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## VEHICLE QUIESCENT CURRENT TESTING

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**NOTE:** On vehicles fitted with a Battery Monitoring System (except Freelander 2/LR2 (LF)), run the power-supply diagnostic routine using a Land Rover or Jaguar approved diagnostic system for quiescent current testing and measurement. For Freelander 2/LR2 vehicles and other Land Rover and Jaguar vehicles without a battery monitoring system, use the procedure detailed below for quiescent current testing.

If an open circuit voltage test gives a result in the region of 12.45 to 12.49 volts, it is recommended that you ensure the battery isn't slowly being discharged by an electrical consumer that is remaining on after the vehicle's shutdown period (see page 16 for typical shutdown periods). Likewise if a customer complains of a vehicle battery that discharges continuously or when left for a prolonged period of time it is recommended that you perform a quiescent drain test as described below:

### **Method of Measurement**

In order to correctly measure quiescent drain, it is preferable to use a Land Rover or Jaguar approved diagnostic system with the current probe attachment. A procedure for quiescent drain measurement using the diagnostic system is available in the Diagnosis and Testing section of the Workshop Manual.

If this is not possible, then an ammeter may be used. Whichever method is used, technicians MUST adhere to the following procedure.

**CAUTION: DO NOT use a multi-meter to check the battery drain on vehicles with an electronic throttle (for example XK8 1997 on or Range Rover 2002 on) as the current drawn by the throttle is in excess of the fuse rating in most multi-meters, and damage to your multi-meter may result.**

### **Using a Land Rover or Jaguar Approved Diagnostic System with Current Probe**

- Switch off all electrical loads and ensure that the ignition is off.
- Connect the current probe to the approved diagnostic system.
- Calibrate the probe.
- Clamp around the battery lead / junction box lead. **Go to Test Results below.**

### **Using a Multi-meter**

- Disconnect the battery negative lead.
- Connect the ammeter between the battery negative post and the negative lead using clips.
- Select high meter range (i.e. equal or more than 10 amps) then switch the multi-meter on. **Go to Test Results below.**

### **Test Results (both methods)**

- Switch the ignition 'on' (ignition mode on keyless vehicles) and then to 'off' (DO NOT CRANK) and remove the key (where applicable).
- Close or latch all doors and remove any other potential electrical consumers.
- Observe / compare the readings obtained over the time scales identified (see page 16)
- Enter the reading obtained on to the applicable Battery Report form (see page 10 or 11)

**NOTE:** The preferred method of testing following an excessive current consumption figure is to use the clamp of the ammeter around individual junction box leads to the various suspected circuits to identify a potential cause. Rather than the old method of pulling fuses out, in a one after another fashion.

The main reasons for using the current probe to determine which junction box/ circuit the drain is going through are:

- 1 Many modules take a considerable time to power down, every time a fuse is removed and re-fitted, the quiescent drain figures will need 45 minutes to reset.
- 2 Sometimes the drain is caused by a module 'holding on' to something that has been switched off. sometimes it is only a relay winding that is activated. Pulling the fuse can allow this to 'reset' and the drain will be lost and go undiagnosed. Similarly for example, the headlights of a Jaguar S-Type are switched on, removing the switch input will not turn them off. Therefore, the reading obtained would be incorrect and misleading.

## BATTERY CURRENT DRAIN - TYPICAL VALUES

The battery drain should be measured (see page 15) using a Land Rover or Jaguar approved diagnostic system (where available) or an ammeter, with the vehicle in the double-locked armed state (i.e. vehicle alarm fully armed), with all doors and other body apertures either closed or latched, so as to appear closed from an electrical point of view.

The test should take place after the vehicle has entered shutdown mode. The time taken for this to occur after key-off varies according to model. (Refer to the table below.)

**NOTE:** When the vehicle is armed, the effect of the security system Light Emitting Diode (LED) flashing is to cause a pulsation in the measured current drain. In this case, either the average current should be taken (using a meter with an averaging function) or the current reading should be taken, ignoring the brief high current peaks.

## JAGUAR VALUES

The current drain after the initial shutdown period should not exceed the value shown in the table.

Model	Shutdown Period (minutes)	Typical Values Battery Drain (mA)
XJS 3.2	60	<30.0
Sovereign 3.2	60	<37.3
XJ6 4.0	60	<38.6
XJS	60	<43.9
XJ6 (X300)(95 MY)	60	<43.0 <sup>1</sup>
XJ8 (X300)	60	<30.0
XK8 (X100)	60	<30.0
S-Type (X200)	60	<30.0
X-Type (X400)	30	<30.0
XJ6 (X350)	40	<30.0
XJ8 (X350)I	40	<30.0
XK (X150)	3 (after lock/arm condition)	<30.0 <sup>2</sup>
	33 (unlocked)	<30.0
XF(X250)	2 (after lock/arm condition)	<24.0 <sup>2</sup>
	30 (unlocked)	<24.0

**NOTE:**

<sup>1</sup> Further drop after 72 hours to 30.0 mA, but this would not be part of the standard test.

<sup>2</sup> Applies to vehicles without TPMS. Vehicle shutdown period with TPMS fitted is approximately 15 minutes.

The total current drain will be higher if certain Jaguar approved accessories (for example, tracker, cool bag, trailer tow module) are fitted.

## LAND ROVER VALUES

Model	Shutdown Period (minutes)	Typical Values Battery Drain (mA)
Range Rover (LM)	30	16.0 - 18.0
Range Rover Sport (LS) - from 2007MY	30	<25.0
Range Rover Sport (LS) up to 2007MY	20	<22
Discovery 3/LR3 (LA) - from 2007MY	30	<25.0
Discovery 3/LR3 (LA) - up to 2007MY	20	<22
Freelander 2/LR2 (LF) - from 2007MY	35 (single locked or unlocked)	<23.6
	12 (double locked)	<23.6
Freelander (LN) - up to 2007MY	10	24-25 - without Becker Navigation system 27-28 with Becker Navigation system
Defender - 1998 onwards	30	<21.0
Discovery Series 2 (LT)	30	<30.0