

Cirrus Perspective™ Electrical System Study Guide

Alternator 1 (ALT 1) is a gear-driven, internally rectified, 100-amp alternator mounted on the right front of the engine.

Alternator 2 (ALT 2) is a 70-amp belt-driven alternator mounted to the left front of the engine. ALT 1 is regulated to 28 volts and ALT 2 is regulated to 28.75 volts. Both alternators are self-exciting (not self-starting) and require battery voltage for field excitation in order to start up.

Battery 1 (BAT 1) is an aviation grade 12-cell, lead-acid, 24-volt, 10-amp-hour battery mounted on the right firewall. BAT 1 is charged from the Main Distribution Bus in the MCU.

Battery 2 (BAT 2), located in the empennage, is composed of two 12-volt, 18-amp-hour, sealed, lead/acid batteries connected in series to provide 24 volts. BAT 2 is charged from the circuit breaker panel Essential Bus.

During normal operation, the alternators feed their respective distribution bus independently (ALT 1 feeds Main Distribution Bus 1 and ALT 2 feeds Main Distribution Bus 2). The main distribution buses are interconnected by an 80-amp fuse and diode. The diode prevents ALT 2 from feeding Main Distribution Bus 1. Additionally, since ALT 2 voltage is slightly higher than ALT 1 voltage, bus voltage is further assured.

Voltage output of each alternator is a function of engine RPM, alternator design, and load on the alternator. During low RPM operation, the alternator will require higher engine RPM to provide the same voltage to increased electrical loads.

Failure or malfunction of ALT 1 will not impair the capability of the main battery to provide power to Main Bus 2. Failure or malfunction of either or both alternators will not impair the capability of either battery to power the essential load circuits, because each of these power sources feed into the Essential Bus. If either alternator is lost, the other alternator and both batteries are still capable of feeding the Essential Bus.

If ALT 2 fails while in operation, the Essential Bus will then get electrical power from ALT 1, BAT 1, and/or BAT 2. The bus structure of the MCU and the circuit breaker panel allows all power devices to feed into the Essential Bus during emergencies. This action is automatic and does not require pilot intervention. As long as one of the four power sources remains functional, the Essential Bus will continue to supply electrical power to all of the flight critical instruments.

The Main Distribution Bus 1 and Main Distribution Bus 2 are separated via a diode which allows the Main Bus 1 to feed into Main Bus 2 during failures of ALT 2. The MCU regulates ALT 1 to 28 VDC, while ALT 2 is regulated to 28.75 VDC which ensures the diode separates the buses during normal operation.

The circuit breaker panel ESS BUS 1 is powered by ALT 1 and ALT 2 from the MCU Essential Distribution Bus through the 20-amp ESSENTIAL POWER circuit breaker and from BAT 2 through the 20-amp BAT 2 circuit breaker. In the event of ALT 1 or ALT 2 failure, the Essential Buses in the circuit breaker panel will be powered by the remaining alternator through the Main Distribution Bus 1 or Main Distribution Bus 2 in the MCU. In the case of both alternators failing, BAT 1 is connected directly to the Essential Distribution Bus in the MCU and will power ESS BUS 1 and ESS BUS 2. In the event of both alternators and BAT 1 failing, BAT 2 is connected directly to ESS BUS 1.

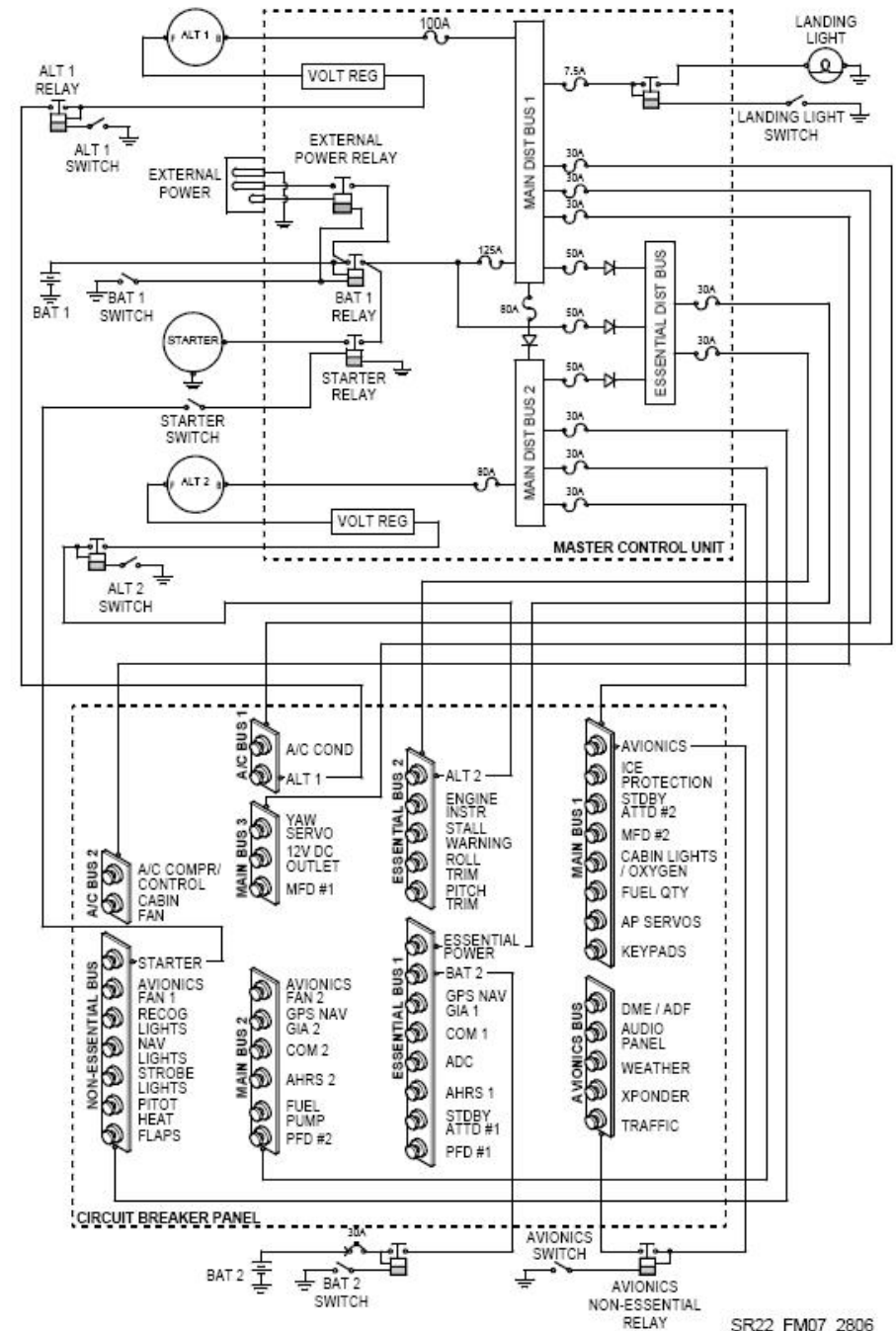
The circuit breaker panel MAIN BUS 1 and MAIN BUS 2 are powered by ALT 2 from the MCU Main Distribution Bus 2 and - in the event of ALT 2 failure - by ALT 1 and BAT 1 from the Main Distribution Bus 2 via the diode interconnecting the MCU distribution buses through 30-amp fuses inside the MCU.

The circuit breaker panel MAIN BUS 3 is powered by ALT 1 and BAT 1 from the MCU Main Distribution Bus 1 through a 30-amp fuse inside the MCU. In the event of ALT 1 failure, BAT 1 will power MAIN BUS 3. ALT 2 is prevented from powering MAIN BUS 3 by the isolation diode interconnecting the MCU Distribution Buses 1 and 2.

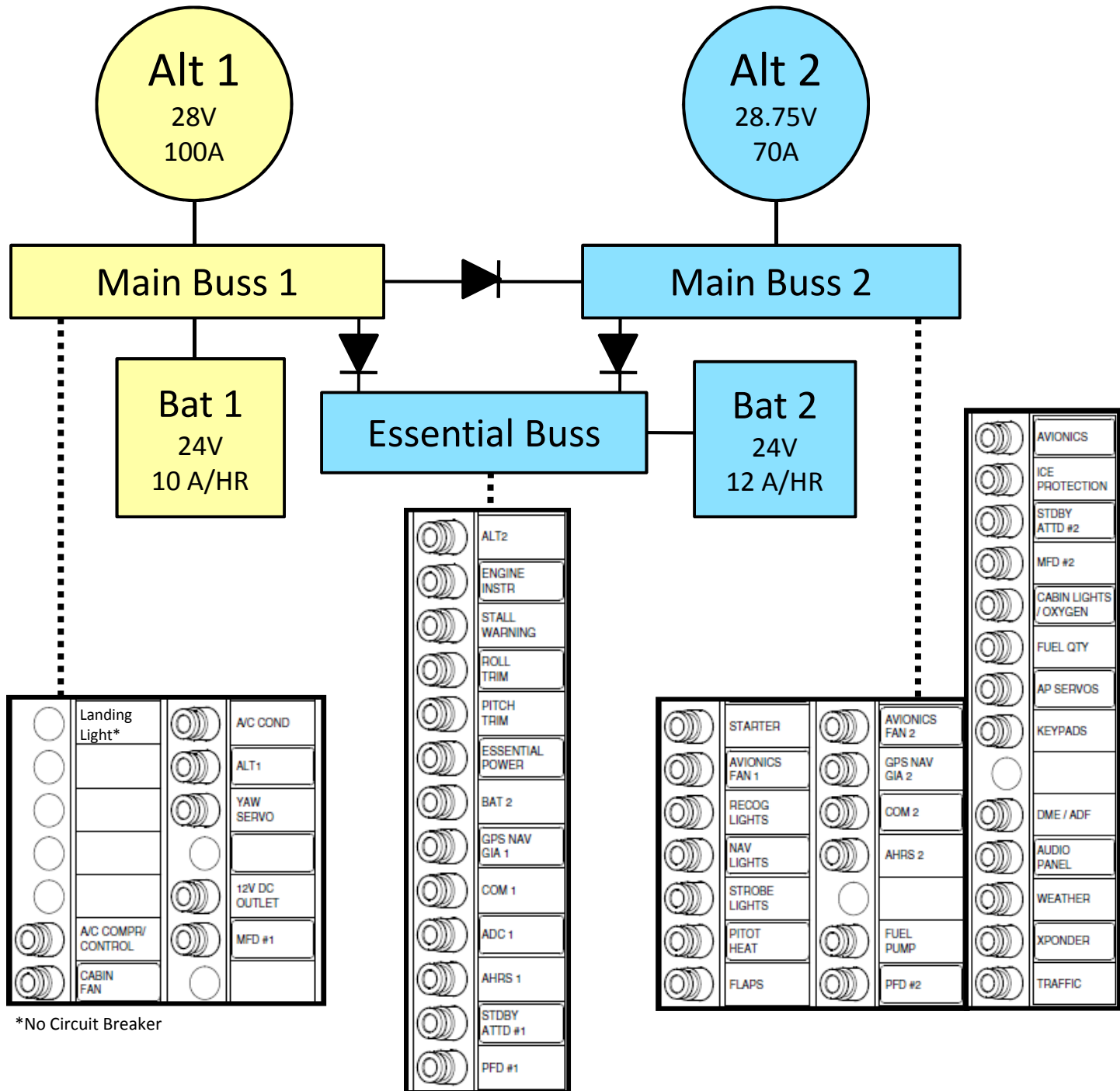
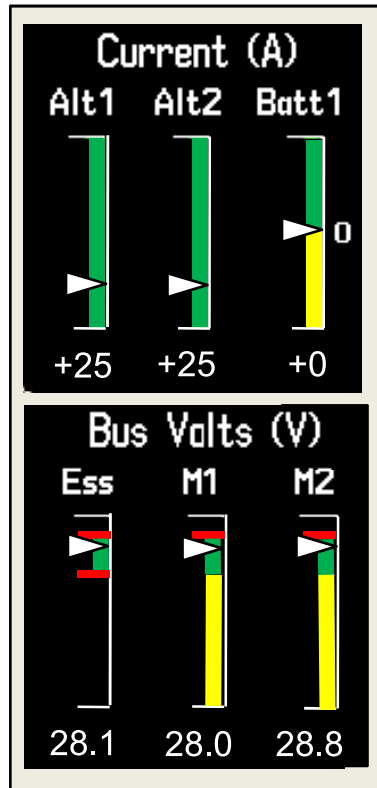
The circuit breaker panel NON ESS BUS is powered by ALT 2 from the MCU Main Distribution Bus 2 and - in the event of ALT 2 failure - by ALT 1 and BAT 1 from the Main Distribution Bus 2 via the diode interconnecting the MCU distribution buses through 30-amp fuses inside the MCU.

The circuit breaker panel A/C BUS 1 and A/C BUS 2, is powered by ALT 1 and BAT 1 from the MCU Main Distribution Bus 1 through a 30-amp fuse inside the MCU. In the event of ALT 1 failure, BAT 1 will power A/C BUS 1 and A/C BUS 2. ALT 2 is prevented from powering A/C BUS 1 and A/C BUS 2 by the isolation diode interconnecting the MCU Distribution Buses 1 and 2.

Transient Voltage Suppressors (TVS) are installed in key areas of the electrical system to protect the system from lightning strikes. By adding a high power TVS at key power entry points on the electrical busses, unwanted energy from electrical transients is allowed to dissipate through a semi-conducting pathway to ground.



Cirrus Perspective Electrical System



*No Circuit Breaker

