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## smart ed - 12V battery discharged, undervoltage, vehicle not drivable, fault messages concerning electric drive system

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Topic number	LI54.10-P-052655
Version	3
Design group	54.10 Battery, voltage supply, voltage converter
Date	02-20-2013
Validity	451ev2 (smart electric drive Phase 2)
Reason for change	Software version updated
Reason for block	

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### Complaint:

- Complaints relating to drive system/ vehicle cannot be started
- IC illumination and indicator lamps flicker
- 12V battery has insufficient voltage (discharged)
- Fault messages (Check Engine lamp ON in yellow/red) due to undervoltage

(This is identifiable from the message "Primary ign volt" in the Zytec snapshot:

At a voltage below 11.5V in this column, consequential faults in other systems are also possible)

### Cause:

The following causes are possible in these situations:

- Drive system: Due to short-distance operations with frequent ignition cycles the 12V battery is insufficiently recharged or is excessively discharged during the operating period
- DC/DC converter: If there is a defect in the DC/DC converter, the 12V battery is not recharged sufficiently
- Additional consumers: Aftermarket accessories, such as light bars, two-way radios, Fleet Management or position tracking equipment, place an additional load on the 12V on-board electrical system

### Remedy:

1. Perform update of BMS to version 1.3.9 and EVCM/EDCM/OS to version 2E1.

(Note: With this software version the 12V battery is assisted even after charging is complete if the vehicle is connected to the charging infrastructure.)

2. Check 12V battery using Midtronics tester, as required (test result) if necessary, replace 12V battery with an AGM battery (see below for part number).

Depending on the vehicle body status it may be necessary to replace the battery bracket.

3. Check function of DC/DC converter (charging of 12V battery):

- a) Check function (charge voltage) of DC/DC converter at key position 1
- b) Check function (charge voltage) of DC/DC converter with activated charging of the high-voltage battery.

- c) Unplug low-voltage connector from EDCM and check connection (condition of pins + correct locking of pins in connector)
- d) Check voltage between pins 23 and 14/15 on detached low-voltage connector of EDCM (12V must be present)
- e) Check ground lines and ground connections (particularly the EDCM ground strap)

The voltage value must not drop below 13V when under load (i.e. including when driving lights and the radio are switched on). This value should be measured as close as possible to the 12V on-board electrical system battery using a multimeter when the vehicle is at standstill + when it is driving. If the charging function of the DC/DC converter is not OK, then create a TIPS case with all the information from the above-mentioned test steps.

4. Check whether additional consumers (accessories not belonging to the vehicle's standard equipment) are installed in the vehicle. In this case, the customer must be notified of the fact that retrofitting on this vehicle is not permitted (see vehicle lease contract) and that any such retrofitted parts must be removed subject to a separate invoice (not W&G).

5. If the above tests are OK, please interview the driver about his driving style. You can also identify short-distance operations by comparing the message "Ignition Cycles" in the ZyteK snapshot with the current mileage (mileage/ignition cycles). If the vehicle is operated for short-distances only, please refer the customer to the following usage instructions:

a) If possible, start the charging process for the HV battery at the end of each journey (by connecting the vehicle to the socket or wall box/charging station with the charging cable)

Note: During the HV battery charging process the 12V battery is recharged at the same time.

b) If the driver remains in his seat during short breaks in driving (e.g. while waiting), the ignition should not be switched off if possible.

Note: When the ignition is on, the 12V battery is recharged from the HV battery via the DC/DC converter.

Important: Make sure that the vehicle is secured to prevent it from rolling, e.g. by engaging P or by applying the parking brake/service brake.

c) For longer idle periods (4-6 weeks or more) the 12V battery should be disconnected

Symptoms
Overall vehicle / Power supply / Alternator / Alternator function / Does not charge
Overall vehicle / Power supply / Alternator / Alternator function / Output too low
Power generation / Engine management / Engine management, display message / Displays fault code
Overall vehicle / Power supply / Battery/On-board electrical system / Battery/on-board electrical system indicator lamp / Battery charge indicator/consumer shutoff / Illuminates red
Power generation / Engine management / Engine management indicator lamp / Engine diagnosis / lit
Overall vehicle / Power supply / Battery/On-board electrical system / Battery function / Battery discharges
Overall vehicle / Power supply / Battery/On-board electrical system / Battery function / Battery cannot be charged
Power generation / Engine management / Engine management, function / Nonfunctional
Power generation / Engine management / Electric drive / Nonfunctional

Parts							
Part number	ES1	ES2	Designation	Quantity	Note	EPC	Other make part

A 000 982 86 08			12V battery	1	60Ah AGM type	X	
A 451 540 01 73			Battery bracket	1	Only where necessary (dependent on vehicle condition)	X	

Validity		
Vehicle	Engine	Transmission
451.391	*	*
451.491	*	*