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# SECTION 5D1

## PART TIME - T/C

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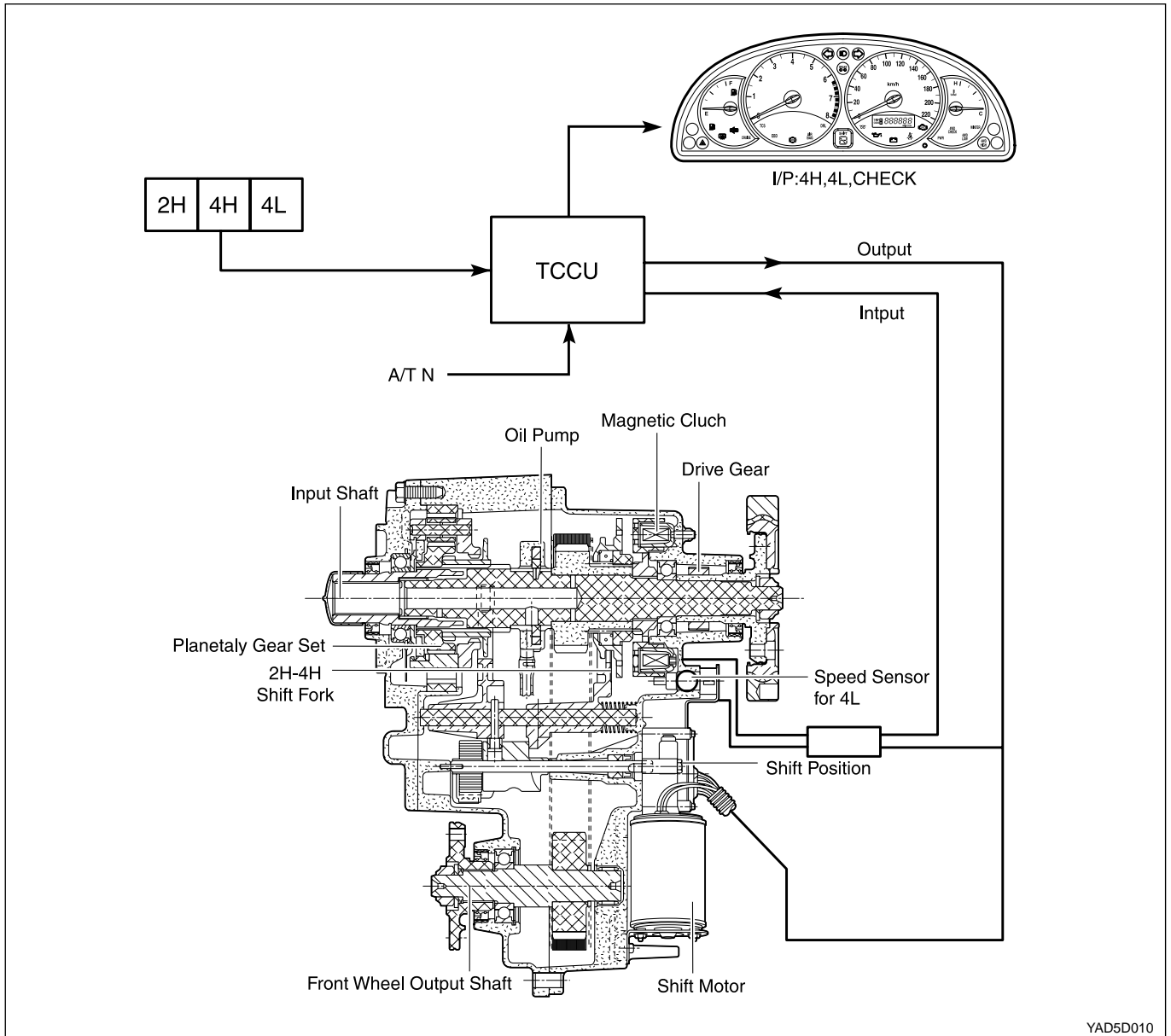
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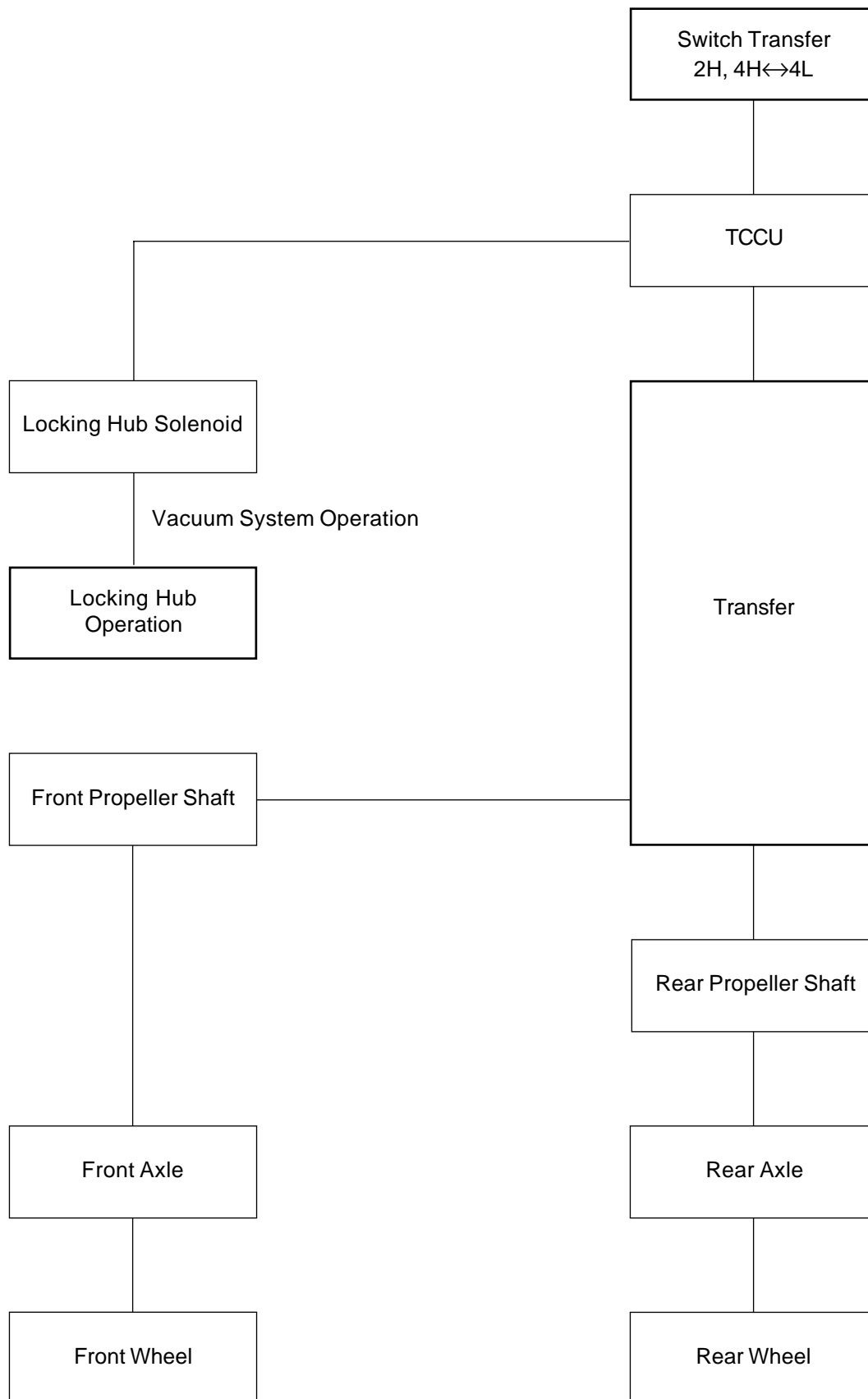
# GENERAL INFORMATION AND OPERATION

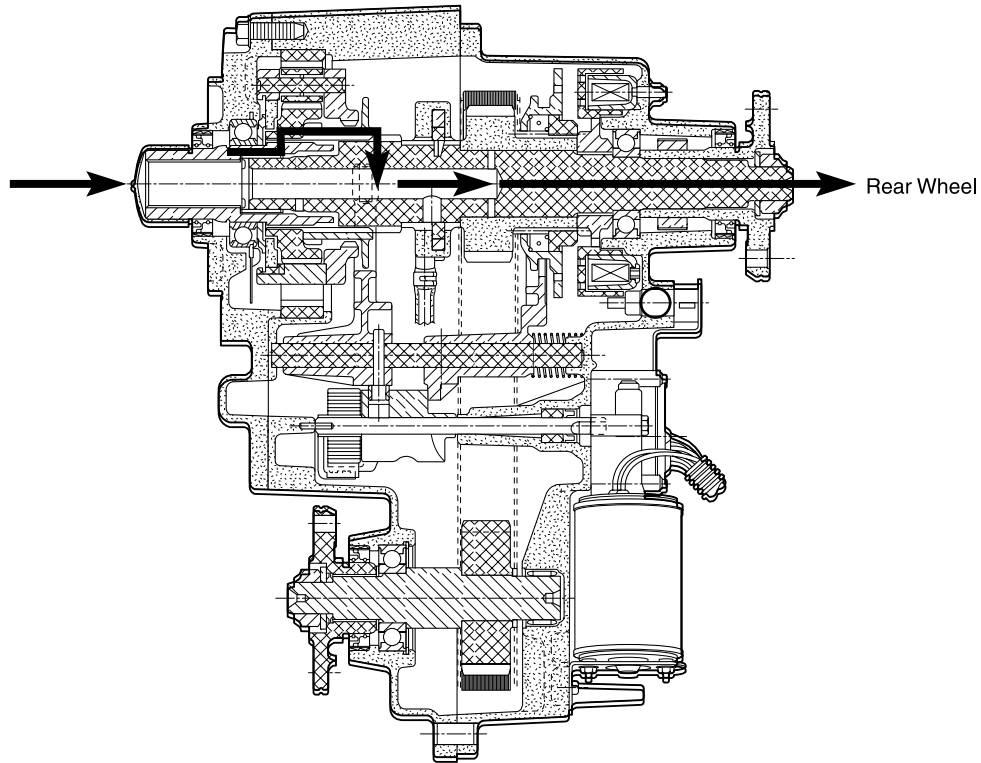
## 4WD OPERATION OVERVIEW

Application	Mode Position		Operation Condition
Driving Type	2H	2WD Drive(Rear Wheel Drive)	<ul style="list-style-type: none"> <li>Normal Driving on the normal road or highway, or high speed driving</li> </ul>
	4H	4WD Drive(High Speed)	<ul style="list-style-type: none"> <li>Slipped road such as snow, rainy, sand, mud etc.</li> </ul>
	4L	4WD Drive(Low Speed)	<ul style="list-style-type: none"> <li>Max driving force requiring condition such as towing, rough road.</li> <li>When a vehicle is driven in turning at low speed on the paved road, a vibration and a noise may be occurred by tight corner braking.</li> </ul>
Transferring	2H ↔ 4H	2WD Drive ↔ 4WD Drive(High Speed)	<ul style="list-style-type: none"> <li>2WD ↔ 4WD transfer is possible below 70 km without operating the clutch.</li> </ul>
	2H, 4H ↔ 4L	2WD Drive, 4WD Drive(High Speed) ↔ 4WD Drive(Low Speed)	<ul style="list-style-type: none"> <li>Manual Transmission Transfer starts after the vehicle stops and the clutch is applied</li> <li>Automatic Transmission Transfer starts after the vehicle stops and the shift lever is shifted [N] position.</li> </ul> <p><b>Notice:</b> After the vehicle stops and the mode switch is selected with applying the brake pedal, shifting [N-R-N] makes the mode transfer easier.</p>

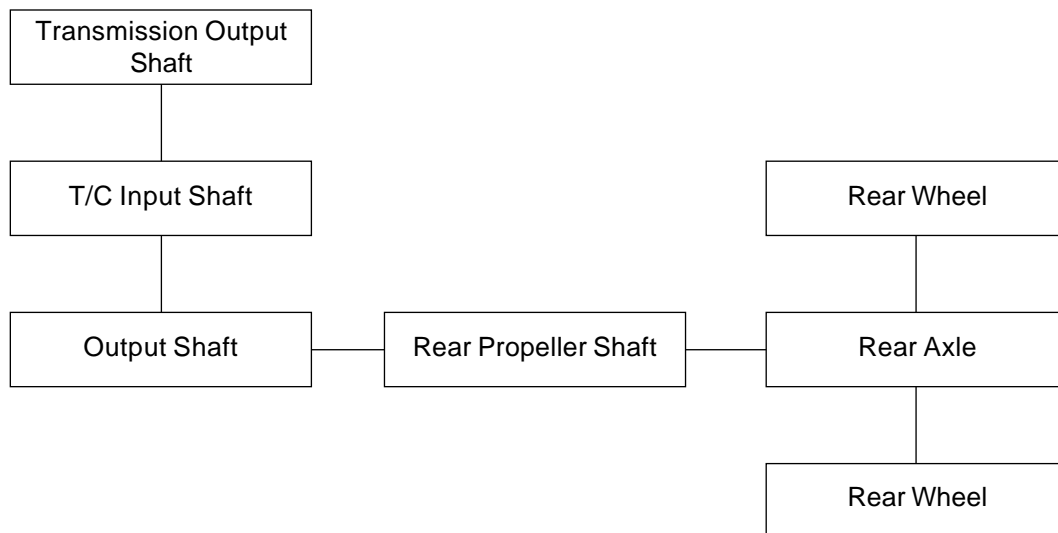
# SYSTEM STRUCTURE



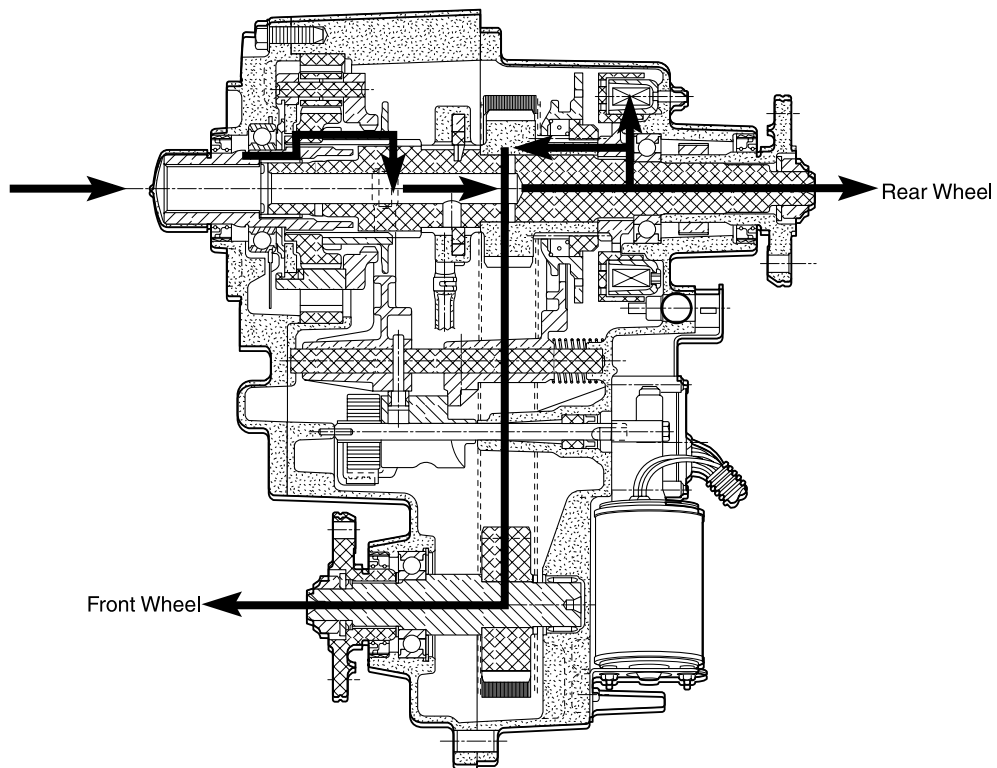
**Power Flow**

**2H MODE(REAR WHEEL DRIVE)**

YAD5D020

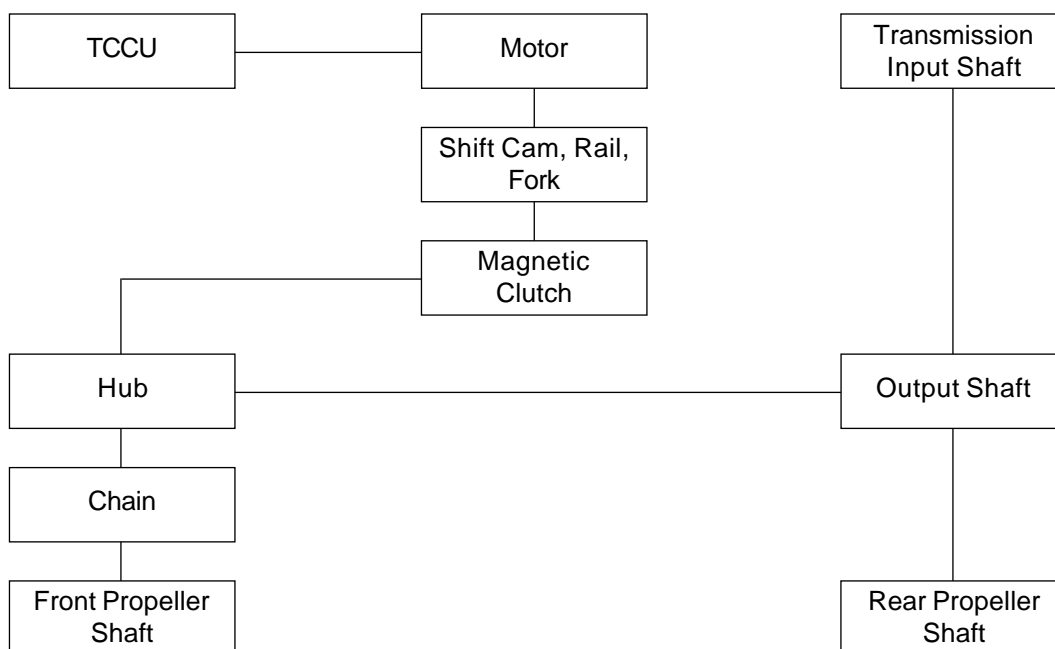
**Power Flow**

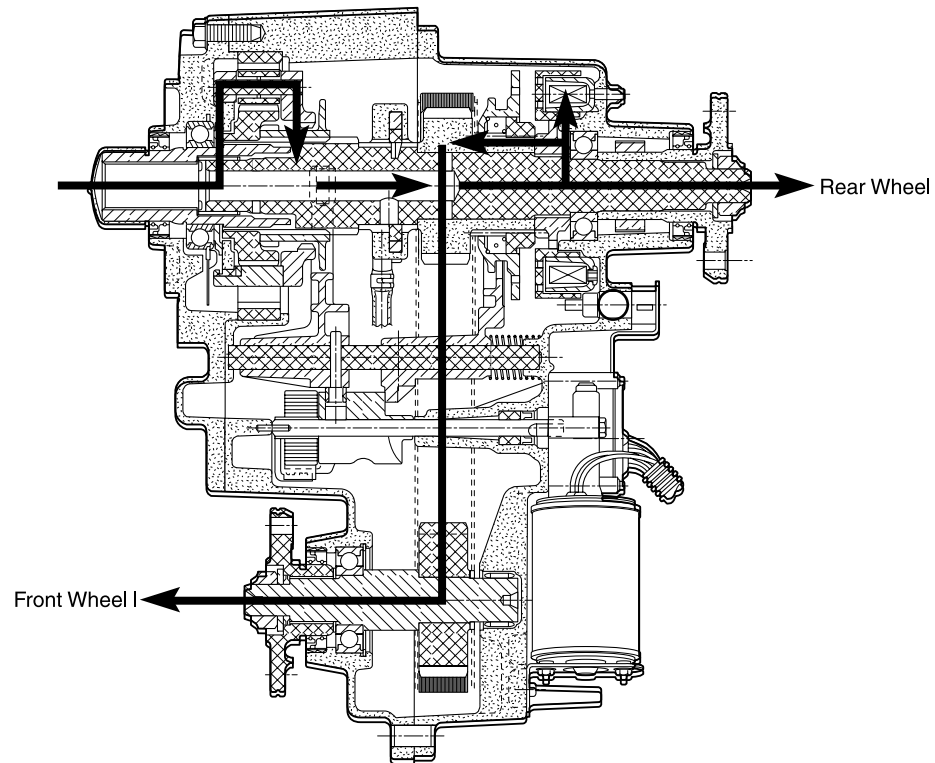
## 4H MODE(4WD DRIVE - HIGH SPEED)



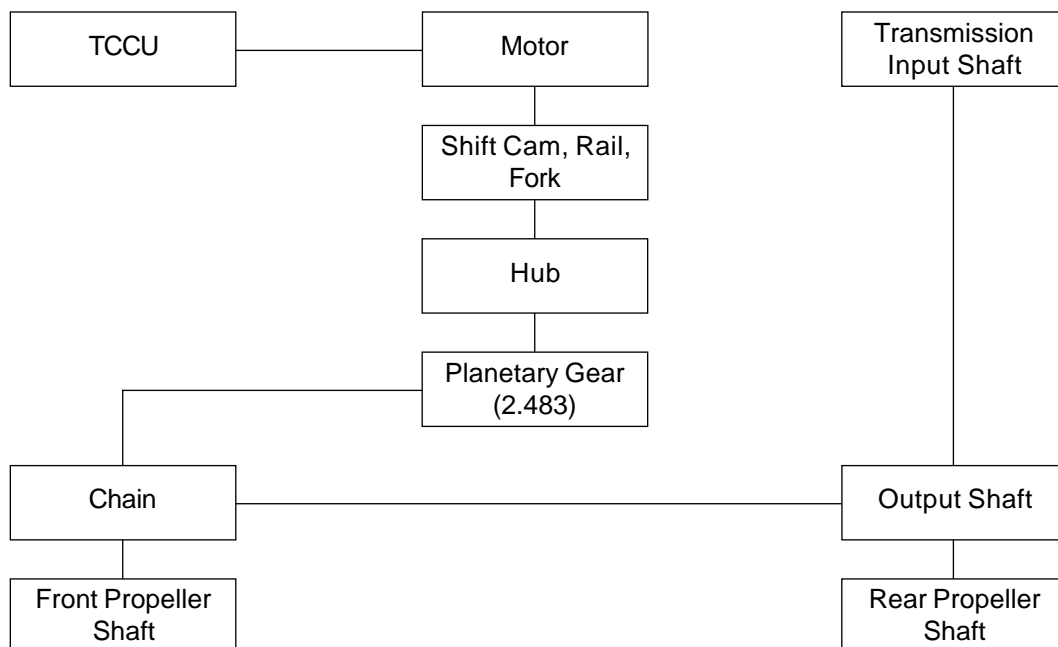
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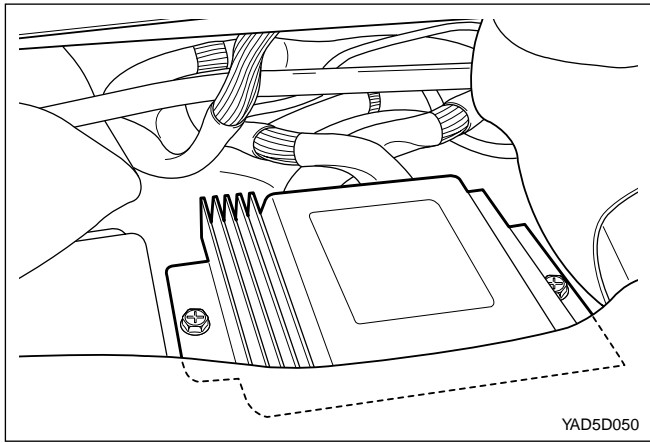
### Power Flow



**4L MODE(4WD DRIVE - LOW SPEED)**

YAD5D040

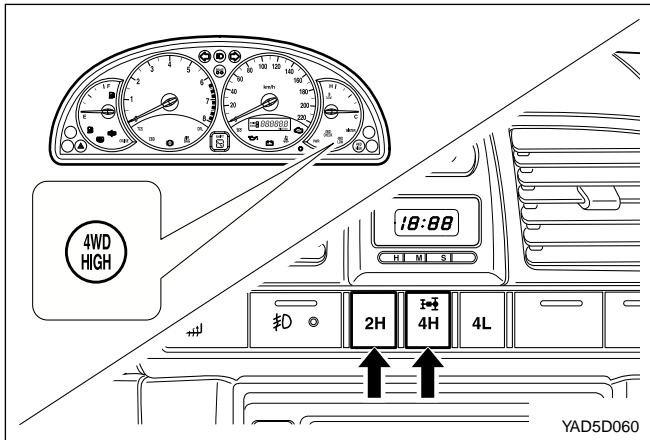
**Power Flow**



## SYSTEM DESCRIPTION

### Transfer Case Control Unit (TCCU)

TCCU is located under the front left handed seat and permits the vehicle to shift from two-wheel drive to four-wheel drive (and back shift) according to drivers switch operation during driving (For the shifting between 4WD HIGH and 4WD LOW, stop the vehicle).



#### 1. Shifting from 2H to 4H

- Position the transfer case switch from '2H' to '4H'.
- Shifting is possible during driving.
- '4WD HI' indicator light will turn on.

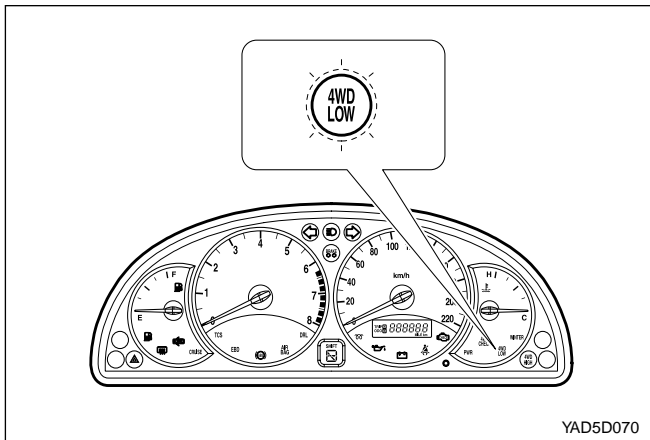
#### 2. Shifting from 4H to 2H

- Position the transfer case switch from '4H' to '2H'.
- Shifting is possible during driving.
- 4WD HI' indicator light will turn off.

#### 3. Shifting between 4H and 4L

- Shifting is possible when the vehicle is almost stopped (below approx. 2 km/h), so it would be better stop the vehicle.
- In case of manual transmission equipped vehicle, apply clutch pedal.
- In case of auto transmission equipped vehicle, put the lever position into 'N'.
- Position the transfer case switch '4H' to '4L' or '4L' to '4H'.
- According to the shifted position, indicator light will turn on.

**Notice:** If there are malfunctions during shifting, '4H' or '4L' indicator light will blink.





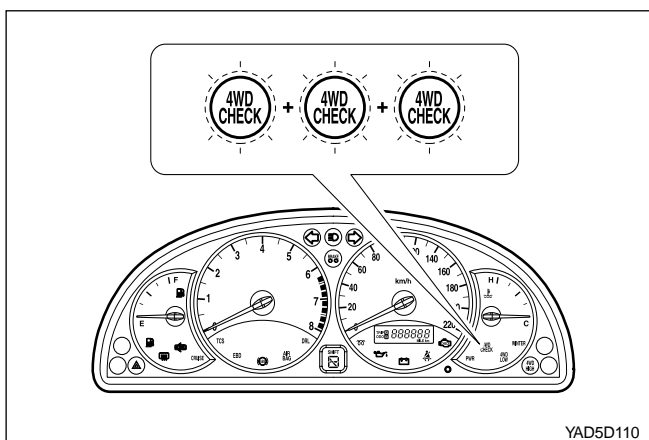
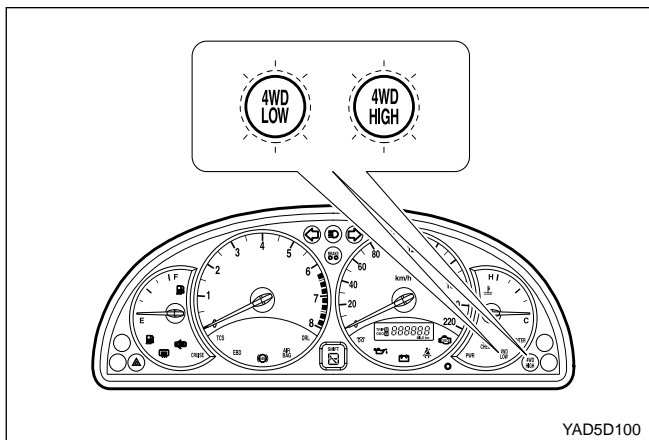
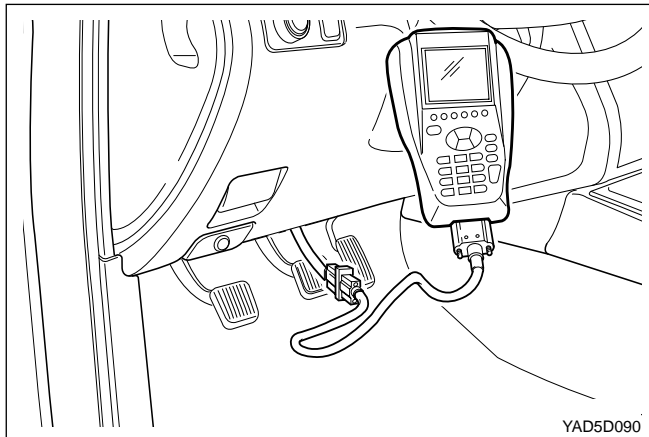
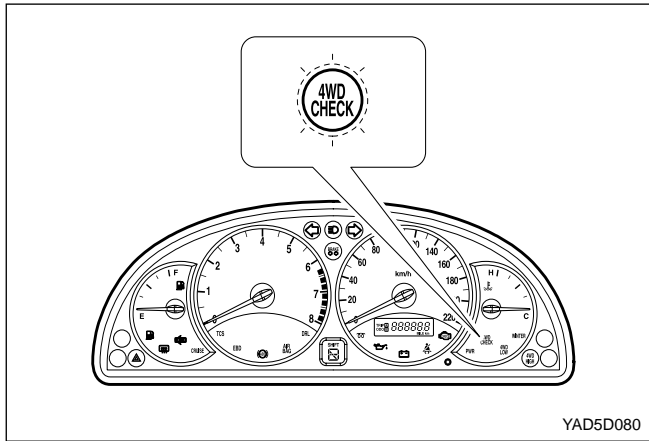
## SPECIFICATIONS

Model	Part-Time 4408 (E)	
Type	E.S.O.F. Type	
Gear Ratio	High	1 : 1
	Low	2.48 : 1
Oil	Specification	ATF S-3, S-4 or DEXRON II, III
	Capacity	1.2 L
	Lubrication	Check : Every 15,000 km
		Replace : Every 50,000 km
Manufacturer	Borg Warner	
Weight	30 kg	

# DIAGNOSTIC INFORMATION AND PROCEDURES

## GENERAL DIAGNOSIS

Symptoms	Check	Action
Electric shift problems	<ul style="list-style-type: none"> <li>Faulty or damaged TCCU, speed sensor, motor, clutch or internal wirings</li> <li>Damaged or worn shift cam, hub, fork and rail shift</li> </ul>	<ul style="list-style-type: none"> <li>Overhaul and check, replace if necessary.</li> <li>Overhaul and check for wear and damage.</li> </ul>
	<ul style="list-style-type: none"> <li>Binding shift fork, hub collar or gear</li> </ul>	<ul style="list-style-type: none"> <li>Replace if necessary.</li> </ul>
Cannot front wheel drive when shifted 4H,4L	<ul style="list-style-type: none"> <li>Broken drive chain</li> </ul>	<ul style="list-style-type: none"> <li>Check sliding parts, replace if necessary.</li> </ul>
Noise in 4WD operation	<ul style="list-style-type: none"> <li>Improper or low oil</li> <li>Loosened bolts or mounted parts</li> <li>Noisy T/C bearing</li> </ul>	<ul style="list-style-type: none"> <li>Drain and replace with specified oil.</li> <li>Retighten as specified.</li> <li>Disassemble bearings and parts and check for wear or damage. Replace if necessary.</li> </ul>
	<ul style="list-style-type: none"> <li>Gear abnormal noise</li> </ul>	<ul style="list-style-type: none"> <li>Check for wear and damage including speedometer gear, replace if necessary.</li> </ul>
Noise in 4H or 4L	<ul style="list-style-type: none"> <li>Worn or damaged sprockets or drive chain</li> <li>Incorrect tire pressure</li> </ul>	<ul style="list-style-type: none"> <li>Disassemble and check for wear and damage, replace if necessary.</li> <li>Adjust tire pressure.</li> </ul>
Transfer case oil leakage	<ul style="list-style-type: none"> <li>Cracked transfer case</li> </ul>	<ul style="list-style-type: none"> <li>Replace the case.</li> </ul>
	<ul style="list-style-type: none"> <li>Leakage from other parts</li> </ul>	<ul style="list-style-type: none"> <li>Clean case and parts and check for leakage.</li> </ul>
	<ul style="list-style-type: none"> <li>Breather clogging</li> </ul>	<ul style="list-style-type: none"> <li>Remove breather hose and clean, replace if necessary.</li> </ul>
	<ul style="list-style-type: none"> <li>Improper or too much oil</li> </ul>	<ul style="list-style-type: none"> <li>Use specified oil and adjust oil level.</li> </ul>
	<ul style="list-style-type: none"> <li>Loosened sealing bolts</li> </ul>	<ul style="list-style-type: none"> <li>Retighten</li> </ul>
	<ul style="list-style-type: none"> <li>Improperly applied sealant</li> <li>Worn or damaged oil seal</li> </ul>	<ul style="list-style-type: none"> <li>Use specified sealant and retighten.</li> <li>Replace</li> </ul>



## SELF-DIAGNOSIS TEST

### System Description

1. TCCU detects transfer case system malfunctions and indicates malfunctioning part(s) through flashing 4H,4L indicator lights.

Using a service connector, connect it to the diagnosis box in the engine room and read the flashing of the “4WD CHECK” indicator light.

The flashing indicator light will show you defective code(s).

2. Identify 7 defective codes after reading the flashing indicator light.

- TCCU
- Shift motor
- Magnetic synchronizer clutch
- Speed sensor
- Hub solenoid
- Selector switch
- Motor position sensor

3. Transfer case system is malfunctioning when:

- 4H, 4L indicator lights are remain on after 0.6 second when turning the ignition switch ON
- 4H, 4L indicator lights are continuously come on during driving.

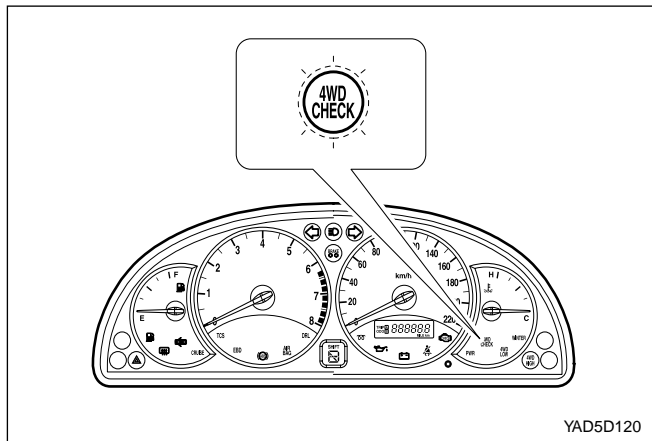
4. If only 1 part is malfunctioning, 4WD CHECK indicator light will display defective code 3 times continuously.

5. If more then 2 part is malfunctioning, the first malfunctioning part will be displayed 3 times and following malfunctioning parts will be displayed .

6. To read defective code, connect the service connector and turn the ignition switch ‘ON’.

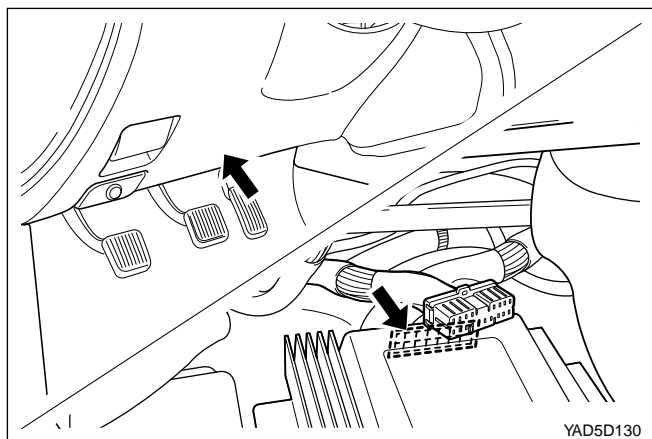
7. After repairing, eliminate the defective code stored in the TCCU.

**Notice:** Before replacing the malfunction parts with defective code, check the wires and connectors for proper condition.



### Defective Code Reading

1. Position the ignition switch to OFF
2. Using a service connector, connect the No.2 pin (Ignition) and No.13 pin (TCCU) of the diagnosis socket in the engine room.
3. Position the ignition switch to ON.
4. Read the flashing 4WD CHECK indicator light and identify the malfunctioning part(See Diagnosis Table).

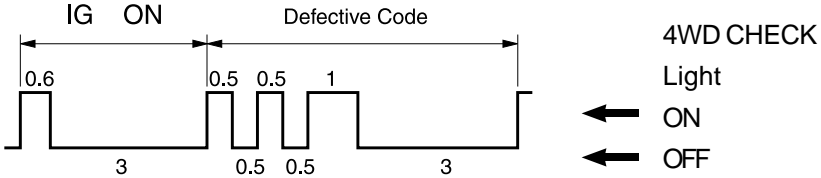
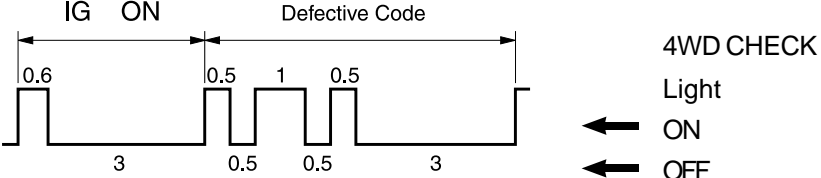
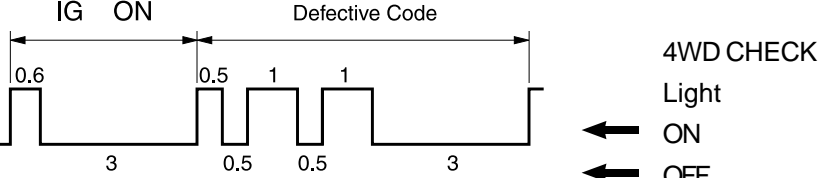
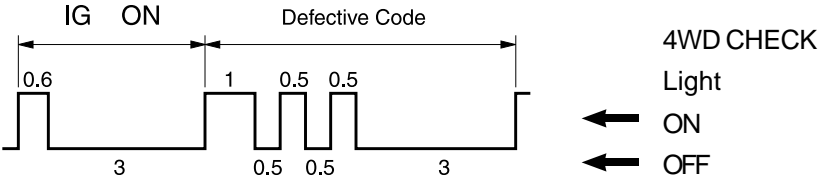
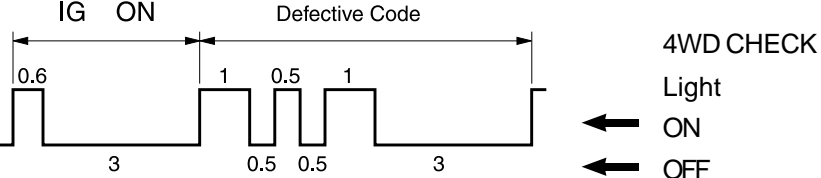


### How to Clear the Fault Code

1. Position the ignition switch to OFF.
2. Using a service connector, connect the No.2 pin (GND) and No.13 pin (TCCU) of the diagnosis socket in the engine room.
3. Position the ignition switch to ON over 5 seconds.
4. Do defective code reading and make sure that all defective codes are eliminated.

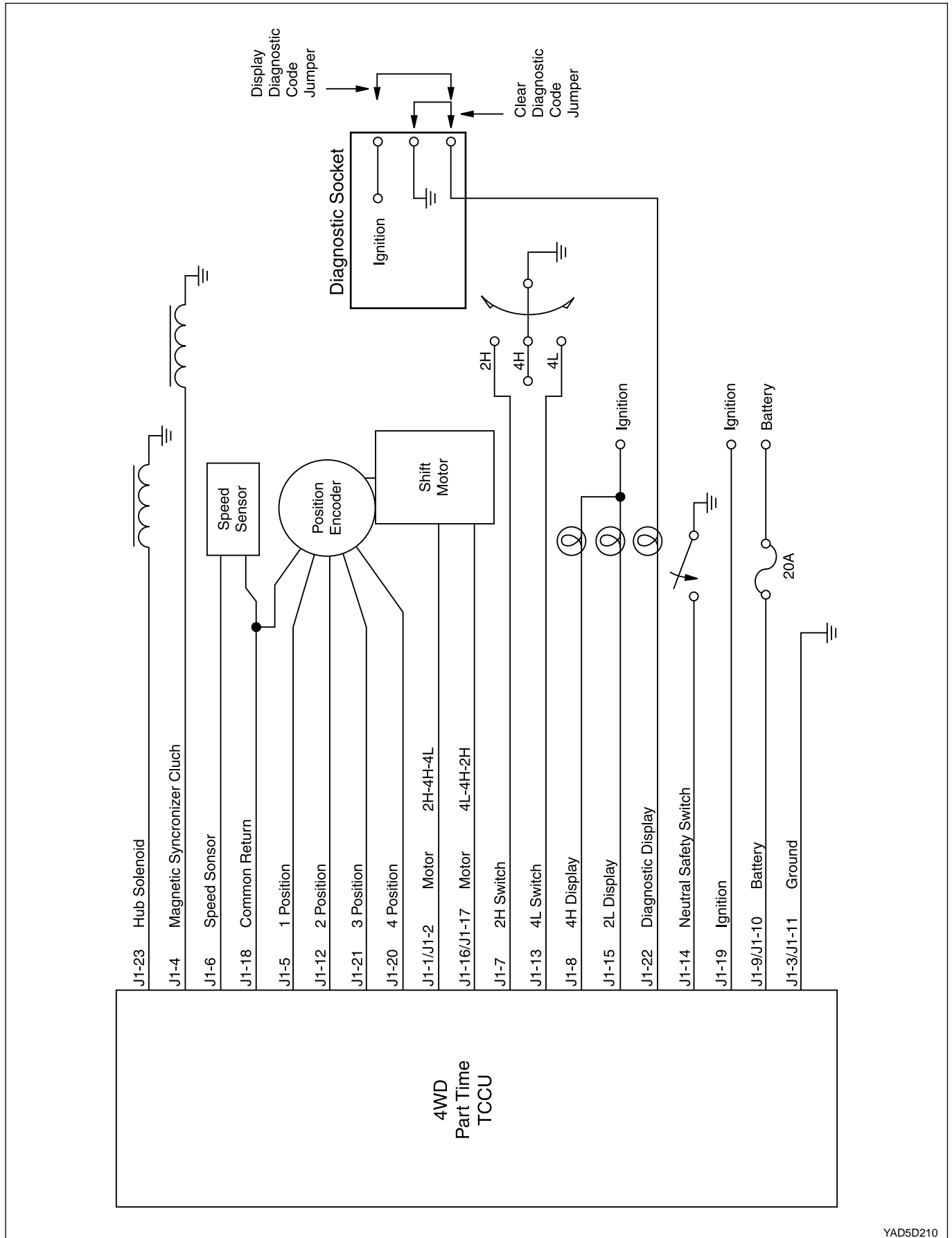
## Diagnostic Table

Connect a service connector. If turn the ignition switch "ON" "4WD CHECK" indicator light will come on for 0.6 second and turn off for 3 seconds and then display a defective code 3 times continuously.

No.	Defective Code	Malfunctioning Part
1	 <p style="text-align: center;">YAD5D140</p>	TCCU
2	 <p style="text-align: center;">YAD5D150</p>	Shift Motor
3	 <p style="text-align: center;">YAD5D160</p>	Synchronizer Clutch
4	 <p style="text-align: center;">YAD5D170</p>	Speed Sensor
5	 <p style="text-align: center;">YAD5D180</p>	Locking Hub Solenoid

No.	Defective Code	Malfunctioning Part
6	<div><div><div><div>IG</div><div>ON</div></div><div><div>0.6</div><div>3</div></div><div><div>1</div><div>0.5</div></div><div><div>1</div><div>0.5</div></div><div><div>3</div></div></div><div><div>Defective Code</div></div><div><div>4WD CHECK</div><div>Light</div><div>ON</div><div>OFF</div></div></div> <div>YAD5D190</div>	Selector Switch
7	<div><div><div><div>IG</div><div>ON</div></div><div><div>0.6</div><div>3</div></div><div><div>1</div><div>0.5</div></div><div><div>1</div><div>0.5</div></div><div><div>1</div><div>0.5</div></div><div><div>3</div></div></div><div><div>Defective Code</div></div><div><div>4WD CHECK</div><div>Light</div><div>ON</div><div>OFF</div></div></div> <div>YAD5D200</div>	Motor Position Sensor

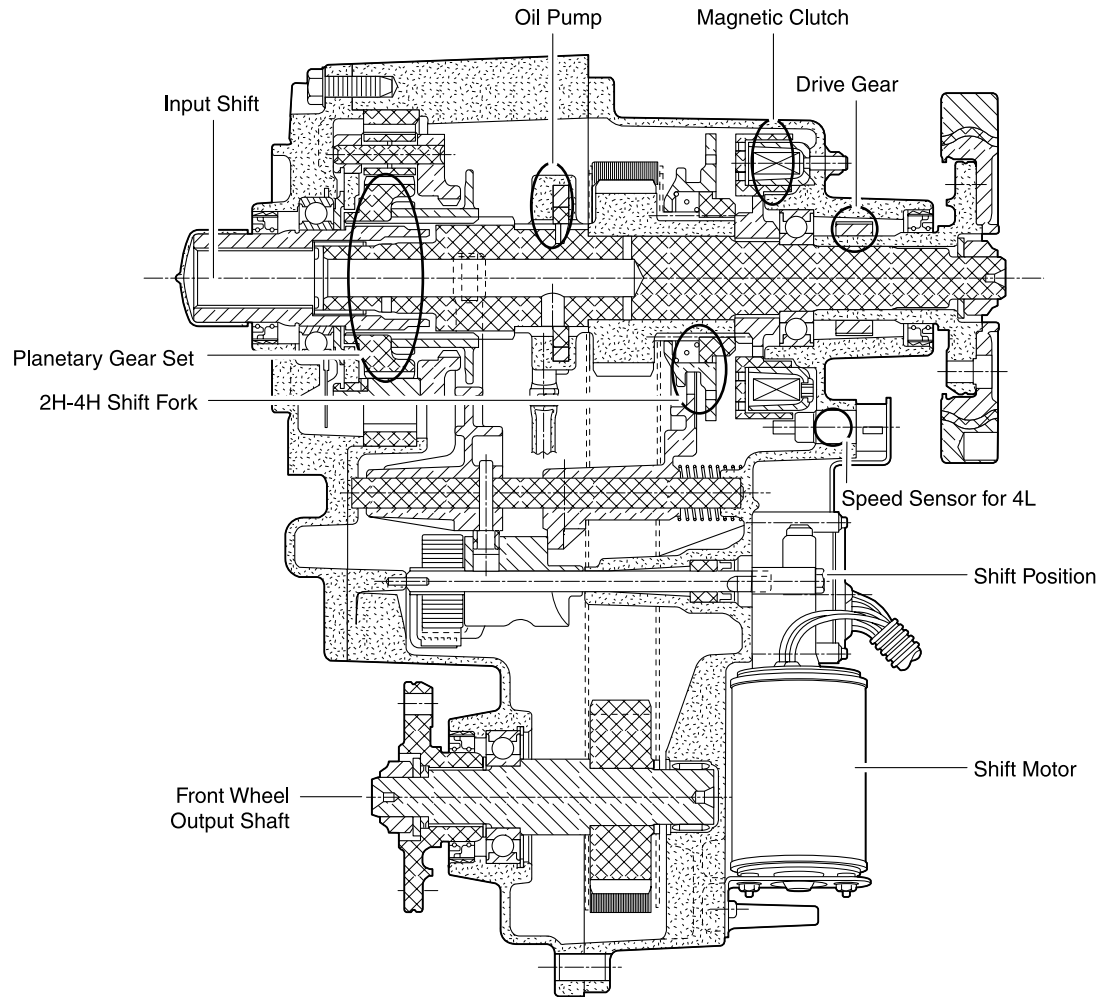
# DIAGNOSTIC DIAGRAM



YAD5D210

# COMTONENT LOCATOR

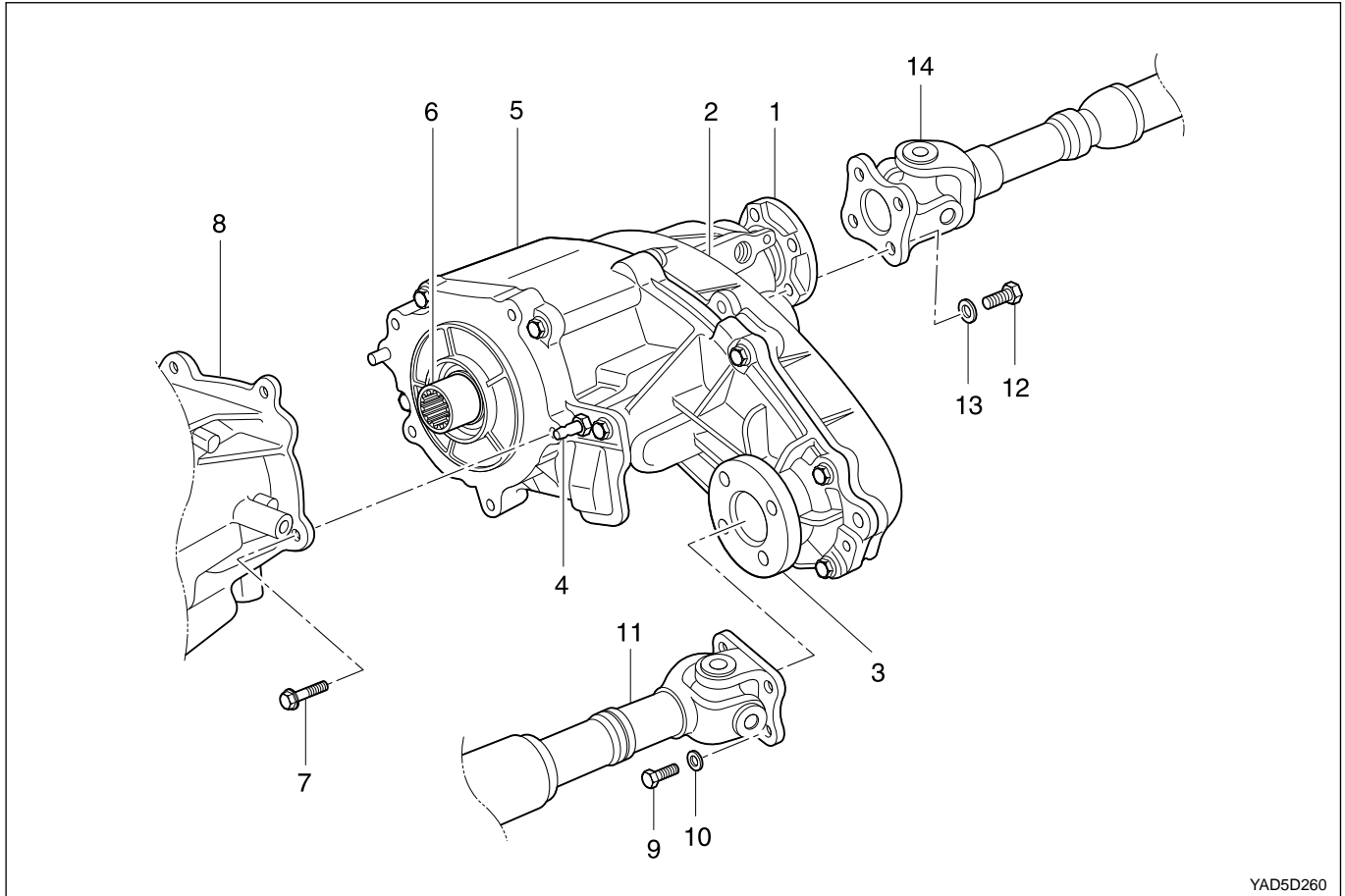
## CROSS SECTIONAL VIEW



YAD5D250



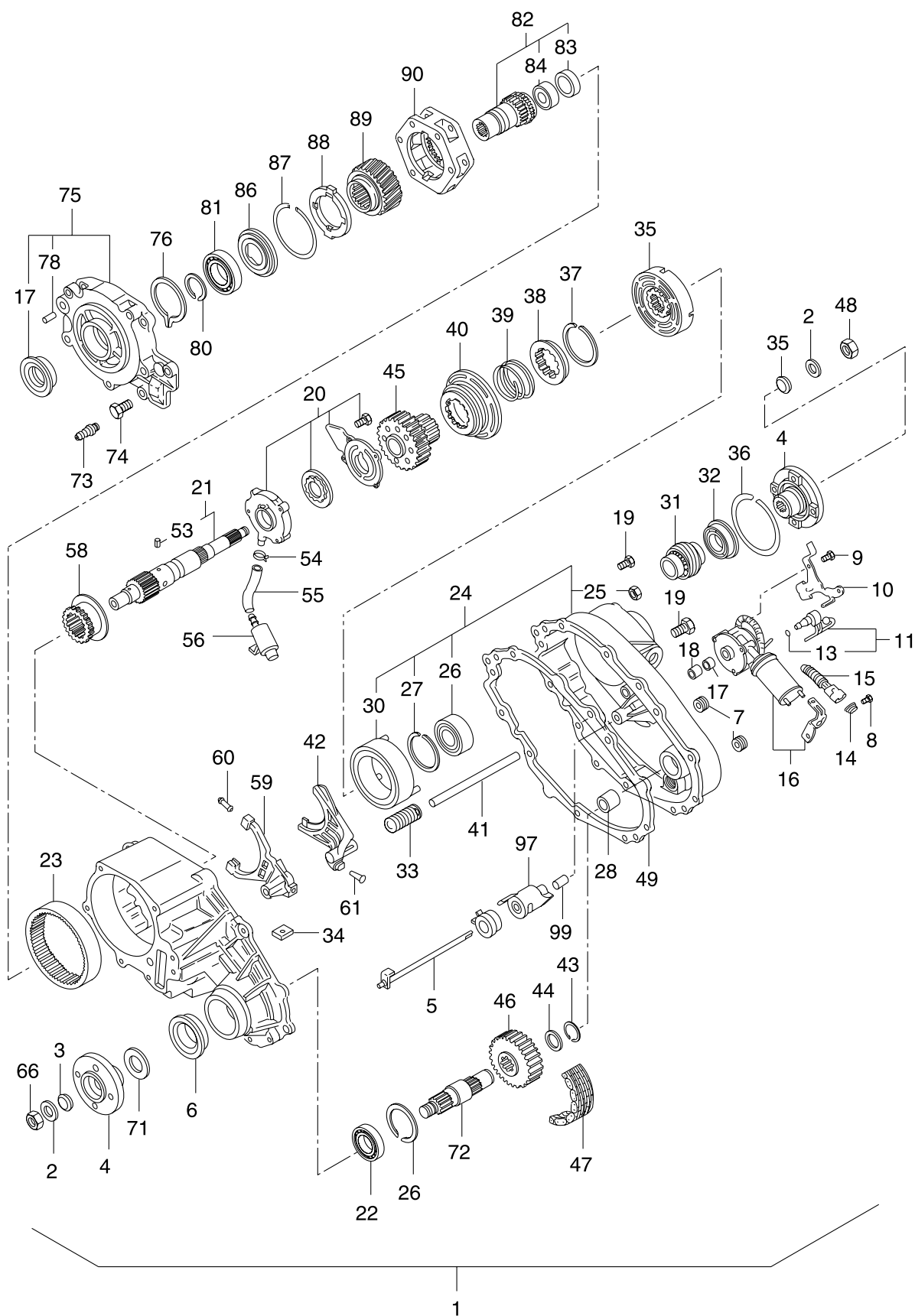
## TRANSFER CASE ASSEMBLY



YAD5D260

- |   |                        |    |                                |
|---|------------------------|----|--------------------------------|
| 1 | Rear Companion Flange  | 8  | Transmission Extension Housing |
| 2 | Case Cover             | 9  | Bolt                           |
| 3 | Front Companion Flange | 10 | Washer                         |
| 4 | Breather Plug          | 11 | Front Propeller Shaft          |
| 5 | Transfer Case          | 12 | Bolt                           |
| 6 | Input Shaft            | 13 | Washer                         |
| 7 | Mounting Bolt          | 14 | Rear Propeller Shaft           |

## DISASSEMBLY AND ASSEMBLY



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1	Transfer Case	41	Rail Shaft
2	Spring Washer	42	Lock-up Fork
3	Oil Seal	43	Snap ring
4	Companion Flange	44	Spacer
5	Shift shaft	45	Driven Sprocket
6	Oil Seal	46	Driving Sprocket
7	Pipe Plug	47	Drive Chain
8	Screw	48	Nut
9	Bolt	49	Gasket
10	Speed Sensor and Harness Bracket	53	Spring Pin
11	Speed Sensor Assembly	54	Hose Clamp
12	Speed Sensor	55	Hose Coupling
13	O-Ring	56	Oil Strainer
14	Locking Clip	58	Reduction Hub
15	Connector	59	Shift Fork Assembly
16	Motor Assembly	60	Shift Fork Facing
17	Oil Seal	61	Roller and Retainer
18	Bearing	66	Nut
19	Bolt	67	Plane Washer
20	Pump Assembly	68	Oil Seal
21	Output Shaft Assembly	71	Spacer
22	Bearing	72	Front Output Assembly
23	Ring Gear	73	Breather
24	Cover Assembly	74	Bolt
25	Nut	75	Front Adapter Assembly
26	Snap Ring	76	Snap Ring
27	Bearing	80	Snap Ring
28	Needle Bearing	81	Bearing
30	Clutch Coil Assembly	82	Input Shaft Assembly
31	Speed Gear	83	Sleeve Assembly
32	Oil Seal	84	Needle Bearing
33	Return Spring	86	Thrust Washer
34	Magnet	87	Retaining Ring
35	Clutch Housing	88	Thrust Plate
36	Snap Ring	89	Sun Gear
37	Snap Ring	90	Gear Carrier Assembly
38	Lock-up Hub	97	Electric Shift Cam
39	Sleeve Return Spring	99	Spacer
40	Lock-up Collar		

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## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

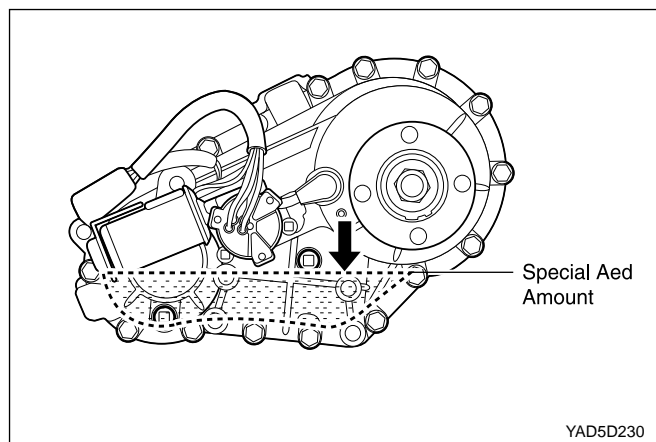
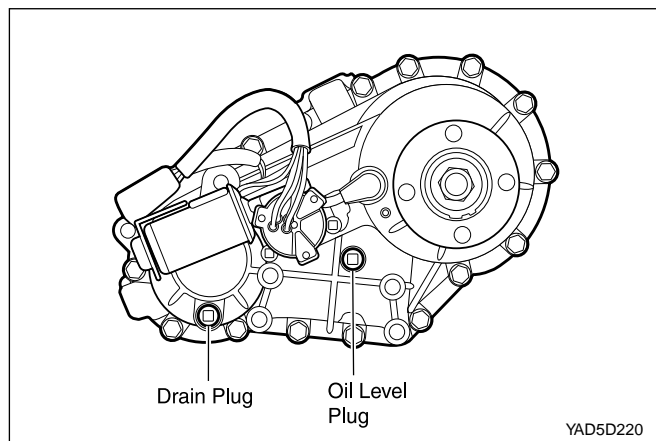
#### MAINTENANCE OF TRANSFER CASE LUBRICANT

##### 1. Oil Level Check

- Clean the oil level plug and surrounding area.
- Remove the oil level plug and check whether oil is drip out or not.
- Tighten the oil level plug.

##### Installation Notice

Tightening Torque	20 - 30 N•m (15 - 22 lb-ft)
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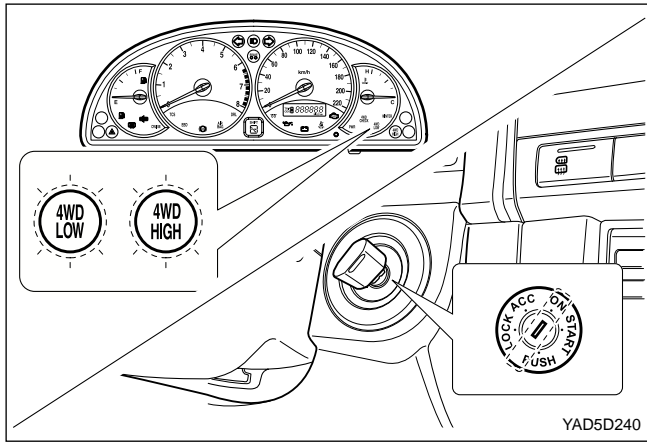


##### 2. Oil Change

- Clean the oil level plug and surrounding area
- Place a suitable container under the transfer case.
- Remove the oil and tighten the drain plug.
- Fill the oil through the oil level plug until oil begins to drip out.
- Tighten the oil level plug.

##### 3. Cautions for oil level check and plugs tightening

- Do not use an impact wrench to remove or tighten the oil level plug or drain plug since this will damage the threads in the transfer case.



## 4H AND 4L INDICATOR

When the ignition switch turns on, 4H and 4L indicators turn on for 0.6 seconds and turn off.

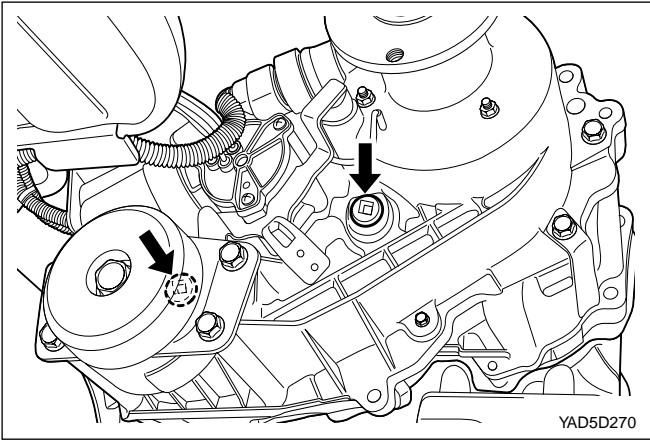
**Notice:** If 4H and 4L indicators do not turn on, check the related bulb, the wiring harness and TCCU.

## TCCU INSPECTION

Pin No.	Operation Condition	Voltage(V)
J1 - 7	4H or 4L	4.75 - 5.35
	2H	0 - 0.50
J1 - 8	4H indicator light ON	< 1.00
	4H indicator light OFF	> 11.00
J1 - 13	2H or 4H	4.75 - 5.35
	4L	0 - 0.50
J1 - 14	Clutch pedal applied	< 0.50
	Clutch pedal released	> 11.00
J1 - 15	4L indicator light ON	< 1.00
	4L indicator light OFF	> 11.00
J1 - 16	Motor OFF	< 1.00
	Motor ON	> 11.00
J1 - 17	Motor OFF	< 1.00
	Motor ON	> 11.00
J1 - 23	Auto locking hub ON	> 11.00
	Auto locking hub OFF	< 1.00

**Notice:**

- DC 12V for the TCCU operation should be maintained.
- In case of J1-8 and J1-15, indicator light will turn on for 0.6 second when turn the ignition switch ON.
- If 4H and 4L indicator lights remain turned on when turn the ignition switch on or during driving, perform the TCCU diagnosis.

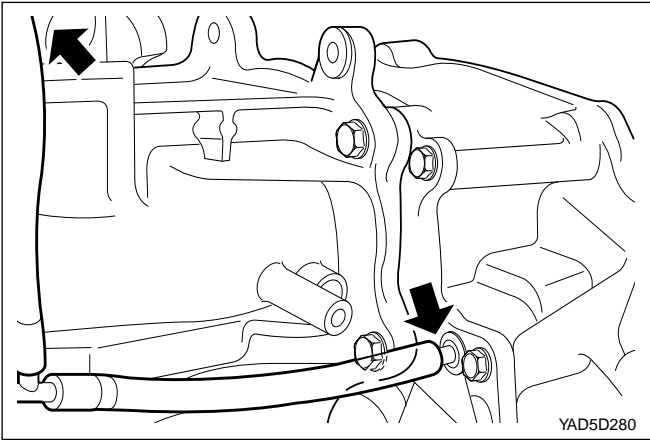


## TRANSFER CASE ASSEMBLY

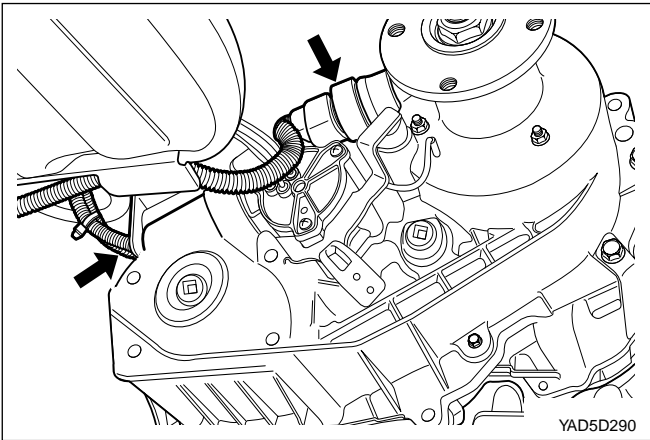
1. Disconnect the negative terminal from the battery.
2. Lift up the vehicle and fix it safely.
3. Remove the damper mounting bolt.
4. Remove the drain plug and drain the oil.  
Reinstall the drain plug.

### Installation Notice

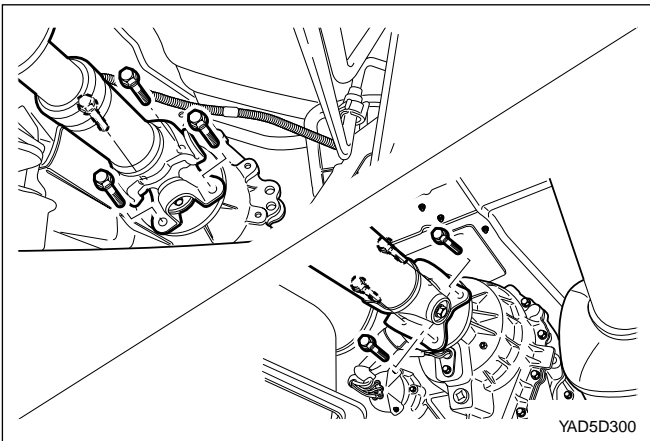
Tightening Torque	19 - 30 N•m (14 - 22 lb-ft)
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5. Remove the breather hose.



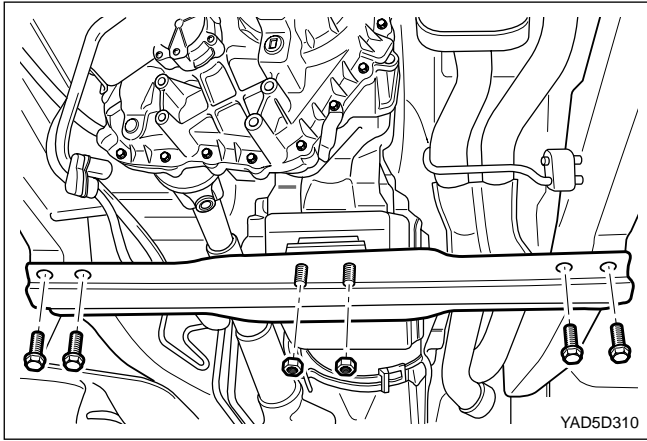
6. Disconnect the speedometer cable connector and other cable connectors and wiring harnesses.



7. Support the transfer case with jack and remove the front and rear propeller shafts from the transfer case.

### Installation Notice

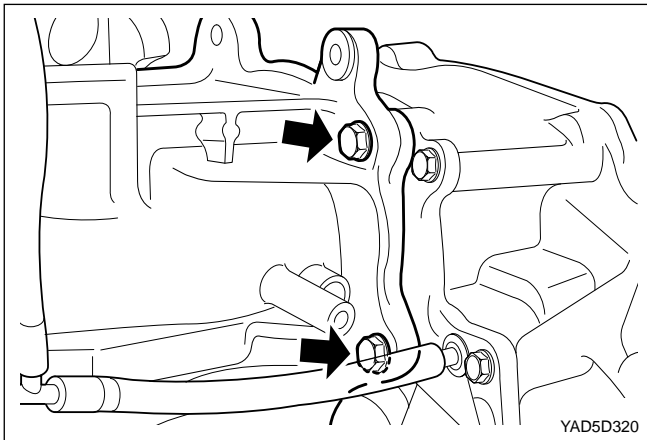
Tightening Torque	Front	81 - 89 N•m (60 - 66 lb-ft)
	Rear	70 - 90 N•m (52 - 66 lb-ft)



8. Remove the center mounting nuts and end sides mounting bolts of the cross member and then remove the cross member.

#### Installation Notice

Tightening Torque(1)	12 - 23 N•m (9 - 17 lb-ft)
Tightening Torque(2)	6 - 8 N•m (53 - 71 lb-in)



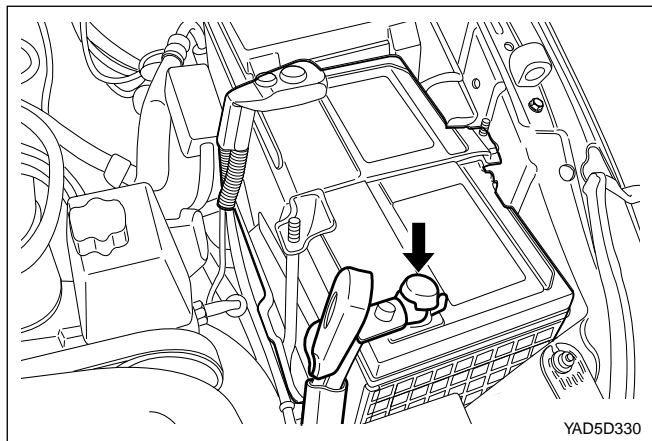
9. Remove the transfer case by removing the bolts attaching the transfer case to the transmission.

#### Installation Notice

Tightening Torque	35 - 60 N•m (26 - 44 lb-ft)
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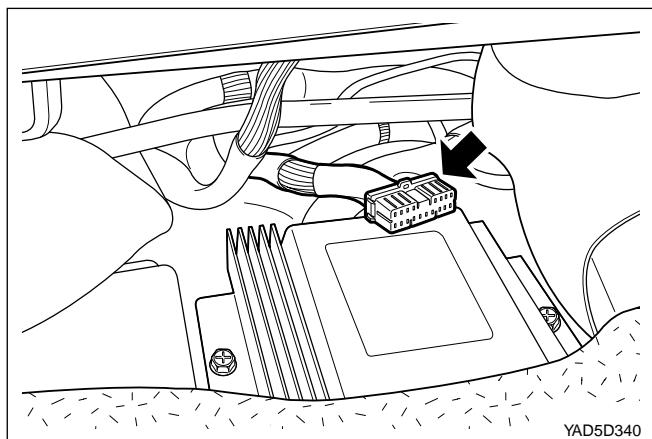
**Notice:** Apply long-term grease to the inner spline of the transfer case input shaft.

10. Installation should follow the removal procedure in the reverse order.

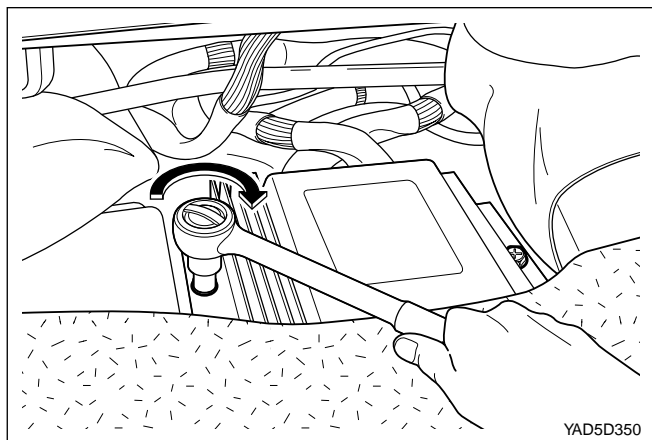


## TCCU

1. Disconnect the negative terminal from the battery.

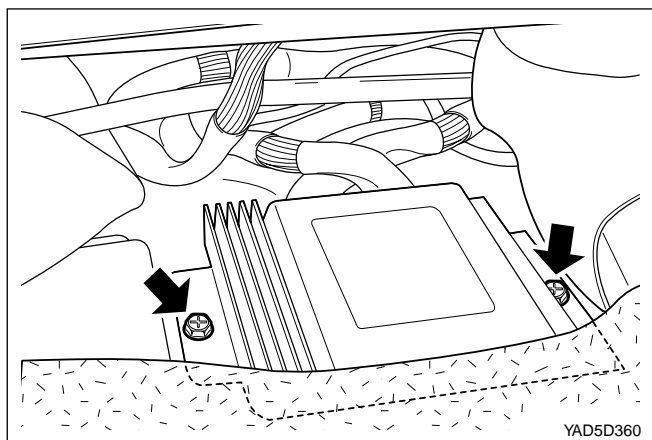


2. Remove the TCCU connector.



3. Remove the TCCU mounting bolt and remove the TCCU.

- TCCU installation position : Under the driver's seat



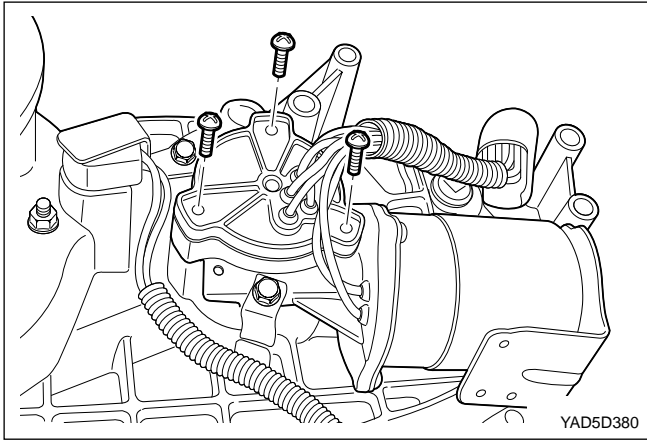
4. Installation should follow the removal procedure in the reverse order.

**Notice:** Be careful not to give any impact to the TCCU body.

### Installation Notice

Tightening Torque	10 N•m (89 lb-ft)
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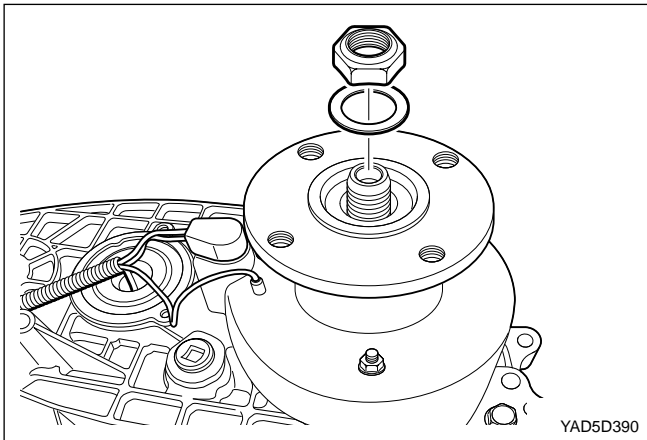


## UNIT REPAIR

### DISASSEMBLY PROCEDURE

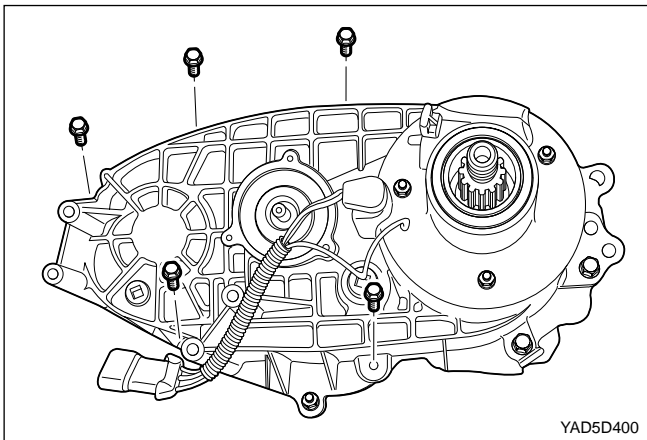
#### Shift Motor Assembly

1. Separate the harness bracket.
2. Remove the shift motor mounting bolt and remove the shift motor assembly.



#### Companion Flange

1. Holding the companion flange, remove the nut and washer and then remove the companion flange.
2. Remove the oil seal.
3. Remove the companion flange from the case cover.

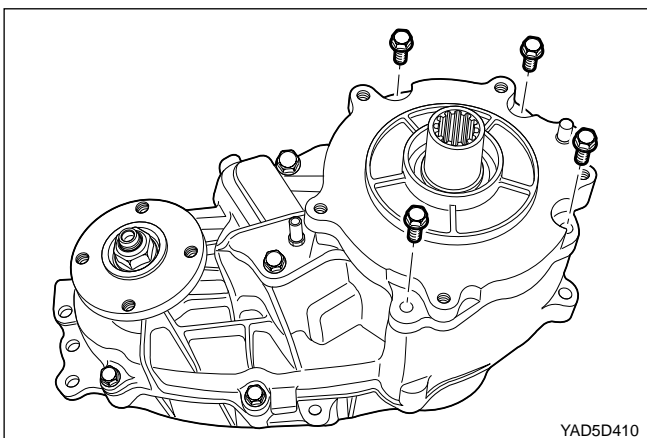


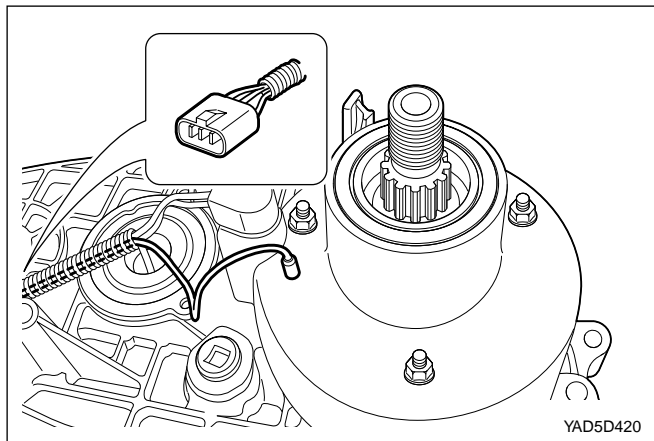
#### Case Cover Assembly

1. Remove the cover mounting bolts(9), and the case mounting bolts(5).

**Notice:** Identification tag has information required for ordering replacement parts, so be careful not to lose it.

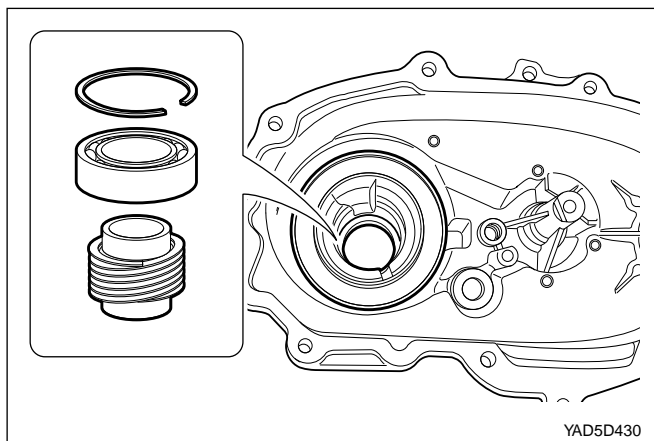
2. Using a driver, pry and disconnect the sealant bond of the cover and required case.



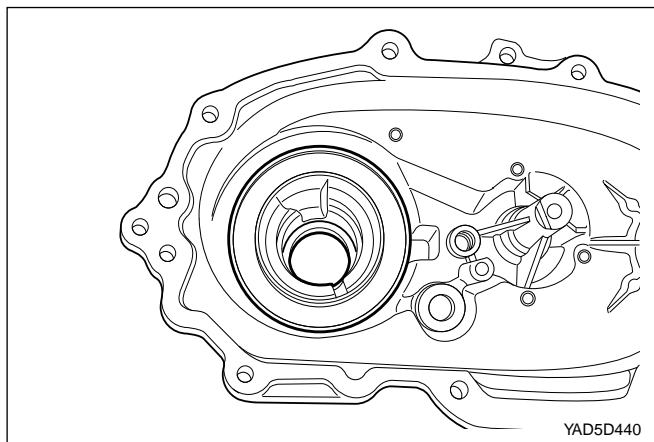


3. Remove the clutch coil wiring from the connector.

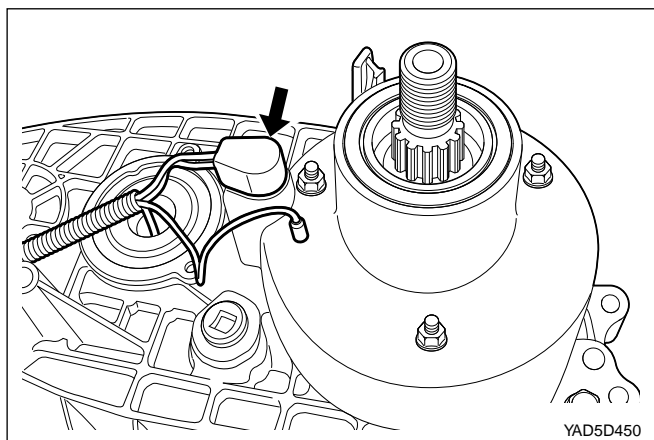
4. Remove the clutch coil assembly mounting nut.



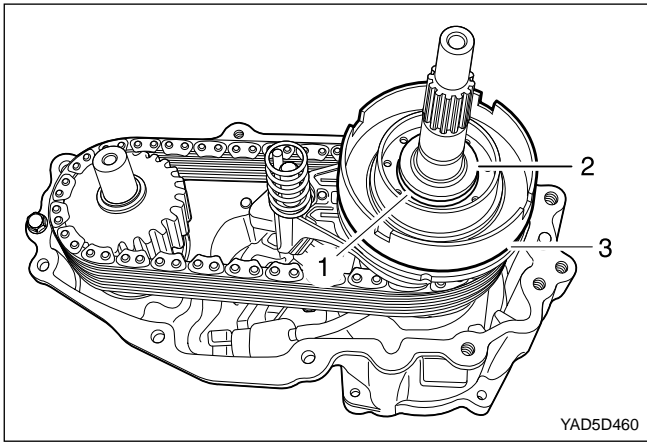
5. Remove the snap ring and pull out the ball bearing from the cover to remove the speed gear.



6. Remove the clutch coil assembly and the oil seal from the cover.

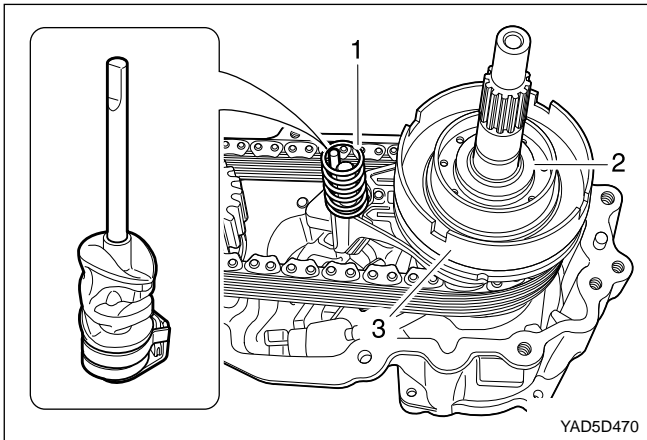


7. Remove the speed sensor and the O-ring from the case cover.



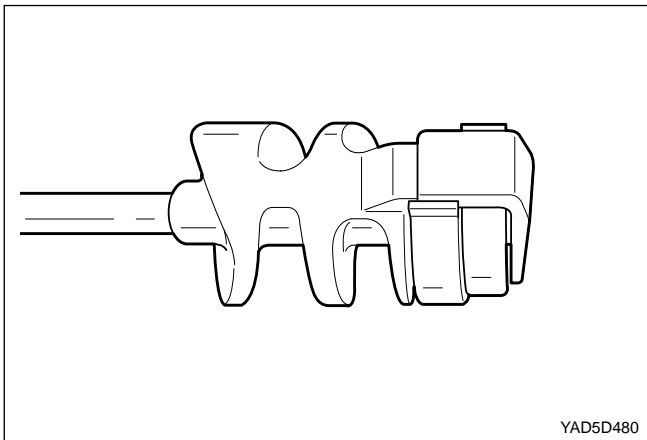
### Transfer Case Assembly

1. Separate the shift motor shaft cam assembly and the spring(1).

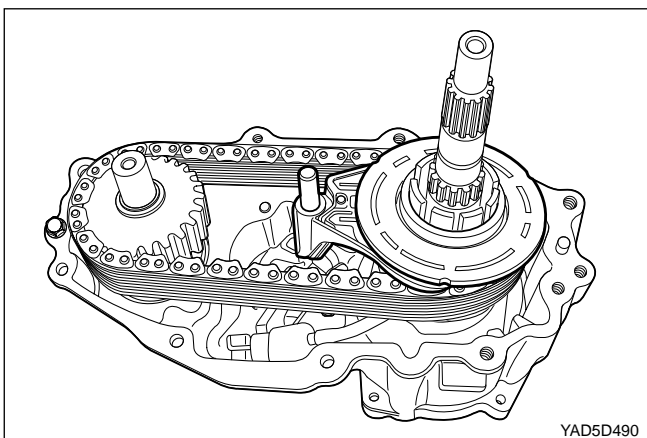


2. Remove the clutch housing assembly from the output shaft.

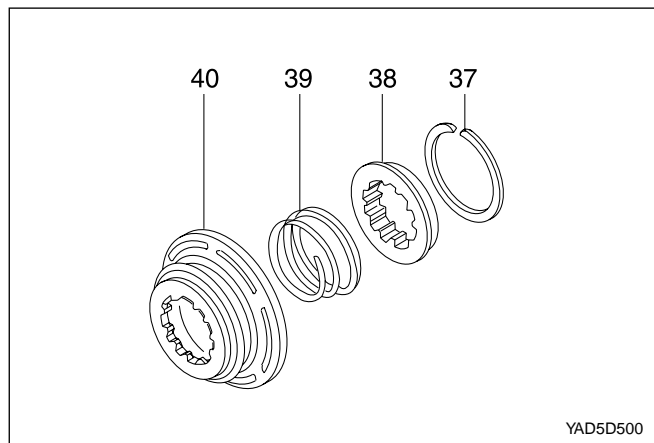
- Clutch Housing Component
  - (1) Retaining Ring
  - (2) Shift collar Hub
  - (3) Clutch Housing



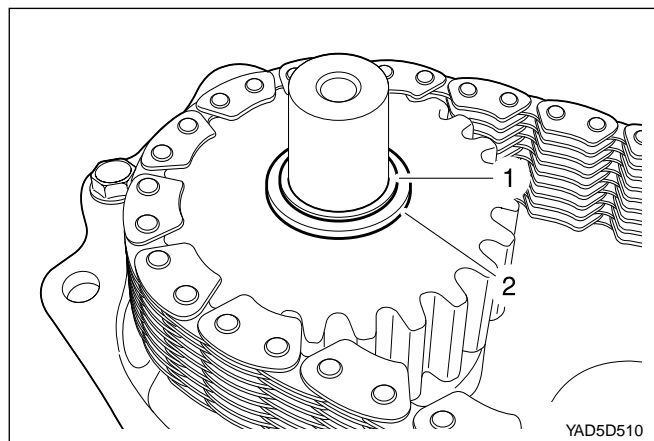
- Remove the shift cam from the shaft.
- Fix the shaft at the vise with the cam removed and remove the torsion bar using a driver.



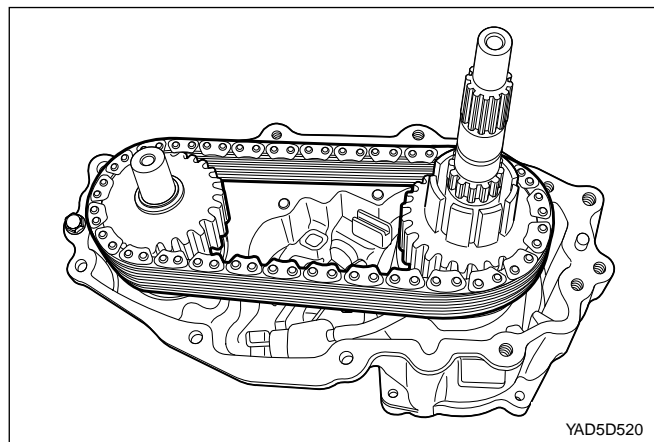
3. Remove the 2WD/4WD lock up assembly, the lock up fork and rail shaft from the output shaft.



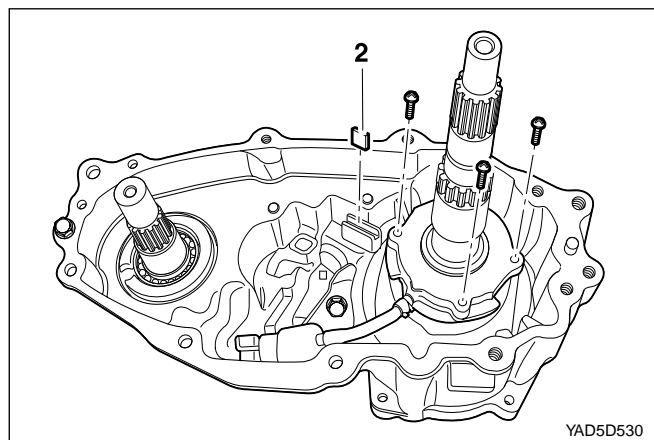
- 2WD/4WD Lock Up Assembly Component
  - (37) Snap Ring
  - (38) Lock up Hub
  - (39) Return Spring
  - (40) Lock up Collar



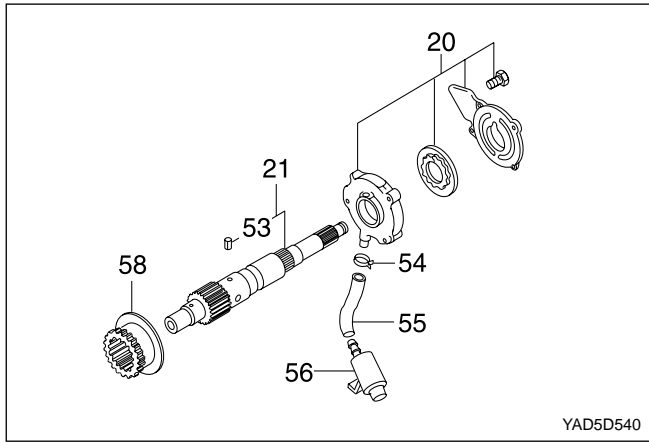
4. Remove the snap ring from the front output driven sprocket and separate the snap ring and the spacer.



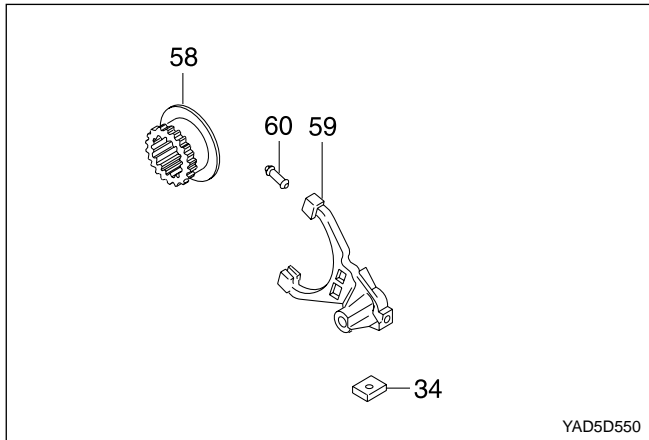
5. Remove the driving sprocket, the driven sprocket and the driving chain from the front/rear output shaft.



6. Remove the oil pump assembly and the magnetic from the output shaft.

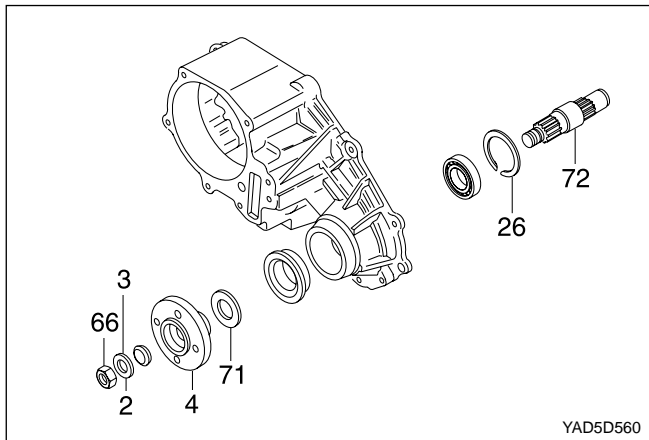


- Remove the bolt and the retainer. Separate the output shaft and rear pump cover.
- Remove the hose clamp and remove the hose coupling cover from the pump housing.
- Remove the hose clamp, the hose coupling and the strainer.
- Remove two pump pins and the spring from the output shaft.
- Separate the front pump and remove the output shaft.



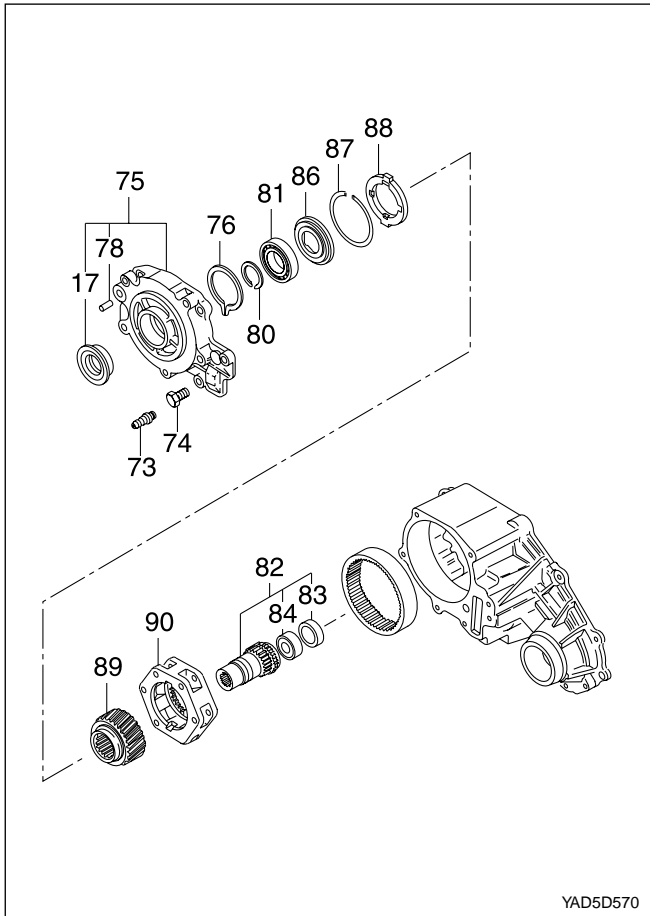
### Reduction Shift Parts

1. Remove the reduction hub and reduction shift fork assembly from the case.
2. Remove the 2 shift fork facings from the shift fork assembly.
3. To remove the roller cam and pin, cut off the plastic retainer when disassembling the fork assembly.



### Front Output Assembly

1. Holding the companion flange, remove the nut and washer and then remove the companion flange and oil seal.
2. Remove the output shaft.



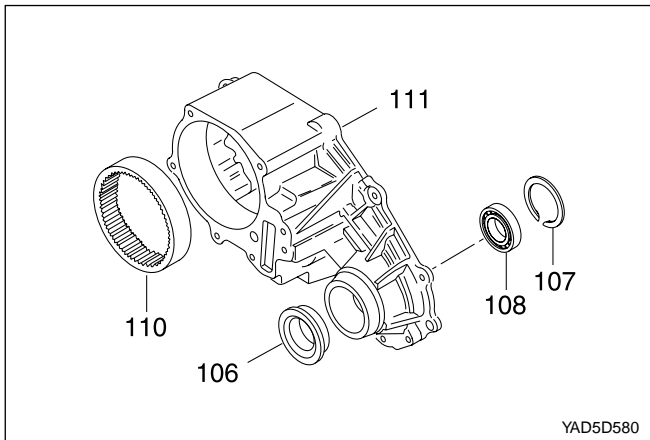
### Adapter, Input Shaft and Carrier Gear

1. Remove the breather.
2. After removing 6 bolts, remove the front adapter by separating the adapter sealer bond from the case using a screw driver.

**Notice:** Be careful not to damage the contacting surface of the case and adapter.

3. Remove the adapter assembly, input shaft assembly and carrier gear assembly.
4. Remove the snap ring and oil seal from the front adapter.
5. After removing snap ring, pull out the bearing and thrust washer from the input shaft assembly and separate the input shaft assembly from the carrier gear assembly.
6. Remove the needle bearing and sleeve bearing from the input shaft assembly.
7. Remove the retaining ring, thrust plate and sun gear from the planet carrier assembly.

**Notice:** Do not disassemble the planet carrier assembly.



### Transfer Case Assembly(Front)

1. Remove the oil seal.
2. Remove the retaining ring and the ball bearing.
3. Remove the pin from the transfer case.

**Notice:** Be careful not to give any damage to the case for removing the pin.

4. Remove the ring gear from the case using the press.

**Notice:** Replace new part for installation.

## Cleaning Procedure

**Notice:** Before cleaning, check the magnet for the presence of metal particles which indicate internal chipping of the transfer case.

1. Using cleaning solvent, clean the residual oil and dirt deposits.

**Notice:** During cleaning, be careful not to damage the metal surfaces.

2. After cleaning, dry the parts with low pressure(Max. 20 psi) compressed air.
3. Lubricate the ball bearings and needle bearings with transfer case oil after cleaning.

**Notice:** Protect the lubricated bearings from dust.

## Inspection Procedure

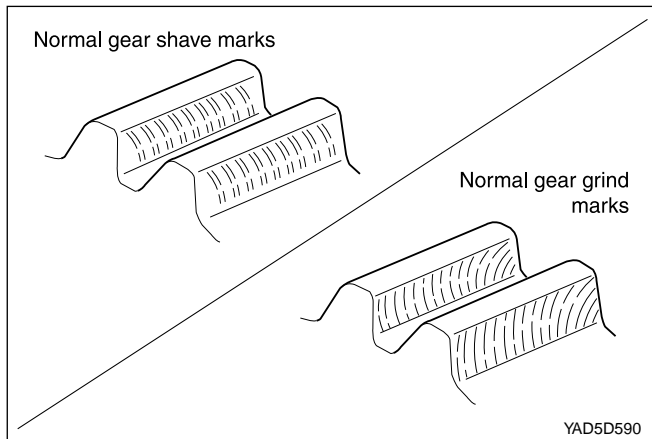
1. Visually check the all removed parts.

**Notice:** Always replace the hose coupling, O-ring and oil seal with new parts.

2. Inspection Terms

- Burr : Local rise of material forming protruding sharp edge
- Chip : An area from which a small fragment has been broken off or cut
- Crack : Surface break of line nature indicating partial or complete separation of material.
- Excessive wear : Heavy or obvious wear beyond expectations considering conditions of operation.
- Indentation : Displacement of material caused by localized heavy contact.
- Galling : Breakdown of metal surface due to excessive friction between parts. Particles of the softer material are torn loose and welded to the harder material.
- Nick : Local break or notch, usually displacement of material rather than loss.
- Scoring : Tear or break in metal surface from contact under abnormal pressure.

- Step wear : Heavy wear that produces a step that can be seen or felt between adjacent contact and non-contact surfaces.
- Uneven wear : Condition of localized, unevenly distributed wear Includes hollows, shiny spots, uneven polish and other visual indications.

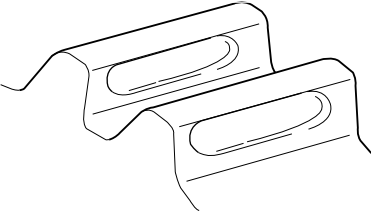
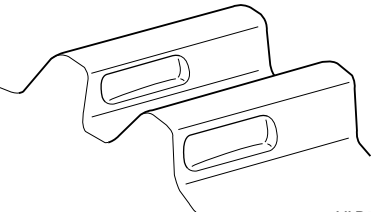
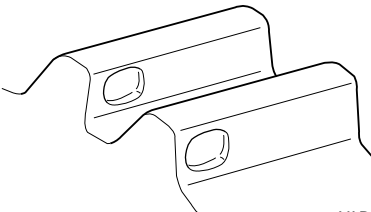
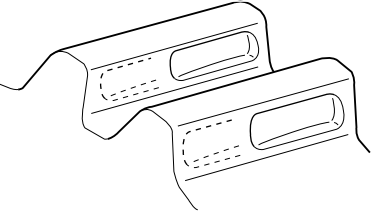
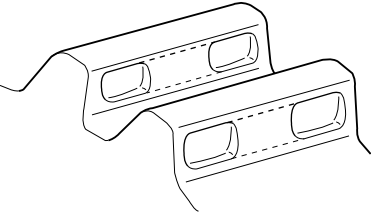
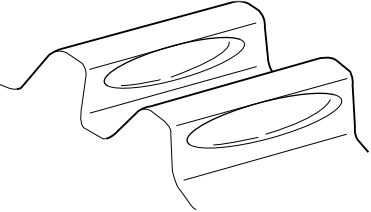
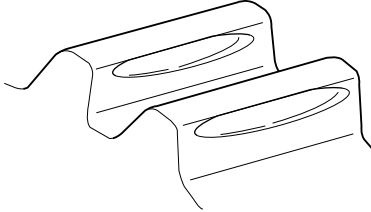
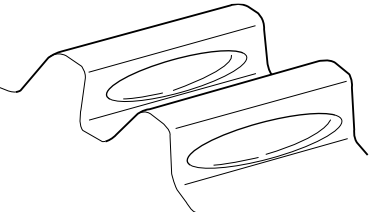
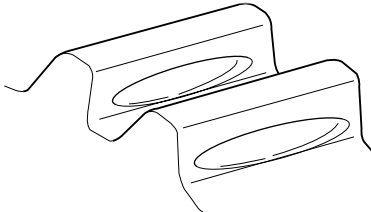


### 3. Specific Inspection

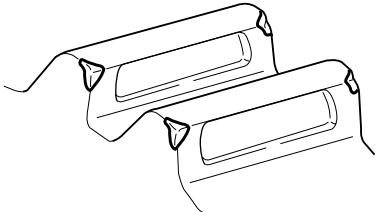
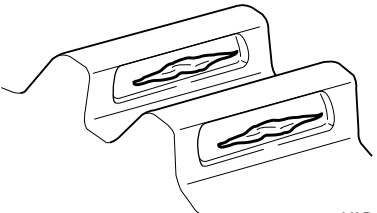
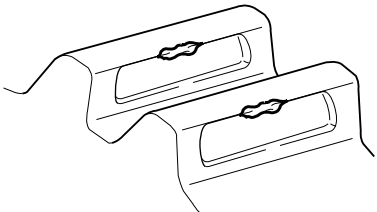
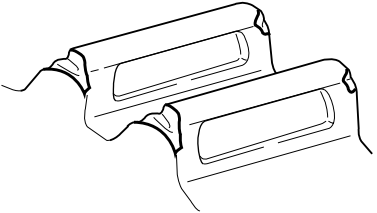
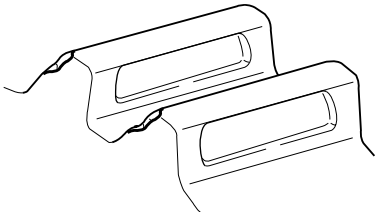
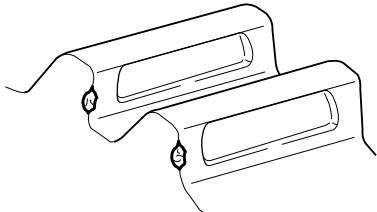
- Referring to normal gear tooth face, specifically inspect the uneven wear and chips of gear tooth. Replace or repair if necessary.



## 4. Inspection of contact patterns

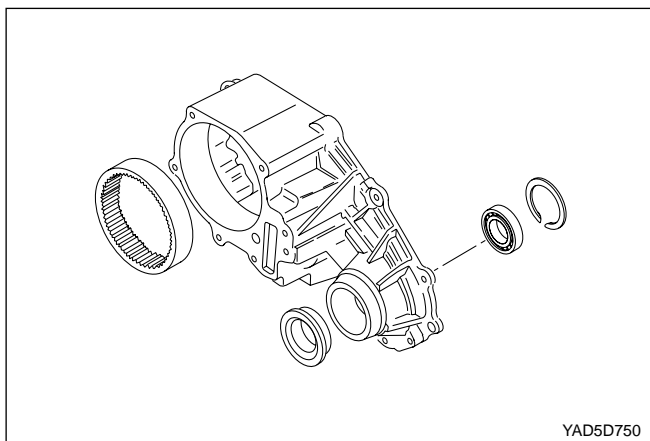
Description	Normal	Abnormal
Normal Wear	 YAD5D600	
End Face Wear	 YAD5D610	 YAD5D620
Traveling Face Wear	 YAD5D630	 YAD5D640
Upper Face Wear	 YAD5D650	 YAD5D660
Lower Face Wear	 YAD5D670	 YAD5D680

## 5. Chip pattern of the gear face

Description	Patterns	Action
Corner chip at drive face	 YAD5D690	Repair
Edge chip at drive face	 YAD5D700	Repair
Corner chip at coast face	 YAD5D710	Repair
Chip within contact pattern	 YAD5D720	Replace
Chip completely through tooth	 YAD5D730	Replace
Side edge chip at drive face	 YAD5D740	Replace

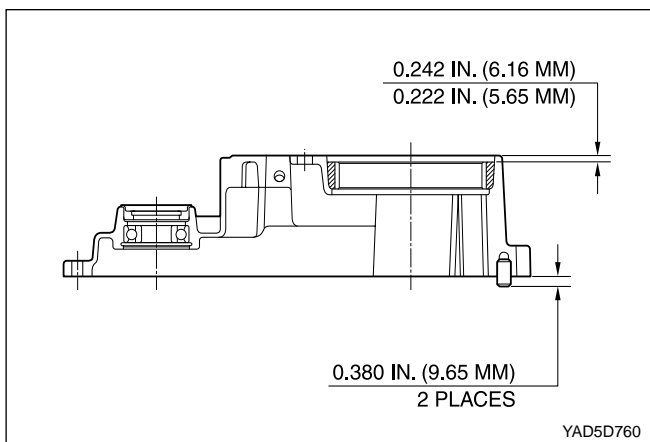
## ASSEMBLY PROCEDURE

- Use special tools during assembly of oil seals and bearings.
- Lubricate bearings, oil seals and bushings before assembly.

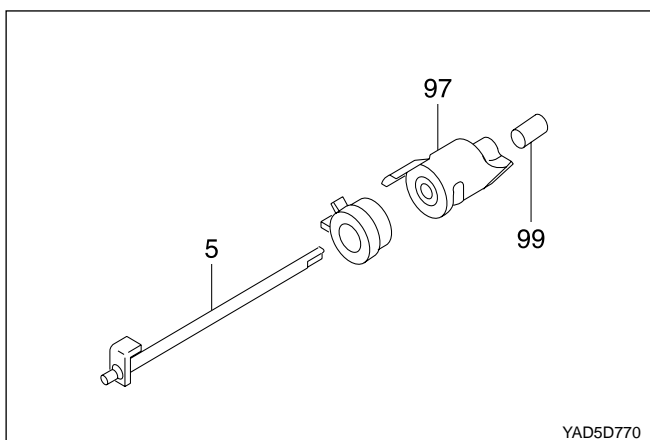


### Transfer Case Assembly

1. If the ring gear was removed, align the outer diameter of the new replaced ring gear with transfer case and assemble it.
2. Insert the pin.
3. Insert the ball bearing to the case and install the retaining ring.
4. Install the new oil seal by pressing into the case.

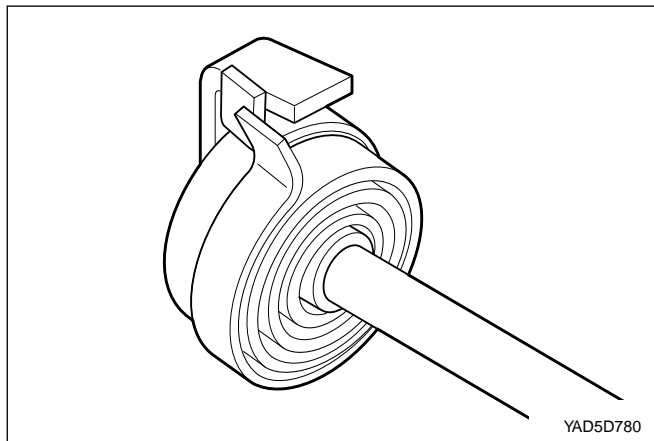


5. Make sure that all parts are correctly and firmly installed into the case.

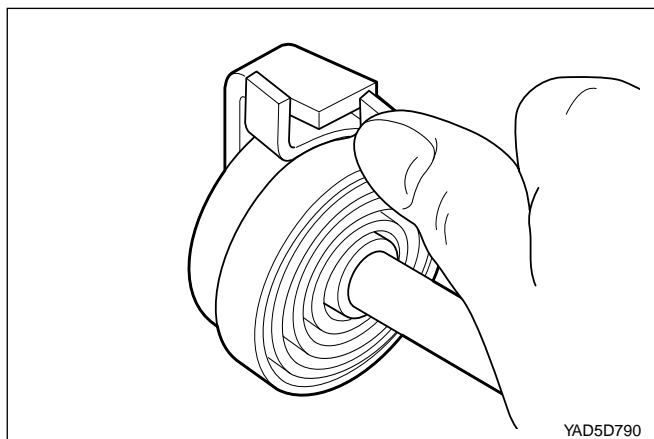


### Electric Shift Cam Parts

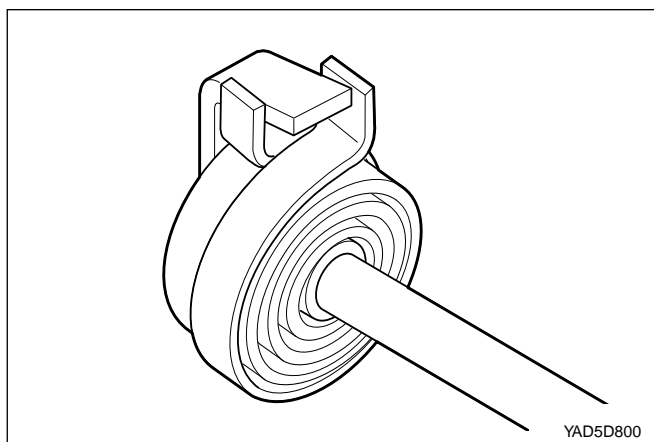
1. Insert the spacer into torsion spring.
2. Insert the end of the shift shaft into the spacer smoothly.



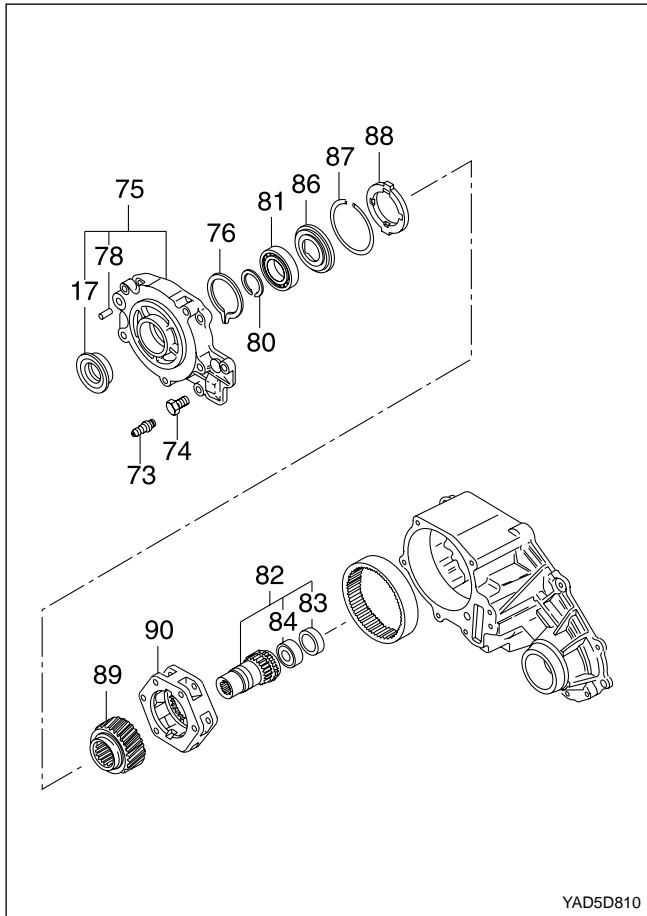
3. Slide the torsion spring and spacer to the left of the shift shaft and position the end of the first spring to fix on the drive tang.



4. Push the end of the second spring to right and fix it on the drive tang.



5. Push the torsion spring and spacer together back them completely.
6. Slide the electric shift cam onto the shift shaft.
7. Install the electric shift cam assembly into the transfer case after installation of the shift fork.



### Adapter, Input Shaft and Carrier

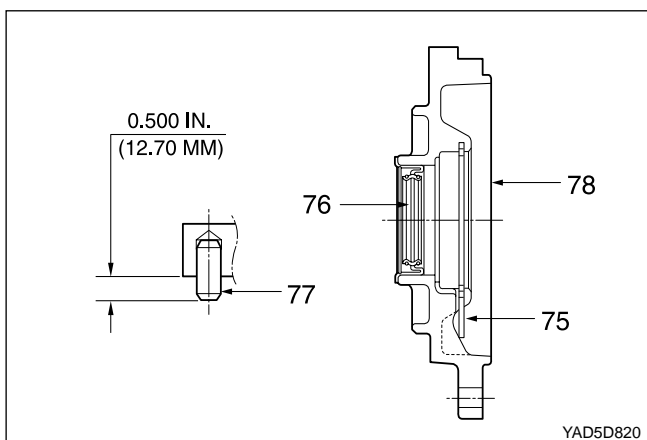
1. Place the planet carrier assembly on work bench to be the retaining ring mounting groove upward.
2. Install the sun gear with the hub end up into the planet carrier assembly and rotate the sun gear to make sure that gears are fully engaged.
3. Align the tabs and install the thrust plate into the planet carrier assembly.
4. Install the retaining ring to the planet carrier assembly.
5. Press the needle bearing into the input shaft and press the new sleeve bearing into the input shaft assembly.
6. Install the planet carrier assembly onto the input shaft and install the thrust washer. Press the bearing over input shaft.
7. After pressing the bearing, install the retaining ring.
8. Press the pin into the front adapter.
9. Slowly press the oil seal into the front adapter.
10. Install the front adapter assembly.

**Notice:** After installation, make sure that snap ring is correctly installed into the groove.

11. Position the input shaft assembly over front cover and engage into the bearing groove by expanding the ends of snap ring.
12. Apply 1.6mm bead of sealant on the mounting face for the transfer case and tighten the 6 bolts.
13. Install the breather.

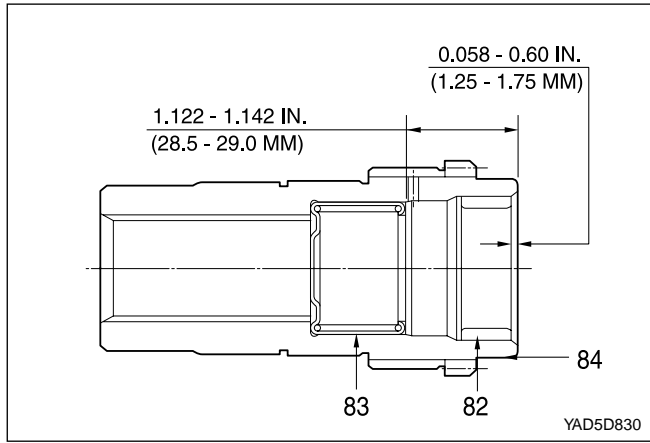
### Installation Notice

Item	Tightening Torque
6 Bolts	28 - 48 N•m (21 - 35 lb-ft)
Breather	8 - 15 N•m



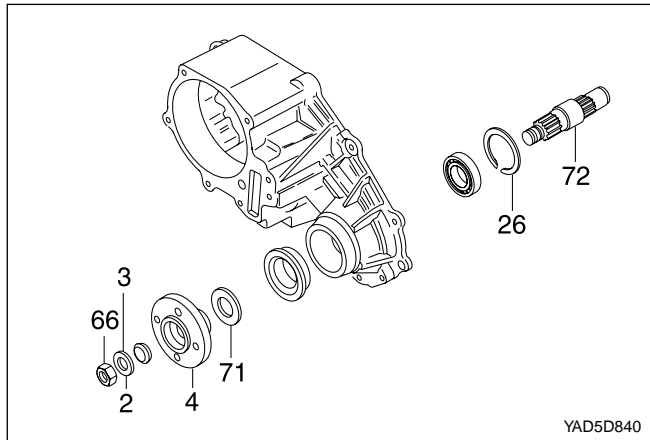
### Front Output Shaft

#### Cross Sectional View



## Input Shaft

### Cross Sectional View



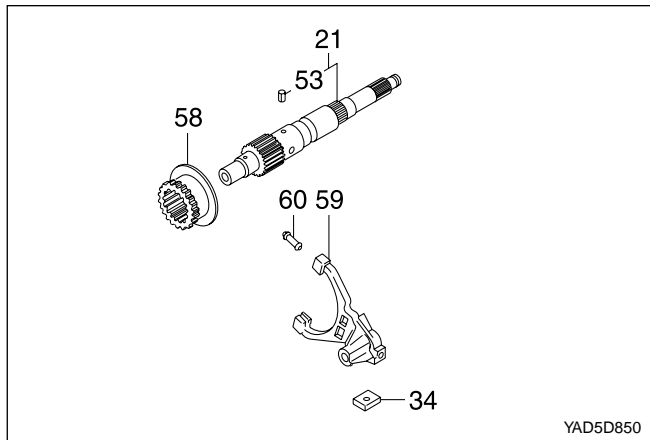
## Front Output Shaft

1. Install the deflector on the yoke.
2. Position the output shaft in transfer case and install the companion flange assembly, oil seal, washer and nut.
3. Holding the companion flange, tighten the nut.

### Installation Notice

Tightening Torque

346 - 380 N•m



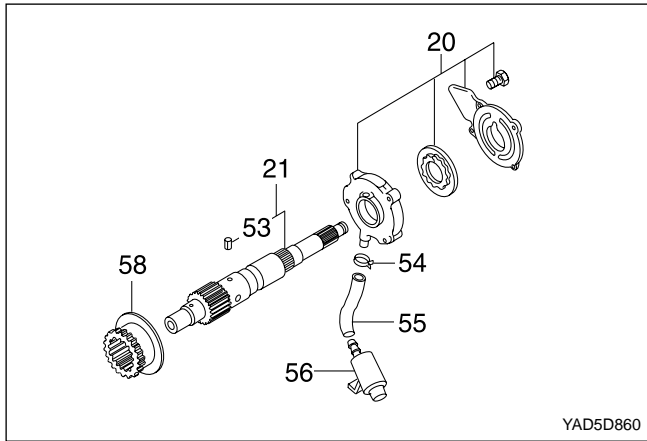
## Reduction Shift Parts

1. Install the new pin, roller and retainer into the reduction shift fork.
2. Press the pin, roller and retainer into the reduction split fork bore completely.

**Notice:** Make sure that the cam roller turns freely.

3. Install the 2 fork facing on the reduction shift fork assembly.
4. Install the reduction shift fork onto the previously installed reduction hub in the transfer case.
5. Install the output shaft spline into the reduction hub and engage the output shaft end with input shaft bearing.

**Notice:** For installation of the output shaft, assemble the oil pump temporarily.



## Oil Pump

1. Install the pump front cover to be the "TOP" mark down and turn the cover to be the "TOP" mark up when installed in vehicle.
2. Install the 2 pump pins and spring to the output shaft.

**Notice:** Flat surface of the pins must point out and align the center line of pins and spring.

3. Connect the hose coupling to the strainer coupling and install the strainer foot into the transfer case slot.

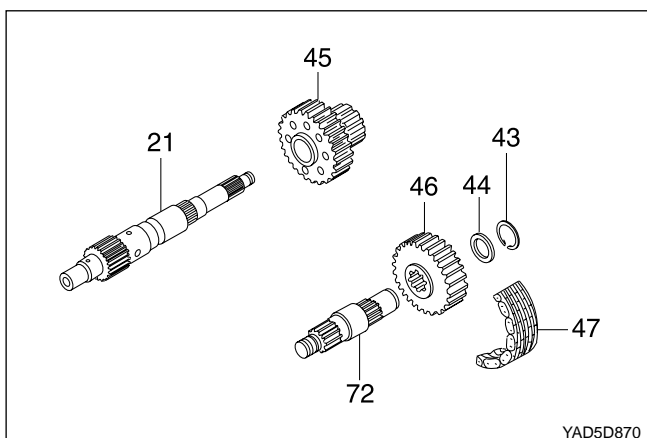
**Notice:** The hose coupling must face the pump assembly.

4. Install the pump housing to be the 'REAR' mark up and seat the 2 pump pins inside of the pump housing by moving pump pins inward and compressing the spring.
5. Tighten the hose to pump housing by hose clamp.

6. Position the pump rear cover to be the TOP REAR mark up and located at the top of transfer case when installed in vehicle. Position the pump retainer on the cover so that tab on the retainer is in notch in the transfer case. Apply Loctite to the bolts and tighten the bolts with turning the output shaft by hand to make the pump pins move freely.

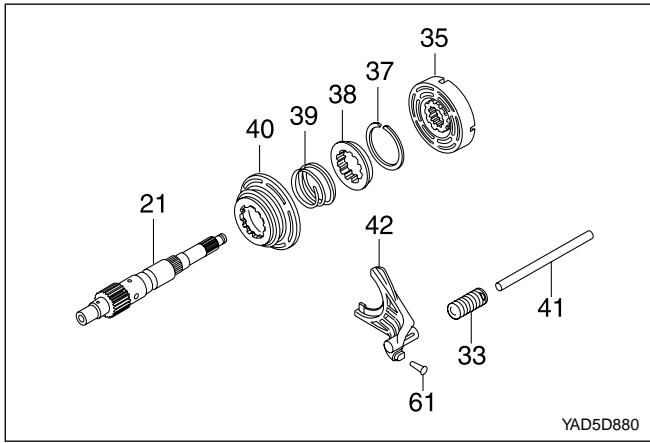
### Installation Notice

Tightening Torque	4 - 8.5 N•m (35 - 75.5 lb-in)
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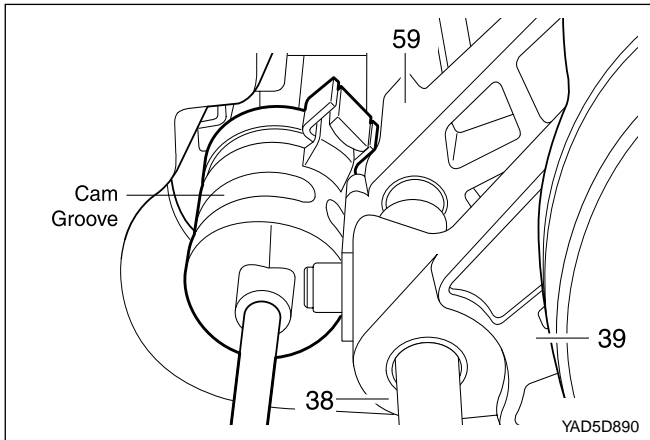
## Drive Chain

1. Position the drive sprocket to the rear output shaft end and driven sprocket to the front output shaft end.
2. Install the drive chain onto the sprocket.
3. Holding each sprocket to be the drive chain tight and parallel with transfer case, install the drive chain assembly to the output shafts.
4. Rotate the driven sprocket slightly to engage splines on the front output shaft.
5. Install the spacer to the front output shaft and insert the snap ring into the shaft groove over spacer.



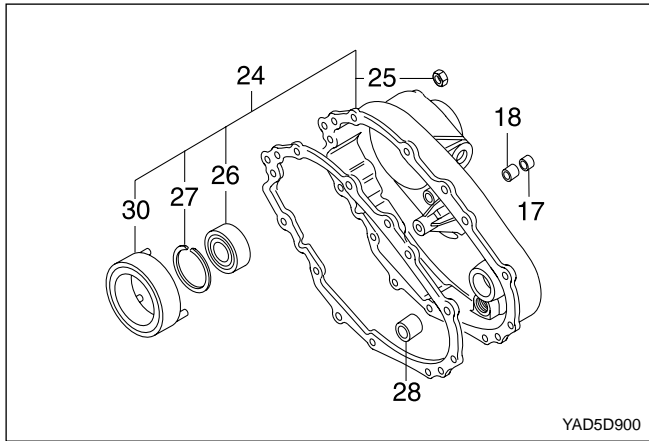
## Lockup Shift

1. Install the lockup hub and return spring to the lockup collar and insert the snap ring.
2. Install the rail shaft through reduction shift fork assembly previously installed and into the blind hole in case.
3. Engage the lockup fork into the 2WD/4WD groove and check operation.
4. Install the shift collar hub to the output shaft spline.



5. Install the previously assembled electric shift cam and assemble the clutch housing as follows.
  - Rotate the shift cam assembly to right so that the end of the torsion spring contacts with reduction shift fork side.
  - Holding the rail shaft, lift up the fork assembly slightly.  
Adjust electric shift cam assembly so that the roller on reduction shift fork assembly is in groove in shift cam and button on lockup fork is on cam end.
  - Install the clutch housing over shift collar hub and insert the retaining ring into the clutch collar hub groove.





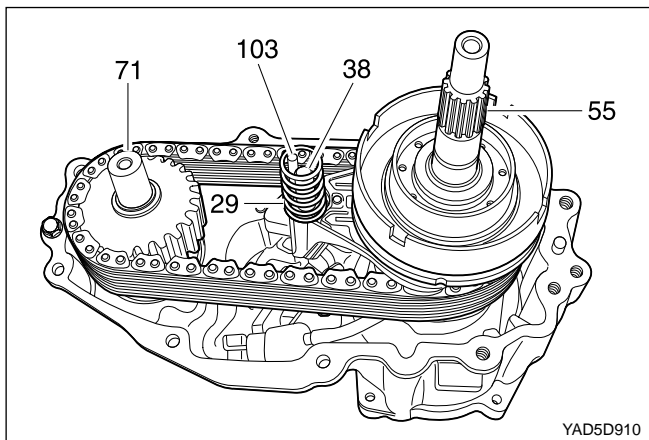
### Cover

1. Position the cover to be the open end up on the work table.
2. Position the end of needle bearing to be identification mark up and press into the cover until upper end of bearing is 40.47 - 40.97 mm below cover face that contacts with transfer case.
3. Press the ball bearing into the cover and install the snap ring .
4. Install remaining parts as follows.
  - Install the 4 O-rings on the stud bolts of the clutch coil assembly.
  - Install the clutch coil assembly inside the cover and tighten 3 nuts.

### Installation Notice

Tightening Torque	8 - 11 N•m (71 - 97 lb-in)
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- Install the bearing and motor bearing into the cover.

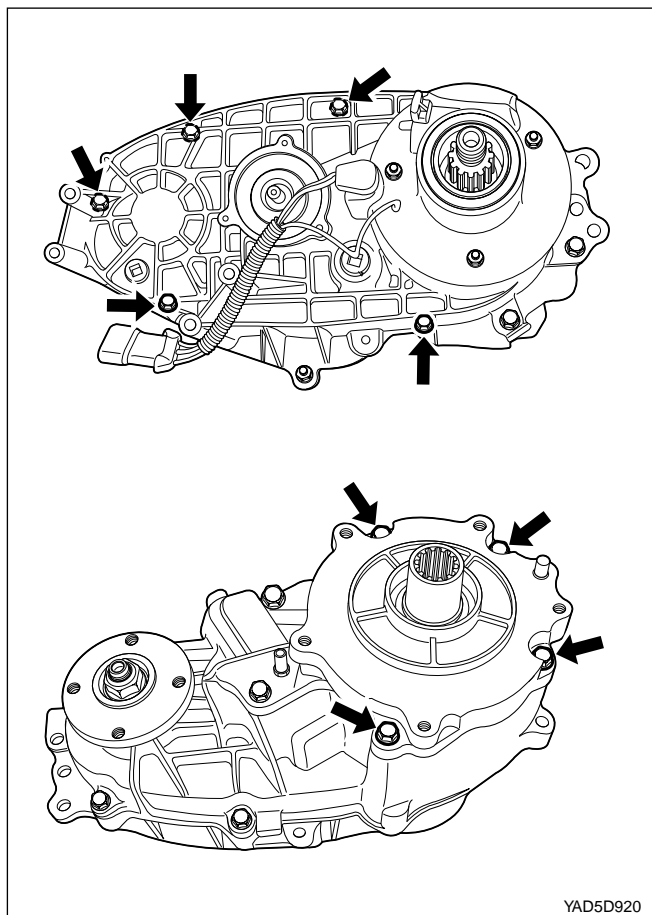


### Cover Assembly

1. Install the return spring over rail shaft in the transfer case.
2. Insert the magnet into the transfer case slot.
3. Apply 1.6mm bead of Loctite RTV 598 to the transfer case mounting surface.

**Notice:** For installation of cover, align the transfer case with cover not to use excessive force.

4. Install the cover onto the transfer case as follows:
  - Align the cover bores with transfer case pins.
  - Align the cover bearings with output shafts.
  - Align the cover blind hole with rail shaft and make sure that return spring is not cocked.

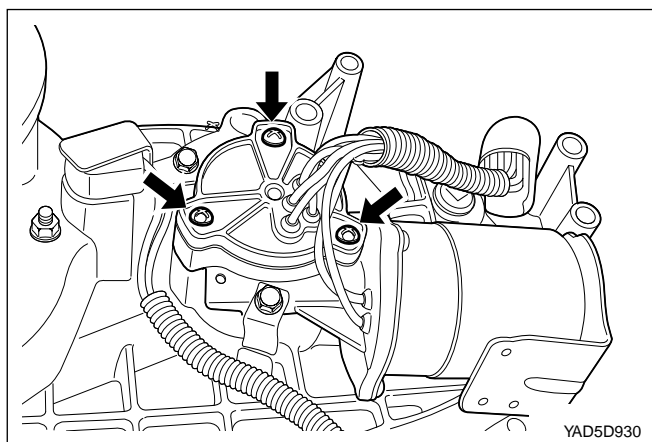


5. Tighten 9 bolts positioning identification tag and wiring clip.

#### Installation Notice

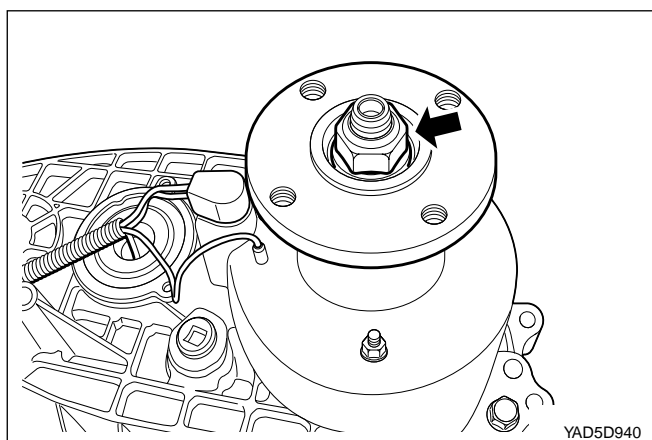
Tightening Torque	28 - 48 N•m (21 - 35 lb-ft)
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6. Install the speed gear over output shaft spline in the cover assembly.
7. Press the new oil seal into the cover assembly.



#### External Electric Shift

1. Align the motor with shift shaft and position the motor assembly onto the cover.
2. Install the motor to the shift shaft and contact cover and rotate the motor clockwise direction to check correct engagement.



3. Insert the 0-ring on the speed sensor assembly to the cover.
4. Install the bracket to the motor assembly and tighten 3 bolts.

#### Installation Notice

Tightening Torque	8 - 11 N•m (71 - 97 lb-in)
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**Companion Flange**

1. Install the 2 plugs to the cover.
2. Install the companion flange, oil seal and washer.
3. Holding the companion flange, tighten the nut.

**Installation Notice**

Tightening Torque	346 - 380 N•m
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**Notice:** Apply Loctite #262 to nut before installation.