



## Closed-circuit Current Measurement

New information provided by this revision is preceded by this symbol .

This Service Information bulletin supersedes SI B61 08 00 **dated November 2015**.

### Whats new:

- Reference to all G-Series vehicles

### MODEL

All
-----

### SITUATION

Closed circuit current needs to be measured.

Excessive closed-circuit currents may occur continuously or intermittently, and may cause the battery to discharge prematurely.

### CAUSE

The increase in closed-circuit current may be caused by a faulty control unit, or by the installation of a non-approved accessory.

### INFORMATION

**In a situation where a vehicle has broken down due to a discharged battery, for diagnostic purposes it is important to not disconnect the battery. This is because a control unit will be reset if the battery is disconnected. Following a reset, the faulty control unit may start functioning correctly again, making accurate diagnosis impossible.**

To correctly measure closed-circuit current, the 50-amp clip-on probe (previously used with the IMIB) or the 100-amp clip-on probe can now be used in conjunction with the IMIB (Integrated Measurement Interface Box) to properly diagnose closed-circuit current problems over an extended period of time. Connect the amp clip-on probe directly to the IMIB Measurement input 3 (green socket).



### PROCEDURE

**Note: It is very important that any “Power management” faults stored be diagnosed and corrected, and the “Energy Diagnosis” test plan carried out before the following procedure is performed. Only perform this procedure if closed-circuit current violations are listed in the “Most Likely Cause” list.**

1. Check and test the battery using the BMW Battery Tester. Refer to SI B 04 25 02 for information about the BMW Battery. Refer to [SI B61 02 11](#) for vehicles equipped with advanced onboard battery diagnostics that do not require the BMW Battery Tester. If necessary, recharge or replace the battery.
2. **If the battery is installed in the trunk**, open the trunk and turn the lock to the locked position, using a screwdriver or similar (simulates the trunk lid being closed). **The hood must be closed.** **If the battery is installed in the engine compartment**, open the hood and pull the front lid contact switch fully up, and lock in this position (workshop position, simulates the front lid being closed). **The trunk must be closed.**

3. With the exception of the trunk/hood above, all other doors/lids must be closed.
4. In order to simulate normal closed-circuit conditions:
  - o Turn the ignition on and activate all electrical consumers, including any accessories. Turn the ignition off. In some cases, a drive cycle may need to be carried out in order to duplicate a closed-circuit current problem.
  - o Open and close the driver's door (simulates somebody getting out).
  - o Lock the car, arming the DWA if this is installed.
5. Measure closed circuit current.

In general, closed-circuit current consistently over 50mA must be investigated. Depending on the vehicle's equipment, closed-circuit current by vehicle model is approximately as follows:

E31	50 milliamps after 16 minutes
E32	50 milliamps after 16 minutes
E34	40 milliamps after 16 minutes
E36, Z3	30 milliamps after 16 minutes
E38	50 milliamps after 16 minutes
E39	40 milliamps after 16 minutes
E46	40 milliamps after 16 minutes
E60, E61, E63, E64	40 milliamps after 60-70 minutes
E65, E66	40 milliamps after 60-70 minutes
E53	40 milliamps after 16 minutes
E70, E71, E72	40 milliamps after 60-70 minutes with TCU (30 minutes without TCU)
E83	40 milliamps after 16 minutes
E82, E84, E88	40 milliamps after 60-70 minutes with TCU (30 minutes without TCU)
E90, E91, E92, E93	40 milliamps after 60-70 minutes with TCU (30 minutes without TCU)
E85	40 milliamps after 16 minutes
E89	40 milliamps after 60-70 minutes with TCU (30 minutes without TCU)
E52	50 milliamps after 16 minutes
All F-Series vehicles	9-22 milliamps after 30 minutes
 All G-Series vehicles	9-22 milliamps after 8 minutes <b>Refer to ISTA FUB-FB-610011-K15 for specific testing procedures</b>

6. If the nominal milliamp reading is not achieved after the appropriate time, refer to the attached troubleshooting charts.

**Note: On 2005 MY vehicles equipped with BMW ASSIST, there are additional current fluctuations as high as 500ma that last for approximately 2 minutes. The fluctuations occur every 15 minutes for up to 14 hours after key off. This is considered normal operation of the TCU, and should not be considered a fault. This also applies to 2005 TCUs that are installed into earlier production**

**vehicles as replacement parts.**

- E60, E63, E64 Closed-Circuit Current Troubleshooting E6x up to 9/05 production
- E60, E61, E63, E64 Closed-Circuit Troubleshooting E6x from 9/05 production
- E65, E66 Closed-Circuit Current Troubleshooting up to 3/04 production
- E65, E66 Closed-Circuit Current Troubleshooting from 3/04 production
- Normal closed-circuit current values for E65, E70, E60, E61, E63, and E64

**CLOSED-CIRCUIT CURRENT MEASUREMENT WITH THE IMIB:**

Note: This technique with an IMIB is particularly suitable for extended measurements, and provides a graphical readout of recorded measurements over time. It is recommended for situations where the use of a multimeter provided insufficient information for problem diagnosis.

1. Select "Activities".
2. Select "Measuring devices"
3. Select from the "Level 1" column, "Measuring devices", and then "OK".
4. From the "Connection manager" screen, select the free IMIB and "Set up connection".
5. The "Measures devices" screen opens on the "Multimeter" tab.
6. Select the "Oscilloscope" tab.
7. Highlight the "CH1" tab to activate channel 1.
8. Under channel 1, "Source," scroll with the arrows to select "Clip-on probe 50A" or "Clip-on probe 100A."
9. Make sure that the clip-on probe is not connected to the battery cable, and acknowledge the pop-up message with "OK." The calibration of the clip-on probe is very important, and must be as close to 0 as possible. If the clip-on probe cannot be calibrated, it must be replaced in order to ensure a proper measurement. Refer to the Parts Information section of this Service Information bulletin for the latest clip-on probe part number.
10. Change the "A/Div" setting to "1A".
11. Under the "Time" selection box, change the "Time/Div" setting based on the number of measurements needed (5 ms to 200 s). The longer times should be selected when performing the measurement over an extended period.
12. Select "CH 1" under "Cursor" to monitor the actual readings.
13. Select "Record" if performing long term measurements.
14. After performing the measurement, select "Record" again; the display will change to "Compress" and display the recorded data on the 1 screen.

**PARTS INFORMATION**

Part Number	Description	Quantity
81 38 0 431 590	Clip-on probe 100A	1

**WARRANTY INFORMATION**

Not applicable.

## ATTACHMENTS

View PDF attachment [B610800 Troubleshooting E6x from 9 2005.](#)

View PDF attachment [B610800 Troubleshooting E65 from 3 2004.](#)

View PDF attachment [B610800 Troubleshooting E6x up to 9 2005.](#)

View PDF attachment [B610800 Troubleshooting E65 up to 3 2004.](#)

View PDF attachment [B610800 Normal Closed Circuit Current Values.](#)

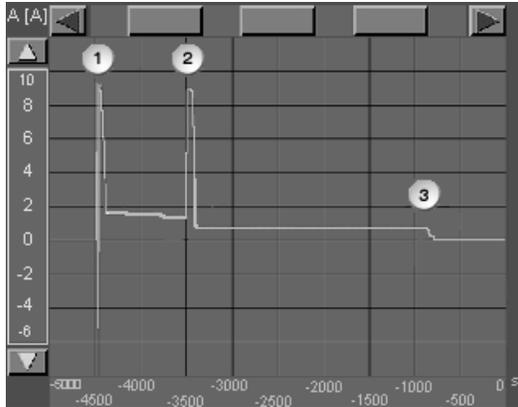
[ Copyright ©2018 BMW of North America, Inc. ]

## E65 normal closed circuit current values

This document provides an overview of the typical current values that are measured in an external closed-circuit current measurement with a current measuring clip during regular sleeping.

For the procedure of an external closed-circuit current measurement with measurement system, see document <Observing sleeping by means of external closed-circuit current measurement>.

Regular sleeping without additional wakings to check the coolant temperature and with transport mode OFF (battery switch ON):



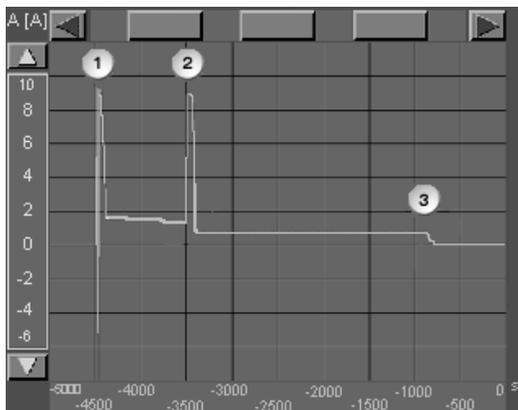
No	Time	Event	Typical current values
1	0 - 3 min	Reaching the idle state	10 to 15 A depending on the equipment.
	3 - 16 min	Vehicle sleeping	0.9 to 1.5 A depending on the consumer units that are switched on (e.g. map-reading light or glove box light).
2	16 - 17 min	PM wakes up the vehicle: First consumer shutdown (roof)	8 to 11 A depending on the equipment.
	17 - 60 min	Vehicle sleeping	approx. 300 mA.
3	60 min	Second consumer shutdown (body)	< 30 mA depending on the equipment.

## E70 normal closed circuit current values

This document provides an overview of the typical current values that are measured in an external closed-circuit current measurement with a current measuring clip during regular sleeping.

For the procedure of an external closed-circuit current measurement with measurement system, see document <Observing sleeping by means of external closed-circuit current measurement>.

Regular sleeping without additional wakings to check the coolant temperature:



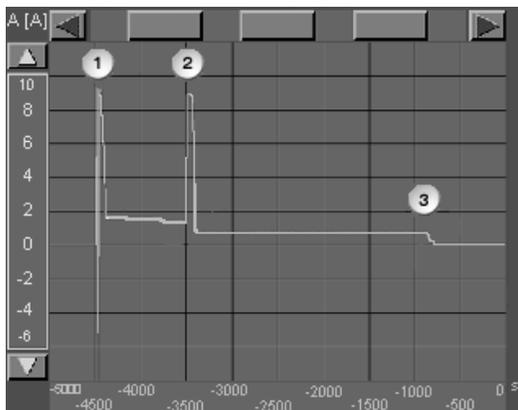
No	Time	Event	Typical current values
1	0 - 3 min	Reaching the idle state	6 to 15 A depending on the equipment.
	3 - 8 min	Vehicle sleeping	0.4 to 1.5 A depending on the consumer units that are switched on (e.g. map-reading light or glove box light).
2	8 - 9 min	FRM wakes up the vehicle: Consumer unit shutdown.	6 to 10 A depending on the equipment.
	9 - 30 min or 9 - 60 min	Vehicle sleeping	500 to 650 mA depending on the equipment.
3	30 or 60 min	Shutdown of terminal 30g	< 25 mA depending on the equipment.

## E6x up to 3/2006 normal closed circuit current values

This document provides an overview of the typical current values that are measured in an external closed-circuit current measurement with a current measuring clip during regular sleeping.

For the procedure of an external closed-circuit current measurement with measurement system, see document <Observing sleeping by means of external closed-circuit current measurement>.

Regular sleeping without additional wakings to check the coolant temperature:



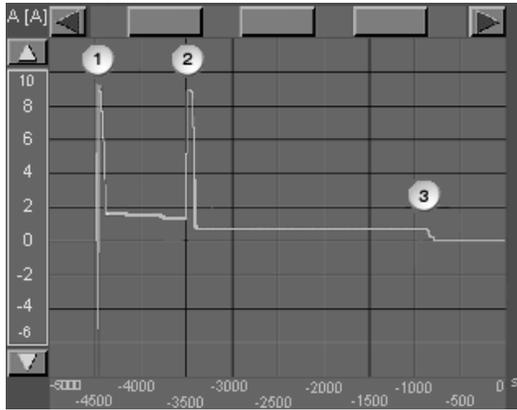
No	Time	Event	Typical current values
1	0 - 3 min	Reaching the idle state	8 to 14 A depending on the equipment.
	3 - 16 min	Vehicle sleeping	0.8 to 1.5 A depending on the consumer units that are switched on (e.g. map-reading light or glove box light).
2	16 - 17 min	KBM wakes up the vehicle: Consumer unit shutdown.	6 to 10 A depending on the equipment.
	17 - 30 min or 17 - 60 min	Vehicle sleeping	approx. 250 mA.
3	30 or 60 min	Shutdown of terminal 30g	< 30 mA depending on the equipment.

## E6x from 3/2006 normal closed circuit current values

This document provides an overview of the typical current values that are measured in an external closed-circuit current measurement with a current measuring clip during regular sleeping.

For the procedure of an external closed-circuit current measurement with measurement system, see document <Observing sleeping by means of external closed-circuit current measurement>.

Regular sleeping without additional wakings to check the coolant temperature:



No	Time	Event	Typical current values
1	0 - 3 min	Reaching the idle state	8 to 14 A depending on the equipment.
	3 - 8 min	Vehicle sleeping	0.8 to 1.5 A depending on the consumer units that are switched on (e.g. map-reading light or glove box light).
2	8 - 9 min	KBM or FRM wakes the vehicle: Consumer unit shutdown.	6 to 10 A depending on the equipment.
	9 - 30 min or 9 - 60 min	Vehicle sleeping	- Before model year 03/2007: approx. 250 mA - As of model year 03/2007: approx. 450 mA (relay of the electric fan at terminal 30g).
3	30 or 60 min	Shutdown of terminal 30g	< 30 mA depending on the equipment.

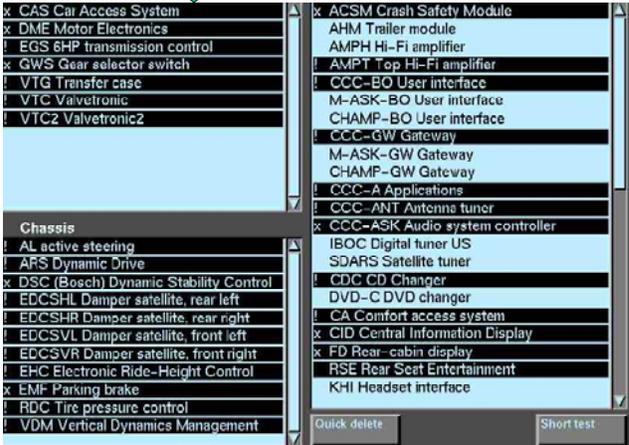
# E6x Troubleshooting High Closed Circuit Current According to Energy Diagnosis Test plan 'Most Likely' causes Vehicles produced from 9/2005 (KGM)

**Closed circuit current monitoring**  
The closed circuit current monitoring starts 90 minutes after switching off Terminal R or the last function performed, such as locking the vehicle.

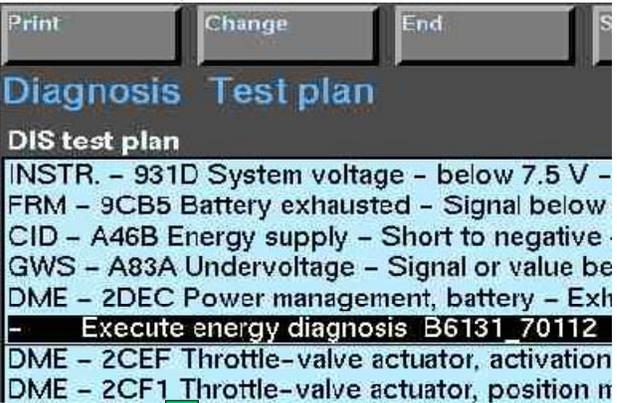
- Customer states CC message "High Battery Drain" displayed during start-up  
- DME FC Excessive closed circuit current



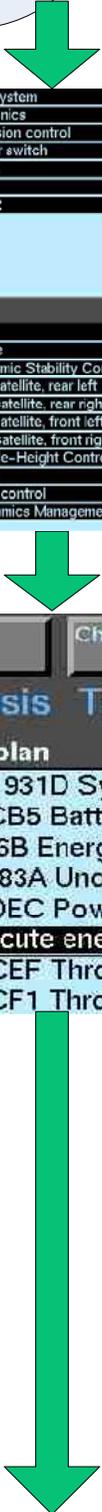
**Vehicle short test**  
It is important to always perform a short test using the latest DIS version.  
**DO NOT** delete faults prior to performing Energy Diagnosis



**Diagnosis Test Plan**  
Always perform the Energy Diagnosis test plan first



**Energy Diagnosis Results**  
After the Energy Diagnosis has completed, the "Most Likely" causes are automatically displayed.





**Energy Diagnosis Selection**  
 Select [1] and [2] to analyze the stored data for each cause of excessive closed-circuit current

Select [3] and [4] for information that will help troubleshoot

**B6131\_70112 / Selection 2**

The energy diagnosis has analyzed the following most likely cause in the vehicle with the last 3000 km (according to kilometre reading; last event in first place):

- [1] Closed-circuit current monitoring
- [2] Closed-circuit current **fault**
- [3] Exhaustive battery charge
- [4] Terminal 30g-f shut-down due to start capability limit

[5] Main selection  
 [6] End test module



**Closed-circuit current faults**  
 - The results screen only gives you information as to the frequency, mileage and current range that the draw is occurring.

**B6131\_70112 / Note 7**

The results of the closed-circuit current monitoring in DME/DDE are questionable (vehicle in sleep mode and closed-circuit current was too high).

The following results of the last 32 cycles of the closed-circuit current monitoring system are saved in the engine control:

Number of cycles with closed-circuit current OK (<80mA): 31  
 Number of cycles with closed-circuit current > 80 mA: 1



**Closed-circuit current faults**  
 - The last 32 drive cycles are displayed. Note the problematic ones

**B6131\_70112 / Note 7**

Before cycle19: Closed-circuit current OK  
 Before cycle20: Closed-circuit current OK  
 Before cycle21: Closed-circuit current OK  
 Before cycle22: Closed-circuit current OK  
 Before cycle23: Closed-circuit current was 200-1000 mA!  
**There was an increase in the closed-circuit current!**  
 Before cycle24: Closed-circuit current OK  
 Before cycle25: Closed-circuit current OK  
 Before cycle26: Closed-circuit current OK  
 Before cycle27: Closed-circuit current OK  
 Before cycle28: Closed-circuit current OK





**B6131\_70112 / Note 7**

[1] Return to last selection  
 [2] Return to main selection  
 [3] End test module

**Check following possible causes of faults:**

- An additional current load is connected to terminal 30 or to the battery
- A component or a control module consumes too much current in sleep mode

**Further troubleshooting procedure:**

- Observe sleep mode by means of external closed-circuit current measurement (see

**B6131\_70112 / Note 7**

**Service Information 61 03 99 474).**

- Measure with the clip-on ammeter to locate the initiator on the power supply lines to the front and rear power distribution boxes. In this way it is possible to determine the area in which the initiator is located.
- The initiator can be determined by unplugging fuses one after the other at the corresponding power distribution box. Since terminal 30g or 30 is switched off 60 minutes after <Terminal R OFF>, concentrate troubleshooting at the components supplied via terminal 30 and terminal 30g-f.

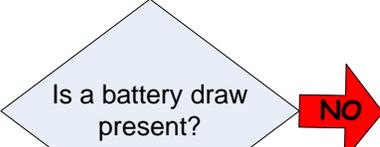


**Closed-circuit current troubleshooting**

- At this point select [3] and end test module.
- Using the measuring system it will be necessary to duplicate the excessive closed-circuit current.
- Refer to SI B 61 08 00 for the procedure on how to monitor the closed-circuit current.
- Disregard the service information reference in the test plan. This does not pertain to this market.

Prepare the vehicle for closed circuit current test

Once the BMW tester is set up for "writer mode" and starts to record, let the vehicle set undisturbed for at least 90 minutes or until vehicle is fully asleep.

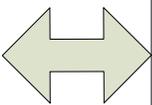


For sporadic faults it may be necessary to monitor the vehicle overnight. In some cases it may be necessary to simulate the customer driving habits/ conditions before testing



**Vehicle preparation:**

- Position vehicle where it will not be disturbed for long term testing
- Ensure battery is fully charged
- Disconnect battery charger prior to measurement
- Set up DIS/GT1 oscilloscope as per SI B61 08 00 using 50A clamp
- Open doors and close latches
- Open trunk and close latch
- Open hood and pull up contact switch
- Open glove box (identifies consumer 1 switch off)
- Remove remote key from CAS – If car has Comfort Access remove remote well away from vehicle.
- Lock the vehicle
- Select the oscilloscope display, calibrate the amp clamp
- Connect 50A clamp to battery ground (arrow towards battery)



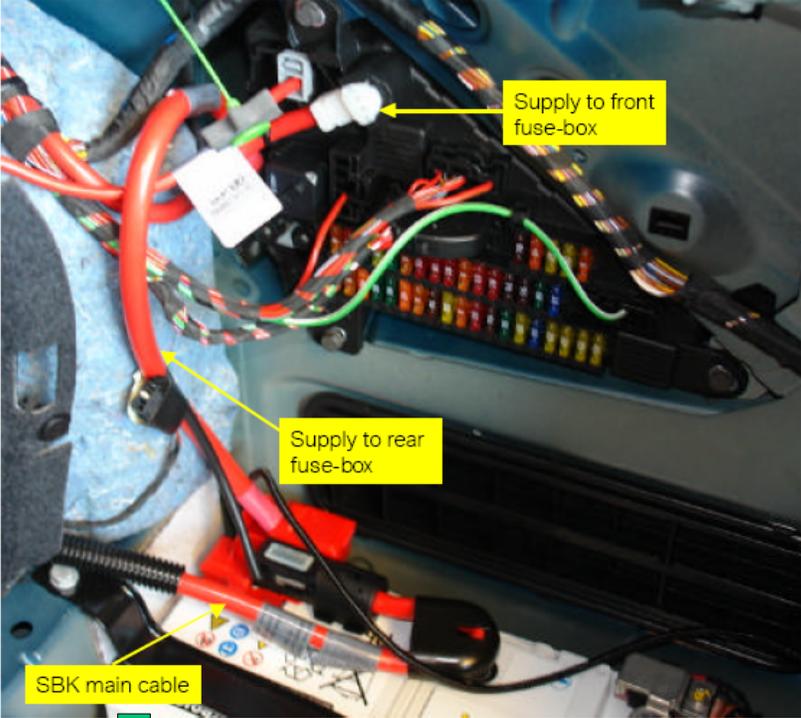


The power distribution from the battery is split as:

- SBK main cable – supplies the starter, alternator and jump-start point in the engine compartment.
  - Main power supply to the rear fuse box, which then supplies power to the front fuse box via a 25mm cable.
- Note:** The IBS power supply is also taken from the main power supply cable.

**Closed-circuit current troubleshooting**

- Using the 50A clamp isolate which circuit the draw is coming from.
- Clip on each cable as noted in the diagram.

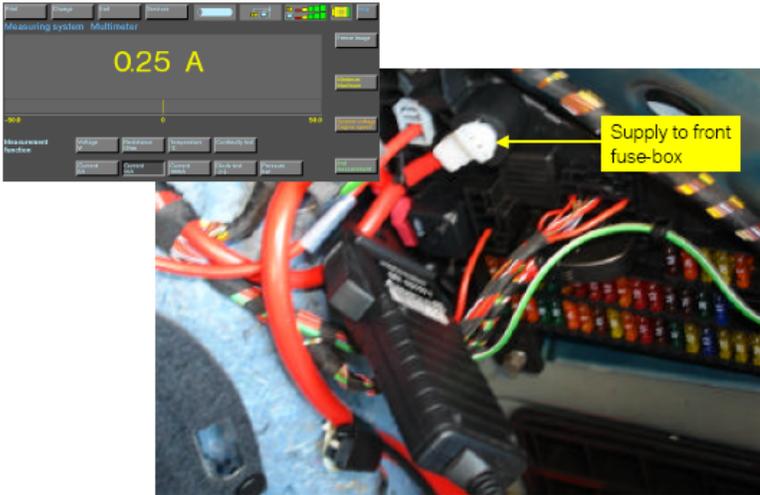


**Example 1 – Excessive drain on front fuse box circuits**

By connecting the 50A clamp to the 25mm cable at the rear fuse box that supplies power to the front fuse box the problem can be seen to be on this circuit.

**Closed-circuit current troubleshooting**

- If the front fuse box is the source of the draw, remove Fuse 18 (Terminal 30g\_f power supply).
- Refer to the wiring diagram for each component that is powered by F18. For example; CCC/MASK, TCU, CDC, CA, etc
- Isolate the cause of the draw by disconnecting fuses from the front fuse box.



This circuit must be split further now by separating Terminal 30g\_f power supply (designated 30\_KGM in the wiring diagram) – remove fuse 18 to do this.





**Closed-circuit current troubleshooting**  
 - Continue troubleshooting by disconnecting each fuse one at a time until the draw is found.



On removal of the fuse the excessive current is no longer present, refit the fuse and allow the car to shut down again. Now disconnect each unit on the Terminal 30g\_f circuit to locate the problem.

If the drain is still present with Terminal 30g\_f isolated the problem is on the main terminal 30 power supply. Continue isolating each circuit by removing fuses one at a time until the excessive closed circuit current is removed.

Refer to the functional description document "Terminal control" for a list of systems supplied directly via terminal 30 – this can be located from the energy diagnosis test module and selecting documents, or the Power Supply SBT (61 07 03) on TIS.



**Closed-circuit current troubleshooting**  
 - The SBK main cable powers the IBS, Alternator and Starter. Always refer to the wiring diagram from specific information about the vehicle being diagnosed.

**Example 2 – Excessive drain on SBK main cable**  
 With the 50A clamp connected to the SBK main cable the fault is localised to the components within the engine compartment.



Refer to the schematic diagram before disconnecting components or fuses on this circuit to eliminate the excessive drain.





### Closed-circuit current troubleshooting

- If the problem still cannot be identified, isolate each circuit at the rear fuse box.
- Start by disconnecting each fuse one at a time.

### Example 3 – Excessive drain not on main battery cables

If the excessive closed circuit current cannot be traced to one of the main power supplies, then the problem is on one of the circuits supplied directly from the rear fuse-box.



With the 50A clamp connected back on the battery earth cable, disconnect the individual plug connections at the rear fuse-box to locate where the problem is – this connection is the power supply for the KGM.

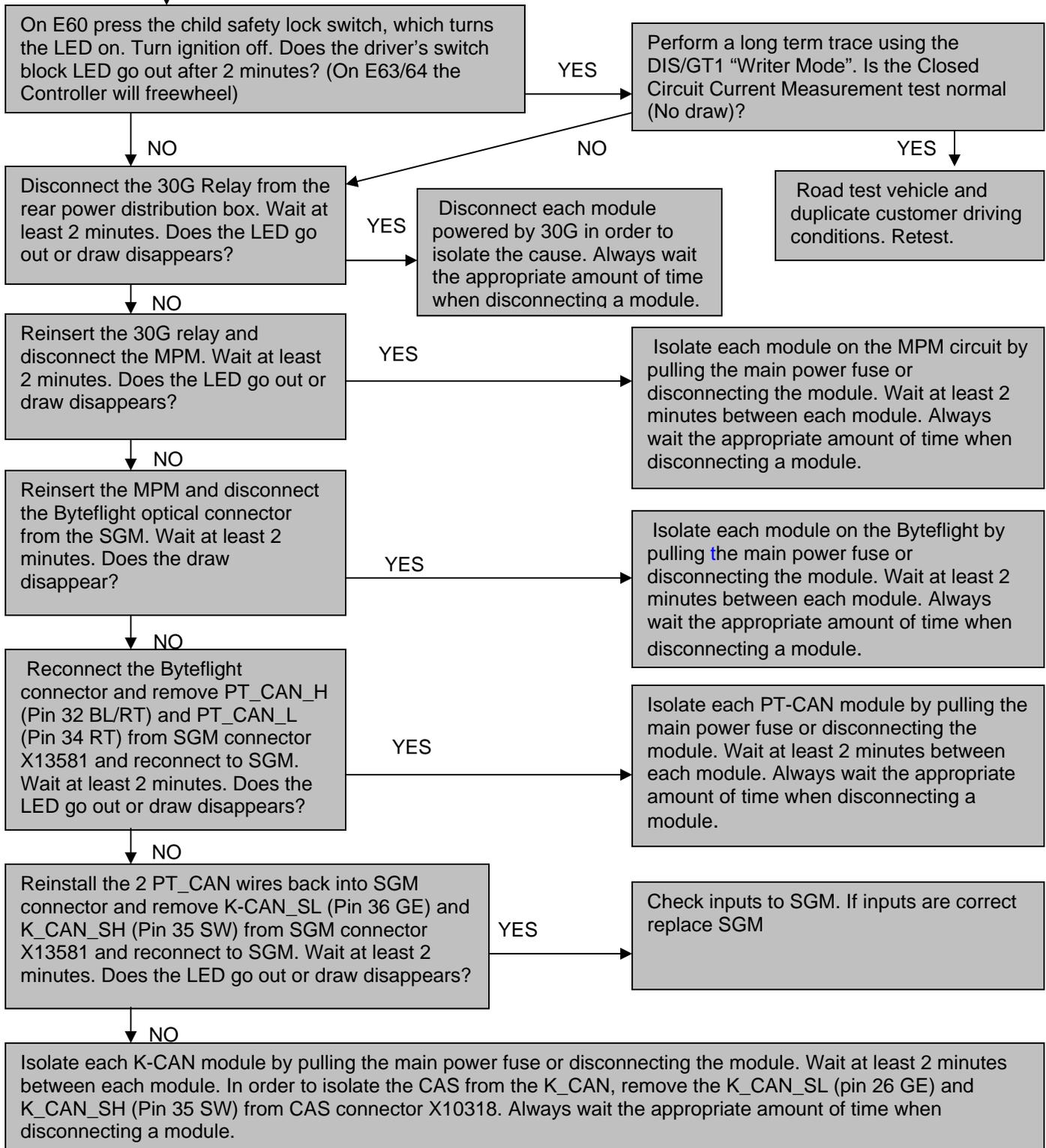
If the draw disappears or is sporadic it may be necessary to wait for the vehicle to enter sleep mode again, since this is a closed circuit current problem that only exists while the vehicle is in sleep mode

All other causes identified by the Energy Diagnosis test plan should be diagnosed according to the instructions included in the test plan.

Refer to the Functional Description documents in the test plan when troubleshooting for more detailed information.

## E6x up to 9/05 production Excessive Closed Circuit Current

**Before proceeding further with this troubleshooting chart always perform the "Energy Diagnosis" test plan using the DIS/GT1.**



7/13/2006

If the *Energy Diagnosis* test plan indicates the vehicle wakes up after sleep mode and this can be verified by using the GT1 writer mode, use the power down command in the GT1 to save time between each diagnostic step. Service functions/Body/Power supply/Activate rest state/Power down command

Closed Circuit Current Monitoring E60/E63/E64

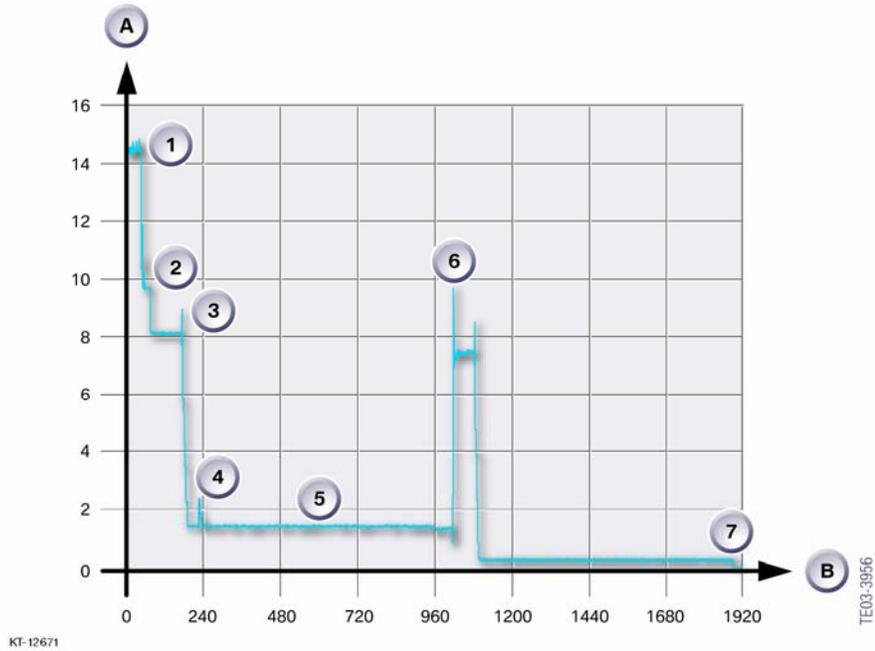
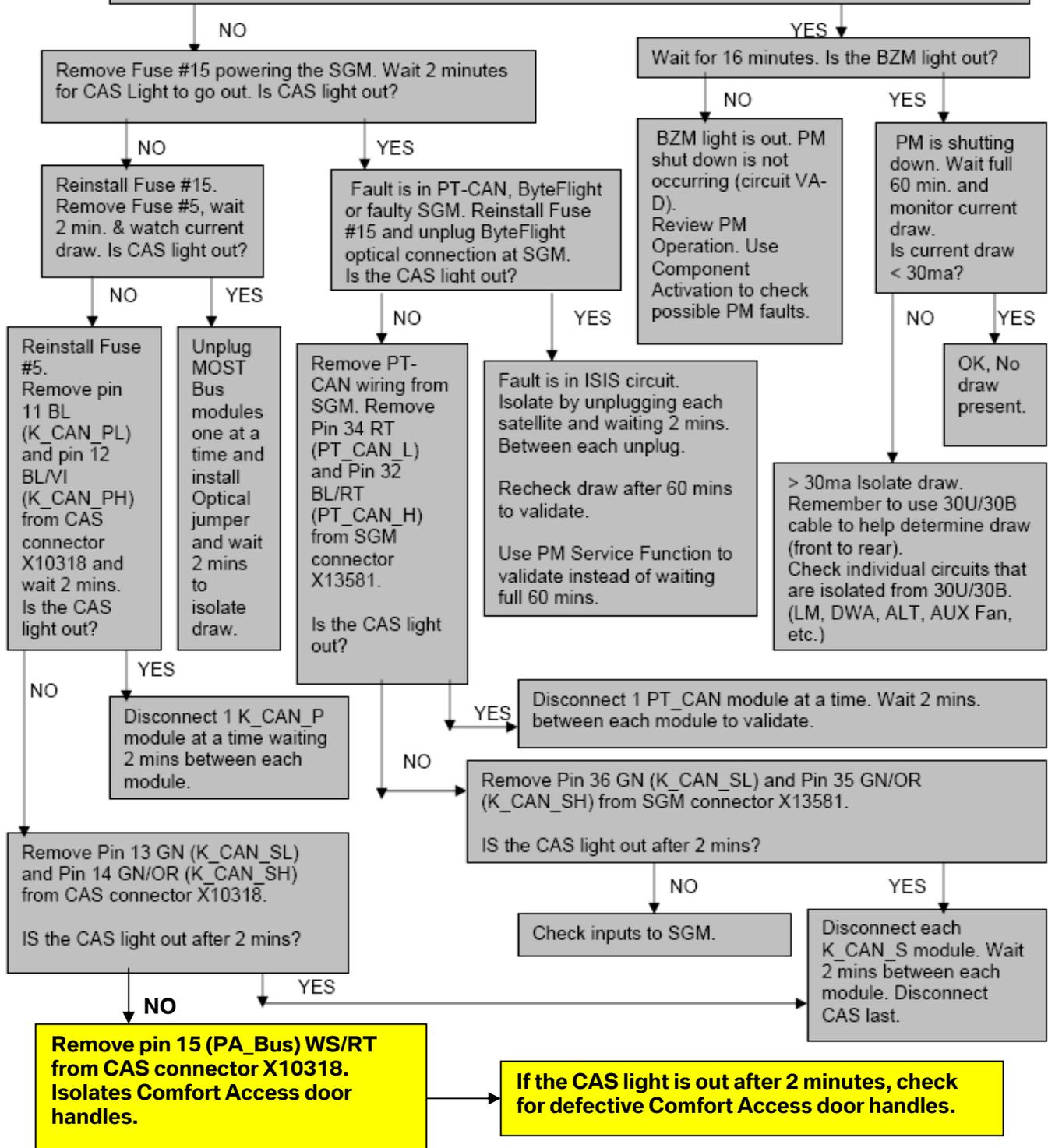


Fig. 3: Current progression after terminal 15 off, E60

Index	Explanation
<b>A</b>	Current (Amps)
<b>B</b>	Time (seconds)
<b>1</b>	Terminal 15 off
<b>2</b>	Terminal R off
<b>3</b>	Bus at rest: Green "child safety lock" lamp in driver's door switch block goes out
<b>4</b>	Current peak, air conditioning flaps closed
<b>5</b>	Dependent on load cutout (map reading light, vanity mirror)
<b>6</b>	16 min.: terminal VA off
<b>7</b>	30 min. or 60 min., telephone cutout terminal 30g, selector lever SMG/EGS LED goes out

## E65 (From 3\_2004) Excessive Closed Circuit Current

*Before proceeding further with this troubleshooting chart always perform the "Energy Diagnosis" test plan using the DIS/GT1.  
Key Off = KL"0", Wait 2 min. Is the CAS LED Out?*



June 2007

**Closed Circuit Current Monitoring Diagnosis E65 up to 3\_2004**  
**Key Off = KL "0", Wait 2 min. Is the CAS LED Out?**

