



Countries: AUSTRALIA, BAHAMAS, BOLIVIA, BELIZE, CANADA, CHILE, COLOMBIA, COSTA RICA, DOMINICAN REPUBLIC, ECUADOR, EL SALVADOR, TRINIDAD AND TOBAGO, UNITED STATES, URUGUAY, VENEZUELA, MEXICO, ARUBA, NICARAGUA, PERU, PUERTO RICO, Curaçao, GUATEMALA, GUYANA, HAITI, HONDURAS, JAMAICA, PANAMA

Availability: ISIS
Major System: ELECTRICAL SYSTEM
Current Language: English
Other Languages: [Español](#),
Viewed: 6350

Document ID: IK0800407
Revision: 11
Created: 11/2/2012
Last Modified: 4/4/2016
Author: David Smith

[Less Info](#)

☒ Hide Details

Coding Information

Copy Link	Copy Relative Link	Bookmark	Add to Favorites	Print	Provide Feedback	Helpful	Not Helpful
		 View My Bookmarks				 38	 40

Title: Starter Diagnostics and Warranty Claim Procedure (Excl : ISB engine /Allison trans)

Applies To: All engine, all chassis, excl : ISB engine /Allison trans

CHANGE LOG

04/04/2016 - Changed applies to all engine, all chassis excl. ISB/Allison Transmission equipped vehicles
 03/14/2016 - Added link to Navistar Starter and Alternator Warranty Quick Reference Guide.
 11/18/2015 - Updated Author for feedback purposes.
 07/20/2015 - Moved diagnostic worksheet link to before step base diagnostic steps, simplified diagnostic steps
 04/14/2015 - Updated to new iKnow article criteria. Revised Diagnostic steps

DESCRIPTION

The following information details the procedure for proper starter diagnostics and requirements for warranty. Use of this document will increase confidence that the right repair is made with minimal downtime and requires the use of the MidTronics EXP tester and the Starter Diagnostic Worksheet.

Note : This **doesn't** cover **CE Bus/DuraStar/WorkStar** equipped with **ISB engines and Allison Transmissions**. See [IK0800503](#) .

SYMPTOMS

Diagnostic Trouble Codes:

DTC/Light	Description
N/A	

Customer Observations or Symptoms:

- Click, No-Crank (solenoid clicks, starter does not crank, engine is in a no crank; no start state)
- No-Click; No-Crank (solenoid does not click, stater does not crank, engine is in a no crank no start state)
- Slow Crank (control circuit working, solenoid working, starter cranks the engine, engine is in a slow or no start state from cranking to slow)

SPECIAL TOOLS / SOFTWARE

Tool Description	Tool Number	Comments
Midtronics EXP	EXP 1000 HD	Dealer essetial tool per SFN-07-77

-

DIAGNOSTIC STEPS

Following the step based procedure below will determine if there is an issue with a starter motor and help prevent warranty denials for No Trouble Found (NTF).

When testing for a Starter related failure, the technician will complete the proper [diagnostic worksheet](#). Critical diagnostic testing values are to be printed and submitted with the claim.

NOTE: Before performing any voltage drop test; inspect each cable end nut torque, insulation, routing, clipping, discoloration, and terminal arching

Step	Action	Decision
1	Diagnostic Trouble Code Check: Review current health report for fault codes that may cause an extended crank condition (Crankshaft Position Sensor, Camshaft Sensor, Fuel System, Electrical codes) Are there pending/active/previously active DTC's causing a crank no start?	Yes. Go to appropriate diagnostic manual to diagnose crank no start symptom
		No. Step 2
2	Manual Engine Barring Test: Have an assistant bar the engine over from the alternator pulley TIP: If an audible noise is heard from the starter area when the engine is rotated by hand, there is most likely flexplate ring gear damage. Does the engine rotate freely?	Yes. Step 3
		No. Diagnose engine lock up condition.
3	Cranking RPM Test: Monitor Engine RPM while cranking the engine Does the engine crank?	Yes. Go to appropriate crank no start diagnostic. Do NOT replace starter motor
		No. Step 4
4	Perform battery test: Follow IK0800482- Battery Testing, Diagnostics & Maintenance Is a warranty approval code (WAC) or failed battery result from any battery generated?	Yes. Replace ONLY failed battery and then recheck for symptom
		No. Step 5
5	Starter Cable Voltage Drop Test: Follow Midtronics starter cable voltage drop test Is combined + & - voltage drop greater than 0.5v?	Yes. Make required repair
		No. Step 6
6	Alternator Cable Voltage Drop Test:	Yes. Make required repair
		No. Step 7

Follow Midtronics alternator cable voltage drop test

Is combined + & - voltage drop greater than 0.5v?

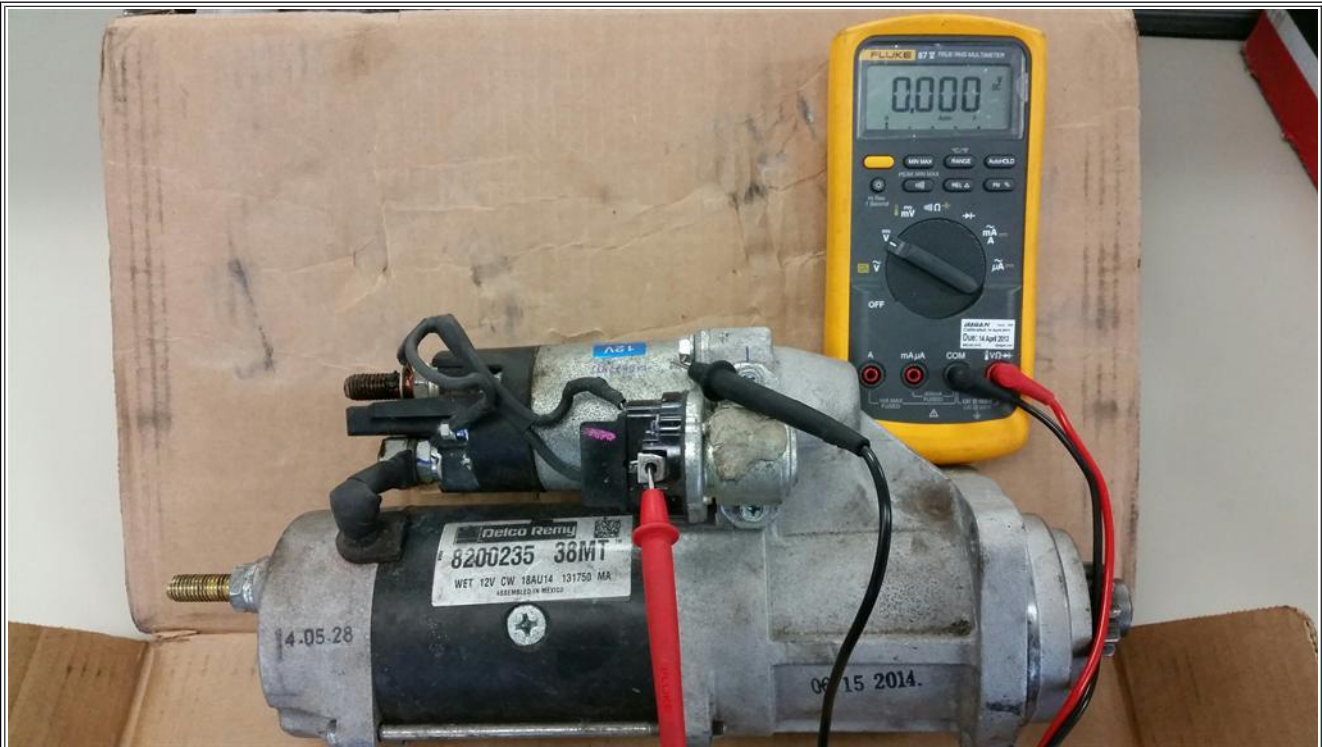


Figure 1: Starter IMS S terminal DVOM Hookup Location

Step	Action	Decision
7	Starter Control Circuit Check: Connect DVOM test leads on IMS (Mag switch) "S terminal" and ground to solenoid case as indicated in Figure 1 Have an assistant hold keyswitch in start position for 5 seconds. Compare DVOM to B+ at batteries Does the DVOM not read battery voltage +/-0.5 volts?	Yes. Perform starter control diagnostics for possible causes: <i>Wiring</i> <i>F3A Fuse</i> <i>Start Relay (Neutral Relay)</i> <i>Crank Inhibit Relay</i> <i>Clutch Switch (Manual Trans)</i> <i>TCM (Auto Trans)</i> <i>ECM</i> <i>Key Switch</i>
		No. Step 8

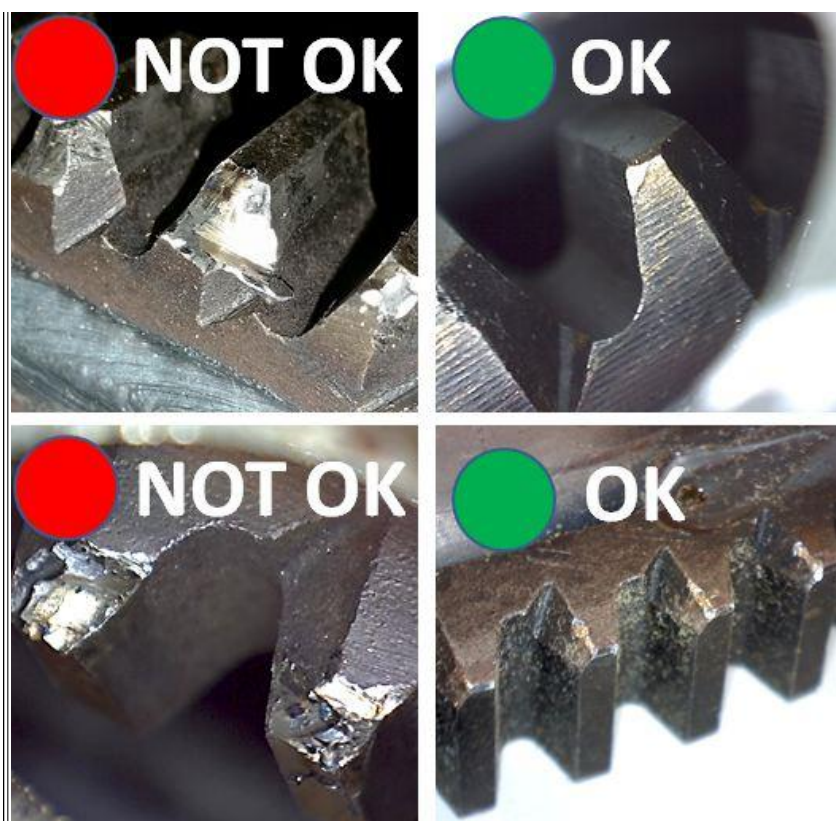


Figure 2 Flexplate/Flywheel Ring Gear

Step	Action	Decision
8	Ring Gear Inspection:	Yes. Step 9
	Remove starter	
	Mark the flexplate ring gear with a paint pen	
	Have an assistant bar the engine over while you inspect each tooth for damage: burrs, milling, chips, etc. (Figure 2)	No. Inspect each tooth
	TIP: This can be done as a one man operation using a borescope or by looking through the starter mount hole	
	Did all teeth get inspected?	

Step	Action	Decision
9	Repair Determination:	Yes. Replace ring gear & starter
		No. Replace starter
	Does the ring gear require replacement when comparing to Figure 2?	

WARRANTY INFORMATION

Warranty Claim Coding:

Group:	08540- Cranking System
Noun:	202- Motor, Starter

Standard Repair Times:

Description	Chassis	Engine	SRT	Hours
Starter Diagnostics	All Chassis	All Engines	Click Here	0.9

Special Requirements:

As of November 1, 2012:

When testing for a Starter related failure, the technician will complete the proper [diagnostic worksheet](#). Critical diagnostic testing values are to be printed and submitted with the claim.

A copy of the completed [diagnostic worksheet](#) should be retained with the warranty claim repair order.

All Starters replaced under Warranty (Warranty Codes 01,03,39,55 and 98) will be requested back to be reviewed and tested. Any which are found non-defective or unnecessarily replaced will be charged back to the dealer.

Also now available [Starter and Alternator Warranty Quick Reference User Guide](#)

Hide Details	Feedback Information
	Viewed: 6349 Helpful: 38 Not Helpful: 40
No Feedback Found	

Copyright © 2016 Navistar, Inc.