

Subject

03 - 09 4Runner 4WD System Diagnosis

Market

USA

Service Category

Drivetrain

Section

Transfer/4wd/Awd

Applicability

03 - 09 4Runner V6

APPLICABLE VEHICLES

03-09 4Runner V6

CONDITION

4WD system is inoperative.

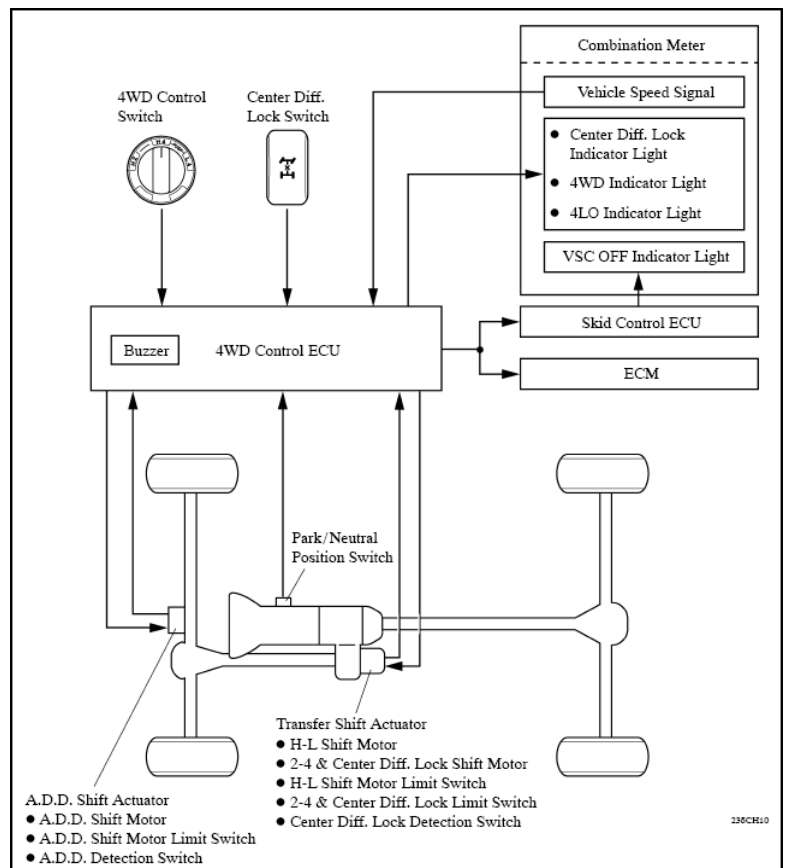
RECOMMENDATIONS

- Understand the basic operation of the system.

BASIC SYSTEM OPERATION

1. Driver requests a 4WD operation.
2. 4WD ECU receives request, flashes the 4WD light while executing request.
3. 4WD ECU notes the 4WD system current status based on electrical inputs and sends a command to the actuators based on current status and driver request.
4. 4WD ECU confirms executed command by monitoring electrical inputs and stops flashing the light when it confirms it achieved the requested position.

NOTE: The 4WD ECU determines the mechanical status of the 4WD system based on electrical inputs, but it is not possible for the ECU to tell you which input is not matching the requested position. The procedure on this Tech Tip will assist you with this.



- After completing this procedure you should be able to confirm the **Mechanical** and **Electrical** status of the 4WD system.
- Once you have this knowledge you will be able to determine which electrical input into the 4WD ECU does not match the mechanical status hence the blinking light.
- Print out a 4WD system EWD for your vehicle and proceed with the inspection procedure.

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Inspection procedure

1. Place vehicle on the hoist with wheels off the ground, start engine and place the transmission in drive (1st if manual transmission) Duplicate and maintain customer concern.
2. During this step you may have to move the selector switch to 2WD, 4HI or 4LO to duplicate the concern, once the switch is in a position where the concern is being duplicated, leave it in that position for the remainder of the procedure.
3. Verify the mechanical status of the 4WD system in the following way: see what is turning and what is not turning. Refer to the following possibilities:
 - a. Rear wheels and front wheels are turning.
 - The system is in 4wd
 - Verify if the system is in 4LO and if the center differential is engaged (see helpful hints below)
 - b. Only rear wheels are turning and the front ADD is not engaged
 - The system is in 2WD
 - c. Only rear wheels are turning and the front ADD is engaged
 - Transfer case is in 2WD but the front differential is engaged
 - d. Only rear wheels and front shaft are turning
 - Transfer case is in 4WD but the front differential is not engaged

NOTE:

If the 4WD system is inoperative while driving on the road but it works normally on the hoist when the wheels are off the ground, then consider: uneven tire wear, inflation pressure or multiple tire size being used.

4. Do not shut engine off, keep vehicle on the hoist, engine running, transmission in drive.
5. While still maintaining the 4WD system concern, proceed with checking the voltages on the input terminals at the 4WD ECU.
6. Use a DVOM. Do not change the position of the selector switch while making your voltage checks, during this step we are trying to determine where the system is electrically during the concern. Use next page to enter your results and compare to reference table.

CAUTION:

Irreparable damage to the transfer case actuator may result when the proper precautions and repair procedures are NOT followed. Follow link to TSB DL001-04 below.

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ENTER YOUR RESULTS HERE

Check all that apply to determine mechanical status

- Rear wheels are turning
- Front shaft is turning
- Front wheels are turning
- Center differential is engaged *
- Front differential is engaged*
- System is in 4LO*

*see helpful hints below

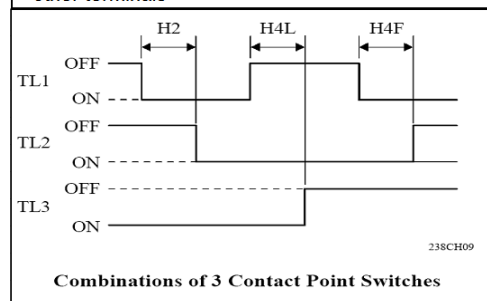


2-4	
LO	
DL	
DD	
DL2	
DL1	
P1	
HL1	
HL2	
TL3	
TL2	
TL1	
L4	

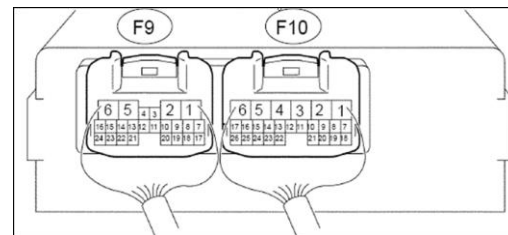
REFERENCE TABLE

	2HI	4HI	4HLK	4LO	4LLK
2 4	closed	0.6	0.6	open	open
LO	open	0.6	0.6	closed	closed
DL	open	open	closed	open	closed
ADD	open	closed	closed	closed	closed
DL2	open	closed	closed	closed	closed
DL1	closed	open	open	open	open
P1	open	open	closed	open	closed
HL1	open	open	open	closed	closed
HL2	closed	closed	closed	open	open
TL3	closed	open	closed		
TL2	open	closed	closed		
TL1	closed	closed	open		
L4	B+	B+	B+	0V	0V

- Open=open circuit, reads battery voltage
- Closed= closed circuit, reads 0 volts
- L4=output signal to inform other ECUs that the system is in 4LO
- P1 may have lower voltage than other terminals



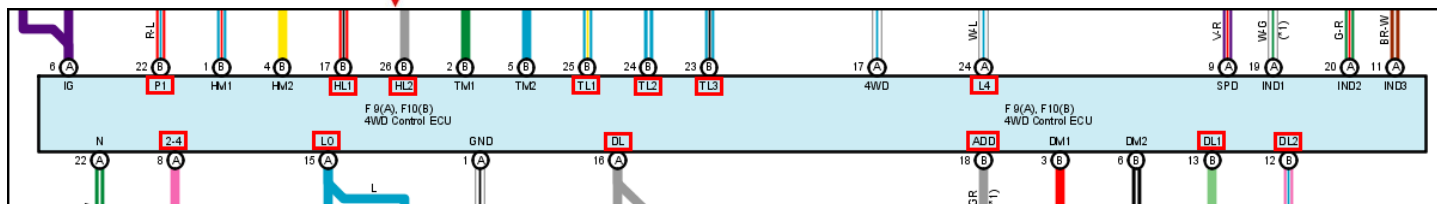
Combinations of 3 Contact Point Switches



4WD ECU location: Passenger side kick pane

Connect this lead to the negative side of the battery or a "known good" ground.

Use positive lead to back probe each input terminal at the 4WD ECU.



NOTE:
Also be sure to check 4WD ECU power and ground circuits and neutral input if selecting 4LO.

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Helpful hints:

1. To determine if the center differential is engaged or not, turn the rear shaft by hand and note which direction the front shaft turns. If it turns in the same direction, the center differential is engaged. If it turns in the opposite direction then the center differential is disengaged.
2. To determine if the front differential is engaged, turn the front wheels by hand and see if the front shaft turns.
3. When the transfer case is in 4LO, speed is limited to about 10-15 MPH.
4. When shifting to 4LO, the transmission must be in neutral and vehicle speed at 0 MPH, otherwise the buzzer will sound.
5. For more information on this system see 03MY 4Runner NCF on TIS. Follow link below

LINK REFERENCES

- [TOYOTA 2009 4Runner Electronic Wiring Diagram \(EM10X0U\) \(2009 4Runner\)](#)
- [4WD System \(2003 4Runner\)](#)
- [DL001-04: 03-04 4Runner V6: 4WD ECU Service Precautions \(Revised\)](#)