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Viewed:	11330		

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Title: 2010 MaxxForce 7, 9, 10 and DT Crank Inhibit Circuit Diagnostics

Applies To: 2010 and later emissions engines MaxxForce 7, 9, 10 and DT

Change Log

Please refer to the change log text box below for recent changes to this article:

06/19/2018 - Corrected DDS Operation Checks based on feedback.
10/03/2017 - Author updated for feedback purposes.
07/21/2015 - Fixed links to Circuit Diagram Manuals.

Description

Follow the instruction below for diagnosing the Crank Inhibit Circuit on all 2010 MaxxForce 7, DT, 9 and 10 engines.

Use the appropriate Circuit diagram when diagnosing the Crank Inhibit Circuit

WARNING:

Batteries expel explosive gases. Keep spark, flames, burning cigarettes or other ignition sources away at all times. Always wear safety glasses and a face shield when working near batteries to avoid personal injury or death.

WARNING:

To avoid personal injury or death, disconnect main negative battery cable before disconnecting or connecting electrical components. If both battery

cables are disconnected, always connect main negative battery cable last.

2010 MaxxForce 7

Please refer to latest circuit diagram manual found on Service Portal: CLICK HERE

Voltage Check at Start Relay and Starter Solenoid

Note: Connect Breakout harness 4908 between relay and relay socket, turn switch to crank and hold. Use DMM to measure voltage.

Test Point	Spec	Comment	Results
86 to GND	B+	If < B+, check power circuit to relay coil for open or short to GND, blown fuse, or possible failed ignition switch.	
85 to GND	< 2v	If B+, check SMC control circuit for OPEN. If extended cranking attempt preceded the no crank condition, wait 15 minutes for thermal overcrank switch to reset if present.	
87 to GND	B+	If < B+, Replace relay. If B+, check voltage at starter solenoid small control circuit wire terminal.	
Solenoid control to GND	B+	If < B+, Check wiring between pin 87 of relay and solenoid control terminal for Open circuit.	

Voltage Check at ECM

Note: Connect 180-Pin Breakout Box between ECM and chassis harness. Turn ignition switch to ON. Use DMM to measure voltage. When checkings DDS circuit place automatic transmission in park or neutral if manual transmission press in clutch.

Test Point	Spec	Comment	Results
C-97 to GND	B+	If < B+, check VIGN circuit for OPEN or short to GND, blown fuse, or possible failed ignition switch.	
C-86 to GND	0 V	If voltage is present, check for OPEN ECM GND circuit.	
C-83 to GND	B+	If < B+, check for OPEN ECM PWR circuit.	
C-60 to GND	B+	If < B+, check DDS for OPEN circuit. • For automatic transmission, see transmission diagnostics. • For manual transmission, check PWR circuit to clutch pedal or blown fuse. A failed clutch pedal switch is possible.	
C-64 to GND	< 2 V	If > 2 V, check ECM programming.	

Harness Resistance Check - ECM to Relay

Note: Turn ignition switch to OFF. Connect 180-Pin Breakout Box and Breakout Harness 4908. Leave ECM and relay disconnected. Use DMM to measure resistance.

Test Point	Spec	Comment	Results
85 to C-64	< 5 Ω	If > 5 Ω, check SMC control circuit for OPEN or possible failed thermal overcrank protection switch.	
85 to GND	> 1 kΩ	If < 1 kΩ, check SMC control for short to GND.	
87 to starter	< 5 Ω	If > 5 Ω, check SMC control for OPEN or possible failed thermal over crank protection switch.	
87 to GND	> 1 kΩ	If < 1 kΩ, check circuit for short to GND.	

Harness Resistance Check - Relay to Battery

Note: Disconnect both battery GND cables and the inline connector on battery ground cable. Disconnect start relay. Use DMM to measure resistance while holding ignition switch in CRANK position.

Test Point	Spec	Comment	Results
86 to GND	> 1 kΩ	If < 1 kΩ, check for short to GND.	
30 to B+ battery post	< 5 Ω	If > 5 Ω, check circuit for OPEN or blown fuse.	
30 to GND	> 1 kΩ	If < 1 kΩ, check for short to GND.	
C-60 DDS circuit		See Chassis Electrical Circuit Diagram Manual. Check for OPEN or short to GND. Possible failed clutch switch or automatic transmission module circuit faults.	

Operational Voltage Check

Note: Connect 180-Pin Breakout Box between ECM and chassis harness. Leave battery cables connected. Turn ignition switch to ON. Use DMM to measure voltage at the conditions specified.

Test Point	Spec	Comment	Results
DDSC-60 to GND	0 V	ECM Input - Clutch pedal not pressed or automatic transmission in gear. Cranking is disabled.	
DDSC-60 to GND	B+	ECM Input - Clutch pedal to the floor or automatic transmission in park or neutral. Cranking is enabled.	

Note: Turn the ignition switch to the Crank position. Use DMM to measure voltage.

Test Point	Spec	Comment	Results
SMCC-64 to PWR	0 V	ECM Control - SMC enabled. To enable SMC, fully depress clutch pedal or shift automatic transmission to park or neutral.	
SMCC-64 to PWR	B+		

		ECM Control - SMC disabled. To disable SMC, do not depress clutch pedal or place shifter of automatic transmission in gear.	

2010 MaxxForce DT, 9 and 10

Please refer to latest circuit diagram manual found on Service Portal: CLICK HERE

Voltage Check at Relay

Note: Connect Breakout Harness 4674 between relay and relay socket. Turn ignition switch ON. Use DMM to measure voltage.

Test Point	Spec	Comment	Results
30 to GND	B+	If < B+, check power circuit to relay switch for OPEN or short to GND, or blown fuse.	
Use DMM to measure voltage while cranking engine.			
86 to GND	B+	If < B+, check PWR circuit to relay coil for OPEN or short to GND, blown fuse, or possible failed ignition switch. For additional circuit information, see truck Chassis Electrical Circuit Diagram Manual and Electrical System Troubleshooting Guide	
85 to GND	< 2 V	If B+, check ECI control circuit for OPEN or failed thermal overcrank protection switch. If 4 V to 5 V, check DDS circuit to ECM, and go to Voltage Check at ECM.	
87 to GND	B+	If < B+, replace relay. If B+, check voltage at starter.	

Voltage check at ECM

Note: Connect 180-Pin Breakout box between ECM and chassis harness. Turn ignition switch ON. Use DMM to measure voltage.

Test Point	Spec	Comment	Results
C-31 to GND	B+	If < B+, check VIGN circuit for OPEN or short to GND, blown fuse, or possible failed ignition switch.	
C-2 to GND C-4 to GND C-6 to GND	0 V	If voltage is present, check for OPEN ECM GND circuit. Go to ECM PWR in this section of manual.	
C-1 to GND C-3 to GND	B+	If < B+, check for OPEN ECM PWR circuit. Go to ECM PWR in this section of manual.	

C-5 to GND			
Place automatic transmission in park or neutral (manual transmission, depress clutch). Use DMM to measure voltage.			
C-65 to GND	B+	If < B+, check DDS for OPEN circuit. • For automatic transmission, see transmission diagnostics. • For manual transmission, check PWR circuit to clutch pedal or blown fuse. A failed clutch pedal switch is possible.	
C-7 to GND	< 2 V	If > 2 V, check ECM programming.	

Harness Resistance Check – ECM to Relay

Turn ignition switch to OFF. Disconnect ECM. Leave relay disconnected. Connect 180-Pin Breakout Box and relay harness. Use DMM to measure resistance.

Test Point	Spec	Comment	Results
85 to C-7	< 5 Ω	If > 5 Ω, check ECI control circuit for OPEN or possible failed thermal overcrank protection switch.	
85 to GND	> 1 kΩ	If < 1 kΩ, check ECI control for short to GND.	
87 to starter	< 5 Ω	If > 5 Ω, check ECI control for OPEN or possible failed thermal overcrank protection switch.	
87 to GND	> 1 kΩ	If < 1 kΩ, check circuit for short to GND.	

Operational Voltage Check

Connect 180-Pin Breakout Box between ECM and chassis harness. Turn ignition switch to ON. Use DMM to measure voltage.

Test Point	Spec	Comment	Results
DDS C-65 to GND	0 V	ECM Input – Clutch pedal not depressed or automatic transmission in gear. Cranking is disabled.	
DDS C-65 to GND	B+	ECM Input – Clutch pedal to the floor or automatic transmission in park or neutral. Cranking is enabled.	
Use DMM to measure voltage while cranking engine.			
ECI C-7 to PWR	0 V	ECM Control – Engine Crank Inhibit Enabled	
ECI	B+		

C-7 to PWR		ECM Control – Engine Crank Inhibit Disabled	

Harness Resistance Check – Relay to Battery

Note: Disconnect both battery GND cables. Disconnect ECI relay and VIGN. Use DMM to measure resistance.

Test Point	Spec	Comment	Results
86 to VIGN	< 5 Ω	If > 5 Ω, check circuit for OPEN.	
86 to GND	> 1 kΩ	If < 1 kΩ, check for short to GND.	
30 to B+ battery post	< 5 Ω	If > 5 Ω, check circuit for OPEN or blown fuse.	
30 to GND	> 1 kΩ	If < 1 kΩ, check for short to GND.	
C-65 DDS circuit	See vehicle electrical diagrams. Check for OPEN or short to GND. Possible failed clutch switch or automatic transmission module circuit faults.		

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