

Technical Bulletin

Model
4 & 6 Cyl.

Group
2

Subject:

Diagnosing Discharged Battery

Part Identifier

2706

Number

9402

ATTENTION: Service Manager / Service Technician

Models Affected:

968 from Model Year 1992-on
911 Carrera 2/4 1989-1994 and 911 Turbo 1991-on

Concern:

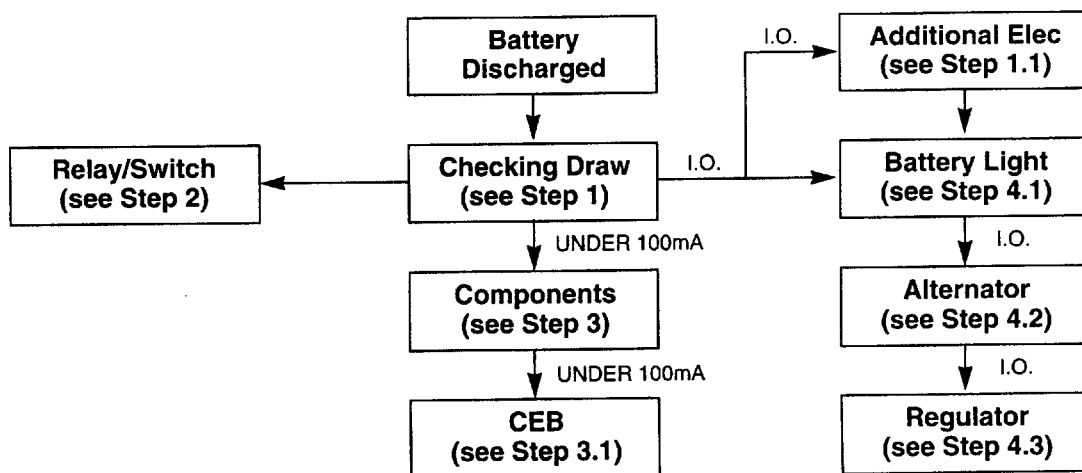
Discharged battery diagnosis through the central electric board and current draw checking.

The following information has been produced in connection with Technical Bulletin Group 2, 9204, dated September 29, 1992. In an effort to avoid repeating covered subject material, only the following topics are discussed:

1. Current draw checking. (Updated information from Technical Bulletin Group 2, 9204.)
2. Diagnosing defective relays. (New information.)
3. Checking current draw and electronic components through the central electronic board. (New information.)
4. Battery charge lamp (excitation voltage, charging voltage) and alternator/regulator checking. (New information.)

IMPORTANT: Before checking current draw, determine the age of the battery, acid level and density.

Diagnosis Program:



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Diagnosis Program (cont.):

The following procedures should be used to diagnose the aforementioned points.

Step 1: Current draw checked at rest is accomplished by using an amp meter connected in series between battery minus cable and the battery minus pole. Select the four amp scale or greater. Switch to the 40mA range without interrupting the circuit.

- **Procedure: Any aftermarket accessory (telephone, stereo, CB radio, etc.) must first be disconnected completely (remove fuses, etc.).**
- Check the on-off switching points for the door switches, glove compartment or engine lid.
- Set the trunk switch to the "off" position on 6 cylinder vehicles and the engine lid switch to the off position on 4 cylinder vehicles.
- Record customer's radio station presets.
- Close all doors and lids and be certain all consumers are switched off.
- Disconnect battery minus cable.
- Connect amp meter as in Step 1.

6 Cylinder – Maximum allowable current draw for 911 C2/4 1989-1993 = 26mA

- If the battery current draw is higher than 26mA, the cause must be determined.
- From model year 1994 (R), the maximum allowable current draw is 16mA.

4 Cylinder – Maximum allowable current draw for 968 from model year 1992 = 18mA

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IMPORTANT NOTE: Procedure: 911 Carrera 2/4 from 1989 to 1993 model years, the current draw can be 26mA or slightly higher. To reduce this current draw by approximately 10mA, proceed as follows:

Coupe Version – Remove the time clock then remove and discard the bulb socket from position #2 (Arrow in Figure 1).

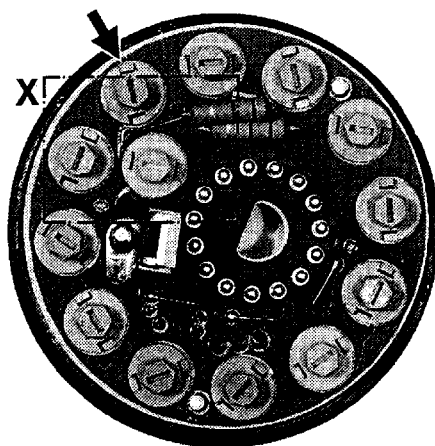


Figure 1

Cabriolet Version – The Cabriolet top warning light (socket #2) must be disconnected from terminal 30 and reconnected onto terminal 15. Proceed as follows:

- Remove the time clock.
- Break the connection from lamp socket #2 (Arrow "A," Figure 2).
- Remove the insulating coating on the current track at arrow "B" (Figure 2).
- Using a short length of wire, connect point "C" of resistor to point "B." Solder connections using a **low** wattage, small tip soldering pencil. Be certain no other connections are made or bridged.
- Reinstall time clock.

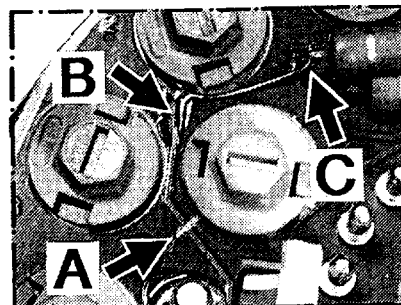


Figure 2

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Diagnosis Program (cont.):

Step 1.1: Reconnect aftermarket equipment and measure the current draw. If higher than 26mA ('89-'93 model years) or 16mA (1994 on), the customer must be informed accordingly that battery discharge is not a warranty matter.

Step 2: Diagnosing faulty relays

When checking current draw, if the amount is over 100mA, a relay is most likely the cause. Remove relays from the C.E.B. one at a time until the current draw drops.

If current draw is over 500mA, a switch could be the cause.

If a sticking relay is suspected, proceed as follows:

- Switch the ignition on and off, remove the key and close the door.
- Install ampmeter between battery minus pole and vehicle body. Then disconnect the vehicle ground strap at the body mounting point. This will prevent interrupting the circuit and allowing the relay to collapse.
- After locating the defective relay, a higher current draw is still possible due to the control unit for the heating-A/C remaining active up to 20 minutes.

Step 3: Measuring current draw of electronic components

- Current draw of electronic components can be measured directly from the fuse in the C.E.B.
- Remove the pertinent fuse and connect ampmeter. A defective fuse should be installed to permit easier connecting of the ampmeter. Do not probe the fuse openings in the C.E.B. as this may cause spreading of the fuse contacts.
- For all 911 Carrera 2/4, the chart on the following page shows approximate (middle) values for current draw by component.



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6 CYLINDER

Component	Fuse Number	Approximate Draw
Window Relay	#4	10mA
Clock, Lighted Diodes (Alarm)	#12	Turbo: 3.0mA, C2/C4:14.0mA*
Sliding Roof/Cab Top	#13	1.7mA
DME Control Unit	#35	1.4mA

*After clock modification approx. 3.0mA

4 CYLINDER

Component	Fuse Number	Approximate Draw
Window Relay	#4	1.0mA
DME Control Unit	#7	2.5mA
Gong Relay, Clock and Outside Temp Display	#11	2.2mA
Lighted Diodes (Alarm)	#12	5.0mA
Radio/Booster	#39	2.2mA

Step 3.1: Diagnosing current draw through the central electric board.

- Remove battery minus cable and install amp meter between battery minus pole and vehicle body.
- Remove and install fuses one at a time and then relays to determine cause of current draw.

Step 4: Battery control lamp – alternator and voltage regulator checking

Step 4.1: Switch on ignition. The battery lamp must light up. After starting the engine, the battery lamp must go out. If this does not occur, a problem exists in the vehicle charging system.

The D+ circuit of the charging system can be checked at the following points:

6 Cylinder – C.E.B. plug "M" terminal 12 (blue wire).

- Pin 11 of the 14 pin connector engine compartment, left side.



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- Diagnosis Program (cont.):**
- Time clock, pin 12. To disconnect, remove the pin from the connector.
 - To interrupt the circuit, remove the pertinent pin from the connector.
- 4 Cylinder** – Directly on alternator.
- C.E.B. plug "E" terminal 15 (blue wire).

CHECKING CHARGING SYSTEM

Ignition On, Engine Not Running. Battery Light Is...	Engine Idling. Battery Light Is...	Comments
On	Off	System OK
On	On	See Step A
On	Glowing	See Step B
Off	Off	See Step C

A. Checking	Condition	Repair Hints
Ignition key on and D+ wire from alternator disconnected (see Step 4.1 for connector location)	Battery light is off	Check alternator & regulator as per Steps 4.2 & 4.3
	Battery light is on	Check for grounding of D+ wire between battery light and alternator

B. Possible Causes Can Be The Following Components		
Component	Cause	Comments/Hints
Alternator	Worn or stuck carbon brushes of voltage regulator	Carbon brush spring pressure weak. Low excitation voltage.
	Defective alternator	Test alternator (see Step 4.2)
Voltage regulator	Defective regulator	Test regulator (see Step 4.3)
Connectors/cable harness	Corroded, loose or broken connections	High resistance to voltage flow. Check voltage (see Note 1 on page 7)



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C. The Excitation Path Is Interrupted

Checking	Condition	Repair Hints
With ignition key on, disconnect D+ wire from alternator and hold against ground (see Step 4.1 for connector locations)	Battery light is on	Problem is in alternator. Check: - Carbon brushes and slip ring condition (see Note 2) - Defective excitation winding (see Note 2) - Defective regulator (see Step 4.3)
	Battery light is off	Problem is in D+ wire circuit. Check: - Cable harness for damage - Defective bulb - Interruption of 15 power to battery light

Note 1: Checking voltage between battery and alternator.

- Start engine and idle. Turn on headlight, rear window defroster and heater blowers.
- Connect voltmeter on terminal 30 of starter and battery + pole. If a voltage greater than 0.3V-0.4V is measured, check cables and grounding for the alternator and the battery.
- The same measurement must be done between the alternator housing (B-) and the battery minus pole.

Note 2: Carbon brush checking and excitation winding checking.

- After removal of the voltage regulator, the carbon brushes and the slip rings can be inspected.
- To check the excitation winding, connect ohmmeter between terminal DF and terminal D+. A resistance of 3-4ohm should be noted.



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Diagnosis Program (cont.):

Step 4.2: Alternator checking

The charging function of the alternator can be checked by connecting a voltmeter on the battery + and - poles.

- Start engine and bring to approximately 2,000 RPM for one minute. Be certain all consumers are switched off.
- The battery voltage must be above 13.0 volts. If not, the alternator must be checked using an oscilloscope.
- Connect the oscilloscope lead as described in Step 4.1 or directly on the battery poles. Start engine and allow to idle.
- The oscilloscope must display the following pattern!



If not, alternator is defective.

Step 4.3: Voltage regulator checking

If the alternator is not defective, the voltage regulator must be checked.

- Start engine and bring to 2,000 RPM for one minute.
- The voltage on terminal D+ must be between 13.2V and 15.0V. If the voltage is out of specification, replace voltage regulator.

NOTE: After repairs, reset the time clock and recode the radio.

For additional information, refer to Technical Bulletin Book I, Group 2, Number 9204, page 49.

Warranty Information:
(If applicable)

Damage Code: 9030 40 0001

Labor Operations	Description	TU
9030 1900	R&R Clock	20
9030 4950	Solder Jumper Wire per Technical Bulletin	20
9030 4900	R&R Clock & Remove Bulb	25

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