

Preview Solution CBR-2495-4

Carb 24 Phase 1 - 48V Diagnostics Guide

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Valid for

Volvo Chassis - VNL and VNR

Mack Chassis - AN and GR

Model Year - 2023 to 2024 (CARB 2024 only)

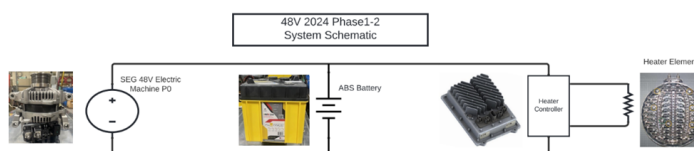
Overview

The purpose of the 48V EATS heater system is to provide additional heat to the exhaust stream allowing the EATS to become active earlier during a cold start and during engine operation that produces low exhaust gas temperatures. The key components of the 48V heater system are the:

- Electric Machine (48V Alternator)
- 48V Lithium Ion Battery
- EHCM (Eaton Heater Control Module)
- Heater element in the EATS assembly

The Electric Machine, battery and EHCM are wired in parallel. Nominal 48V is only present with the ignition ON with certain fault codes not being present. Many 48V faults will NOT turn ON the 48V system and no 48V will be measured at any of the above components.

The 48V battery will NOT have 48V present at the battery posts with the engine OFF and Ignition key OFF. **Checking voltage with ignition key OFF does not indicate a dead battery.**



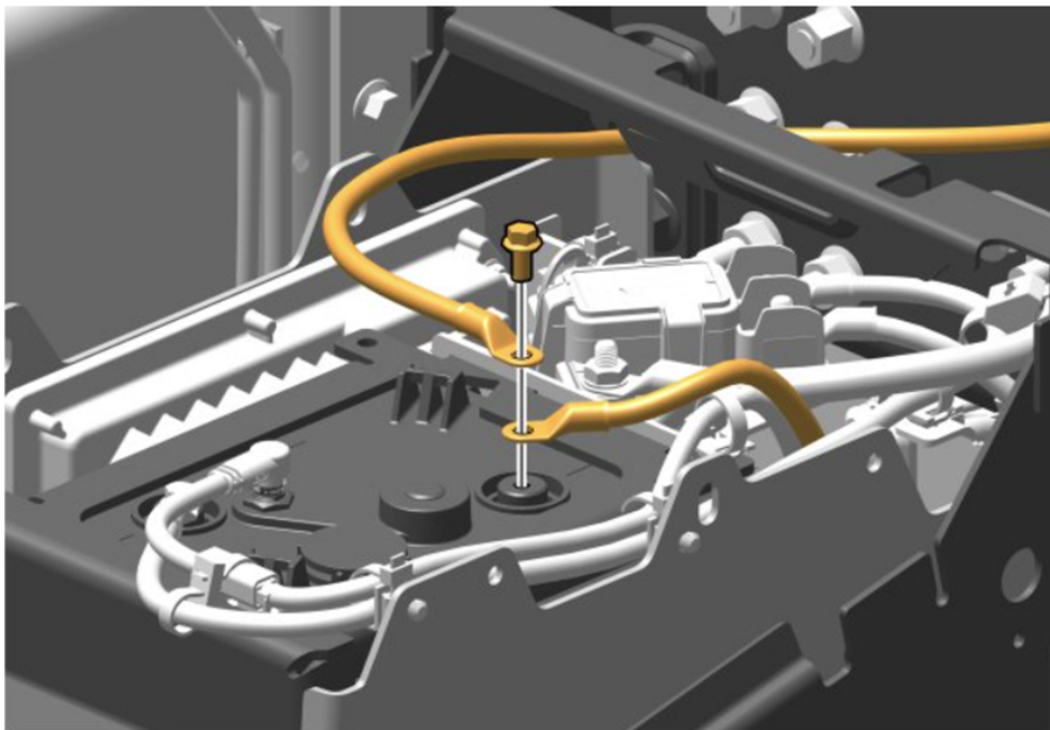
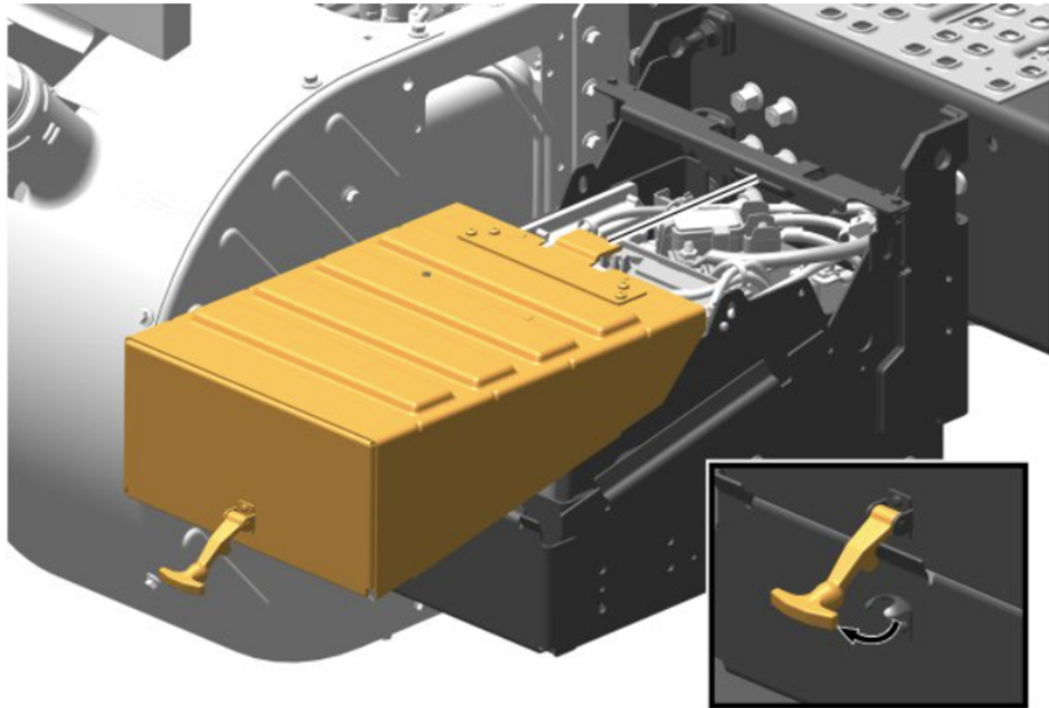
More detailed information on the operation of the 48V heater system can be found in impact under Description, Design and Function:

- Function Group 25: For information on EATS heater system
- Function Group 31: For information on 48V Battery

- Function Group 321: For information on 48V Electric Machine (alternator)

Diagnostics

The first step when diagnosing ANY 48V system faults starts by observing the LED push button/light located on top of the 48V battery located in the CARB box on the frame rail of the truck. The aluminum CARB box cover must be removed to view the battery LED.

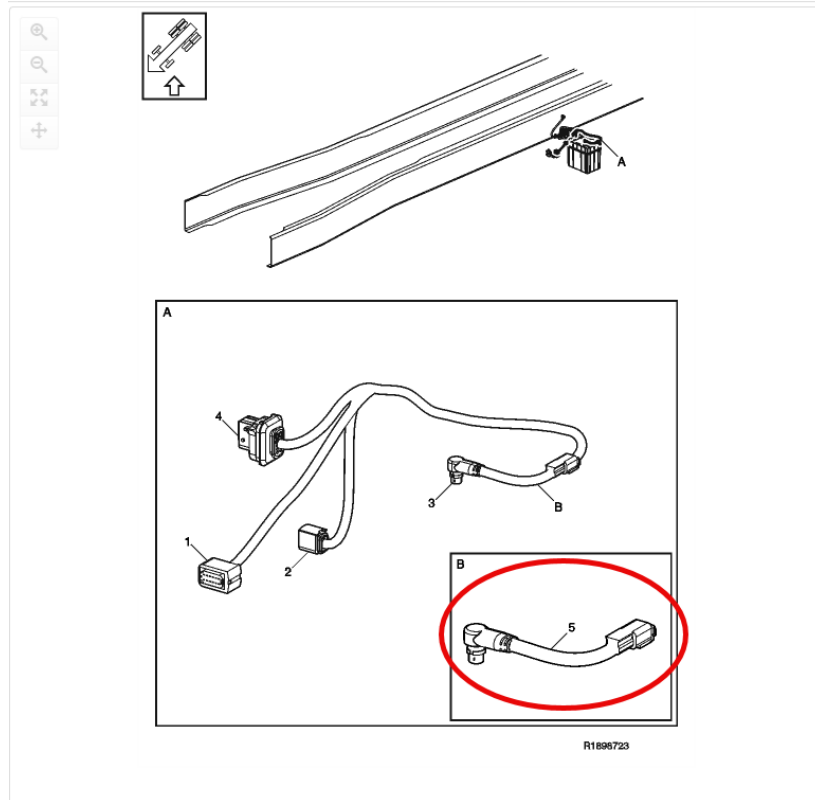


1. Press and release the SOC LED on top of the 48V battery with engine off, key OFF. Should blink a quick red then a white light, indicating the battery has sufficient charge for operation. If no light comes ON, battery is discharged and needs to be replaced.
2. With Key On, Engine OFF LED should blink green three times, indicating a successful pre-charge and will allow the contacts inside the battery to close with nominal 48V indicated at all heater system components. If the LED blinks red it indicates an unsuccessful pre charge and the contacts will NOT close inside the battery and nominal 48V will NOT be indicated on any of the heater system components.
 - If LED blinks red, turn ignition OFF and disconnect positive cable at 48V battery post.
 - With Key On, Engine OFF LED should blink green. If it continues to blink red, the battery has an internal fault. Replace battery and retest for blinking green LED

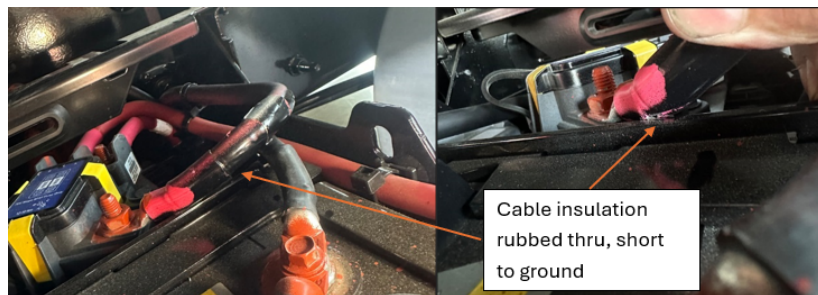
Common DTCs for 48V system.

- If all three DTCs listed below are set:
 - P028A14 - Charge Air Cooler Cooling Fan Control (Circuit short to ground or open)
 - P2F8916 - Catalyst Heater Control Module "A" Voltage Sensor Circuit (Circuit voltage below threshold)
 - P351787 - Motor/Generator (Missing message)
- Check fuse FE7 (CARB24 FAN) to see if it is missing or open. This fuse is located in fuse box under the hood.
- If P351587 (missing battery message) is active:
 - Check CAN cable pigtail from battery to CARB box wiring harness connections and/or for damaged wires.

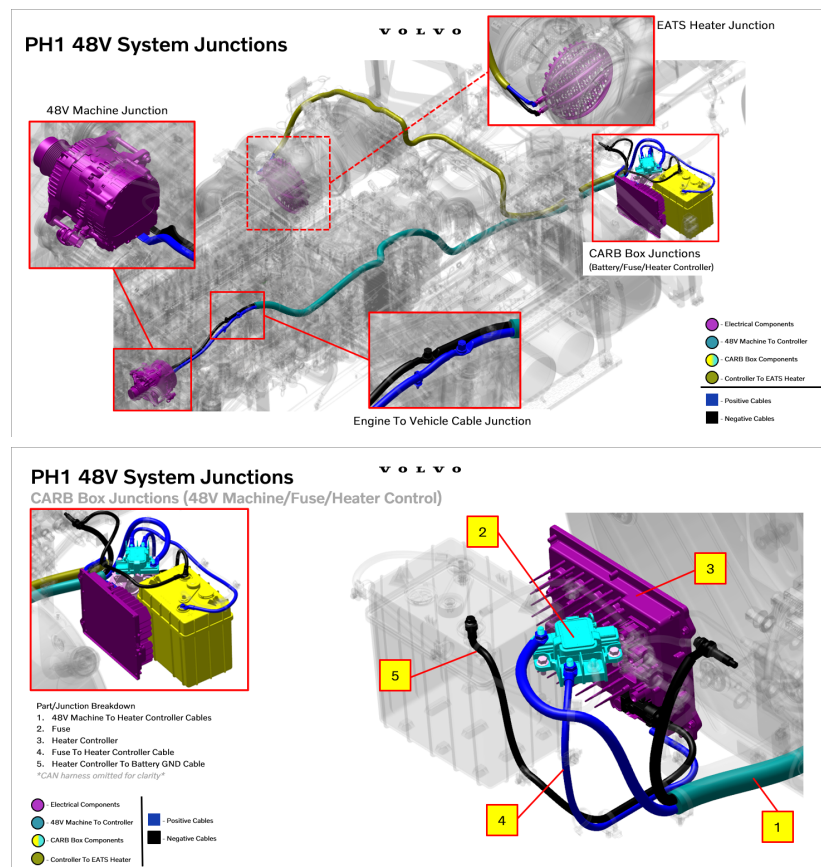
P/N 24583917



- If P350B63 - (Intermediate Voltage Battery Precharge Circuit, Circuit/Component Protection Time-Out) is active:
 - Check positive cable from CARB box fuse block to 48V Generator for rubbing/short to battery hold down bracket. Reinsulate cable and reposition cable away from the bracket hold down.



- If no rubbing or shorts are found, check 48V cables for shorts to ground from CARB box to under hood routing and to EATS heater.
- If no shorts are found, check for the swapped location of long 48V cables. Long cables run from CARB box to 48V alternator (teal) and from EHCM to heater (yellow). Cable pairs are almost identical in length. Correct routing and retest for DTC removal.



- P351162 - (Intermediate Voltage Battery Pack Voltage, Signal Compare Failure) is active:
 - Clear DTC and rescan faults. If DTC is active again, contact tech support for further direction.
- P2F8D85 - (Catalyst Heater Control Module "A" Temperature Sensor Circuit, Signal Above Allowable Range) and/or P351822 - (Intermediate Voltage Electrical System, Signal Amplitude Greater Than Maximum), sets "Get Out of Truck" message on instrument cluster are active:
 - Please insure that all software is up to date on truck.
- P35172F, P351709, and P351738: Do not diagnose these codes at this time.



links and attachments



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