

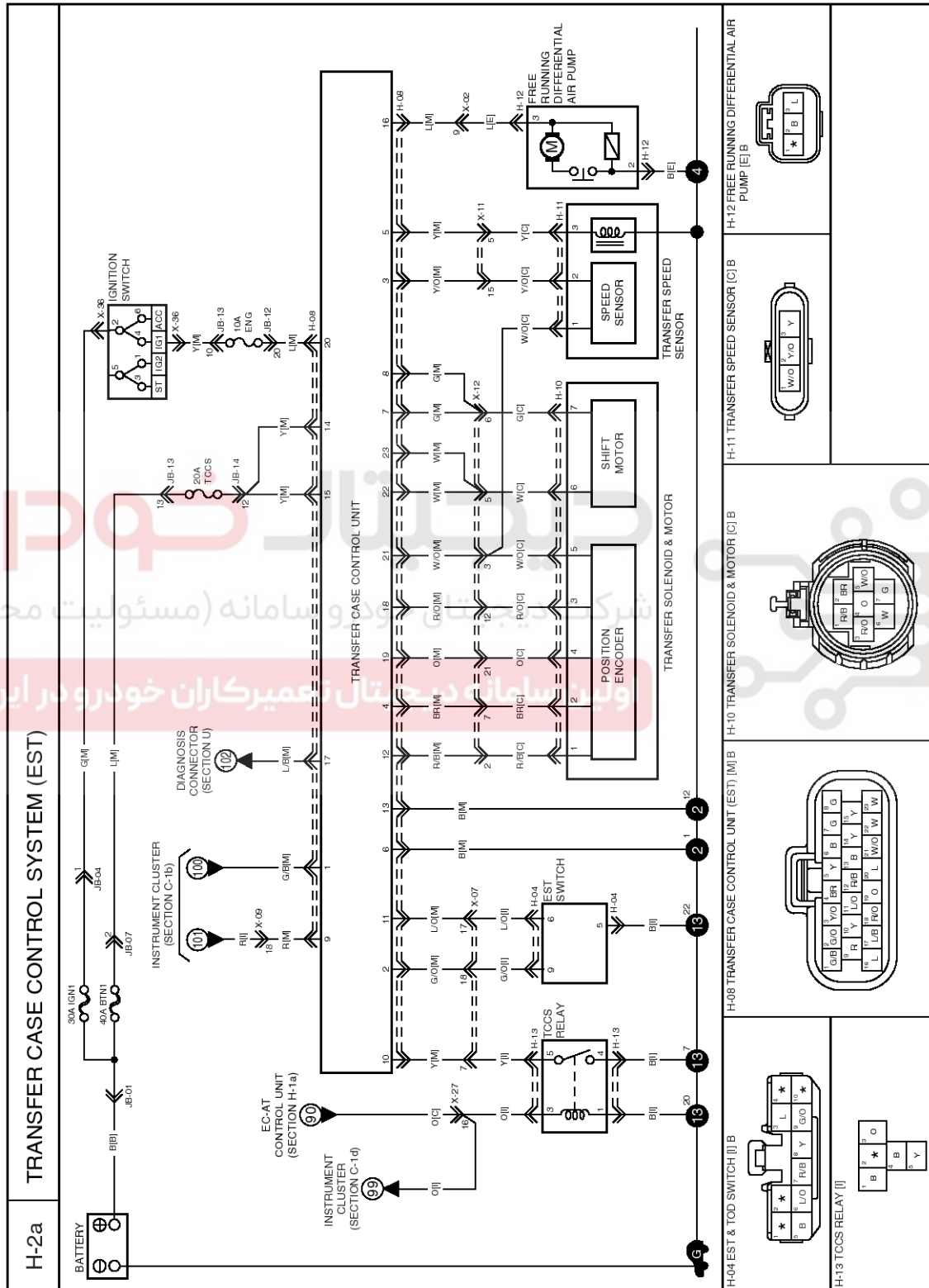
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Transfer System

Transfer Case Assembly

TCCM

EST Circuit diagram (1)

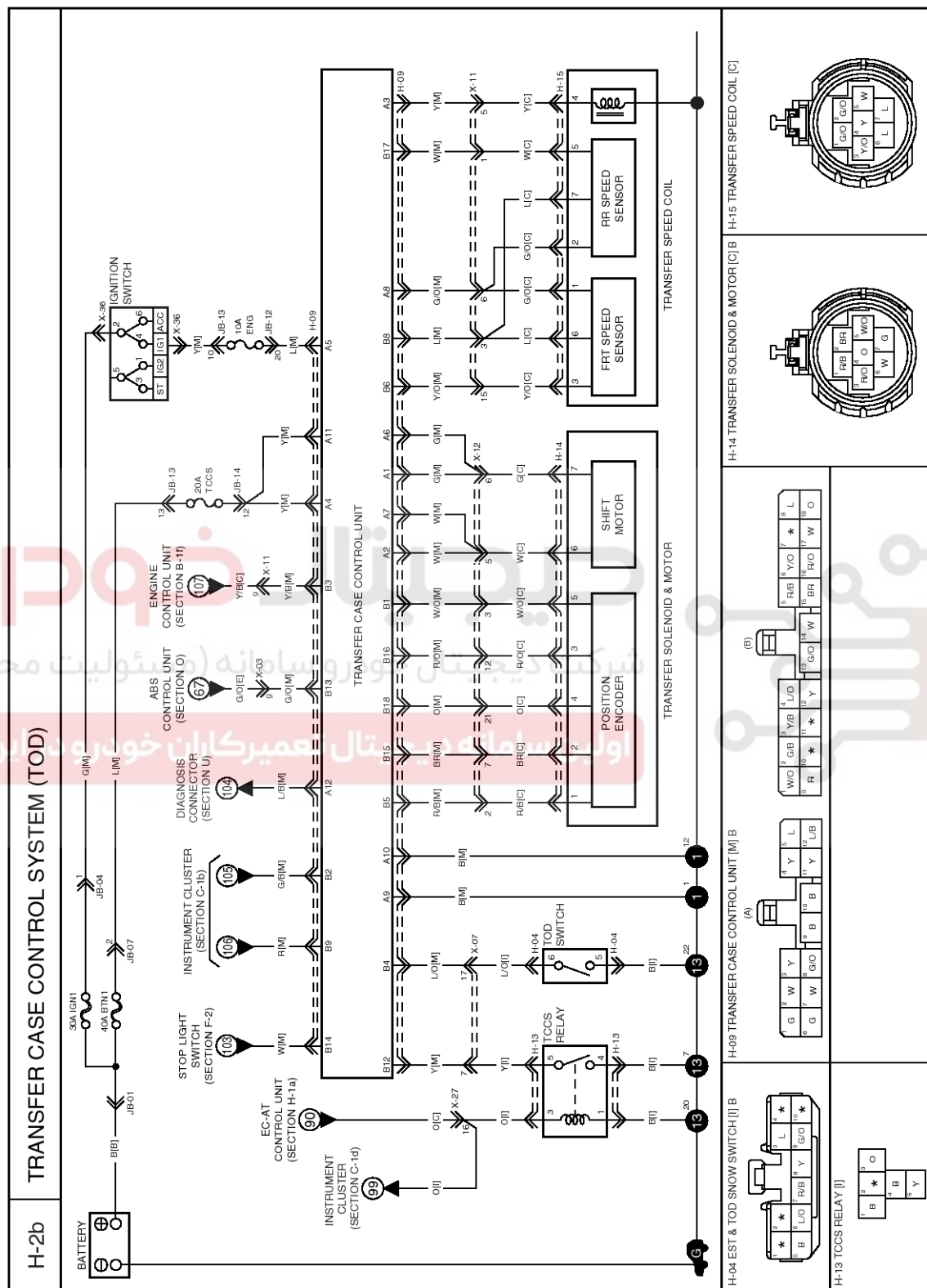


Transfer Case Assembly

WD-3

BMAD340A

ATT(or TOD) Circuit diagram (2)



BMAD350A

WD-4

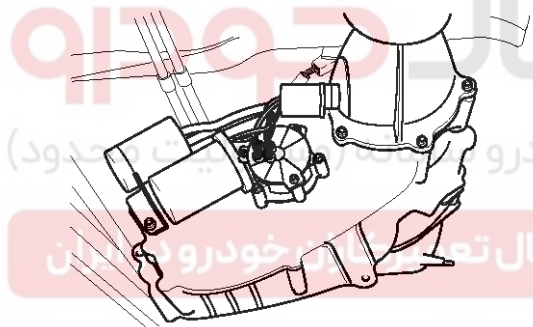
Transfer System

EST (ELECTRONIC SHIFT TRANSFER)

INTRODUCTION

EXT system is a kind of part time 4 wheel drive system and its full name is "Electronic shift transfer". Instead of previous free wheel hub, FRRD (Free Running Differential) was adopted and this one is for SOTF (shift on the fly) while vehicle driving. When the vehicle runs with 2WD again, the front axle will be rotated idly due to the vehicle speed and this makes the noise and vibration on the propeller shaft and ring gear set. Therefore FRRD will prevent these phenomena to get a driving stability, efficiency and improved NVH.

When 4WD is selected by driver, a FRRD air pump motor operates and a dog clutch in FRRD is engaged to pinion shaft making s front wheels drive. Therefore the front propeller shaft and the front drive shaft are coupled rotating together. Oppositely, if 2WD is selected by a driver, the dog clutch in a FRRD is disengaged resulting in disconnection between the front propeller shaft and the front drive shaft.

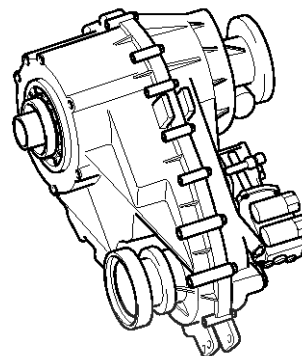


BKAE090A

TOD (TORQUE ON DEMAND) OR ATT (ACTIVE TORQUE TRANSFER)

INTRODUCTION

TOD system is a kind of full time 4 wheel drive system and its full name is "Torque on demand". The optimum engine torque distribution ration between front and rear is controlled by TOD transfer case. This transfer case is controlled and operated by independent control module, that is TCCM (Transfer case control module) and it is located under the crash pad on passenger side.



BKAE090B

The torque transmission ratio to front and rear side is not fixed and it is changed and controlled continuously depends on the road and vehicle driving condition.

Basically the torque split ratio will be 0:100 (that is "FR" situation) on road driving with low and medium vehicle speed. If there is any amount of slip on the rear wheel, the optimum amount of torque will be distributed to front wheel to get a stable driving performance.

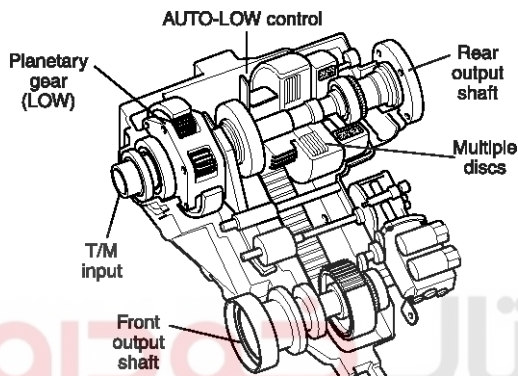
The range of torque split ratio is from 0:100 to 50:50. It means the maximum torque amount of front wheel cannot be higher than rear wheel in any kind of road or vehicle condition.

Transfer Case Assembly

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According to the speed signal of front and rear wheel from each sensor, the engine torque information from engine ECM, EMC (Electro magnetic clutch) will be activated and it will result the change of depressing force to the multiple disc clutch. If the force is high, more engine torque will be transmitted to front wheel.

Oppositely, if it becomes low, the torque to front side also will be decreased. It means the slip inside of multiple disc clutch will be increased also. Therefore the oil pump for lubrication of clutch is installed and very important for the overall system durability.



BKAE090C



شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

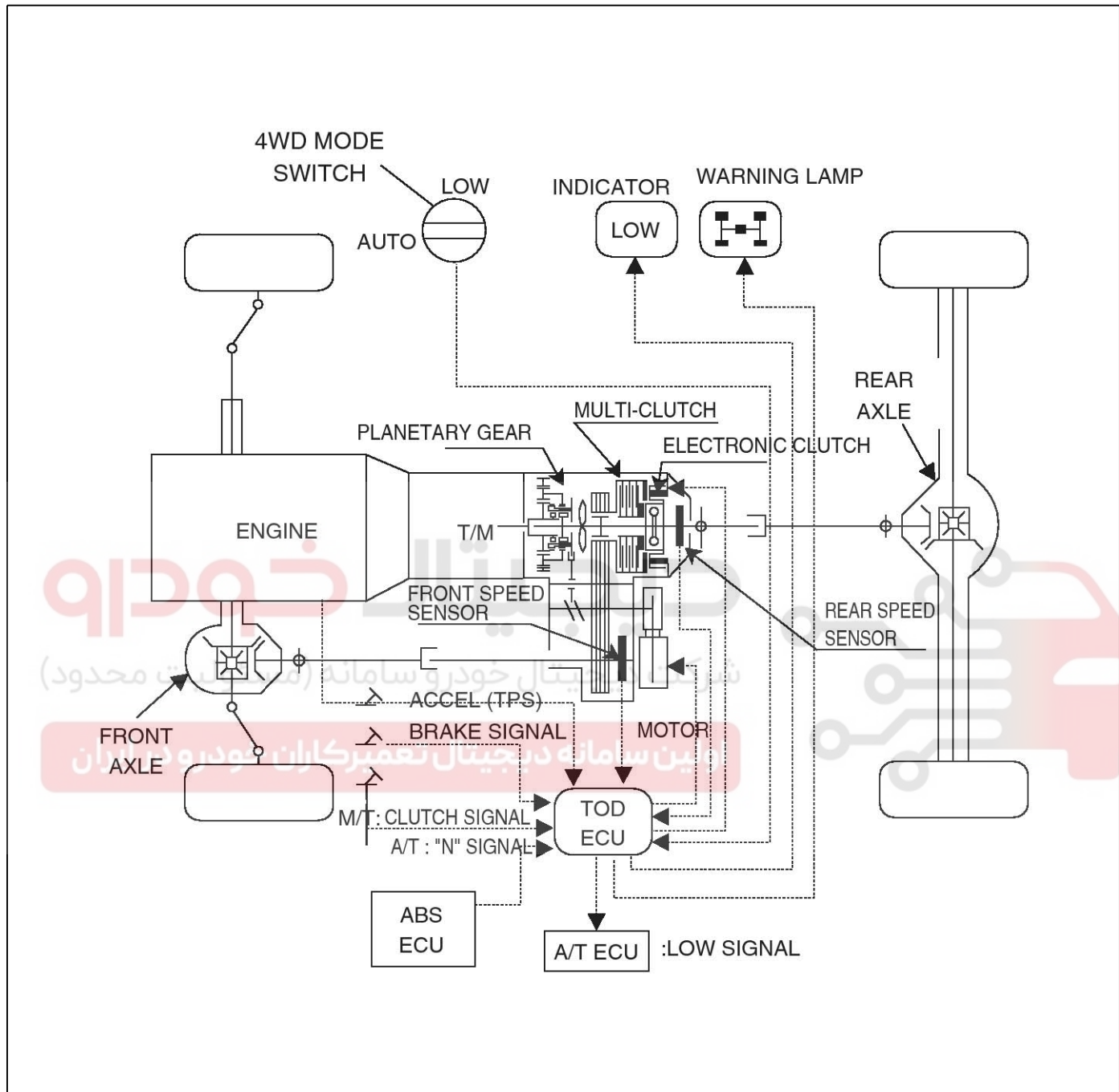
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

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Transfer System

SYSTEM DIAGRAM

ACTIVE TORQUE TRANSFER (ATT)



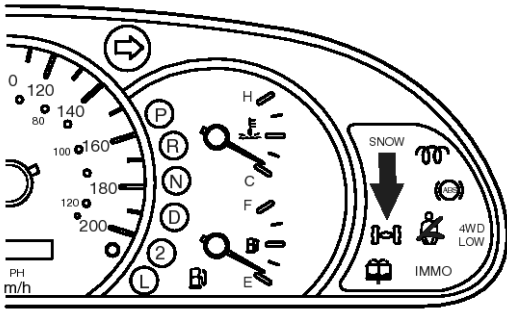
BMAD195A

Transfer Case Assembly

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ELECTRIC SHIFT TRANSFER

1. If a malfunction occurs, the 4WD indicator lamp will blink to warn the driver.



LMAC200A

2. Following items will be indicated

- 1) TCCM
- 2) Shift motor
- 3) Magnetic synchronizer clutch
- 4) Speed sensor
- 5) Hub solenoid
- 6) Selector switch
- 7) Motor position sensor

3. DTC Table

Code	Item
001	TCCM
010	Shift motor
011	Synchronizer clutch
100	Speed sensor
101	Hub solenoid
110	Selector switch
111	Motor position sensor

4. DTC Indication

- 1) Indicator lamp check (0.6S)
- 2) Lamp OFF (3S)
- 3) DTC Indication
- 4) OFF (3S)
- 5) Repeat steps 3), 4)
- 6) Repeat steps 3), 4), 5) for additional faults.

Normal

5. Meaning of code

0 : Lamp ON for 0.5 second

1 : Lamp ON for 1 second

6. EX) TCCM Fault (DTC : 001)

1) Indicator lamp check (0.6S)

2) Lamp OFF (3S)

3) Lamp ON (0.5S)

4) Lamp OFF (0.5S)

5) Lamp ON (0.5S)

6) Lamp OFF (0.5S)

7) Lamp ON (1S)

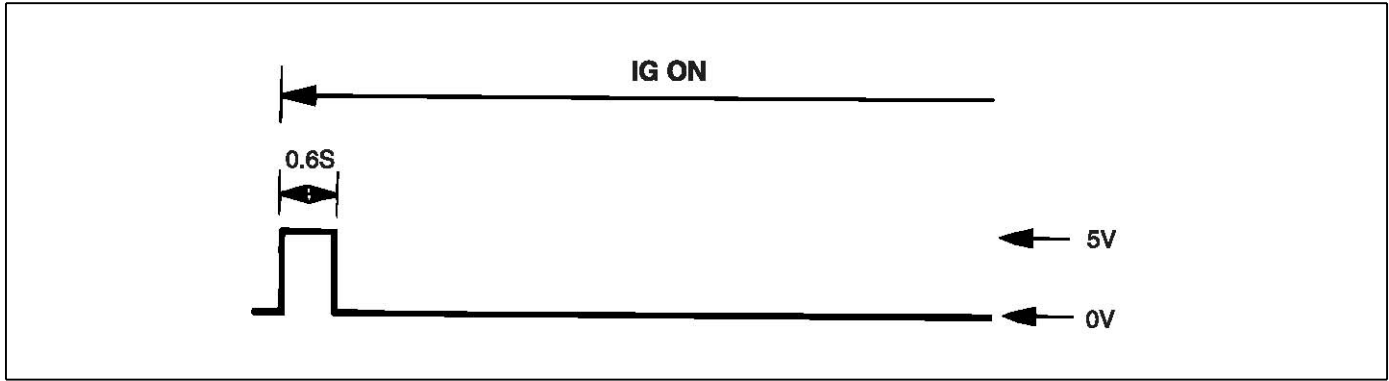
8) Lamp OFF (3S)

9) Repeat steps 3) - 8).

READING METHOD

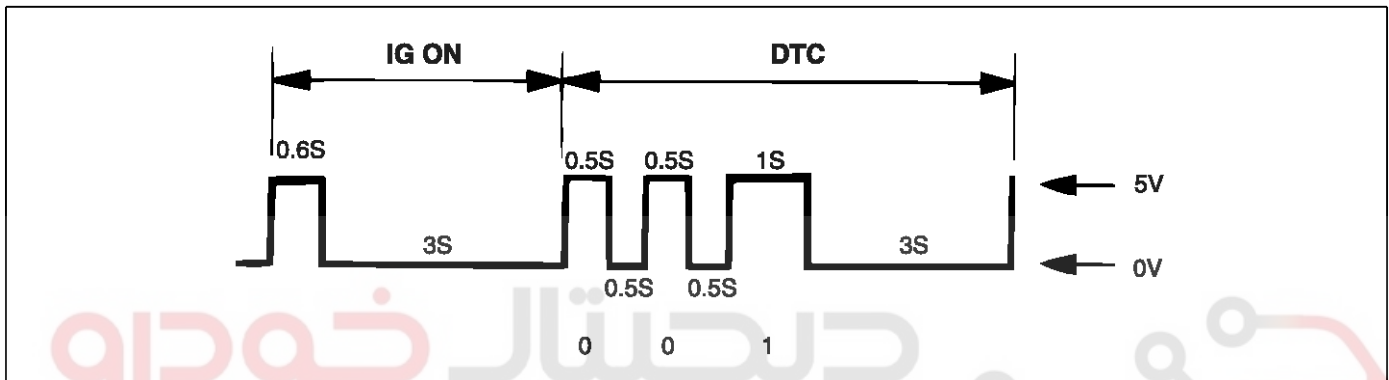
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Transfer System

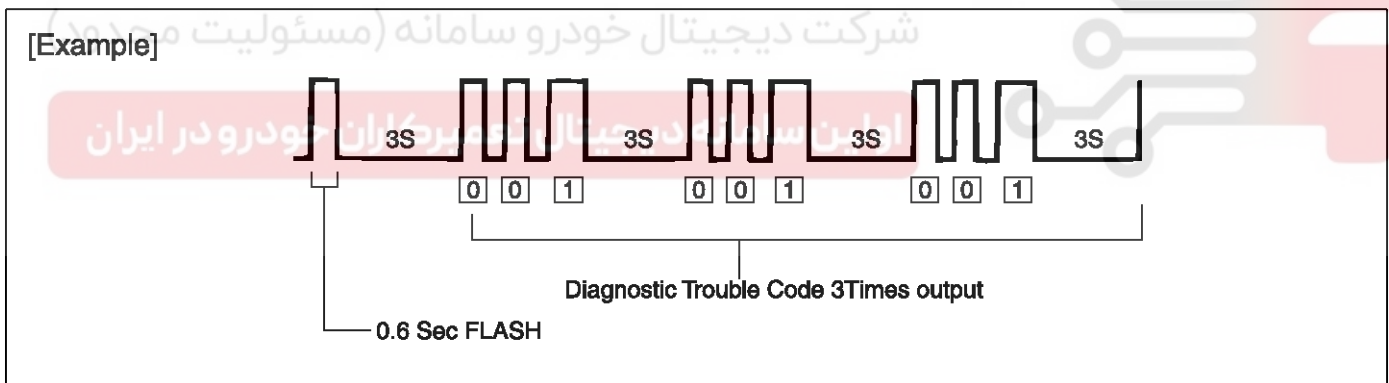


LMAC210A

Fault



LMAC210B

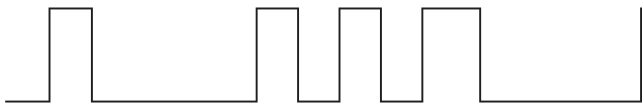
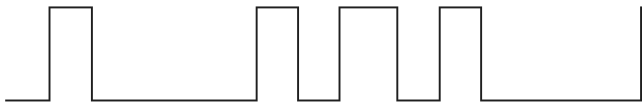
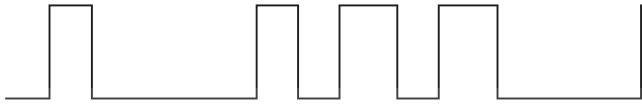
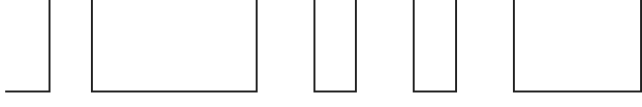


LMAC210C

Transfer Case Assembly

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DTC PATTERN

Code	Output pattern	Item
001		TCCM
010		Shift motor
011		Magnetic synchronizer clutch
100		Speed sensor
101		Hub solenoid valve
110		Select switch
111		Motor position sensor

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Transfer System

ACTIVE TORQUE TRANSFER (TOD)

DTC	Content
P1725	TOD CONTROL MODULE(CHECKSUM) ERROR
P1726	THROTTLE POSITION INPUT - LOSS OF SIGNAL
P1727	THROTTLE POSITION INPUT - OUT OF RANGE
P1728	EMC - OPEN/SHORT TO BATTERY
P1729	EMC - SHORT TO GROUND
P1730	FRONT SPEED SENSOR - LOW INPUT
P1731	FRONT SPEED SENSOR - HIGH INPUT
P1732	REAR SPEED SENSOR - LOW INPUT
P1733	REAR SPEED SPEED SENSOR - HIGH INPUT
P1734	SPEED SENSOR REFERENCE - LOW INPUT
P1735	SPEED SENSOR REFERENCE - HIGH INPUT
P1736	SHIFT MOTOR - OPEN
P1737	SHIFT MOTOR - OPEN/SHORT TO GROUND
P1738	SHIFT SYSTEM TIMEOUT
P1739	GENERAL POSITION ENCODER FAULT
P1740	POSITION 1 - SHORT TO GROUND
P1741	POSITION 2 - SHORT TO GROUND
P1742	POSITION 3 - SHORT TO GROUND
P1743	POSITION 4 - SHORT TO GROUND

Transfer Case Assembly

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DTC Memory Erase

DTC memory in case of the Active Torque Transfer type is erased by the Hi-Scan.

SELF-DIAGNOSIS PROCEDURE FOR EST(MANUAL)

1. Connect a Hi-scan to the self-diagnosis connector on the engine room OBD connector. (the lower inside of crash pad in driver's side)
2. Turn the ignition ON.
3. Select and operate according to the instructions on the Hi-scan screen.
 - 1) Select "KIA VEHICLE DIAGNOSIS".
 - 2) Select "VEHICLE NAME".
 - 3) Select "4WD SYSTEM".

KIA VEHICLE DIAGNOSIS	
MODEL : SORENTO	2004MY
01. TROUBLE SHOOTING 02. ENGINE CONTROL 03. AUTOMATIC TRANSAXLE 04. ANTI-LOCK BRAKE SYSTEM 05. SRS-AIRBAG 06. ELEC. POWER STEERING 07. 4WD 08. CODE SAVING	

BKAE091A

- 4) Select "4WD(EST-MANUAL)".

KIA VEHICLE DIAGNOSIS	
MODEL : SORENTO	2004MY
SYSTEM : 4WD	
01. 4WD(EST-MANUAL) 02. 4WD(TOD-AUTO)	

BKAE091B

- 5) Select "01.DIAGNOSTIC TROUBLE CODES".

It shows diagnostic trouble code list.

1. KIA VEHICLE DIAGNOSIS	
MODEL : SORENTO	2004MY
SYSTEM : 4WD	
4WD(EST-MANUAL)	
01. DIAGNOSTIC TROUBLE CODES	

BKAE091C

1.1 DIAGNOSTIC TROUBLE CODES	
001. TCCU MODULE 010. SHIFT MOTOR 011. MAGNETIC S/CLUTCH 100. SPEED SENSOR 101. HUB SOLENOID VALVE 110. SELECTOR SWITCH 111. MOTOR POSITION SENSOR	
NUMBER OF DTC : 7 ITEMS	
HELP	ERAS

BKAE091D

ERAES THE DIAGNOSTIC TROUBLE CODES FOR EST

1. Select and operate according to the instructions on the Hi-scan screen.
 - 1) Select "KIA VEHICLE DIAGNOSIS".
 - 2) Select "VEHICLE NAME".
 - 3) Select "4WD SYSTEM".
 - 4) Select "4WD(EST-MANUAL)".
 - 5) Select "01.DIAGNOSTIC TROUBLE CODES".

1.1 DIAGNOSTIC TROUBLE CODES	
1. PUT THE IG KEY OFF 2. JUMP PIN '8' TO PIN '4' OF DIAG. TERMINAL IN ENGINE ROOM 3. PUT THE IG KEY ON 4. WAIT FOR 10 SEC. DONE PRESS 'DOWN' TO SEE DIAG. TERMINAL	
MIL CODE COUNTER : 000	
HELP	ERAS
FLOW	PART

BKAE091E

1.1 DIAGNOSTIC TROUBLE CODES																					
<DIAG. TERMINAL IN ENGINE ROOM>																					
<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td> </tr> <tr> <td>5</td><td>6</td><td>7</td><td>8</td> </tr> <tr> <td>9</td><td>10</td><td>11</td><td>12</td> </tr> <tr> <td>13</td><td>14</td><td>15</td><td>16</td> </tr> <tr> <td>17</td><td>18</td><td>19</td><td>20</td> </tr> </table>		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	2	3	4																		
5	6	7	8																		
9	10	11	12																		
13	14	15	16																		
17	18	19	20																		
JUMP PIN '8' TO PIN '4'. PRESS 'ESC'																					
MIL CODE COUNTER : 000																					
HELP	ERAS																				
FLOW	PART																				

BKAE091F

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Transfer System

SELF-DIAGNOSIS PROCEDURE FOR TOD(AUTO)

1. Select and operate according to the instructions on the Hi-scan screen. (Refer to EST(MANUAL) procedures)

KIA VEHICLE DIAGNOSIS	
MODEL : SORENTO	2004MY
SYSTEM : 4WD	
01. 4WD(EST-MANUAL)	
02. 4WD(TOD-AUTO)	

BKAE091G

1. KIA VEHICLE DIAGNOSIS	
MODEL : SORENTO	2004MY
SYSTEM : 4WD	
4WD(TOD-AUTO)	
01. DIAGNOSTIC TROUBLE CODES	

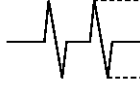
BKAE091H

EST standard input and output value in TCCM

No.	Items	Condition	Signal		Remarks
			Type	Level	
1	A1	MOTOR OUTPUT (2H-4H-4L)	DC	Vbatt	*Current : INRUSH(+) : 4.64A INRUSH(-) : 4.4A OPERATION : 0.6 A
				0V	
2	A2	MOTOR OUTPUT (2H-4H-4L)	DC	Vbatt	A
				0V	
3	A3	GND			
4	A4	CLUTCH COIL IDLE (2H→4H→4L)	DC	Vbatt	*Current : 4.28A
				0V	
5	A5	POSITION 1 MTR IDLE (P/R/N/D/2/L)	2H 2H→4H 4H→4L	CODE : 1010 CODE : 0011 CODE : 1100 LOGIC HI(1) : 5V LOGIC LO(0) : 0.5V or less	*MTR POS. CODE : 1/2/3/4 = XXXX (1=5V dc) (0≤0.5V dc)

Transfer Case Assembly

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6	A6	SPEED SENSOR	IDLE	PULSE	 135Hz at 60 KPH	*VSS of 60KPH : HI : 16.4V LOW : -6.4V
7	A7	2H SW.	SW OFF	DC	4.5 ~ 5.5V	
			SW ON	↑	0.5V or less	
8	A8	4H DISPLAY	SW OFF	DC	Vbatt	
			SW ON	↑	0.5V or less	
9	A9	BATT	IGN OFF	DC	Vbatt	
			IGN ON	↑	Vbatt	
10	A10	BATT	IGN OFF	DC	Vbatt	
			IGN ON	↑	Vbatt	
11	A11	GND				
12	A12	POSITION 2 MTR	IDLE (P/R/N/D/2/L)	2H 2H→4H 4H→4L	CODE : 1010 CODE : 0011 CODE : 1100 LOGIC HI(1) : 5V LOGIC LO(0) : 0.5V or less	*MTR POS. CODE : 1/2/3/4 = XXXX (1=5V dc) (0≤0.5V dc)
13	A13	4L SW	SW OFF	DC	4.5 ~ 5.5V	
			SW ON	↑	0.5V or less	
14	A14	INHIBITOR SW(AT) CLUTCH INTERLO- CK SW(MT)	N	DC	0V	
			P/R/D/2/L	↑	Vbatt	
15	A15	4L DISPLAY	IDL("N")	DC	Vbatt	
				↑	0V	
16	A16	MOTOR OUTPUT (4L→4H→2H)	IDL("N")	DC	Vbatt	
				↑	0V	
21	A21	POSITION 3 MTR	IDLE (P/R/N/D/2/L)	2H 2H→4H 4H→4L	CODE : 1010 CODE : 0011 CODE : 1100 LOGIC HI(1) : 5V LOGIC LO(0) : 0.5V or less	*MTR POS. CODE : 1/2/3/4 = XXXX (1=5V dc) (0≤0.5V dc)
22	A22	DIA.DISPLAY	In comm.	PULSE	 4V or more 0-0.9V	
23	A23	FRRD SOLENOID	IDLE (2H→4H)	OFF		
				ON		

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Transfer System

WARNING LAMP OPERATING CONDITIONS

Items	Condition	INDICATOR		Description
		4LOW	W/Lamp	
TPS	OPEN OR SHORT(GND)	OFF	OFF	1. No warning lamp blink or ON 2. AUTO ↔ 4LOW shift is possible
SHIFT MOTOR	OPEN	OFF	Blink	1. Warning lamp blinks after 1 sec. since the fault is occurred. 2. Fail at the "AUTO mode" - AUTO mode holding - "4LOW" lamp blinks if "4L" is selected 3. Fail at the "4LOW mode" - 4L mode holding - "4LOW" lamp blinks if "AUTO" is selected 4. Even though the fault is repaired, shift prevention is still existed. If IG. ON again, system is operated normally.
SHIFT MOTOR POSITION SENSOR (1), (2), (3), (4)	OPEN Short to battery	OFF	Blink	1. Warning lamp blinks after 1 sec. since the fault is occurred. 2. Fail at the "AUTO mode" - AUTO mode holding - "4LOW" lamp blinks if "4L" is selected 3. Fail at the "4LOW mode" - 4L mode holding - "4LOW" lamp blinks if "AUTO" is selected 4. Even though the fault is repaired, shift prevention is still existed. If IG. ON again, system is operated normally.
	SHORT(GND)			
FRT SPEED SENSOR	OPEN	OFF	OFF	1. Warning lamp blinks after 0.5 sec. since the fault is occurred. 2. Fail at the "AUTO mode" - AUTO mode holding - "4LOW" lamp blinks if "4L" is selected 3. Fail at the "4LOW mode" - 4L mode holding - "4LOW" lamp blinks if "AUTO" is selected 4. Even though the fault is repaired, shift prevention is still existed. If IG. ON again, system is operated normally.
RR SPEED SENSOR	OPEN	OFF	OFF	

Transfer Case Assembly

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EMC (ELECTRO MAGNETIC CLUTCH)	OPEN	OFF	Blink	- Warning lamp blinks after 0.8 sec. since the fault is occurred. - Fail at the "AUTO mode" "AUTO" mode holding "4LOW" lamp blinks if "4L" is selected - Fail at the "4LOW mode" 4L mode holding "4LOW" lamp blinks if "AUTO" is selected - Even though the fault is repaired, shift prevention is still existed. If IG. ON again, system is operated normally.
	SHORT(GND)	OFF	Blink	

DTC LIST AND FAILSAFE

No.	Description	P-code	Failure effect	Fail-safe	W/Lamp
1	EEPROM check sum fault	P1725	TOD	Default calibration data	-
2	TPS loss of signal	P1726	TOD (TPS Idle)	TOD Determined by wheel slip only	OFF
3	TPS out of range	P1727	TOD (TPS Idle)	TOD Determined by wheel slip only	OFF
4	EMC open/shorted to battery	P1728	TOD Halted (2WD)	None	Blink
5	EMC shorted to ground	P1729	TOD Halted (2WD)	None	Blink
6	Front speed sensor voltage low	P1730	TOD	4H mode fail, Rear speed sensor, EMC Touch off level fixing. 4L Mode fail, EMC Maximum level fixing.	OFF
7	Front speed sensor voltage high	P1731	TOD	4H mode fail, Front speed sensor, EMC Touch off level fixing. 4L Mode fail, EMC Maximum level fixing.	OFF
8	Rear speed sensor voltage low	P1732	TOD	4H mode fail, Front speed sensor, EMC Touch off level fixing. 4L Mode fail, EMC Maximum level fixing.	OFF
9	Rear speed sensor voltage high	P1733	TOD	4H mode fail, Zero speed sensor, EMC Touch off level fixing. 4L Mode fail, EMC Maximum level fixing.	OFF
10	Vehicle speed sensor reference voltage low	P1734	TOD	4H mode fail, Zero speed sensor, EMC Touch off level fixing. 4L Mode fail, EMC Maximum level fixing.	OFF
11	Vehicle speed sensor reference voltage high	P1735	TOD	4H mode fail, Zero speed sensor, EMC Touch off level fixing. 4L Mode fail, EMC Maximum level fixing.	OFF
12	Shift motor open/shorted to battery	P1736	Electric motor shifting (4H→4L→4H)	No shifts	Blink
13	Shift motor open/shorted to ground	P1737	Electric motor shifting (4H→4L→4H)	No shifts	Blink
14	Shift system timeout	P1738	Electric motor shifting (4H→4L→4H)	No shifts	Blink
15	General position encoder fault	P1739	Electric motor shifting (4H→4L→4H)	No shifts	OFF

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Transfer System

16	Position 1 shorted to ground	P1740	Electric motor shifting (4H→4L→4H)	No shifts	OFF
17	Position 2 shorted to ground		Electric motor shifting (4H→4L→4H)	No shifts	
18	Position 3 shorted to ground		Electric motor shifting (4H→4L→4H)	No shifts	
19	Position 4 shorted to ground		Electric motor shifting (4H→4L→4H)	No shifts	

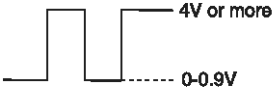
STANDARD INPUT AND OUTPUT VALUE IN TODCM

No.	Items	Condition	Signal		Remarks
			Type	Level	
1	A1	MOTOR OUTPUT (HI-LOW)	DC	Vbatt	
				0V	
2	A2	MOTOR OUTPUT (LOW-HI)	DC	Vbatt	
				0V	
3	A3	EMC	Vehicle driving PULSE (PWM)	 FREQ : 50Hz DUTY(-) : 0~88%	*4LOW DUTY(-): 88.72%
4	A4	BATT	IGN OFF	DC	Vbatt
			IGN ON	↑	Vbatt
5	A5	IGN 1	IGN OFF	DC	0V
			IGN ON	↑	Vbatt
6	B1	ENCODER GND			
7	B2	DIAGNOSTIC DISPLAY	LAMP OFF	DC	Vbatt
			LAMP ON	↑	0.5V or less
8	B3	TPS (PWM)	ACCEL C.T & W.O.T	PWM	HI : 4V MIN LOW : 0.9V MAX FREQ : 100Hz DUTY(-) : C.T-10%, W.O.T-83%
9	B4	AUTO/LOW SW.	IDLE (A/T LEVER "N")	AUTO LOW	4V or more 0.9V or less (AUTO mode : 4V or more)
10	B5	SHIFT MOTOR POSITION 2	IDLE (A/T LEVER "N")	→AUTO →LOW	CODE : 0010 → 0000 CODE : 0101 → 0000 LOGIC HI(1) : 4.5V or more LOGIC LO(0) : 0.5V or less

*MTR POS. CODE
:
1/2/3/4 = XXXX

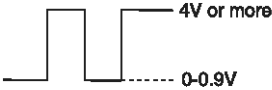
Transfer Case Assembly

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11	B6	FRT SPEED SNSR	Vehicle driving	PULSE	 30PULSE/PROPSHAFT REV. DUTY(-) : 50%	*VSS 60KPH : 985Hz
12	B7	N.A				
13	B8	SPEED SNSR GND				
14	A6	MOTOR OUTPUT (HI-LOW)	IDLE("N")	DC	Vbatt	
				↑	0V	
15	A7	MOTOR OUTPUT (LOW-HI)	IDLE("N")	DC	Vbatt	
				↑	0V	
16	A8	SPEED REFERENCE	IGN OFF	DC	0.9V or less	
			IGN ON	↑	4.75~5.25V	
17	A9	GND FOR ECU				
18	A10	GND FOR ECU				
19	A11	BATT	IGN OFF	DC	Vbatt	
			IGN ON	↑	Vbatt	
20	A12	K-LINE	In comm. (10.4Kbps)	PULSE	LOGIC "0" : Vbatt 20% or less LOGIC "1" : Vbatt 80% or more	
21	B9	4LOW DISPLAY	SW OFF	DC	Vbatt	*IGN ON : Turned on for 3sec
			SW ON	↑	0.5V or less	
22	B10	N.A				
23	B11	N.A				
24	B12	TRANS. NEUTRAL	N	DC	0.9V or less	
			P/R/D/2/L	↑	4.5 ~5.5V	
25	B13	ABS INPUT	ABS OFF	DC	4.5 ~5.5V	
			ABS ON	↑	0.9V or less	
26	B14	BRAKE SW.	SW OFF	DC	0.9V or less	
			SW ON	↑	Vbatt	
27	B15	SHIFT MOTOR POSITION 1	IDLE (A/T LEVER "N")	→AUTO →LOW	CODE : 0010 → 0000 CODE : 0101 → 0000 LOGIC HI(1) : 4.5V or more LOGIC LO(0) : 0.5V or less	*MTR POS. CODE : 1/2/3/4 = XXXX
28	B16	SHIFT MOTOR POSITION 3	IDLE (A/T LEVER "N")	→AUTO →LOW	CODE : 0010 → 0000 CODE : 0101 → 0000 LOGIC HI(1) : 4.5V or more LOGIC LO(0) : 0.5V or less	*MTR POS. CODE : 1/2/3/4 = XXXX

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Transfer System

29	B17	RR SPEED SNSR	Vehicle driving	PULSE	 30PULSE/PROPSHAFT REV. DUTY(-) : 50%	*VSS 60KPH : 966Hz
30	B18	SHIFT MOTOR POSITION 4	IDLE (A/T LEVER "N")	→AUTO →LOW	CODE : 0010 → 0000 CODE : 0101 → 0000 LOGIC HI(1) : 4.5V or more LOGIC LO(0) : 0.5V or less	*MTR POS. CODE : 1/2/3/4 = XXXX

INSPECTION PROCEDURES FOR DIAGNOSTIC TROUBLE CODES

DESCRIPTIONS

TOD control unit starts self-diagnostic function after the ignition is switched ON.

If TOD control unit detects failure for each circuit and component by comparing condition of the system with limited condition set inside TOD control unit, TOD control unit stores the failure code.

The failure code stored in TOD control unit can be confirmed by scan tool and then outputs the four-digit code to the scan tool when the scan tool is connected to TOD data link connector in the engine room.

Please refer to the self-diagnosis procedure for TOD(auto) in detail as followed.

DIAGNOSTIC TROUBLE CODE SUMMARY

CODE	POSSIBLE CAUSE	REMEDY
P1725	EEPROM CHECKSUM error - When EEPROM CHECKSUM of TCCU is error	1. Measure TCCU supply voltage 2. Inspect ground 3. Inspect connection of relevant connector 4. Inspect malfunction of TCCU
P1726	No signal of throttle position - When the signal of throttle position is not recognized	1. Inspect communication line connection between engine ECU and TCCU 2. Diagnose defect of engine ECU 3. Inspect malfunction of TCCU
P1727	Abnormality of throttle position signal - When the throttle position signal is error	1. Inspect communication line connection between engine ECU and TCCU 2. Diagnose defect of engine ECU

Transfer Case Assembly

WD-19

P1728	Open/short circuit of electro magnetic clutch(EMC) - When the electro magnetic clutch(EMC), the relevant connector or the wire is error	1. Measure supply voltage of EMC • Inspection condition: IG ON / Engine driving • Specified value - Terminal voltage between TCCU No.4 and No.17 : 11-15 V 2. Measure resistance of EMC(Item condition) • Inspection condition: With disconnecting the connector, inspect the wire side connector pin • Specified value - Terminal resistance between TCCU pin No.3 and No.17 : 2.5 Ω - Terminal voltage between TCCU pin No. 3 and No.17: LOW : 0V, HIGH : 11-15V 3. Inspect open/short circuit of cable related to the electro magnetic clutch(EMC) 4. Inspect abnormal connection of connector related to EMC
P1729	Open(GND) circuit of EMC - When the EMC or the relevant connector or the wire is error	1. Inspect supply voltage of EMC • Inspection condition: IG ON / Engine driving • Specified value - Terminal voltage between TCCU No.4 and No.17 : 11-15 V 2. Measure resistance of EMC(Item condition) • Specified value - Terminal resistance between TCCU pin No.3 and No.17 : 2.5 Ω - Terminal voltage between TCCU pin No. 3 and No.17 : LOW : 0V, HIGH : 11-15V
P1730	Low voltage of front speed sensor - When front speed sensor is too low output voltage	1. Inspect output waveform of front speed sensor • Inspection condition: At driving • Specified value - Terminal voltage between TCCU pin No. 11 and No.13: LOW : below 0.9V, HIGH : 4.75-5.25V 2. Inspect abnormal connection of the relevant connector 3. Inspect open/short circuit related to cable
P1731	High voltage of front speed sensor - When front speed sensor is too high output voltage	1. Inspect output waveform of front speed sensor • Inspection condition: At driving • Specified value - Terminal voltage between TCCU pin No. 11 and No.13: LOW : below 0.9V, HIGH : 4.75-5.25V 2. Inspect abnormal connection of the relevant connector 3. Inspect open/short circuit related to cable

WD-20

Transfer System

P1732	Low voltage of rear speed sensor - When rear speed sensor is too low output voltage	- Inspect output waveform of rear speed sensor - Inspection condition: At driving - Specified value - Terminal voltage between TCCU pin No. 29 and 13 : LOW : below 0.9V, HIGH : 4.75-5.25V - Inspect abnormal connection of the relevant connector - Inspect open/short circuit related to cable
P1733	High voltage of rear speed sensor - When rear speed sensor is too high output voltage	- Inspect output waveform of rear speed sensor - Inspection condition: At driving - Specified value - Terminal voltage between TCCU pin No. 29 and 13 : LOW : below 0.9V, HIGH : 4.75-5.25V - Inspect abnormal connection of the relevant connector - Inspect open/short circuit related to cable
P1734	Low standard voltage of speed sensor - When speed sensor is too low supply voltage	- Measure supply voltage of speed sensor - Inspection condition: IG ON / At driving - Specified value - Terminal voltage between TCCU pin No. 16 and 13 : 4.75-5.25V - Inspect abnormal connection of the relevant connector - Inspect open/short circuit related to cable
P1735	High standard voltage of speed sensor - When speed sensor is too high supply voltage	- Measure supply voltage of speed sensor - Inspection condition: IG ON / At driving - Specified value - Terminal voltage between TCCU pin No. 16 and 13 : 4.75-5.25V - Inspect abnormal connection of the relevant connector - Inspect open/short circuit related to cable
P1736	Open/short(power) circuit of shift motor - When the shift motor or the wire of motor is error	- Inspect resistance of shift motor - Inspection condition: With disconnecting the connector, inspect the wire side connector pin - Specified value - Terminal voltage between TCCU No.1 and No.2, No. 1 and No.15 : Specified value : 0.7 Ω - Terminal resistance between TCCU pin No.14 and No.15, No.14 and No.2 : 0.7 Ω - Inspect supply voltage of shift motor - Inspection condition: IG ON - Specified value : When "4H/4L" switch is operated, 11-15 V (Battery voltage) - Inspect abnormal connection of the relevant connector - Inspect open/short circuit related to cable

Transfer Case Assembly

WD-21

P1737	Shift motor output short (GND) - When the shift motor or the wire of motor is error	- Inspect resistance of shift motor - Inspection condition: With disconnecting the connector, inspect the wire side connector pin - Specified value - Terminal voltage between TCCU No.1 and No.2, No. 1 and No.15 : Specified value : 0.7 Ω - Terminal resistance between TCCU pin No.14 and No.15, No.14 and No.2 : 0.7 Ω - Inspect supply voltage of shift motor - Inspection condition: IG ON - Specified value : When "4H/4L" switch is operated, 11-15 V (Battery voltage) - Inspect abnormal connection of the relevant connector - Inspect open/short circuit related to cable
P1738	Shift system time out - When shift system is error	- Remove the motor and then connect the connector which of condition operate motor. If motor is operated, inspect transfer case assembly but if not, replace motor. - Inspect open/short circuit related to cable - Inspect defective connection of the relevant connector
P1739	Malfunction of position encoder - When the position encoder that recognizes shift motor is error	- Inspect open/short circuit related to cable - Inspect abnormal connection of the relevant connector - Inspect encoder
P1740	Short circuit of "1" position (GND) - At short circuit between encoder signal No.1 and GND	- Inspect open/short circuit related to cable - Inspect abnormal connection of the relevant connector - Inspect encoder
P1741	Short circuit of "2" position (GND) - At short circuit between encoder signal No.2 and GND	- Inspect open/short circuit related to cable - Inspect abnormal connection of the relevant connector - Inspect encoder
P1742	Short circuit of "3" position (GND) - At short circuit between encoder signal No.3 and GND	- Inspect open/short circuit related to cable - Inspect abnormal connection of the relevant connector - Inspect encoder
P1743	Short circuit of "4" position (GND) - At short circuit between encoder signal No.4 and GND	- Inspect open/short circuit related to cable - Inspect abnormal connection of the relevant connector - Inspect encoder

WD-22

Transfer System

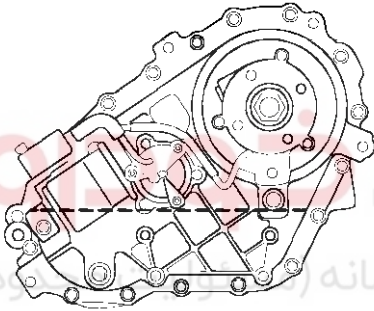
SERVICE ADJUSTMENT PROCEDURES

FLUID LEVEL INSPECTION

1. Wipe fluid level plug and surrounding area clean.
2. Remove fluid level plug.
3. When transfer case is full, lubricant will just drip out fluid level plug opening.
4. Add approved lubricant if required.
5. Install fluid level plug and torque to 20 - 30 N·m (14 - 22 lb·ft).

NOTICE

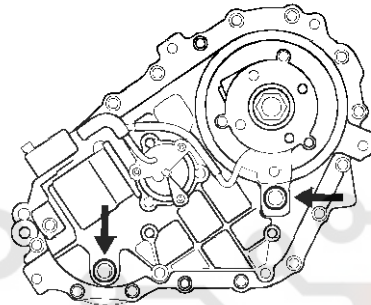
- To check or drain the lubricant, the transfer case should be warm.
This is best done shortly after shutdown.
- Do not use an impact wrench to remove or install the fill or drain plugs since this will damage female threads in transfer case cover.



LMAC330A

FLUID REPLACEMENT

1. Wipe fluid level and drain plug and surrounding areas clean.
2. Place suitable container under transfer case.
3. Remove drain plug.
4. Remove fluid level plug.
5. Allow all lubricant to drain.
6. Install drain plug and torque to 20 - 30 N·m (14 - 22 lb·ft).
7. Add approved lubricant through fluid level plug opening until lubricant just begins to drip back out of opening.
8. Install fluid level plug and torque to 20 - 30 N·m (14 - 22 lb·ft).



LMAC330B

Transfer Case Assembly

WD-23

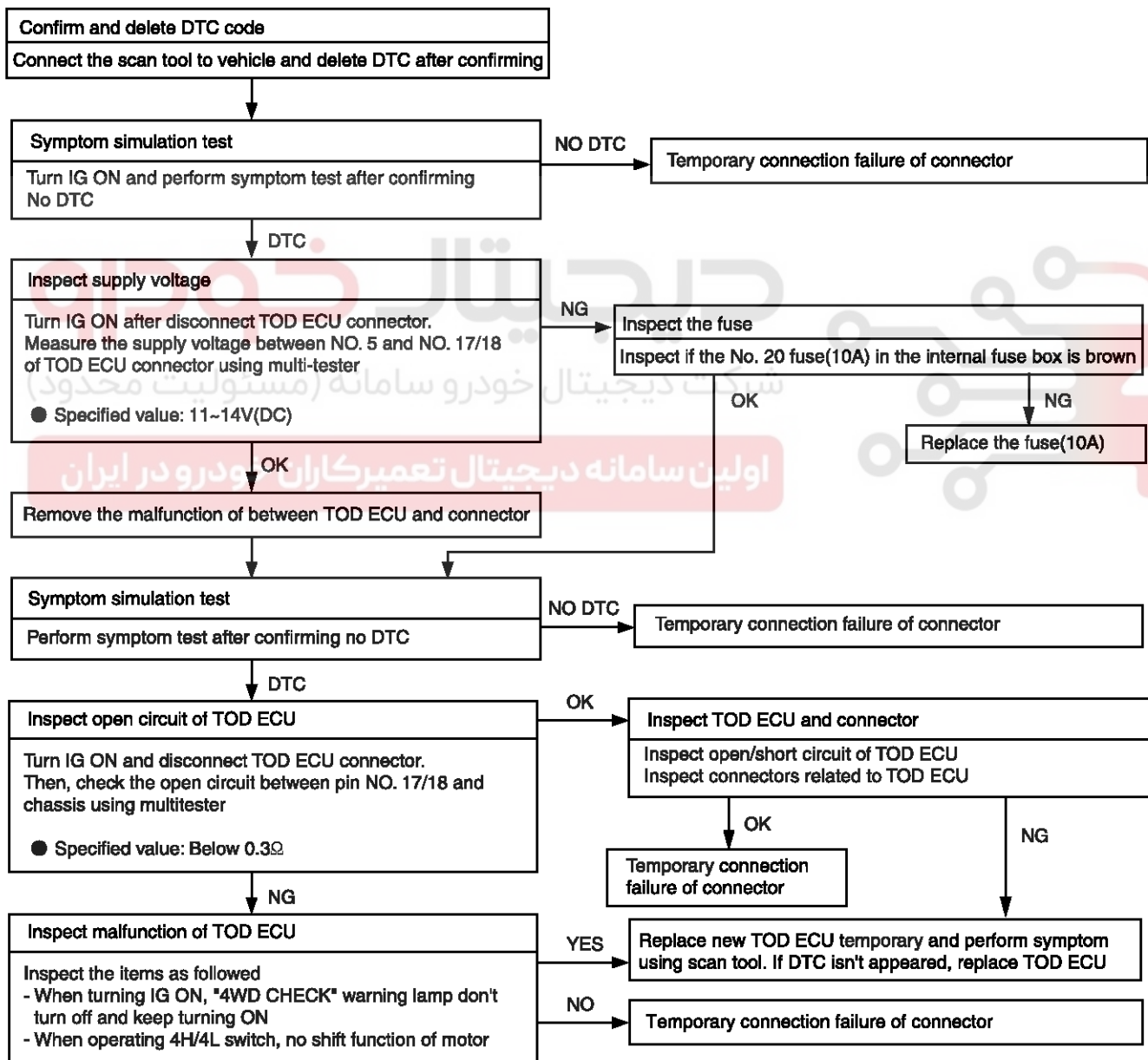
P1725

INSPECTION PROCEDURES FOR
DIAGNOSTIC TROUBLE CODE

TOD CONTROL MODULE(CHECKSUM)

P1725	TOD CONTROL MODULE(CHECKSUM) ERROR
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COMMENT	PROBABLE CAUSE
When IG switch is turned to ON, "4WD CHECK" warning lamp turns ON and then does not turn OFF. Also diagnostic trouble code No.P1725 is output when using the scan tool.	- Malfunction of EEPROM CHECKSUM - Malfunction of TOD control unit



BKAE100A

WD-24

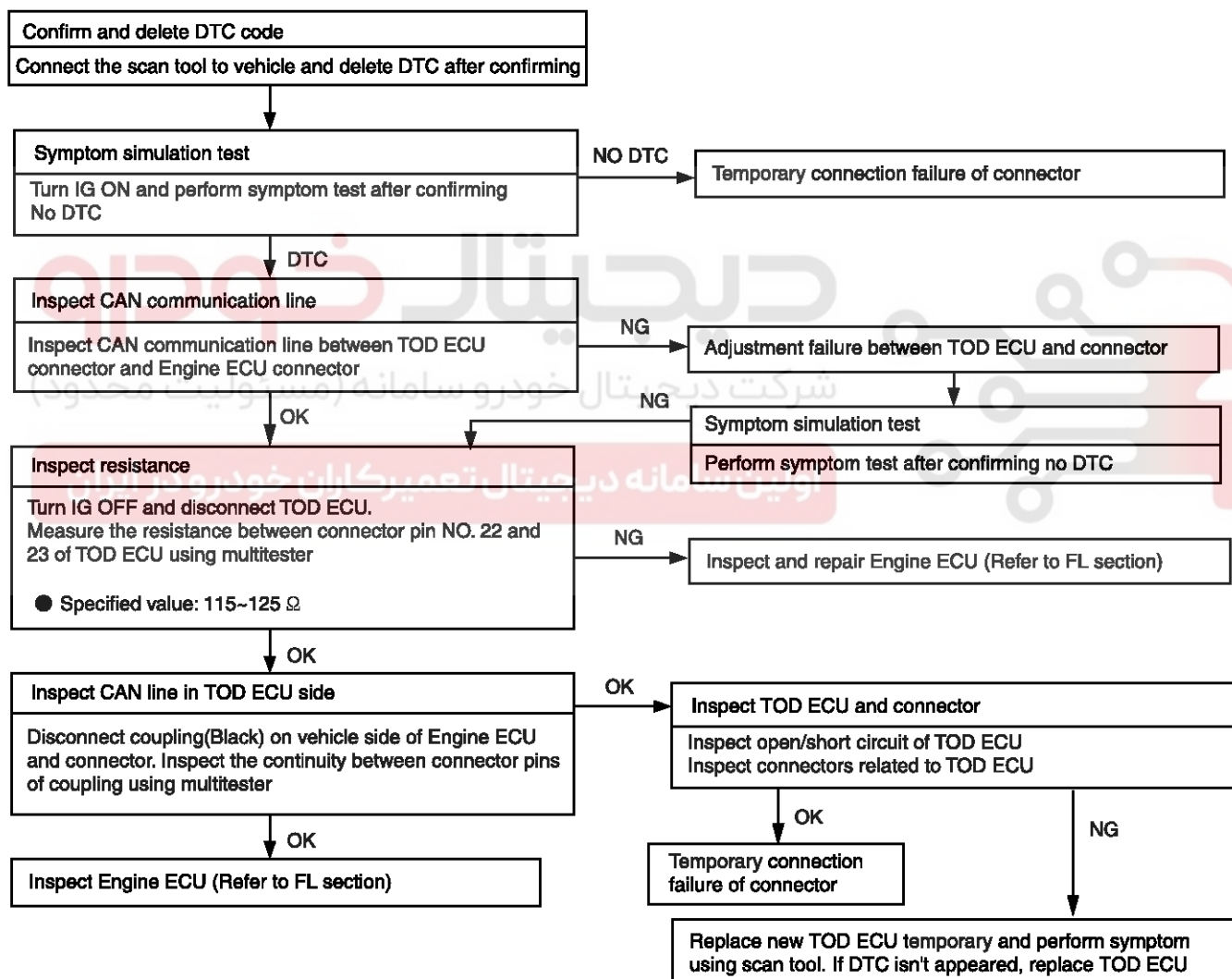
Transfer System

P1726

THROTTLE POSITION INPUT

P1726	THROTTLE POSITION INPUT-LOSS OF SIGNAL
P1727	THROTTLE POSITION INPUT-OUT OF RANGE

COMMENT	PROBABLE CAUSE
The diagnostic trouble code No.P1726 is output when using scan tool.	- Malfunction of TOD ECU - Malfunction of CAN communication line - Malfunction of engine ECU



BKAE100B

Transfer Case Assembly

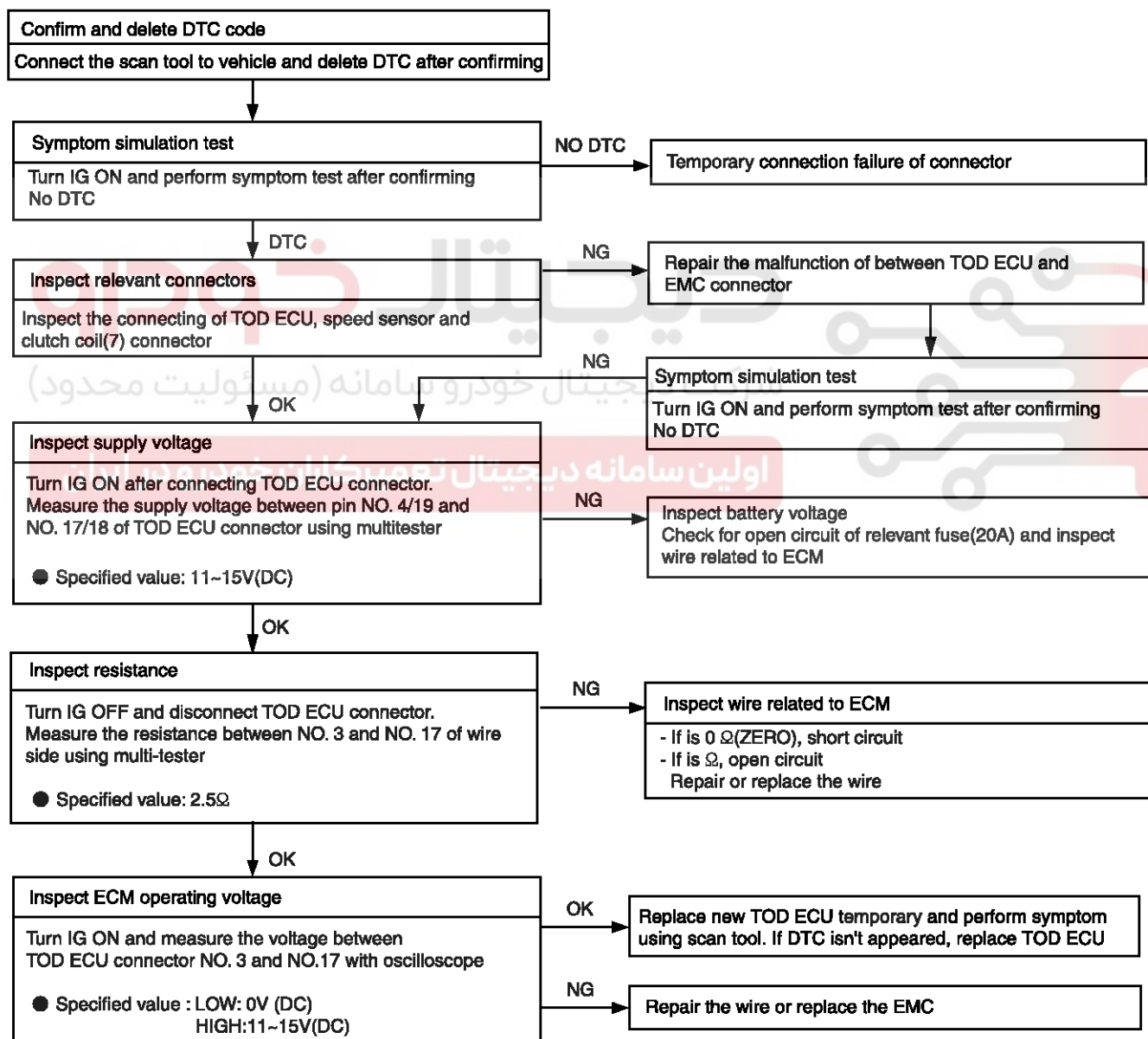
WD-25

P1728

EMC

P1728	EMC-OPEN/SHORT TO BATTERY
P1729	EMC-SHORT TO GROUND

COMMENT	PROBABLE CAUSE
When IG switch is turned to ON, "4WD CHECK" warning lamp turns ON and then does not turn OFF. Also the diagnostic trouble code No.P1728, P1729 is output when using the scan tool.	- Malfunction of electronic magnet clutch - Malfunction of connector or wire



BKAE100C

WD-26

Transfer System

P1730

SPEED SENSOR

P1730	FRONT SPEED SENSOR-LOW INPUT
P1731	FRONT SPEED SENSOR-HIGH INPUT
P1732	REAR SPEED SENSOR-LOW INPUT
P1733	REAR SPEED SENSOR-HIGH INPUT
P1734	SPEED SENSOR REFERENCE-LOW INPUT
P1735	SPEED SENSOR REFERENCE-HIGH INPUT

COMMENT	PROBABLE CAUSE
When IG switch is turned to ON, "4WD CHECK" warning lamp turns ON and then does not turn OFF. Also the diagnostic trouble code No.P1730~P1735 is output when using the scan tool.	• Malfunction of speed sensor(Front/Rear) • Malfunction of power supply • Malfunction of connector or wire

دیجیتال خودرو

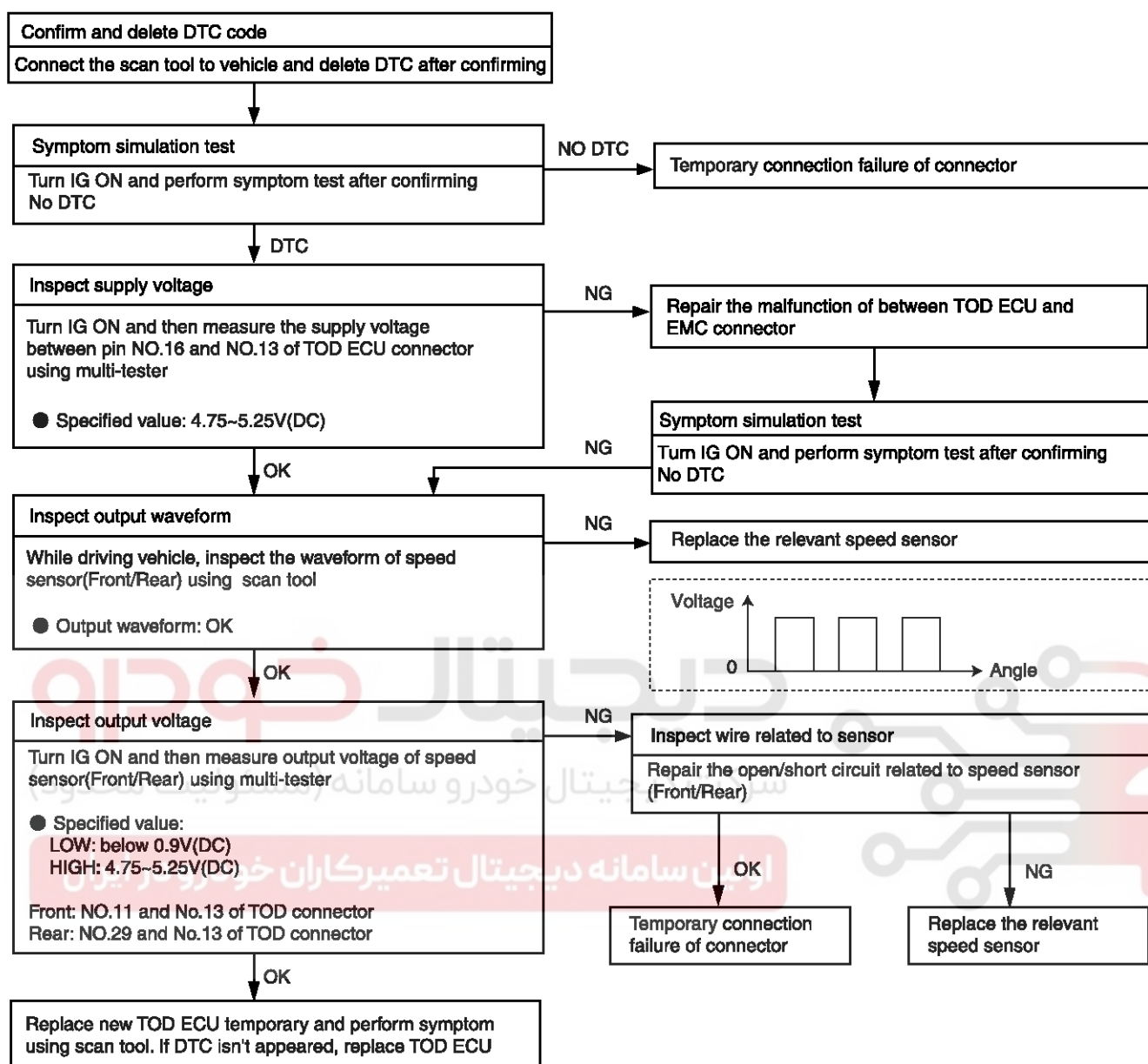
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



Transfer Case Assembly

WD-27



BKAE100D

WD-28

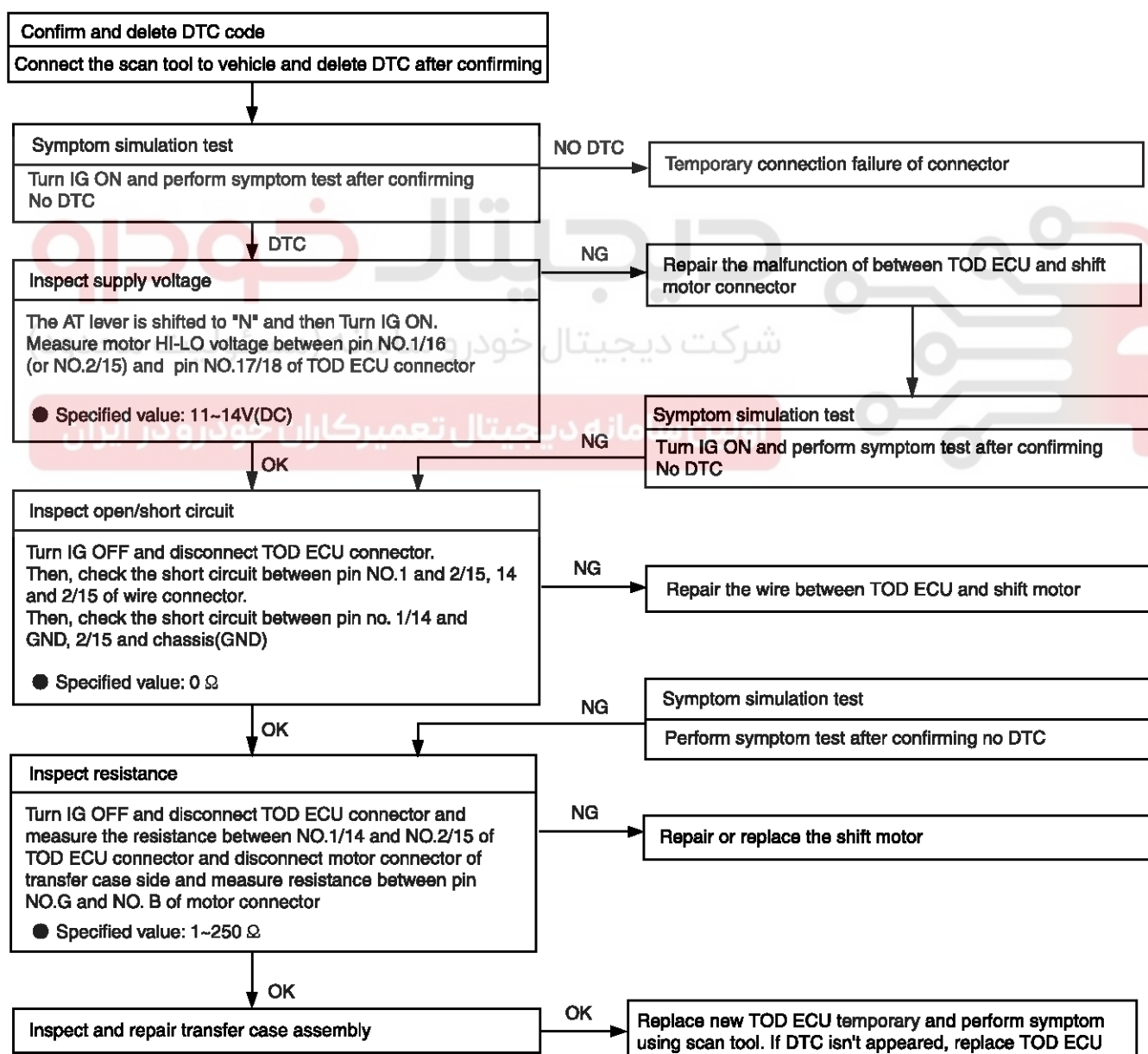
Transfer System

P1736

SHIFT MOTOR

P1736	SHIFT MOTOR-OPEN
P1737	SHIFT MOTOR-OPEN/SHORT TO GROUND
P1738	SHIFT SYSTEM TIMEOUT

COMMENT	PROBABLE CAUSE
When "4H/4L switch" is shifted from 4H to 4L, "4L" lamp does not turn on for some time then turns on. And "4WD CHECK" warning lamp turns on. Also the diagnostic trouble code No.P1736~P1738 is output when using the scan tool. When operating "4H/4L switch", "4H/4L switch" isn't shifted.	- Malfunction of shift motor - Malfunction of power supply - Malfunction of connector - Open/short circuit of wire



Transfer Case Assembly

WD-29

BKAE100E

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



WD-30

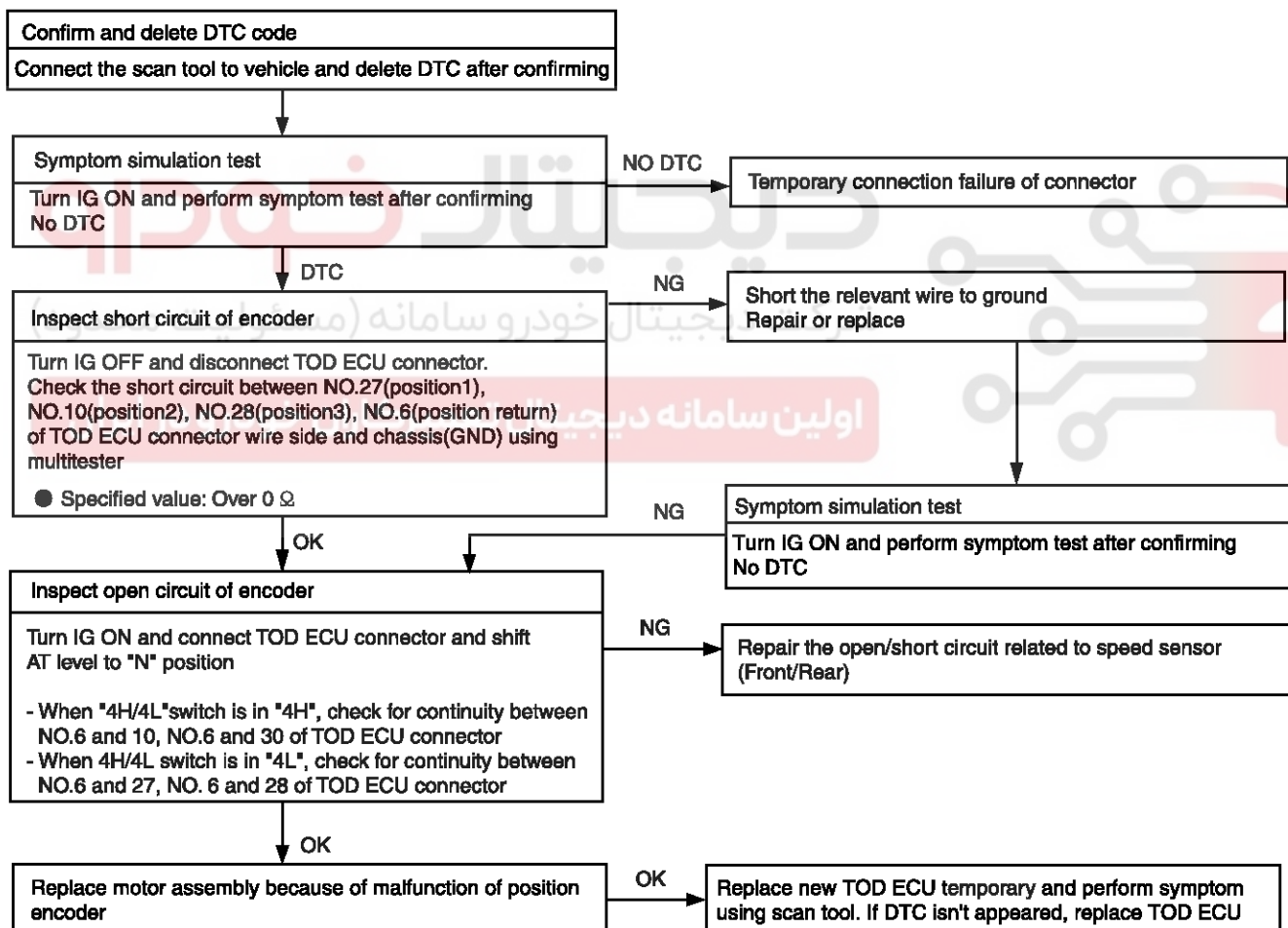
Transfer System

P1739

POSITION ENCODER

P1739	GENERAL POSITION ENCODER FAULT
P1740	POSITION 1 - SHORT TO GROUND
P1741	POSITION 2 - SHORT TO GROUND
P1742	POSITION 3 - SHORT TO GROUND
P1743	POSITION 4 - SHORT TO GROUND

COMMENT	PROBABLE CAUSE
When IG switch is turned to ON, "4WD CHECK" warning lamp turns ON and then does not turn OFF. Also the diagnostic trouble code No.P1739~P1743 is output when using the scan tool.	- Malfunction of position encoder - Short circuit between each wire and ground



BKAE100F

NOTICE

With the connector connected when the IG is ON, do not operate the switches while measuring resistance or the continuity test corresponding to the connector.

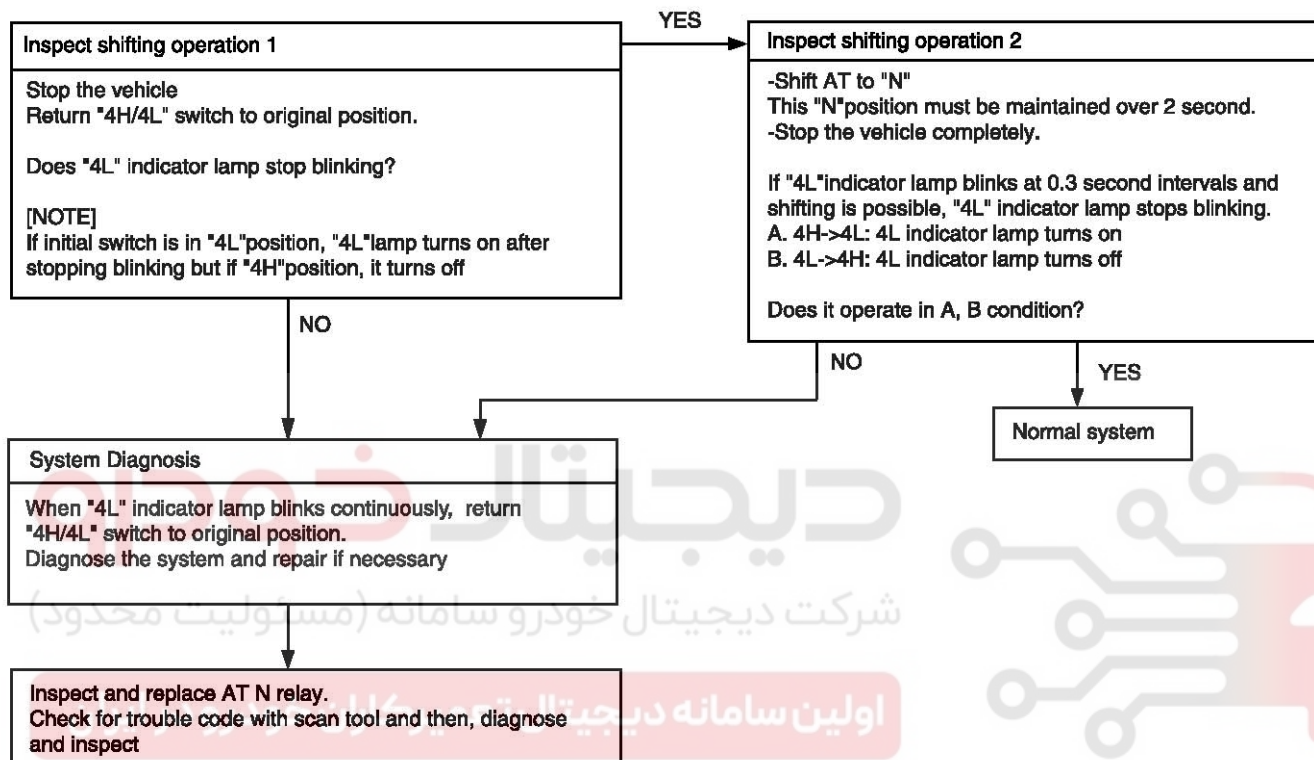
If the switches are operated, be careful that the tester may be damaged or injured due to excessive current in the connector momentarily.

Transfer Case Assembly

WD-31

Abnormality of shifting operation

NO DTC	Abnormality of shifting operation
COMMENT	PROBABLE CAUSE
When "4H/4L" switch is shifted from 4H to 4L, "4L" indicating lamp is blinking continuously.	Failure of system



BKAE100G

WD-32

Transfer System

Transfer Case

4WD SYSTEM DESCRIPTION

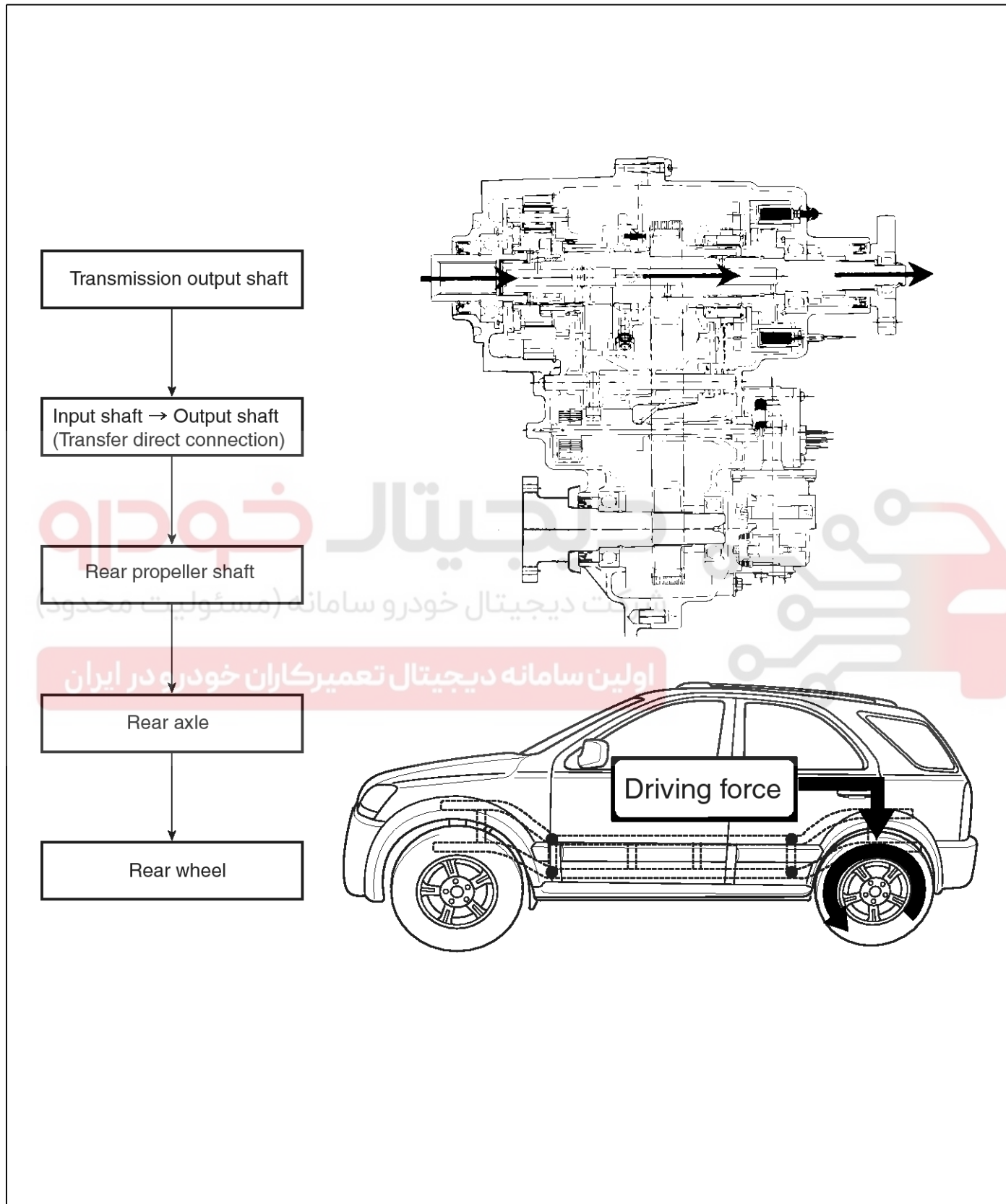
Drive type	Drive item	Drive mode	Drive status	Useful condition
Electric Shift Transfer (EST type)	Drive mode	2H	2WD, Rear wheel drive	Use on the roadway
		4H	4WD HIGH	- Use on the off-road or snowy and rainy road having slippery road surface. - When turning on the roadway at low speed, vibration and noise happens by tight corner braking.
		4L	4WD LOW	Use in the condition which driving force is required like escaping from rough way and towing.
	Transfer	2H ↔ 4H	2WD ↔ 4WD	Possible to transfer 2WD into 4WD and vice versa at 80kph or below during driving.
		4H ↔ 4WD (L)	4WD(H) ↔ 4WD(L)	- Necessary to stop the vehicle for transfer - M/T vehicle : Transfer the switch after pressing the clutch pedal. - A/T vehicle : Transfer the switch after positioning the A/T lever to "N". - All vehicles with 4L mode should stop the vehicle for transfer.
Active Torque Transfer (ATT type)	Drive mode	AUTO	2WD ↔ 4WD	- Use on the various road surfaces including roadway, off-road, or snowy and rainy road having slippery road surface. - Using multiple clutch, control the revolution difference between front and rear wheels electronically. So this mode can correspond to the various road surfaces by controlling the ATT unit automatically.
		LOW	4WD LOW	Refer to 4L of part time.
	Transfer	AUTO ↔ LOW	4WD(H) ↔ 4WD(L)	- Necessary to stop the vehicle for transfer - M/T vehicle : Transfer the switch after pressing the clutch pedal. - A/T vehicle : Transfer the switch after positioning the A/T lever to "N" - All vehicles with 4L mode should stop the vehicle for transfer.

Transfer Case Assembly

WD-33

EST POWER FLOW

1. 2H Mode (Rear Wheel Drive)

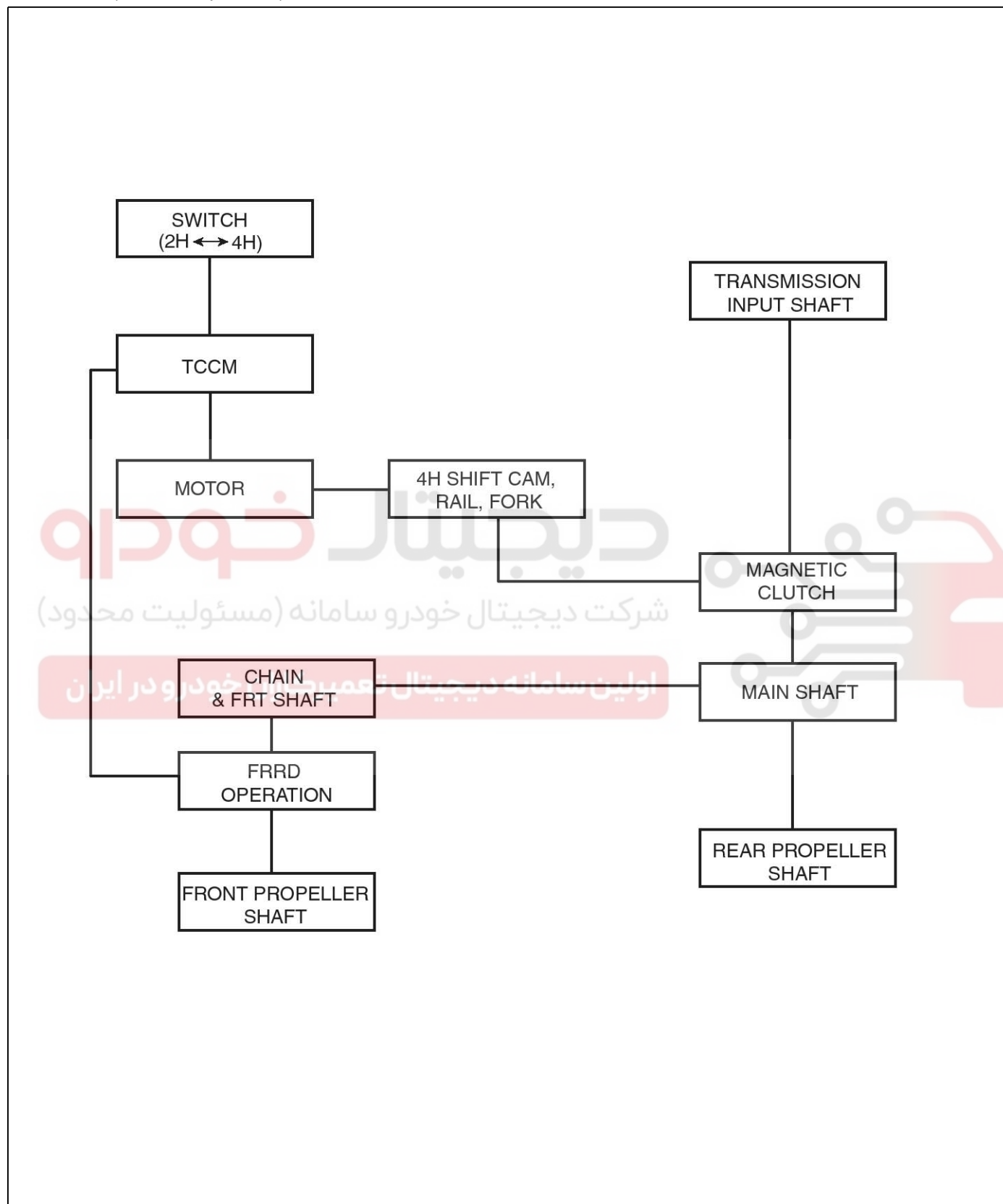


WD-34

Transfer System

LMAC250A

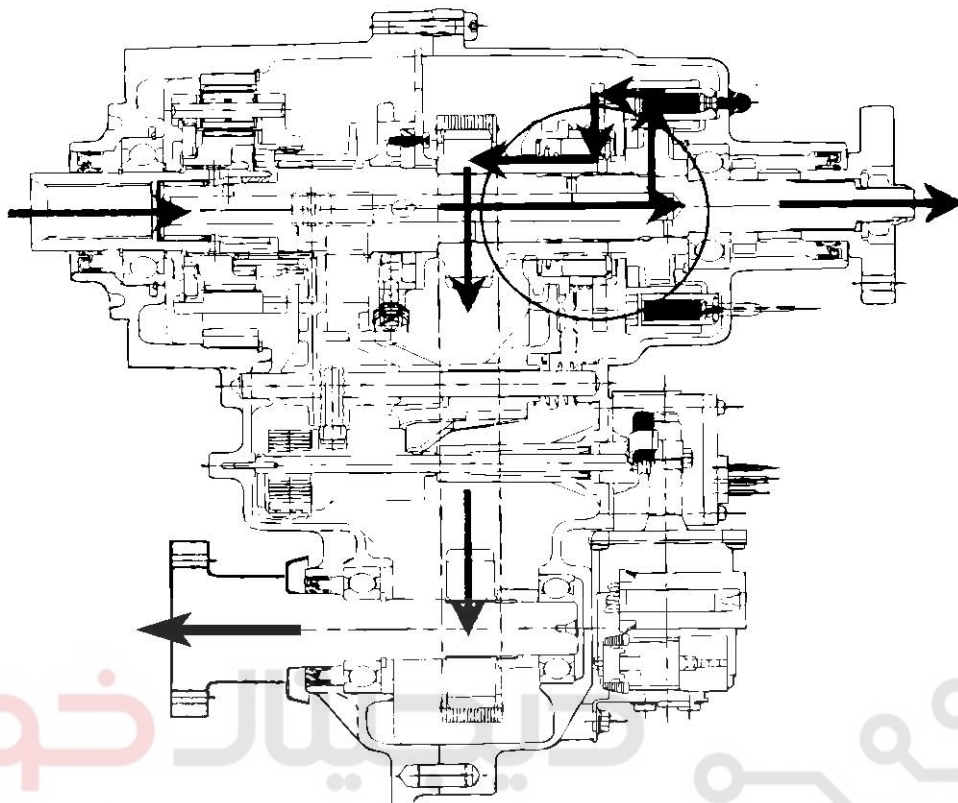
2. 4H Mode (Transfer Operation)



LMAC250C

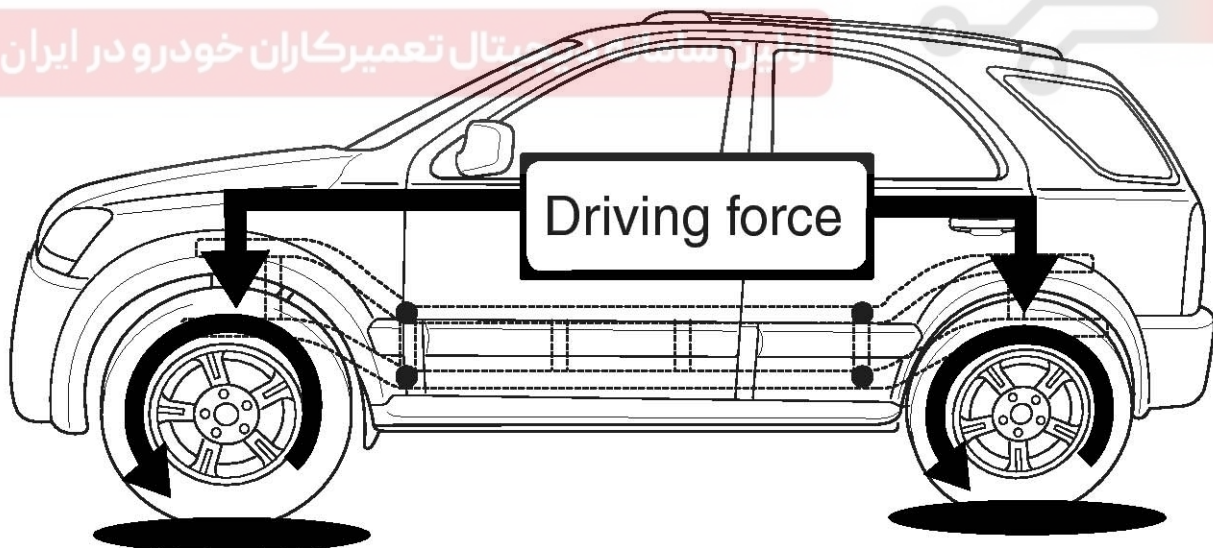
Transfer Case Assembly

WD-35



شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

ایستاد تعمیرکاران خودرو در ایران

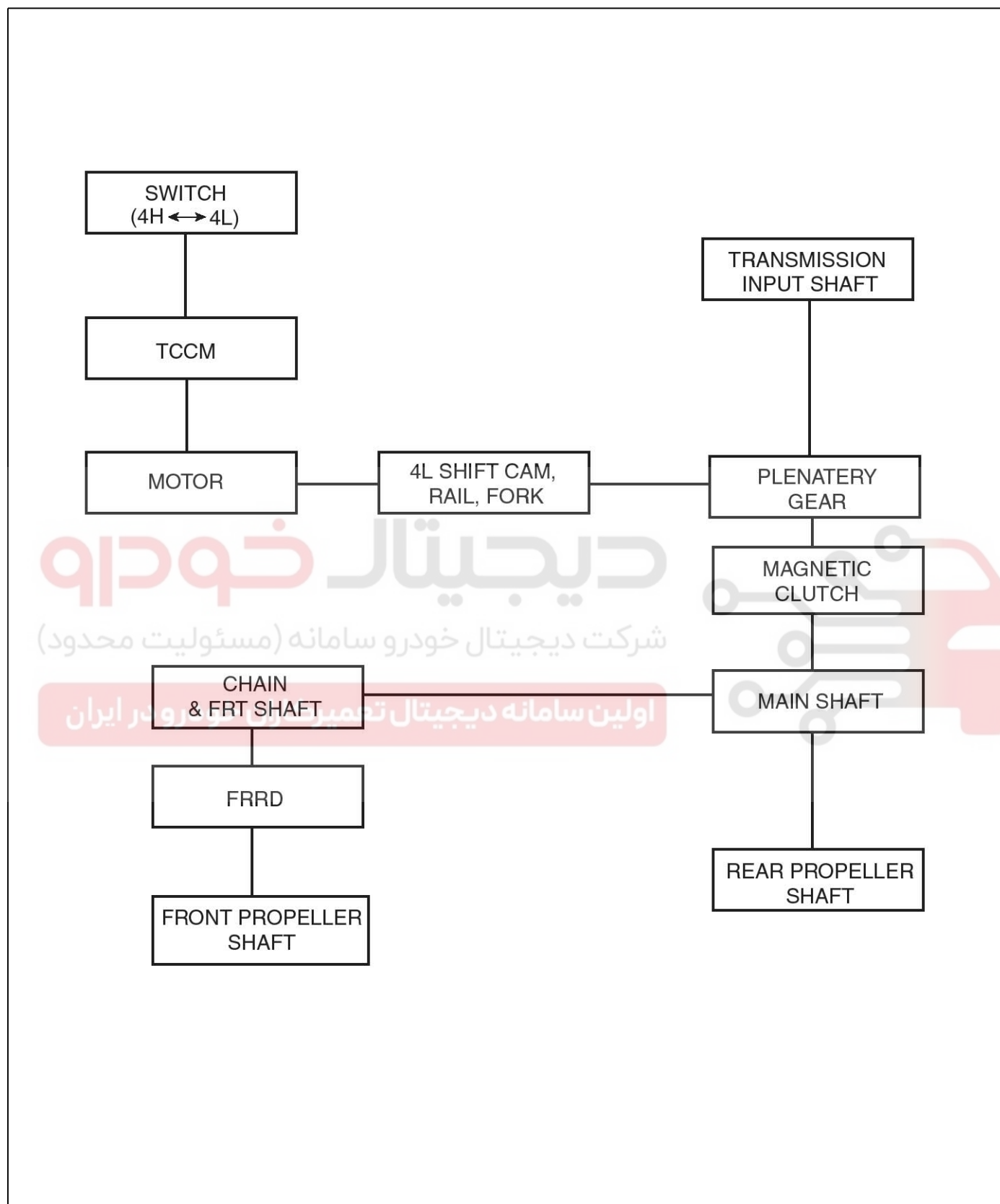


LMAC250D

WD-36

Transfer System

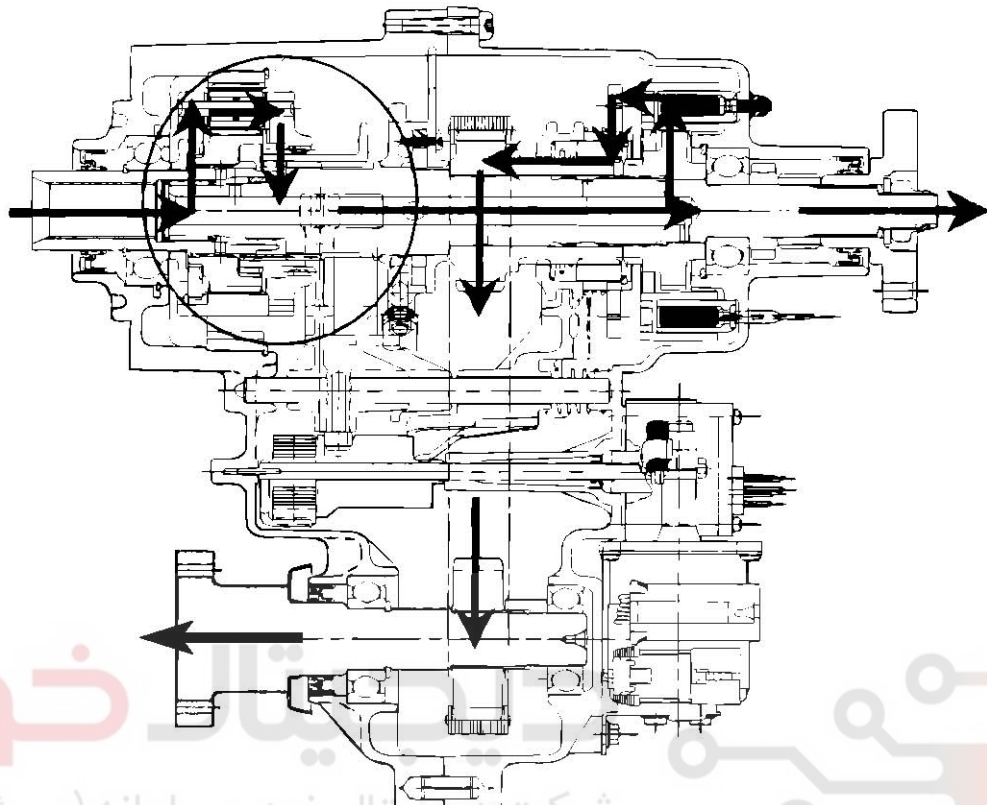
3. 4L Mode



LMAC250E

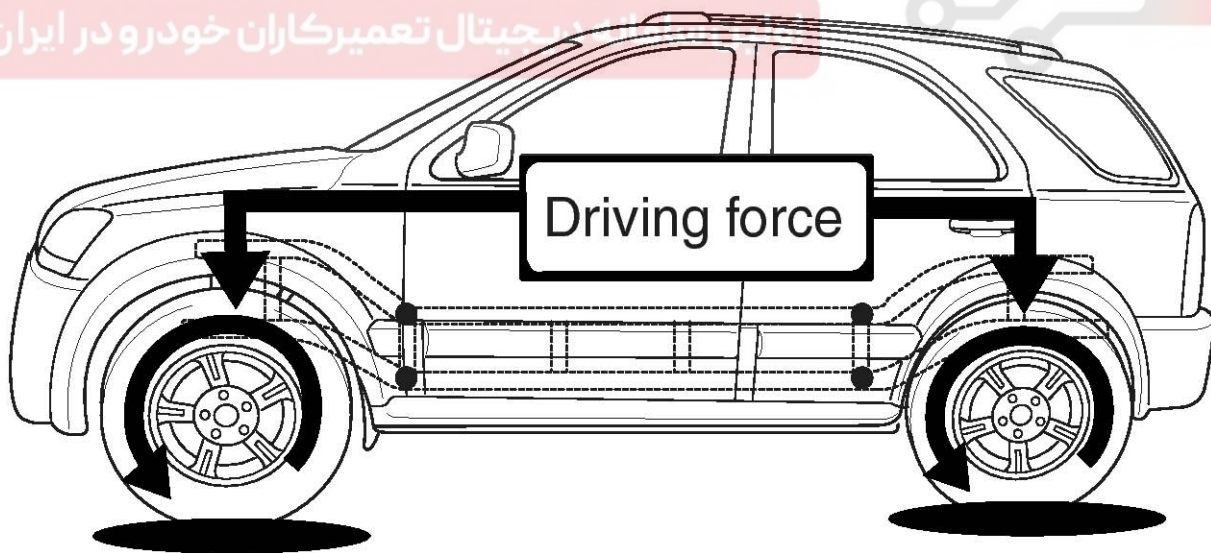
Transfer Case Assembly

WD-37



شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

تعمیرکاران خودرو در ایران



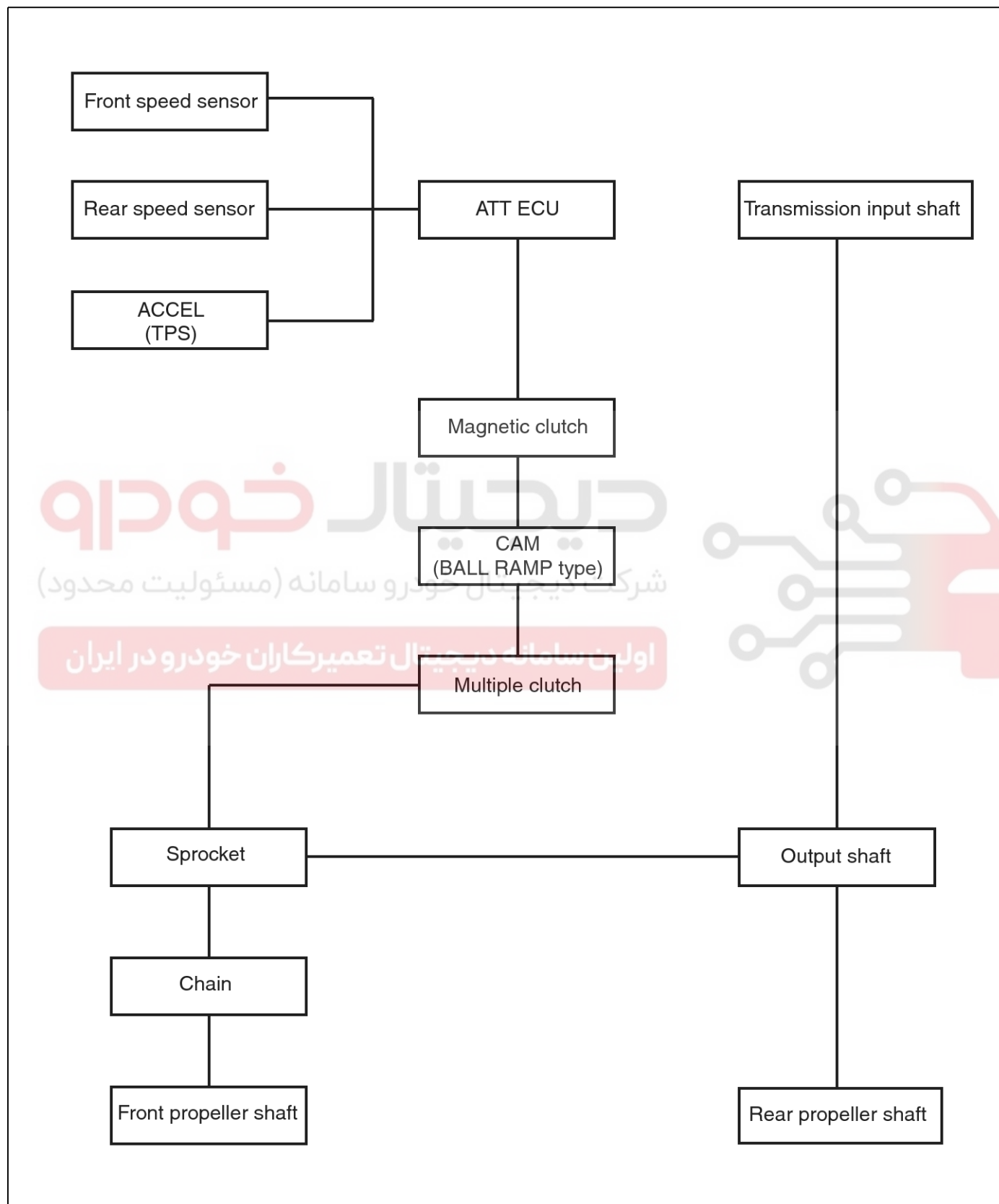
LMAC250F

WD-38

Transfer System

ATT(ACTIVE TORQUE TRANSFER) POWER FLOW

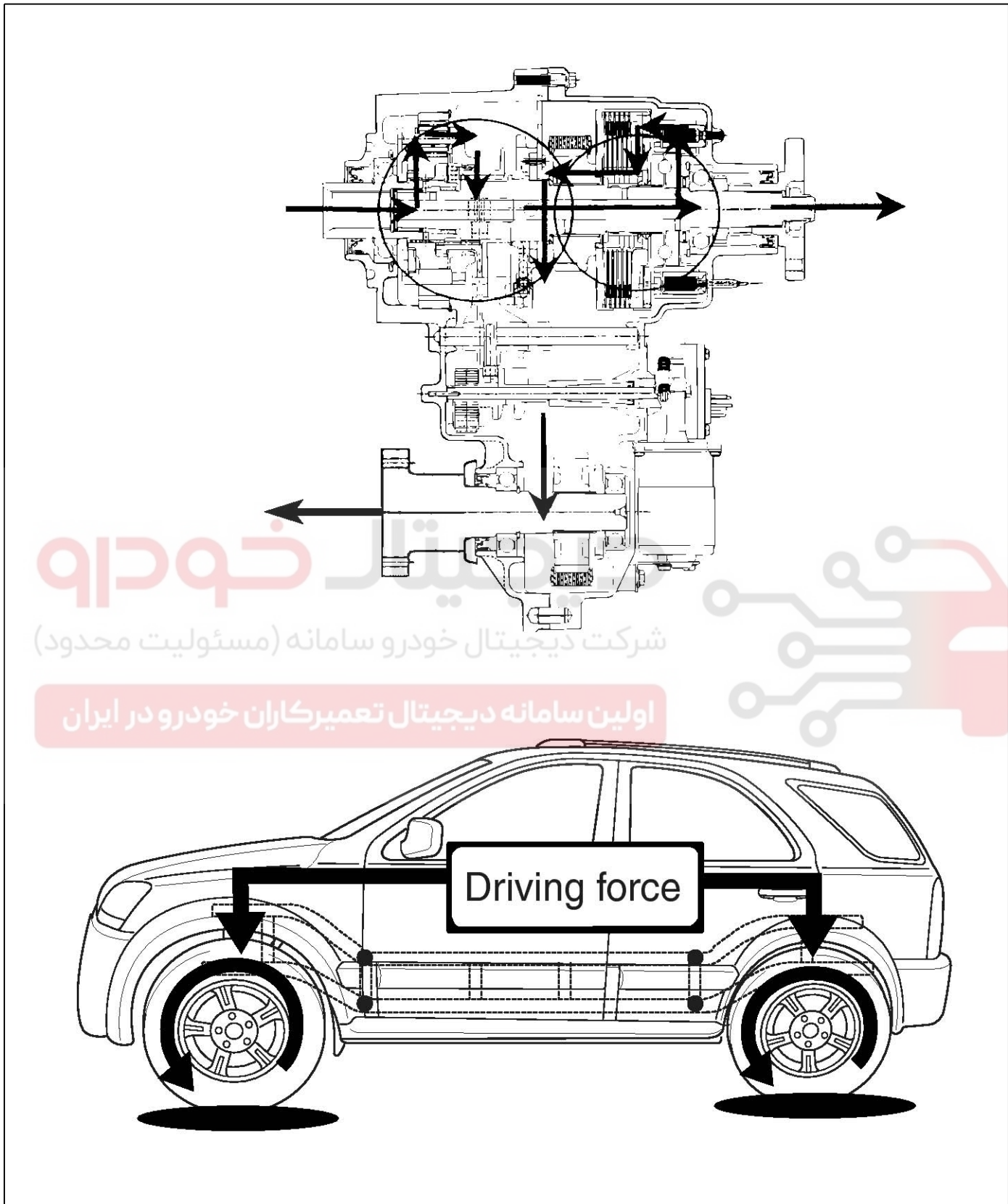
1. AUTO Mode



Transfer Case Assembly

WD-39

LMAC260A

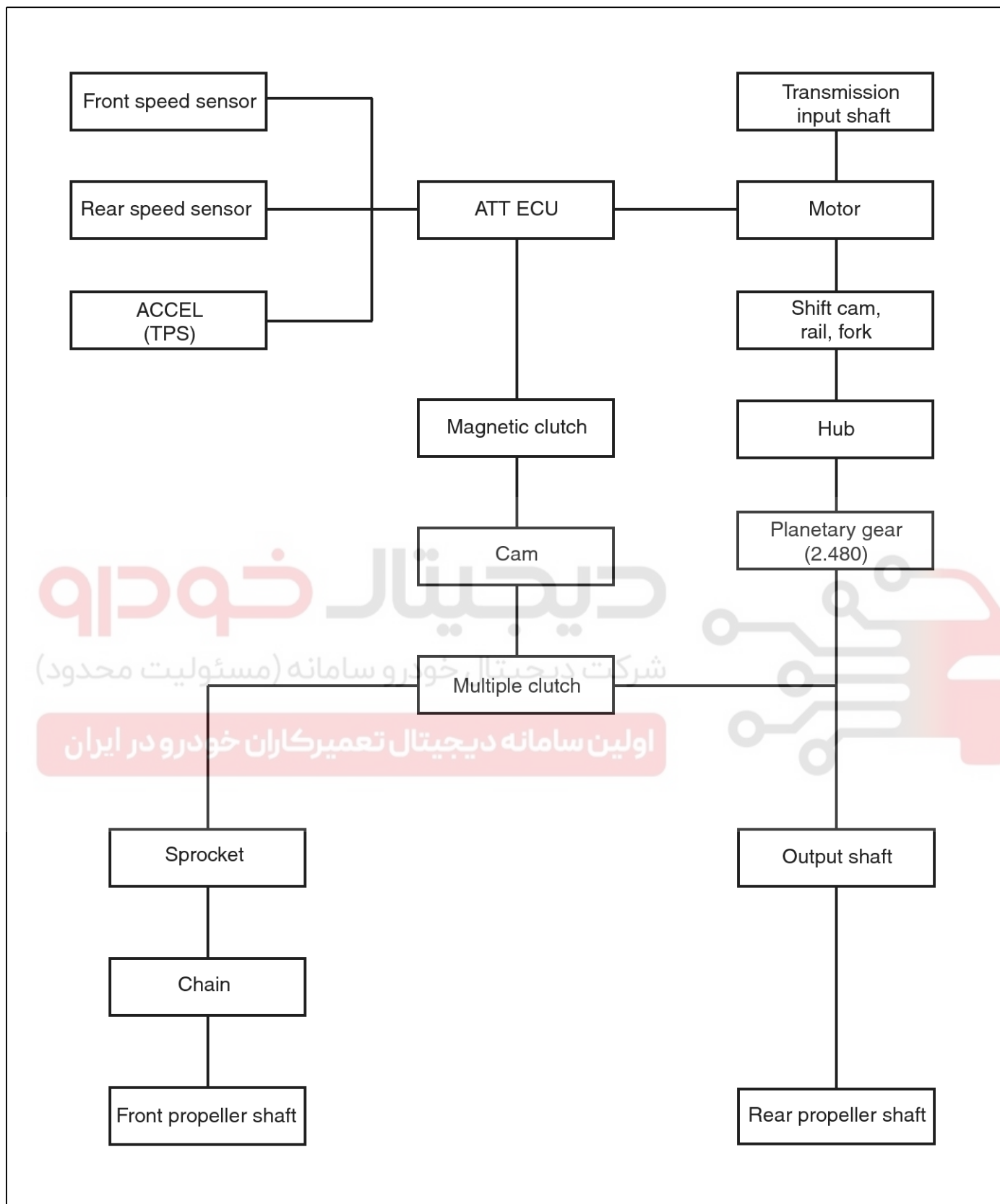


LMAC260B

2. LOW Mode

WD-40

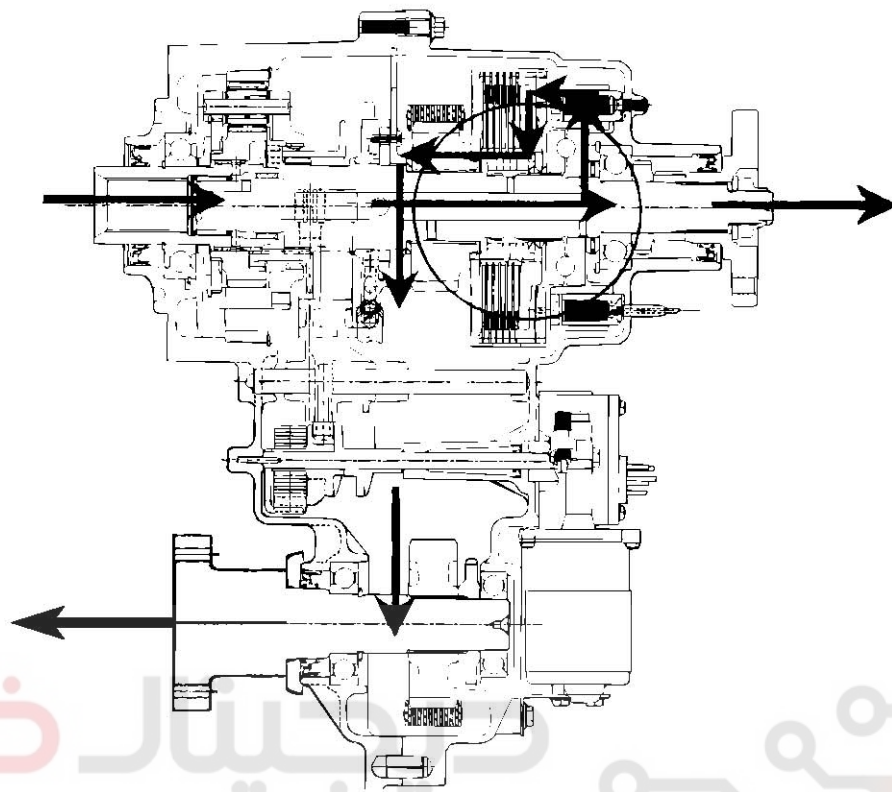
Transfer System



LMAC260C

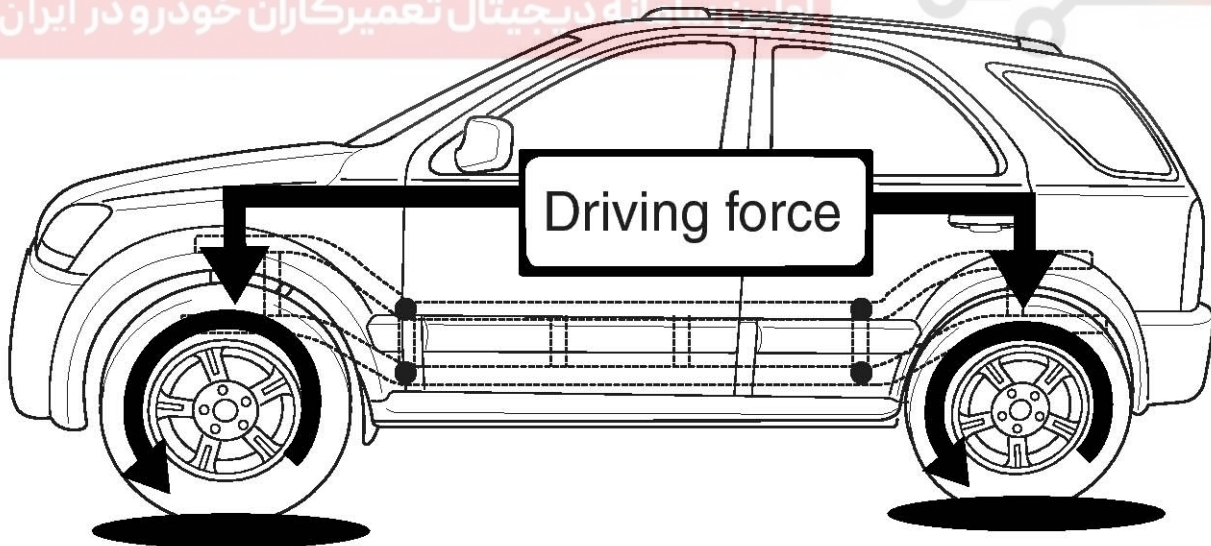
Transfer Case Assembly

WD-41



دیجیتال خودرو
شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

ایران دیجیتال خودرو تعمیرکاران خودرو در ایران

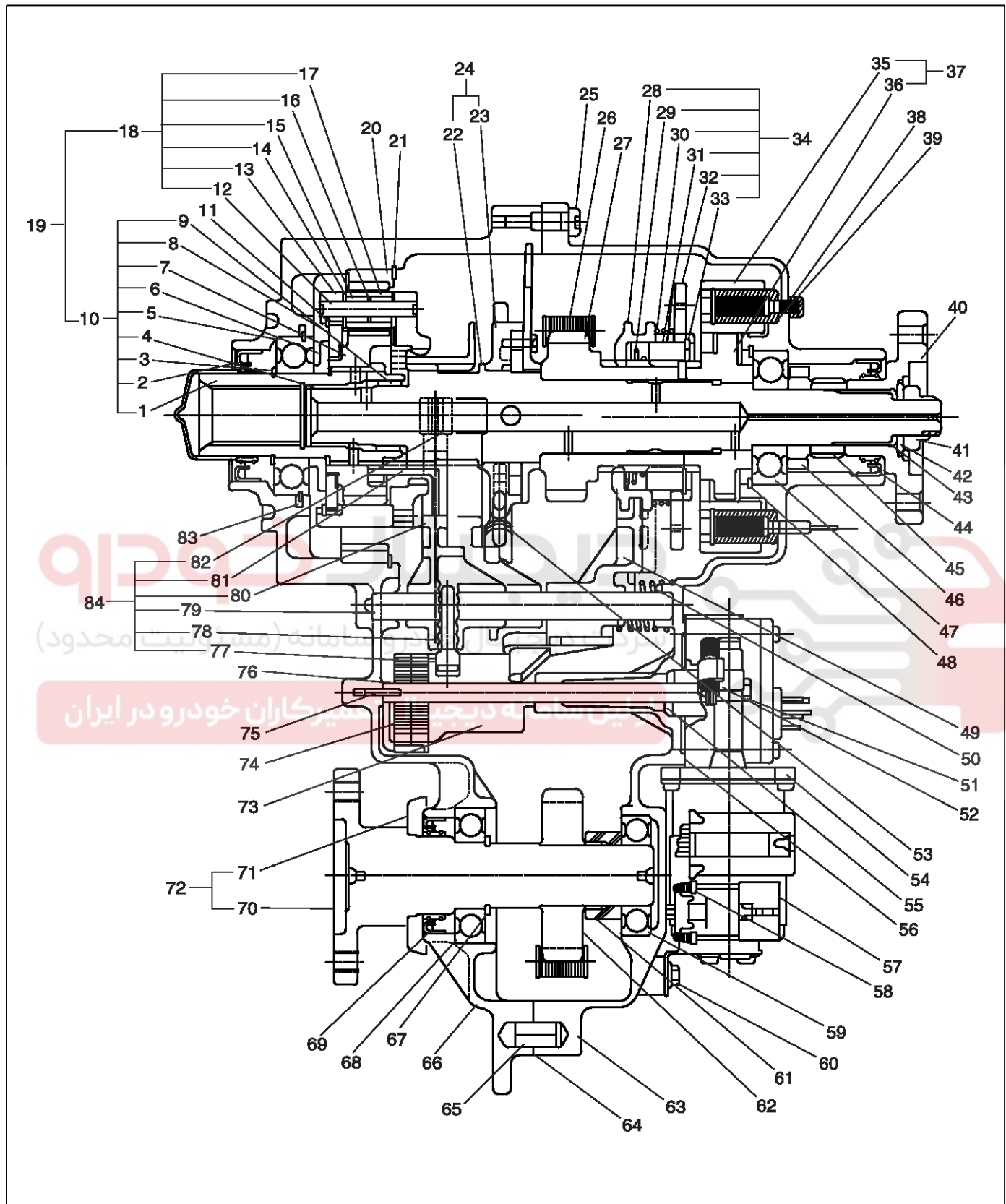


LMAC260D

WD-42

Transfer System

EST



BKAE110A

Transfer Case Assembly

WD-43

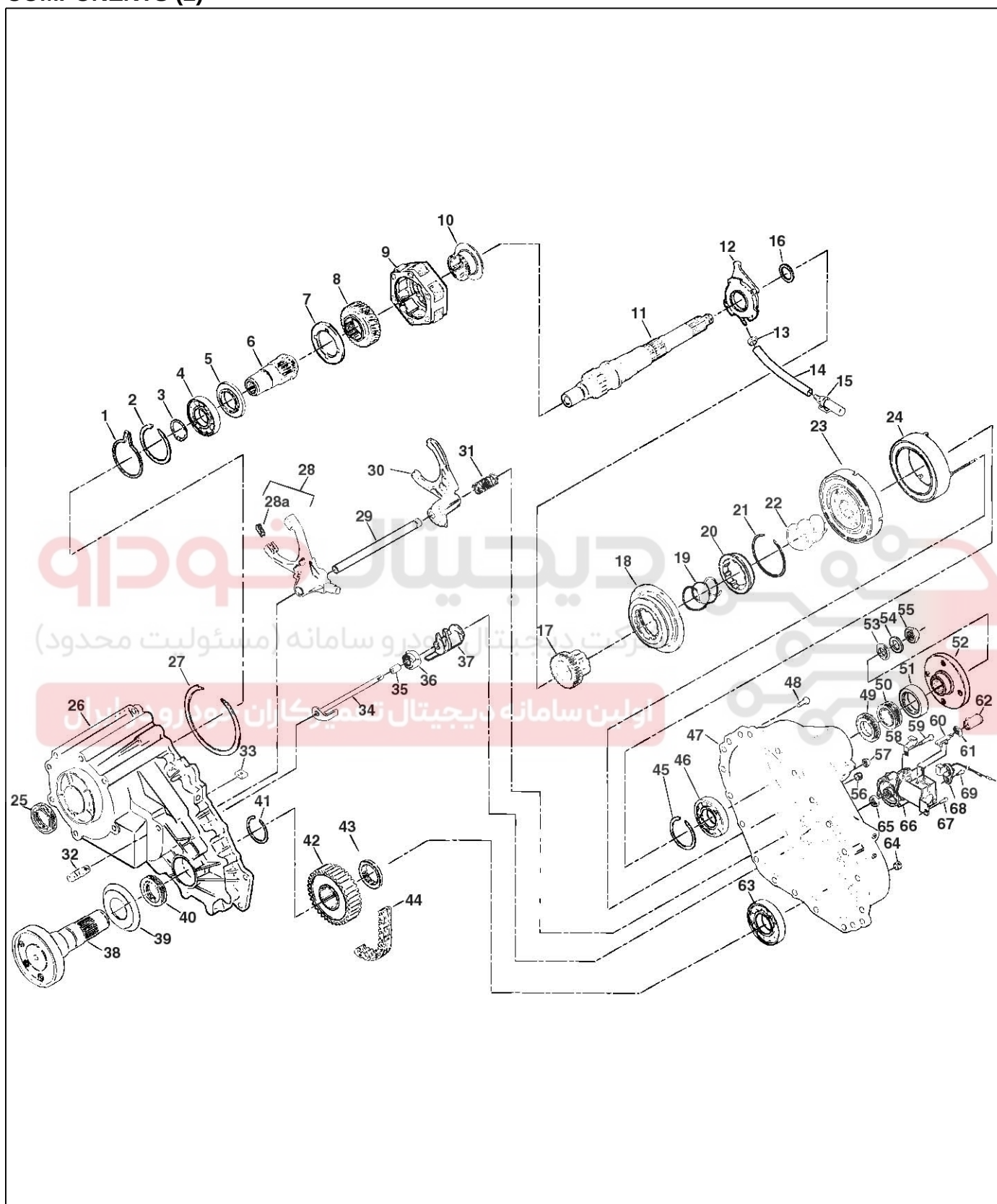
- | | |
|-------------------------------|-------------------------------------|
| 1. Input shaft | 43. Oil seal |
| 2. Input seal | 44. Oil seal |
| 3. Snap ring | 45. Speedo gear |
| 4. Bearing | 46. Upper tone wheel |
| 5. Bearing | 47. Bearing |
| 6. Circular hub | 48. Retaining ring |
| 7. Sun gear | 49. Shift fork |
| 8. Trust plate | 50. Return spring |
| 9. Bushing | 51. Hex head bolt |
| 10. Input shaft sub assembly | 52. J clip |
| 11. Snap ring | 53. Hose clamp |
| 12. Planet pinion shaft | 54. Electric motor assembly |
| 13. Planet carrier | 55. Oil seal |
| 14. Pinion thrust washer | 56. Sealing compound |
| 15. Needle roller bearing | 57. Connector pin |
| 16. Pinion needle spacer | 58. Clip locking |
| 17. Pinion gear | 59. Bearing |
| 18. Carrier | 60. Hex head cap screw |
| 19. Carrier assembly | 61. Spacer |
| 20. Ring gear | 62. Lower sprocket |
| 21. Retaining ring | 63. Finish cover |
| 22. Main shaft | 64. Sealing compound |
| 23. Gerotor pump assembly | 65. Case/cover dowel |
| 24. Main shaft assembly | 66. Case sub assembly |
| 25. Metric bolt | 67. Snap ring |
| 26. Chain | 68. Ball bearing |
| 27. Lower sprocket | 69. Oil seal |
| 28. Lock up collar | 70. Output shaft |
| 29. Sleeve return spring | 71. Dust deflector |
| 30. Torsion spring | 72. Front output shaft sub assembly |
| 31. Lockup hub | 73. Electric shift cam |
| 32. Armature | 74. Torsion spring |
| 33. Retaining ring | 75. Shift shaft |
| 34. Lock up collar assembly | 76. Spacer |
| 35. Coil housing | 77. Cam roller |
| 36. Shift hub | 78. Pin shift fork |
| 37. Cam/coil housing assembly | 79. Shift rail |
| 38. Metric nut | 80. Shift fork |
| 39. Electric coil assemble | 81. Reduction hub |
| 40. Companion flange | 82. Shift fork facing |
| 41. Metric nut | 83. Snap ring |
| 42. Washer | 84. Shift fork assembly |

BKAE110B

WD-44

Transfer System

COMPONENTS (2)



LMAC270A

Transfer Case Assembly

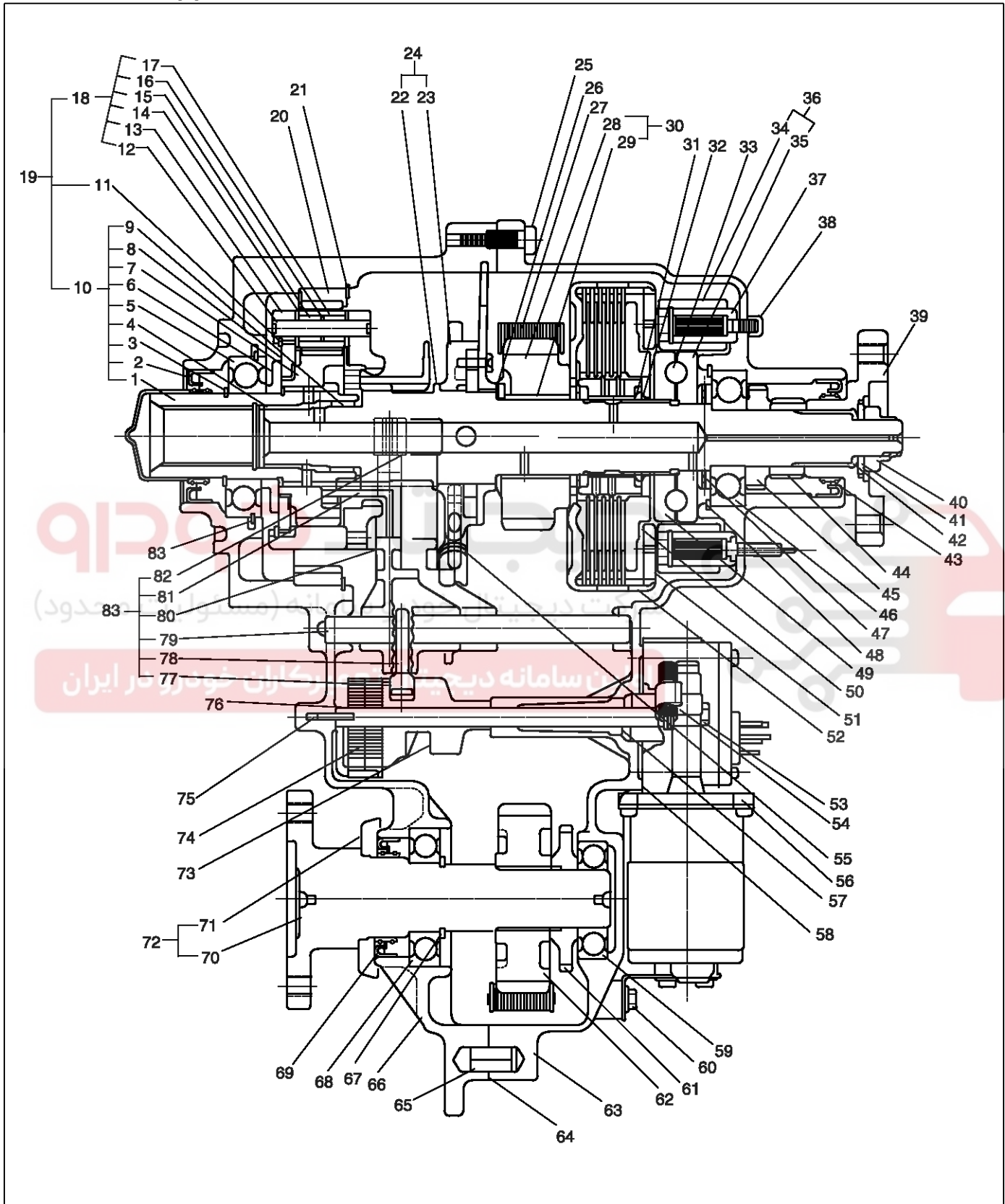
WD-45

- | | |
|--------------------------|----------------------|
| 1. Snap ring | 35. Spacer |
| 2. Snap ring | 36. Torsion spring |
| 3. Snap ring | 37. Shift cam |
| 4. Bearing | 38. Output shaft |
| 5. Hub | 39. Dust defector |
| 6. Input shaft | 40. Oil seal |
| 7. Thrust plate | 41. Snap ring |
| 8. Sun gear | 42. Lower sprocket |
| 9. Carrier | 43. Spacer |
| 10. Reduction hub | 44. Chain |
| 11. Main shaft | 45. Retaining ring |
| 12. Rotor pump | 46. Bearing |
| 13. Hose clamp | 47. Cover |
| 14. Hose | 48. Nut |
| 15. Filter | 49. Tone wheel |
| 16. Thrust washer | 50. Speedo gear |
| 17. Upper sprocket | 51. Oil seal |
| 18. Lock-up collar | 52. Companion flange |
| 19. Sleeve return spring | 53. Oil seal |
| 20. Lock-up hub | 54. Washer |
| 21. Snap ring | 55. Nut |
| 22. Spring | 56. Pipe plug |
| 23. Clutch housing | 57. Nut |
| 24. Electric coil | 58. 'J' clip |
| 25. Oil seal | 59. Bolt |
| 26. Transfer case | 60. Clip |
| 27. Retaining ring | 61. Connector lock |
| 28. Shift fork | 62. Connector |
| 28a. Shift fork pad | 63. Bearing |
| 29. Shift rail | 64. Plug |
| 30. Lock-up fork | 65. Oil seal |
| 31. Return spring | 66. Electric motor |
| 32. Breather | 67. Bolt |
| 33. Magnet | 68. Speed sensor |
| 34. Shift shaft | 69. Bolt |

LMAC270B

WD-46

Transfer System

ATT (ACTIVE TORQUE TRANSFER)
COMPONENTS (1)

BKAE120A

Transfer Case Assembly

WD-47

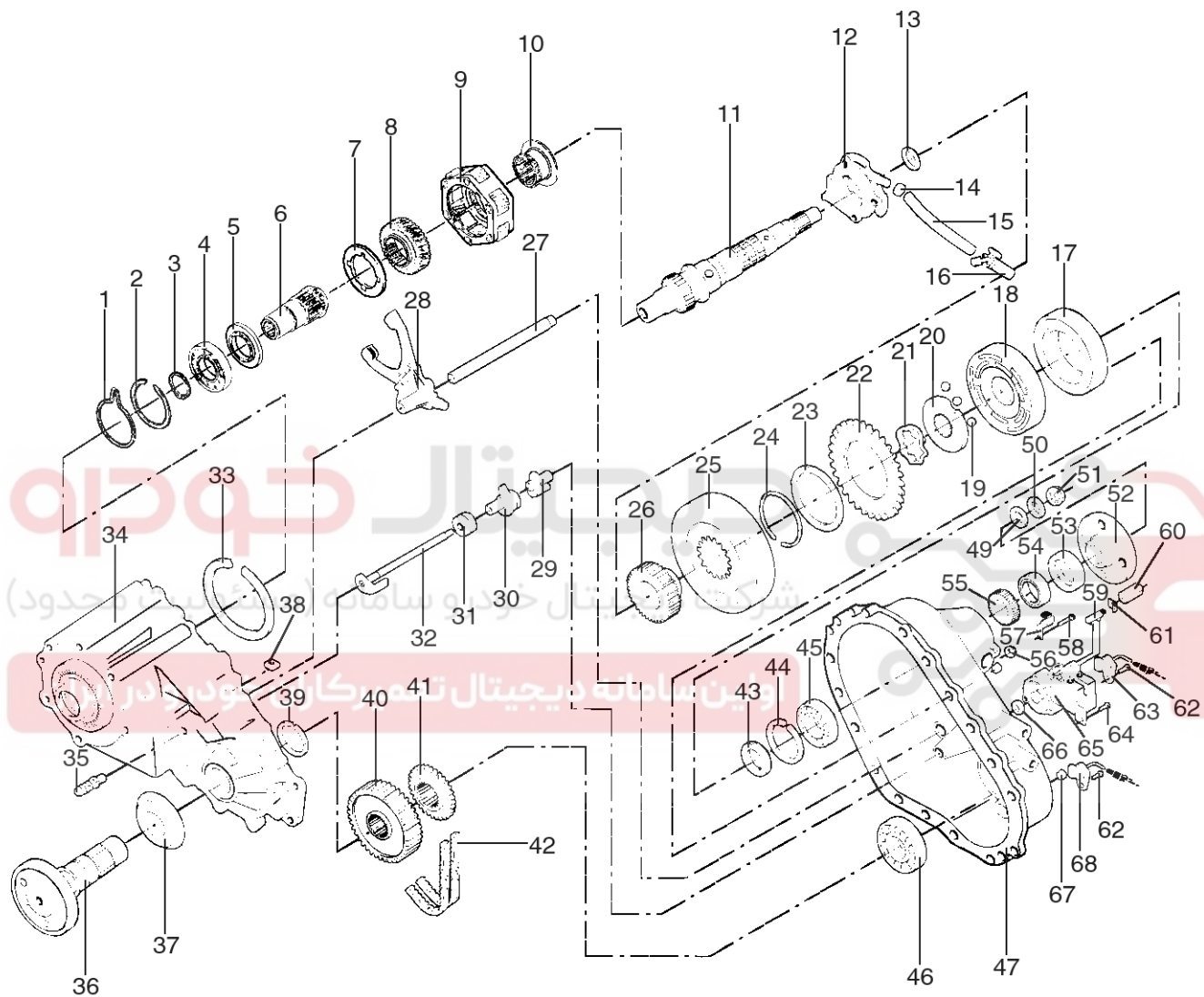
- | | |
|-------------------------------|-------------------------------------|
| 1. Input shaft | 43. Oil seal |
| 2. Input seal | 44. Speedo gear |
| 3. Snap ring | 45. Upper tone wheel |
| 4. Bearing | 46. Bearing |
| 5. Bearing | 47. Thrust bearing assembly |
| 6. Circular hub | 48. Retaining ring |
| 7. Sun gear | 49. Apply cam |
| 8. Trust plate | 50. Insulator washer |
| 9. Bushing | 51. Armature |
| 10. Input shaft sub assembly | 52. Clutch pack assembly |
| 11. Snap ring | 53. Hex head bolt |
| 12. Planet pinion shaft | 54. J clip |
| 13. Planet carrier | 55. Hose clamp |
| 14. Pinion thrust washer | 56. Electric motor assembly |
| 15. Needle roller bearing | 57. Oil seal |
| 16. Pinion needle spacer | 58. Sealing compound |
| 17. Pinion gear | 59. Bearing |
| 18. Carrier | 60. Hex head cap screw |
| 19. Carrier assembly | 61. Lower tone wheel |
| 20. Ring gear | 62. Lower sprocket |
| 21. Retaining ring | 63. Finish cover |
| 22. Main shaft | 64. Sealing compound |
| 23. Gerotor pump assembly | 65. Case/cover dowel |
| 24. Main shaft assembly | 66. Case sub assembly |
| 25. Metric bolt | 67. Snap ring |
| 26. Chain | 68. Ball bearing |
| 27. Lower sprocket | 69. Oil seal |
| 28. Upper sprocket | 70. Output shaft |
| 29. Bushing | 71. Dust deflector |
| 30. Drive sprocket assembly | 72. Front output shaft sub assembly |
| 31. Retaining ring | 73. Electric shift cam |
| 32. Wave spring | 74. Torsion spring |
| 33. Ball | 75. Shift shaft |
| 34. Coil housing | 76. Spacer |
| 35. Base cam | 77. Cam roller |
| 36. Cam/coil housing assembly | 78. Pin shift fork |
| 37. Coil electric assembly | 79. Shift rail |
| 38. Metric nut | 80. Shift fork |
| 39. Companion flange | 81. Reduction hub |
| 40. Metric nut | 82. Shift fork facing |
| 41. Washer | 83. Snap ring |
| 42. Oil seal | 84. Shift fork assembly |

BKAE120B

WD-48

Transfer System

COMPONENTS (2)



LMAC300A

Transfer Case Assembly

WD-49

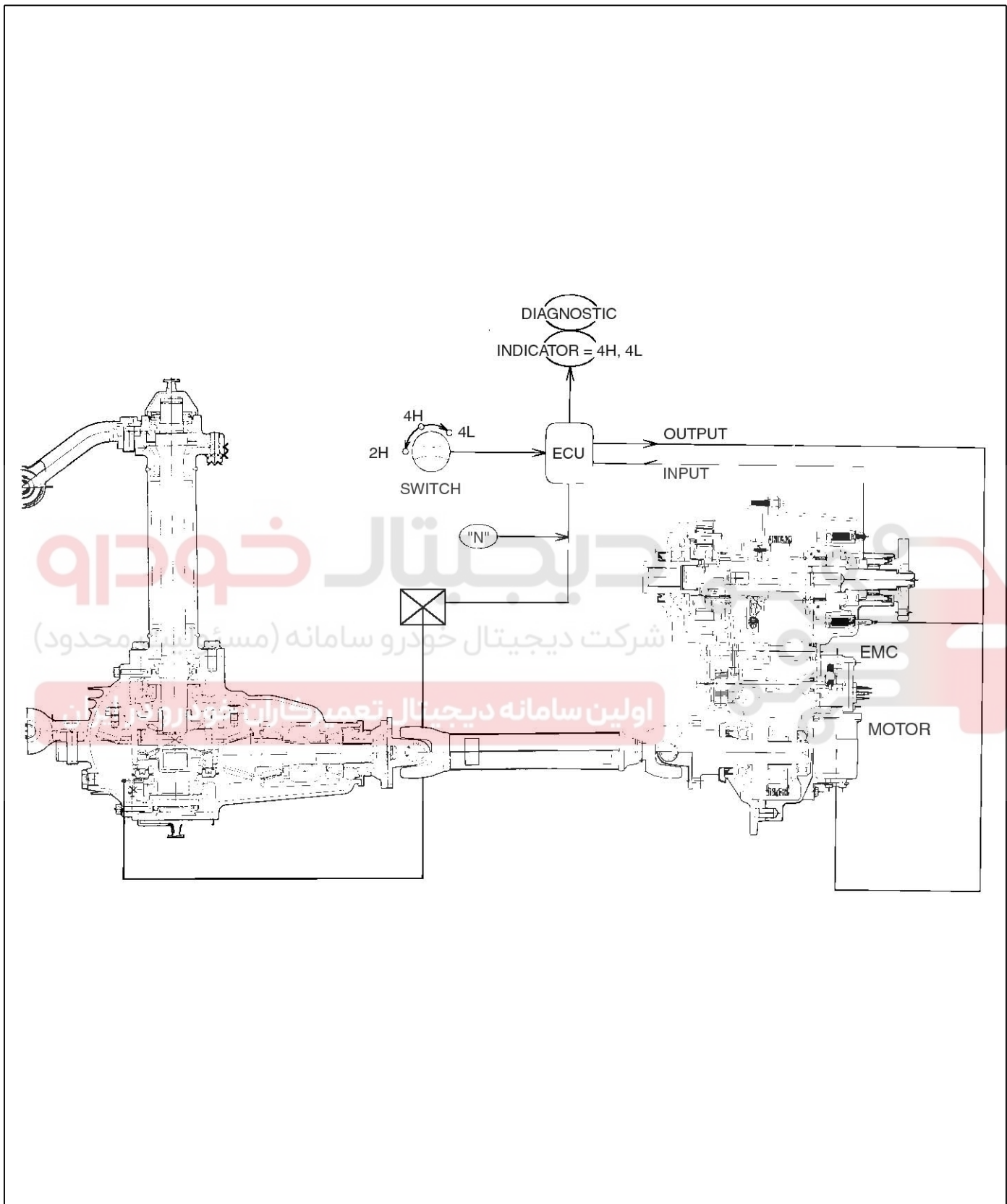
- | | |
|------------------------|------------------------|
| 1. Snap ring | 38. Magnet |
| 2. Snap ring | 39. Snap ring |
| 3. Snap ring | 40. Lower socket |
| 4. Bearing | 41. Lower tone wheel |
| 5. Circula hub | 42. Chain |
| 6. Input shaft | 43. Bearing thrust |
| 7. Thrust plate | 44. Retaining ring |
| 8. Sun gear | 45. Bearing |
| 9. Carrier | 46. Bearing |
| 10. Reduction hub | 47. Cover |
| 11. Main shaft | 48. Metric bolt |
| 12. Pump | 49. Oil seal |
| 13. Thrust washer | 50. Washer |
| 14. Hose clamp | 51. Metric nut |
| 15. Hose | 52. Companion flange |
| 16. Filter | 53. Oil seal |
| 17. Electric coil | 54. Speedo gear |
| 18. Cam coil housing | 55. Upper tone wheel |
| 19. Ball | 56. Metric nut |
| 20. Cam apply | 57. J-clip |
| 21. Wave spring | 58. Hex head bolt |
| 22. Amateur | 59. Clip |
| 23. Insulator washer | 60. Connector |
| 24. Retaining ring | 61. Connector lock |
| 25. Clutch pack | 62. Hex head bolt |
| 26. Drive sprocket | 63. Upper speed sensor |
| 27. Shift rail | 64. Hex head cap screw |
| 28. Shift fork | 65. Electric motor |
| 29. Electric shift cam | 66. Oil seal |
| 30. Electric shift cam | 67. Pipe plug |
| 31. Torsion spring | 68. Lower speed sensor |
| 32. Shift shaft | |
| 33. Retaining ring | |
| 34. Transfer case | |
| 35. Breather | |
| 36. Output shaft | |
| 37. Dust deflector | |

LMAC300B

WD-50

Transfer System

ELECTRIC SHIFT TRANSFER

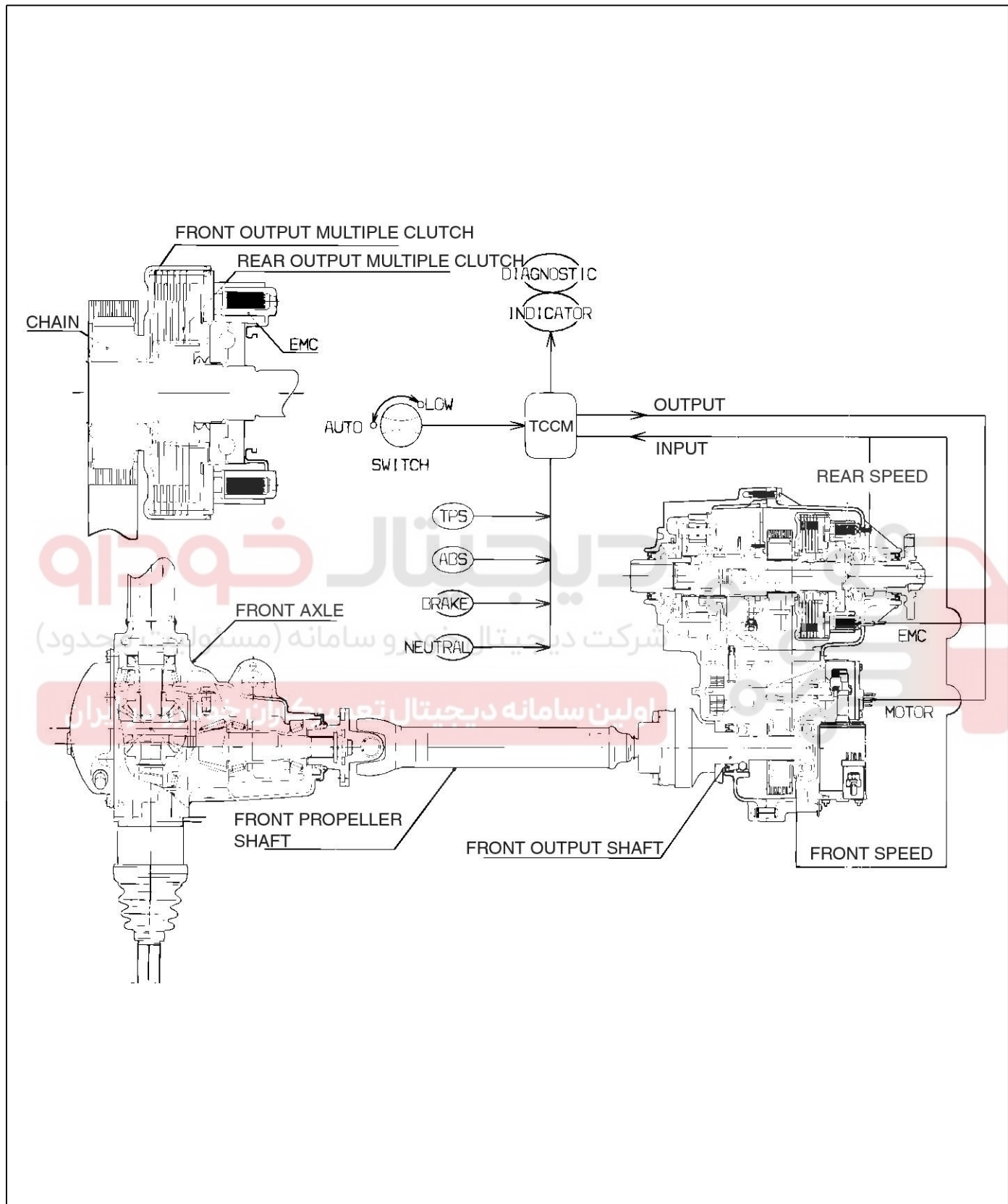


LMAC242A

Transfer Case Assembly

WD-51

ACTIVE TORQUE TRANSFER



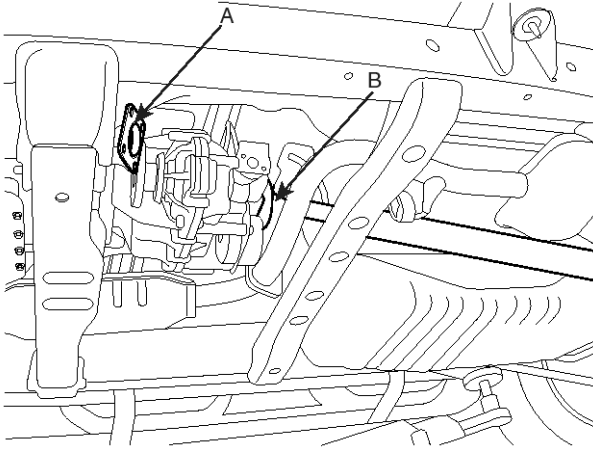
LMAC244A

WD-52

Transfer System

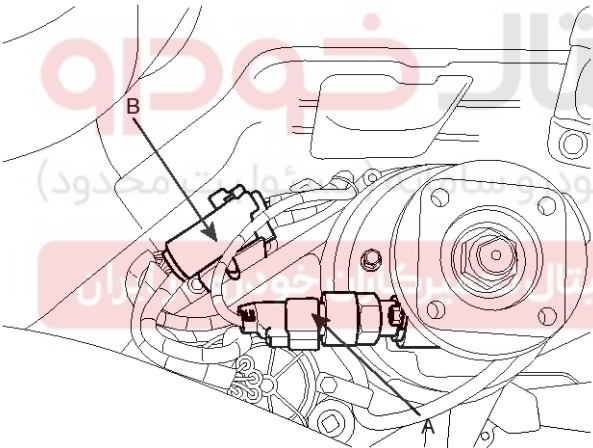
Removal

1. Disconnect the battery (-) terminal.
2. Remove the front/rear propeller shaft(A,B).



SBLAT8002D

3. Disconnect the speed sensor connector (A) and 4WD connector (B).

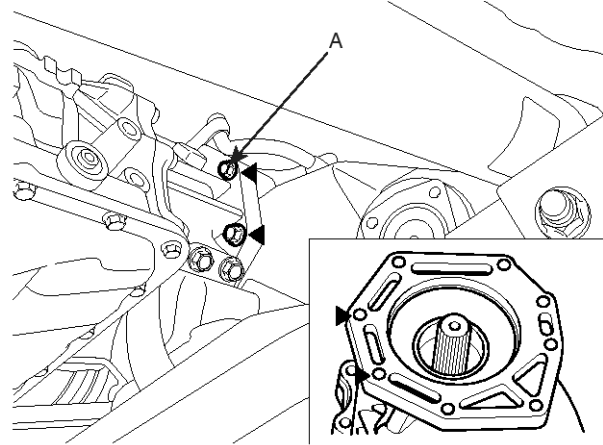


SBLAT8003D

4. Remove the transfer assembly by removing the mounting bolts (8ea) from the transmission side.

NOTICE

Location of the bolts refers to the illustration of contacting surface of the transmission assembly.



SBLAT8001D

Transfer Case Assembly

WD-53

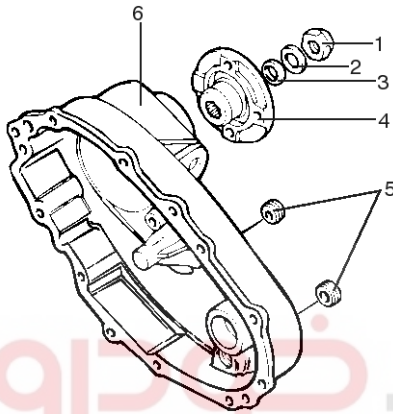
DISASSEMBLY COMPANION FLANGE

NOTICE

Position transfer case on work bench with rear or cover side up.

Use wooden blocks under front to keep assembly level.

1. Remove nut and washer.
2. Pull companion flange.
3. Remove oil seal.
4. If installed, remove two plugs from cover.



1. Nut
2. Washer
3. Oil seal
4. Companion flange
5. Plug
6. Cover

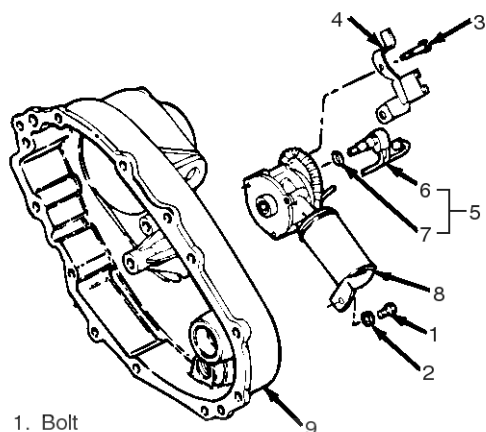
LMAC280A



WD-54

EXTERNAL ELECTRIC SHIFT

1. Remove bolt (1).
2. Remove three bolts (3).
3. Remove sensor and harness bracket.
4. Remove speed sensor assembly.
5. Remove motor assembly.



1. Bolt
2. Washer
3. Bolt
4. Harness bracket & sensor
5. Sensor assembly
6. Speed sensor
7. O-ring
8. Motor assembly
9. Cover

LMAC280B

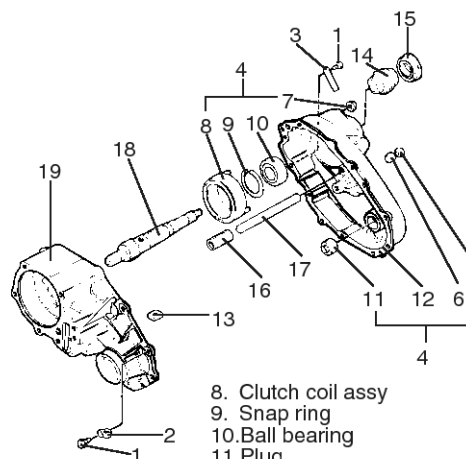
COVER ASSEMBLY

1. Remove nine bolts (1). This will free wiring harness clip and identification tag. Use care not to lose identification tag.

It contains information required for ordering replacement parts.

2. Pry at the bosses provided on the cover and transfer case to break the sealant bond loose. Then, lift cover assembly straight up to remove.
3. On electric shift units, remove oil seal (5), bearing, three nuts and clutch coil assembly.
4. Remove snap ring and pull ball bearing from cover. This will free speedo gear.
5. Pull needle bearing from cover.
6. Pull oil seal (15) from cover.
7. Remove magnet from slot in case.
8. Remove return spring from rail shaft.
9. Scrap and clean sealant from mating faces of cover and transfer case. Use care not to damage metal faces or allow scrapings to fall into transfercase.

Transfer System

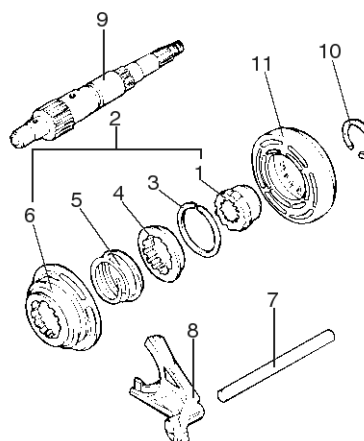


1. Bolt
2. Wiring clip
3. Identification tag
4. Cover Assy
5. Oil seal
6. Bearing
7. Nut
8. Clutch coil Assy
9. Snap ring
10. Ball bearing
11. Plug
12. Cover
13. Magnet
14. Speedo gear
15. Oil seal
16. Return spring
17. Rail shaft
18. Output shaft
19. Transfer case

LMAC280C

LOCK SHIFT

1. From electric shift only, remove retaining ring and slide clutch housing from shift collar hub.
2. Remove shift collar hub from output shaft.
3. Together, slide 2W-4W lockup assembly and lockup fork from output shaft and rail shaft. Separate assemblies and remove rail shaft.
4. To disassemble 2W-4W lockup assembly, remove snap ring, lockup hub and return spring from lockup collar.
5. One-piece, plastic lockup fork replaces earlier fork assembly with metal fork and separate roller parts.



1. Shift collar hub
2. 2W-4W Lockup Assy
3. Snap ring
4. Lockup hub
5. Return spring
6. Lockup collar
7. Rail shaft
8. Lockup fork
9. Output shaft
10. Retaining ring
11. Clutch housing

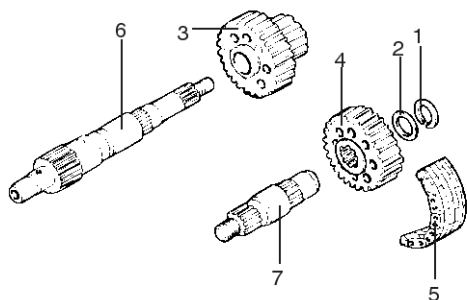
Transfer Case Assembly

WD-55

LMAC280D

CHAIN DRIVE

1. Remove snap ring and spacer from output shaft (front).
2. Together, slide drive sprocket, driver sprocket and drive chain from output shafts (rear and front). Separate sprockets and chain when out of assembly.

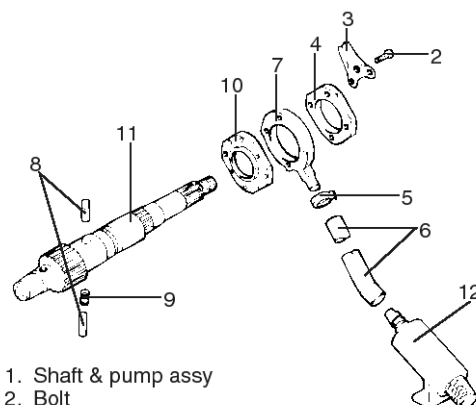


1. Snap ring
2. Spacer
3. Drive sprocket
4. Driven sprocket
5. Drive chain
6. Output shaft (rear)
7. Lockup collar

LMAC280E

OIL PUMP

1. Remove four bolts (2) and retainer. Slide rear pump cover off output shaft.
2. Loosen hose clamp and separate hose coupling from pump housing. Slide pump housing off output shaft.
3. Remove hose clamp, hose coupling and strainer.
4. Remove two pump pins and spring from output shaft.
5. Slide front pump cover off output shaft and remove output shaft.



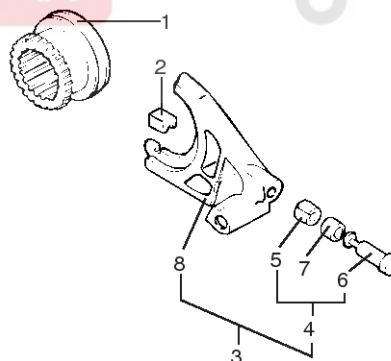
1. Shaft & pump assy
2. Bolt
3. Pump retainer
4. Rear pump cover
5. Hose clamp
6. Hose coupling
7. Pump housing
8. Pump pin
9. Spring
10. Front pump cover
11. Output shaft
12. Strainer

LMAC280F

REDUCTION SHIFT

1. Remove reduction hub and reduction shift fork assembly from transfer case.
2. Remove two facings from shift fork assembly.
3. Disassemble fork assembly only if parts replacement is required.

Cut plastic retainer to remove, freeing pin and cam roller.



1. Reduction hub
2. Shift fork facing
3. Reduction shift fork assy
4. Pin, roller and retainer assy
5. Retainer
6. Pin
7. Cam roller
8. Reduction shift fork

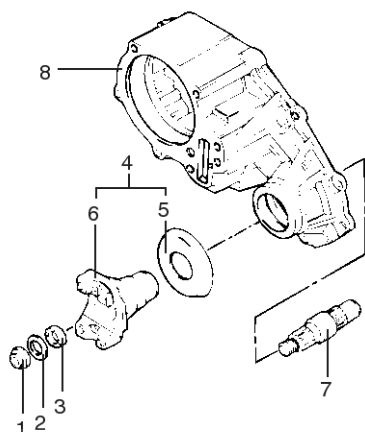
LMAC280G

WD-56

Transfer System

FRONT OUTPUT SHAFT

1. Hold yoke and remove nut and washer.
Pull yoke assembly and oil seal.
2. Press deflector from yoke only if replacement is required.
3. Remove output shaft.

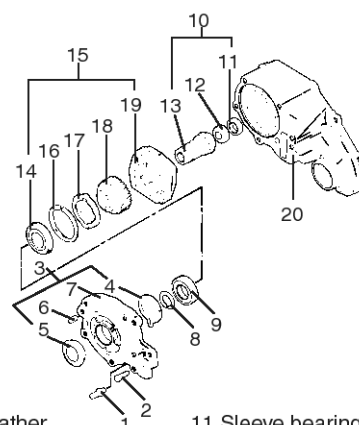


1. Nut
2. Washer
3. Oil seal
4. Yoke assy
5. Deflector
6. Yoke
7. Output shaft(front)
8. Transfer case

LMAC280H

ADAPTER, INPUT SHAFT AND GEAR CARRIER

1. Remove breather.
2. Remove six bolts (2).
Carefully pry front adapter up to break sealant band with transfer case. Use care not to damage adapter or case.
3. Remove adapter assembly, input shaft assembly and gear carrier assembly as an assembled group.
4. Holding end of input shaft on workbench press down on adapter while expanding long ends of snap ring.
5. Remove snap ring and pump oil seal from front adapter.
Remove pin only if replacement is required.
6. Remove retaining ring (8). Pull bearing and thrust washer from end of input shaft assembly. Remove input shaft assembly from gear carrier assembly.
7. To disassemble input shaft assembly, pull sleeve bearing and needle bearing from input shaft.
8. Remove retaining ring (16), thrust plate end sun gear from planet carrier assembly.

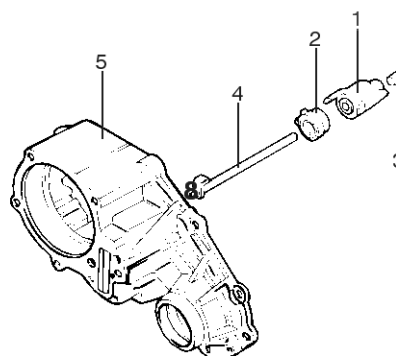


- | | |
|----------------------|-------------------------|
| 1. Breather | 11. Sleeve bearing |
| 2. Bolt | 12. Needle bearing |
| 3. Adapter assy | 13. Input shaft |
| 4. Snap ring | 14. Thrust washer |
| 5. Oil seal | 15. Gear carrier assy |
| 6. Spiral pin | 16. Retaining ring |
| 7. Front adapter | 17. Thrust plate |
| 8. Retaining ring | 18. Sun gear |
| 9. Bearing | 19. Planet carrier assy |
| 10. Input shaft assy | 20. Transfer case |

LMAC280I

SHIFT CAM (Electric parts)

1. Remove electric shift cam group (1 through 4) from transfer case as an assembly.
2. Slide electric shift cam off shift shaft.
3. Clamp retainer end of shift shaft.
Keeping fingers away from spring ends, pry torsion spring out of engagement with shaft drive tang using a screwdriver.
4. Remove torsion spring and spacer from shift shaft.



1. Electric shift cam
2. Torsion spring
3. Spacer
4. Shift shaft
5. Transfer case

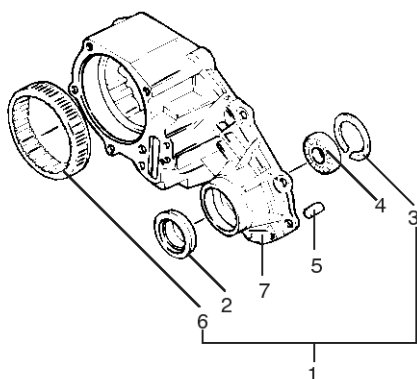
LMAC280J

Transfer Case Assembly

WD-57

CASE ASSEMBLY

1. Pull oil seal.
2. Remove retaining ring and pull ball bearing.
3. Remove dowel pins from transfer case only if they are loose or damaged.
4. Press ring gear out of transfer case only if ring gear must be replaced.

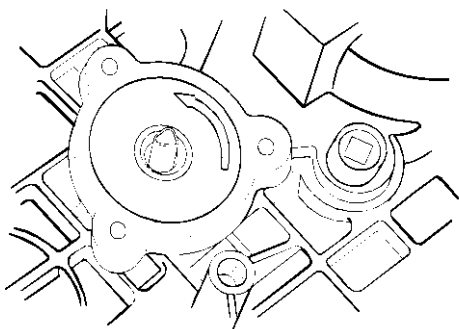


1. Transfer case assembly
2. Oil seal
3. Retaining ring
4. Ball bearing
5. Dowel pin
6. Ring gear
7. Transfer case

LMAC280K

DISASSEMBLY

1. Remove the transfer case from the vehicle.
2. Remove the flange washer and nut.
3. Disconnect the shift motor/clutch coil connector and the speed sensor connector.
4. Remove the outer tube of the speed sensor connector wire.
5. Remove the wire fixing cap in the rear of the speed sensor connector.
6. Disconnect the speed sensor connector.
7. Remove the shift motor.

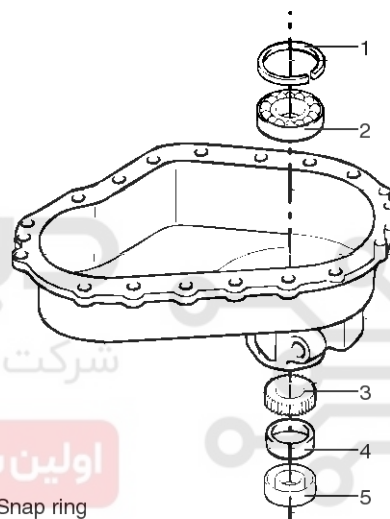


LMAC310A

8. If necessary, remove the front and rear speed sensor.
9. Remove the mounting bolts for the rear and front case.
10. Make sure that the front case is facing downward so that the rear cover is facing upwards.
11. Separate the front case from the rear case.
12. Remove all traces of gasket sealant from the mating surfaces of the front case and rear case.
13. If the speedometer drive gear is to be replaced, first remove the flange seal or use the Impact Slide Hammer to pop off the flange seal.

⚠ CAUTION

Do not damage the bearing and the bearing case.



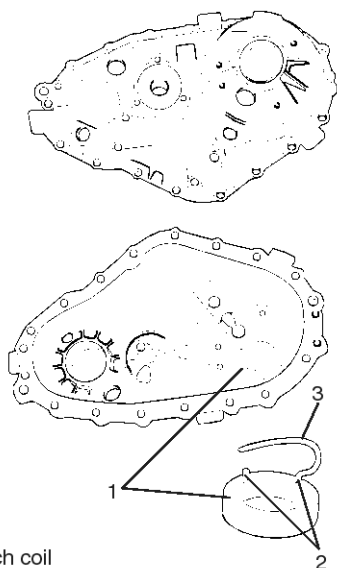
1. Snap ring
2. Bearing
3. Upper tone wheel
4. Speedometer drive gear
5. Flange seal yoke

LMAC310B

14. Remove the speedometer drive gear and upper tone wheel.
15. If the rear output shaft bearing requires replacing, remove the internal snap ring that retains the bearing in the bore.
16. From the outside of the case, drive out the bearing.
17. Remove the three nuts and washers retaining the clutch coil assembly to the rear case.
18. Pull the coil assembly, along with the O-rings and wire, from the case.

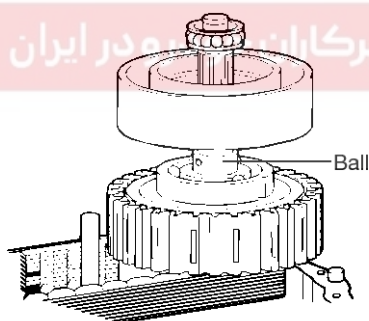
WD-58

Transfer System

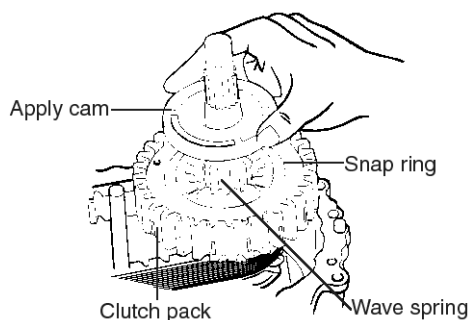


LMAC310C

19. Remove the bearing assembly from the output shaft.
20. Remove the clutch housing from the output shaft.
21. Remove the balls and the apply cam and the waver washer from the output shaft.
22. Remove the snap ring from the output shaft.
23. Remove the clutch pack and lower tone wheel from output shaft.



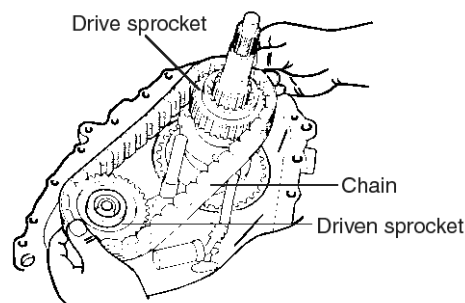
LMAC310D



LMAC310E

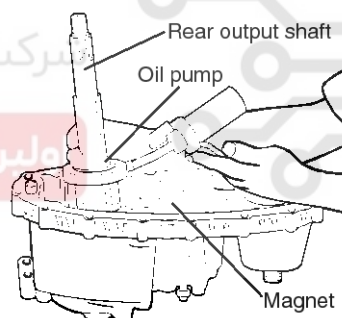
24. Remove the chain, the driven sprocket and the drive

sprocket as an assembly.



LMAC310F

25. Remove the thrust washer from the output shaft.
26. Remove the oil pan magnet from the slot in the front of the case bottom.
27. Remove the output shaft and oil pump as an assembly.
28. If required, to remove the pump from the output shaft, rotate the pump to align.
29. Pull out the shift rail.
30. Remove the helical cam from the front case.
31. If required, remove the helical cam, torsion spring and sleeve from the shaft.



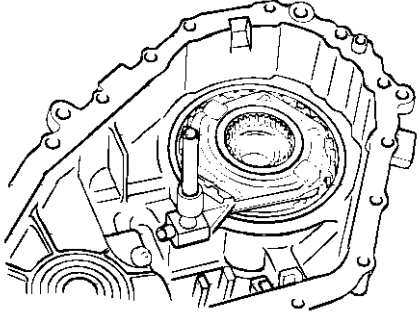
LMAC310G

32. Remove the high-low range shift fork and collar as an assembly.
33. Expand the tangs of the large snap ring in the case using the Ring Plier or equivalent.
34. With the input shaft against a bench, push the case down and slide the main drive gear bearing retainer off the bearing.
35. Lift the input shaft and front planet from the case.
36. If required, remove the oil seal from the case by prying and pulling on the curved-up lip of the oil seal or use the Slide Hammer to pop off the oil seal.
37. Remove the internal snap ring from the planetary carrier.
38. Separate the front planet from the input shaft.

Transfer Case Assembly

WD-59

39. Remove the external snap ring from the input shaft.
40. Place the input shaft in a vise and remove the bearing.
41. Remove the thrust, thrust plate and the sun gear off the put shaft.



LMAC310H

42. Inspect the bushing and needle bearing in the end of the input shaft for wear or damage.

CAUTION

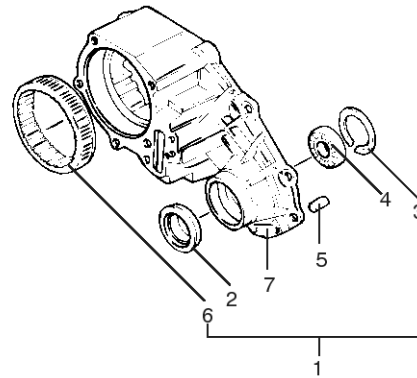
Under normal use, the needle bearing and bushing should not require replacement.

If replacement is required, the bushing and needle bearing must be replaced as a set.

43. If required, remove the front yoke to flange seal by prying and pulling on the curved-up lip of the yoke to flange seal.
44. If required, remove the internal snap ring retaining the front output shaft ball bearing and remove the bearing.

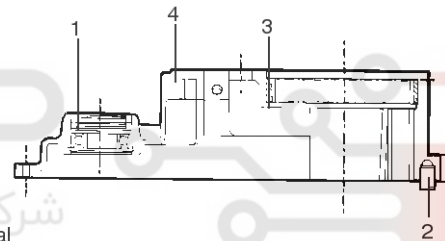
REASSEMBLY CASE ASSEMBLY

1. If ring gear was removed for replacement, align serrations on OD of new ring gear with those in transfer case. Press in ring gear, chamfered end first. Make sure gear is not cocked and is firmly seated in case.
2. If removed, press two new dowel pins into case.
3. Press in ball bearing to bottom in transfer case and install retaining ring.
4. Position new oil seal and press in to seat seal flange against transfer case.



1. Transfer case assembly
2. Oil seal
3. Retaining ring
4. Ball bearing
5. Dowel pin
6. Ring gear
7. Transfer case

LMAC290A

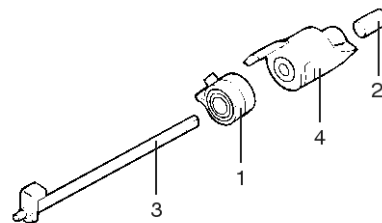


1. Oil seal
2. Dowel pin
3. Ring gear
4. Transfer case

LMAC290B

SHIFT CAM (ELECTRIC PARTS)

1. Insert spacer in torsion spring and install over free end of shift shaft.



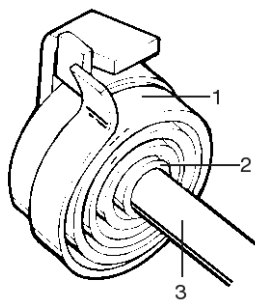
1. Torsion spring
2. Spacer
3. Shift shaft
4. Electric shift cam

LMAC290C

2. Slide torsion spring and spacer on shift shaft up to drive tang and position first spring end to left (Viewed from free end of shaft) of drivetang.

WD-60

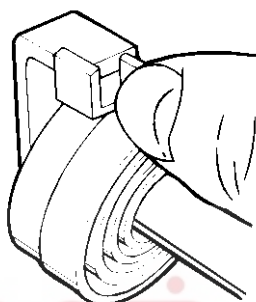
Transfer System



1. Torsion spring
2. Spacer
3. Shift shaft

LM290D

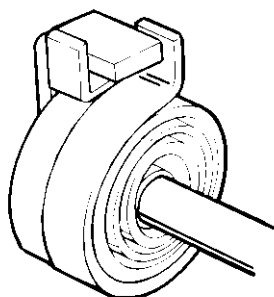
3. Twist second spring end to right of drive tang on shift shaft.



LM290E

4. Push torsion spring and spacer together back as far as they will go.
5. Slide electric shift cam onto shift shaft, drive tang on cam first.

Position drive tang on cam so that it will go under drive tang on shift shaft and between spring ends and slide cam as far as it will go.

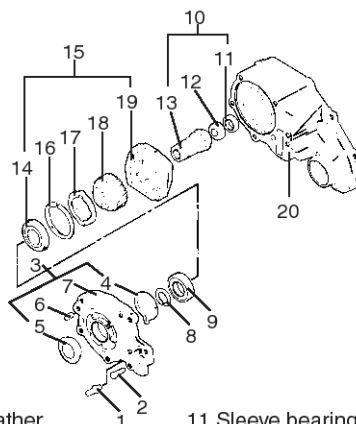


LM290F

ADAPTER, INPUT SHAFT AND CARRIER

1. Lay planet carrier assembly on work bench with end having groove for retaining ring up.
2. Install sun gear with hub end up. Rotate gear of planet carrier assembly as required until sun gear is fully meshed.
3. Align tabs and install thrust plate into planet carrier assembly.

4. Install retaining ring (16) to complete gear carrier assembly.



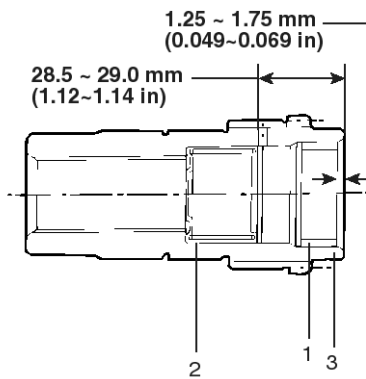
- | | |
|----------------------|-------------------------|
| 1. Breather | 11. Sleeve bearing |
| 2. Bolt | 12. Needle bearing |
| 3. Adapter assy | 13. Input shaft |
| 4. Snap ring | 14. Thrust washer |
| 5. Oil seal | 15. Gear carrier assy |
| 6. Spiral pin | 16. Retaining ring |
| 7. Front adapter | 17. Thrust plate |
| 8. Retaining ring | 18. Sun gear |
| 9. Bearing | 19. Planet carrier assy |
| 10. Input shaft assy | 20. Transfer case |

LM280I

5. If removed, position needle bearing and press into input shaft to dimension shown. Press in new sleeve bearing to complete input shaft assembly.
6. Lift up gear carrier assembly and install input shaft assembly up through gear carrier assembly. Install thrust washer and press bearing over end of input shaft assembly. Retain bearing on input shaft with retaining ring in shaft groove.
7. If removed, press new pin into front adapter.
8. Position oil seal and press into front adapter to dimension shown.
9. Install snap ring in groove in front adapter with long ends of snap ring in adapter groove to complete front adapter assembly.
10. Position front adapter assembly with face that mates with transfer case up. Support on wood blocks to provide clearance for input shaft assembly. Position assembled input shaft and carrier group over front adapter with input shaft down. Lower shaft and carrier group while expanding long ends of snapping until snap ring engages groove in outside diameter of bearing.

Transfer Case Assembly

WD-61



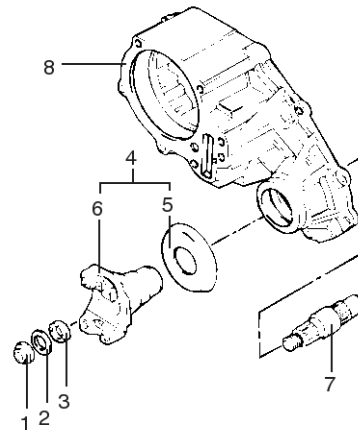
1. Sleeve bearing
2. Needle bearing
3. Input shaft

LMAC290G

11. Apply continuous 1/16 in.(1.6 mm) bead of sealant (Neutral Cure RTV, Loctite 598) all around transfer case mounting face for front, adapter. Center sealant bead between edges of face. Circle bolt holes.
12. Install assembled adapter, input shaft and carrier group on transfer case and attach with six bolts. Torque bolts to 20 - 34 lb-ft (27 -46 Nm)
13. Install breather bard and torque to 6 - 14 lb-ft (8 - 19 Nm).

FRONT OUTPUT SHAFT

1. If removed, press deflector onto yoke.
2. Position output shaft in transfer case and install yoke assembly, oil seal, washer and nut.
3. Hold yoke and torque nut to 150 - 180 lb-ft (203 - 244 Nm).



1. Nut
2. Washer
3. Oil seal
4. Yoke assy
5. Deflector
6. Yoke
7. Output shaft(front)
8. Transfer case

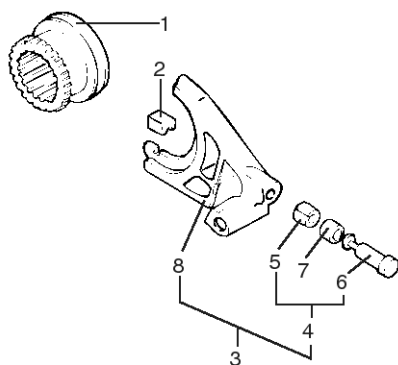
LMAC280H

REDUCTION SHIFT

1. If disassembled for parts replacement, assemble reduction shift fork assembly using new pin, roller and retainer assembly.
Press pin, roller and retainer assembly in to bore in reduction shift fork until retainer passes completely through and snaps in place. Make sure that cam roller turns freely.
2. Install two fork facings on reduction shift fork assembly.
3. Engage reduction shift fork assembly with reduction hub and position in transfer case, reduction hub in gear carrier assembly previously installed.
4. Install output shaft, engaging output shaft end with input shaft bearings and output shaft spline with reduction hub.

WD-62

Transfer System



1. Reduction hub
2. Shift fork facing
3. Reduction shift fork assy
4. Pin, roller and retainer assy
5. Retainer
6. Pin
7. Cam roller
8. Reduction shift fork

LMAC280G

OIL PUMP

1. Locate pump front cover. Front pump cover has tapped holes.

Position front cover so that word TOP faces down and turned so that it will be at top of transfer case when installed in vehicle.

Install front pump cover over output shaft in this position.

2. Install two pump pins with spring between them in output shaft.

Flat surface on both pins must point out and face up. Center pins and spring in output shaft.

3. Push hose coupling onto bard on strainer and install L shaped foot on filter in slot in transfer case. Hose coupling must point in direction of pump assembly.

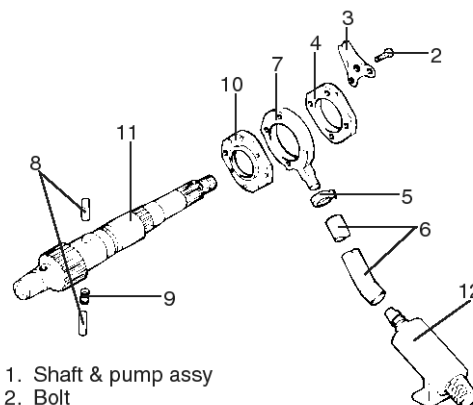
4. Install pump housing so that word REAR marked on it is up and hose bard points toward hose coupling and strainer. Lower pump housing over upper output shaft, moving pump pins inward and compressing spring so that both pins are contained inside pump housing.

5. Slip hose clamp over free end of hose coupling and push onto hose bard on pump housing. Secure hose clamp over hose coupling on hose bard.

6. Position pump rear cover over assembly with words TOP REAR facing up and located to be at top of transfer case when installed.

Position pump retainer on cover so that tab on retainer is in notch in transfer case. Clean threads on four bolts and apply Loctite 222. Align pump holes

and install bolts. Torque bolts to 2.9 - 6.3 lb-ft (4.0 - 8.5 Nm) while turning output shaft by hand to insure that pump pins move freely.



1. Shaft & pump assy
2. Bolt
3. Pump retainer
4. Rear pump cover
5. Hose clamp
6. Hose coupling
7. Pump housing
8. Pump pin
9. Spring
10. Front pump cover
11. Output shaft
12. Strainer

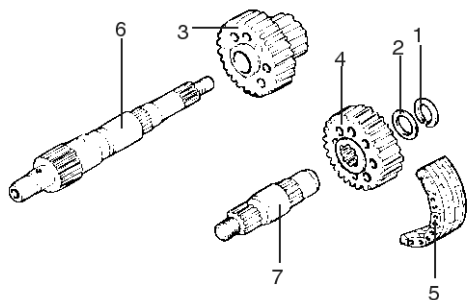
LMAC280F

CHAIN DRIVE

1. On work bench, next to transfer case assembly, position driven sprocket (with internal spline) at front output shaft end of case and drive sprocket (with smooth bore) at output shaft end.
2. Assemble drive chain around sprockets.
3. Grasp each sprocket, hold drive chain tight and parallel with transfer case, and install chain drive assembly over output shaft. It may be necessary to rotate driven sprocket slightly to engage splines on front output shaft.
4. Install spacer on front output shaft. Install snap ring in shaft groove over spacer.

Transfer Case Assembly

WD-63

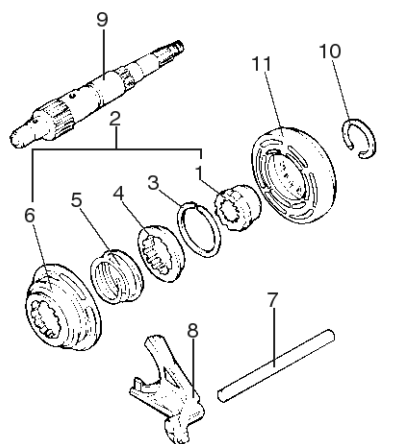


1. Snap ring
2. Spacer
3. Drive sprocket
4. Driven sprocket
5. Drive chain
6. Output shaft (rear)
7. Lockup collar

LMAC280E

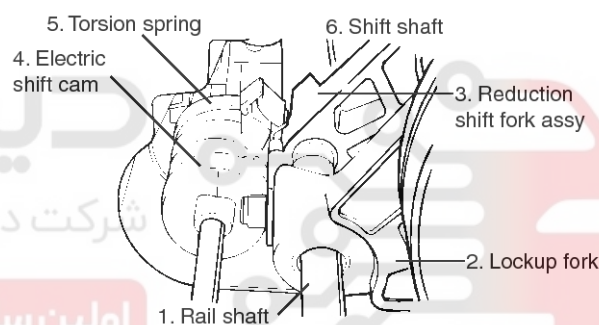
LOCKUP SHIFT

1. Assemble return spring and lockup hub in lockup collar and retain with snap ring, completing 2W-4W lockup assembly.
2. Install rail shaft in transfer case, through reduction shift fork assembly previously installed and into blind hole in case.
3. Engage lockup fork in groove in 2W-4W lockup assembly and slide this group down over output shaft and rail shaft.
4. Install shift collar hub, engaging splines on output shaft and in 2W-4W lockup assembly.
5. On electric shift units only, install electric shift cam group previously assembled and clutch housing as follow :
 - 1) Position electric shift cam group rotated so that end of torsion spring will contact side of reduction shift fork assembly that faces up, toward top of case.
 - 2) Holding rail shaft down, raise up fork assemblies slightly. Rotate electric shift cam group into position so that roller on reduction shift fork assembly is in groove in shift cam and button on lockup fork is on cam end. Then lower this group of parts into the transfer case engaging shift shaft on pin in transfer case.
 - 3) Position clutch housing in transfer case over shift collar hub. Attach with retaining ring in clutch collar hub groove.



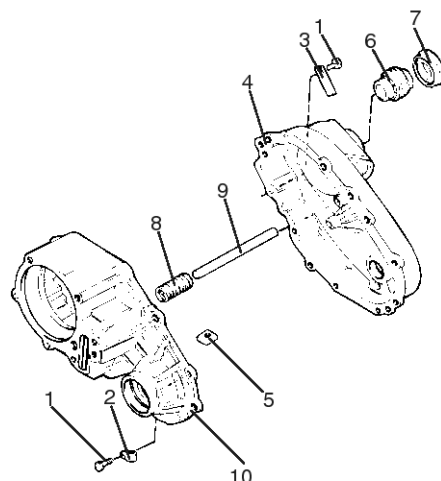
1. Shift collar hub
2. 2W-4W Lockup assy
3. Snap ring
4. Lockup hub
5. Return spring
6. Lockup collar
7. Rail shaft
8. Lockup fork
9. Output shaft
10. Retaining ring
11. Clutch housing

LMAC280D



LMAC290I

CASE COVER



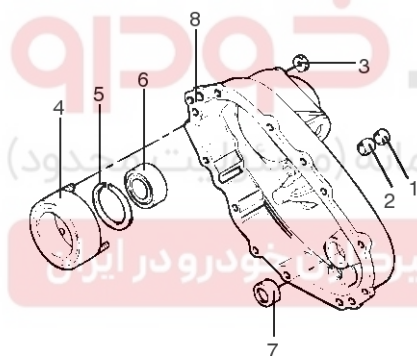
1. Bolt
2. Wiring clip
3. Identification tag
4. Cover assy
5. Magnet
6. Speedo gear
7. Oil seal
8. Return spring
9. Rail shaft
10. Transfer case

WD-64

Transfer System

LMAC290J

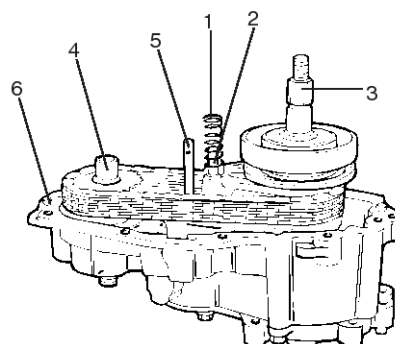
1. Position cover on bed of suitable press so that open face of cover is up and parallel with press bed.
2. Position end of needle bearing with identification marking up and press into cover until upper end of bearing is 1.593 -1.603 in. (40.47 -40.97 mm) below face of cover that mates with transfer case.
3. Press in ball bearing to bottom in cover and install snap ring.
4. On electric shift units only, install parts as follow :
 - 1) Verify that four O-rings (one on wire and one each on three studs) are in place on clutch coil assembly. Install clutch coil assembly in inside of cover, with electrical wire and studs extending through cover, with electrical wire and stud extending through cover. Use care not to kink or trap electrical wire under clutch coil assembly. Attach with three nuts and torque to 6 -8 lb·ft (8 - 11 Nm).



1. Oil seal
2. Bearing
3. Nut
4. Clutch coil assy
5. Snap ring
6. Ball bearing
7. Needle bearing
8. Case cover

LMAC290K

5. Install return spring over rail shaft in transfer case to rest on shift fork.
6. Install magnet in slot in transfer case.
7. Apply continuous 1/16 in. (1.6 mm) bead of sealant (Neutral Cure RTV, Loctite 598) all around transfer case mounting face for cover assembly. Center sealant bead between edges of face. Circle bolt holes. Remove excess if sealant bead is larger than 1/16 in. (1.6 mm).



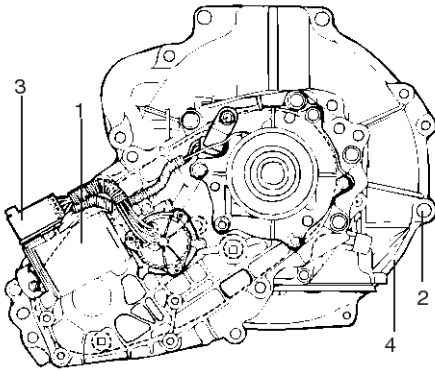
1. Return spring
2. Rail shaft
3. Output shaft
4. Front output shaft
5. Shift shaft
6. Dowel pin

LMAC290L

8. Install cover assembly on transfer case. All of the following alignment conditions must be met for the cover assembly to seat on transfer case properly.
 - 1) Cover holes with transfer case dowel pins.
 - 2) Cover bearings with output shafts.
 - 3) Blind hole in cover with rail shaft. Make sure spring is not cocked. On electric shift, check with pen light through cover hole for speed sensor.
 - 4) On electric shift units, cover bearing with shift shaft.
9. Install nine bolts positioning identification tag and wiring clip under bolt heads at locations. Torque bolts to 20 - 34 lb·ft (27 -46 Nm).
10. Install speedo gear over spline of output shaft into cover assembly.
11. Press new oil seal into cover assembly.

Transfer Case Assembly

WD-65

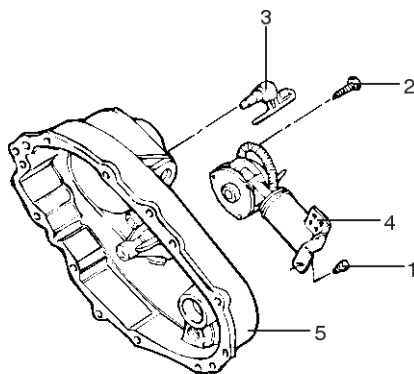


1. Motor assembly
2. Bolt
3. Wiring clip
4. Identification tag

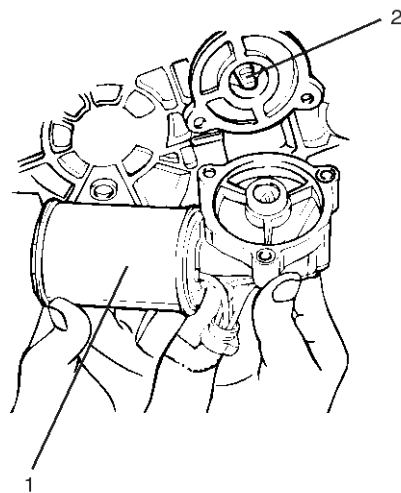
LMAC290M

EXTERNAL ELECTRIC SHIFT

1. Position motor assembly so that triangular slot in motor will align with shift shaft. Move motor in to engage shift shaft and contact cover. Then rotate motor in clockwise direction until motor is in correct position and mounting holes are aligned.
2. Fit O-ring on speed sensor and install speed sensor assembly in cover. Install bracket so that it is over speed sensor and install three bolts. Torque bolts to 6 - 8 lb-ft (8 - 11 Nm).
3. Install bolt and washer at bracket end of motor assembly and torque to 6 - 8 lb-ft (8 - 11 Nm).



1. Bolt
2. Bolt
3. Speed sensor
4. Motor assembly
5. Cover



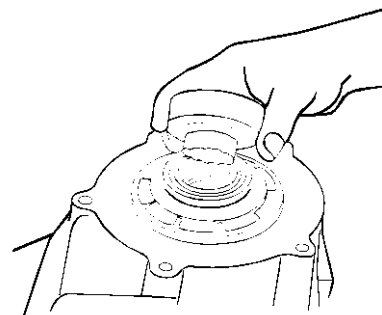
1. Motor assy
2. Shift shaft

LMAC290N

LMAC290O

REASSEMBLY

1. Before assembly, lubricate all parts with the specified grease oil.
2. If removed, drive the bearing into the front output case bore.
3. Install the internal snap ring that retains the bearing to the front case.
4. If removed, install the front yoke to flange seal in the front case bore.
5. If removed, install the yoke to flange seal into the mounting adapter bore.

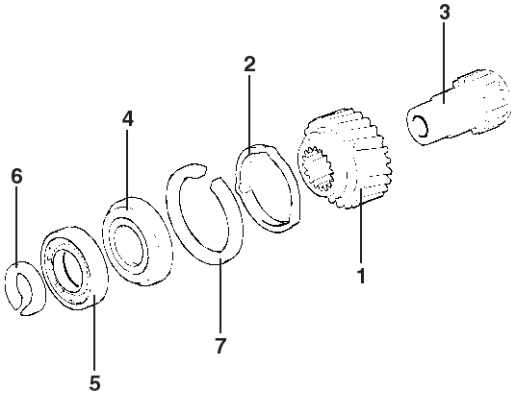


LMAC320A

6. If the input shaft needle bearing and bushing were removed, install a new bearing and bushing.
7. The recessed face of the sun gear and the snap ring groove on the bearing outer race should be toward the rear of the transfer case.
8. The stepped face of the thrust washer should face toward the bearing.

WD-66

9. Slide the sun gear, thrust plate and thrust washer into position on the input shaft.
10. Press the bearing over the input shaft.
11. Install the external snap ring to the input shaft.
12. Install the front planet to the sun gear and input shaft.
13. Install the internal snap ring to the planetary carrier.



1. Sun gear
2. Thrust plate
3. Input shaft
4. Thrust washer
5. Bearing
6. Outer snap ring
7. Inner snap ring

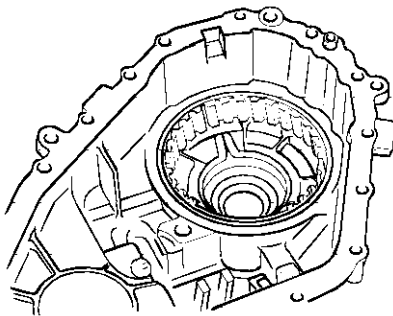
LMAC320B

14. Place the tanged snap ring in the case.

Expand the snap ring with the snap ring pliers and install the planetary carrier assembly.

Check the installation by holding the case and carefully tapping the face of the input shaft against a wooden block to make sure the snap rings are installed.

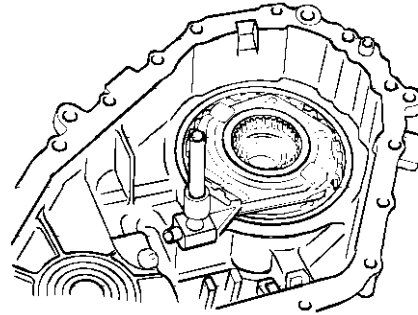
15. Remove all traces of gasket sealant from the front case and mounting adapter mating surfaces.



LMAC320C

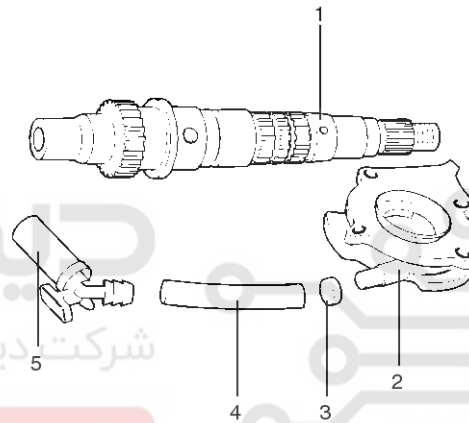
16. Install the high-low shift fork and high-low collar as an assembly into the front planet.

Transfer System



LMAC320D

17. Check the pump to make sure the pump rotates freely.
18. Inspect the outside surfaces and bore of the oil pump.



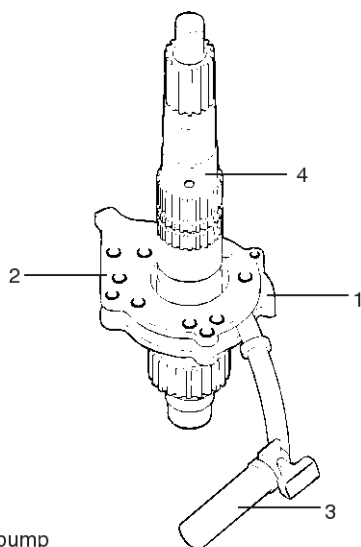
1. Rear output shaft
2. Pump body
3. Clamp
4. Hose
5. Filter

LMAC320E

19. Install the output shaft and oil pump in the input shaft. Make sure that the internal splines of the output shaft engage the internal splines of the high-low shift collar. Make sure that the oil pump retainer arm and oil filter leg are in the groove and slot of the front case.

Transfer Case Assembly

WD-67

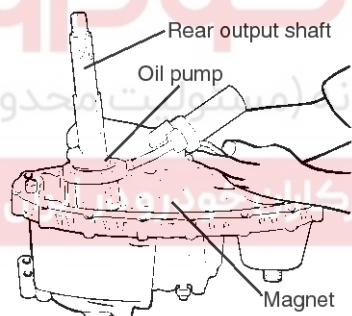


1. Oil pump
2. Pump retainer
3. Oil pump filter
4. Output shaft

LMAC320F

20. Install the oil pan magnet in the slot in the front case just above the oil filter leg.

21. Install the front output shaft in the front case.



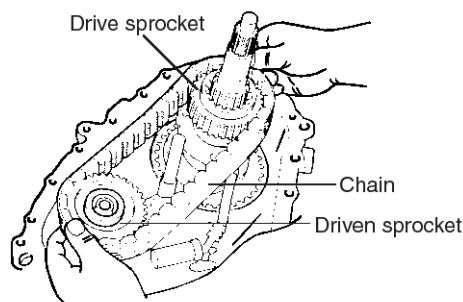
LMAC320G

22. Install the thrust washer on the rear output shaft.

23. Install the chain, drive sprocket and driven sprocket as an assembly over the output shaft.

CAUTION

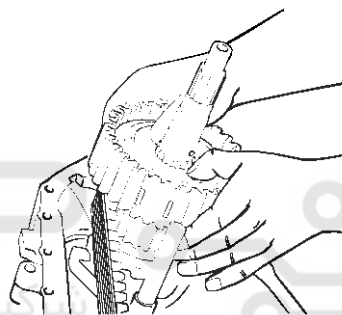
The driven sprocket (on the front output shaft) must be installed with the marking REAR facing toward the rear case, if so marked.



LMAC320H

24. Install tone wheel onto the front output shaft. Make sure the spline on the tone wheel engages the spline on the front output shaft.

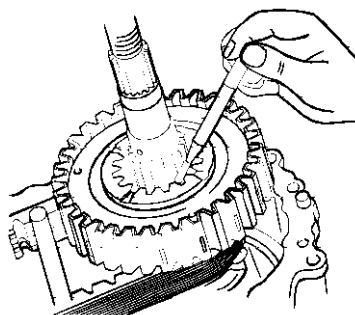
25. Install clutch pack assembly onto the rear output shaft. Make sure that the spline on the clutch pack engages to the spline of the sprocket.



LMAC320I

26. Install snap ring onto the rear output shaft. Start the snap ring over the spline and use the wave spring to seat the snap ring in the snapping groove.

If the snap ring will not install, the thrust washer inside the clutch pack may not be seated properly.



LMAC320J

27. Three slots on the thrust washer must be aligned with the three tabs on the clutch pack housing.

28. Install the apply cam onto the rear output shaft.

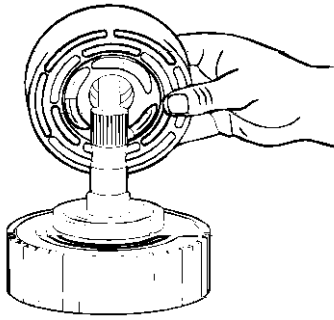
29. Install three balls into the apply cam.

30. Install cam and coil housing assembly onto rear output shaft.

WD-68

Transfer System

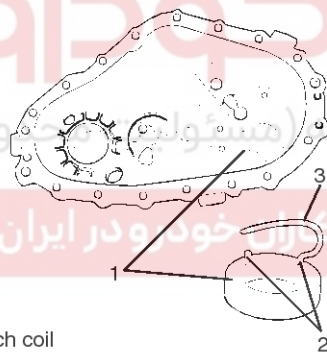
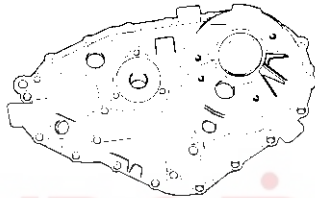
31. Install thrust bearing assembly onto output shaft.



LMAC320K

32. Install the clutch coil from inside the rear case until the wire and studs extend through the cover.

33. Install the washers and nuts and tighten to 8 - 11Nm.

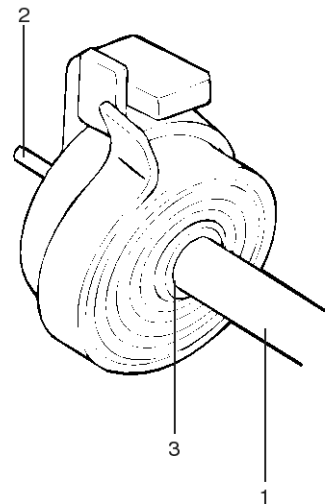


- 1. Clutch coil
- 2. Clutch coil retaining nut
- 3. Wire

LMAC320L

34. Slide the spring spacer on the cam shaft and position it beneath the drive tang.

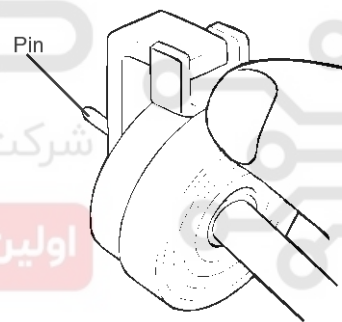
35. Place the torsion spring on the cam shaft. Position the first spring tang to the left of the cam shaft drive tang.



- 1. Cam shaft
- 2. Pin
- 3. Spring spacer

LMAC320M

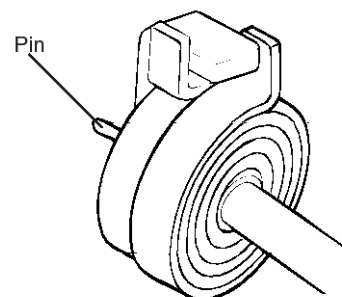
36. Wind the second spring tang clockwise past the drive tang.



LMAC320N

37. Push the torsion spring and sleeve in as far as it will go.

38. Install the helical cam and slide the drive tang between the torsion spring tangs as far as it will go.



LMAC320O

39. Install the pin on the tang end of the helical cam into the hole in the front case.

Transfer Case Assembly

WD-69

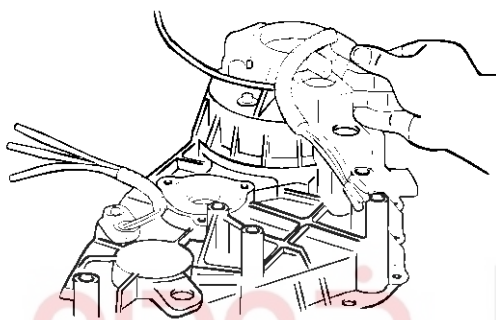
Position the torsion spring tangs so that they are pointing toward the top side of the transfer case and just touching the high-low shift fork.

⚠ CAUTION

Do not bend the helical cam during installation to the front case because of possible damage to the pin at the tang end of the motor shaft.

40. Install the shift rail through the high-low shift fork and make sure that the reverse gear shift rail is seated in the front case bore.

41. Install upper and lower speed sensors into the cover. Feed the coil wire through the upper speed sensor wire shield.



LMAC320P

42. Install upper tone wheel, speedometer gear and rear output seal.



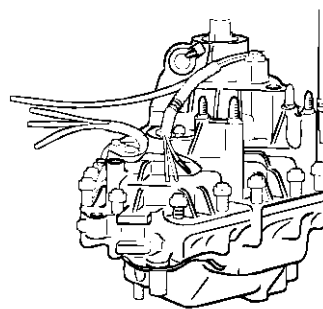
LMAC320Q

43. Coat the mating surface of the front case with sealant.

44. The following procedure must be followed prior to installing the rear case onto the front case half :

- 1) Align the output shaft with the rear case output shaft bore.
- 2) Align the helical cam with the rear case motor bore. If difficulty is encountered with seating the rear case, tap the rear output shaft with a sharp blow using a rubber mallet in a direction away from the triangular shaft while pushing down on the rear case.

45. Install the bolts retaining the case halves and tighten to 25 - 37 N·m (250 - 370 kg·cm, 19 25 lb·ft).

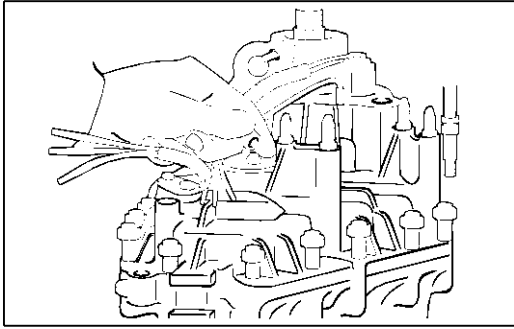


LMAC320R

46. Install shift shaft oil seal if it is not installed.

WD-70

Transfer System



LMAC320S

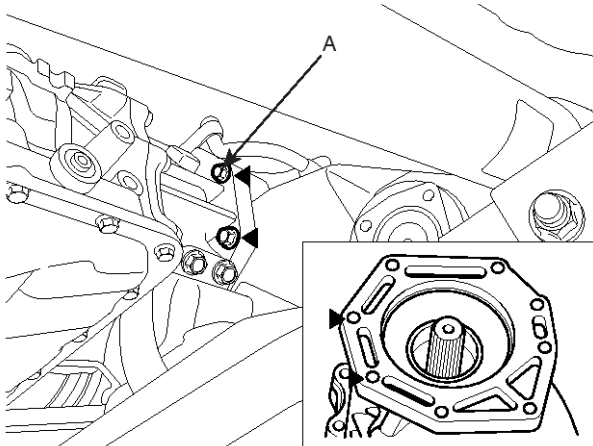
47. Using pliers equipped with soft jaws, rotate the triangular shaft so it is aligned with the triangular slot in the transfer case shift motor. If triangular shaft will not rotate, rotate the rear output shaft.
48. Slightly loosen the two nuts that attach the slotted support bracket to the end of the motor house.
49. Apply the sealant to motor housing base and install on transfer case.
50. Install the transfer case shift motor.
51. Holding the slotted support bracket tight against the motor housing end secure the bracket to the transfer case, tightening the bolt with lockwasher to 8 - 11 N·m (80 - 110 kg·cm, 6 - 8 lb·ft).
52. Retighten the two nuts that attach the slotted support bracket to the end of the motor to 3-4 N·m (30 - 40 kg·m, 2 - 3 lb·ft).

Installation

1. Install the transfer assembly by installing the mounting bolts (8ea) from the transmission side.

NOTICE

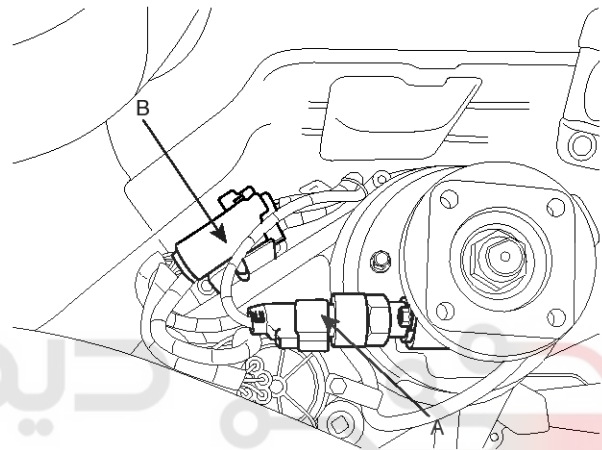
Grease the spline end of the transmission output shaft before installing the transfer assembly.



SBLAT8001D

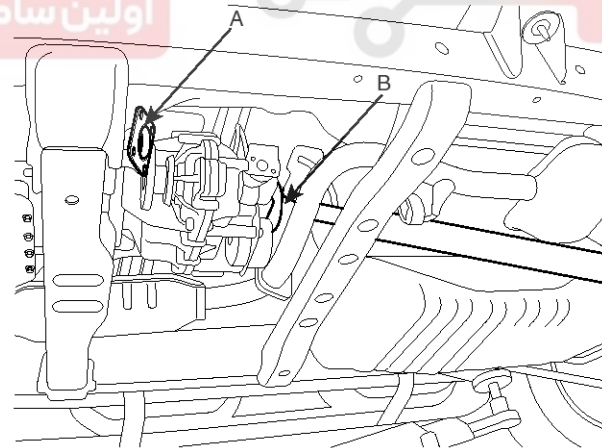
2. Connect the speed sensor connector (A) and 4WD

connector (B).



SBLAT8003D

3. Install the front/rear propeller shaft(A,B).



SBLAT8002D

4. Connect the battery (-) terminal.