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2017 FORD Ranger Double Cab OEM Service and Repair Workshop Manual

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	REFER to: Charging System - 3.3L Duratec-V6/5.0L 32V Ti-VCT (414-00 Charging System - General Information, Diagnosis and Testing).

A4 CHECK GROUND TO THE TCCM (TRANSFER CASE CONTROL MODULE)

- Ignition OFF.
- Disconnect TCCM (transfer case control module) C2371B.
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C2371B-7	Ω	Ground

Is the voltage between 11 and 14 volts?

Yes	GO to A6

No	GO to A5

A5 CHECK VOLTAGE SUPPLY TO THE TCCM (TRANSFER CASE CONTROL MODULE)

Positive Lead	Measurement / Action	Negative Lead
C2371B-7	V	Ground

Is the voltage between 11 and 14 volts?

Yes	REPAIR the ground circuit. CLEAR all CMDTC (continuous memory diagnostic trouble code) s.

the ELD (electronic locking differential) is locked, the indicator illuminates steadily. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
TCCM (transfer case control module) P185D:00	Differential Lock-Up Control Circuit Performance: No Sub Type Information	The TCCM (transfer case control module) sends a signal to the lock up solenoid to lock the differential. After several unsuccessful attempts, the TCCM (transfer case control module) sets this DTC (diagnostic trouble code) alerting the driver the ELD (electronic locking differential) is inoperative. Fault may be due to a wheel speed condition or due to a mechanical failure within the driveline / axle subsystem.

Possible Sources

- Wiring, terminals or connectors
- ELD (electronic locking differential) field coil

B1 CHECK THE ABS (ANTI-LOCK BRAKE SYSTEM) MODULE WHEEL SPEED SENSOR PID (PARAMETER IDENTIFICATION)S

NOTE

Make sure the battery is fully charged before carrying out this pinpoint test.

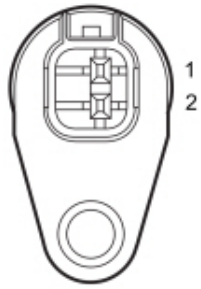
- Enter the following diagnostic mode on the scan tool: ABS (anti-lock brake system) Module Datalogger
- While driving the vehicle at 30 km/h (18 mph), monitor the following wheel speed sensor PID (parameter identification) s:
  - Left Front Wheel Speed Sensor (LF_WSPD)
  - Left Rear Wheel Speed Sensor (LR_WSPD)
  - Right Front Wheel Speed Sensor (RF_WSPD)
  - Right Rear Wheel Speed Sensor (RR_WSPD)
- Compare the speedometer reading to the wheel speed sensor PID (parameter identification) s.

Do the wheel speed sensor PID (parameter identification) s and speedometer speeds match within 1.5 km/h (1 mph)?

Yes	GO to B2

B3 CHECK THE ELD (ELECTRONIC LOCKING DIFFERENTIAL) FIELD COIL GROUND

- Measure:

Positive Lead	Measurement / Action	Negative Lead
 E197495 ELD (electronic locking differential) field coil pin 2 component side	Ω	Ground

Is the resistance less than 3 ohms?

Yes	To repair the rear differential, REFER to: Differential Carrier - Vehicles With: Electronic Locking Differential (ELD) (205-02A Rear Drive Axle/Differential - Vehicles With: Ford 8.8 Inch Ring Gear, Disassembly and Assembly). REFER to: Differential Carrier - Vehicles With: Electronic Locking Differential (ELD) (205-02B Rear Drive Axle/Differential - Vehicles With: Ford 9.75 Inch Ring Gear, Disassembly and Assembly). . CLEAR the DTC (diagnostic trouble code) s.

No	REPAIR the circuit.

C1 CHECK FOR TCCM (TRANSFER CASE CONTROL MODULE) DTC (DIAGNOSTIC TROUBLE CODE)S

- Ignition ON.
- Set the ELD (electronic locking differential) MSS (mode select switch) to OFF.
- Enter the following diagnostic mode on the scan tool: TCCM (transfer case control module) Self-Test.

Are any DTC (diagnostic trouble code) s present?

Yes	For DTC (diagnostic trouble code) P187C:00, GO to C4 For DTC (diagnostic trouble code) P187D:00, GO to C2 For all other DTC (diagnostic trouble code) s, REFER to the DTC (diagnostic trouble code) Chart: TCCM (transfer case control module) .
No	VERIFY the customer concern and GO to the Symptom Chart.

C2 CHECK FOR TCCM (TRANSFER CASE CONTROL MODULE) DTC (DIAGNOSTIC TROUBLE CODE)S WITH THE ELD (ELECTRONIC LOCKING DIFFERENTIAL) FIELD COIL DISCONNECTED

- Ignition OFF.
- Disconnect ELD (electronic locking differential) Field Coil C4359.
- Ignition ON.
- Set the ELD (electronic locking differential) MSS (mode select switch) to OFF.
- Enter the following diagnostic mode: TCCM (transfer case control module) Self-Test.

CLEAR the DTC (diagnostic trouble code) s. REPEAT the self-test. Does DTC (diagnostic trouble code) P187D:00 return?

Yes	GO to C3
No	INSTALL a new ELD (electronic locking differential) field coil. REFER to: Differential Carrier - Vehicles With: Electronic Locking Differential (ELD) (205-02A Rear Drive Axle/Differential - Vehicles With: Ford 8.8 Inch Ring Gear, Disassembly and Assembly). REFER to: Differential Carrier - Vehicles With: Electronic Locking Differential (ELD) (205-02B Rear Drive Axle/Differential - Vehicles With: Ford 9.75 Inch Ring Gear, Disassembly and Assembly). CLEAR the DTC (diagnostic trouble code) s.

No	REPAIR the circuit.

C5 CHECK FIELD COIL GROUND CIRCUIT

- Measure:

Positive Lead	Measurement / Action	Negative Lead
C4359-2	Ω	Ground

Is the resistance less than 3 ohms?

Yes	GO to C6

No	REPAIR the circuit.

C6 CHECK FOR CORRECT TCCM (TRANSFER CASE CONTROL MODULE) OPERATION

- Ignition OFF.
- Disconnect and inspect all TCCM (transfer case control module) connectors.
- Check for the Following:
- Connect all TCCM (transfer case control module) connectors. Make sure they seat and latch correctly.
- Operate the system and verify the concern is still present.

Is the concern still present?

Yes	INSTALL a new TCCM (transfer case control module) , REFER to: Transfer Case Control Module (TCCM) (307-07A Four-Wheel Drive Systems, Removal and Installation).

No	The system is operating correctly at this time. Concern may have been caused by a loose or corroded connector. ADDRESS the root cause of the connector or pin issues.

C4359-1	V	Ground

Is any voltage present?

Yes	GO to D2

No	To repair the rear differential,

D2 CHECK THE ELD (ELECTRONIC LOCKING DIFFERENTIAL) FIELD COIL CIRCUIT FOR A SHORT TO VOLTAGE

- Ignition OFF.
- Disconnect TCCM (transfer case control module) C2371B.
- Ignition ON.
- Measure:

Positive Lead	Measurement / Action	Negative Lead
C4359-1	V	Ground

Is any voltage present?

Yes	REPAIR the circuit.

No	GO to D3

D3 CHECK THE TCCM (TRANSFER CASE CONTROL MODULE) REAR LOCKING DIFFERENTIAL PWM OUTPUT CONTROL (DIFF_PWM_OS) PID

- Ignition OFF.
- Connect PWM (pulse width modulation) Field Coil C4359.

Normal Operation and Fault Conditions The TCCM (transfer case control module) communicates directly on the HS-CAN2 (high-speed controller area network 2) network with the ATCM (all terrain control module) , ABS (anti-lock brake system) module, and GWM (gateway module A) . The TCCM (transfer case control module) communicates with the PCM (powertrain control module) , TCM (transmission control module) , and BCM (body control module) on the HS-CAN1 (high-speed controller area network 1) network via the GWM (gateway module A) . The TCCM (transfer case control module) communicates with the IPC (instrument panel cluster) on the HS-CAN3 (high-speed controller area network 3) network via the GWM (gateway module A) . The TCCM (transfer case control module) sets a DTC (diagnostic trouble code) for lost communication when it has not received messages from the suspect module for more than 5 seconds with ignition in RUN and battery voltage in range. Other modules that require data from the suspect module may also set a lost communication DTC (diagnostic trouble code) if the fault is common to both receiving modules. **DTC Fault Trigger Conditions**

DTC (diagnostic trouble code)	Description	Fault Trigger Condition
TCCM (transfer case control module) U0100:00	Lost Communication With ECM/PCM 'A': No Sub Type Information	Sets in continuous memory in the TCCM (transfer case control module) if powertrain data messages received from the PCM (powertrain control module) over the HS-CAN (high-speed controller area network) are missing for longer than 5 seconds with ignition in RUN and battery voltage in range.
TCCM (transfer case control module) U0101:00	Lost Communication with TCM: No Sub Type Information	Sets in continuous memory in the TCCM (transfer case control module) if powertrain data messages received from the TCM (transmission control module) over the HS-CAN (high-speed controller area network) are missing for longer than 5 seconds with ignition in RUN and battery voltage in range.
TCCM (transfer case control module) U0121:00	Lost Communication With Anti-Lock Brake System (ABS) Control Module 'A': No Sub Type Information	Sets in continuous memory in the TCCM (transfer case control module) if ABS (anti-lock brake system) module data messages received from the ABS (anti-lock brake system) module over the HS-CAN (high-speed controller area network) are missing for longer than 5 seconds.
TCCM (transfer case control module) U0138:00	Lost Communication with All Terrain Control Module: No Sub Type Information	Sets in continuous memory in the TCCM (transfer case control module) if data messages received from the Terrain Management module through the GWM (gateway module A) are missing for 5 seconds or longer.

No	The system is operating correctly at this time. The DTC (diagnostic trouble code) may have been set due to high network traffic or an intermittent fault condition.

E3 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S FROM THE PCM (POWERTRAIN CONTROL MODULE) KOEO (KEY ON, ENGINE OFF) SELF-TEST

- Using a diagnostic scan tool, perform the PCM (powertrain control module) KOEO (key on, engine off) self-test.

Are any DTC (diagnostic trouble code) s recorded?

Yes	DIAGNOSE and REPAIR all suspect module DTC (diagnostic trouble code) , REFER to: Electronic Engine Controls (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14B Electronic Engine Controls - 3.3L Duratec-V6, Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14C Electronic Engine Controls - 3.5L EcoBoost (BM), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14E Electronic Engine Controls - 3.5L V6 PowerBoost (CN), Diagnosis and Testing). REFER to: Electronic Engine Controls (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Diagnosis and Testing). REFER to: Electric Powertrain Control (303-14F Electric Powertrain Control - 3.5L V6 PowerBoost (CN), Diagnosis and Testing).

No	GO to E4

E4 RETRIEVE THE RECORDED DTC (DIAGNOSTIC TROUBLE CODE) S FROM THE AWD (ALL-WHEEL DRIVE) MODULE SELF-TEST

- Using a diagnostic scan tool, perform the ATCM (all terrain control module) self-test.

Is DTC (diagnostic trouble code) P0562:00 or P0563:00 recorded?

Yes	REFER to: Controller Area Network (CAN) Module Communications Network(418-00A Controller Area Network (CAN) Module Communications Network, Diagnosis and Testing).

	Guided Routine available in the on-line Workshop Manual.. REFER to: Powertrain Control Module (PCM) (303-14A Electronic Engine Controls - 2.7L EcoBoost (238kW/324PS), Removal and Installation). REFER to: Powertrain Control Module (PCM) (303-14B Electronic Engine Controls - 3.3L Duratec-V6, Removal and Installation). REFER to: Powertrain Control Module (PCM) (303-14B Electronic Engine Controls - 3.3L Duratec-V6, Removal and Installation). REFER to: Powertrain Control Module (PCM) (303-14E Electronic Engine Controls - 3.5L V6 PowerBoost (CN), Removal and Installation). REFER to: Powertrain Control Module (PCM) (303-14D Electronic Engine Controls - 5.0L 32V Ti-VCT, Removal and Installation). REFER to: Inverter System Controller [SOBDMC] (303-14F Electric Powertrain Control - 3.5L V6 PowerBoost (CN), Removal and Installation).

No	The system is operating correctly at this time. The concern may have been caused by module connections. ADDRESS the root cause of any connector or pin issues.

E7 CHECK FOR CORRECT ATCM (ALL TERRAIN CONTROL MODULE) OPERATION