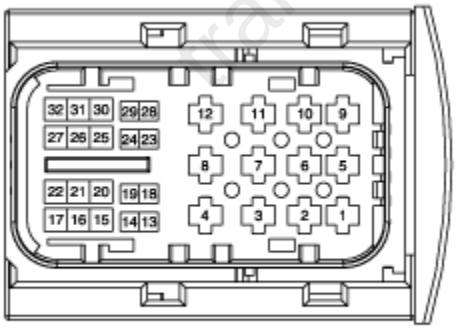
Dual Clutch Transmission Control System / DCT Control Module (TCM)

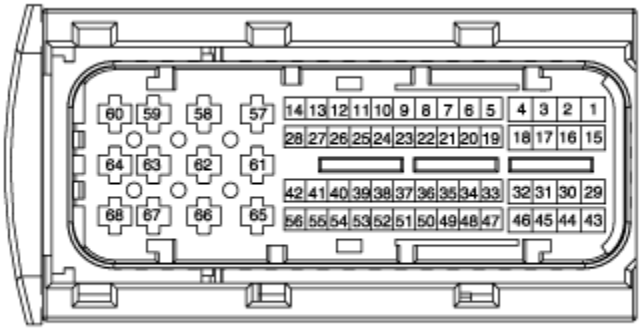
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Schematic diagrams

TCM Connector



Connector [A]



Connector [B]

TCM Terminal Function

Connector [A]

Pin	Description	Pin	Description
1	Clutch actuator (Clutch motor 1 (Odd)_Phase V)	15	Clutch actuator (Clutch motor 1 (Odd)_Sensor ground)
2	Clutch actuator (Clutch motor 2 (Even)_Phase V)	18	Clutch actuator (Clutch motor 1 (Odd)_Hall 1)
3	Select actuator (Select solenoid 2 (Even)_Sensor ground)	19	Clutch actuator (Clutch motor 1 (Odd)_Supply)
4	Select actuator (Select solenoid 1 (Odd)_Push)	20	Select actuator (Select solenoid 1 (Odd)_Sensor supply)
5	Clutch actuator (Clutch motor 1 (Odd)_Phase U)	21	Select actuator (Select solenoid 2 (Even)_Sensor supply)
6	Clutch actuator (Clutch motor 2 (Even)_Phase U)	22	Select actuator (Select solenoid 2 (Even)_Sensor ouput)
7	Select actuator (Select solenoid 1 (Odd)_Sensor ground)	23	Clutch actuator (Clutch motor 2 (Even)_Hall 2)
8	Select actuator (Select solenoid 2 (Even)_ Pull)	24	Clutch actuator (Clutch motor 2 (Even)_Hall 3)
9	Clutch actuator (Clutch motor1 (Odd)_Phase W)	25	Clutch actuator (Clutch motor 2 (Even)_Sensor ground)
10	Clutch actuator (Clutch motor 2 (Even)_Phase W)	26	Select actuator (Select solenoid 1 (Odd)_Sensor output)
11	Select actuator (Shifts olenoid 1 (Odd)_Pull)	28	Clutch actuator (Clutch motor 2 (Even)_Hall 1)
12	Select actuator (Shift solenoid 2 (Even)_Push)	29	Clutch actuator (Clutch motor 2 (Even)_Sensor supply)
13	Clutch actuator (Clutch motor 1 (Odd)_Hall 2)	30	Select actuator (Select solenoid 1 (Odd)_Sensor ground)
14	Clutch actuator (Clutch motor (Odd)_Hall 3)	31	Select actuator (Select solenoid 2 (Even)_Sensor ground)

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Connector [B]

Pin	Description	Pin	Description
3	ON / START input	42	Shift actuator (Shift motor 2 (Even) _Hall 3)
5	Inhibitor switch "P" input signal	43	Inhibitor switch "M" Input signal
6	Inhibitor switch "R" input signal	44	CAN1 communication port1 High
7	Inhibitor switch "D" input signal	45	CAN1 communication port1 low
8	Manual mode "Down" switch	48	Flex ray high (BP)
9	Input speed sensor signal 2 (Even)	49	Input speed supply 1 (Odd)

13	Shift actuator (Shift motor 1 (Odd) _Hall 2)	50	Input speed signal 1 (Odd)
14	Shift actuator (Shift motor 1 (Odd) _Hall 3)	54	Shift actuator (Shift motor 2 (Even) _Sensor supply)
17	Battery power low VBD	55	Shift actuator (Shift motor 2 (Even) _Hall 1)
19	Manual mode "Select" switch	56	Shift actuator (Shift motor 2 (Even) _Sensor ground)
20	Inhibitor switch "N" input signal	57	Power ground 1 for high current modules
21	Manual mode "Up" switch	58	Power ground 2 for high current modules
23	Input speed supply 2 (Even)	59	Shift actuator (Shift motor 2 (Even)_Phase W)
24	5V spare supply output	60	Shift actuator (Shift motor 1 (Odd)_Phase W)
26	Shift actuator (Shift motor 1 (Odd)_Sensor supply	61	Power ground 3 for high current modules
27	Shift actuator (Shift motor 1 (Odd)_Hall 1)	63	Shift Actuator (Shift motor 2 (Even)_Phase V)
28	Shift actuator (Shift motor 1 (Odd)_Sensor ground)	64	Shift Actuator (Shift Motor 1 (Odd)_Phase V)
30	CAN2 communication port2 High	65	Motor supply voltage 1 from direct battery
31	CAN2 communication port2 Low	66	Motor supply voltage 2 from direct battery
34	Flex ray bus, BM	67	Shift actuator (Shift motor 2 (Even)_Phase U)
41	Shift actuator (Shift motor 2 (Even) _Hall 2)	68	Shift actuator (Shift motor 1 (Odd)_Phase U)

Terminal input/output signal

Connector [A]

Pin	Description	Condition	Input / output value	
			Type	Level
1	Clutch actuator (Clutch motor 1 (Odd)_Phase V)	Low	Output	0V
		PWM		0V ~ Battery voltage
2	Clutch actuator (Clutch motor 2 (Even)_Phase V)	Low	Output	0V
		PWM		0V ~ Battery voltage
3	Select actuator (Select solenoid 2 (Even)_Sensor ground)	Static on	Output	0V
4	Select actuator (Select solenoid 1 (Odd)_Push)	On	Output	Battery voltage
		Off		0V
5	Clutch actuator (Clutch motor 1 (Odd)_Phase U)	Low	Output	0V
		PWM		0V ~ Battery

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				voltage
6	Clutch actuator (Clutch motor 2 (Even)_Phase U)	Low	Output	0V
		PWM		0V ~ Battery voltage
7	Select actuator (Select solenoid 1 (Odd)_Sensor ground)	Static on	Output	0V
8	Select actuator (Select solenoid 2 (Even)_ Pull)	On	Output	Battery voltage
		Off		0V
9	Clutch actuator (Clutch motor1 (Odd)_Phase W)	Low	Output	0V
		PWM		0V ~ Battery voltage
10	Clutch actuator (Clutch motor 2 (Even)_Phase W)	Low	Output	0V
		PWM		0V ~ Battery voltage
11	Select actuator (Select solenoid 1 (Odd)_Pull)	On	Output	Battery voltage
		Off		0V
12	Select actuator (Select solenoid 2 (Even)_Push)	On	Output	Battery voltage
		Off		0V
13	Clutch actuator (Clutch motor 1 (Odd)_Hall 2)	High	Input	4.5V
		Low		0V
14	Clutch actuator (Clutch motor (Odd)_Hall 3)	High	Input	4.5V
		Low		0V
15	Clutch actuator (Clutch motor 1 (Odd)_Sensor ground)	Ground	Ground	0V
18	Clutch actuator (Clutch motor 1 (Odd)_Hall 1)	High	Input	4.5V
		Low		0V
19	Clutch actuator (Clutch motor 1 (Odd)_Sensor supply)	-	Power	8.75V
20	Select actuator (Select solenoid 1 (Odd)_Sensor supply)	-	Power	8.75V
21	Select Actuator (Select solenoid 2 (Even)_Sensor Supply)	-	Power	8.75V
22	Select actuator (Select solenoid 2 (Even)_Sensor ouput)	High	Input	4V
		Low		1V
23	Clutch actuator (Clutch motor 2 (Even)_Hall 2)	High	Input	4.5V
		Low		0V
24	Clutch actuator (Clutch motor 2 (Even)_Hall 3)	High	Input	4.5V
		Low		0V
25	Clutch actuator (Clutch motor 2 (Even)_Sensor ground)	Ground	Ground	0V
26	Select actuator (Select solenoid 1 (Odd)_Sensor output)	High	Input	4V

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		Low		1V
28	Clutch actuator (Clutch motor 2 (Even)_Hall 1)	High	Input	4.5V
		Low		0V
29	Clutch actuator (Clutch motor 2 (Even)_Supply)	-	Power	8.75V
30	Select actuator (Select solenoid 1 (Odd)_Sensor ground)	Ground	Ground	0V
31	Select actuator (Select solenoid 2 (Even)_Sensor ground)	Ground	Ground	0V

Connector [B]

Pin	Description	Condition	Input / output value	
			Type	Level
3	ON / START input	-	Power	9V < Battery voltage < 16V
5	Inhibitor switch "P" input signal	High	Input	9V < Battery voltage < 16V
		Low		0V
6	Inhibitor switch "R" input signal	High	Input	9V < Battery voltage < 16V
		Low		0V
7	Inhibitor switch "D" input signal	High	Input	9V < Battery voltage < 16V
		Low		0V
8	Manual mode "Down" switch	High	Input	9V < Battery voltage < 16V
		Low		0V
9	Input speed sensor signal 2 (Even)	High	Input	0.448V
		Low		0.224V
13	Shift actuator (Shift motor 1 (Odd) _Hall 2)	High	Input	4.5V
		Low		0.8
14	Shift actuator (Shift motor 1 (Odd) _Hall 3)	High	Input	4.5V
		Low		0.8
17	Battery power low VBD	-	Power	9V < Battery voltage < 16V
18	Paddle shift down signal	High	Input	9V < Battery voltage < 16V
		Low		0V

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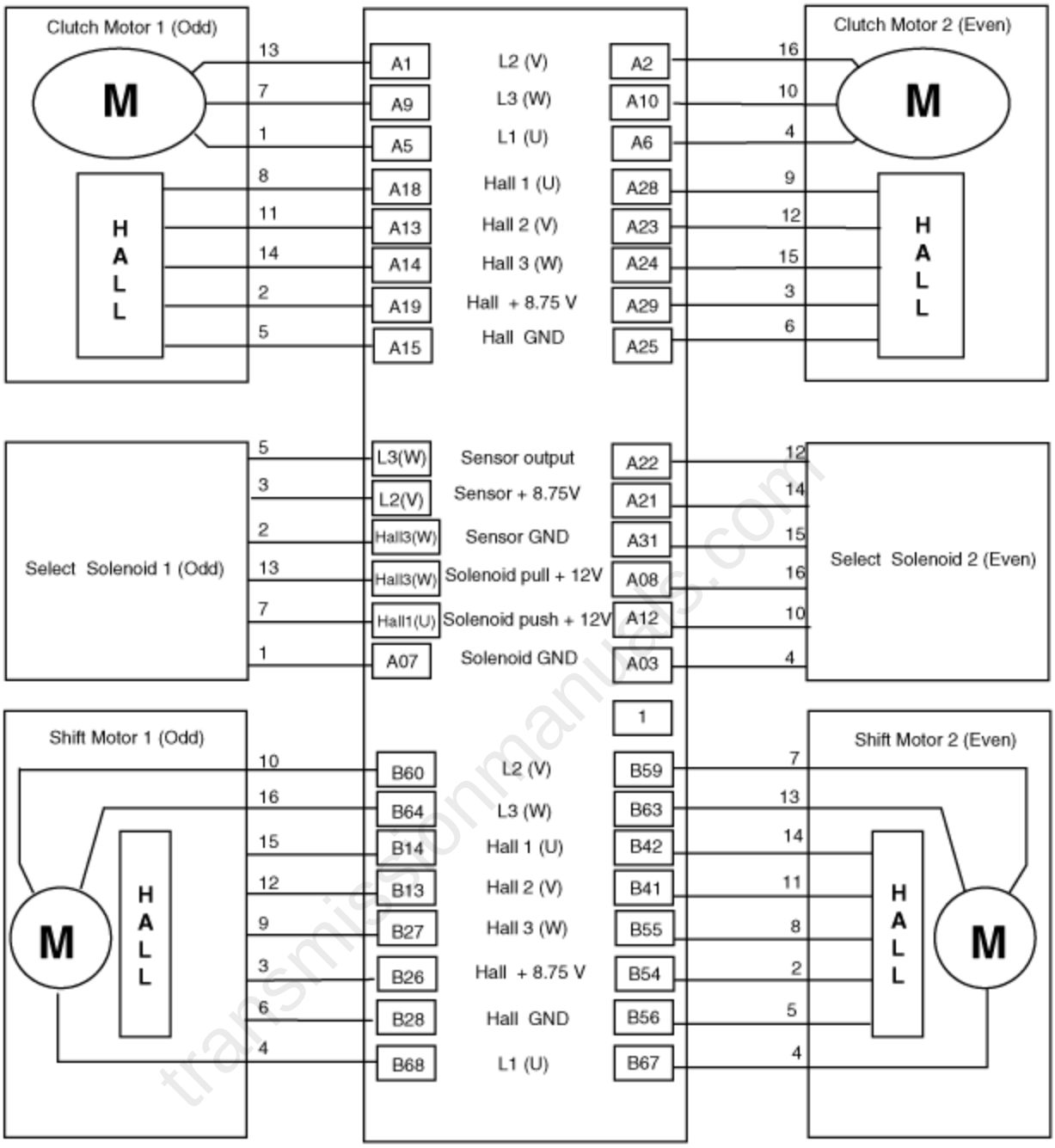
19	Shift lever select switch	High	Input	9V < Battery voltage < 16V
		Low		0V
20	Inhibitor switch "N" input signal	High	Input	9V < Battery voltage < 16V
		Low		0V
21	Manual mode "Up" switch	High	Input	9V < Battery voltage < 16V
		Low		0V
23	Input speed supply 2 (Even)	-	Power	8.75V
24	5V spare supply output	-	Power	5V
26	Shift actuator (Shift motor 1 (Odd)_Sensor supply)		Power	8.75V
27	Shift actuator (Shift motor 1 (Odd)_Hall 1)	High	Input	4.5V
		Low		0.8V
28	Shift actuator (Shift Motor 1 (Odd)_Sensor Ground)	Ground	Ground	0V
30	CAN2 communication port2 High	Rec./Dom	CAN Line	Recessive : 2.5V
				Dominant : 3.5V
31	CAN2 communication port2 Low	Rec./Dom	CAN Line	Recessive : 2.5V
				Dominant : 1.5V
34	Flex ray bus, BM	Idle	CAN Line	Idle : 2.5V
		Differential		Differential : 2.0 V / 3.0 V
41	Shift actuator (Shift motor 2 (Even) _Hall 2)	High	Input	4.5V
		Low		0.8V
42	Shift actuator (Shift motor 2 (Even) _Hall 3)	High	Input	4.5V
		Low		0.8V
43	Inhibitor switch "M" input signal	High	Input	9V < Battery voltage < 16V
		Low		0V
44	CAN1 communication port1 High	Idle	CAN Line	
		Differential		
45	CAN1 communication port1 Low	Idle/Diff.	Rec./Dom	Recessive : 2.5V
				Dominant : 3.5V
48	Flex ray High (BP)	Idle/Diff.	CAN Line	Idle : 2.5V
				Differenital : 2.0V / 3.0V

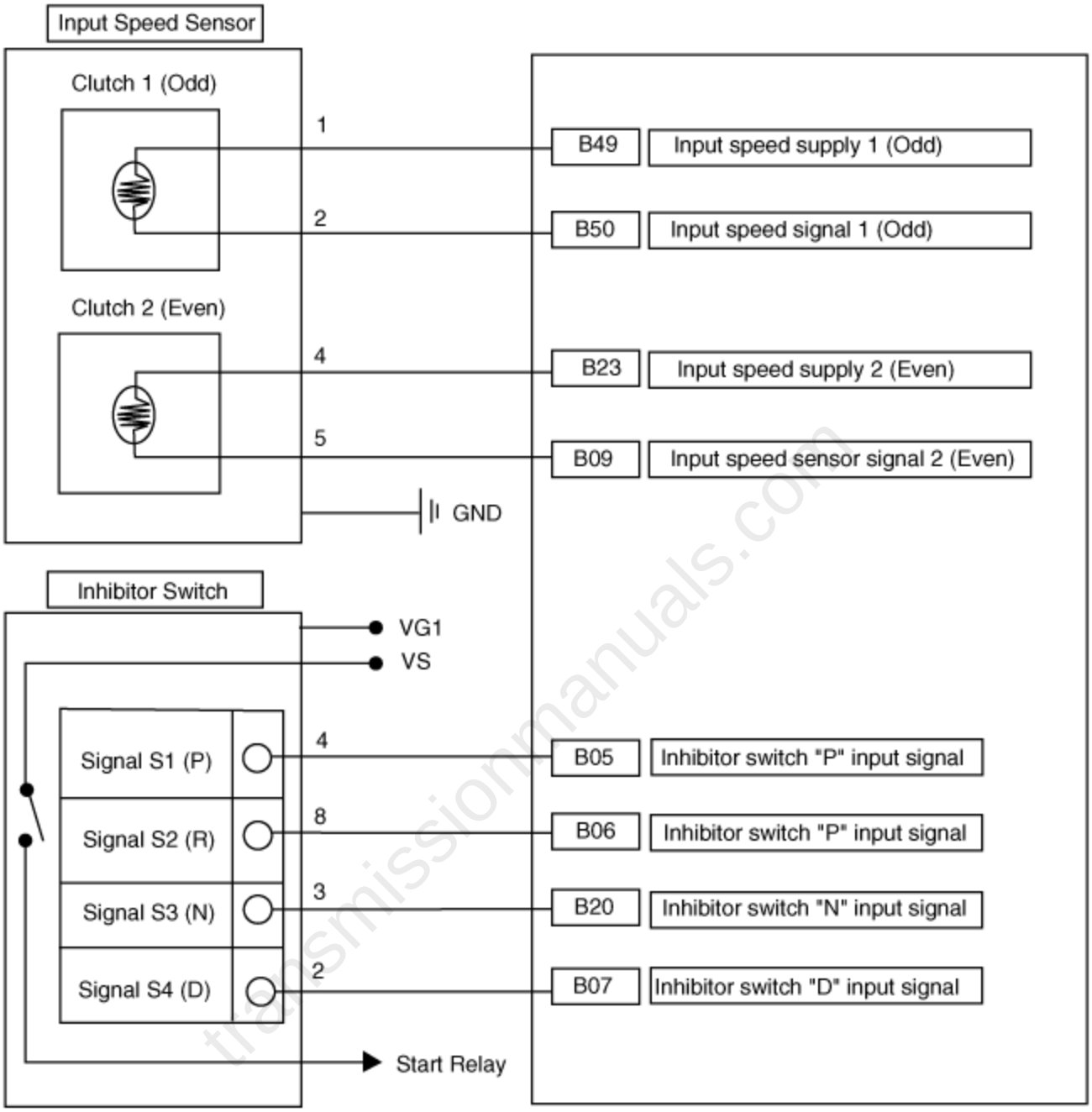
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49	Input speed supply 1 (Odd)	-	Power	8.75V
50	Input speed signal 1 (Odd)	High	Input	0.448V
		Low		0.224V
54	Shift actuator (Shift motor 2 (Even) _Sensor supply)	-	Power	8.75V
55	Shift actuator (Shift motor 2 (Even) _Hall 1)	High	Input	4.5V
		Low		0.8V
56	Shift actuator (Shift motor 2 (Even) _Sensor ground)	Ground	Ground	0V
57	Power ground 1 for high current modules	Ground	Ground	0V
58	Power ground 2 for high current modules	Ground	Ground	0V
59	Shift actuator (Shift motor 2 (Even)_Phase W)	Low	Output	0V
		PWM		0V~Battery voltage
60	Shift actuator (Shift motor 1 (Odd)_Phase W)	Low	Output	0V
		PWM		0V~Battery voltage
61	Power ground 3 for high current modules	Ground	Ground	Ground
63	Shift actuator (Shift motor 2 (Even)_Phase V)	Low	Output	0V
		PWM		0V~Battery voltage
64	Shift actuator (Shift motor 1 (Odd)_Phase V)	Low	Output	0V
		PWM		0V~Battery voltage
65	Motor supply voltage 1 from direct battery	-	Power	9V < Battery voltage < 16V
66	Motor supply voltage 2 from direct battery	-	Power	9V < Battery voltage < 16V
67	Shift actuator (Shift motor 2 (Even)_Phase U)	Low	Output	0V
		PWM		0V~Battery voltage
68	Shift actuator (Shift motor 1 (Odd)_Phase U)	Low	Output	0V
		PWM		0V~Battery voltage

Circuit Diagram

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Clutch Motor 1 (Odd)
M
HALL
13
7
1
8
11
14
2
5
A1
A9
A5
A18
A13
A14
A19
A15
L2 (V)
L3 (W)
L1 (U)
Hall 1 (U)
Hall 2 (V)
Hall 3 (W)
Hall + 8.75 V
Hall GND
A2
A10
A6
A28
A23
A24
A29
A25
16
10
4
9
12
15
3
6
Clutch Motor 2 (Even)
M
HALL
Select Solenoid 1 (Odd)
5
3
2
13
7
1
L3(W)
L2(V)
Hall3(W)
Hall3(W)
Hall1(U)
A07
Sensor output
Sensor + 8.75V
Sensor GND
Solenoid pull + 12V
Solenoid push + 12V
Solenoid GND
A22
A21
A31
A08
A12
A03
12
14
15
16
10
4
Select Solenoid 2 (Even)
1
Shift Motor 1 (Odd)
M
HALL
10
16
15
12
9
3
6
4
B60
B64
B14
B13
B27
B26
B28
B68
L2 (V)
L3 (W)
Hall 1 (U)
Hall 2 (V)
Hall 3 (W)
Hall + 8.75 V
Hall GND
L1 (U)
B59
B63
B42
B41
B55
B54
B56
B67
7
13
14
11
8
2
5
4
Shift Motor 2 (Even)
HALL
M



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Repair procedures

Inspection

1. TCM ground circuit test: Measure resistance between TCM and chassis ground using the backside of TCM harness connector as TCM side check point.

Specification : Below 1Ω

2. TCM connector test: Disconnect the TCM connector and visually check the ground terminals on TCM side and harness side for bent pins or poor contact pressure.

3. If problem is not found in Steps 1 and 2, the TCM could be faulty. If so, replace the TCM with a new one, and then check the vehicle again. If the vehicle operates properly, then the problem was likely with the TCM.

4. The original TCM re-test : Install the original TCM (may be broken) into a known-good vehicle and check the vehicle. If the problem occurs again, replace the original TCM with a new one. If problem does not occur, this is intermittent problem. If the problem does not occur, the problem was likely with other parts.

Removal

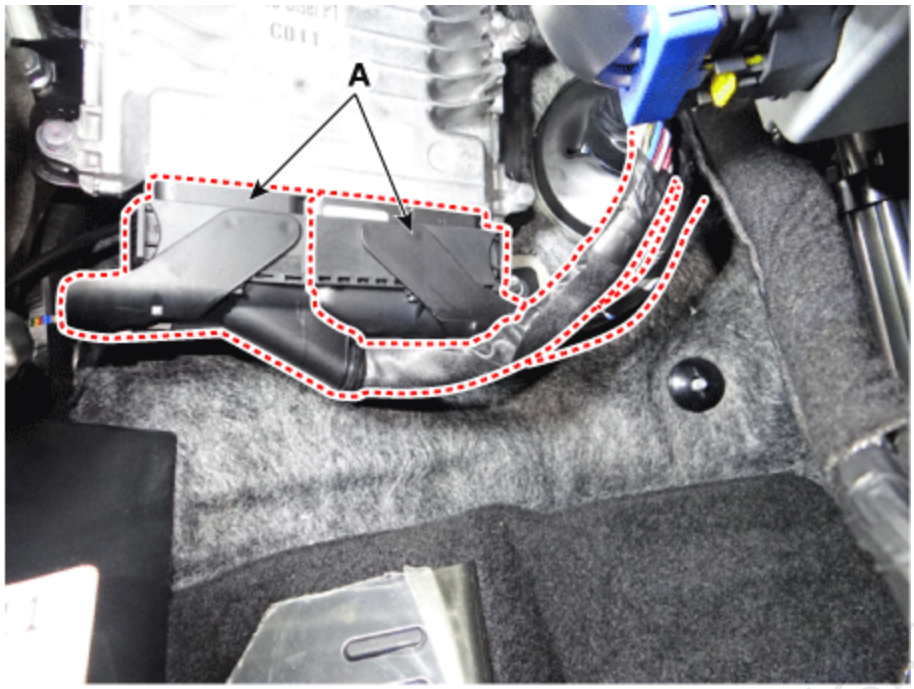
1. Disconnect the battery negative (-) cable.

2. Remove the Integrated central control unit (ICU).

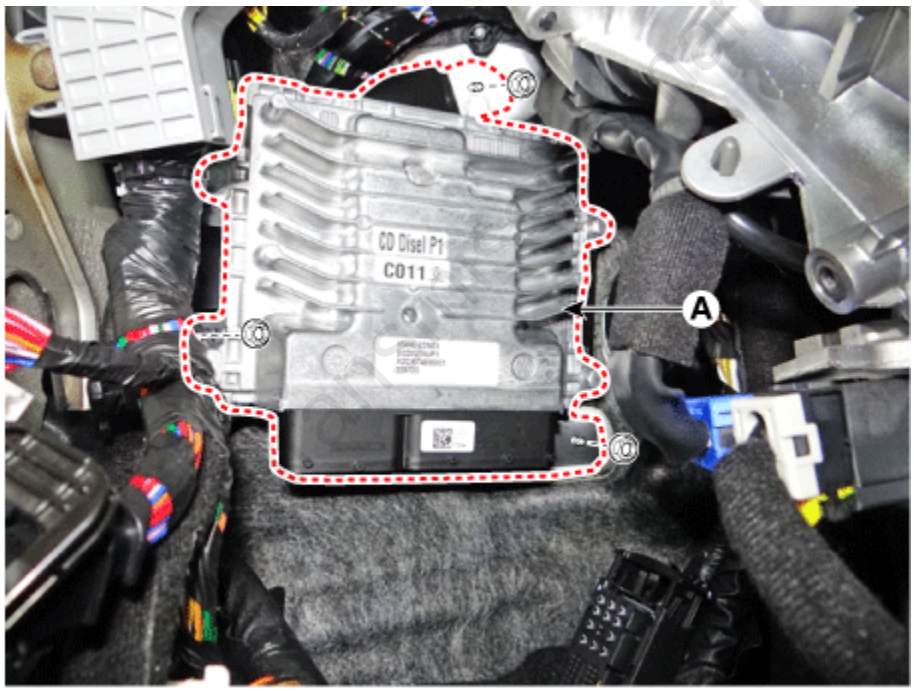
   (Refer to Body Electrical System - "Integrated Central Control Unit (ICU)")

3. Disconnect the TCM connectors (A).

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4. Remove the TCM (A) after loosening the nuts.

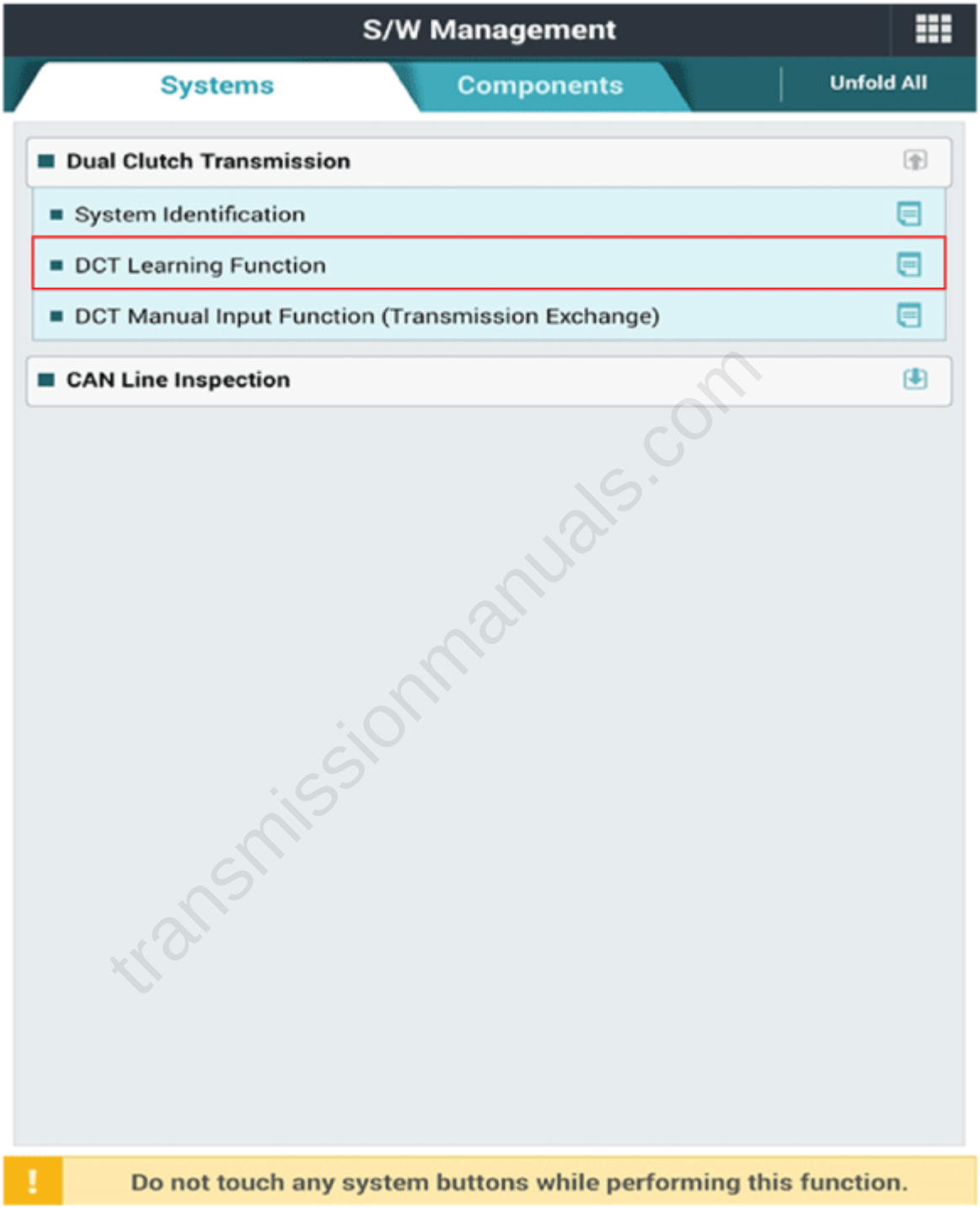


Installation

1. Install in the reverse order of removal.

NOTICE

Perform the clutch touch point learning procedure using the KDS after replacing TCM.



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Dual Clutch Transmission Control System
Description and operation Description The Dual Clutch Transmission (DCT) control system measures data required for identifying the state

Clutch Actuator Assembly
Components and components location Component Location 1. Clutch actuator assembly 2. Fork cover Specifications

of control target and computes the appropriate ... Specification ...

Other information:

Kia Forte 2019-2023 (BD) Service Manual: Front Door Window Glass

Components and components location Component Location 1. Front door window glass Repair procedures Replacement 1. Remove the front door trim. (Refer to Front Door - "Front Door Trim") 2. ...

Kia Forte 2019-2023 (BD) Service Manual: Seat Heater Unit

Components and components location Components Front Seat Heater 1. Front seat heater unit 2. Front heat & ventilation unit 3. Front seat back heater 4. Front seat cushion heater Rear Seat Heater 1. Rea ...

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