

GROUP 23

AUTOMATIC TRANSAXLE

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GENERAL DESCRIPTION

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- This automatic transaxle is a high torque capacity FF 6-speed A/T. By making the shift range into a multi step, a more effective engine torque transfer results.
- The reduction of parts count from the conventional 5 A/T has improved the productivity.

Characteristics

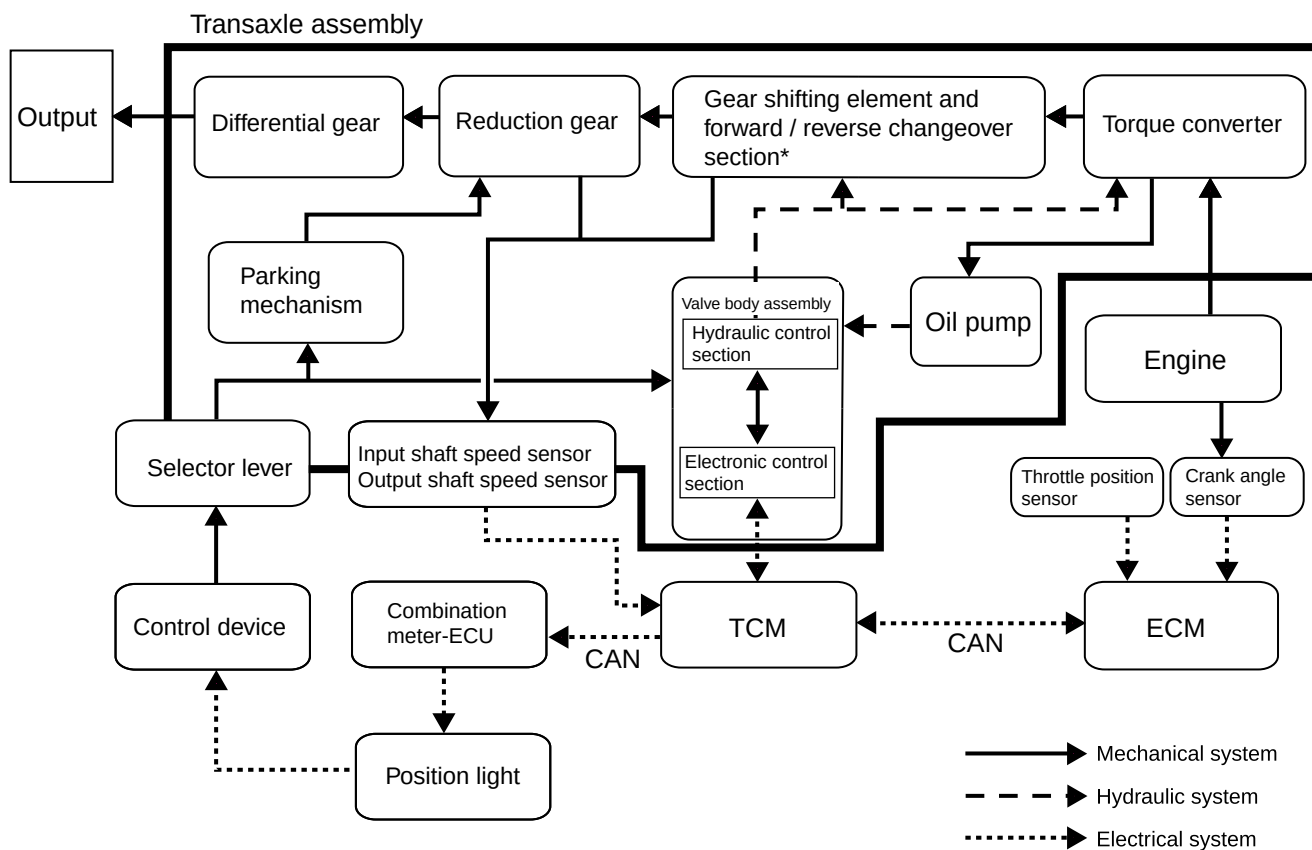
Item	Contents
Power/fuel consumption performance	The gear ratio range (1st to 6th) of up to 6.1 has been adopted to combine the fuel consumption and power performance.
Shift control	The TCM accommodating the controls of slip lock-up*¹, INVECS-II*², and manual shift control*² has been adopted. *¹: Mechanism that controls the slip amount inside the torque converter *²: Control which selects the optimum gear that matches the driving style or driving environment

SPECIFICATIONS

Transaxle model		F6AJA	W6AJA
Drive type		FWD	AWD
Torque converter	Model	3-element, 1-stage, 2-phase	
	Stall torque ratio	1.96	
	Lock-up	Present	
Shift position		P-R-N-D + sport mode	
Transaxle type		Forward 6-speed, reverse 1-stage	
Front and rear switching		Single pinion x 2 (front, rear) Double pinion x 1 (reduction) <Based on lepelletier system>	
Clutch and brake		Clutch x 3 (low clutch, 3-5 reverse clutch, high clutch) Brake x 2 (2-6 brake, low and reverse brake)	
Oil pump		Trochoid type	
Maximum hydraulic pressure		2.0 MPa (290 psi)	
Torque capacity		320 N·m (236 ft-lb)	
Solenoid valve		Linear x 6 pieces ON/OFF x 2 pieces	
Transaxle ratio	1st	4.199	
	2nd	2.405	
	3rd	1.583	
	4th	1.161	

	5th	0.855
	6th	0.685
	Reverse	3.457
Primary reduction ratio: A		1.071
Final reduction ratio: B		3.333
A × B		3.571
Weight (including transmission fluid)		FWD: Approximately 102 kg (225 pounds)/AWD: Approximately 103 kg (227 pounds)
Transmission fluid		DIA QUEEN ATF - J2

System configuration



* : Low clutch, 3-5 reverse clutch, High clutch, Low-reverse brake, 2-6 brake, Input shaft, front/rear/reduction planetary gear

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Parts name	Function
Torque converter	Composed of the cover converter, turbine assembly, stator, pump impeller assembly, and others. It increases the engine torque, and transfers the power to transaxle.
Oil pump	Composed of the gear, housing, cover, and others. It generates the oil pressure necessary for the transmission fluid circulation, and for the operations of clutch and brake.

AUTOMATIC TRANSAXLE CONSTRUCTION AND OPERATION

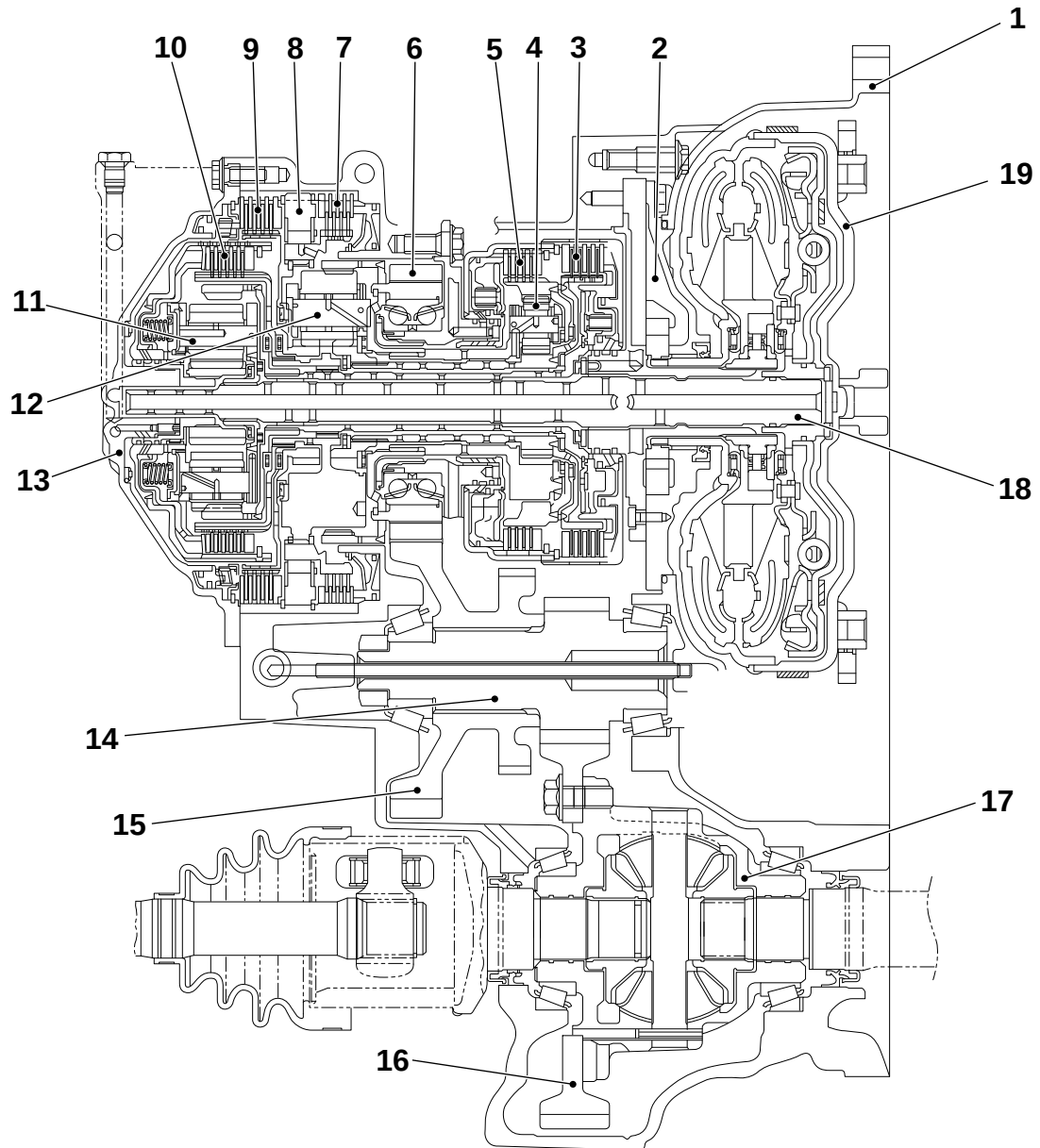
Low clutch	Composed of the clutch drum, piston, spring retainer assembly, drive plate, driven plate, and others. It links the plates by the hydraulic operation of piston, and transfers the power to the front internal gear.
3-5 reverse clutch	The components are the same as for the low clutch. It links the plates by the hydraulic operation of piston, and transfers the power to the front sun gear.
High clutch	The components are the same as for the low clutch. It links the plates by the hydraulic operation of piston, and transfers the power to the rear carrier.
Low and reverse brake	Composed of the piston, spring retainer assembly, drive plate, driven plate, and others. It links the plates by the hydraulic operation of piston, and fixes the rear carrier.
2-6 brake	The components are the same as for the low and reverse brake. It links the plates by the hydraulic operation of piston, and fixes the rear sun gear.
Input shaft	It is spline-engaged with the reduction carrier. It transfers the power from the torque converter. For the shaft inner hole, there are the lubricant supply hole for the each sliding area inside the unit and the hydraulic pressure distribution hole for the lock-up ON-OFF.
Front planetary gear	Composed of the carrier, sun gear, and internal gear. It increases or decreases the output rotation in relation to the input by fixing or releasing the carrier, sun gear, and internal gear.
Rear planetary gear	The components are the same as for the front planetary gear. By fixing or releasing the carrier, sun gear, and internal gear, it increases or decreases the output rotation in relation to the input, and switches the rotation direction between normal and reverse.
Reduction planetary gear	The components are the same as for the front planetary gear. By fixing or releasing the carrier, sun gear, and internal gear, it increases or decreases the output rotation in relation to the input.
4-point gear	The power is transferred from the rear internal gear to the output gear → idler gear → reduction pinion gear → final gear.
Valve body assembly	Controls the original pressure from the oil pump to the suitable hydraulic pressure for the line pressure control system, shift control system, lock-up control system, and lubrication system.

CONSTRUCTION AND OPERATION

SECTIONAL VIEW

<F6AJA>

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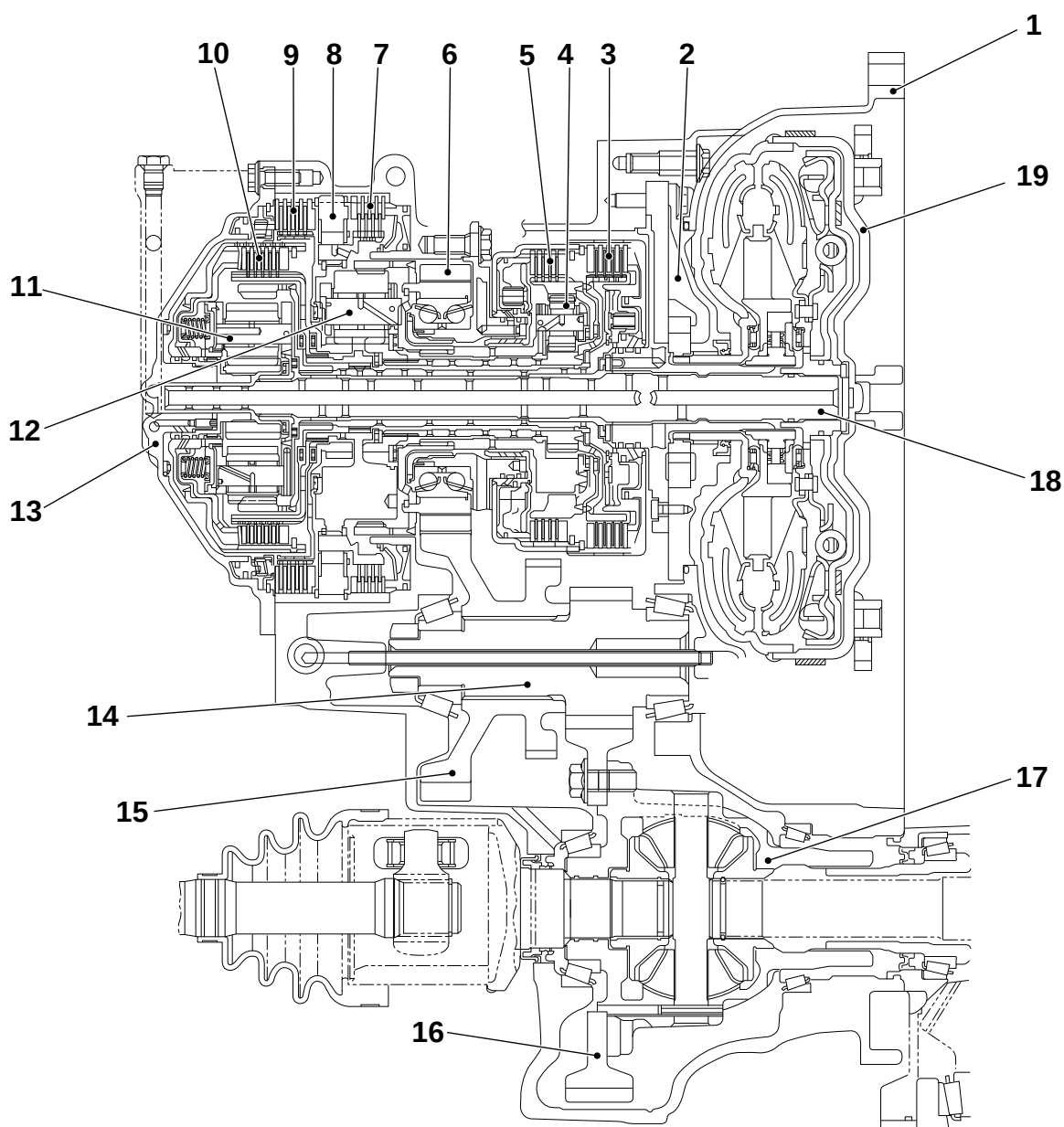
Based on lepelletier system

- | | |
|--------------------------|------------------------------|
| 1. Converter housing | 10. High clutch |
| 2. Oil pump | 11. Reduction planetary gear |
| 3. 3-5 reverse clutch | 12. Rear planetary gear |
| 4. Front planetary gear | 13. Side cover |
| 5. Low clutch | 14. Reduction pinion gear |
| 6. Output gear | 15. Idler gear |
| 7. Low and reverse brake | 16. Final gear |
| 8. One-way clutch | 17. Differential case |
| 9. 2-6 brake | 18. Input shaft |

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19. Torque converter

<W6AJA>



Based on lepelletier system

- | | |
|-------------------------|------------------------------|
| 1. Converter housing | 7. Low and reverse brake |
| 2. Oil pump | 8. One-way clutch |
| 3. 3-5 reverse clutch | 9. 2-6 brake |
| 4. Front planetary gear | 10. High clutch |
| 5. Low clutch | 11. Reduction planetary gear |
| 6. Output gear | 12. Rear planetary gear |

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- | | |
|---------------------------|-----------------------|
| 13. Side cover | 17. Differential case |
| 14. Reduction pinion gear | 18. Input shaft |
| 15. Idler gear | 19. Torque converter |
| 16. Final gear | |

Torque converter

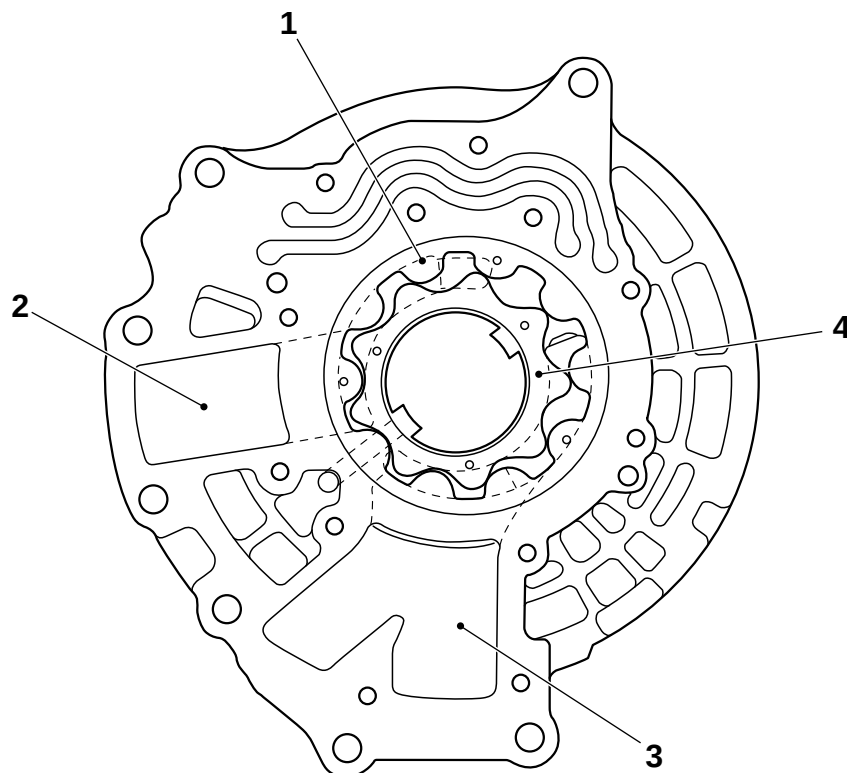
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The torque converter with the "3-element, 1-stage, 2-phase" lock-up mechanism has been adopted.

Oil pump

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The oil pump of "internal trochoid gear pump" has been adopted.



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- | | |
|-------------------|---------------|
| 1. Outer gear | 3. Inlet port |
| 2. Discharge port | 4. Inner gear |

CLUTCH AND BRAKE

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Dish plate and high-load wave plate

In order to reduce the shock at the engagement, the "dish plate" with elastic effect has been adopted to the high clutch and low clutch. Also, the "high-load wave plate" with the similar effect has been adopted to the 2-6 brake and 3-5 reverse clutch.

Centrifugal cancel chamber

With this A/T, a "centrifugal cancel chamber" that faces all the clutch chambers is used. To the "centrifugal cancel chamber," the transmission fluid is always charged via the special oil passage of oil pump.

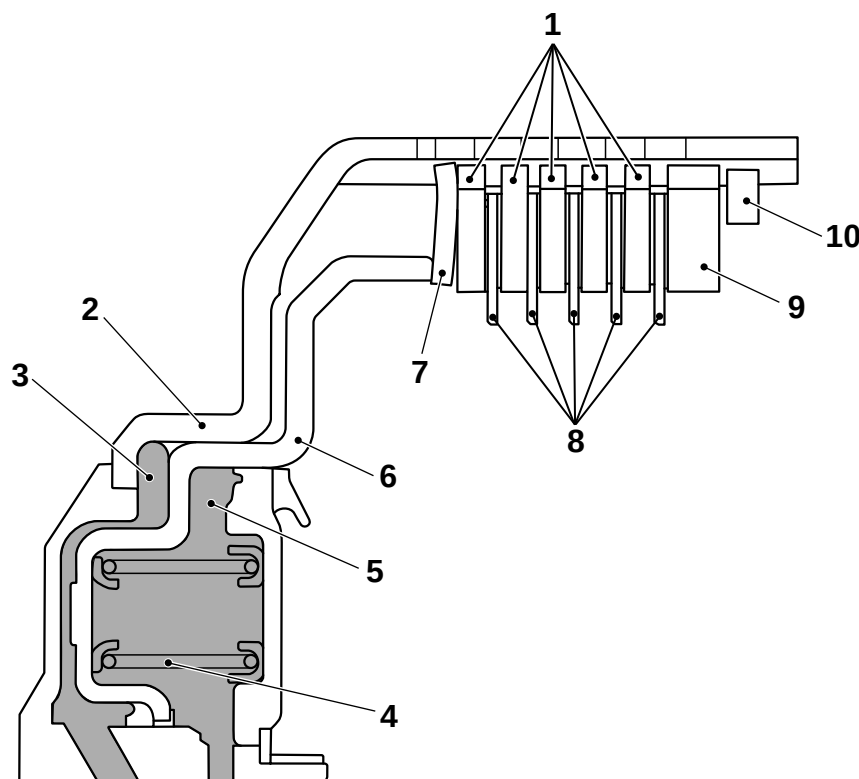
Operation and function

▪Clutch pressure not in operation

When the clutch drum is rotated, the centrifugal force works on the remaining transmission fluid in clutch chamber, and the force pushes the clutch piston. However, because the centrifugal force also works on the transmission fluid charged in the centrifugal cancel chamber, the clutch piston is pushed back. Therefore, the clutch piston does not move because both forces are cancelled by each other, preventing the clutch drag.

▪Clutch pressure in operation

When the clutch pressure works on the cylinder chamber, the pressure overcomes the facing centrifugal cancel chamber's hydraulic pressure and the spring force. Consequently, the clutch piston is pushed, and the clutch is engaged. At this time, the centrifugal force that works on the clutch pressure of cylinder chamber is cancelled out by the centrifugal force that works on the centrifugal cancel chamber. Therefore, the effects from centrifugal force generated by the clutch drum rotation will be eliminated. For this reason, the constant clutch piston pushing force is obtained with all rotations, and smooth shifting has been achieved.



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1. Clutch plate
2. Clutch drum
3. Cylinder chamber
4. Return spring
5. Centrifugal cancel chamber

6. Clutch piston
7. Dish plate
8. Clutch disc
9. Retaining plate
10. Snap ring

One-way clutch

The type of one-way clutch adopted with this A/T is called as "roller type." Depending on the direction of torque application, the clutch engages by itself and

transfers the torque. It rotates freely to the opposite direction, and does not transfer the torque.

STRUCTURE

With "roller type," the roller and spring are inserted between the inner race of cylindrical surface and the

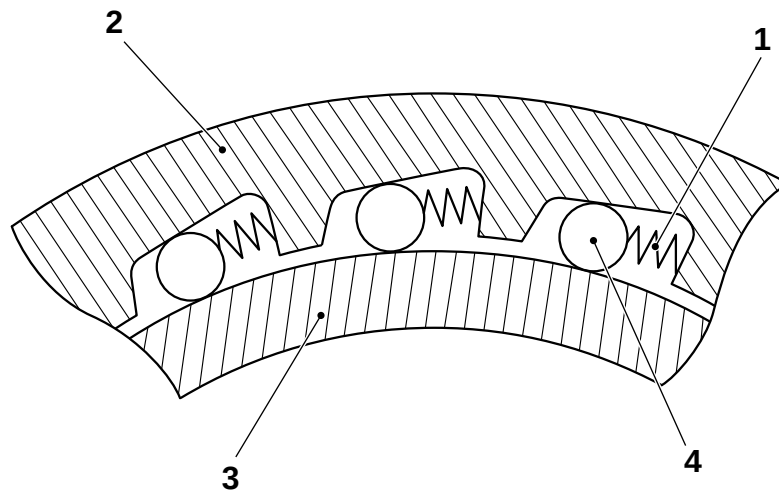
OPERATION

- When the one-way clutch is operating
When the one-way clutch rotates toward the torque transmission direction, the rollers move toward the narrow side of the roller chamber, which is composed of the inner race and the outer race. Since the narrow side of the roller chamber is smaller than the roller diameter, the rollers are engaged between the cam surfaces of the outer race and the cylindrical surface of the inner race,

outer race with a number of tilted cam surfaces. This type is composed of four parts.

and the inner race and the outer race rotate together.

- When the one-way clutch is not operating
When the one-way clutch rotates toward the direction opposite to the torque transmission, the rollers move toward the wide side of the roller chamber, which is composed of the inner race and the outer race. Since the wide side of the roller chamber is larger than the roller diameter, a clearance is created between the roller chamber and the rollers. Therefore, the inner race and the outer race are released.



- 1. Spring
- 2. Outer race

- 3. Inner race
- 4. Roller

VALVE BODY ASSEMBLY

The valve body assembly plays its role as the core of the A/T which performs "shift control", "hydraulic pressure control", and "fluid distribution to lubrication

line". The components are the "body lower", "body upper", "body inter", "separate plate", "solenoid valve", "valve spool", "spring", and "check ball", and all these parts require considerable precision.

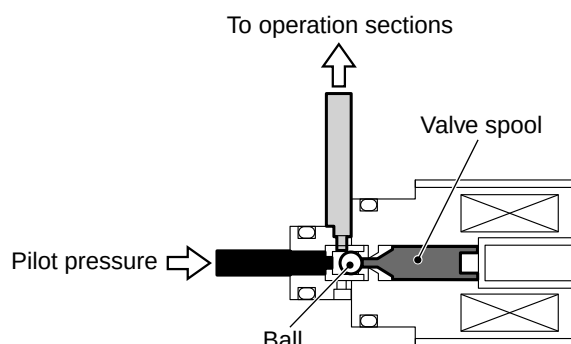
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Solenoid valve

There are two types of the solenoid valve adopted to this A/T, "ON-OFF solenoid valve" and "linear solenoid valve".

- ON-OFF solenoid valve

The valve spool installed inside the coil only operates so as to press or not to press the ball, which seals the hydraulic pressure supply section, against the sheet surface. With this A/T, the normal low type is used. When the voltage is not applied to the coil, the ball is pressed against the sheet surface by the force of built-in spring, stopping the pilot pressure. When the voltage is applied to the coil, the valve is drawn to the right, and the hydraulic pressure seal by the ball is released, supplying the pilot pressure to the operation sections.

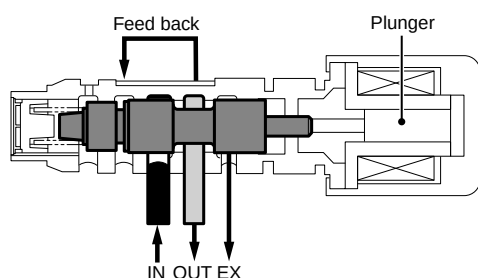


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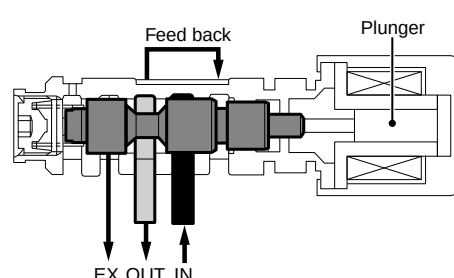
Linear solenoid valve

There are two types to this solenoid valve, the normal low type with which the control hydraulic pressure is not generated when the voltage is not applied to the coil, and the normal high type which has an opposite characteristics. The principle of solenoid valve is the phenomenon that the pushing force against the valve spool installed inside the coil increases approximately in proportion to the electric current. By using this pushing force, it can generate the hydraulic pressure proportionate to the force.

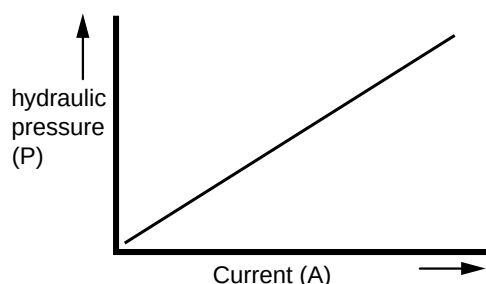
Normal low type



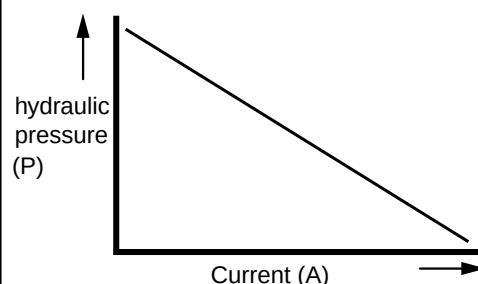
Normal high type



Characteristics diagram of normal low type



Characteristics diagram of normal high type



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PARKING MECHANISM

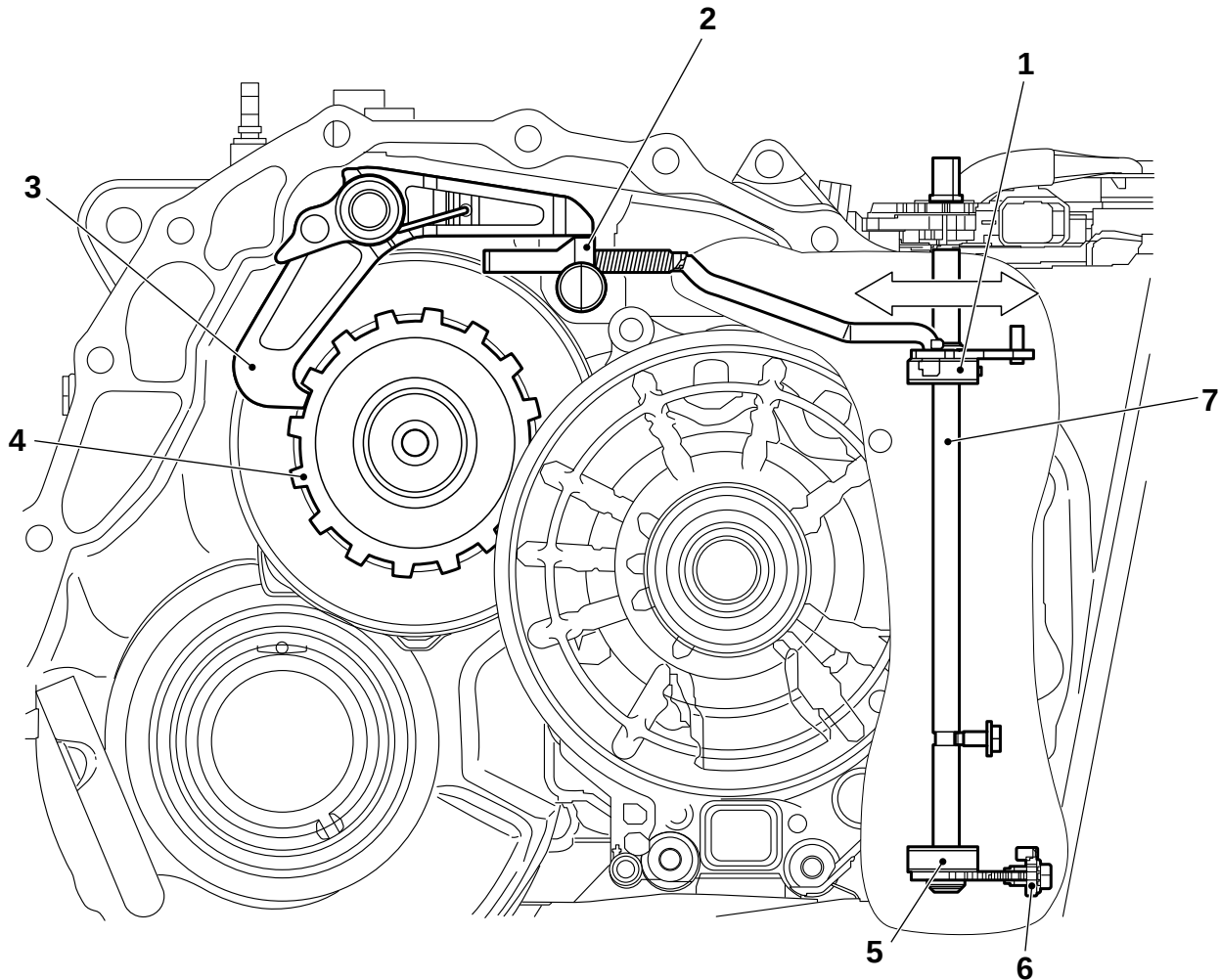
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The parking mechanism immobilizes the vehicle in combination with the side brake while the vehicle is parked. This is interlocked with the vehicle's selector lever, and it mechanically locks the parked vehicle so

that the vehicle does not move. Its components includes the manual shaft, manual plate, rod plate, parking rod, detent spring, parking pawl, and parking gear.

Parking structure

1. Select the parking position with the manual shaft. (The detent feel of each range is determined by the detent spring and the overstriding force over the protrusion and depression of manual plate.)
2. When the rod plate reaches the P position, the parking rod is pressed down, and the rod slides in the support actuator inner hole.
3. At the parking rod cam, a force acts to turn the parking pawl. Then, the pawl section of the parking pawl is engaged with the parking gear.
4. Because the parking gear which is spline-engaged with the reduction gear will be fixed, the output axis will also be fixed.



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- | | |
|----------------|-----------------|
| 1. Rod plate | 3. Parking pawl |
| 2. Parking rod | 4. Parking gear |

5. Manual plate

6. Detent spring

7. Manual shaft

SHIFT MECHANISM

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When three elements (sun gear, carrier, internal gear) of planetary gear are selected as input, output, and fixing for each element, the gear ratio and rotation direction are determined. Each clutch and brake

perform the input, output, and fixing. The following tables "Clutch and brake, and their actions" and "Clutch and brake, and their operations" indicate the relation of planetary gear with the clutch and brake.

Clutch and brake, and their actions

Parts name	Function
Low clutch	Works with 1st, 2nd, 3rd, and 4th gears, and transfers the input from 3-5 reverse clutch drum to the front internal gear.
3-5 reverse clutch	Works with 3rd, 5th, and reverse gears, and transfers the reduction internal gear input to the front sun gear.
High clutch	Works with 4th, 5th, and 6th gears, and transfers the input shaft input to the rear carrier.
Low and reverse brake	Works with engine brake, 1st and reverse gears, and fixes the rear carrier.
2-6 brake	Works with 2nd and 6th, and fixes the rear sun gear rotation.
One-way clutch	Works when in 1st gear under acceleration status, and fixes the rear carrier.

Clutch and brake, and their operations

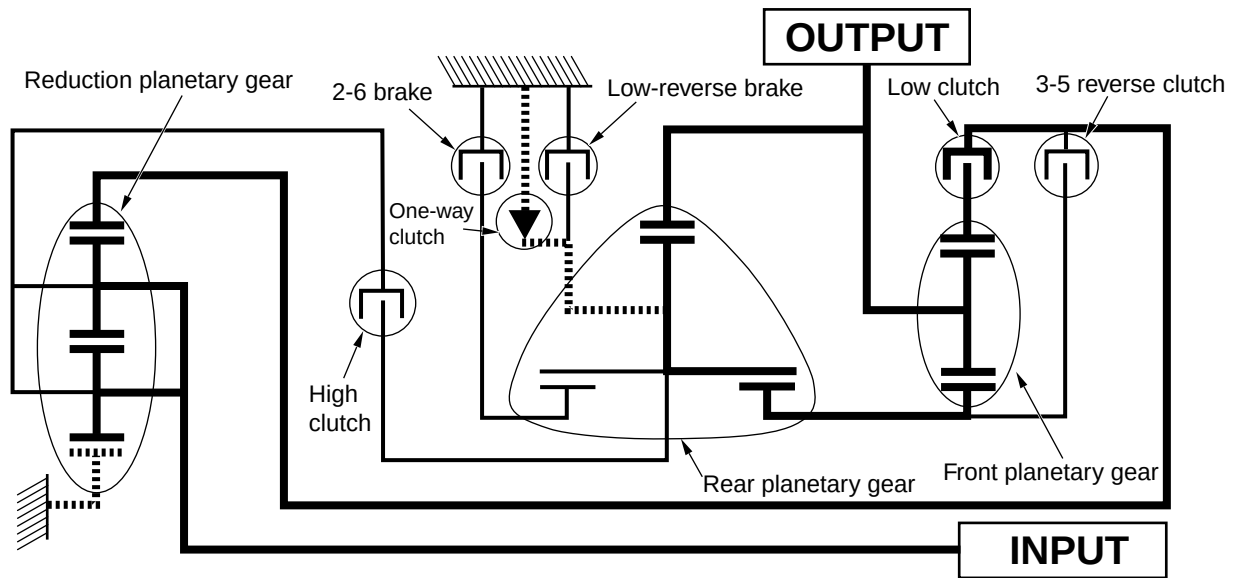
Transmission range		Low clutch	3-5 reverse clutch	High clutch	Low and reverse brake	2-6 brake	One-way clutch
P		-	-	-	-	-	-
R		-	×	-	×	-	-
N		-	-	-	-	-	-
D	1st	×	-	-	-	-	×
	1st gear engine brake	×	-	-	×	-	-
	2nd	×	-	-	-	×	-
	3rd	×	×	-	-	-	-
	4th	×	-	×	-	-	-
	5th	-	×	×	-	-	-
	6th	-	-	×	-	×	-

×: Function element -: Not applicable

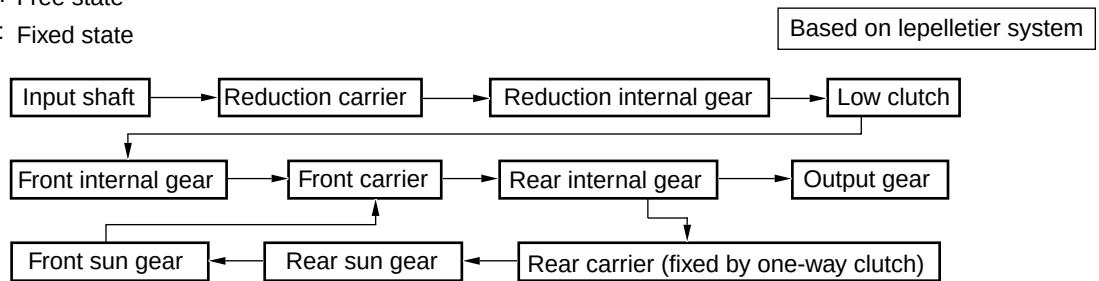
POWER FLOW

The following skeleton diagram (simplified drawing of unit structure used for the locations which indicates the power flow passage) describes at the time of 1st to 6th and reverse.

1st

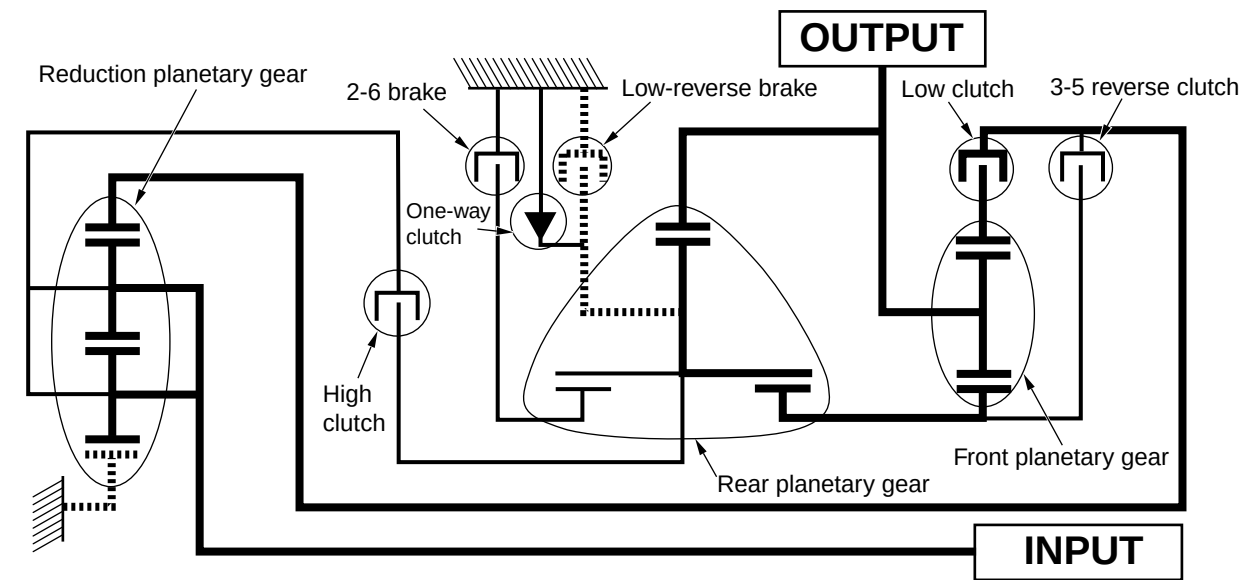


- : Torque-transfer state
- : Free state
- : Fixed state



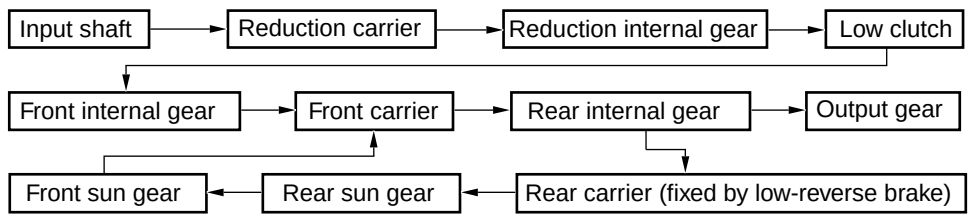
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1st gear engine brake



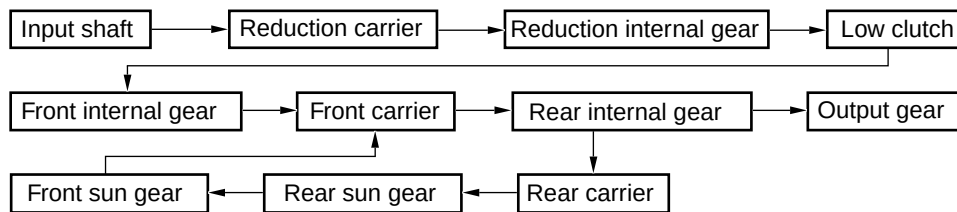
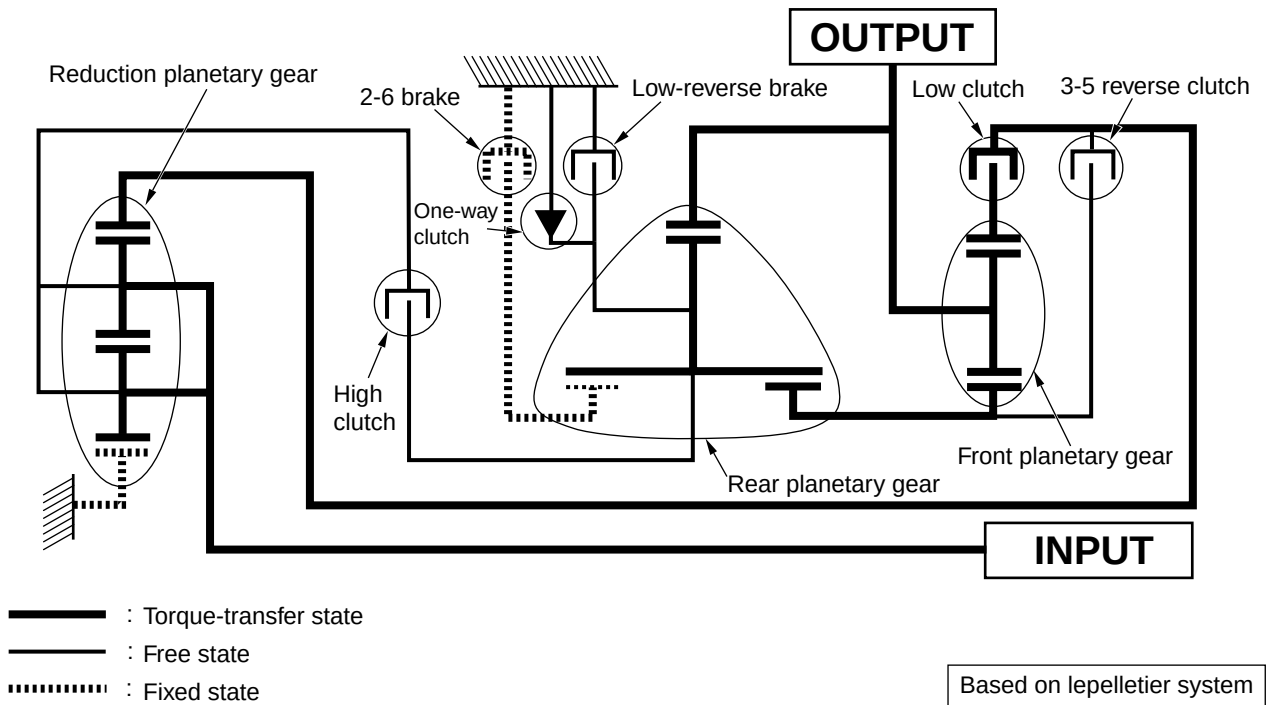
- : Torque-transfer state
- - - : Free state
- : Fixed state

Based on lepelletier system

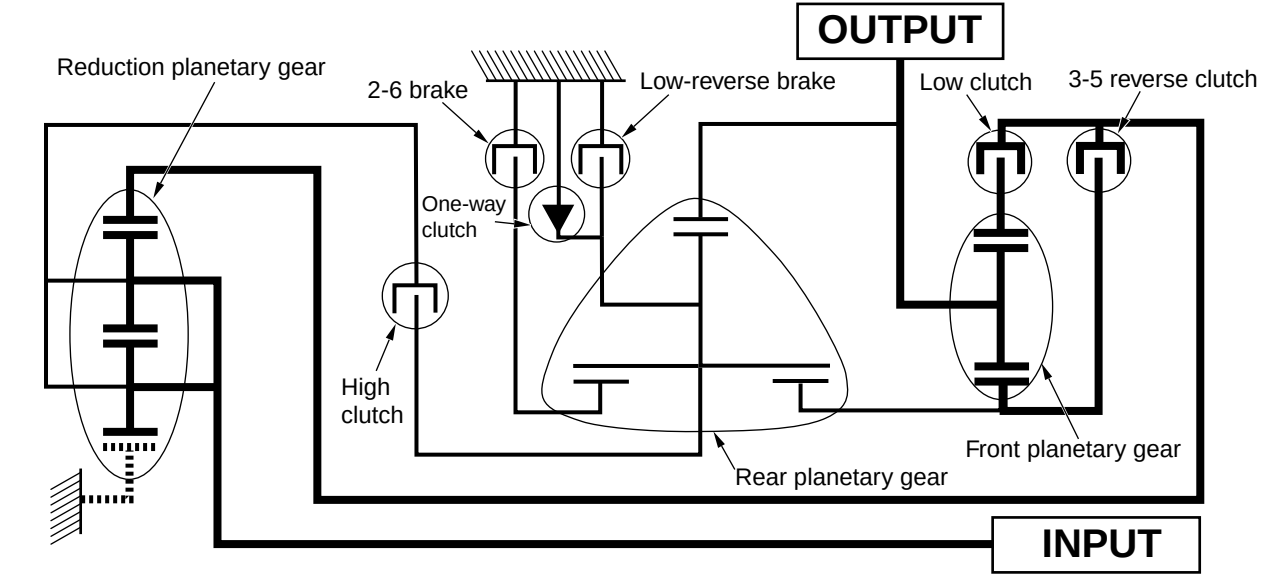


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2nd

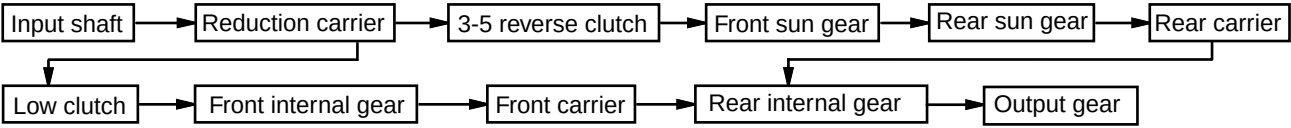


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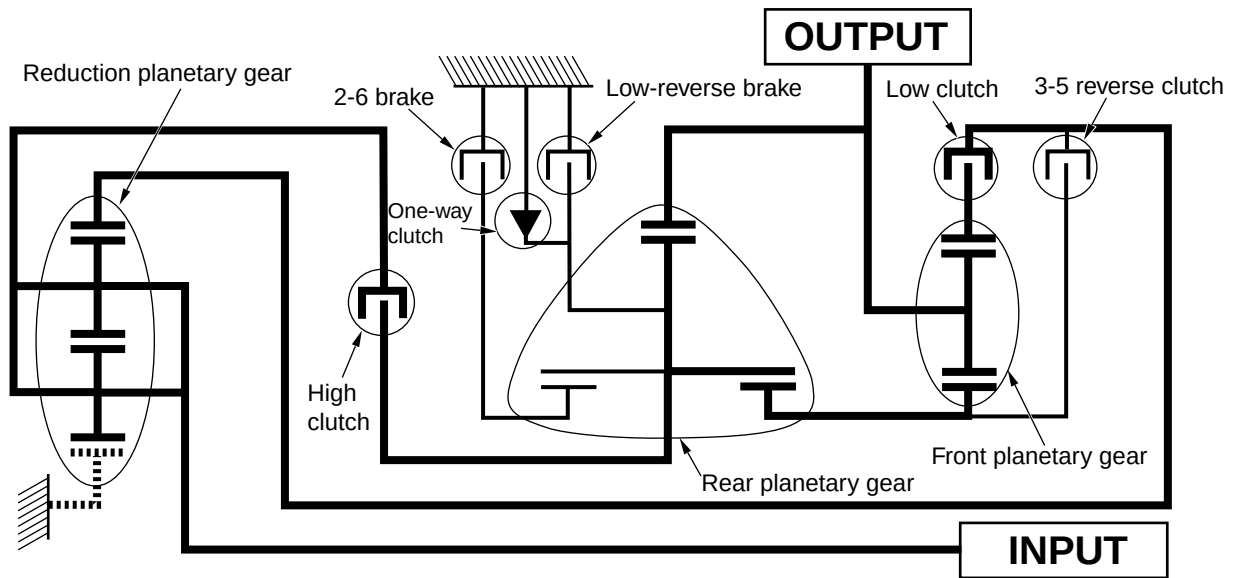


- : Torque-transfer state
- - - : Free state
- : Fixed state

Based on lepelletier system

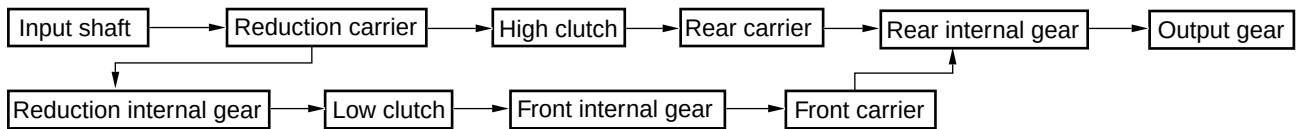


4th

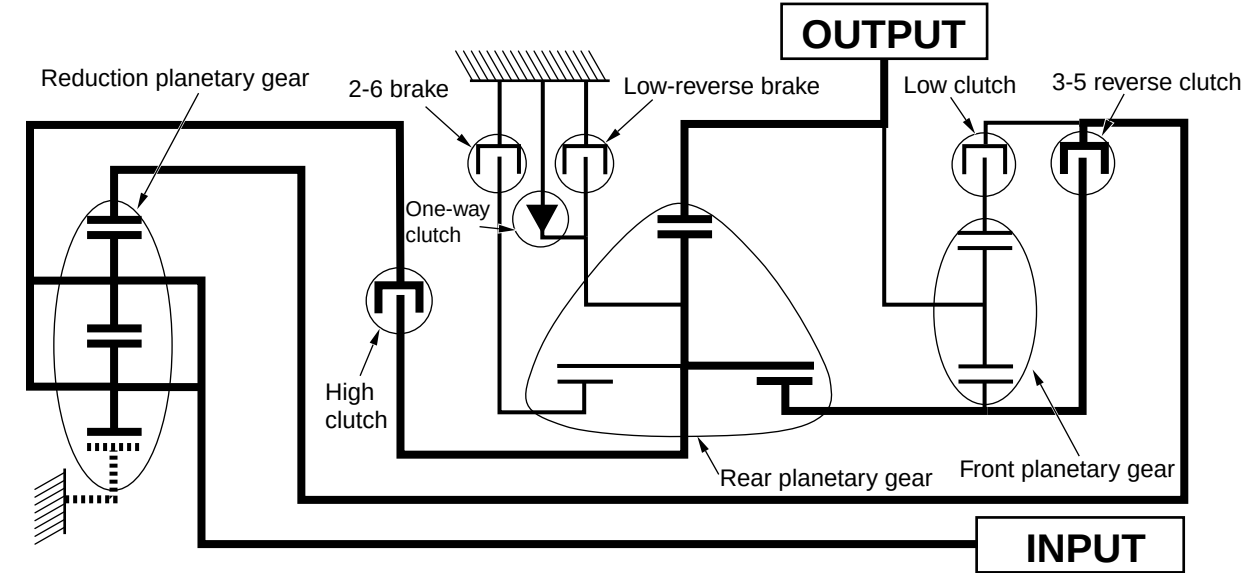


— : Torque-transfer state
 — : Free state
 : Fixed state

Based on lepelletier system

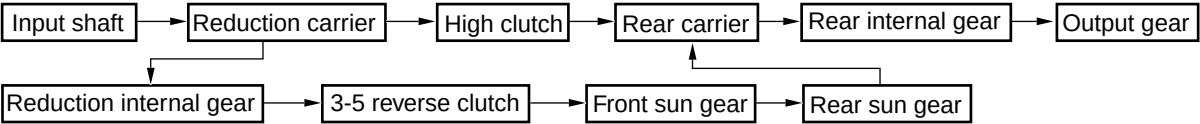


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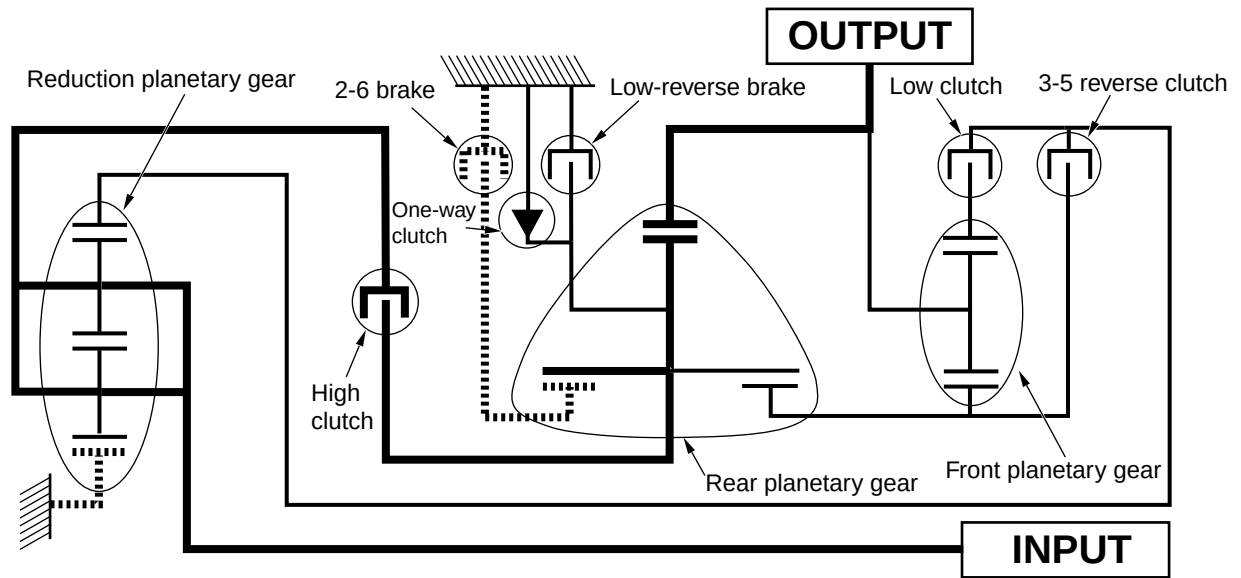
- : Torque-transfer state
- - - : Free state
- : Fixed state

Based on lepelletier system



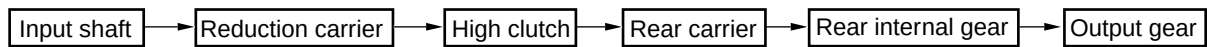
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6th



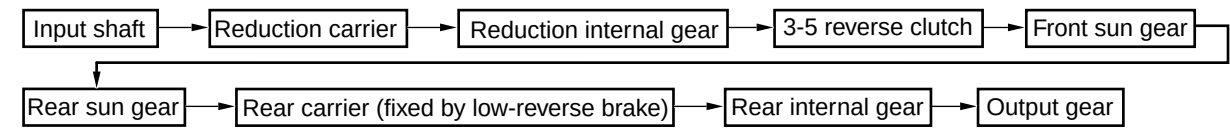
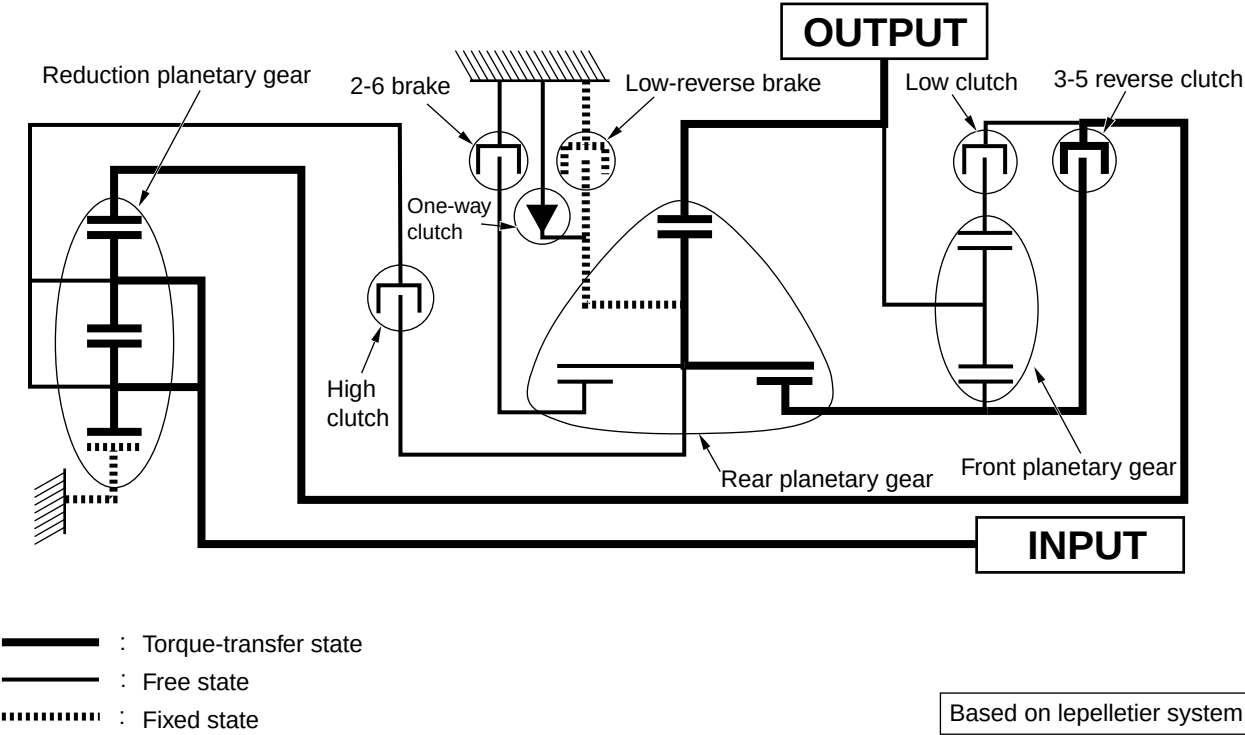
— : Torque-transfer state
 - - - : Free state
 : Fixed state

Based on lepelletier system



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Reverse



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ELECTRONIC CONTROL SYSTEM

Control system

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List of control items and input/output signals

Part name			Gear Change	Pressure Control	Lock up	Torque management	Display	INVECS-II	Manual shift control	OBD-II
Input system	Transmission range	switch	x	x	x	x	x	x	x	x
	Output shaft speed	sensor	x	x	x	x	-	x	-	x

	Input shaft speed sensor		×	×	×	×	-	×	-	×
	Transmission fluid temperature sensor		×	×	×	-	-	-	-	×
	Shift switch assembly		-	-	-	-	-	-	×	×
	Paddle shift switch		-	-	-	-	-	-	×	×
	Low clutch pressure switch		×	-	-	-	-	-	-	-
	2-6 brake pressure switch		×	-	-	-	-	-	-	-
	3-5 reverse clutch pressure switch		×	-	-	-	-	-	-	-
	High clutch pressure switch		×	-	-	-	-	-	-	-
	Low-reverse brake pressure switch		×	-	-	-	-	-	-	-
	C A N	Throttle Signal	×	×	×	×	-	×	-	×
		Engine revolution signal	×	×	×	×	-	×	-	×
		Engine torque signal	-	×	×	×	-	×	-	-
		Gear change forbid	×	-	-	-	-	×	-	-
		Engine coolant temperature signal	-	-	-	-	-	×	-	-
		Stoplight signal	×	-	×	-	-	×	-	×
Output system	Low clutch Linear solenoid		×	-	-	-	-	-	×	×
	2-6 brake Linear solenoid		×	-	-	-	-	-	×	×
	3-5 reverse clutch Linear solenoid		×	-	-	-	-	-	×	×
	High clutch Linear solenoid		×	-	-	-	-	-	×	×
	Lock-up & low-reverse brake Linear solenoid		×	-	×	-	-	-	×	×
	Low clutch Shift solenoid		×	-	-	-	-	-	×	×
	Low-reverse brake Shift solenoid		×	-	×	-	-	-	×	×
	PL liner solenoid		-	×	-	-	-	-	-	×
	C A N	Fast torque request	-	-	-	×	-	-	-	-
		Slow torque request	-	-	-	×	-	-	-	-
		Torque converter state	-	-	-	×	-	-	-	-

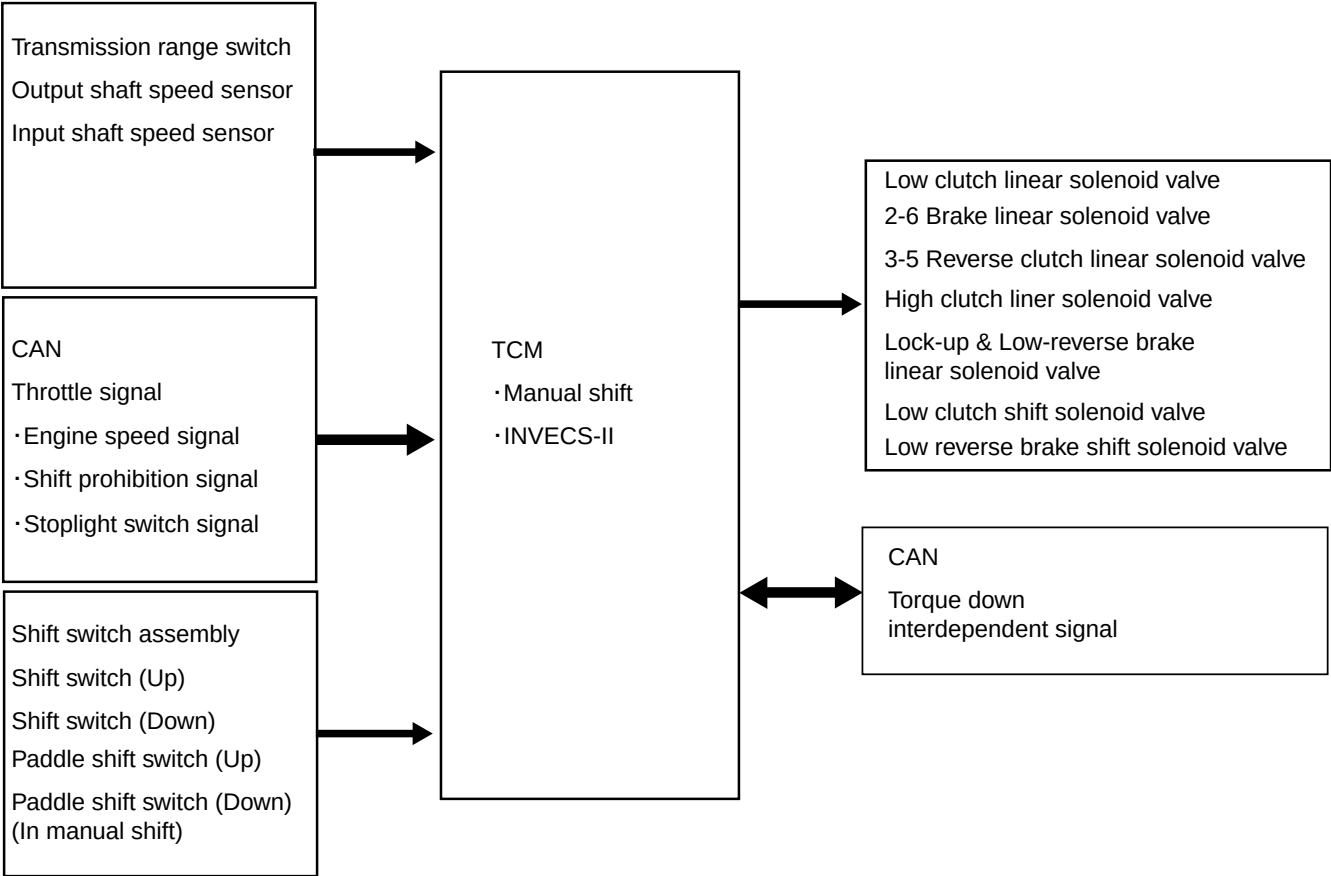
	Lever and position	A/T	-	-	-	-	×	-	-	-
	Failure lamp		-	-	-	-	×	-	-	-
	MIL lamp		-	-	-	-	×	-	-	-
	CAN output		-	-	-	×	×	-	-	-

×: Function element -: Not applicable

CONTROL SCHEMATIC DIAGRAM

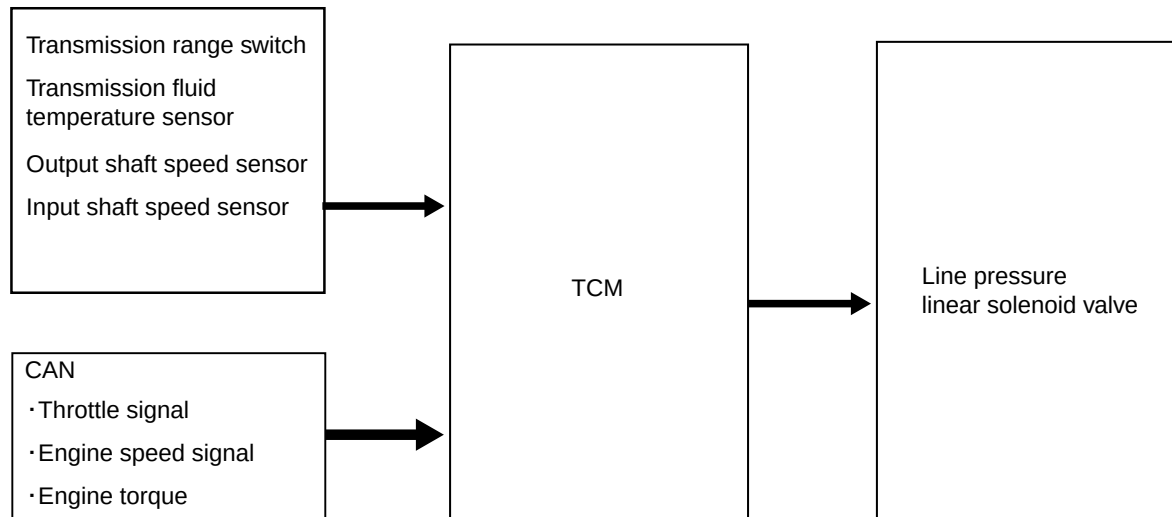
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Shifting control



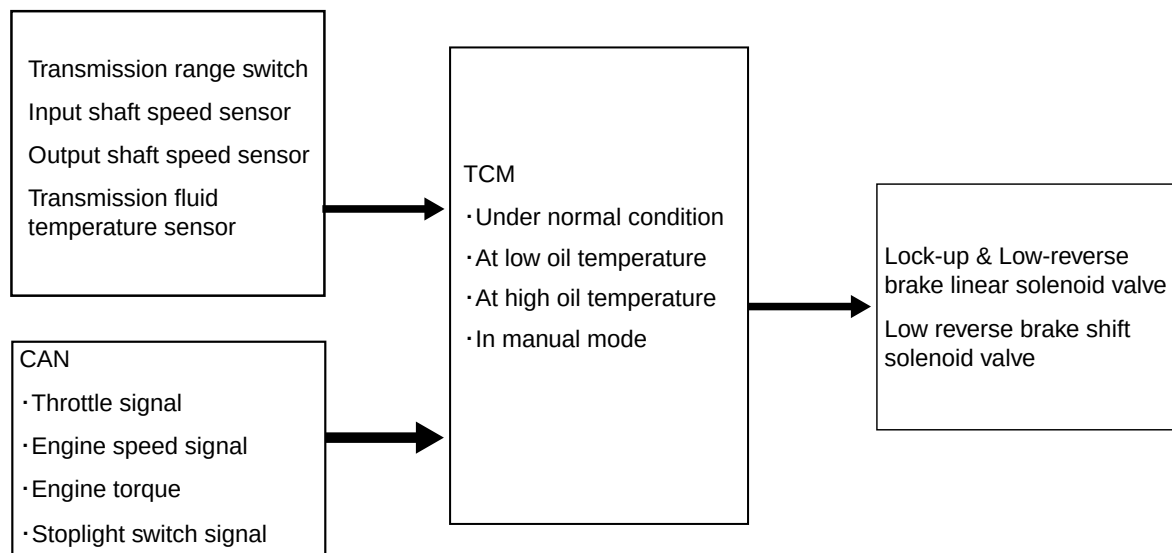
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Hydraulic pressure shifting



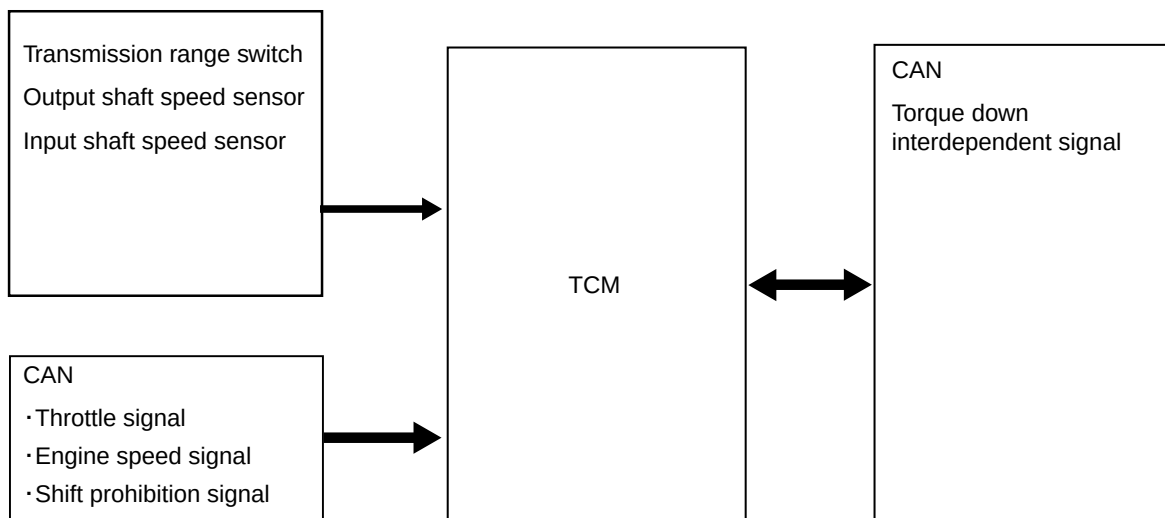
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Lock-up shifting



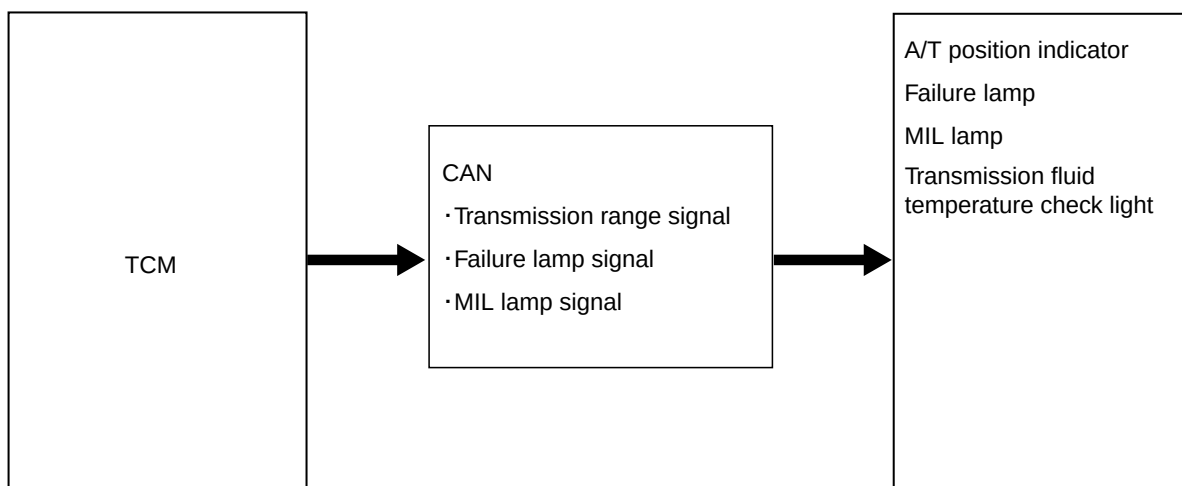
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Torque down shifting



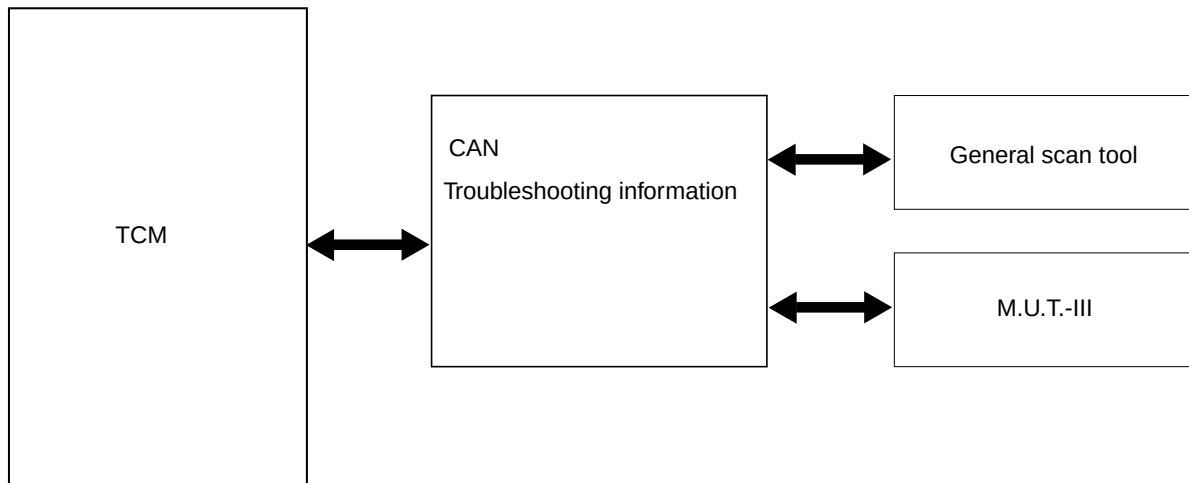
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Monitor



ZC6023980000

Troubleshooting



ZC6023990000

OPERATION REFERENCE TABLE FOR EACH SHIFT RANGE

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	Pressure switch					Linear solenoid					Shift solenoid	
	Low clutch	2-6 brake	3-5 reverse clutch	High clutch	Low-reverse brake	Low clutch	2-6 brake	3-5 reverse clutch	High clutch	Lock-up & Low-reverse brake	Low clutch	Low-reverse brake
D1	×	-	-	-	-	×	-	-	-	-	-	×
D2	×	×	-	-	-	×	×	-	-	-	-	-
D2 Lock-up	×	×	-	-	-	×	×	-	-	×	-	-
D3	×	-	×	-	-	×	-	×	-	-	-	-
D3 Lock-up	×	-	×	-	-	×	-	×	-	×	-	-
D4	×	-	-	×	-	×	-	-	×	-	-	-
D4 Lock-up	×	-	-	×	-	×	-	-	×	×	-	-
D5	-	-	×	×	-	-	-	×	×	-	×	-
D5 Lock-up	-	-	×	×	-	-	-	×	×	×	×	-
D6	-	×	-	×	-	-	×	-	×	-	×	-
D6 Lock-up	-	×	-	×	-	-	×	-	×	×	×	-
P	-	-	-	-	-	-	-	-	-	-	-	×
R	-	-	×	-	×	-	-	×	-	×	-	×
N	-	-	-	-	-	-	-	-	-	-	-	×
1st gear engine brake	×	-	-	-	×	×	-	-	-	×	-	×

×: Function element - : Not applicable

DIAGNOSTIC FUNCTION

The TCM is equipped with the diagnostic function to monitor the input signals from each sensor and output signals from the actuators. If an abnormality occurs in

the signal system, the diagnostic function memorizes the abnormal symptoms and outputs a diagnostic trouble code.

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FAIL-SAFE FUNCTION

The fail-safe function has been adopted with which if an abnormality occurs in signals from various

sensors, switches, or solenoids, the abnormality is controlled with the minimum adverse effect to the driving performance.

DTC code No.	Detection items	Fail-safe
P0705	Transmission range switch system	Fixed to the "D" range or the "R" range.
P0712	Transmission fluid temperature sensor system (Short circuit)	Not present
P0713	Transmission fluid temperature sensor system (Open circuit)	Fixed to 5th gear during driving, and to 3rd gear after a vehicle stop.
P0715	Input shaft speed sensor system	*Fixed to the driving gear position during driving, and to 3rd gear after a vehicle stop. *Manual mode is prohibited.
P0720	Output shaft speed sensor system	
P0729	6th gear incorrect ratio	The current shift position is continued, and gear is fixed to 3rd gear after a vehicle stop.
P0731	1st gear incorrect ratio	*At engine runup detection: Fixed to 5th gear after a vehicle stop. *At gear ratio abnormality detection: Fixed to 2nd, 3rd, 4th gear.
P0732	2nd gear incorrect ratio	The current shift position is continued, and gear is fixed to 5th gear after a vehicle stop.
P0733	3rd gear ratio	The current shift position is continued, and gear is fixed to 6th gear after a vehicle stop.
P0734	4th gear incorrect ratio	The current shift position is continued, and gear is fixed to 5th gear after a vehicle stop.
P0735	5th gear incorrect ratio	The current shift position is continued, and gear is fixed to 2nd gear after a vehicle stop.
P0736	Reverse gear incorrect ratio	Controlled by making the line pressure to maximum.
P0741	Torque converter clutch system (Stuck off)	Lock-up is prohibited.
P0742	Torque converter clutch system (Stuck on)	Not present

DTC code No.	Detection items	Fail-safe
P0743	Lock-up & Low-reverse brake linear solenoid valve system	When the lock-up and low-reverse brake linear solenoid is ON, fixed to 5th gear during driving and to 3rd gear after a vehicle stop.
P0748	Line pressure linear solenoid valve system	In case of the short circuit (short to ground), controlled by making the line pressure to maximum.
P0753	Low clutch linear solenoid valve system	Fixed to 5th gear.
P0758	2-6 brake linear solenoid valve system	Fixed to 5th gear during driving, and to 3rd gear after a vehicle stop.
P0763	3-5 reverse clutch linear solenoid valve system	Fixed to 5th gear during driving, and to 3rd gear after a vehicle stop.
P0768	High clutch linear solenoid valve system	Fixed to 5th gear.
P0815	Paddle shift switch (up) system	The paddle shift operation during the driving cycle* ¹ in question is prohibited.
P0816	Paddle shift switch (down) system	The paddle shift operation during the driving cycle* ¹ in question is prohibited.
P0826	Shift switch assembly system	The manual mode during the driving cycle* ¹ in question is prohibited.
P0841	Low clutch pressure switch system	Control is continued with switch always on.
P0846	2-6 brake pressure switch system	Control is continued with switch always on.
P0871	3-5 reverse clutch pressure switch system	Control is continued with switch always on.
P0876	High clutch pressure switch system	Control is continued with switch always on.
P0893	Interlock detection	A reproducible shift position is selected.
P0988	Low-reverse brake pressure switch system	Control is continued with switch always on.
P1705	Throttle position sensor information (engine)	*Controlled with the throttle position fixed to 2/8 position. *Lock-up is prohibited.
P1706	Accelerator pedal position information	*Controlled with the throttle position fixed to 2/8 position.

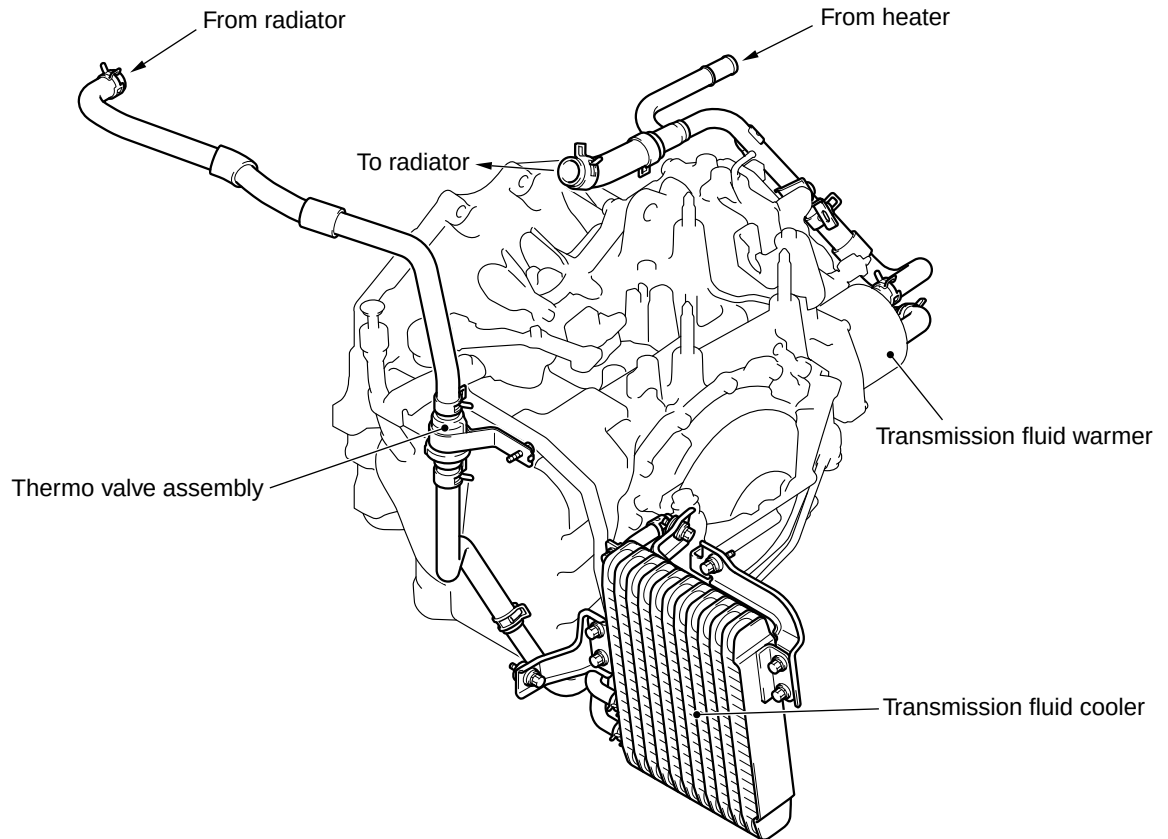
AUTOMATIC TRANSAXLE
TRANSMISSION FLUID COOLER

DTC code No.	Detection items	Fail-safe
		*Lock-up is prohibited.
P1731	1st engine brake detection	The low-reverse brake shift solenoid valve system is released.
P1753	Low clutch shift solenoid valve system	Fixed to 5th gear.
P1758	Low-reverse brake shift solenoid valve system	Fixed to 5th gear during driving, and to 3rd gear after a vehicle stop.
P1773	ABS Information (ASC)	The lock-up during the deceleration and when vehicle speed is 40 km/h (25 mph) or less is prohibited.
P1794	Ground return	Fixed to 5th gear.
U0001	CAN bus off	No action
U0100	ECM time out	No action
U0121	ASC-ECU time out	No action
U0141	ETACS-ECU time out	No action

*1: Indicates the series of driving cycle "ignition key
OFF → ON → drive → OFF."

TRANSMISSION FLUID COOLER

M22301000192USA0000010000



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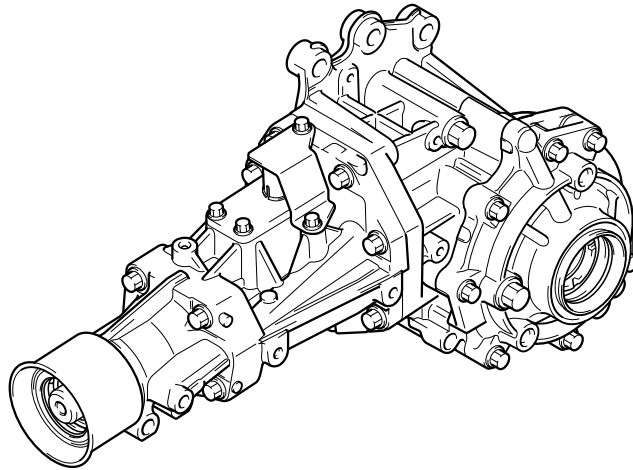
In addition to the transmission fluid warmer which utilizes the engine coolant, the air-cooled transmission fluid cooler has been adopted. The transmission fluid warmer makes the best use of the characteristics that engine coolant gets warm more quickly than transmission fluid after the engine starts.

The warmer warms the transmission fluid up to an optimum temperature [70 - 80°C (158 - 176°F) quickly to avoid loss of the automatic transaxle performance. Once the transmission fluid has reached the optimum temperature, the warmer starts cooling down the fluid to stabilize the temperature.

TRANSFER

GENERAL DESCRIPTION

M22301000001USA0000010001



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The newly-developed transfer for the electronically-controlled AWD has been adopted. The features are as follows:

- Lightweight and compact design with the simpler internal structure compared to that of the center differential type full-time AWD, by installing the

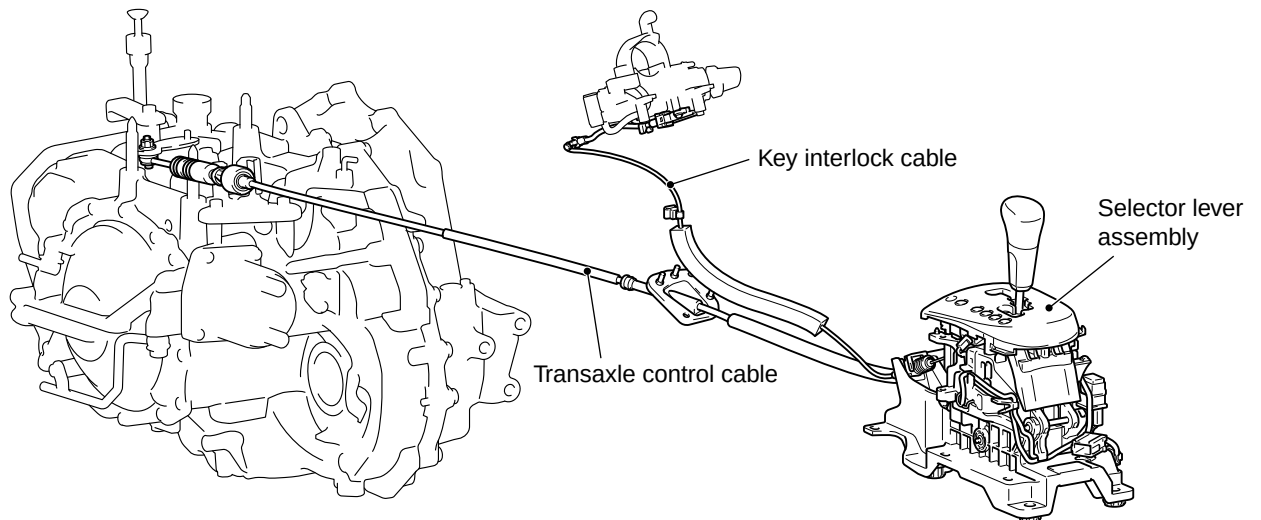
driving force distribution mechanism of the electronically-controlled AWD onto rear differential side.

- The optimized gear ratio by reducing gear offset amount
- Higher output shaft take-out position corresponding to the flattened front suspension crossmember

TRANSAXLE CONTROL

GENERAL DESCRIPTION

M22301000001USA0000010002



ZC6032120000

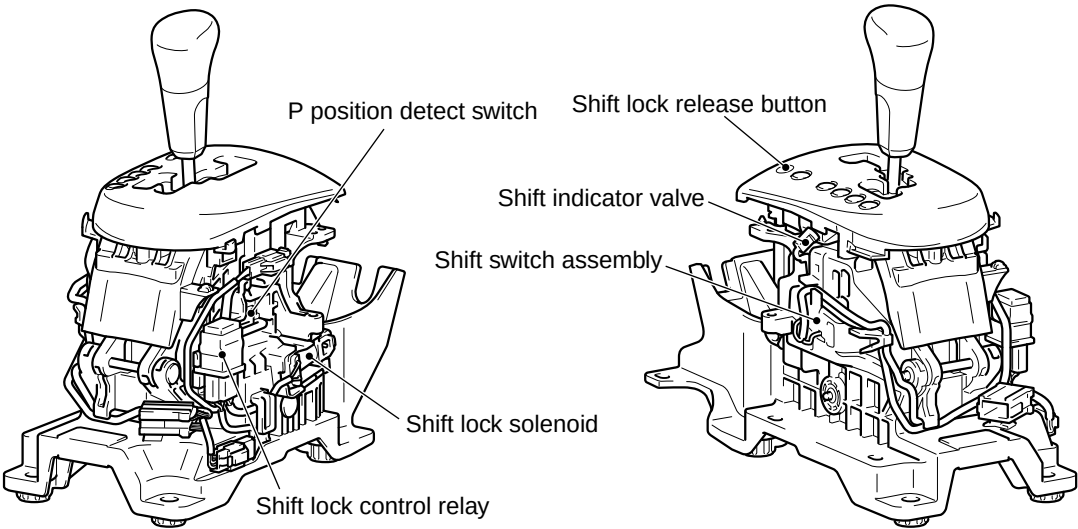
The selector lever with the gate-type sport mode has been adopted. The paddle shift is fitted near the steering wheel. The selector lever has the following features:

- The shift gate configuration and the operating power at each shift position have been properly tuned, ensuring firm and smooth operation.
- The sport mode (6-speed) allows the driver to shift manually.

- The shift knob is painted in metallic silver with a high-grade appearance. A genuine-leather shift knob is available on some models.
- The main components have been made of plastic to reduce weight and number of components.
- Electrical control-type shift lock mechanism with the solenoid for ease of adjustment.
- The cable control-type key interlock mechanism has been adopted.

SELECTOR LEVER ASSEMBLY

M22301000189USA0000010000



ZC6031910000

The electrical control-type shift lock (the shift lever is locked in the P position if the brake pedal is not depressed) mechanism has been adopted for the selector lever assembly. The functions of each switch are as follows:

Name	Function
Shift lock release button	Releases forcibly (mechanically) the shift lock.
Shift indicator bulb	Illuminates the shift indicator.
Shift switch assembly	Detects the selector lever activation in the sport mode.
Shift lock solenoid	Switches the shift lock mechanism ON/OFF.
Shift lock control relay	Switches the shift lock solenoid power supply circuit ON/OFF.
P position detection switch	Detects the P position.

A/T ERRONEOUS OPERATION PREVENTION MECHANISMS

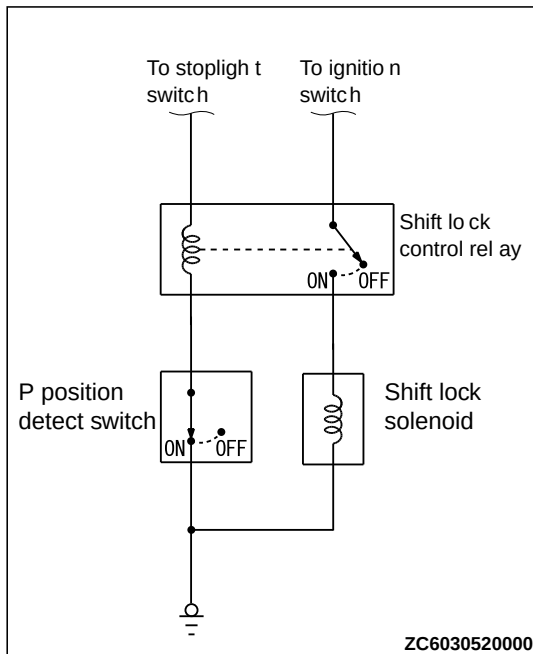
SHIFT LOCK MECHANISM

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STRUCTURE OF SHIFT LOCK SYSTEM

This system is comprised of the following components.

- Lock lever
- Shift lock solenoid
- Shift lock control relay
- P position detection switch

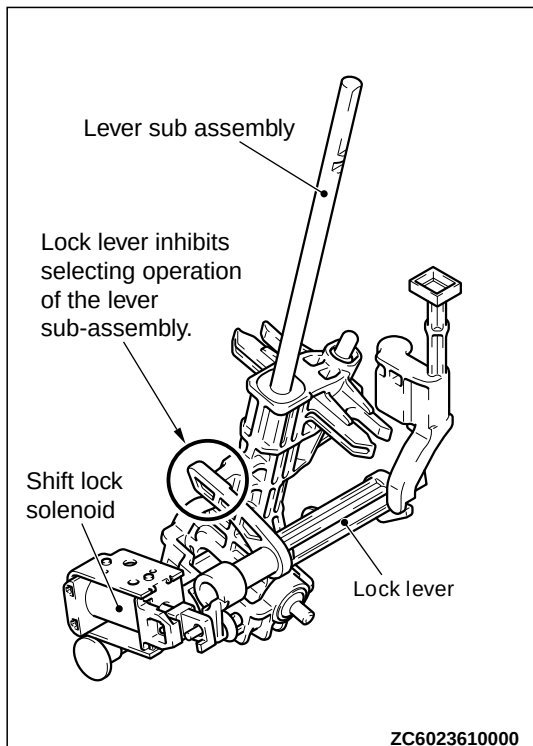


SHIFT LOCK CIRCUIT

Under all of the following conditions, the shift lock solenoid is energized, allowing the selector lever to move from the P position to another position.

- Ignition switch: ON
- P position detection switch: ON (the selector lever is in the P position)
- Stop light switch: ON (brake pedal is depressed)

OPERATIONAL DESCRIPTION

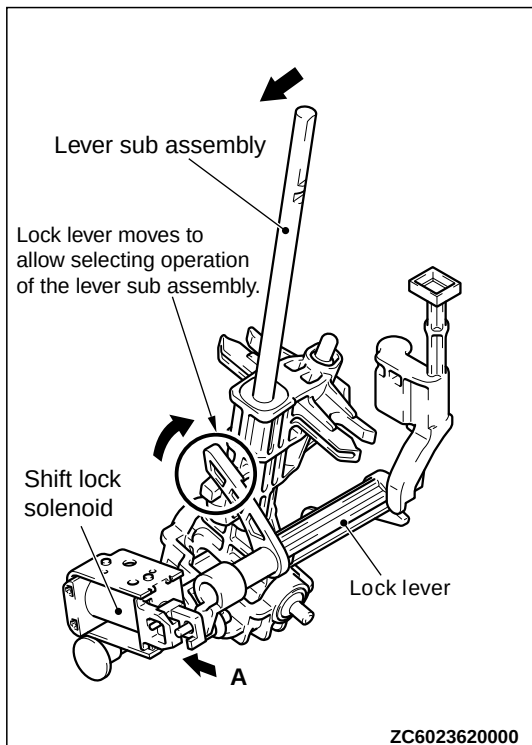


SHIFT LOCK STATUS

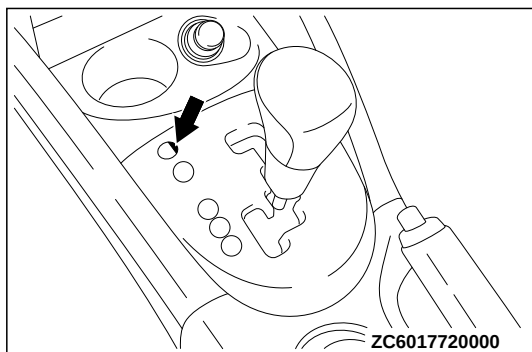
With the shift lock status, the shift lock solenoid is not energized, so when the select operation of the selector lever is attempted, no select operation is possible because the lock lever blocks the lever assembly path.

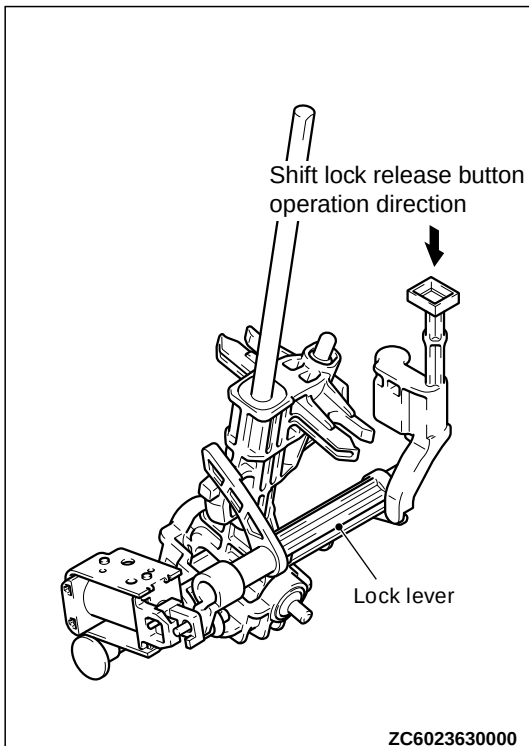
SHIFT LOCK RELEASE STATUS

When the ignition switch is ON, the selector lever is in the P position, and the brake pedal is depressed, the shift lock solenoid is energized to move the shift lock solenoid toward the direction A shown in the figure. Then the lock lever linked to the shift lock solenoid moves as shown in the figure, and no longer blocks the lever sub assembly path when the select operation is performed, enabling the operation.

**RELEASE USING THE SHIFT LOCK RELEASE BUTTON**

If the shift lock no longer operates properly due to a dead battery or the like, pressing the shift lock release button enables shift operation from the P position. The shift lock release button can be operated by removing the cover (arrow-indicated point in the figure) and pressing it with a flat-tipped screwdriver. Pressing the shift lock release button moves the lock lever to the position shown in the figure, enabling shift operation.





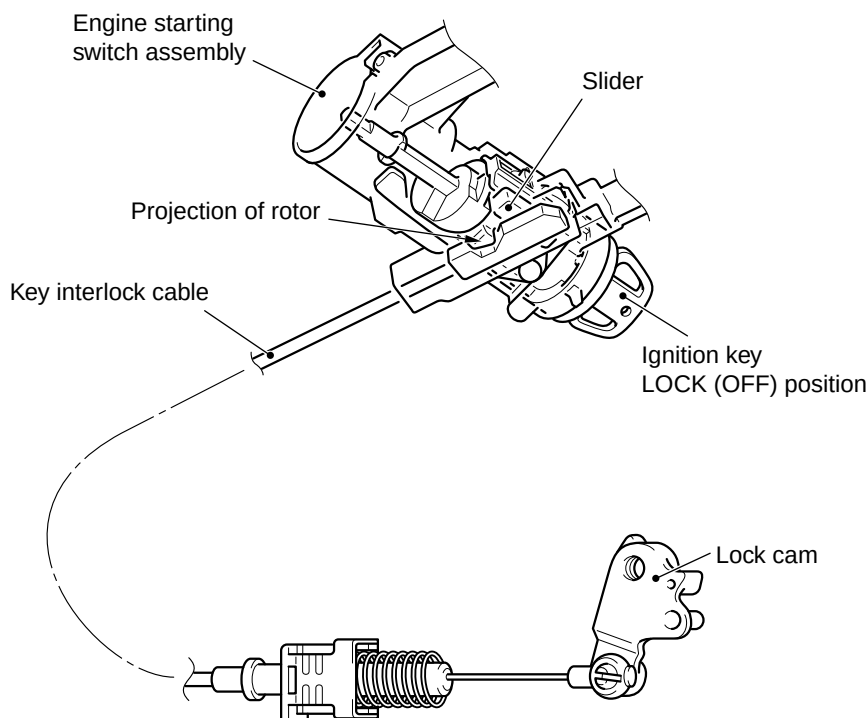
KEY LOCK MECHANISM

M22301000205USA0000010000

When the ignition key is in any position the LOCK (OFF) position, the selector lever cannot be shifted from the P position to another position. Also, when the

selector lever is not in the P position, the ignition key cannot be turned to the LOCK (OFF) position and pulled out.

When the ignition key is in the LOCK (OFF) position (With the selector lever in the P position)



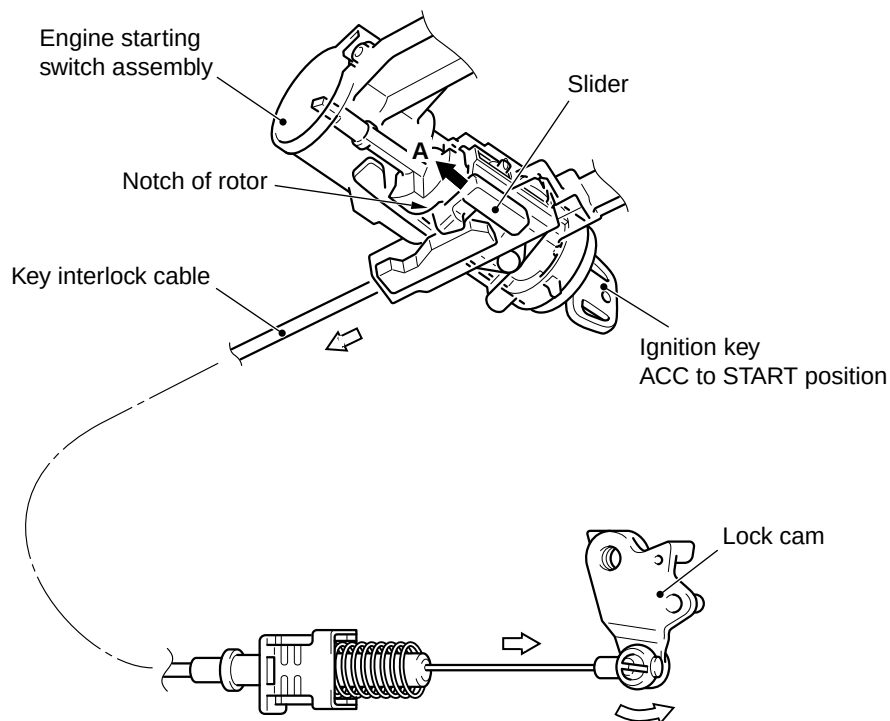
ZC6027600002

In the engine starting switch assembly, the slider is engaged with the notch of the key interlock cable, and the slider is locked by the projection of the rotor so that

the key interlock cable does not move and the lock cam does not move either.

As a result of this, any attempt to shift the selector lever, which is interlocked with the lock cam, from the P position to another position is prevented because the lock cam does not rotate.

When the ignition key is in position between ACC and START positions (With the selector lever in the P position)

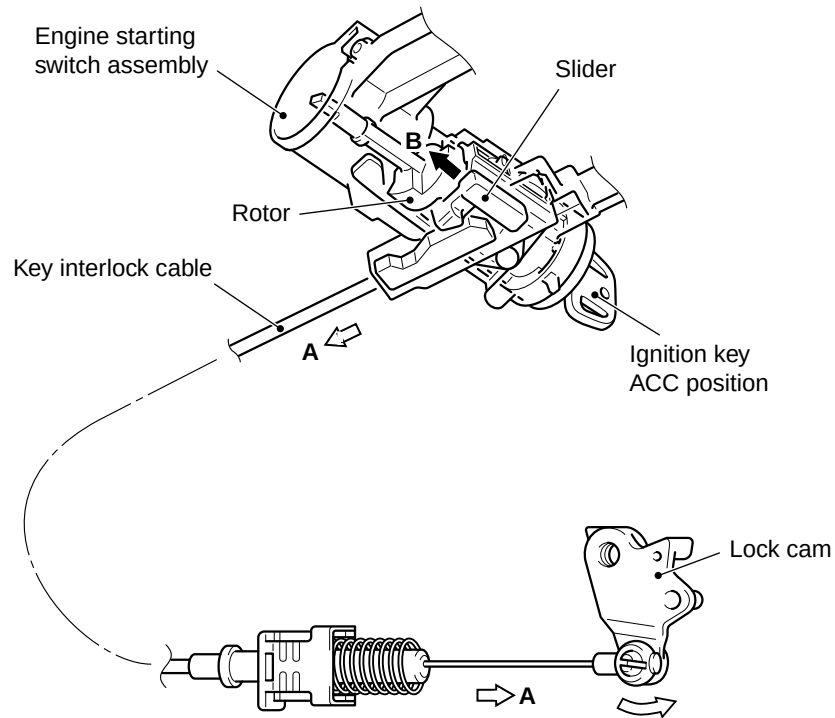


ZC6027580000

The rotor in the engine starting switch assembly is synchronized with the movement of the ignition key. Because the notch of the rotor exists in between ACC and START positions, the slider is unlocked. When the key interlock cable is pulled, the slider moves in direction A as illustrated in the figure. Therefore, the lock cam rotation becomes possible, and the selector lever which is interlocked with lock cam can be shifted from the P position to another position.

NOTE: When the ignition key is in any position ON positions without depressing the brake pedal, the

selector lever cannot be shifted from the P position to another position because the shift lock function is in operation. When the ignition key is in the ACC position or START position, the selector lever cannot be shifted from the P position to another position even if the brake pedal is depressed because the shift lock function locks the selector lever. (To shift the selector lever from the P position to another position with the ignition key in the ACC position or START position, move the selector lever while pressing the shift lock release button.)

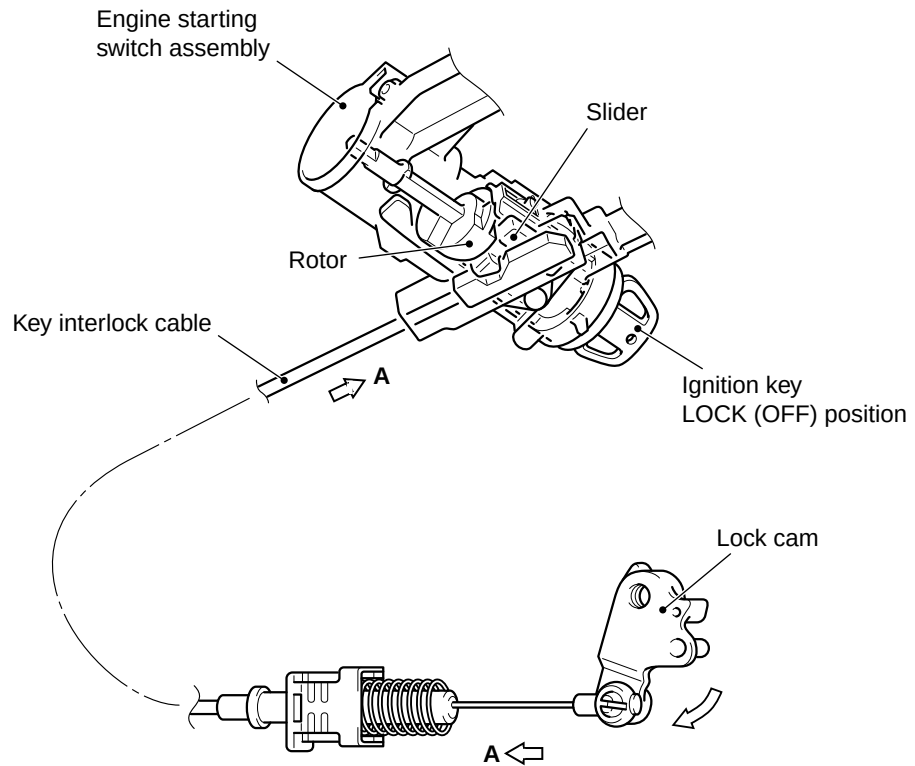
When pulling out the key with the selector lever in other than the P position

ZC602758

When the selector lever is not in the P position, the lock cam is kept in a rotated condition, and the key interlock cable is kept pulled in direction A as illustrated in the figure. In this state, the slider in the engine starting switch assembly is locked with the slider moved in direction B as illustrated in the figure.

The rotor in the engine starting switch assembly is synchronized with the movement of the ignition key. When the ignition key is turned toward the LOCK (OFF) position, the slider prevents the rotor from turning. Therefore, the ignition key can only be turned to the ACC position, so that it cannot be pulled out.

When pulling out the key with the selector lever in the P position



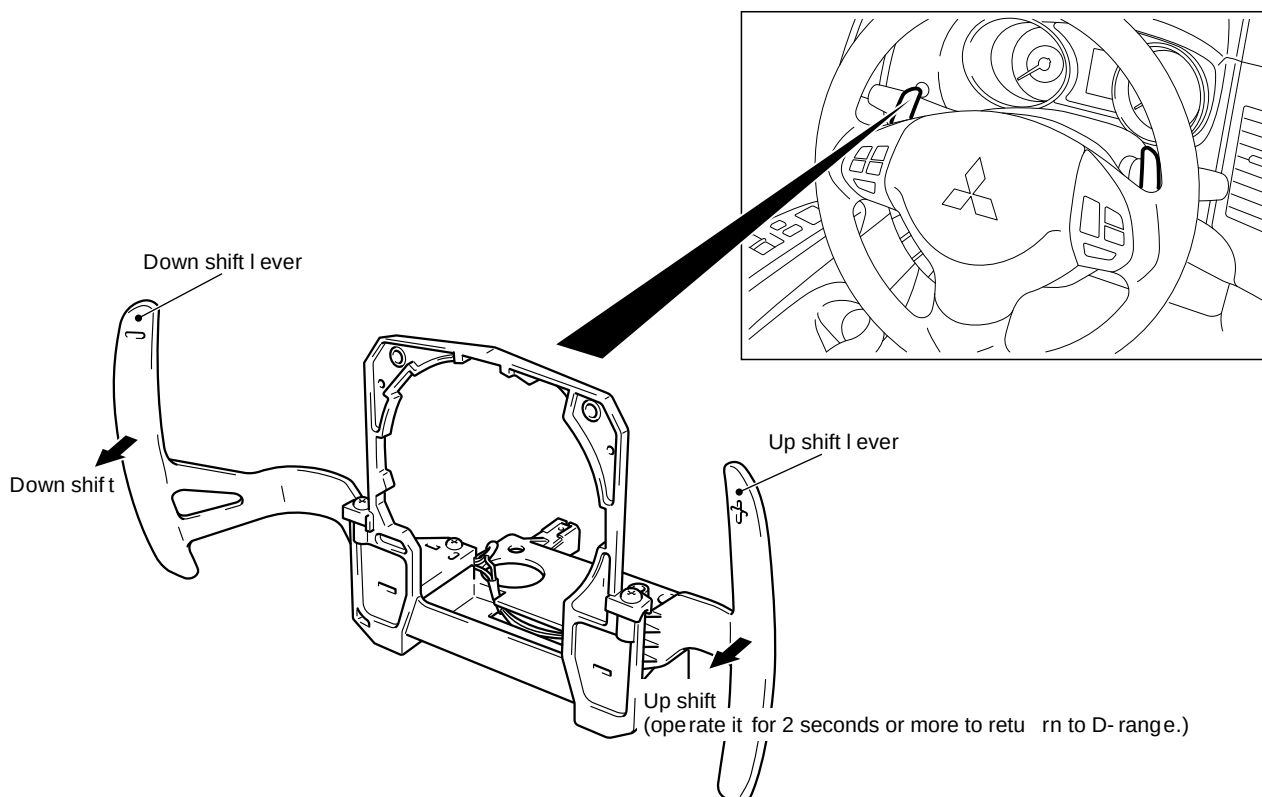
ZC6027600003

When the selector lever is shifted to the P position, the lock cam turns. Then the key interlock cable is moved by the lock cam in direction A as illustrated in the figure.

As a result of this, the slider in the engine starting switch assembly is unlocked. Because the rotor can rotate with this status, the ignition key can be pulled out after the key is turned to the LOCK (OFF) position.

PADDLE SHIFT

M22301000206USA0000010000



ZC6029410000

For some models, the paddle-shaped upshift/downshift lever has been fitted near the steering wheel to allow the driver to operate upshift or downshift with his/her hands kept on the steering wheel. The paddle shift has the following features:

- The lever on the right of the vehicle is for upshift and that on the left is for downshift.
- As the paddle shift is fixed on the steering column to maintain the certain position regardless of the steering wheel angle, the proper operation can be performed without possibility of improper up/down position even when the steering wheel is fully turned.
- The paddle shift can perform the upshift/downshift operation whether the selector lever is in the sport mode or automatic shifting to provide a rapid shift operation.

NOTE: When the mode is changed to the sport mode using the paddle shift during automatic gear shifting, the sport mode is cancelled under the following conditions.

- The upshift lever is pulled for 2 seconds or more.

▪ The vehicle is stopped.

▪ No operation is carried out for 55 minutes.

- The main components are made of magnesium alloy for weight reduction and a sporty look.