

Where'd My Electrons Go?

Instrumenting the GMC's
12 VDC Electrical System.

Ammeters

- Ammeters measure the flow of electrons (Current)
- Analog meters deflect needle because of current flow through a magnetic coil.
- Direct reading meter must pass entire current – Please don't take more than 30A through cockpit – Big wire needed.

Ammeters (cont)

- Remote reading ammeter is actually a voltmeter showing the voltage drop across a resistor (shunt).
 - Usually shunt is sized to produce 50 mV drop at rated current. Meter scale shows the rated current instead of 50 mV full scale.
 - Only small wire needed to carry 50 mV signal to the remote ammeter.

20-500 A Shunt



Digital Ammeter

- Digital Ammeter shows numbers.
 - Like the remote analog ammeter, a digital ammeter measures voltage across a shunt, which is sometimes internal.

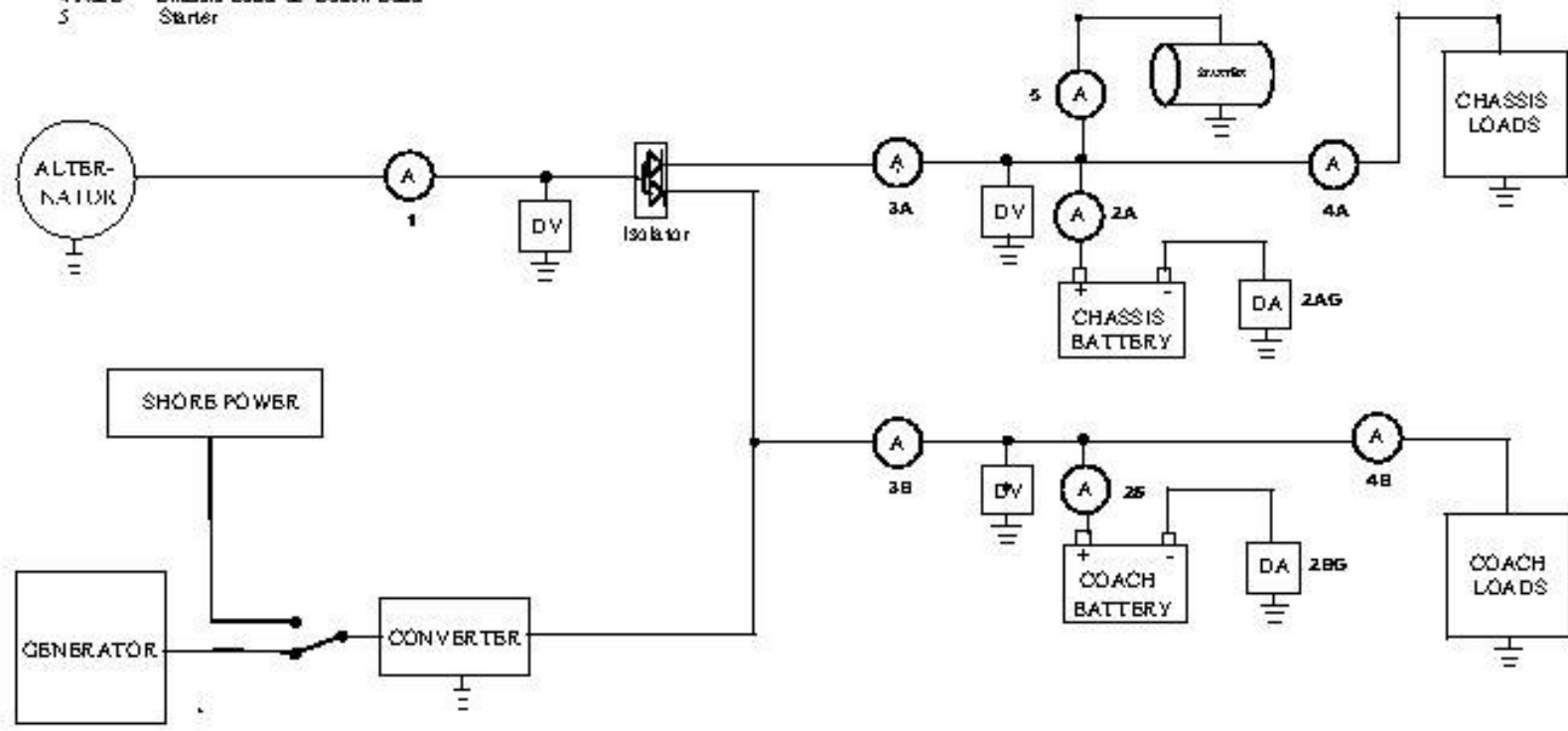
Digital Ammeter (Cont.)

- Digital meter must either:
 - A. Have an independent battery supply
 - B. Be designed to measure own supply
- Digital meter without independent battery must measure current in ground leg.

Where to Install Ammeter

- What do you want to know?
- Alternator output?
- Whether battery is being charged or discharged?
- Where's the problem?

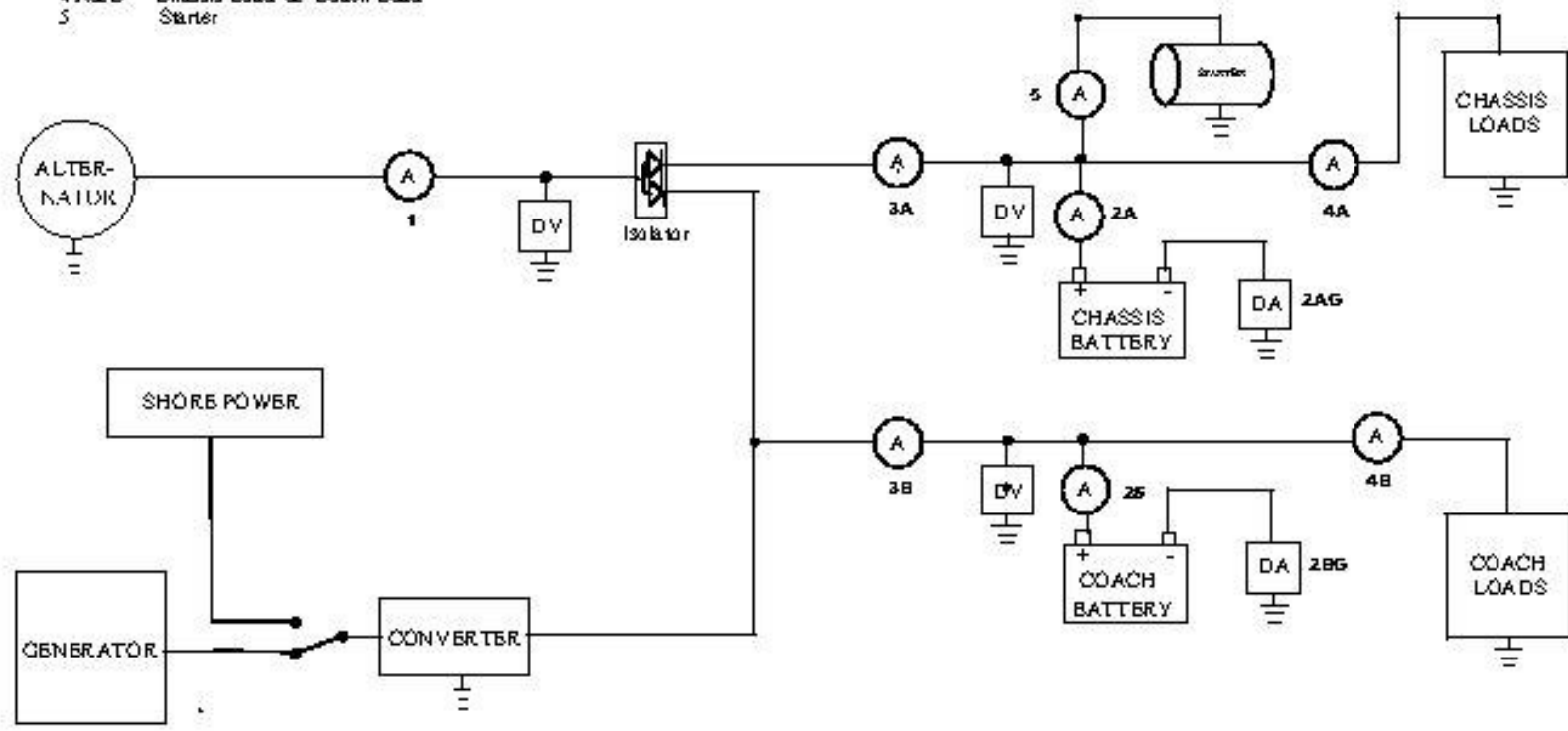
- | Ammeter | Shows |
|---------|--|
| 1 | All alternator loads |
| 2 A & B | Charge and discharge rates of batteries, including starter on Chassis Battery
AG & BG |
| 3 A | Total Chassis Battery Charge + Chassis Loads |
| 3 B | Converter Load / Total Coach Battery Charge + Coach Loads |
| 4 A & B | Chassis Load & Coach Load |
| 5 | Starter |



Is It REALLY Worth It?

- Every possible location has some shortcoming.
- Selecting n locations requires multiple shunts and DPnT switch.
- Indication doesn't show cause.

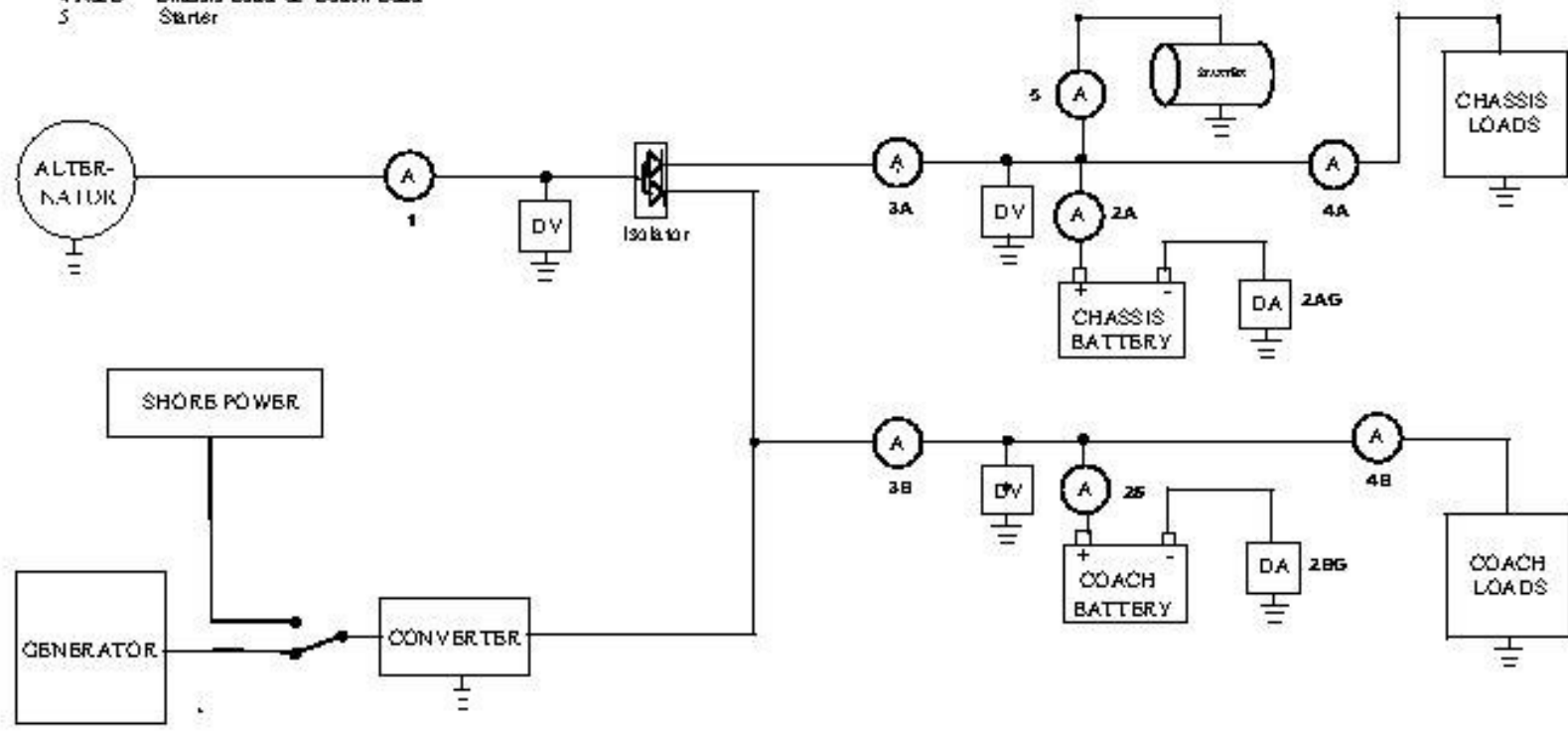
- | Ammeter | Shows |
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How About the Voltmeter?

- Only 3 Voltmeter locations are shown.
- A SPDT switch will allow monitoring of the 2 most important values – each battery.
- Digital Meter can be used in most locations if can read own supply.

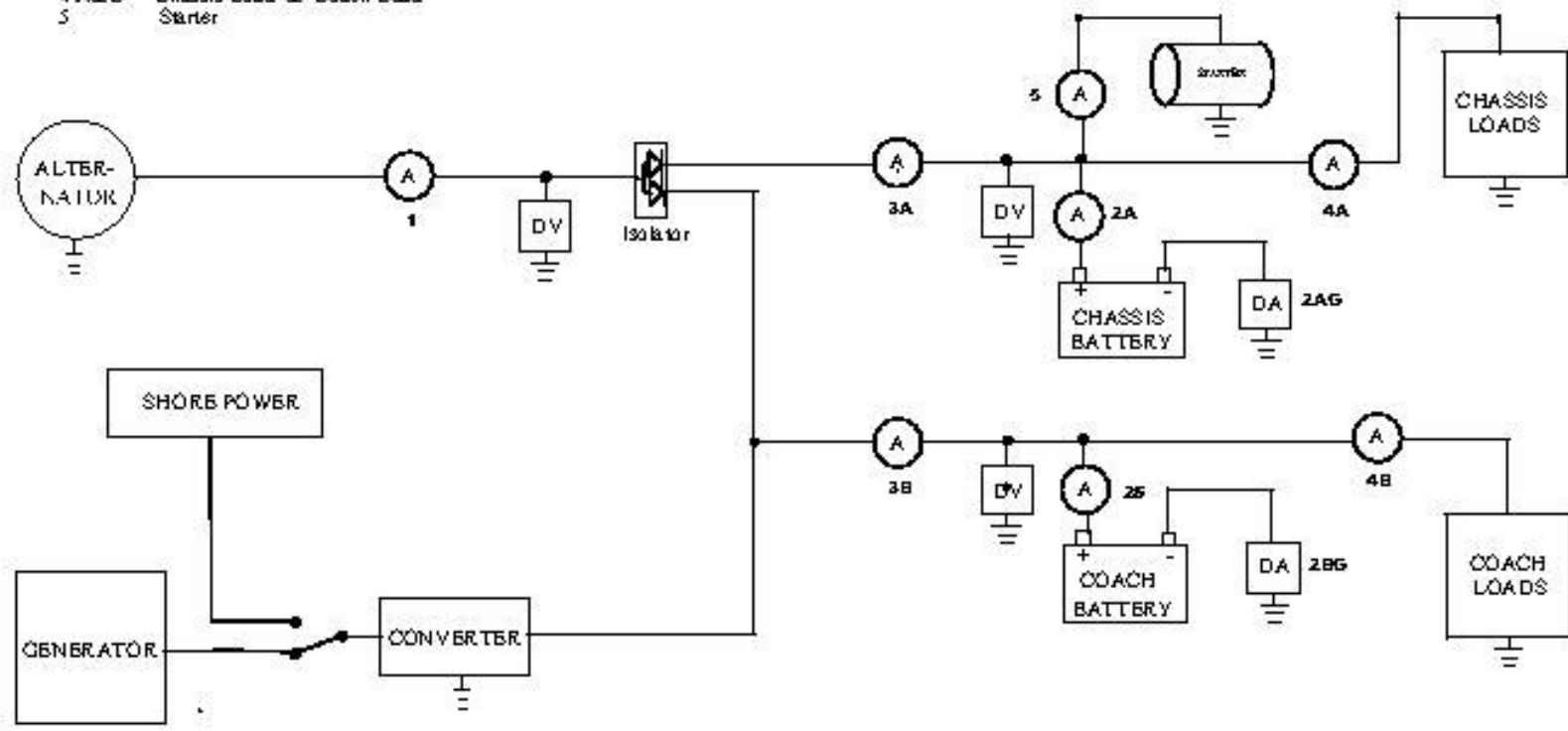
- | Ammeter | Shows |
|---------|---|
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What Can Ammeter Do For You?

- Monitor charging system
 - Low/Negative reading may indicate:
 - Defective/Inadequate Alternator
 - Continuous high reading may indicate:
 - High load
 - Defective Battery
 - Short circuit
 - Alternator over-voltage

- | Ammeter | Shows |
|---------|--|
| 1 | All alternator loads |
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AG & BG |
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What Can Voltmeter Do For You?

- Monitor Charging System
 - Continuous high reading may indicate:
 - Alternator lost reference voltage
 - Alternator internal failure
 - Regulator
 - Diodes

What Can Voltmeter Do For You?

- Monitor Charging System
 - Continuous low reading may indicate:
 - Low battery
 - Bad battery (heavy load)
 - High circuit load
 - Short circuit
 - Defective alternator
 - Slipping belt
 - Internal failure

Ammeter or Voltmeter?

Voltmeter easiest to install

Voltmeter gives most information

Only Ammeter can show the amount of power being produced.

User's Choice but Both is Best