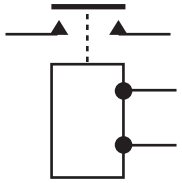
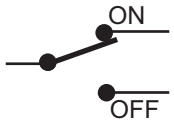
Schematic Symbols



RELAY COIL



SWITCH

SHUNT WITH METER

CURRENT LIMITER

GROUND

DIODE

PUSH-PULL CIRCUIT BREAKER

SWITCH BREAKER

FUSE

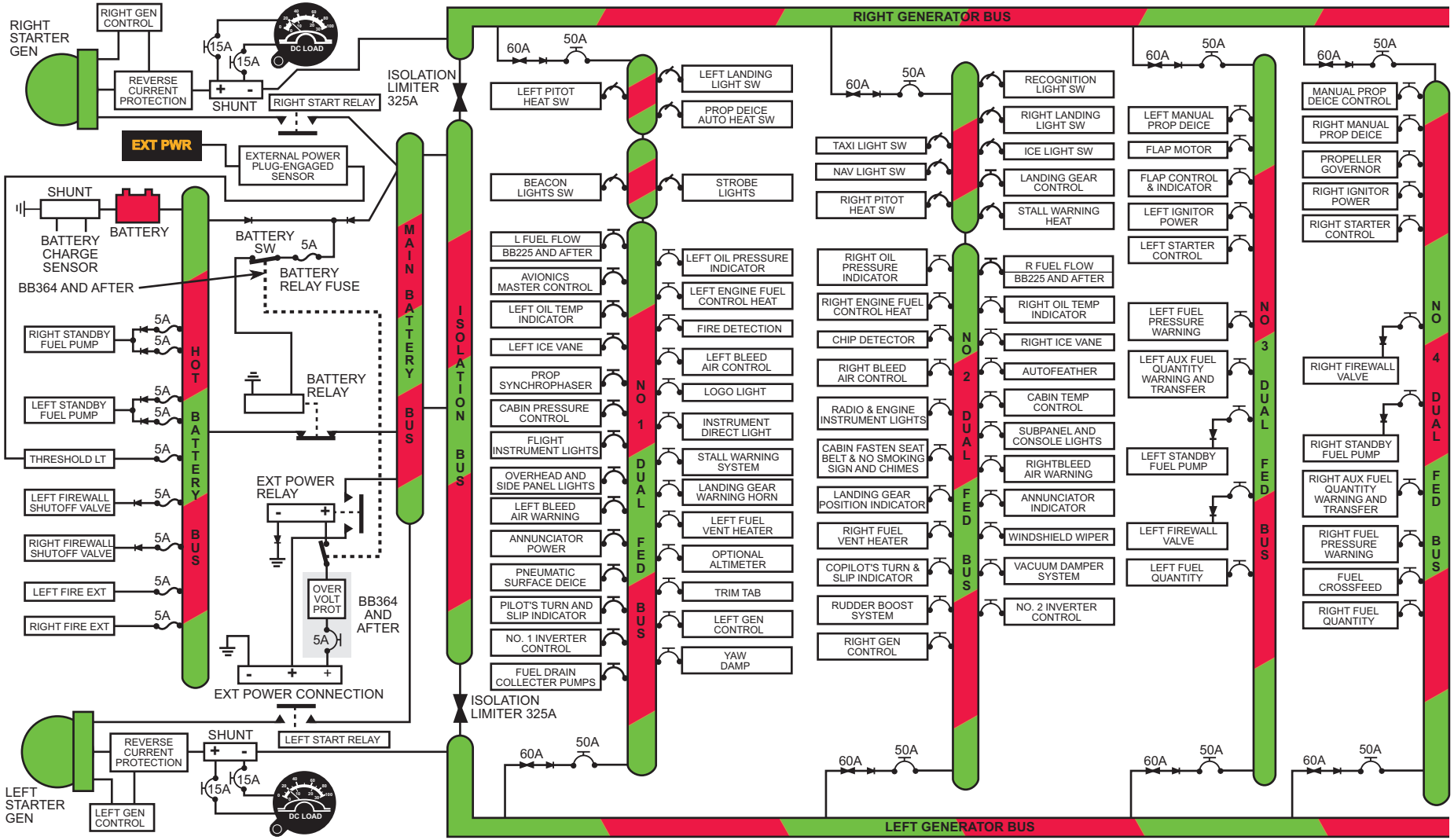
CHECK VALVES

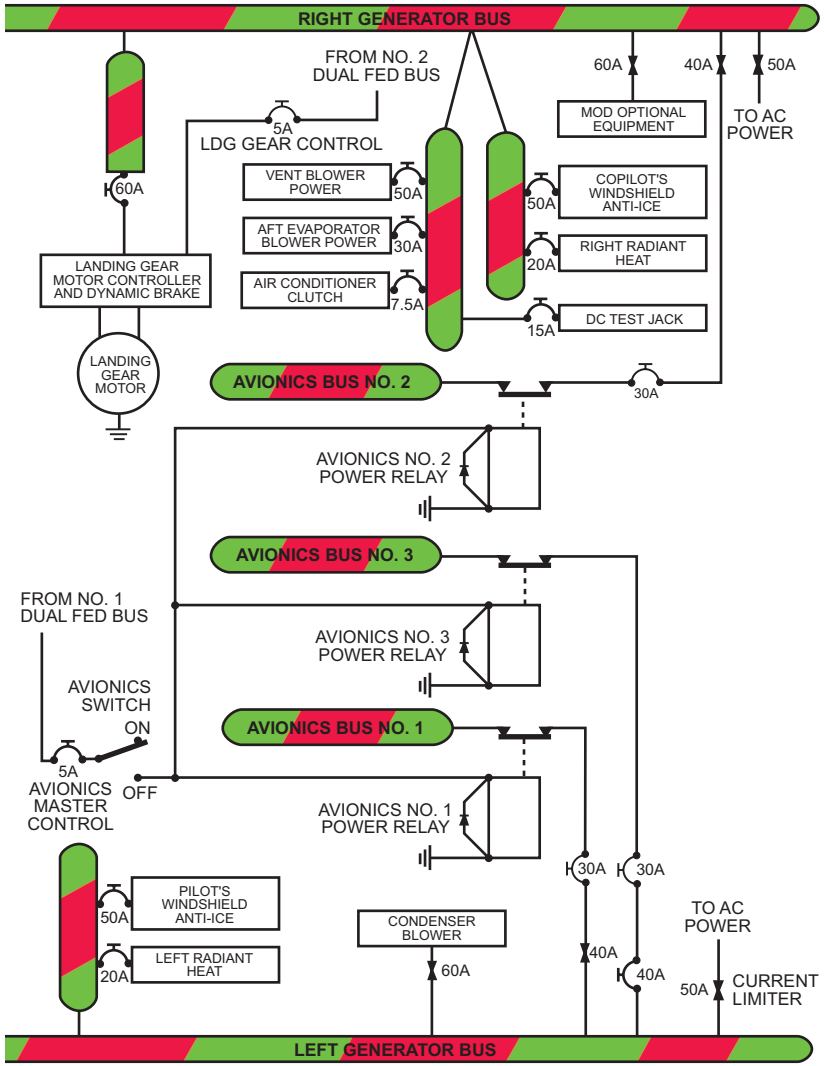
NORMALLY OPEN (NO)

NORMALLY CLOSED (NC)

DC Electrical System

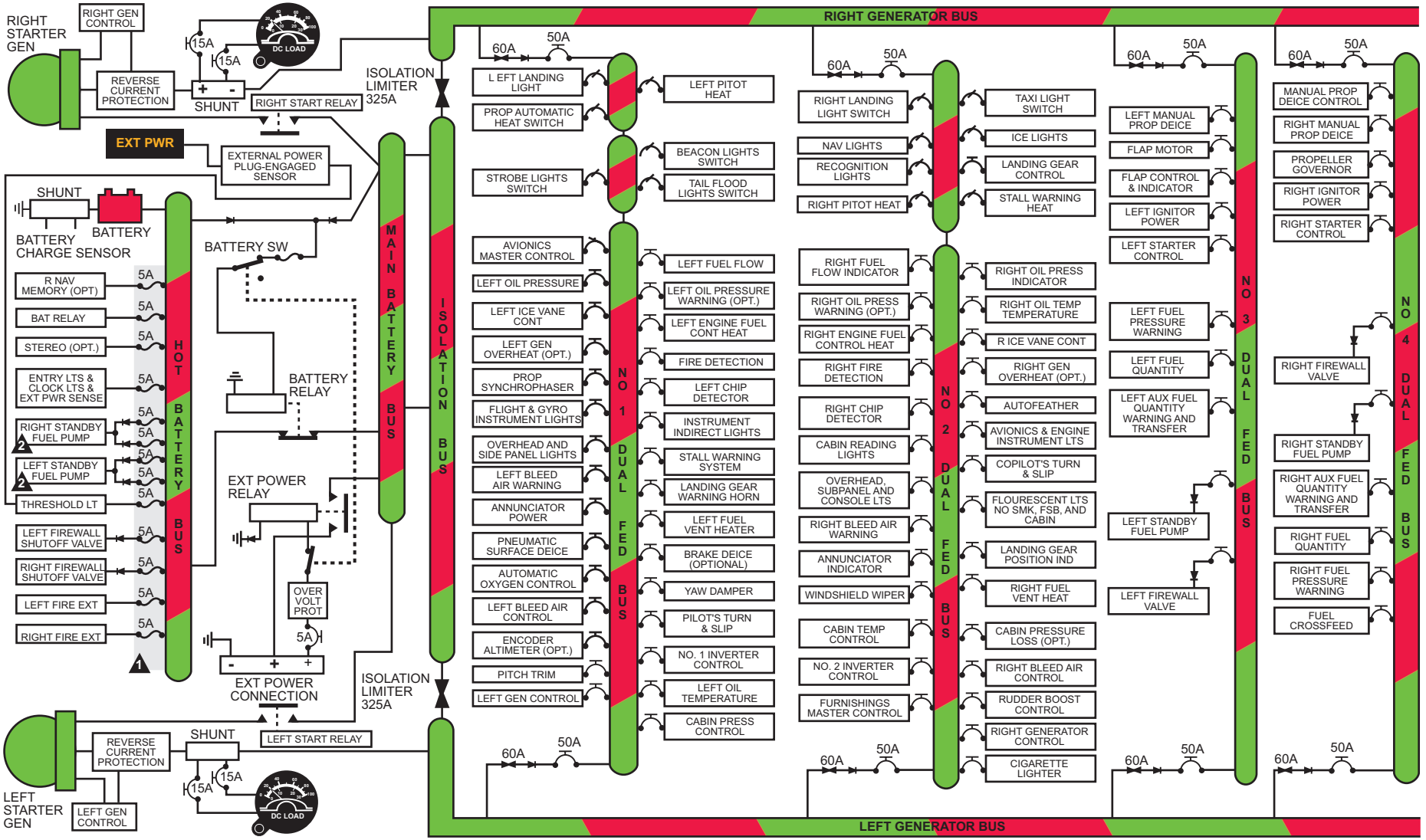
King Air 200




RIGHT GENERATOR BUS
FROM NO. 2
DUAL FED BUS
5A
LDG GEAR CONTROL
60A
VENT BLOWER
POWER
50A
AFT EVAPORATOR
BLOWER POWER
30A
AIR CONDITIONER
CLUTCH
7.5A
LANDING GEAR
MOTOR CONTROLLER
AND DYNAMIC BRAKE
LANDING
GEAR
MOTOR
60A
40A
50A
MOD OPTIONAL
EQUIPMENT
TO AC
POWER
50A
COPILOT'S
WINDSHIELD
ANTI-ICE
20A
RIGHT RADIANT
HEAT
15A
DC TEST JACK
AVIONICS BUS NO. 2
30A
AVIONICS NO. 2
POWER RELAY
AVIONICS BUS NO. 3
FROM NO. 1
DUAL FED BUS
AVIONICS NO. 3
POWER RELAY
AVIONICS
SWITCH
ON
5A
AVIONICS
MASTER
CONTROL
OFF
AVIONICS BUS NO. 1
AVIONICS NO. 1
POWER RELAY
30A
30A
50A
PILOT'S
WINDSHIELD
ANTI-ICE
20A
LEFT RADIANT
HEAT
CONDENSER
BLOWER
60A
40A
40A
TO AC
POWER
50A
CURRENT
LIMITER
LEFT GENERATOR BUS

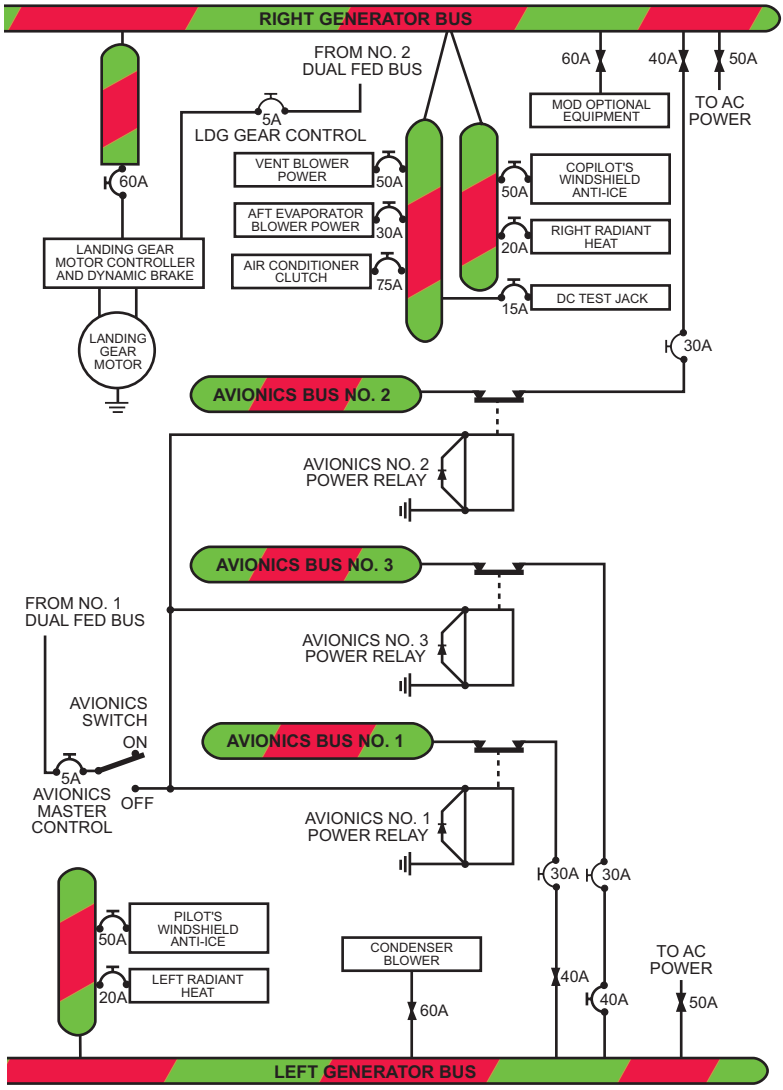
DC Electrical System

King Air B200



1 ON BB-1096, BB-1098 AND SUBSEQUENT CIRCUIT BREAKERS REPLACE FUSES

2 ON BB-1097, BB-1095 AND PRIOR


RIGHT GENERATOR BUS
FROM NO. 2
DUAL FED BUS
60A
40A
50A
MOD OPTIONAL
EQUIPMENT
TO AC
POWER
5A
LDG GEAR CONTROL
VENT BLOWER
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ANTI-ICE
60A
AFT EVAPORATOR
BLOWER POWER
30A
20A
RIGHT RADIANT
HEAT
LANDING GEAR
MOTOR CONTROLLER
AND DYNAMIC BRAKE
AIR CONDITIONER
CLUTCH
75A
15A
DC TEST JACK
LANDING
GEAR
MOTOR
30A
AVIONICS BUS NO. 2
AVIONICS NO. 2
POWER RELAY
AVIONICS BUS NO. 3
FROM NO. 1
DUAL FED BUS
AVIONICS NO. 3
POWER RELAY
AVIONICS
SWITCH
ON
AVIONICS BUS NO. 1
5A
AVIONICS
MASTER
CONTROL
OFF
AVIONICS NO. 1
POWER RELAY
30A
30A
PILOT'S
WINDSHIELD
ANTI-ICE
50A
CONDENSER
BLOWER
TO AC
POWER
20A
LEFT RADIANT
HEAT
40A
40A
60A
50A
LEFT GENERATOR BUS

Electrical System

DC System

DC electrical sources include:

- a 24V, 34 amp-hour nickel-cadmium battery
- two 250A 30V DC starter/generators
- an external DC power system.

These power sources supply the dual-fed bus system that distributes power to the aircraft through circuit breakers:

- Battery

The battery powers starting and emergency operation of essential equipment powered from the Hot Battery bus. With the BATT switch in ON, power flows from the battery through the battery relay to the Main Battery bus. The Main Battery bus then feeds the Isolation bus that, in turn, provides power to the Left and Right Generator buses. Once the Generator buses are powered, the four Dual-Fed buses are powered.

The Main Battery bus also supplies two starter circuits controlled by the engine starter switches and starter relays.

For nicad batteries, a battery charge current detector continuously monitors battery charging rate. If charging rate exceeds 7 amps for six seconds or more, the monitoring system illuminates the BATTERY CHARGE annunciator and triggers the flashing MASTER CAUTION annunciators. After a battery engine start, the BATTERY CHARGE annunciator normally illuminates after the operating engine generator is turned on.

Generators

The generators function as starters during engine starts. Once an engine is running, the generators provide DC power to the aircraft. GEN 1 and GEN 2 switches control the generators. The MASTER SWITCH gang bar turns off the battery and generator switches simultaneously.

Reverse-current protection prevents the generators from absorbing power from the Generator buses if the generators are not operating, or if generator voltage is less than bus voltage.

Voltage Regulation

On **aircraft BB-2 to 88**, a voltage regulation system consists of transistorized regulators, overvoltage relays, paralleling relays, and reverse current relays. These components provide:

- generator load paralleling
- reverse current cutout
- voltage regulation to 28.25 ±0.25V DC
- overvoltage protection
- under voltage protection
- starter/generator priority

The voltage regulators (one for each generator) maintain a constant level voltage output. The paralleling circuit functions when both generators are on-line. The circuit depresses the voltage of the high- output generator and increases that of the low-output generator until both are equal.

If generator output exceeds 32 to 34V, the overvoltage relay trips to take the generator off-line. Actuation of the overvoltage relay also removes voltage from the SW terminal of the reverse-current relay so it opens and removes the generator from the bus. If the overvoltage condition is the result of a voltage regulator malfunction, the overvoltage relays stops the condition. If generator output voltage drops below bus voltage, the reverse current relay isolates the generator from the bus to protect the generator.

On **aircraft BB-89 and subsequent; BL-1 and subsequent**, generator control units (GCUs) and line contactor relays regulate voltage to provide:

- voltage regulation
- line contactor relay control
- generator load paralleling
- differential voltage and reverse current sensing and control
- overvoltage and overexcitation control
- start/generator priority.

Once the engine is running, the GCU uses residual voltage to build generator voltage to the point where it can actually regulate output voltage. Once generator output reaches this point, the GCU increases generator output until it reaches 28.25 ±0.25V DC. At this point, generator output can be connected to the associated Generator bus.

After the GEN switch is in ON, the GCU compares bus voltage to generator output voltage. When these voltages are nearly the same, the GCU closes the line contactor relay. Generator output is then connected to the respective Generator bus. With both generators on-line, the GCU equalizer relay energizes to enable load paralleling circuits. Both GCUs compare their respective generator's output voltage to the opposite generator. The GCUs then adjusts generator output voltage so both generators equally share the load within approximately 10%.

If a generator begins drawing current from the electrical system (i.e., reverse current condition), the GCU opens the line contactor relay to remove the generator from its Generator bus. Once the reverse current condition clears, the GCU automatically resets and the generator comes back on-line.

An overvoltage condition can occur when generator output voltage increases to 32V DC. If this occurs, the GCU will deenergize the generator and trip the line contactor. Once the overvoltage condition clears, the generator must be manually brought back on-line.

External Power

An appropriately rated ground power unit (GPU) can supply the aircraft electrical system through an external power receptacle on the right wing. The ground power unit (GPU) should be capable of providing a continuous load of 300A at 24 to 30V DC and 1,000A for 0.1 seconds during engine start. Use of an inadequate GPU will cause a voltage drop below the start relay's drop-out voltage. This may result in relay chatter and welded contacts. Similarly, a GPU that provides more than 350A continuous load will damage the external power relay and airplane power cables. Connecting a GPU illuminates the EXT PWR annunciator. With external power connected, the generators will not come on-line.

CAUTION: The output setting must not exceed 1,000A on external power sources with a higher current-carrying capability. Any current in excess of 1,000A may overtorque the starter-generator driveshaft or produce heat sufficient to shorten starter-generator life.

DC Power Distribution

The DC power distribution system includes:

- Hot Battery bus
- Main Battery bus
- Isolation bus
- Left and Right Generator buses
- Nos. 1, 2, 3, and 4 Dual-Fed buses
- Nos. 1 and 2 Avionics buses
- optional No. 3 Avionics bus.

The battery directly powers the Hot Battery bus. This bus is unswitched (i.e., always powered) and supplies power to items that may be operating with the battery switch OFF. With the battery switch ON, the closed battery contacts connect the battery to the Main Battery bus.

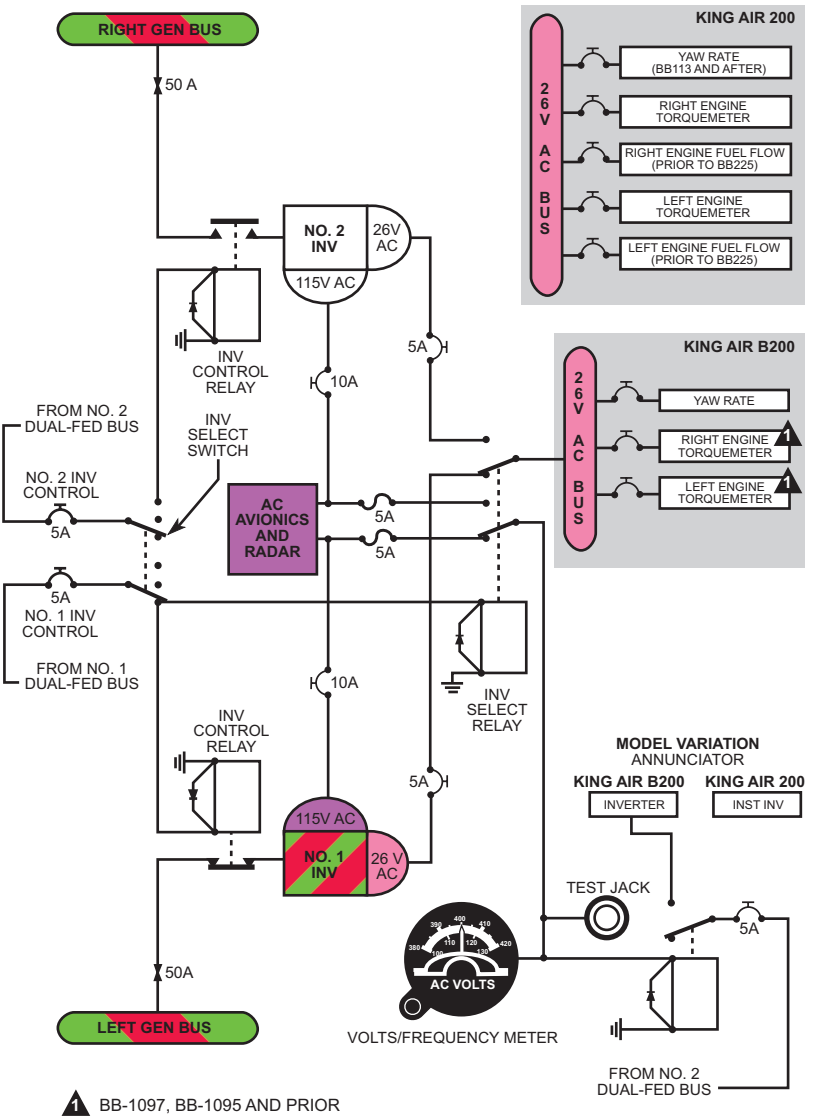
The primary load of the Main Battery bus is the left and right starter/generators during engine start. It also powers the Isolation bus. With a GPU connected to the aircraft, the Main Battery bus is powered through the closed external power relay.

The Isolation bus serves as a connection between the Left and Right Generator buses. High amperage current limiters between the Isolation bus and the Generator buses isolate the battery from a Generator bus fault.

Each of the four Dual-Fed buses receive power simultaneously from the Left and Right Generator buses. These buses are always powered from a combination of three sources. Typically, these sources are both generators or a generator and/or battery.

The left and right generators power, respectively, the Nos. 1 and 2 DC Avionics buses. The AVIONICS MASTER switch and avionics master power relays control this power. With the switch in ON, the relays de-energize to the normally closed position to ensure that if the switch fails, the relays provide continued power to the avionics equipment.

AC Electrical System



AC Power

Two 250VA or 750VA, 400 Hz static inverters supply 115V and 26V AC power. Each inverter operates on 28V DC. The Left Generator bus powers the No. 1 inverter while the Right Generator bus powers the No. 2 inverter.

Placing the INVERTER switch in the No. 1 or No. 2 position energizes the respective inverter's control relay. The relay closes so that Generator bus powers the inverter. The INVERTER switch also controls the inverter select relay to connect the 26V AC buses to the selected inverter and 115V AC to the voltage/frequency meter and inverter fail relay.

THE INVERTER or INST INV annunciator illuminates when 115V is lost at the annunciator relay.

MODEL

PC-250	**PC-17A**
250VA	750VA
115V ±3%	115V +5% or -7%
400 Hz ±1%	400 Hz ±1%

Electrical Systems

DC Electrical System

Power Source	Battery Starter/Generators (2) 250A (STD) External power unit
Distribution	Hot Battery bus Battery relay Main Battery bus Start Relays (left and right) Isolation bus Generator buses (left and right) Dual-Fed buses (No. 1 through 4) Avionic buses (No. 1, No. 2, and optional No. 3)
Control	Switches BATT IGNITION AND ENGINE START (L/R) Two-position GEN (1/2) – **BB-088 and prior** Three-position GEN (1/2) – **BB-089 and sub.**
Monitor	DC volt/loadmeter (L/R) GEN annunciators (L/R) EXT POWER annunciator Battery Charge annunciator
Protection	Voltage regulator Generator paralleling Reverse current sensing and control Over-voltage protection Over-excitation protection Under-excitation protection GPU Reverse polarity sensing Generator buses Isolation limiters (325A) Current limiters Circuit breakers Dual-fed buses Current limiters (60A) Circuit breakers (50A) Diodes (70A) Hot Battery bus Fuses or circuit breakers

AC Electrical System

Power Source	Inverters (250VA – 750VA)
Distribution	Generator buses (L/R) Inverters Nos 1 and 2 26V AC bus 115V AC avionics
Control	INVERTER switch
Monitor	INVERTER annunciator Volt/Frequency meter
Protection	DC to inverter: 50A current limiter Inverter output: fuses and circuit breakers