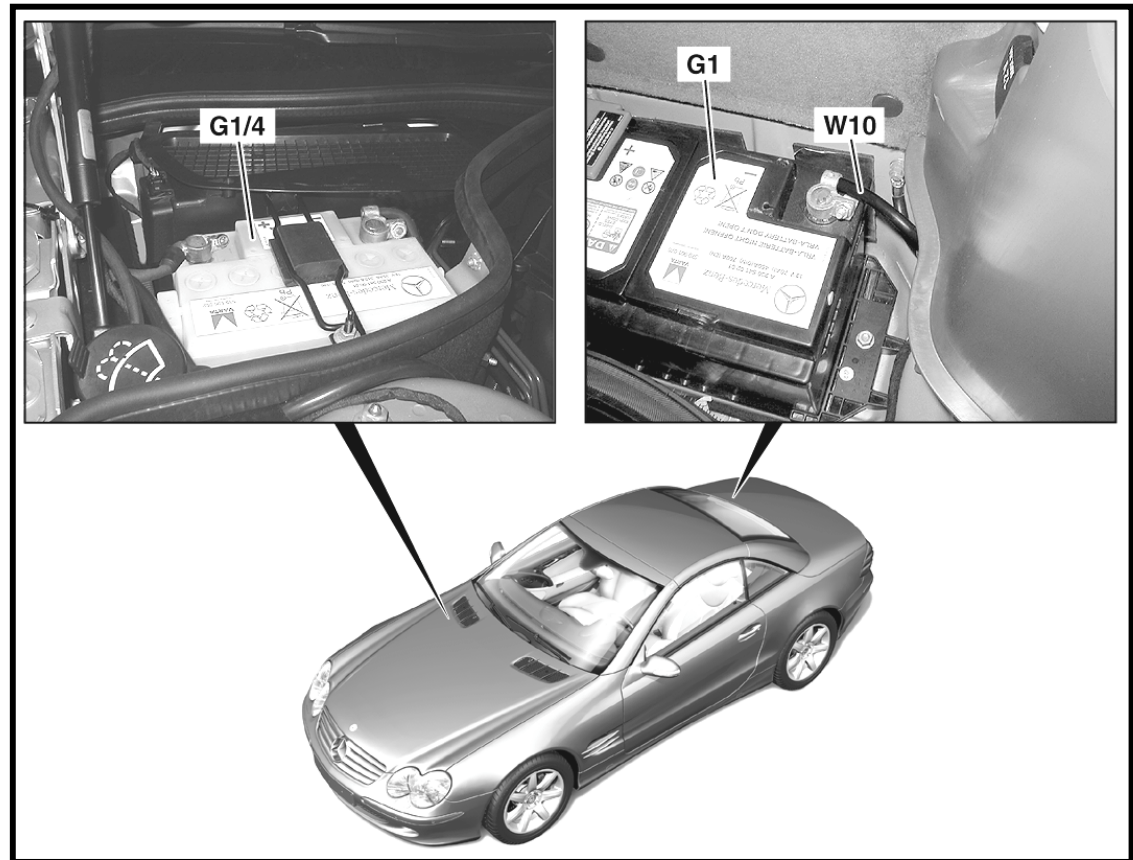




Mercedes-Benz

R230 Dual Battery On-board Electrical System



Dual Battery System Tasks

- Extends vehicle's driving time for safety

Manage electrical power consumption by temporarily disabling convenience consumers if vehicle power falls below a certain voltage.

- Guarantees vehicle will start with a dead systems battery

To provide a back-up power supply to the systems circuit if the system battery cannot provide sufficient power to the vehicle.

Program Highlights

- Dual battery on-board electrical system components
 - starter battery
 - systems battery
 - vehicle power supply control module
 - battery cut-off relay
 - isolation relay
- Power distribution
 - prefuse function & locations
- Dual battery functional description
 - normal modes
 - failure modes

Starter Battery (G1/4)



Note: when jump starting, ONLY USE THIS BATTERY!



- Starter battery: 12V 35Ah 315A (DIN) 520A (EN)
- Construction: standard automotive lead acid (maintenance required)
- Function: i) supplies electrical power for starter motor armature only
ii) provides back up power to the system circuit

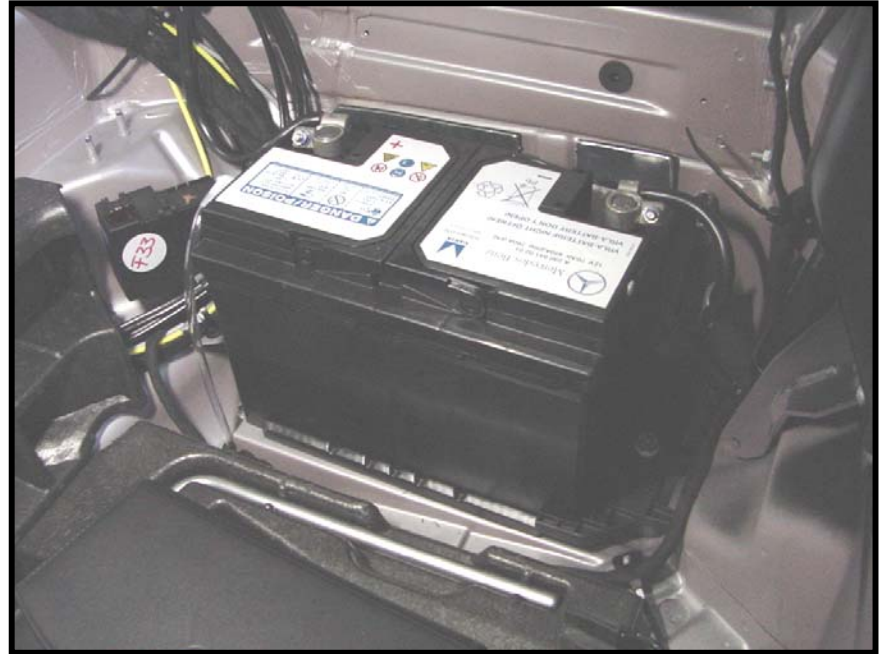
Starter Battery Failure Display



- Multi-function display red (category 1 malfunction)
- DTC's will be set in the vehicle power supply control module (N82/1)
- Cannot be erased by customer (can only be erased using SDS / DAS)

Systems Battery (G1)

Note: when jump starting,
NEVER USE THIS BATTERY!



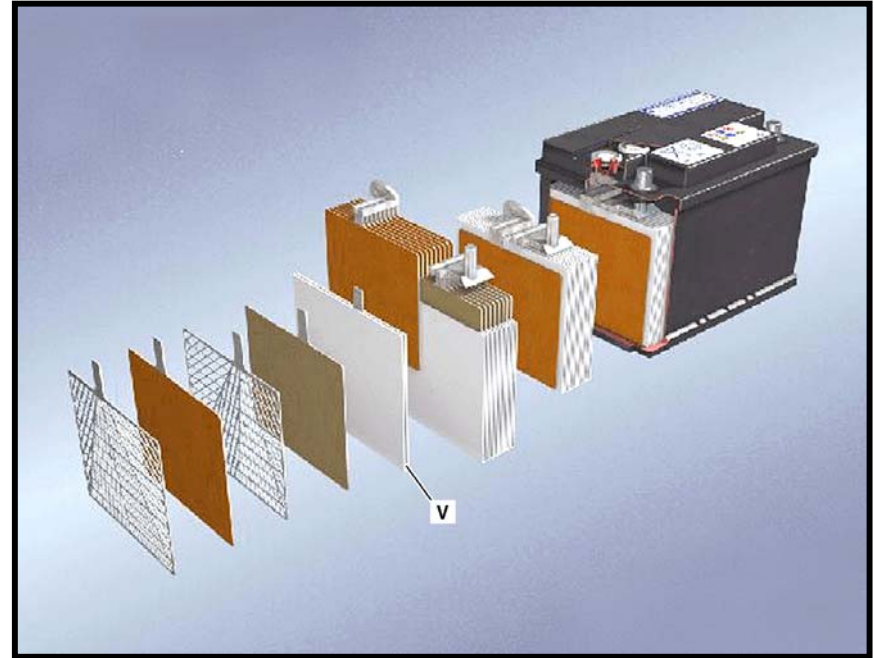
Location: in trunk - right side

- Systems battery: 12V 70Ah 450A (DIN) 798A (EN)
- Construction: Valve Regulated Lead Acid (VRLA) type, using Absorbent Glass Mat (AGM) design
- Function: supplies electrical power for entire vehicle (incl. the starter solenoid) with the exception of the starter motor armature

AGM / VRLA Battery Construction

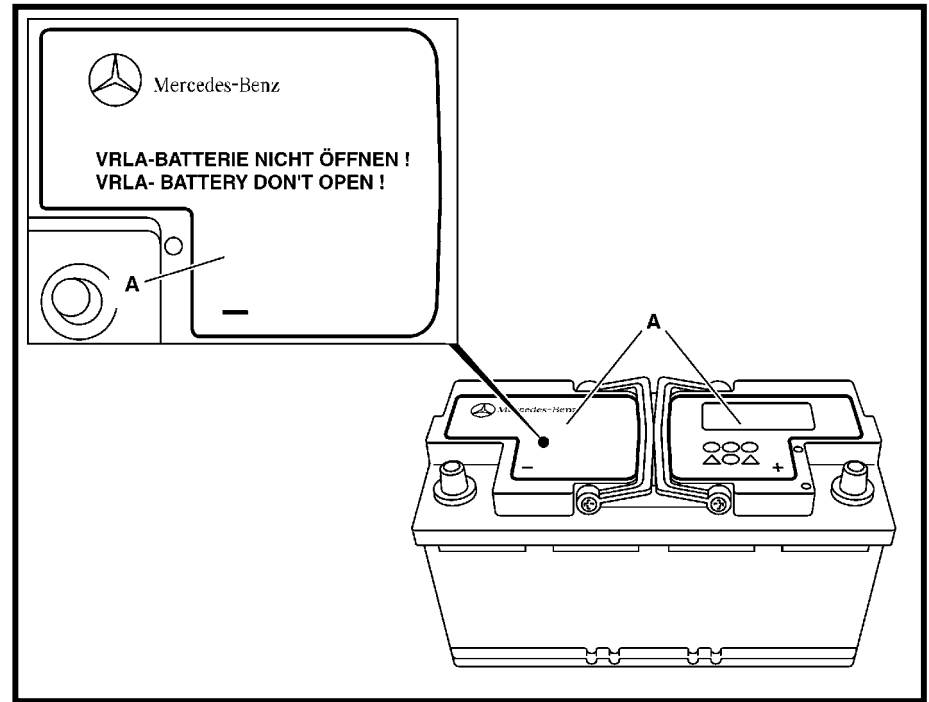
The major differences in construction between a AGM battery and standard lead acid automotive battery are:

- Completely sealed case construction
- No liquid electrolyte in solution
- Absorbent glass mat (V) holds electrolyte in contact with positive and negative plates
- Vent valve is normally sealed no gases can escape during normal charging
- Vent valve is only opened if internal pressure exceeds predetermined level



AGM / VRLA Battery Properties

- Longer service life
- Improved deep cycle performance
- No liquid acid spills or leaks
- Fast recharge time
- Completely maintenance free



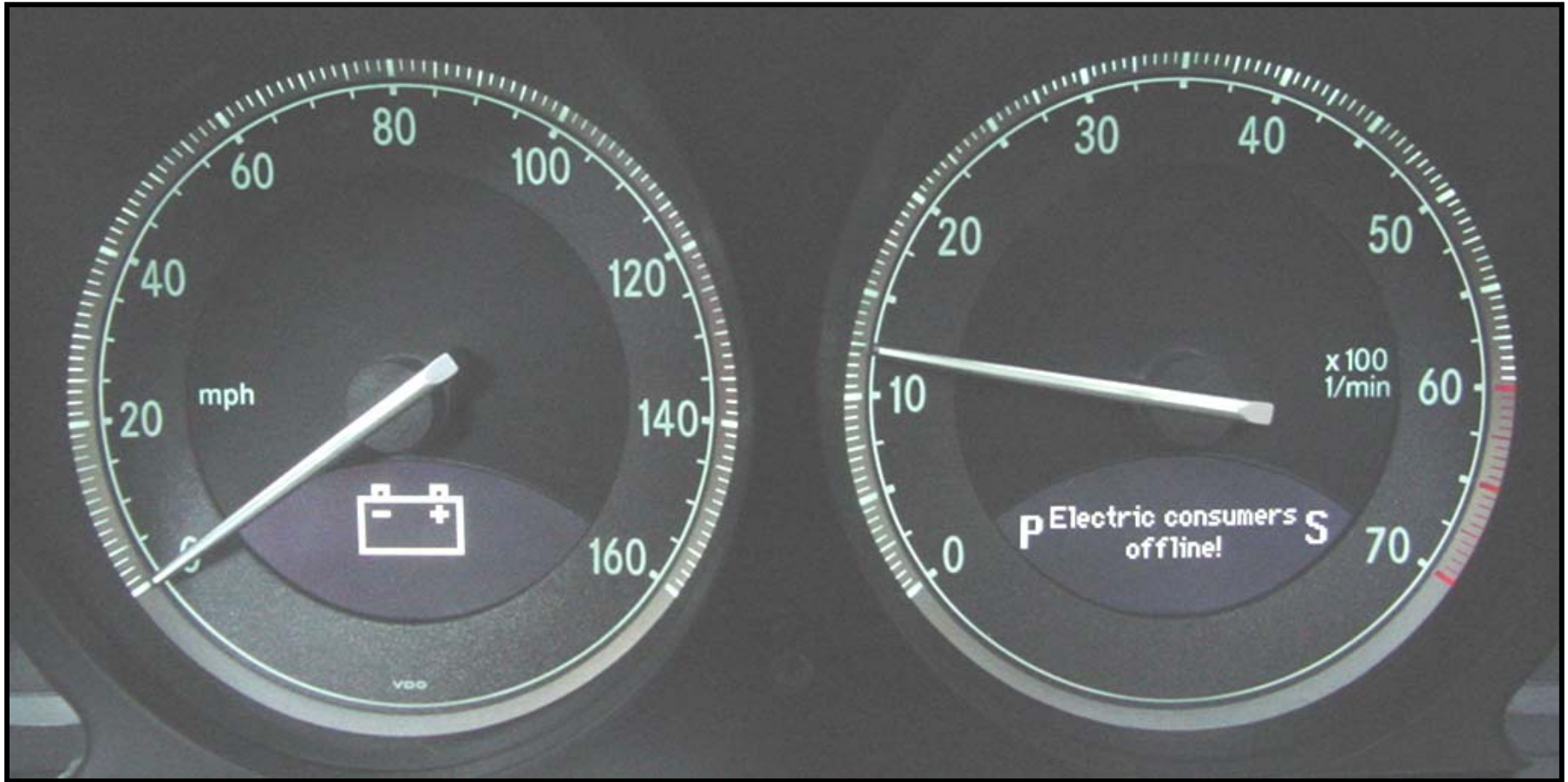
AGM / VRLA Battery Testing

- Requires the new Midtronics MCR 717 tester and printer
- Tester measures battery conductance by inducing A/C voltage of a given frequency and amplitude on the battery posts and monitoring the current flow in response to it
- Discard the acid density sheet, and enter test code (recorded by tester) on warranty claim forms
- Battery replaced under warranty must have a test printout attached to the R.O.
- Detailed information about testing, and using the MCR717 can be found in WIS SI54.10-P-0003-01



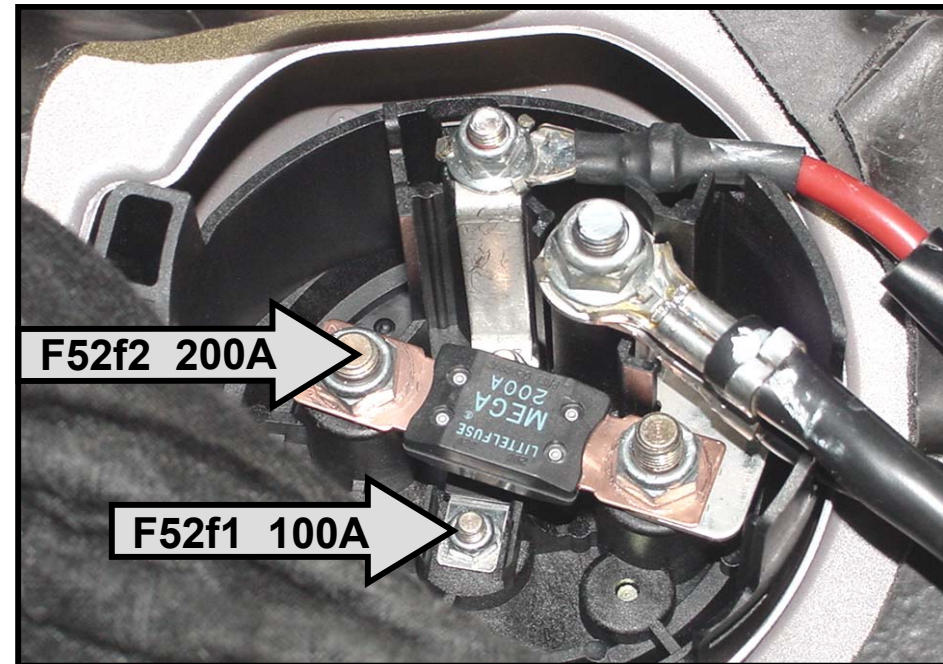
```
Micro717 v1.0  
(C) MIDTRONICS  
  
MBUSA EDUCATION  
CENTER WEST  
RANCHO CUCAMONGA  
CALIFORNIA  
(909) 476-7500  
  
_____  
BATTERY TEST  
  
VEHICLE:  
PASSENGER CAR  
  
RATING:  
315 A (DIN)  
  
12.79V 379 A (DIN)  
GOOD BATTERY  
  
TEST CODE  
4M2LT-0F
```

Systems Battery Failure Display



- Multi-function display blue (category 2 malfunction)
- DTC's will be set in N82/1
- High current consumers are shut down (prioritization feature)

Front Pre-fuse Block (F52)

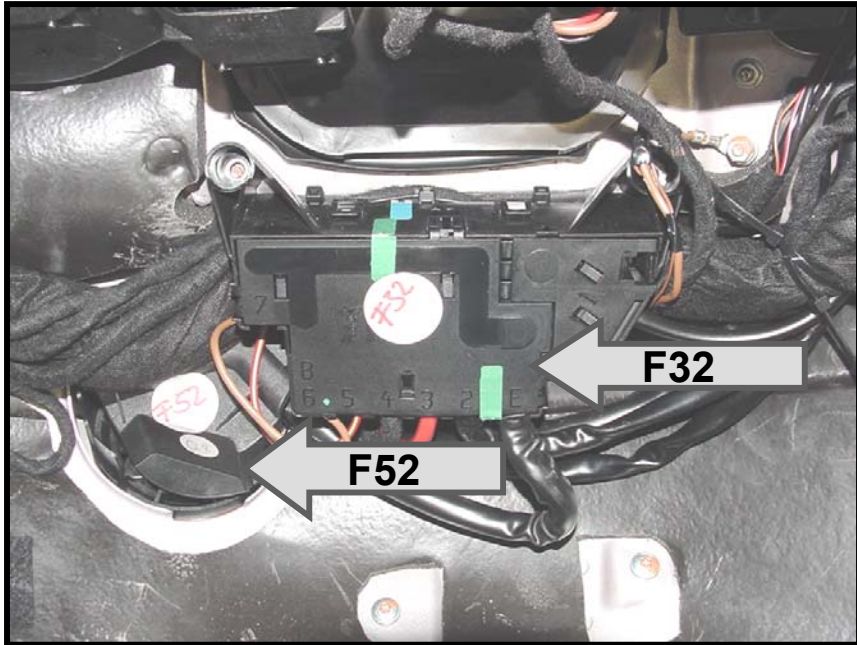


Location: passenger footwell (upper left)

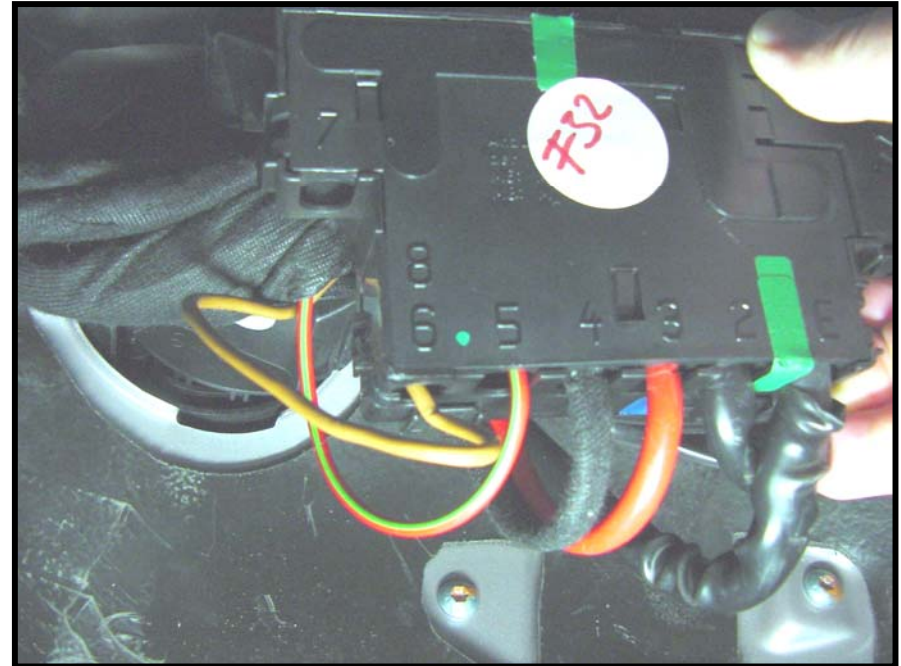
F52f1- Circuit 30a protection for supply wires to K57, K75, and N82/1

F52f2- Alternator (G2) short circuit protection

Front Pre-fuse Block (F32)



Location: passenger footwell



Function: over current protection for the following:

F & R SAM , EIS, blower motor, suction fan

Rear Pre-fuse Block (F33)

F33f3 - External fuse 7.5A
Used for Emergency Engine Stop

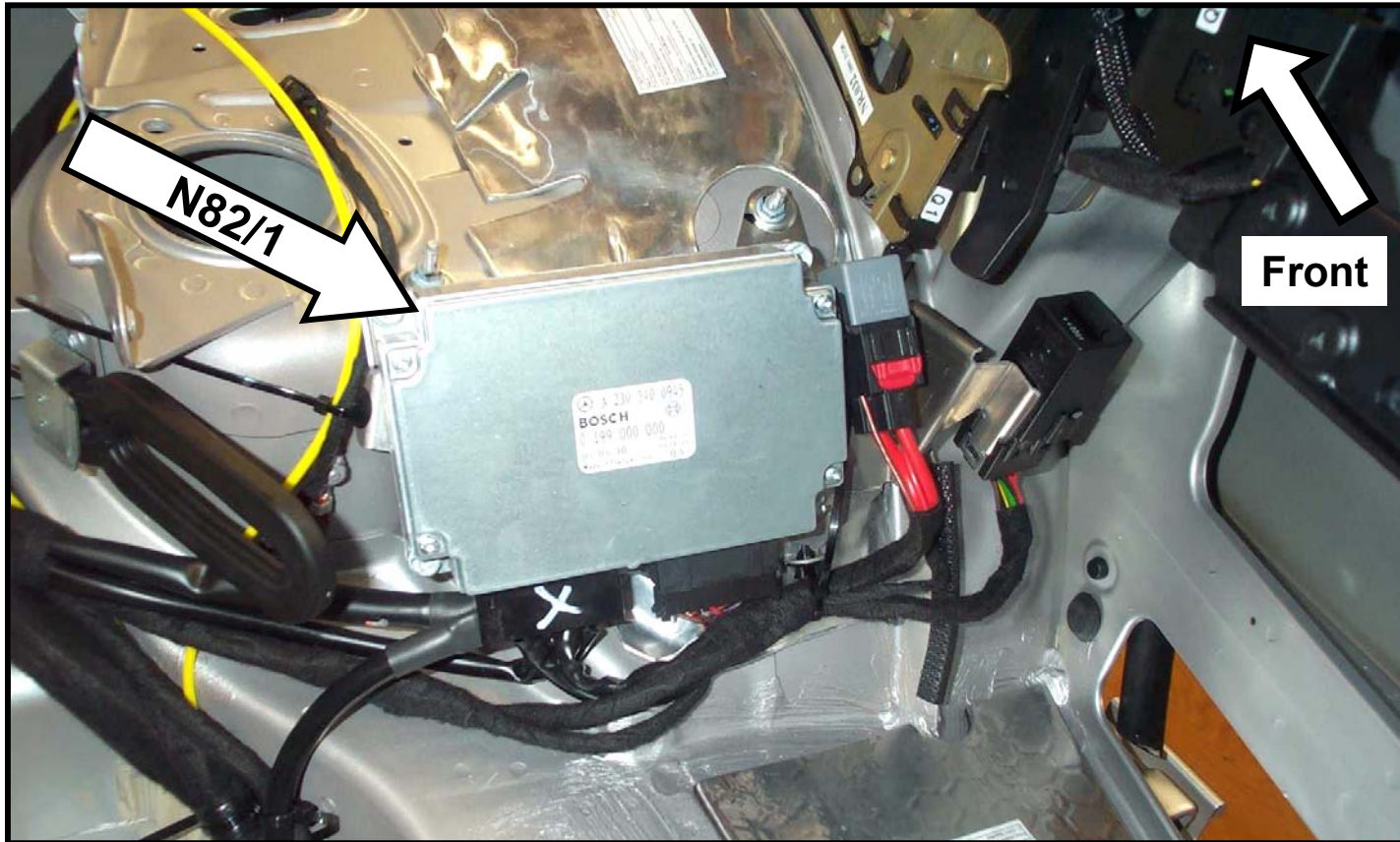
- Feeds Z4/4 (30z)
 - EIS (N73) power supply
 - SCM (N80) power supply
 - ME (N3/10) power supply



Location: right side of trunk

Note: vehicle fuse chart refers to this fuse as #78

Vehicle Power Supply Control Module (N82/1)



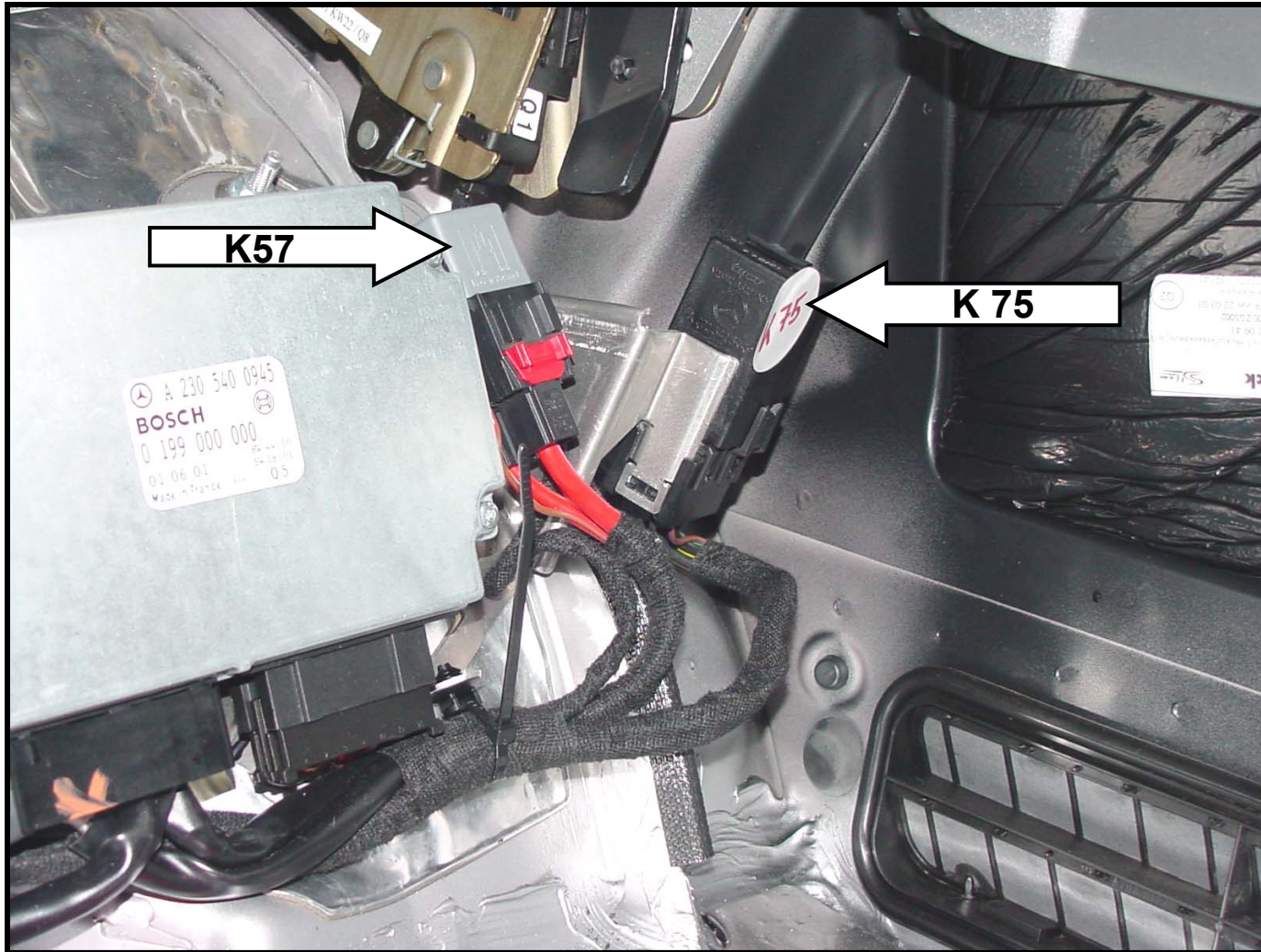
Location: right side of trunk

Note: SDS / DAS Acronym BNS (Board Net System)

N82/1 Function as Described in WIS

1. Monitors the voltages of (G1) and (G1/4)
2. Controls battery cut-off relay (K57) & isolation relay (K75)
3. Protects vehicle electrical systems from voltage surges
4. Protects vehicle electrical systems from short circuits
5. Controls consumer prioritization function
6. Optimizes charging of starter battery (G1/4)
7. Notes emergency operation and sets fault codes
(CAN communication / DTC's)

Cut-off (K57) and Isolation (K75) Relays



Location: right side of trunk

Function of Relays (K57) and (K75)



Cut-off relay (K57):

- Controlled by N82/1
- De-energized during normal operation (N.O.)
 - Isolates (G1) from (G1/4) during normal operation
- Energized during emergency operation
 - Connects (G1/4) to (G1) during emergency operation



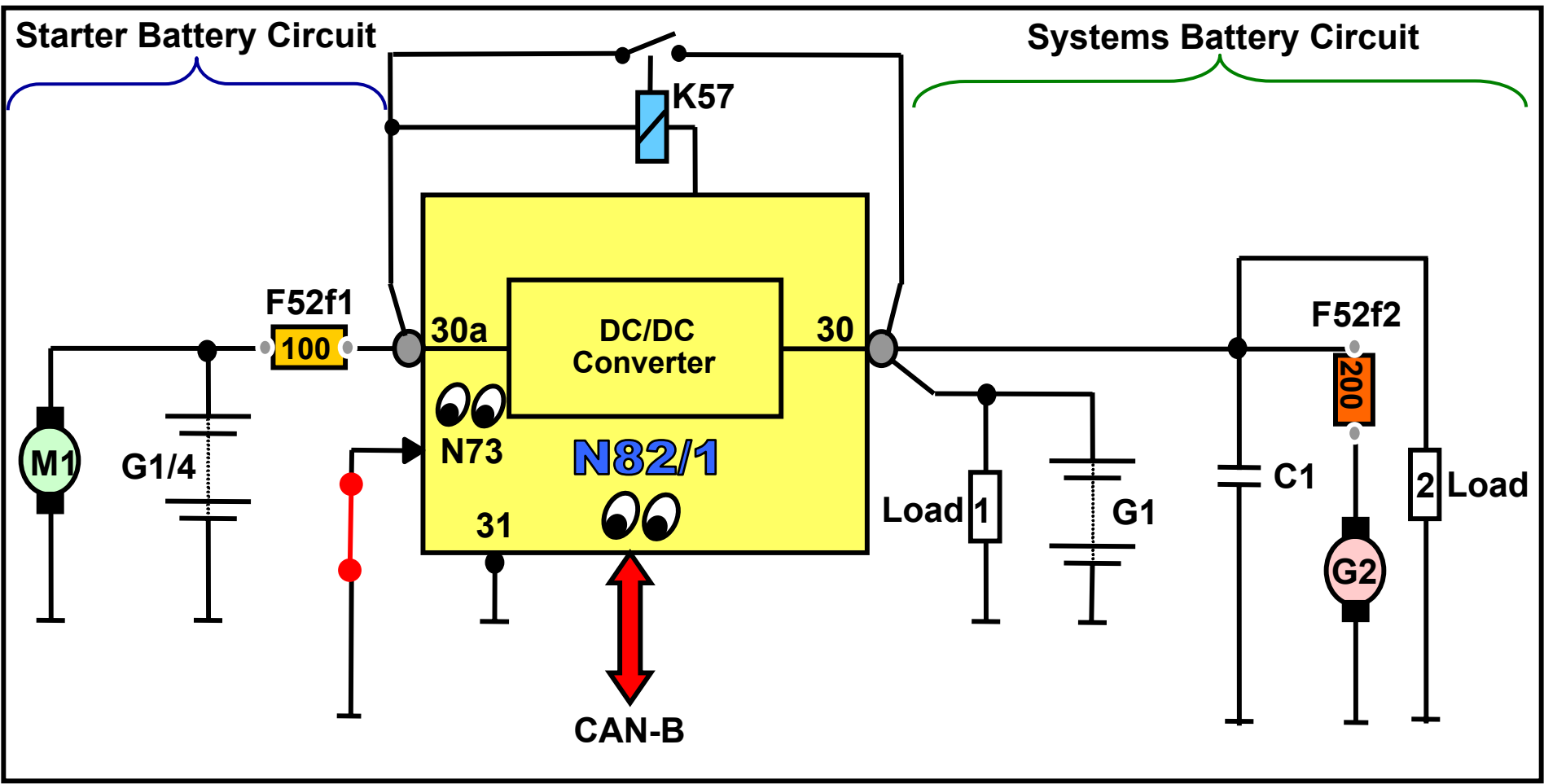
Isolation relay (K75):

- Controlled by N82/1
- De-energized during normal operation (N.C.)
- Energized during emergency operation
 - Opens 30/15R to cigar lighter (R3r1), and 12V trunk socket (X58/1) during emergency operation

Dual Battery On-board Electrical System

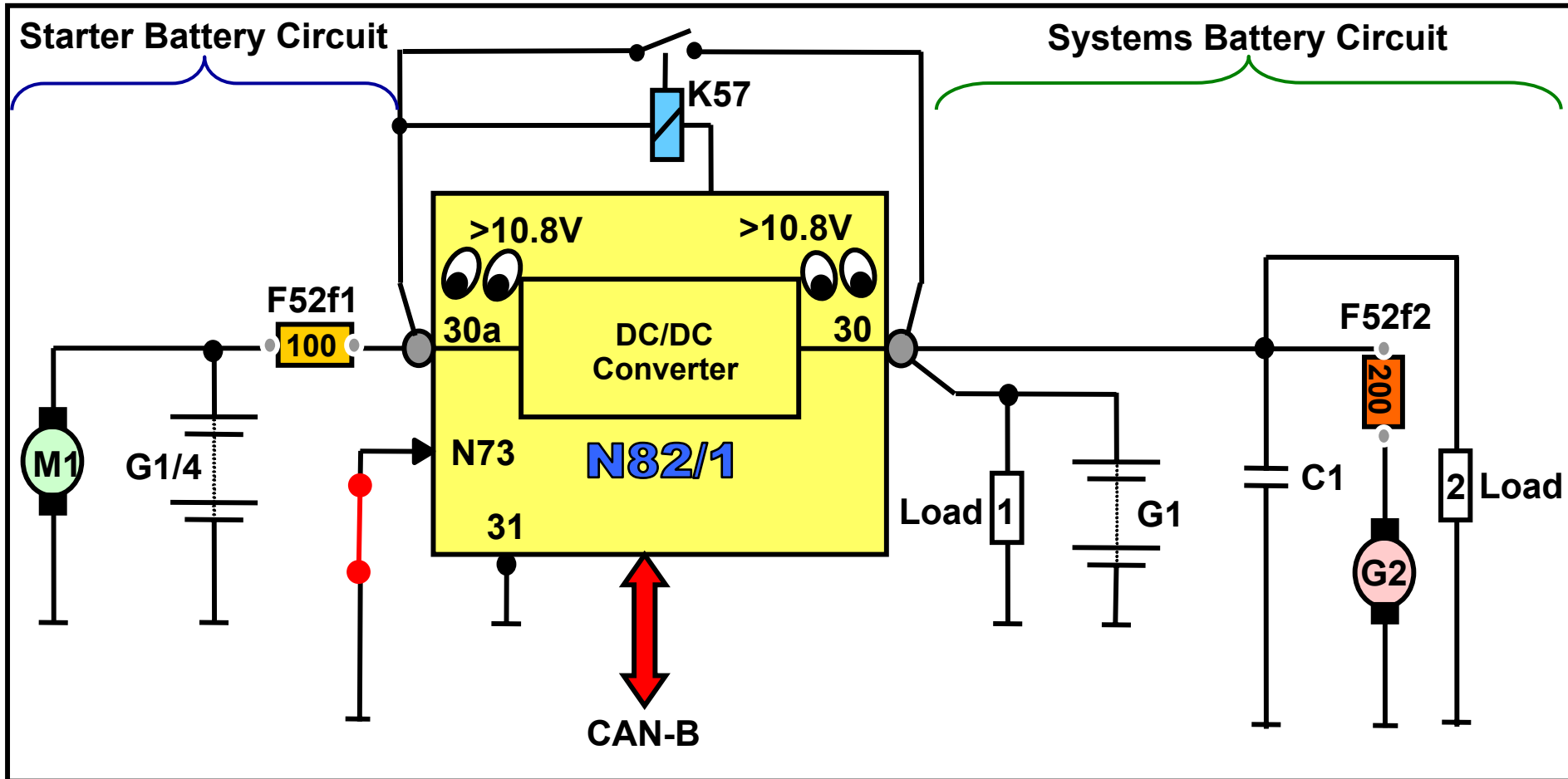
Functional Description

Normal Operation (Wake-up)



N82/1 control module is activated by: CAN-B or microswitch in EIS

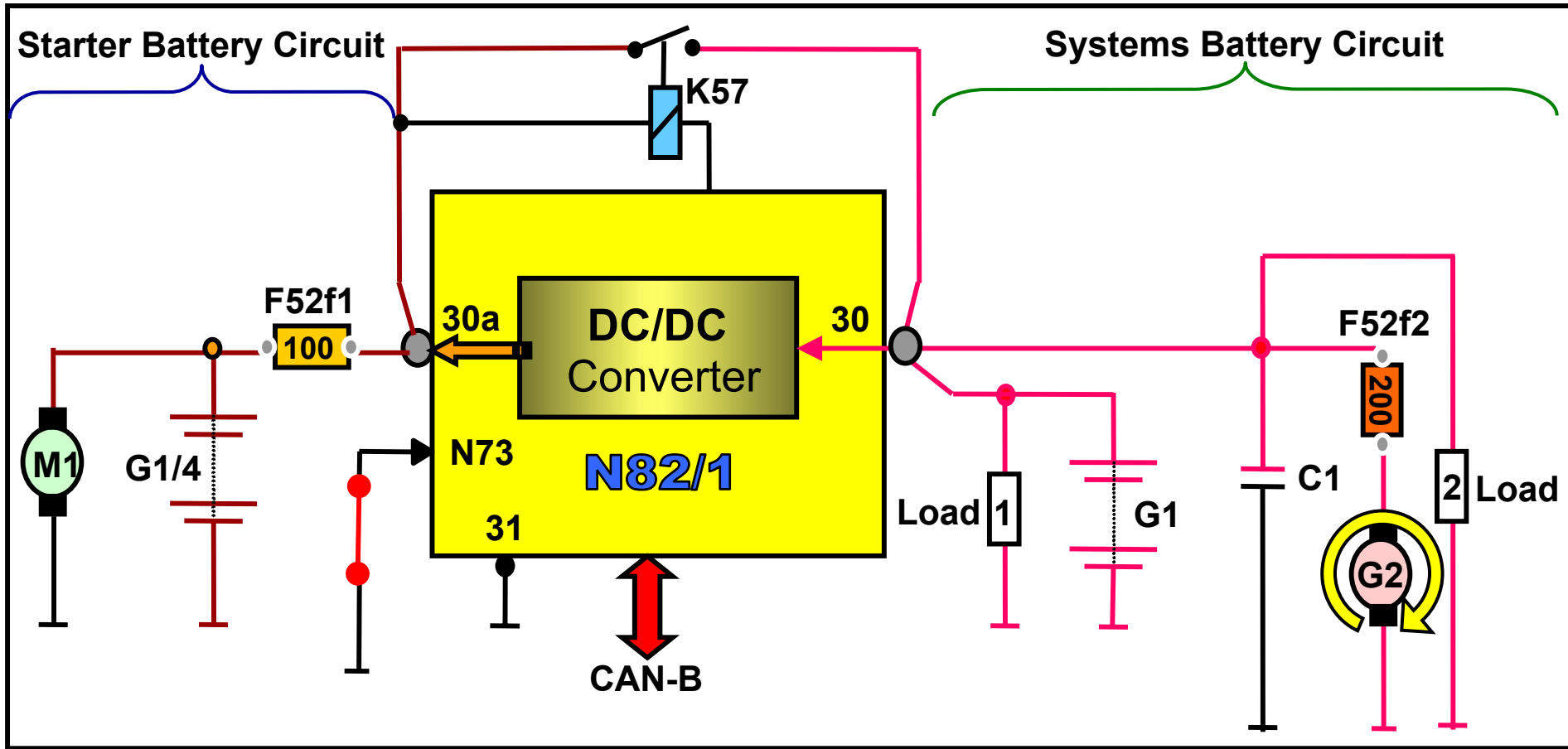
Normal Operation (Voltage Monitoring)



N82/1 control module checks battery voltages

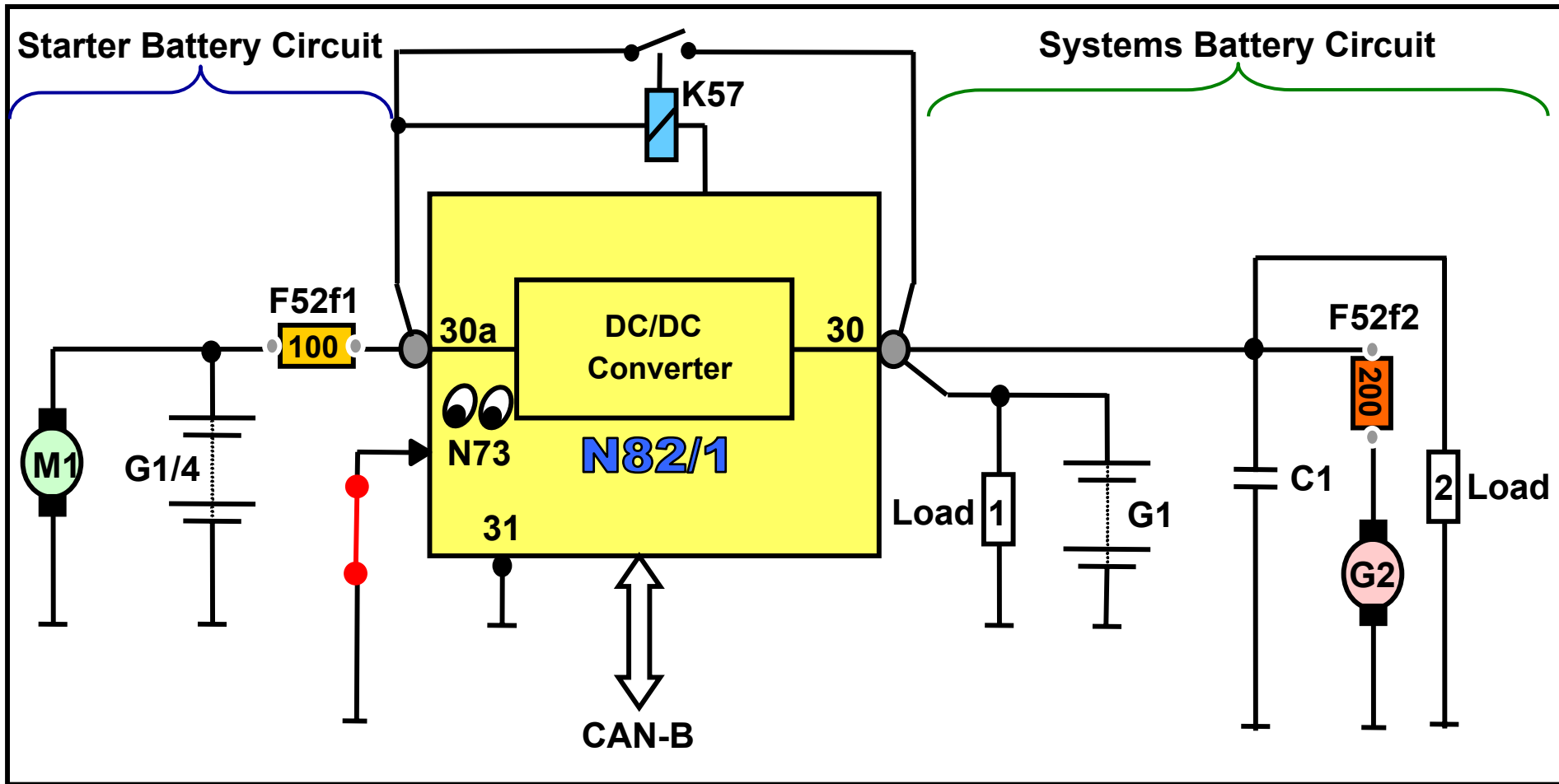
N82/1 control module isolates starter battery from systems battery via open relay K57 (not energized)

Normal Operation (Charging)



- Engine running, alternator charges the systems battery directly
- Starter battery charged via the DC / DC converter (15A max), based on:
 - Starter battery voltage
 - Starter battery temperature calculated by N82/1 using:
 - Ambient temperature (B14)
 - Engine coolant temperature (B11/4)

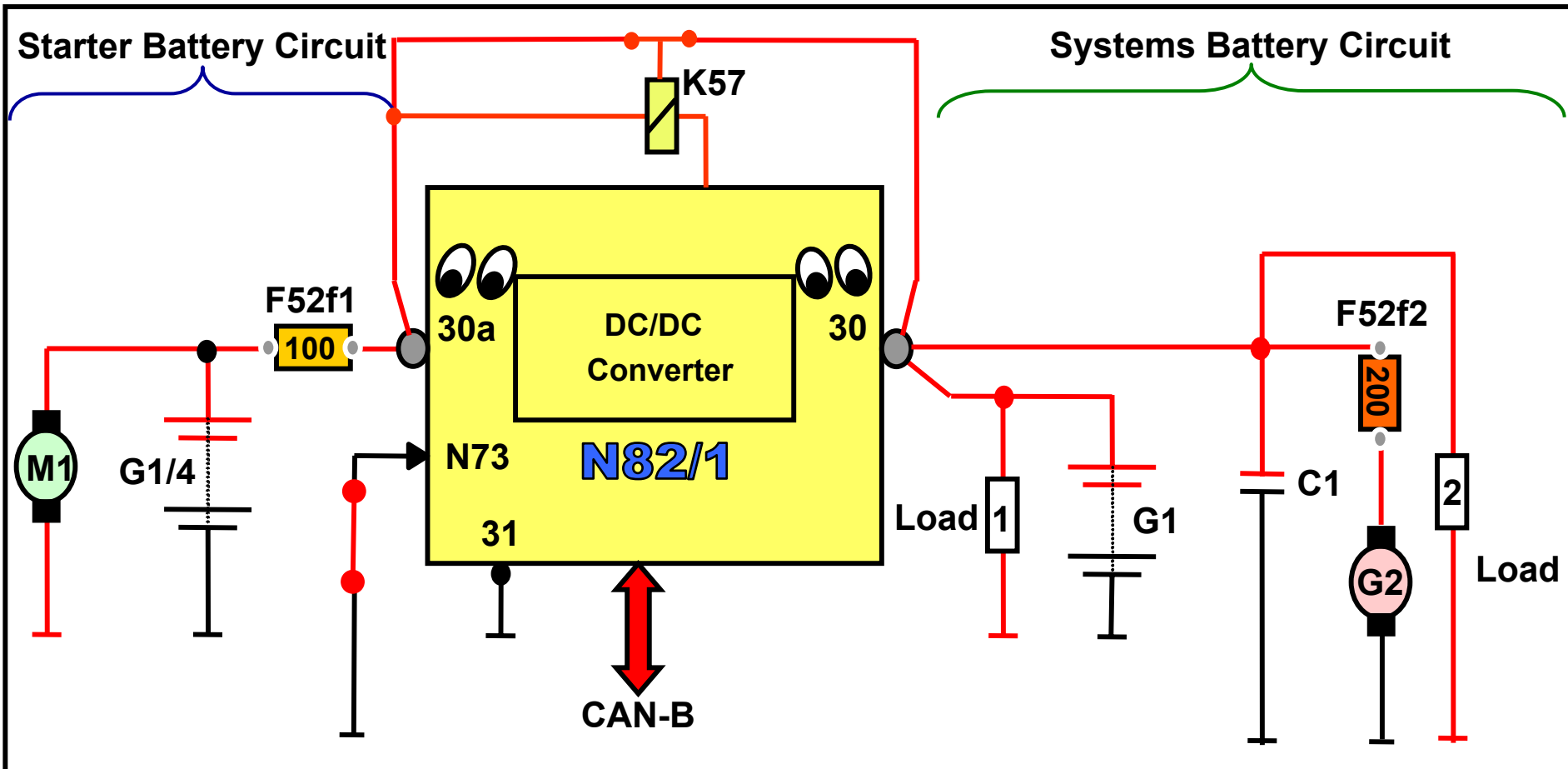
Emergency Start (Wake-up)



Scenario - Systems battery weak:

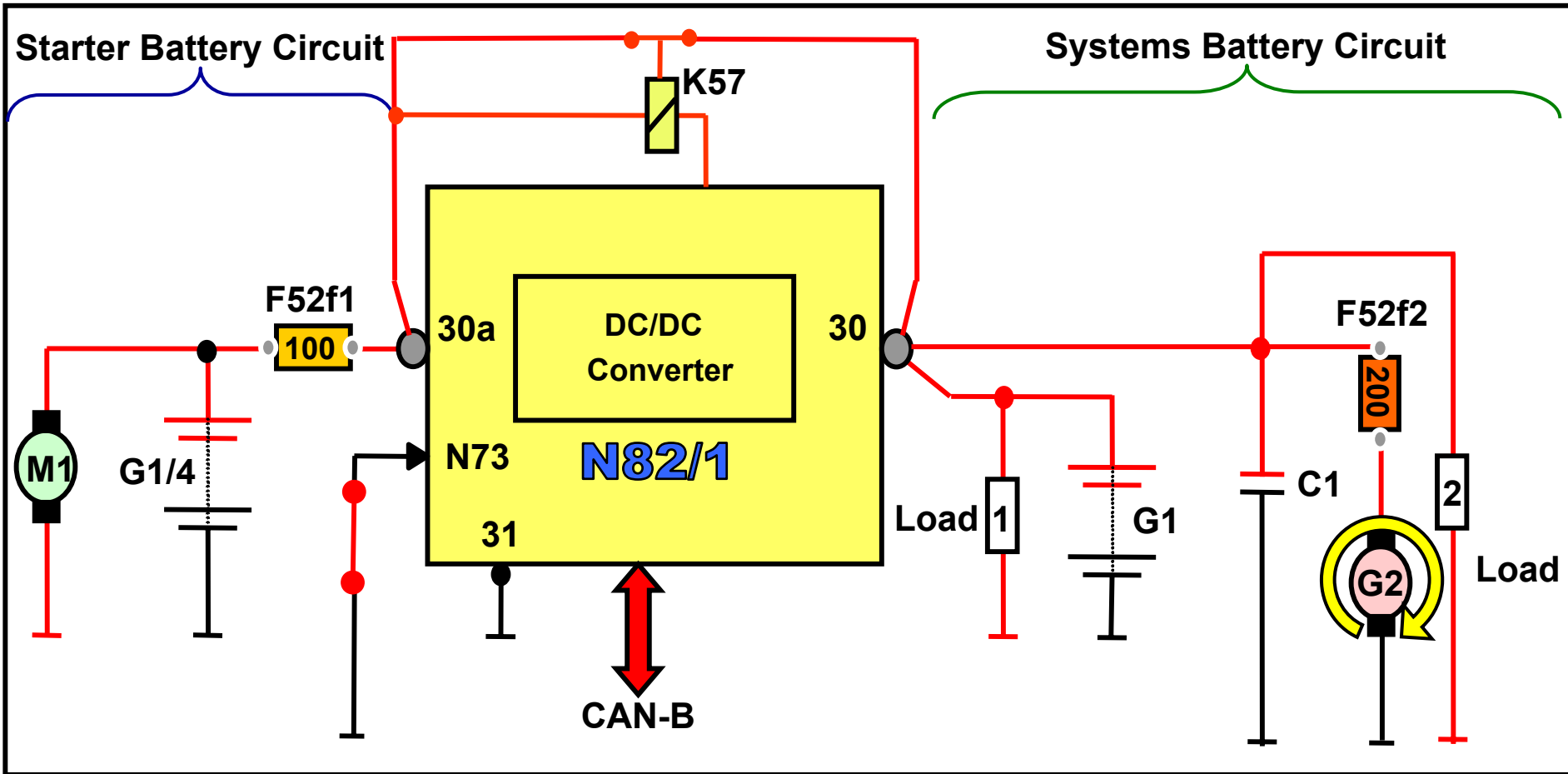
N82/1 control module is activated by the ground microswitch in EIS (N73)

Emergency Start



- N82/1 activates relay (K57), starter battery supplies power to systems circuit
- N82/1 control module sends emergency operation message via CAN B
- DTC's stored in N82/1

Emergency Operation (Limp Home)



- Engine running alternator charges G1 and G1/4
- Relay (K57) remains activated ~5 minutes after engine is started to quick charge G1/4
- Prioritization function active for ~8 to 18 minutes (if voltage at t30 > ~10.8V)

Emergency Mode Summary

- N82/1 activates cut-off relay (K57) and isolation relay (K75)
- Starter battery (G1/4) supplies power to systems circuit
- N82/1 sends emergency operation message via CAN B
- N82/1 stores DTC's
- Instrument cluster multi-function display "Electric consumers offline!"
- Prioritization function active:
 - seat heaters inoperative
 - seat fans inoperative
 - Vario roof can only be raised
 - AAC blower is regulated up to a maximum of 50%
 - rear window defroster inoperative
 - parktronic switched off
 - radio volume limited

Emergency Mode Summary (cont.)

- Engine switched off, SmartKey in pos. 0 or removed:
 - K57 remains energized for ~5 min. (e.g. windows, CTEL, or TeleAid call)
- SmartKey reinserted in pos. 0:
 - K57 will re-energize for 30 seconds
- SmartKey reinserted to pos. 1 or 2:
 - K57 will re-energize for ~5 min.
- If voltage at N82/1 terminal 30 increases to >10.8v:
 - prioritization function cancelled after ~8 to 18 min. of engine running

Dual Battery Service Tips

Normalization:

If batteries are disconnected or dead, the following systems should be checked for normal operation. If systems are inoperative or erratic then normalization will have to be performed.

Potential systems requiring normalizing are:

- ESP - electronic stability program
- AAC - automatic air conditioning (2 items)
- Left front seat (7 items)
- Right front seat (7 items)
- Steering wheel and mirrors
- Windows
- Tire pressure monitoring

Appendix

WIS doc.#	Topic
AR51.10-P-1129-01A	Checking battery with Midtronics MCR717
OF58.40-P-3000-04A	Order form for Midtronics MCR717
GF54.10-P-6005A	Problems with charging batteries
GF54.10-P-4200R	Battery cut-off relay, location, and function
GF54.10-P-1001R	Two-battery vehicle power supply, function
GF54.21-P-4118R	Vehicle power supply control module, function
GF54.21-P-4118-01R	Vehicle power supply control module, task
PE54.10-U-2101-99KA	Wiring diagram of N82/1

Internet Sites	Topic
www.midtronics.com	Total battery management (AGM) charging, testing