

Functional impairment of 48 V on-board electrical system

Topic number	LI54.10-P-069698
Version	5
Function group	54.10 Battery, power supply, voltage converter
Date	10-19-2020
Validity	Model series 257, 213, 238, 167, 290 with code B01
Reason for change	updating remedies
Reason for block	

Complaint:

1. Instrument cluster message 48 V on-board electrical system battery (G1/3) in yellow or red
2. Vehicle does not start
3. Limp home mode due to high engine operating temperatures

Cause:

Cause 1/6: Communication error between 48 V on-board battery G1/3 and DC/DC converter: B183387 in DC/DC converter N83/1

Cause 2/6: Always create PTSS case - Limp home mode with additional symptoms: overheating, A/C blowing hot, and loss of acceleration with fault code: B183371 The battery for 48V on-board electrical system has a malfunction. The actuator is blocked.

Note: this fault code may include additional 48V system consequential faults although B183371 is the primary root cause.

Cause 3/6: Red battery light or check engine light without fault B183371

Cause 4/6: Battery Not found in Quick Test.

Cause 5/6: Fault B183301 in DC/DC or B183349 in 48V battery.

Cause 6/6: B183319 in 48V battery - hardware short circuit in 48V system

Remedy:

Preliminary measures 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
- Complete guided test(s) and subsequent physical layer inspection.
- Confirm all 48v components can be actuated via Xentry guided tests: A1 = M75 electrical coolant pump, A2 = M60 Electrical turbo, A3 = A9/5 electric refrigerant (A/C)
- Test 12V with Xentry Battery Tester in FSAM

XENTRY TIPS

- 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 be nearly 0.2 ohms).
- Road test to attempt to duplicate fault. Test drive 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.
- Make sure to indicate in file names or descriptions the order the uploaded documents occurred.
- If complaint cannot be replicated and this is vehicle's first visit clear all fault codes, save new quick test, field test for 20 miles with varying driving styles, and then open PTSS case.
- Upload all relevant documentation from above including:
 1. Screenshots showing completed guided test(s) for Every fault code
 2. Initial quick test
 3. DC/DC Control Unit log

Remedy 1/6 -- if (No start)

- a. If first visit pull Quick Test
 - i. If fault code is B183387 in DC/DC converter N83/1 - replace battery
- b. If second visit open PTSS case

Remedy 2/6 -- if limp home: CEL, overheating, loss of power/acceleration, etc. - Create PTSS case with:

1. Review all 48V component wiring and connectors
2. Check and document circuit 40 from ISA to Battery for resistance
3. Confirm all 48V components can be actuated via Xentry guided tests
4. Confirm completed guided test(s) for every fault code--not just 48V
5. At the screw connections of the Phases of ISA: Use torque wrench to release the bolts to see what the release torque is on each bolt. Document for case. Retorque to 11N-m.
6. DC/DC control unit log
8. Recent 48V Conspicuous Data from FSAM
9. If any faults in ISA control unit:
 - 9a. Upload ISA performance data from the N129 control unit under Special Procedures, then "Procedures for support queries to market support", "Collation of diagnosis performance data".
 - 9b. We need both "engine at standstill" and at "engine at idle" downloaded in a .CSV format. Must be in .CSV format.
 - 9c. VERY IMPORTANT: take both data from BEFORE and then AFTER clearing faults in ISA.
- 9d. 4 total .CSV files = 2 from BEFORE DTCs are deleted (standstill / idle) AND 2 from AFTER DTCs are deleted (standstill / idle).
10. Clear all faults and test drive for 20 miles.
11. Open PTSS case with above information

Remedy for 3/6 Battery light or CEL (without limp home mode)

XENTRY TIPS

- a. If faults any of these faults exist (WITHOUT B183371): B183214, B183216, or B183217
- b. Check ground point W106/x or W30/11 exactly (correct torque, damage, soiling)
- c. Test drive.
 - i. If reproducible:
 1. unplug all 48 V components individually (on F153/2 disconnect the individual components of circuits 40) and perform a test drive each time.
 2. After each test drive, run a quick test to check if any of the 48 V components - except the unplugged ones - are detected as faulty.
 - a. Try to actuate all components that are still connected.
 3. If unable to actuate or detected faulty = replace component.
 4. Retest.
 - ii. If cannot reproduce = release

Remedy for 4/6 and 5/6

- a. if 48v battery not found in quick test even though wiring harness G1/3 to N83/1 has no faults
- b. OR if fault B183301 in DC/DC
- c. OR if fault B183349 in 48v
 - i. Replace battery only
 - ii. Update DC/DC converter N83/1 if later software is available.

Remedy for 6/6

1. Disconnect the 48V battery.
2. Remove terminal 40 (plus 48-V) to DC/DC converter N83/1.
3. Error code still present?

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

If no:

1. Short must be outside the 48 V line battery - possibly in the cables, screw connections, or components.
2. All 48V components in the series (depending on the equipment) must be disconnected one at a time. If after disconnecting of a component the error code "B183319" in 48 V on-board power battery G1/3 is deleted or the vehicle can be started, this component is defective and should be replaced

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

XENTRY TIPS

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.

Parts						
Part number	ES1	ES2	Designation	Quantity	Note	EPC
A 000 982 67 14			48 V on-board electrical system battery (48 V LIB) G1/3	1		X
A 789 906 16 00			DC/DC converter (DDW) N83/1			X

Operation numbers/damage codes				
Op. no.	Operation text	Time	Damage code	Note
			540HY 73	Battery 48 V on-board electrical system - electrical fault
			09803 **	Electric additional compressor - not determinable
			1500X 92	Integrated starter alternator short circuit
			5416D 73	DC/DC converter 48 V on-board electrical system