	Ventilated Disc	Ventilated Disc	Ventilated Disc
65	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
	Single 10	Single 10	Single 10
	LSP and BV	LSP and BV	LSP and BV
	Double Wishbone Coil	Double Wishbone Coil	Double Wishbone Coil
70	Rigid Leaf	Rigid Leaf	Rigid Leaf
	STD	STD	STD
	—	—	—
	Rack and Pinion	Rack and Pinion	Rack and Pinion
	19 4	19 4	19 4
75	Integral Type	Integral Type	Integral Type

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OUTLINE OF NEW FEATURES

The following changes are made for the 2003 model year.

1. 1MZ-FE Engine

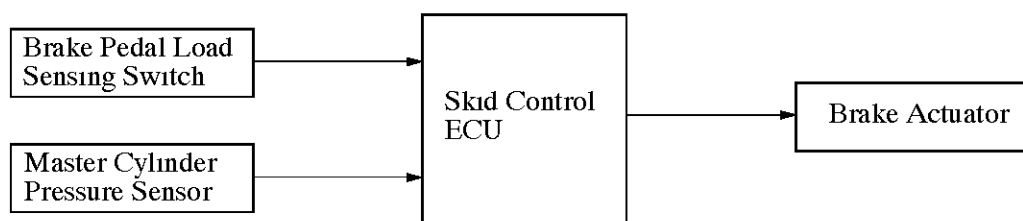
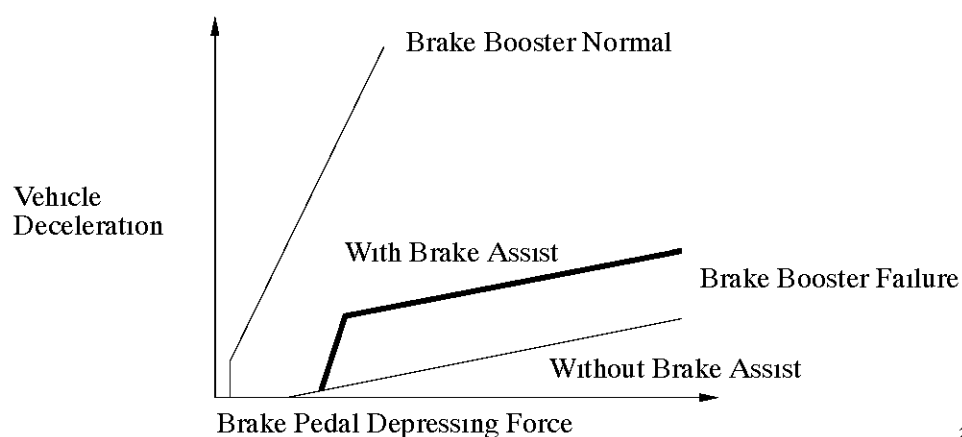
To comply with the OBD-II (On-Board Diagnosis II) regulations, all the DTC (Diagnostic Trouble Code) have been made to correspond to the SAE controlled codes. For details, refer to 2003 General Features section.

2. Brake

- In the brake assist function of the brake control system, which is standard equipment on all models, a logic for detecting a brake booster failure has been added in order to increase the amount of brake force in the event the brake booster fails.
- Along with the aforementioned change, a brake pedal load sensing switch, which detects the amount of effort that is applied to the brake pedal, has been provided on the brake pedal.

► Effectiveness of the Brake Assist Operation (brake booster fails) ◀

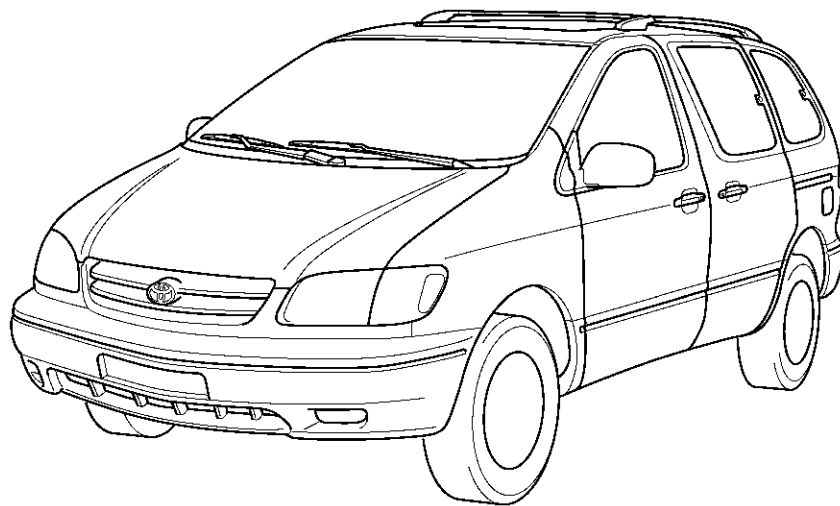
If worst comes to worst and the brake booster has failed, it is necessary for a driver to apply more brake depressing force than usual. However, in this system, the skid control ECU detects the failure of the brake booster and actuates the brake actuator to assist the driver's brake depressing force.



MAJOR TECHNICAL SPECIFICATIONS

Item				Area		U.S.A. and Canada							
Body Type				5 Door Wagon									
Vehicle Grade				—									
Model Code				ACU20L BWPNKA		ACU25L BWPNKA		MCU20L BWPNKA		ACU25L BWPNKA			
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	4685 (184.4)		4685 (184.4)		4685 (184.4)		4685 (184.4)		5	
		Width	mm (in.)	1825 (71.9)		1825 (71.9)		1825 (71.9)		1825 (71.9)			
		Height*1	mm (in.)	1670 (65.7)*1 1725 (67.9)*2		1680 (66.1)*1 1735 (68.3)*1 *2		1670 (65.7)*1 1725 (67.9)*1 *2		1680 (66.1)*1 1735 (68.3)*1 *2			
	Wheel Base		mm (in.)	2715 (106.9)		2715 (106.9)		2715 (106.9)		2715 (106.9)		10	
	Tread	Front	mm (in.)	1580 (62.2)		1575 (62.0)		1580 (62.2)		1575 (62.0)			
		Rear	mm (in.)	1565 (61.6)		1555 (61.2)		1565 (61.6)		1555 (61.2)			
	Effective Head Room	Front	mm (in.)	1017 (40.0) 980 (38.6)*3		1017 (40.0) 980 (38.6)*3		1017 (40.0) 980 (38.6)*3		1017 (40.0) 980 (38.6)*3		15	
		Rear	mm (in.)	1012 (39.8) 988 (38.9)*3		1012 (39.8) 988 (38.9)*3		1012 (39.8) 988 (38.9)*3		1012 (39.8) 988 (38.9)*3			
	Effective Leg Room	Front	mm (in.)	1035 (40.7)		1035 (40.7)		1035 (40.7)		1035 (40.7)		20	
		Rear	mm (in.)	925 (36.4)		925 (36.4)		925 (36.4)		925 (36.4)			
	Shoulder Room	Front	mm (in.)	1470 (57.9)		1470 (57.9)		1470 (57.9)		1470 (57.9)		25	
		Rear	mm (in.)	1448 (57.0)		1448 (57.0)		1448 (57.0)		1448 (57.0)			
	Overhang	Front	mm (in.)	920 (36.2)		920 (36.2)		920 (36.2)		920 (36.2)		30	
		Rear	mm (in.)	1050 (41.3)		1050 (41.3)		1050 (41.3)		1050 (41.3)			
	Min. Running Ground Clearance		mm (in.)	175 (6.9)		185 (7.3)		175 (6.9)		185 (7.3)		35	
	Angle of Approach		degrees	27°		28°		27°		28°			
	Angle of Departure		degrees	21°		22°		21°		22°			
	Curb Mass	Front	kg (lb)	915 (2017)		955 (2105)		990 (2183)		1025 (2260)		40	
		Rear	kg (lb)	665 (1466)		730 (1610)		670 (1477)		735 (1620)			
		Total	kg (lb)	1580 (3483)		1685 (3715)		1660 (3660)		1760 (3880)			
	Gross Vehicle Mass	Front	kg (lb)	1150 (2540)		—		—		—		45	
		Rear	kg (lb)	1110 (2445)		—		—		—			
		Total	kg (lb)	2260 (4985)		2260 (4985)		2260 (4985)		2260 (4985)			
	Fuel Tank Capacity		L (U.S. gal) Imp. gal.	75 (19.8 16.5)		75 (19.8 16.5)		75 (19.8 16.5)		75 (19.8 16.5)		50	
	Luggage Compartment Capacity		m ³ (cu ft)	—		—		—		—			
Performance	Max. Speed		km/h (mph)	180 (112)		180 (112)		180 (112)		180 (112)		55	
	Max. Cruising Speed		km/h (mph)	180 (112)		180 (112)		180 (112)		180 (112)			
	Acceleration	0 to 100 km/h	sec	10.8		11.3		8.5		8.8		60	
		0 to 400 m	sec	17.7		18		16.4		16.6			
	Max. Permissible Speed	1st Gear	km/h (mph)	69 (43)		62 (39)		70 (44)		65 (40)			
		2nd Gear	km/h (mph)	123 (76)		111 (69)		125 (78)		117 (73)			
		3rd Gear	km/h (mph)	180 (112)		172 (107)		180 (112)		180 (112)			
		4th Gear	km/h (mph)	—		—		—		—			
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)	6.2 (20.3)		6.2 (20.3)		6.2 (20.3)		6.2 (20.3)		65	
		Curb to Curb	m (ft)	5.9 (19.4)		5.9 (19.4)		5.9 (19.4)		5.9 (19.4)			
Engine	Engine Type		2AZ FE		2AZ FE		1MZ FE		1MZ FE		70		
	Valve Mechanism		16 Valve DOHC		16 Valve DOHC		24 Valve DOHC		24 Valve DOHC				
	Bore × Stroke		mm (in.)	88.5 × 96.0 (3.48 × 3.78)		88.5 × 96.0 (3.48 × 3.78)		87.5 × 83.0 (3.44 × 3.27)		87.5 × 83.0 (3.44 × 3.27)		75	
	Displacement		cm ³ (cu in.)	2362 (144.2)		2362 (144.2)		2995 (182.8)		2995 (182.8)			
	Compression Ratio			9.6 : 1		9.6 : 1		10.5 : 1		10.5 : 1			
	Carburetor Type			SFI		SFI		SFI		SFI		80	
	Research Octane No.		RON	91 or more		91 or more		91 or more		91 or more			
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	115 / 5600 (155@5600)		115 / 5600 (155@5600)		164 / 5800 (220@5800)		164 / 5800 (220@5800)			
Max. Torque (SAE NET)		N·m/rpm (lb ft@rpm)	221 / 4000 (163@4000)		221 / 4000 (163@4000)		301 / 4400 (222@4400)		301 / 4400 (222@4400)		85		
Battery Capacity (5HR)		Voltage & Amp. hr	12 55		12 55		12 55		12 55				
Alternator Output		Watts	1200 1560*4		1200 1560*4		1200 1560*4		1200 1560*4				
Starter Output		kW	1.4		1.4		1.4		1.4		90		
Clutch Type			—		—		—		—				
Transmission Type			U241E		U140F		U140E		U140F				
Chassis	Transmission Gear Ratio	In First		3.943		3.938		3.938		3.938		95	
		In Second		2.197		2.194		2.194		2.194			
		In Third		1.413		1.411		1.411		1.411			
		In Fourth		1.020		1.019		1.019		1.019			
		In Reverse		3.145		3.141		3.141		3.141			
	Counter Gear Ratio			—		—		—		—		100	
	Differential Gear Ratio (Final)			3.120		3.478		3.080		3.291			
	Rear Differential Gear Ratio			—		2.928		—		2.928			
	Rear Differential Gear Size			—		6.7		—		6.7			
	Brake Type	Front		Ventilated Disc		Ventilated Disc		Ventilated Disc		Ventilated Disc		105	
		Rear		Solid Disc		Solid Disc		Solid Disc		Solid Disc			
	Parking Brake Type			Duo Servo Drum		Duo Servo Drum		Duo Servo Drum		Duo Servo Drum		110	
	Brake Booster Type and Size		in	Single 10		Single 10		Single 10		Single 10			
	Proportioning Valve Type			—		—		—		—			
	Suspension Type	Front		MacPherson Strut		MacPherson Strut		MacPherson Strut		MacPherson Strut		115	
Rear			MacPherson Strut		MacPherson Strut		MacPherson Strut		MacPherson Strut				
Stabilizer Bar	Front		STD		STD		STD		STD		120		
	Rear		STD		STD		STD		STD				
Steering Gear Type			Rack & Pinion		Rack & Pinion		Rack & Pinion		Rack & Pinion		125		
Steering Gear Ratio (Overall)			16:1		16:0		16:1		16:0				
Power Steering Type			Integral Type		Integral Type		Integral Type		Integral Type				

SIENNA



191SI01

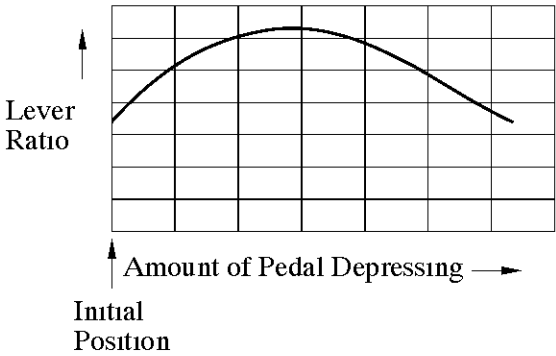
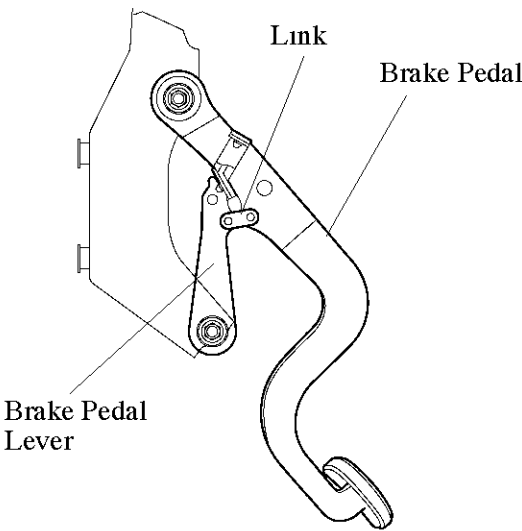
SIENNA

OUTLINE OF NEW FEATURES

The following changes are made for the 2003 model year.

Brake

- A double-link type brake pedal is used to provide an excellent brake feeling. This brake pedal has adopted a construction in which the brake pedal and pedal lever are jointed by a link to vary the lever ratio.
 - When a small or medium amount of pressure is applied at the initial position of the pedal, the lever ratio is increased in order to reduce the pedal effort.
 - When a large amount of pressure is applied at the initial position of the pedal, the lever ratio is decreased in order to provide an ample pedal response.



228SI01

- The type and the specifications of the brake booster and the master cylinder have been changed as follows:

Item		'03 Model	'02 Model
Master Cylinder	Type	Tandem	←
	Diameter mm (in.)	20.64 (0.81)	25.4 (1.00)
Brake Booster	Type	Single	Tandem
	Size in.	9"	8"+9"

MAJOR TECHNICAL SPECIFICATIONS

Item				Area		U S A		Canada			
Body Type				5 Door Wagon							
Vehicle Grade				CE		LE LXE		CE		LE LXE	
Model Code				MCL10L PFSDKA		MCL10L PFSGKA		MCL10L PFSDKK		MCL10L PFSGKK	
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	4930 (194 1)		4930 (194 1)		4930 (194 1)		4930 (194 1)	
		Width	mm (in.)	1865 (73 4)		1865 (73 4)		1865 (73 4)		1865 (73 4)	
		Height	mm (in.)	1710 (67 3)* ¹		1710 (67 3)* ¹		1710 (67 3)* ¹		1710 (67 3)* ¹	
	Wheel Base		mm (in.)	2900 (114 2)		2900 (114 2)		2900 (114 2)		2900 (114 2)	
	Tread	Front	mm (in.)	1565 (61 6)		1565 (61 6)		1565 (61 6)		1565 (61 6)	
		Rear	mm (in.)	1610 (63 4)		1610 (63 4)		1610 (63 4)		1610 (63 4)	
	Effective Head Room	Front	mm (in.)	1032 (40 6)		1032 (40 6)		1032 (40 6)		1032 (40 6)	
		Rear	mm (in.)	1034 (40 7)		1034 (40 7)* ² 1001 (39 4)* ³		1034 (40 7)		1034 (40 7)* ² 1001 (39 4)* ³	
	Effective Leg Room	Front	mm (in.)	1066 (42 0)		1066 (42 0)		1066 (42 0)		1066 (42 0)	
		Rear	mm (in.)	926 (36 5)		926 (36 5)* ² 932 (36 7)* ³		926 (36 5)		926 (36 5)* ² 932 (36 7)* ³	
	Shoulder Room	Front	mm (in.)	1535 (60 4)		1535 (60 4)		1535 (60 4)		1535 (60 4)	
		Rear	mm (in.)	1578 (62 1)		1578 (62 1)		1578 (62 1)		1578 (62 1)	
	Cargo Space	Length	mm (in.)	401 (15 8)		401 (15 8)		401 (15 8)		401 (15 8)	
		Width	mm (in.)	1210 (47 6)		1210 (47 6)		1210 (47 6)		1210 (47 6)	
		Height	mm (in.)	1044 (41 4)		1044 (41 4)		1044 (41 4)		1044 (41 4)	
	Overhang	Front	mm (in.)	970 (38 2)		970 (38 2)		970 (38 2)		970 (38 2)	
		Rear	mm (in.)	1060 (41 7)		1060 (41 7)		1060 (41 7)		1060 (41 7)	
	Min. Running Ground Clearance		mm (in.)	150 (5 9)		150 (5 9)		150 (5 9)		150 (5 9)	
	Angle of Approach		degrees	17°		17°		17°		17°	
	Angle of Departure		degrees	17°		17°		17°		17°	
	Curb Mass	Front	kg (lb)	1025 (2260)		1030 (2271)* ⁴		1025 (2260)		1030 (2271)	
		Rear	kg (lb)	735 (1620)		735 (1620)		735 (1620)		735 (1620)	
		Total	kg (lb)	1760 (3880)		1765 (3891)* ⁴		1760 (3880)		1765 (3891)	
	Gross Vehicle Mass	Front	kg (lb)	—		—		—		—	
		Rear	kg (lb)	—		—		—		—	
		Total	kg (lb)	2380 (5247)		2380 (5247)		2380 (5247)		2380 (5247)	
	Fuel Tank Capacity		L (U S gal) Imp gal	79 (20 9 17 4)		79 (20 9 17 4)		79 (20 9 17 4)		79 (20 9 17 4)	
	Luggage Compartment Capacity		m ³ (cu ft)	—		—		—		—	
Performance	Max. Speed		km/h (mph)	170 (105)		170 (105)		170 (105)		170 (105)	
	Max. Cruising Speed		km/h (mph)	170 (105)		170 (105)		170 (105)		170 (105)	
	Max. Permissible Speed	1st Gear	km/h (mph)	64 (40)		64 (40)		64 (40)		64 (40)	
		2nd Gear	km/h (mph)	120 (74)		120 (74)		120 (74)		120 (74)	
		3rd Gear	km/h (mph)	—		—		—		—	
		4th Gear	km/h (mph)	—		—		—		—	
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)	—		—		—		—	
Curb to Curb		m (ft)	12.2 (40)		12.2 (40)		12.2 (40)		12.2 (40)		
Engine	Engine Type		1MZ FE		1MZ FE		1MZ FE		1MZ FE		
	Valve Mechanism		24 Valve DOHC		24 Valve DOHC		24 Valve DOHC		24 Valve DOHC		
	Bore × Stroke		mm (in.)	87.5 × 83.0 (3.44 × 3.27)		87.5 × 83.0 (3.44 × 3.27)		87.5 × 83.0 (3.44 × 3.27)		87.5 × 83.0 (3.44 × 3.27)	
	Displacement		cm ³ (cu in.)	2995 (182.8)		2995 (182.8)		2995 (182.8)		2995 (182.8)	
	Compression Ratio		10.5 : 1		10.5 : 1		10.5 : 1		10.5 : 1		
	Carburetor Type		SFI		SFI		SFI		SFI		
	Research Octane No.		RON	91 or more		91 or more		91 or more		91 or more	
	Max. Output (SAE NET)		kW/rpm (HP@rpm)	156 / 5800 (210@5800)		156 / 5800 (210@5800)		145 / 5200 (194@5200)		145 / 5200 (194@5200)	
	Max. Torque (SAE NET)		N m/rpm (lb ft@rpm)	298 / 4400 (220@4400)		298 / 4400 (220@4400)		283 / 4400 (209@4400)		283 / 4400 (209@4400)	
Engine Electrical	Battery Capacity (5HR)		Voltage & Amp hr	12 55		12 55		12 55		12 55	
	Alternator Output		Watts	1200		1200		1200		1200	
	Starter Output		kW	1.4		1.4		1.4		1.4	
Chassis	Clutch Type		—		—		—		—		
	Transmission Type		A541E		A541E		A541E		A541E		
	Transmission Gear Ratio	In First	2.810		2.810		2.810		2.810		
		In Second	1.549		1.549		1.549		1.549		
		In Third	1.000		1.000		1.000		1.000		
		In Fourth	0.735		0.735		0.735		0.735		
		In Fifth	—		—		—		—		
		In Reverse	2.296		2.296		2.296		2.296		
	Counter Gear Ratio		0.945		0.945		0.945		0.945		
	Differential Gear Ratio (Final)		3.933		3.933		3.933		3.933		
	Brake Type	Front	Ventilated Disc		Ventilated Disc		Ventilated Disc		Ventilated Disc		
		Rear	Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		
	Parking Brake Type		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		Leading Trailing Drum		
	Brake Booster Type and Size		in	Tandem 8 + 9		Tandem 8 + 9		Tandem 8 + 9		Tandem 8 + 9	
	Proportioning Valve Type		Dual P Valve		Dual P Valve		Dual P Valve		Dual P Valve		
	Suspension Type	Front	MacPherson Strut		MacPherson Strut		MacPherson Strut		MacPherson Strut		
		Rear	Torsion Beam		Torsion Beam		Torsion Beam		Torsion Beam		
Stabilizer Bar	Front	STD		STD		STD		STD			
	Rear	—		—		—		—			
Steering Gear Type		Rack and Pinion		Rack and Pinion		Rack and Pinion		Rack and Pinion			
Steering Gear Ratio (Overall)		17.4		17.4		17.4		17.4			
Power Steering Type		Integral Type		Integral Type		Integral Type		Integral Type			

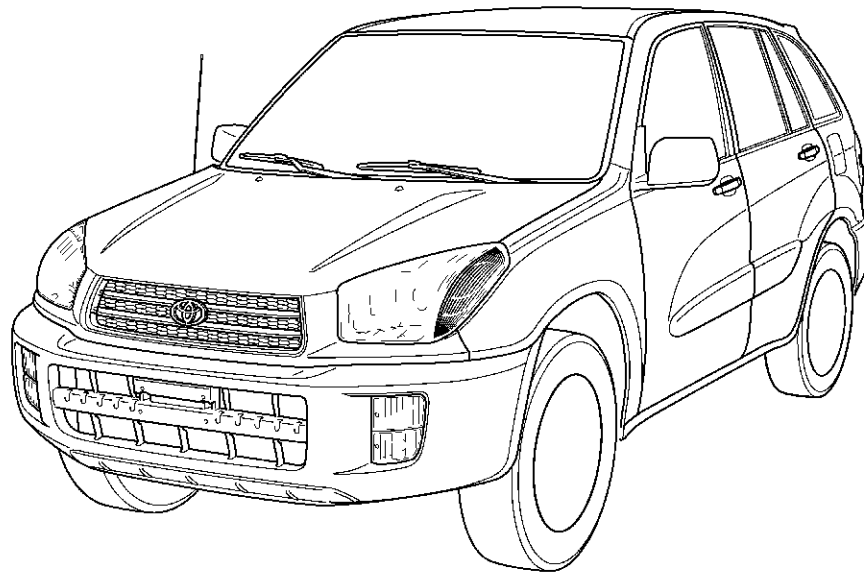
*1 Unladen Vehicle

*3 Captain Seat

*2 Bench Seat

*4 California Specification Model

RAV4



214RA01

RAV4

OUTLINE OF NEW FEATURES

The following changes are made for the 2003 model year.

Brake

The specifications of the brake master cylinder has been changed as follows:

Item		'03 Model	'02 Model
Master Cylinder	Type	Tandem	←
	Diameter mm (in.)	20.64 (0.81)	22.22 (0.87)

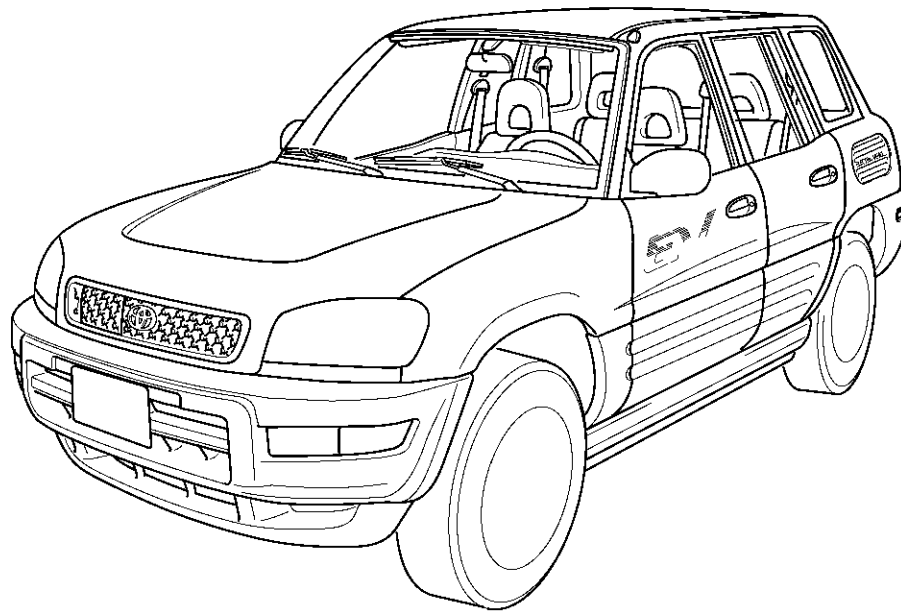
MAJOR TECHNICAL SPECIFICATIONS

Item			U S A			
Body Type			Wagon			
Vehicle Grade			Standard			
Model Code			ACA21L AWMNKA	ACA21L AWPNKA	ACA26L AWMNKA	ACA26L AWPNKA
Major Dimensions & Vehicle Weights	Overall	Length mm (in)	4195 (165 2) 4210 (165 7)*1	4195 (165 2) 4210 (165 7)*1	4195 (165 2)	4195 (165 2)
		Width mm (in)	1735 (68 3) 1785 (70 3)*1	1735 (68 3) 1785 (70 3)*1	1735 (68 3)	1735 (68 3)
		Height* mm (in)	1660 (65 4) 1650 (65 0)*1	1660 (65 4) 1650 (65 0)*1	1650 (65 0)	1650 (65 0)
	Wheel Base mm (in)		2490 (98 0)	2490 (98 0)	2490 (98 0)	2490 (98 0)
	Tread	Front mm (in)	1505 (59 3) 1525 (60 0)*1	1505 (59 3) 1525 (60 0)*1	1510 (59 4)	1510 (59 4)
		Rear mm (in)	1495 (58 9) 1520 (59 8)*1	1495 (58 9) 1520 (59 8)*1	1500 (59 1)	1500 (59 1)
	Effective Head Room	Front mm (in)	1048 (41 3)*2 1033 (40 7)*3 1007 0 (39 5)*2 *4 991 8 (39 0)*3 *4	1048 (41 3)*2 1033 (40 7)*3 1007 0 (39 5)*2 *4 991 8 (39 0)*3 *4	1048 (41 3)*2 1033 (40 7)*3 1007 0 (39 5)*2 *4 991 8 (39 0)*3 *4	1048 (41 3)*2 1033 (40 7)*3 1007 0 (39 5)*2 *4 991 8 (39 0)*3 *4
		Rear mm (in)	970 (38 2)	970 (38 2)	970 (38 2)	970 (38 2)
	Effective Leg Room	Front mm (in)	1076 (42 4)*2 1067 (42 0)*3	1076 (42 4)*2 1067 (42 0)*3	1076 (42 4)*2 1067 (42 0)*3	1076 (42 4)*2 1067 (42 0)*3
		Rear mm (in)	827 (32 6)*5 848 (32 6)*6	827 (32 6)*5 848 (32 6)*6	827 (32 6)*5 848 (32 6)*6	827 (32 6)*5 848 (32 6)*6
	Shoulder Room	Front mm (in)	1375 (54 1)	1375 (54 1)	1375 (54 1)	1375 (54 1)
		Rear mm (in)	1364 (53 7)	1364 (53 7)	1364 (53 7)	1364 (53 7)
	Overhang	Front mm (in)	760 (29 9)	760 (29 9)	760 (29 9)	760 (29 9)
		Rear mm (in)	945 (37 2) 960 (37 8)*1	945 (37 2) 960 (37 8)*1	960 (37 8)	960 (37 8)
	Min. Running Ground Clearance mm (in)		170 (6 7) 160 (6 3)*1	170 (6 7) 160 (6 3)*1	160 (6 3)	160 (6 3)
	Angle of Approach degrees		28° 27°*1	28° 27°*1	27°	27°
	Angle of Departure degrees		29° 28°*1	29° 28°*1	28°	28°
	Curb Mass	Front kg (lb)	735 (1620) 740 (1631)*1	735 (1620) 740 (1631)*1	685 (1510)	715 (1576)
		Rear kg (lb)	570 (1257) 580 (1279)*1	570 (1257) 580 (1279)*1	545 (1202)	545 (1202)
		Total kg (lb)	1305 (2877) 1320 (2910)*1	1305 (2877) 1320 (2910)*1	1230 (2712)	1260 (2778)
Performance	Gross Vehicle Mass	Front kg (lb)	893 (1969)	893 (1969)	867 (1911)	867 (1911)
		Rear kg (lb)	916 (2019)	916 (2019)	921 (2030)	921 (2030)
		Total kg (lb)	1809 (3988)	1809 (3988)	1790 (3946)	1790 (3946)
	Fuel Tank Capacity L (U S gal Imp gal)		56 (14 8 12 3)	56 (14 8 12 3)	56 (14 8 12 3)	56 (14 8 12 3)
	Luggage Compartment Capacity m ³ (cu ft)		—	—	—	—
	Max. Speed km/h (mph)		180 (112)	175 (109)	180 (112)	175 (109)
	Max. Cruising Speed km/h (mph)		145 (90)	140 (87)	145 (90)	140 (87)
	Acceleration	0 to 100 km/h sec	10 5	10 7	10 4	10 6
		0 to 400 m sec	17 4	18 2	17 2	17 9
	Max. Permissible Speed	1st Gear km/h (mph)	47 (29) 46 (29)*1	63 (39) 62 (38)*1	50 (31)	66 (41)
		2nd Gear km/h (mph)	87 (54) 85 (53)*1	113 (70) 110 (68)*1	94 (58)	119 (74)
		3rd Gear km/h (mph)	134 (83) 131 (81)*1	—	144 (89)	—
		4th Gear km/h (mph)	—	—	—	—
	Turning Diameter (Outside Front)	Wall to Wall m (ft)	11 2 (36 7)	11 2 (36 7)	11 2 (36 7)	11 2 (36 7)
		Curb to Curb m (ft)	10 8 (35 4)	10 8 (35 4)	10 8 (35 4)	10 8 (35 4)
Engine	Engine Type		1AZ FE	1AZ FE	1AZ FE	1AZ FE
	Valve Mechanism		16 Valve DOHC	16 Valve DOHC	16 Valve DOHC	16 Valve DOHC
	Bore × Stroke mm (in)		86 0 × 86 0 (3 39 × 3 39)	86 0 × 86 0 (3 39 × 3 39)	86 0 × 86 0 (3 39 × 3 39)	86 0 × 86 0 (3 39 × 3 39)
	Displacement cm ³ (cu in)		1998 (121 9)	1998 (121 9)	1998 (121 9)	1998 (121 9)
	Compression Ratio		9 8 1	9 8 1	9 8 1	9 8 1
	Carburetor Type		SFI	SFI	SFI	SFI
	Research Octane No. RON		91 or more	91 or more	91 or more	91 or more
	Max. Output (SAE NET) kW/rpm (HP@rpm)		110 / 6000 (148@6000)	110 / 6000 (148@6000)	110 / 6000 (148@6000)	110 / 6000 (148@6000)
Engine Electrical	Max. Torque (SAE NET) N m/rpm (lb ft@rpm)		192 / 4000 (142@4000)	192 / 4000 (142@4000)	192 / 4000 (142@4000)	192 / 4000 (142@4000)
	Battery Capacity (SHR)	Voltage & Amp hr	12 36 52*8	12 36 52*8	12 36 52*8	12 36 52*8
		Watts	1080	1080	1080	1080
		kW	1 2 1 4*8	1 2 1 4*8	1 2 1 4*8	1 2 1 4*8
Chassis	Clutch Type		Dry Single Plate Diaphragm	—	Dry Single Plate Diaphragm	—
	Transaxle Type		E352F	U140F	E352	U241E
	Transmission Gear Ratio	In First	3 833	3 938	3 833	3 943
		In Second	2 045	2 194	2 045	2 197
		In Third	1 333	1 411	1 333	1 413
		In Fourth	1 028	1 019	1 028	1 020
		In Fifth	0 820	—	0 820	—
		In Reverse	3 583	3 141	3 583	3 145
	Counter Gear Ratio		—	—	—	—
	Differential Gear Ratio (Final)		4 562	3 291	4 235	3 120
	Transfer and Rear Differential Gear Ratio		2 928	2 928	—	—
	Rear Differential Gear Size in		6 7	6 7	—	—
	Brake Type	Front	Ventilated Disc	Ventilated Disc	Ventilated Disc	Ventilated Disc
		Rear	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum	Leading Trailing Drum
	Parking Brake Type		Duo Servo Drum	Duo Servo Drum	Duo Servo Drum	Duo Servo Drum
	Brake Booster Type and Size in		Single 10	Single 10	Single 10	Single 10
	Proportioning Valve Type		PV*7	PV*7	PV*7	PV*7
	Suspension Type	Front	MacPherson Strut	MacPherson Strut	MacPherson Strut	MacPherson Strut
		Rear	Double Wishbone	Double Wishbone	Double Wishbone	Double Wishbone
	Stabilizer Bar	Front	STD	STD	STD	STD
		Rear	STD	STD	STD	STD
	Steering Gear Type		Rack & Pinion	Rack & Pinion	Rack & Pinion	Rack & Pinion
	Steering Gear Ratio (Overall)		16 0	16 0	16 0	16 0
	Power Steering Type		Integral Type	Integral Type	Integral Type	Integral Type

*1 With P235 / 60 R15 Tire *6 LH Seat
*2 Driver's Seat *7 Without ABS
*3 Passenger's Seat
*4 With Moon Roof
*5 RH Seat

	U S A	
	Wagon	
	Standard	
	ACA21L AWMNKK	ACA21L AWPNNK
5	4195 (165 2) 4210 (165 7)* ¹	4195 (165 2) 4210 (165 7)* ¹
	1735 (68 3) 1785 (70 3)* ¹	1735 (68 3) 1785 (70 3)* ¹
	1660 (65 4) 1650 (65 0)* ¹	1660 (65 4) 1650 (65 0)* ¹
	2490 (98 0)	2490 (98 0)
	1505 (59 3) 1525 (60 0)* ¹	1505 (59 3) 1525 (60 0)* ¹
10	1495 (58 9) 1520 (59 8)* ¹	1495 (58 9) 1520 (59 8)* ¹
	1048 (41 3)* ² 1033 (40 7)* ³	1048 (41 3)* ² 1033 (40 7)* ³
	1007.0 (38 5)* ² 991.8 (38 0)* ³ 970 (38 2)	1007.0 (38 5)* ² 991.8 (38 0)* ³ 970 (38 2)
	1076 (42.4)* ² 1067 (42.0)* ³	1076 (42.4)* ² 1067 (42.0)* ³
	827 (32.6)* ⁵ 848 (32 6)* ⁶	827 (32.6)* ⁵ 848 (32 6)* ⁶
15	1375 (54 1)	1375 (54 1)
	1364 (53 7)	1364 (53 7)
	760 (29 9)	760 (29 9)
	945 (37 2) 960 (37 8)* ¹	945 (37 2) 960 (37 8)* ¹
	170 (6 7) 160 (6 3)* ¹	170 (6 7) 160 (6 3)* ¹
20	28° 27°* ¹	28° 27°* ¹
	29° 28°* ¹	29° 28°* ¹
	740 (163 1) 745 (164 2)* ¹	770 (169 8) 775 (170 9)* ¹
	570 (125 7) 580 (127 9)* ¹	570 (125 7) 580 (127 9)* ¹
	1310 (28 88) 1325 (29 21)* ¹	1340 (29 54) 1355 (29 87)* ¹
25	893 (196 9)	893 (196 9)
	916 (20 19)	916 (20 19)
	180 9 (39 88)	180 9 (39 88)
	56 (14 8 12 3)	56 (14 8 12 3)
	—	—
30	180 (11 2)	175 (10 9)
	145 (9 0)	140 (8 7)
	10 5	10 7
	17 4	18 2
	47 (29) 46 (29)* ¹	63 (39) 62 (38)* ¹
35	87 (54) 85 (53)* ¹	113 (70) 110 (68)* ¹
	134 (83) 131 (81)* ¹	—
	—	—
	11 2 (36 7)	11 2 (36 7)
	—	—
40	1AZ FE	1AZ FE
	16 Valve DOHC	16 Valve DOHC
	86 0 × 86 0 (3 39 × 3 39)	86 0 × 86 0 (3 39 × 3 39)
	1998 (121 9)	1998 (121 9)
	9 8 1	9 8 1
45	SFI	SFI
	91 or more	91 or more
	110 / 6000 (148@6000)	110 / 6000 (148@6000)
	192 / 4000 (142@4000)	192 / 4000 (142@4000)
	12 36 52* ⁸	12 36 52* ⁸
50	1080	1080
	1 2, 1 4* ⁸	1 2, 1 4* ⁸
	Dry Single Plate Diaphragm	—
	E352	U140F
	3 833	3 938
55	2 045	2 194
	1 333	1 411
	1 028	1 019
	0 820	—
	3 583	3 141
60	—	—
	4 235	3 291
	2 928	2 928
	—	—
	Ventilated Disc	Ventilated Disc
65	Leading Trailing Drum	Leading Trailing Drum
	Duo Servo Drum	Duo Servo Drum
	Single10	Single10
	PV* ⁷	PV* ⁷
	MacPherson Strut	MacPherson Strut
70	Double Wishbone	Double Wishbone
	STD	STD
	STD	STD
	Rack & Pinion	Rack & Pinion
	16 0	16 0
	Integral Type	Integral Type

RAV4 EV



166EV04

RAV4 EV

OUTLINE OF NEW FEATURES

The following changes are made for the 2003 model year.

1. EV Control System

- The cooling fan of the power control unit has been discontinued.
- The mounting position of the motor inverter temperature sensor has been changed.
- The motor inverter has been relocated.
- The detection conditions of some of the DTC (Diagnostic Trouble Code) have been changed or discontinued.

2. Brake

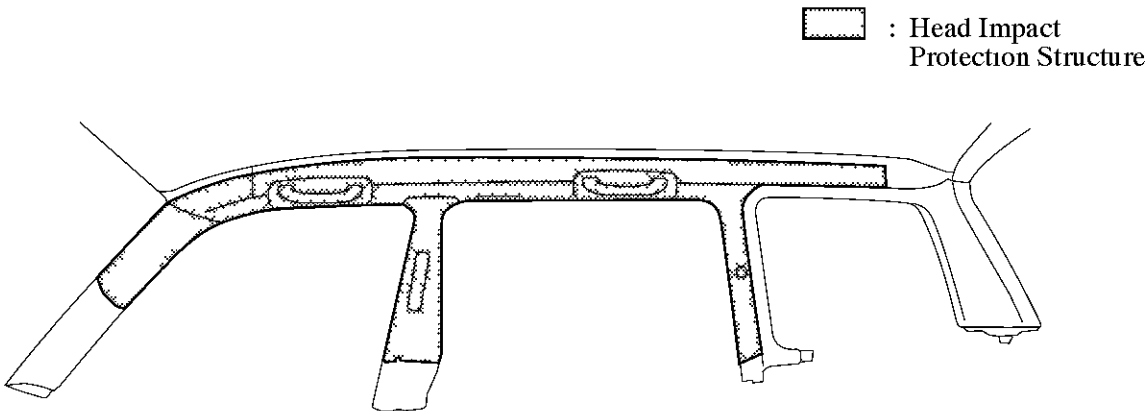
The specifications of the front brakes have been changed as follows:

Item		'03 Model	'02 Model
Front Brake	Type	Ventilated Disc	Solid Disc
	Pad Area cm² (in.²)	47.9 (7.42)	←
	Pad Material	Molded Resin, Non Asbestos	←
	Wheel Cylinder Diameter mm (in.)	54.0 (2.13)	←
	Rotor Size (D × T)* mm (in.)	301.7 × 18.0 (11.88 × 0.71)	←
	Rotor Material	Cast Iron	Aluminum

*: D: Outer Diameter, T: Thickness

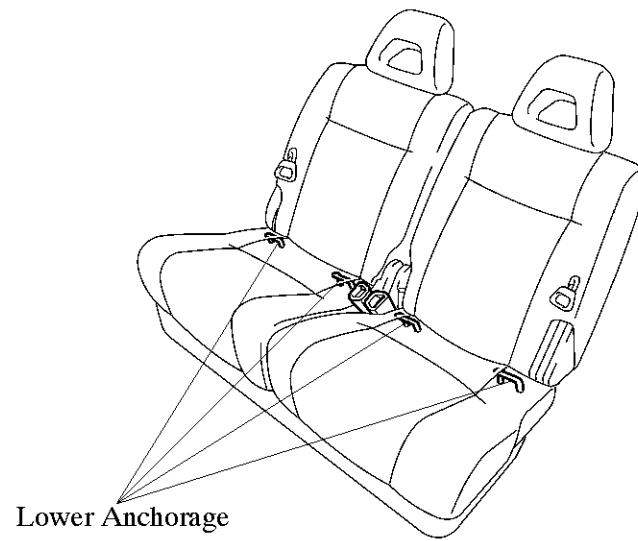
3. Safety Features

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 ribs of the roof side rail and pillar collapses to help reduce the impact.



4. Rear Seat

CRS (Child Retrain System) lower anchorage for securing child seats has been provided behind the seat cushion of the rear seat.



228EV02

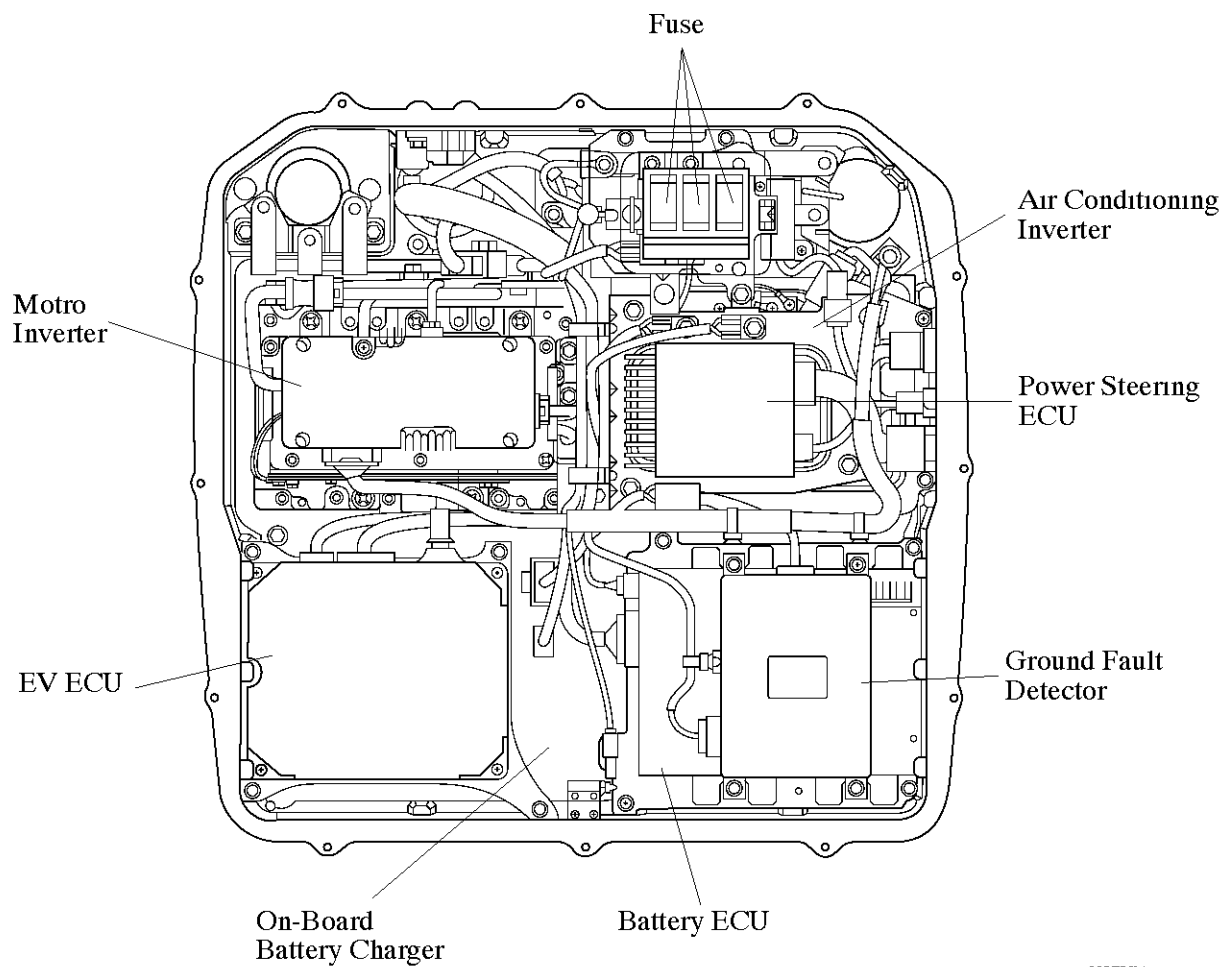
NEW FEATURES

■ EV CONTROL SYSTEM

1. General

The following changes have been made to the EV control system from the '02 model to the '03 model:

- The cooling fan of the power control unit has been discontinued.
- The mounting position of the motor inverter temperature sensor has been changed.
- The motor inverter has been relocated.
- The detection conditions of some of the DTCs (Diagnostic Trouble Codes) have been changed or discontinued.



228EV01

2. Motor Inverter

- The motor inverter of the '03 model has been made more compact by integrating the following components that were provided separately on the '02 model: controller, transistor bridge circuit, and condenser. As a result, serviceability has been improved.
- The motor inverter temperature sensor has been included in the transistor bridge circuit of the motor inverter. As a result, the temperature detection precision has been improved by enabling the direct measurement of the circuit temperatures.
- The detection conditions of some of the DTCs have been changed or discontinued in accordance with the aforementioned changes in the sensor.

3. EV ECU

The detection conditions of some of the DTCs have been changed or discontinued as follows:

► DTCs with Changed Detection Conditions ◀

DTC No.	Detection Item	Detection Condition	
		'03 Model	'02 Model
C2860/31	Motor Inverter Temp. Sensor Circuit Malfunction	When NRDY signal is LOW, and INVT signal is below 0.2V or above 4.8V for 2.0 sec. or more.	When NRDY signal is LOW, INVT signal is below 1V for 2.0 sec. or more.
C2872/78	Motor Control System Malfunction	When C2864/84, C2865/85, C2867/87, or C2868/88 is not detected, and a malfunction is detected in traction motor control system by feedback current from motor inverter.	When C2863/83, C2864/84, C2865/85, C2866/86, C2867/87 or C2868/88 is not detected, and a malfunction is detected in traction motor control system by feedback current from motor inverter.

► Discontinued DTC ◀

DTC No.	Detection Item
C2862/82	Motor Inverter Over Temp. Signal Circuit Malfunction
C2863/83	Motor Inverter Over Current Malfunction
C2866/86	Inverter Over Current Signal Circuit Malfunction

MAJOR TECHNICAL SPECIFICATIONS

Item				Area	U S A
Body Type					4 Door Wagon
Battery Charge Type					Inductive Type
Model Code					BEA11L AWDHSA
Major Dimensions & Vehicle Weights	Overall	Length	mm (in)	3980 (156 7)	5
		Width	mm (in)	1695 (66 7)	
		Height*	mm (in)	1675 (64 4)	
	Wheel Base		mm (in)	2410 (94 9)	
	Tread	Front	mm (in)	1460 (57 5)	10
		Rear	mm (in)	1450 (57 1)	
	Effective Head Room	Front	mm (in)	1024 (40 3)	
		Rear	mm (in)	990 (39 0)	
	Effective Leg Room	Front	mm (in)	1013 (39 9)	
		Rear	mm (in)	862 (33 9)	
	Shoulder Room	Front	mm (in)	1349 (53 1)	15
		Rear	mm (in)	1350 (53 1)	
	Overhang	Front	mm (in)	742 (29 2)	
		Rear	mm (in)	830 (32 7)	
	Min. Running Ground Clearance		mm (in)	189 (7 4)	
	Angle of Approach		degrees	30°	20
	Angle of Departure		degrees	29°	
	Curb Weight	Front	kg (lb)	880 (1940)	
		Rear	kg (lb)	708 (1560)	
		Total	kg (lb)	1588 (3500)	
	Gross Vehicle Weight	Front	kg (lb)	977 (2153)	25
		Rear	kg (lb)	981 (2163)	
		Total	kg (lb)	1958 (4316)	
	Luggage Compartment Capacity		m ³ (cu ft)	—	
Performance	Max. Speed		km/h (mph)	125 (78)	30
	Max. Cruising Speed		km/h (mph)	—	
	Acceleration	0 to 60 km/h	sec	18.5	
		0 to 400 m	sec	—	
	Turning Diameter (Outside Front)	Wall to Wall	m (ft)	—	
Curb to Curb		m (ft)	11.0 (36 1)		
Traction Motor	Type			Permanent Magnet Motor	35
	Max. Output		kW/rpm	50 / 3100 4600	
	Max. Torque		N m/rpm	190 / 0 1500	
Traction Batteries	Type			Nickel Metal Hydride	
	Total Voltage			288	
	Number of Batteries			24	40
Chassis	Transaxle Type			Planetary Gear	
	Reduction Gear Ratio			9.455	
	Brake Type	Front		Ventilated Disc	
		Rear		Leading Trailing Drum	
	Parking Brake Type			Drum	45
	Brake Booster Type			Hydraulic	
	Proportioning Valve Type			P & B Valve	
	Suspension Type	Front		MacPherson Strut	
		Rear		Double Wishbone	
	Stabilizer Bar	Front		STD	50
		Rear		—	
	Steering Gear Type			Rack & Pinion	
Steering Gear Ratio (Overall)			18.1		
Power Steering Type			EHPS		

* Unladen Vehicle