

Functional impairment of 48 V on-board electrical system

Topic number	LI54.10-P-069698
Version	8
Function group	54.10 Battery, power supply, voltage converter
Date	12-17-2020
Validity	Model series 257, 213, 238, 167, 290 with code B01
Reason for change	updating remedies
Reason for block	

Complaint:

Various causes are possible. The faults listed in the various causes do not all have to be present at all times. Some of these complaints may overlap. Rely on the faults listed in the Cause section for identifying the correct Remedy.

1. No start
2. Yellow or red instrument cluster message for 48 V on-board electrical system battery (G1/3)
3. Limp home mode, overheating, A/C not blowing cold, or loss of acceleration

Cause:

Cause 1: B183387 in DC/DC converter N83/1

Cause 2: B183349 and B183371 in 48V battery G1/3.

Cause 3: B183319 in 48V battery - hardware short circuit in 48V system

Cause 4: 48V battery detects abnormality and disconnects causing additional symptoms: Limp Home Mode, overheating, A/C not blowing cold, or loss of acceleration This cause will always have fault code in G1/3: B183371 but will Not have B183349.

Cause 5: Red battery light or check engine light: With B183214, B183216, or B183217 but Without B183371

Remedy:

Note: each of these remedies correspond to a specific cause. Make sure to match correct Cause with Remedy.

Remedy 1:

M256 update software in G1/3 using either AddOn 17762 (DVD0920) or AddOn 17763 (DVD1220)

M177/M176:

- a. If first visit pull Quick Test
 - i. If fault code is B183387 in N83/1 (regardless of other faults) - replace only 48V battery
- b. If second visit open PTSS case

XENTRY TIPS

Remedy 2:

1. Check software version in battery. If 19/46 000 replace only 48V battery (regardless of other faults)
2. Update DC/DC converter N83/1 if later software is available.
3. If software version is Not 19/46 000, open a PTSS case.

Remedy for 3:

1. Disconnect the 48V battery.
2. Remove terminal 40 on 48V battery to DC/DC converter N83/1.
3. Check in XD if error code still present?

If yes, replace 48V on-board power battery G1/3 and settle for damage key 540HY73.

If no, short must be outside the 48 V line battery. Possibly causes are the cables, screw connections, or 48V components.

--Disconnect all 48V components one at a time.

--Check after disconnecting each component if the error code "B183319" is still in the 48V battery G1/3.

--If after disconnected the fault is gone, or the vehicle can be started, the disconnected component is defective and should be replaced.

PRELIMINARY MEASURES required for Remedy 4 and 5.

NOTE: It is imperative to document each one of these steps in detail. Some of the remedies will require opening a PTSS case. This information is vital in helping to expedite the diagnostic process.

- Make sure Add-ons are up to date in Xentry Machine
- Before clearing faults or road test: pull initial Quick Test and DC/DC CUL.
- Road test to attempt to duplicate fault before proceeding below. Test drive with multiple ECO stop/starts and under as many various driving styles as possible: manual, automatic, slow, aggressive, Comfort, Sport+, etc. SAFETY is more important than testing. Please proceed with caution.
- Upload all below documentation and perform testing:
- Make sure to indicate in file names or descriptions the order the uploaded documents occurred.
- Quick Test and DC/DC Control Unit log (after test drive)
- Complete guided test(s) and subsequent physical layer inspection.
- Detach line between DC/DC converter N83/1 and 48 V on-board electrical system battery. Check for: damage, soiling, corrosion, and check resistance of all cable pins (should <0.2 ohms).
- Remove and inspect all cables into/out of DC/DC converter.
- Note: ISA and ISG terms both refer to same component: Integrated Starter Alternator and Integrated Starter Generator
- Additional docs required for each Remedy

XENTRY TIPS

Remedy 4:

1. In XD go to N10/6 FSAM, on-board electrical data, conspicuous data. Locate date/time of complaint.
2. Review Fault Driving Cycle check if Excess current is or is not highlighted in Red. Then we have two options Excess Current or No Excess current.
3. First option if highlighted in Red (or this is the second visit for this complaint) create with a PTSS case with the following:

A) Ask the customer about the driving situation: highway or in the city, during start/stop, acceleration, or constant speed, approximate speed, additional details?

B) Complete guided test(s) for every fault code--not just 48V

C) DC/DC control unit log

D) ISA performance data from the N129 control unit under Special Procedures, then "Procedures for support queries to market support", "Collation of diagnosis performance data", and select "engine at idle".

--After next screen loads with data click continue. The next screen will show where the .CSV file is located in your Xentry. Navigate to this location and upload this CSV file to the case.

--Note it is important this is a .CSV file extension and Not a screenshot or print of the data values.

4. Second option if excess current is NOT highlighted in Red (text is currently black) then:

Check for 48V terminal40/41 connections with following instructions

Check each screw connection on a fixed seat:

Can the cable lug be moved? Is it wobbling? Are deformations on the cable lug? Are discolorations, signs of overheating visible? Are paint residues or dirt visible on the bolt or cable lug?

There two types of ground bolts M6 and M8:

For M6 bolts with paint-scraping nut, the thread cuts into the paint and the current flows through the nut and the thread into the bolts. No further contact surface on the bolt is required!

If one of these is suspected of causing a contacting problem, this must be reported in the PTSS case.

For M8 ground points, the current flows through the contact surface between the bolt foot and the cable lug. For this reason, a clean contact surface must also be taken into account.

Review for the following chassis:

BR167

-W106/1 (circuit 41 on battery)

-F153/2 (Pre-fuse box engine compartment to DCDC converter terminal 40)

XENTRY TIPS

-F150/2 A2 (Pre-fuse box battery circuit 30)

BR213/257

-F153/2 (Pre-fuse box engine compartment circuit 40)

-Powerpack 48V (circuit 30 and 31)

-W106/2 (battery grounds)

-W106/3

-N129 (ISA circuit 40 and 41)

-W30/11

Review 48V cables and control unit connectors must be checked for the following properties:

- Is the plug firmly locked?
- Are the contact pins in the plug locked?
- Are there signs of mechanical damage to the plug or pins (e.g. due to improper repair attempts, etc.)
- Are there traces of water, corrosion or traces of thermal overload?
- Check lines for damage such as abrasion, animal bites or other types of damage.
- Check all 48V screw and plug connections on each component present in the vehicle:
- Circuit 40/41 cables on components:
 - Check circuit 40/41 M8 bolts should 16N-m

If after reviewing the above nothing is found the vehicle can be released to the customer.

If any abnormalities open a PTSS case with preliminary documentation requested.

Remedy for 5: Red battery light or check engine light: With B183214, B183216, or B183217 but Without B183371

- a. Check ground point W106/x or W30/11 exactly (correct torque, damage, soiling)
- b. Test drive.
 - i. If reproducible:
 1. unplug each 48V component circuit 40 one at time on F153/2.
 2. Start vehicle and check if any 48V components - except the unplugged ones - are detected as faulty. Do not test vehicle for extended periods due to unpowered components such as coolant pump.
 3. If faults clear after disconnecting a component - replace that component.
 4. Retest.
 - ii. If cannot reproduce = open PTSS case

Attachments

XENTRY TIPS

File	Description
Excess Current.png	Excess current in N10/6 conspicuous data

Symptoms
Overall vehicle / Power supply / Battery/On-board electrical system / Battery function / Battery discharges
Overall vehicle / Power supply / Battery/On-board electrical system / Battery/on-board electrical system display message / Battery/Alternator - Serviced Required

Control unit/fault code		
Control unit	Fault code	Fault text
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183301	The battery for the 48V on-board electrical system has a malfunction. There is a general electrical fault. (LIB48_222)
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183217	The 48V on-board electrical system has a malfunction. The limit value for electrical voltage has been exceeded.
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183216	The 48V on-board electrical system has a malfunction. The limit value for electrical voltage has not been attained.
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183301	The battery for the 48V on-board electrical system has a malfunction. There is a general electrical fault.
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183214	The 48V on-board electrical system has a malfunction. There is a short circuit to ground or an open circuit. (LIB48_222)
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183216	The 48V on-board electrical system has a malfunction. The limit value for electrical voltage has not been attained. (LIB48_222)
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183217	The 48V on-board electrical system has a malfunction. The limit value for electrical voltage has been exceeded. (LIB48_222)
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183371	The battery for the 48V on-board electrical system has a malfunction. The actuator is blocked. (LIB48_222)
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183319	The battery for the 48V on-board electrical system has a malfunction. The limit value for current has been exceeded. (LIB48_222)
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183214	The 48V on-board electrical system has a malfunction. There is a short circuit to ground or an open circuit.
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183319	The battery for the 48V on-board electrical system has a malfunction. The limit value for current has been exceeded.
N83/1 - DC/DC converter (DDW) (DCDC48_222)	B183371	The battery for the 48V on-board electrical system has a malfunction. The actuator is blocked.

Operation numbers/damage codes				
Op. no.	Operation text	Time	Damage code	Note
			540HY 73	Battery 48 V on-board electrical system - electrical fault
			5416D 73	DC/DC converter 48 V on-board electrical system