

PUBLISHED: 08-JUN-2020
2020.0 DEFENDER (LE), 414-01A

BATTERY, MOUNTING AND CABLES - VEHICLES WITH: NON-ELECTRIC VEHICLES

BATTERY DIAGNOSTICS - 12 VOLT MIDTRONICS EXP-1080 JLR HAND-HELD BATTERY DIAGNOSTIC TOOL (G2401004)

mcx30.com

PRINCIPLES OF OPERATION

For a detailed description of the battery system and operation, refer to the relevant Description and Operation section of the workshop manual. REFER to: Battery and Cables (414-01, Description and Operation).

INSPECTION AND VERIFICATION

 CAUTION:

Diagnosis by substitution from a donor vehicle is **NOT** acceptable. Substitution of control modules does not guarantee confirmation of a fault and may also cause additional faults in the vehicle being checked and/or the donor vehicle.

 NOTES:

- Generic scan tools may not read the codes listed, or may read only five digit codes. Match the five digits from the scan tool to the first five digits of the seven digit code listed to identify the fault (the last two digits give additional information read by the manufacturer-approved diagnostic system).
- When performing voltage or resistance tests, always use a digital multimeter that has the resolution ability to view 3 decimal places. For example, on the 2 volts range can measure 1mV or 2 K Ohm range can measure 1 Ohm. When testing resistance always take the resistance of the digital multimeter leads into account.
- Check and rectify basic faults before beginning diagnostic routines involving pinpoint tests.
- If Diagnostic Trouble Code(s) (DTC)s are recorded and, after performing the pinpoint tests, a fault is not present, an intermittent concern may be the cause. Always check for loose connections and corroded terminals.

1. Verify the customer concern

2. Visually inspect for obvious signs of mechanical or electrical damage

Visual Inspection

MECHANICAL

ELECTRICAL

MECHANICAL	ELECTRICAL
■ Generator ■ Drive belt ■ Drive belt tensioner ■ Generator pulley ■ Check the security of the generator fixings	■ Generator ■ Battery ■ Battery connections ■ Starter motor ■ Harnesses and connectors ■ Fuses ■ Charge warning lamp function ■ Body Control Module (BCM) ■ Gateway Module (GWM)

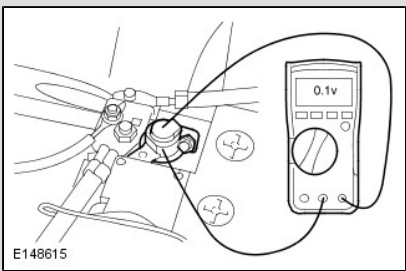
3. If an obvious cause for an observed or reported concern is found, correct the cause (if possible) before proceeding to the next step
4. If the cause is not visually evident check for Diagnostic Trouble Codes (DTCs) and refer to the DTC Index
5. Check the Jaguar Land Rover claims submission system for open campaigns. Refer to the corresponding bulletins and SSMs which may be valid for the specific customer complaint and complete the recommendations as required

12 VOLT MIDTRONICS EXP-1080 JLR HAND-HELD BATTERY DIAGNOSTIC TOOL USER GUIDE

PINPOINT TEST A : VOLTAGE DROP ACROSS VEHICLE HARNESS AND BATTERY TERMINAL	
A1: GROUND CIRCUIT	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 NOTE: This test checks for high resistance between the battery terminal and the battery clamp.	
	1 Connect the multimeter across the battery negative terminal and the battery clamp as shown in picture (do not disconnect the battery at this stage). Set the multimeter to read Direct Current (DC) voltage.

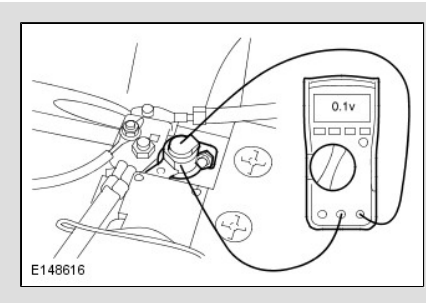
PINPOINT TEST A : VOLTAGE DROP ACROSS VEHICLE HARNESS AND BATTERY TERMINAL

A1: GROUND CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	2 Start the engine, turn on the following: ■ (1) Air conditioning ■ (2) Blower fan on full speed ■ (3) Headlights on high beam ■ (4) Heated screen - rear ■ (5) Heated screen - front (if installed) ■ (6) Heated seats (if installed) ■ Record the reading on the multi-meter, the reading must be taken within the first 20 seconds of the engine starting. Failure to follow this requirement will render incorrect results
	Is reading equal to or below 0.1 volts? Yes GO to A2. No Switch all electrical loads and engine off, return the vehicle to an ignition off condition. Disconnect the battery negative clamp, clean clamp and terminal then reconnect and repeat test GO to A1.

A2: POWER CIRCUIT

TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
 NOTE: This test checks for high resistance between the battery terminal and the battery clamp.	
	1 Connect the multimeter across the battery positive terminal and the battery clamp as shown in picture (do not disconnect the battery at this stage). Set the multimeter to read DC voltage.

A2: POWER CIRCUIT	
TEST CONDITIONS	DETAILS/RESULTS/ACTIONS
	2 Start the engine, turn on the following: ■ (1) Air conditioning ■ (2) Blower fan on full speed ■ (3) Headlights on high beam ■ (4) Heated screen - rear ■ (5) Heated screen - front (if installed) ■ (6) Heated seats (if installed) ■ Record the reading on the multi-meter, the reading must be taken within the first 20 seconds of the engine starting. Failure to follow this requirement will render incorrect results
	Is reading equal to or below 0.1 volts? Yes Complete the Midtronics battery test procedure No Switch all electrical loads and engine off, return the vehicle to an ignition off condition. Disconnect the battery power clamp, clean clamp and terminal then reconnect and repeat test GO to A2.

The following steps must be completed to facilitate correct operation of the EXP-1080 JLR hand-held battery diagnostic tool during the battery test procedure

CHECKS	ACTION
Battery fluid leakage, check for battery fluid leaks or damage to the battery casing	 NOTE: If visible damage to the case is evident do not return battery under warranty. Replace the battery if there is any battery fluid leaks evident
Battery vent pipe routing	Check for routing, make sure there are no kinks
EXP-1080 fly lead, condition of clamps	Clean or replace as required
EXP-1080 fly lead connection	Confirm secure connection



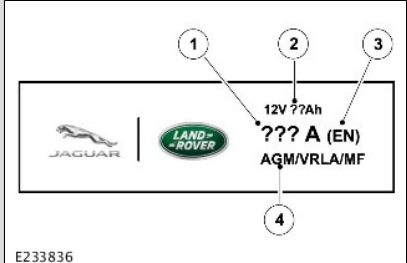
NOTE:

The Midtronics EXP-1080 JLR hand-held battery diagnostic tool is suitable for testing flooded and absorbed glass mat (AGM) type batteries including Primary and Secondary batteries.

Testing a Battery

Using the Midtronics EXP-1080 JLR hand-held battery diagnostic tool, the following test procedure will confirm the serviceability of the battery (see Completing a Battery Test)

Battery Label Example

 NOTE: All AGM batteries are marked with AGM. Flooded batteries have no reference to being Flooded. 1. Battery Rating Units CCA (Cold Cranking Amps) 2. Battery voltage and Battery Ah rating 3. Battery rated units (battery standard EN or SAE) 4. Battery type (battery technology, AGM or Flooded)	
--	---

Battery Test Types

The Midtronics EXP-1080 JLR hand-held battery diagnostic tool has three types of battery test available to the technician to select:

Battery Test

- 1. The BATTERY TEST should be used on any battery that has started its warranty life cycle. The battery is in use and installed to a vehicle registered to an owner

Pre-Delivery Inspection (PDI) / Storage

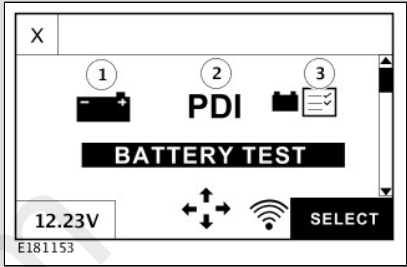
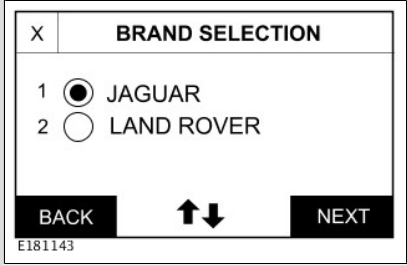
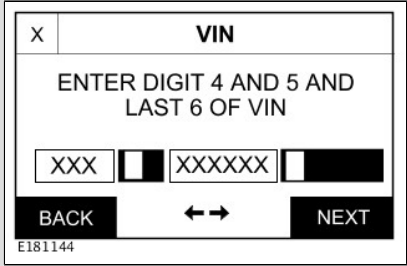
- 2. The PDI / STORAGE test should be used on any battery that has not yet been entered into the warranty life cycle. The battery is installed to a NEW vehicle, but the vehicle has not yet been sold/registered to an owner

Battery Storage

- 3. This BATT. STORAGE test should be used on any battery that has not yet been entered into the warranty life cycle. The battery is not in use and is a Parts Stock battery and has not yet been installed to a vehicle

Completing a Battery Test

1	Connect the fly-lead to the Midtronics EXP-1080 JLR hand-held battery diagnostic tool
---	---

2	Connect the fly-leads to the battery terminals, black lead to the negative terminal, red lead to the positive terminal and confirm the connections are secure	 E181155
3	The battery tester will power ON automatically when connected to a battery	
4	MAIN MENU - Select the correct BATTERY TEST using the arrow keys on the battery tester panel (see Battery Test Types) 1. BATTERY TEST 2. PDI / STORAGE 3. BATT. STORAGE NOTE: When BATT. STORAGE is selected, the technician must enter IDENTIFICATION data or a purchase order reference number for the battery being tested. The battery tester will then move on to BATTERY TYPE (Step 8). Select NEXT to continue	 E181153
5	BRAND SELECTION NOTE: This step is required for BATTERY TEST and PDI/STORAGE only. Select the correct brand of the vehicle battery being tested using the scroll arrow keys on the battery tester panel Select NEXT to continue	 E181143
6	Vehicle Identification Number (VIN) NOTES: - This step is required for BATTERY TEST and PDI/STORAGE only. - Letters SAL or SAJ may be different than displayed on the EXP-1080 if the vehicle is manufactured outside the United Kingdom, this will not affect the battery testing. Enter the 4th and 5th digit followed by the last 6 of the VIN using the alphanumeric key pad on the battery tester panel Select NEXT to continue	 E181144
7	BATTERY LOCATION	

**NOTES:**

- This step is required for BATTERY TEST and PDI/STORAGE only.
- Selecting the correct battery details at this point is critical to getting the correct Battery Test Results.

Select IN VEHICLE if the battery is tested connected to the vehicle

**NOTES:**

- When disconnecting the 12 volt battery, customer pre-sets will be lost and there may be additional disruptions to vehicle features for a short period of time. To prevent customer dissatisfaction, only disconnect the battery if no other option is available.
- Make sure the Ignition is OFF and the vehicle is powered down with the modules entering 'sleep mode' before commencing with the battery test.

Select OUT OF VEHICLE only if the battery is electrically disconnected from the vehicle or on a bench

Select NEXT to continue

The screenshot shows a screen titled "BATT. LOCATION" with a close button (X) in the top left. It contains two options: "1 ☒ IN VEHICLE" and "2 ☐ OUT OF VEHICLE". At the bottom, there are "BACK", "NEXT", and a scroll arrow icon. A reference number "E164366" is at the bottom left.

8

BATTERY TYPE**NOTES:**

- All AGM batteries are marked with AGM. Flooded batteries have no reference to being Flooded.
- Selecting the correct battery details at this point is critical to getting the correct Battery Test Results.

Select the correct battery type (see Battery Label Example, Label 4) using the scroll arrow keys on the battery tester panel

Select NEXT to continue

The screenshot shows a screen titled "BATTERY TYPE" with a close button (X) in the top left. It contains two options: "1 ☒ AGM" and "2 ☐ REGULAR/FLOODED". At the bottom, there are "BACK", "NEXT", and a scroll arrow icon. To the right is a battery label example with "AGM" highlighted and a red arrow pointing to option 1. A reference number "E181145" is at the bottom left.

9

RATING UNITS**NOTE:**

Selecting the correct battery details at this point is critical to getting accurate Battery Test Results.

Select the correct battery rating from the battery label in brackets (see Battery Label Example, Label 3) using the scroll arrow keys on the battery tester panel

Select NEXT to continue

The screenshot shows a screen titled "RATING UNITS" with a close button (X) in the top left. It contains four options: "1 ☒ EN", "2 ☐ CCA/SAE", "3 ☐ DIN", and "4 ☐ JIS". At the bottom, there are "BACK", "NEXT", and a scroll arrow icon. To the right is a battery label example with "850 A (EN)" highlighted and a red arrow pointing to option 1. A reference number "E181146" is at the bottom left.

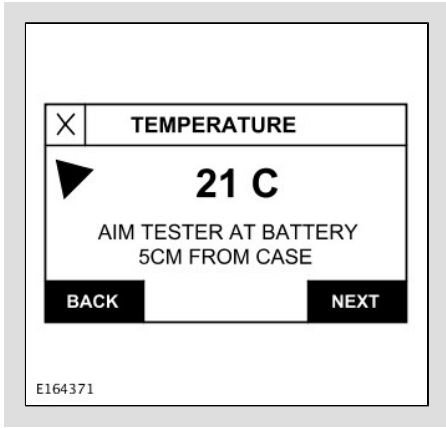
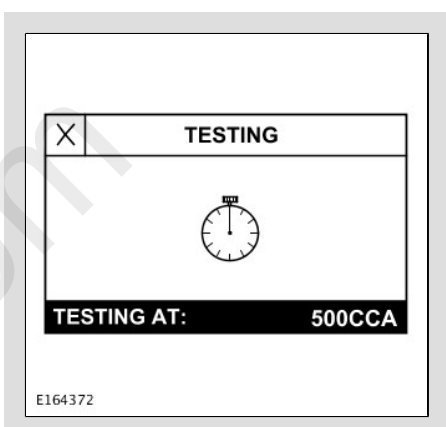
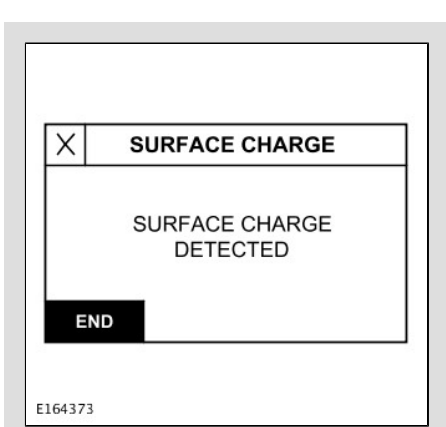
10

BATTERY RATING**NOTE:**

Selecting the correct battery details at this point is critical to getting accurate Battery Test Results.

Select the correct CCA rating (see Battery Label Example, Label 1) using the scroll arrow keys, or enter the rating with the numeric key pad on the battery tester panel

The screenshot shows a screen titled "BATTERY RATING" with a close button (X) in the top left. It displays "500" and "CCA" with a scroll arrow icon between them. At the bottom, there are "BACK", "NEXT", and a scroll arrow icon. To the right is a battery label example with "500" highlighted and a red arrow pointing to the input field. A reference number "E181154" is at the bottom left.

	Select NEXT to continue	
11	TEMPERATURE Aim the temperature sensor towards the battery casing (maintain a distance of 5 cm) Select NEXT to continue	
12	TESTING The battery tester screen will now display clock hands rotating, the battery tester will automatically advance when the test has completed	
13	SURFACE CHARGE  NOTE: This step will take place automatically only when required. The SURFACE CHARGE test is an additional step required if the battery voltage is above 12.55v with a low CCA measured ■ Follow the battery tester on screen instructions ■ 1. Turn the ignition ON (position 2) ■ 2. Turn ON the headlights (high beam) until the battery tester shows- Turn OFF headlights ■ 3. Turn the ignition OFF (position 0)	
14	BATTERY CHARGE	

**NOTES:**

- This step will take place automatically only when required.
- To support a Warranty Claim, TEST CODE details for BEFORE CHARGING and AFTER CHARGING must be supplied in the technical comments box of the Warranty Claim. The after charging TEST CODE should be obtained from a final battery test that should be performed with the battery disconnected and removed from the vehicle.

Using the scroll arrow keys on the battery tester panel: Select BEFORE CHARGING if the battery has not been connected to a recommended mains charger

Select AFTER CHARGING if the battery has been connected to a recommended mains charger for the recommended time shown on the result screen

Select NEXT to continue

X	BATTERY CHARGE
1	☒ BEFORE CHARGING
2	☐ AFTER CHARGING
BACK  NEXT	

E164374

15 DEEP SCAN

**NOTE:**

This step will take place automatically only when required.

The battery tester will display and complete an automated DEEP SCAN test only if required, then automatically advance when the DEEP SCAN test has completed

X	TESTING
DEEP SCAN TECHNOLOGY	
	
PLEASE WAIT.....	

E164375

16 RESULTS

Review the battery test results and complete the appropriate actions (see Battery Tester Results Table)

X	RESULTS
GOOD BATTERY	
VOLTAGE :	12.57V
MEASURED :	427 A(EN)
RATED :	440 A(EN)
TEMPERATURE :	21C
PRINT	END

E181150

17 TEST CODE

**NOTE:**

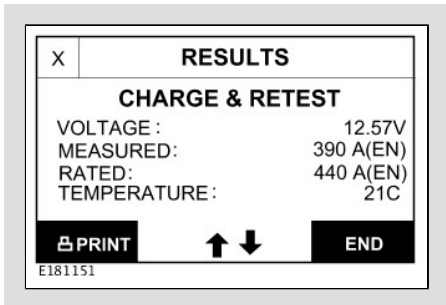
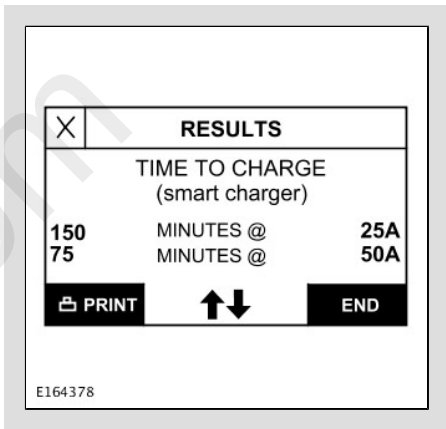
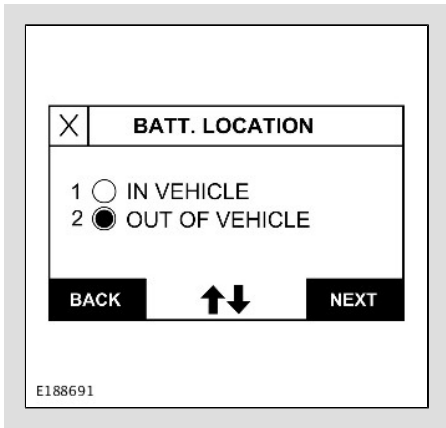
To support a Warranty Claim, TEST CODE details for BEFORE CHARGING and AFTER CHARGING must be supplied in the technical comments box of the Warranty Claim. The after charging TEST CODE should be obtained from a final battery test that should be performed with the battery disconnected and removed from the vehicle.

From the RESULTS display, view the TEST CODE using the scroll arrow keys on the battery tester panel

X	RESULTS
TEST CODE	
11D1AW-LEMHGG5-RL0000	
PRINT	END

E181152

Battery Tester Results Table

RESULTS	ACTION	
GOOD BATTERY	Return the battery to service	
CHARGE AND RETEST	 NOTE: To support a Warranty Claim, TEST CODE details for BEFORE CHARGING and AFTER CHARGING must be supplied in the technical comments box of the Warranty Claim. The after charging TEST CODE should be obtained from a final battery test that should be performed with the battery disconnected and removed from the vehicle. When the battery test result equals CHARGE and RETEST, view the TIME TO CHARGE screen using the scroll arrow keys on the Battery Tester panel Follow the 50AMP charge time for all vehicles, except Defender which can be charged with a 25 Amp charger After the battery has charged allow 30 minutes to elapse before performing a retest Follow the recommended action in the test results If the second battery test result equals CHARGE and RETEST the battery must be replaced	 
REPLACE BATTERY OR BAD CELL-REPLACE	1. Repeat the test with the battery disconnected from the vehicle. This test must be completed within 24hrs of the first battery test. For Battery Location, select "OUT OF VEHICLE" on the Battery Tester for this test. 2. Follow the instructions as per the test result - For a repeat REPLACE BATTERY or BAD-CELL test result, DO NOT ATTEMPT TO RECHARGE THE BATTERY, REPLACE THE BATTERY	
FROZEN BATTERY	Allow the battery to thaw naturally in workshop conditions and retest	
UNABLE TO DO TEST	Disconnect the battery from the vehicle and retest	

Flooded Battery Care Point

If the vehicle is equipped with a flooded battery, make sure the replacement battery is a flooded battery of the same specification (cold cranking amperage (CCA), battery standard (EN/SAE) / amp hour rating (Ah)) as the original battery

Under no circumstances should you fit a flooded battery to a vehicle that originally had an AGM battery, unless formally instructed by Jaguar/Land Rover

AGM Battery Care Point

If the vehicle is equipped with an absorbed glass mat (AGM) battery, make sure the replacement battery is a AGM battery of the same specification (cold cranking amperage (CCA), battery standard (EN/SAE) / amp hour rating (Ah)) as the original battery, unless formally instructed by Jaguar/Land Rover

DTC INDEX

For a list of Diagnostic Trouble Codes (DTCs) that could be set on this vehicle, please refer to Section 100-00.

cmjjaGFyZG1vbnRvbjsyMDIwLTA5LTE4VDA5OjA5OjI3LjUzM1o7OTIuNDAuMTg5LjYxOw==

mcx30.com