CHAPTER 7 – ELECTRICAL

LIST OF ILLUSTRATIONS

DC ELECTRICAL SYSTEM

CIRCUIT BREAKER PANELS

1. INTRODUCTION

The aircraft AC electrical power is provided by two engine-driven generation systems. Each system includes an integrated drive generator (IDG) and a generator control unit (GCU). An auxiliary power unit (APU) generator is also available as a back AC power source to replace either or both IDGs.

In the event of total AC power loss, emergency AC power is available from an in-flight air-driven generator (ADG). The ADG assembly is stowed in a compartment on the right side of the nose section.

DC power is supplied by four transformer rectifier units (TRU) which rectifies AC input power into DC output power. An AC power center (ACPC) and two DC power centers (DCPCs) are used for connecting AC and DC power to the appropriate buses, depending on system configuration and health. The following is a list of all the aircraft electrical system buses:

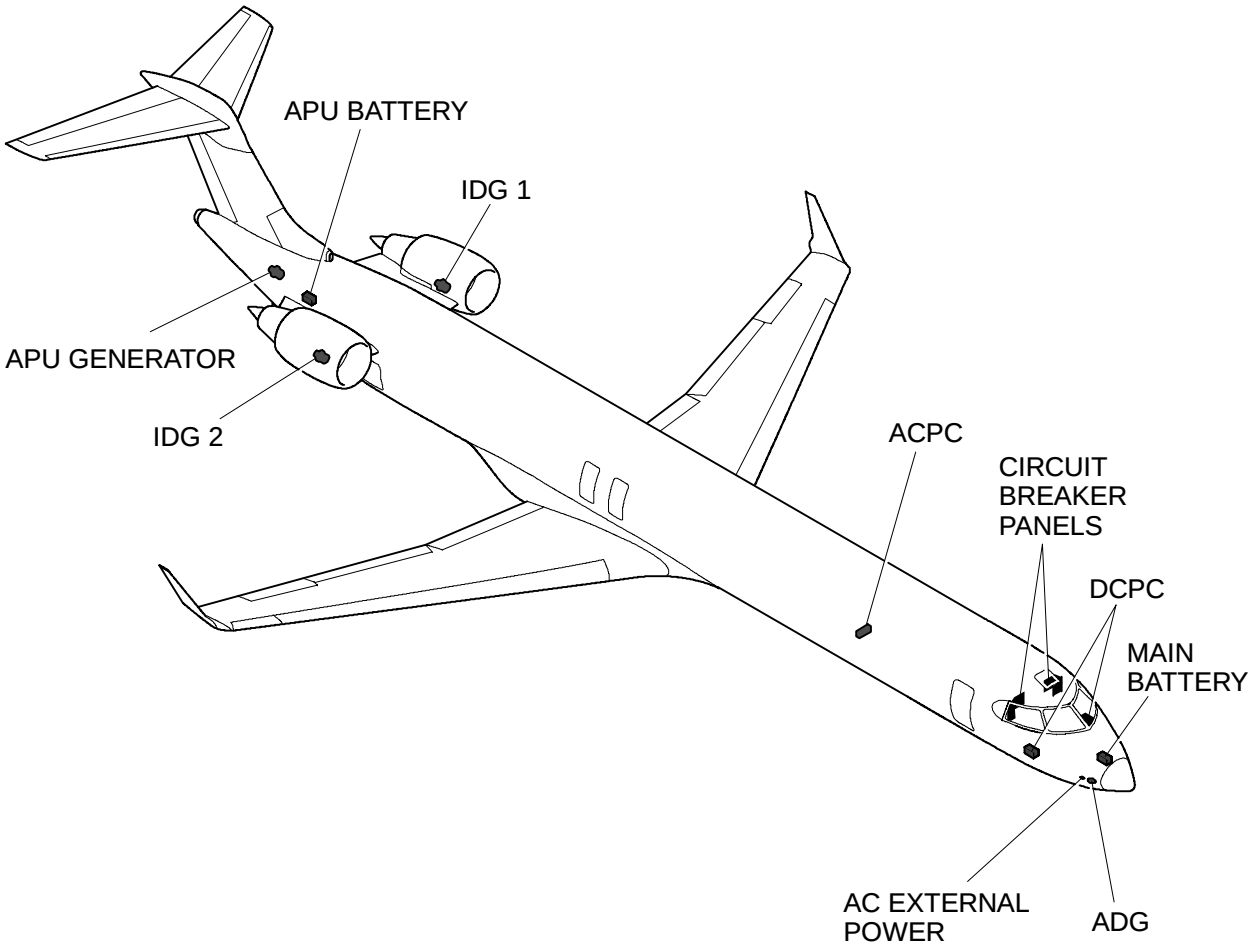
AC BUSSES	DC BUSSES
	DC BUS 1
	DC BUS 2
AC BUS 1	DC ESSENTIAL BUS
AC BUS 2	DC SERVICE BUS
AC ESSENTIAL BUS	DC BATTERY BUS
AC SERVICE BUS	DC EMERGENCY BUS
ADG BUS	DC UTILITY BUS
	MAIN BATTERY DIRECT BUS
	APU BATTERY DIRECT BUS

A main battery and an APU battery, with battery chargers, are installed in the aircraft electrical power system. Power for starting the APU is provided by the APU battery.

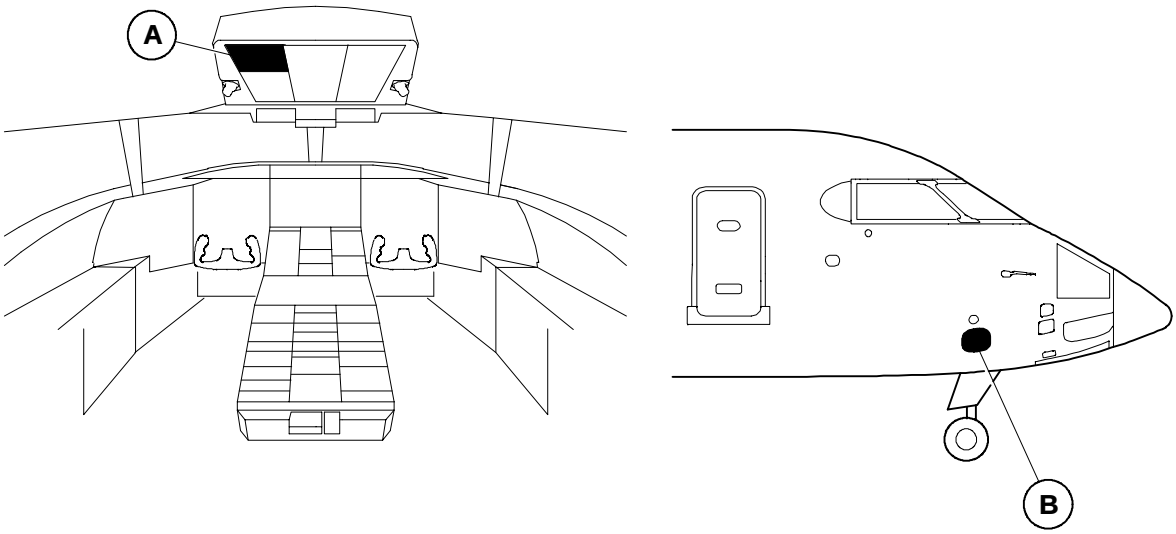
On the ground, the aircraft can receive external AC power through a receptacle located on the forward right side of the fuselage.

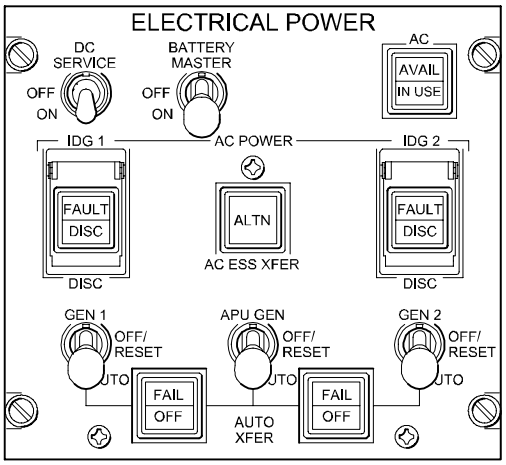
The electrical power panel in the flight compartment, and the external service panel on the right forward fuselage, contain the AC system control switches. The switches are used for manual and automatic control of the electrical power generating system and external power operation.

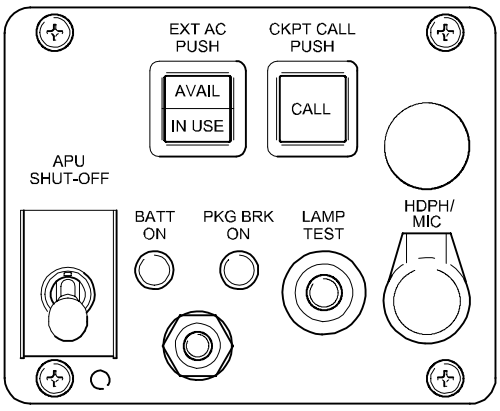
Electrical system warnings and cautions are displayed on the EICAS primary page. Status and advisory messages are displayed on the EICAS status page. General views of the electrical systems are displayed on the EICAS, AC and DC synoptic pages. Access to the AC and DC synoptic page is through the EICAS control panel (ECP). One push of the ELEC key on the ECP will display the AC synoptic page. Pushing the ELEC key a second time will display the DC synoptic page.



Electrical System – Introduction
Figure 07–10–1







A Electrical Power Panel Overhead Panel

B External Service Panel Right Forward Fuselage

Electrical System – Control Panels <1205>
Figure 07–10–2

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1. AC ELECTRICAL SYSTEM

AC power for the aircraft electrical systems is provided by two engine-driven, integrated drive generators (IDGs) which power all AC buses during normal operations. An APU generator provides a backup AC power source, in flight, if an IDG is inoperative or when the aircraft is on the ground with the engines off. If all AC power is lost in flight, emergency AC power is provided automatically by a deployable air-driven generator (ADG). The AC distribution system is controlled by the respective IDG and APU generator control units (GCUs). Each generator is monitored by the GCUs for voltage, frequency and kilovolt amps (kVA) for display on the EICAS and for system fault protective shutdowns.

A. Integrated Drive Generator (IDG)

Each IDG consists of a constant speed drive (CSD) and a generator. The CSD hydro-mechanically, converts the variable input speed from the engine accessory gearbox to a constant output speed to the generator to produce a constant frequency. An oil cooler cools the oil used by the IDG.

Each IDG has a disconnect switchlight (on the electrical panel) to manually decouple the IDG from the engine gearbox in the event of a CSD low oil pressure or high oil temperature. The IDG will automatically disconnect if a severe over temperature or overtorque condition occurs. Once disconnected, either manually or automatically, the IDG cannot be reconnected in flight. It can only be reset on the ground, with the engine shutdown.

Voltage and frequency regulation and fault protection is incorporated into each generator control unit (GCU). The GCU also protects the electrical system from overcurrent and differential current faults. In the event of a malfunction, the GCU will automatically disconnect the faulty generator from the respective AC buses. The generator may be reset when the malfunction is corrected or no longer exists, by selecting the generator switch to the OFF/RESET position then back to ON.

B. APU Generator

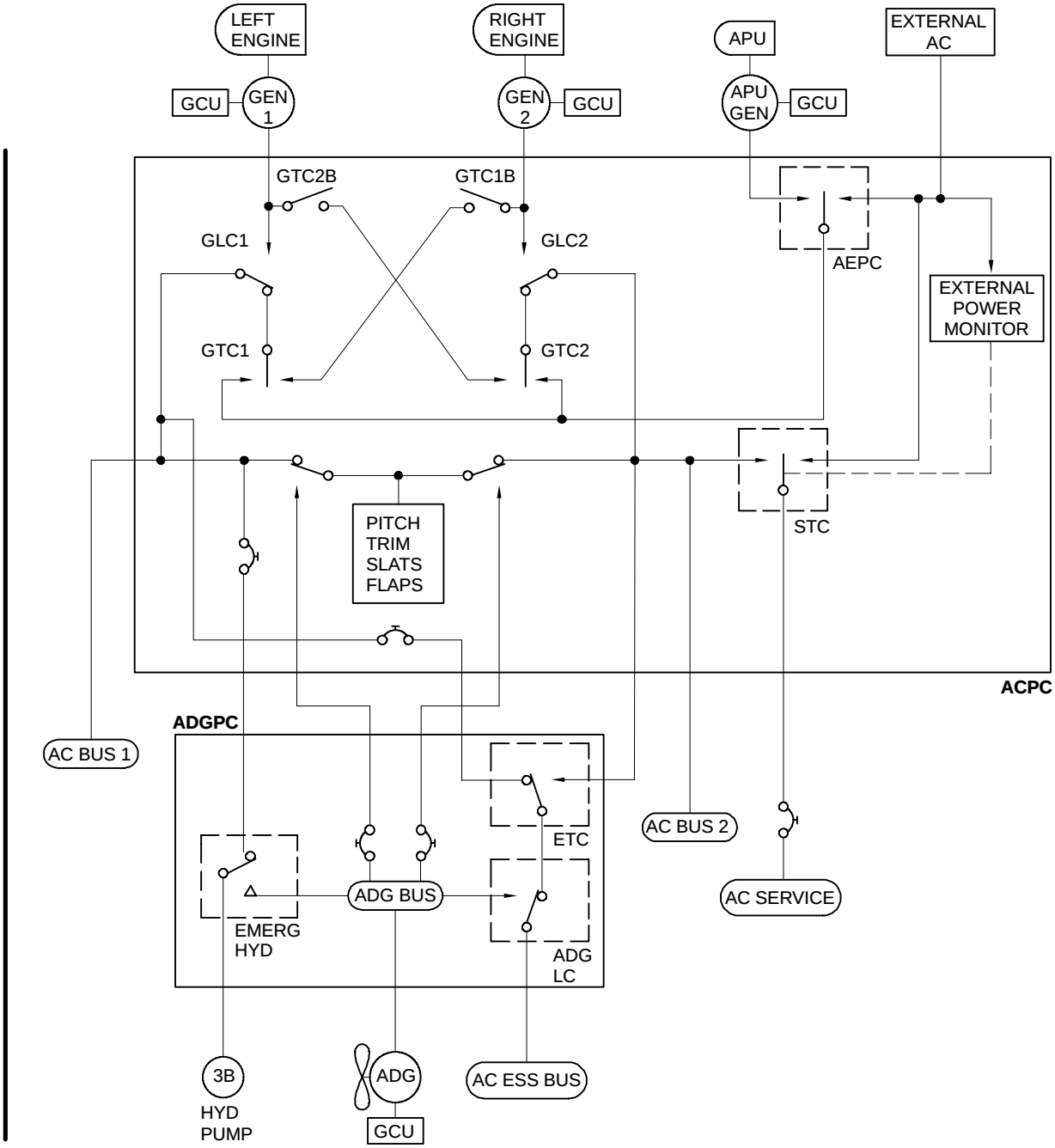
The APU generator is driven, directly by the APU gearbox, at a constant speed to maintain a constant frequency output. A GCU, identical to the IDG GCU, provides the same regulation and protection functions as the IDG GCUs.

C. AC Distribution

AC power from IDG 1 and IDG 2 is distributed to the AC buses via GCU controlled switches in the AC power center (ACPC). There is a priority control of AC power distribution. During normal operations, IDG 1 powers AC bus 1 and IDG 2 powers AC bus 2. Failure of an IDG generator, for any reason other than a fault on its associated bus, will automatically transfer the load from the failed IDG to the remaining operative IDG. The APU generator can then be used to replace the failed IDG to power the respective AC bus.

On the ground, if the aircraft is being powered with external AC power and either the APU or an IDG is brought on line, the external power will be automatically disconnected and the respective APU or IDG generator will power all the AC buses. When external power is not available, the APU generator provides electrical power to the AC buses and bleed air to start the aircraft engines. If an IDG is powering its respective AC bus and the APU generator is powering the other AC bus, when the remaining IDG is brought on line, the APU generator will be automatically taken off line.

IDG 1	APU GENERATOR	IDG 2
Failed	Not available	Both AC Bus 1 and AC Bus 2
Failed	AC Bus 1	AC Bus 2
Both AC Bus 1 and AC Bus 2	Not available	Failed
AC Bus 1	AC Bus 2	Failed
Failed	Both AC Bus 1 and AC Bus 2	Failed



AC System Distribution
Figure 07–20–1

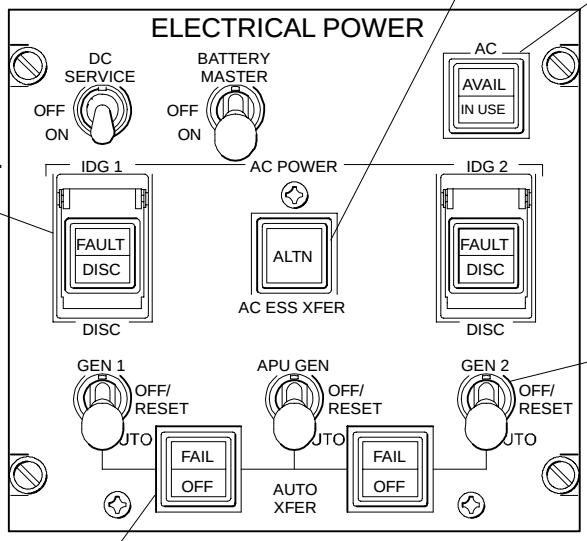
AC ESS XFER
Used to switch essential bus feed from AC bus 1 to AC bus 2.
- ALTN (white) light indicates essential bus is fed from AC bus 2.

Transfer is automatic during an AC bus 1 failure.

IDG 1 and 2 DISC (Guarded)
Used to disconnect IDG from engine.
- DISC (white) light indicates selected disconnect is successful.
- FAULT (amber) light indicates a fault within IDG (low oil pressure or high oil temperature).

IDG will automatically disconnect, when an overtemperature or overtorque condition occurs.

Once disconnected, the IDG cannot be reset with the engines running.



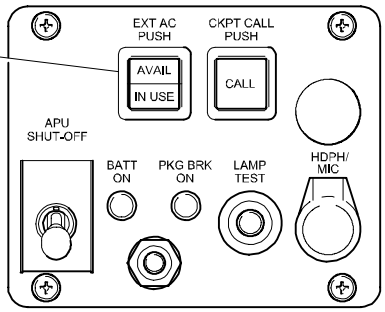
Electrical Power Panel
Overhead Panel

AC
Used to select external AC power.
- AVAIL (green) light indicates external power is connected and is ready to use.
- IN USE (white) light indicates that the external AC power unit is supplying the electrical system.

GEN 1, 2 and APU GEN
- AUTO – Connects generator to associated bus.
- OFF/ RESET – Disconnects generator from associated bus and/ or resets the generator control circuit.

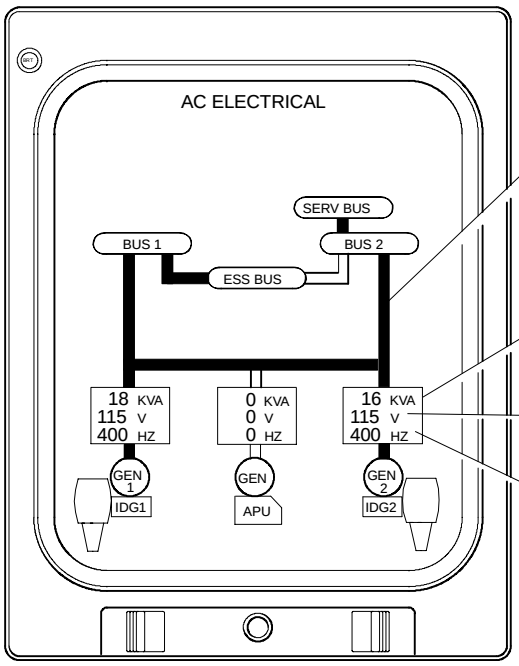
AUTO XFER
Used to disable automatic transfer of associated IDG.
- OFF (white) light indicates autotransfer is selected off.
- FAIL (amber) light indicates a fault preventing autotransfer.

EXT AC PUSH
Used to select external AC power.
- AVAIL (green) light indicates external power is connected and is ready to use.
- IN USE (white) light indicates that the external AC power unit is supplying the electrical system.



External Service Panel
Right Forward Fuselage

AC Electrical System
Figure 07–20–2



Flow Lines
- Green – Bus energized.
- Blank – Bus not energized.

Generator Load
Displays the load on the generator.

Generator Voltage
Displays the generator voltage level.

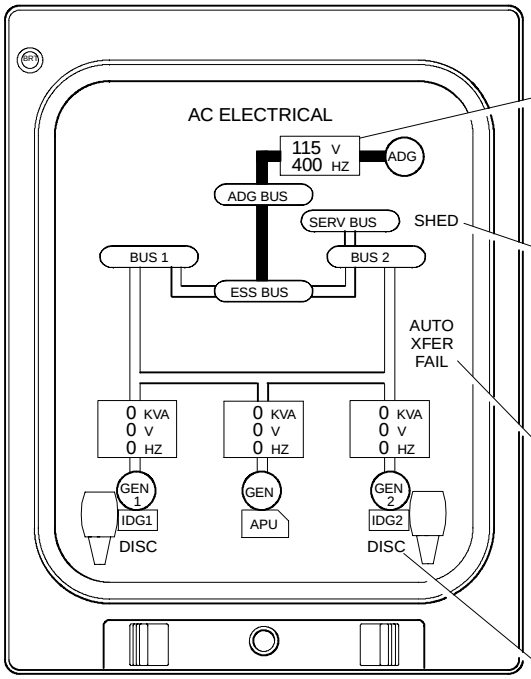
Generator Frequency
Displays the generator frequency level.

AC Electrical Page

EICAS DIGITAL READOUT	GREEN	AMBER	WHITE	HALF INTENSITY MAGENTA	AMBER DASHES
XX KVA	Generator loaded	Generator overload	Generator not loaded	Insufficient data	Invalid data
XXX V	Voltage in range	–	Voltage not in range	Insufficient data	Invalid data
XXX HZ	Frequency in range	–	Frequency not in range	Insufficient data	Invalid data

EICAS OUTLINE	GREEN	AMBER	WHITE	HALF INTENSITY MAGENTA	HALF INTENSITY CYAN
BUS	Bus powered	Bus not powered or voltage low	–	Invalid data	–
GEN	Generator on	Generator off with engine / APU running	Both generator and engine / APU are off	Invalid data	–
IDG	Constant speed drive on	Low oil pressure or high oil temperature	Engine is off or IDG has disconnected	Invalid data	–
APU	–	–	Engine / APU off	Invalid data	Engine / APU running and ready to load

AC Electrical System Synoptic Page
Figure 07–20–3 Sheet 1



AC Electrical Page

ADG Features
Displayed when ADG voltage is more than 10 volts and frequency is more than 300 Hz.

SHED (white)
Indicates that service bus is not powered.

AUTO XFER OFF (white)
Indicates that corresponding automatic transfer has been selected off.

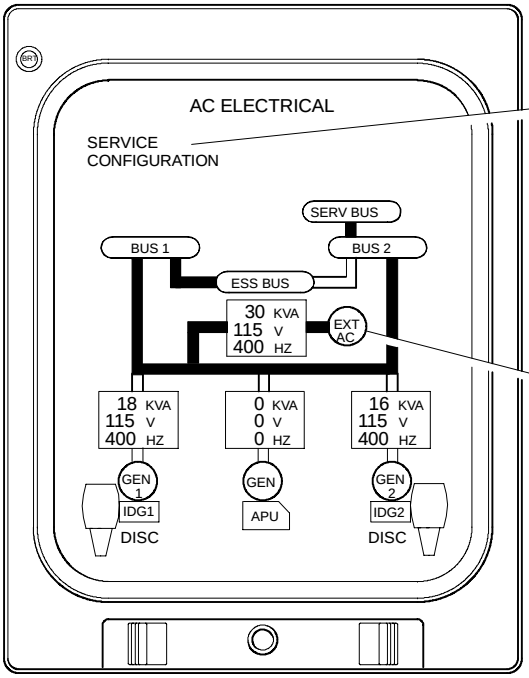
AUTO XFER FAIL (amber)
Indicates that corresponding automatic transfer has failed.

DISC (white)
Indicates that IDG has been disconnected.

EICAS DIGITAL READOUT	GREEN	WHITE	AMBER DASHES
XXX V	Between 108 and 130 volts	Less than 108 volts or more than 130 volts	Invalid data
XXX HZ	Between 360 and 440 Hz	Less than 360 Hz or more than 440 Hz	Invalid data

EICAS OUTLINE	GREEN	WHITE
ADG BUS	ADG outline green	ADG outline white
ADG	Voltage and frequency digital readouts green	Voltage or frequency digital readouts white

AC Electrical System Synoptic Page
Figure 07–20–3 Sheet 2



AC Electrical Page

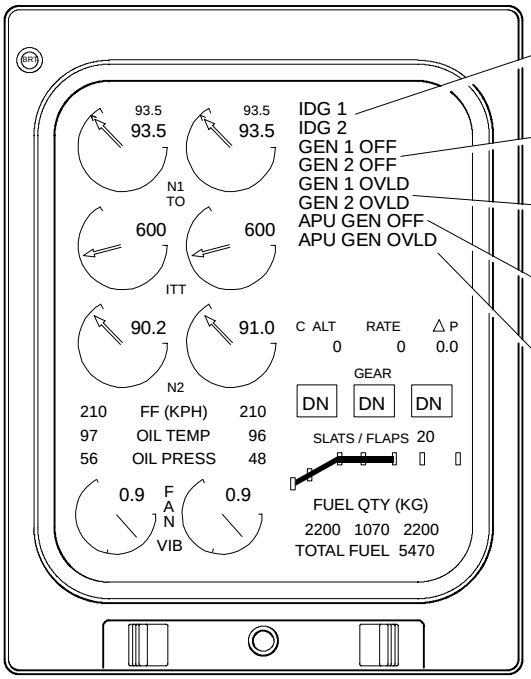
SERVICE CONFIGURATION (green)
Displayed when external AC power is available and the AVAIL switchlight on the external AC service panel has been selected. Only the AC service bus will be powered.

External AC Power Features
Displayed when external AC voltage is more than 10 volts and frequency is more than 50 Hz.

EICAS DIGITAL READOUT	GREEN	AMBER	WHITE	HALF INTENSITY MAGENTA	AMBER DASHES
XX KVA	Loaded	Overload	Not loaded	Insufficient data	Invalid data
XXX V	Between 106 and 124 volts	–	Less than 106 volts or more than 124 volts	–	Invalid data
XXX HZ	Between 370 and 430 Hz	–	Less than 370 Hz or more than 430 Hz	–	Invalid data

EICAS OUTLINE	GREEN	WHITE	HALF INTENSITY MAGENTA
EXT AC	External AC available or in use	External AC not available and not in use	Invalid data

AC Electrical System Synoptic Page
Figure 07–20–3 Sheet 3



Primary Page

IDG 1 or 2 caution (amber)
Indicates that IDG has low oil pressure or high oil temperature.

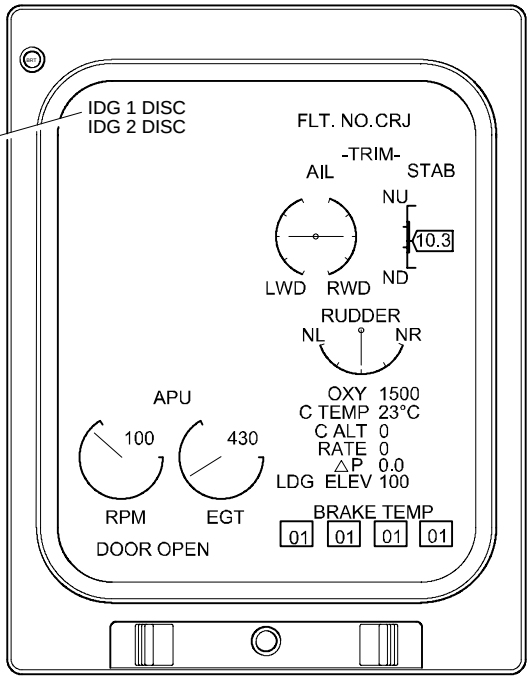
GEN 1 or 2 OFF caution (amber)
Indicates that generator is off.

GEN 1 or 2 OVLD caution (amber)
Indicates that generator control unit has detected a load of greater than 40 kVA.

APU GEN OFF caution (amber)
Indicates that APU generator is off and APU is ready to load.

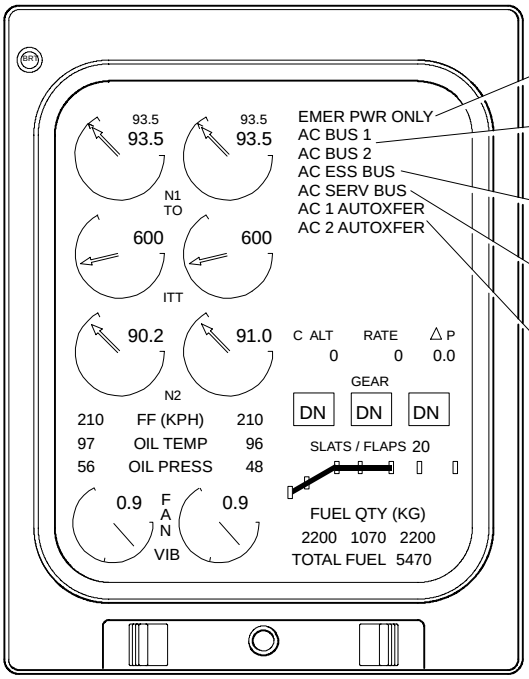
APU GEN OVLD caution (amber)
Indicates that generator control unit has detected a load of greater than 40 kVA.

IDG 1 or 2 DISC status (white)
Indicates that IDG has been disconnected, either automatically or manually.



Status Page

AC Electrical System – EICAS Indications (Generators) <1001>
Figure 07–20–4



Primary Page

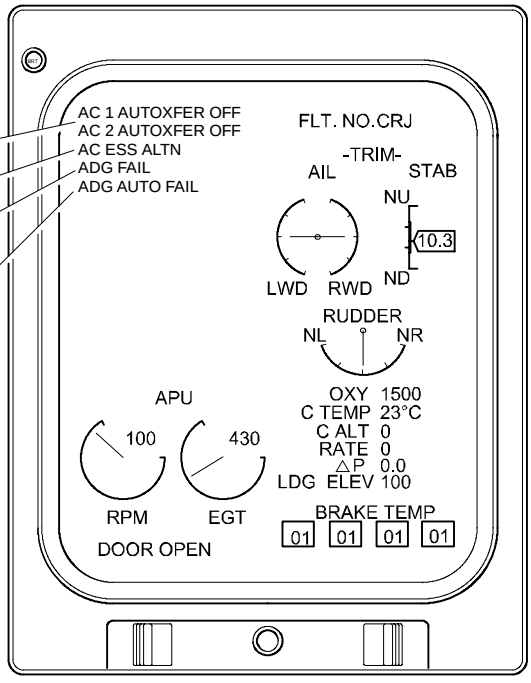
EMER PWR ONLY warning (red)
Indicates that the ADG has deployed.

AC BUS 1 or 2 caution (amber)
Indicates that the associated bus is not powered.

AC ESS BUS caution (amber)
Indicates that AC essential bus is less than 90 Volts.

AC SERV BUS caution (amber)
Indicates that AC bus 2 is powered and AC service bus is less than 90 Volts.

AC 1 or 2 AUTOXFER caution (amber)
Indicates that the corresponding automatic bus transfer has failed.



Status Page

AC 1 or 2 AUTOXFER OFF status (white)
Indicates that the corresponding automatic bus transfer has been selected off.

AC ESS ALTN status (white)
Indicates that AC essential bus is being fed from AC bus 2.

ADG FAIL Status (white)
Indicates that generator control unit has failed.

ADG AUTO FAIL status (white)
Indicates a fault in the deploy control unit, unit is not powered or up-lock solenoid has failed.

AC Electrical System – EICAS Indications (Busses)<1001>
Figure 07–20–5

The AC essential bus is normally powered by AC bus 1. If a fault exists on AC bus 1, the GCU will automatically transfer the power supplied to the AC essential bus, from AC bus 1 to AC bus 2. The crew can also manually transfer the AC essential bus supply power, from AC bus 1 to AC bus 2, using the AC ESS XFER switchlight on the electrical panel. In flight, the AC service bus is normally powered from AC bus 2. On the ground, it is powered from the APU or external AC.

D. AC Loads Distribution

AC BUS 1	AC BUS 2	AC ESSENTIAL
Flight Recorder Power	Quick Access Recorder (QAR) <1204>	Essential TRU 1
TRU 1	TRU 2	Display Cooling Fan 1
Main Battery Charger	Essential TRU 2	Avionics Cooling Fan 1
Recirculating Fan 1	Recirculating Fan 2	Crossflow Pump
Display Cooling Fan 2	Galley Exhaust Fan	Left Pitot Heater
Lavatory Exhaust Fan	Galley Heater	Standby Pitot Heater
Baggage Compartment Heater	Slats and Flaps Channel 2	Left AOA Heater
Slats and Flaps Channel 1	Pitch Trim Channel 2	Ice Detector 1
Pitch Trim Channel 1	Hydraulic Pumps 3A and 1B	Left Window Heater
Hydraulic Pumps 3B and 2B	Right Windshield Heaters	Cabin Ceiling Lighting
Hydraulic System Fan	Right Window Heater	CB Panel Integral Lights
Left Windshield Heater	Ice Detector 2	Pilot Panel Integral Lights
TAT Probe Heater	Copilot Panel Integral Lights	Overhead Panel Integral Lights
Right AOA Heater	Inertial Reference Unit Fan <1025>	Center Panel Integral Lights
Right Pitot Heater		Traffic Alert and Collision Avoidance System (TCAS)
Enhanced Ground Proximity Warning System (EGPWS)		Engine Ignition A
Engine Vibration Monitor		
Avionics Cooling Fan 2		
ADG Heater		

AC SERVICE BUS	ADG Bus
APU Charger	Hydraulic Pump 3B
Logo Lights <1020>	Pitch Trim #2
Cabin Sidewall Lighting	Slats and Flaps #1
Cabin Ceiling Lighting	Slats and Flaps #2
Toilet	
Water System	

E. Air Driven Generator (ADG)

In the event of a complete AC power failure in flight, the ADG will automatically deploy and supply emergency AC power to the ADG bus and to the AC essential bus. If the automatic deploy function fails, the ADG can be deployed manually by pulling the ADG manual release handle on the ADG CONTROL control panel at the rear of the center console.

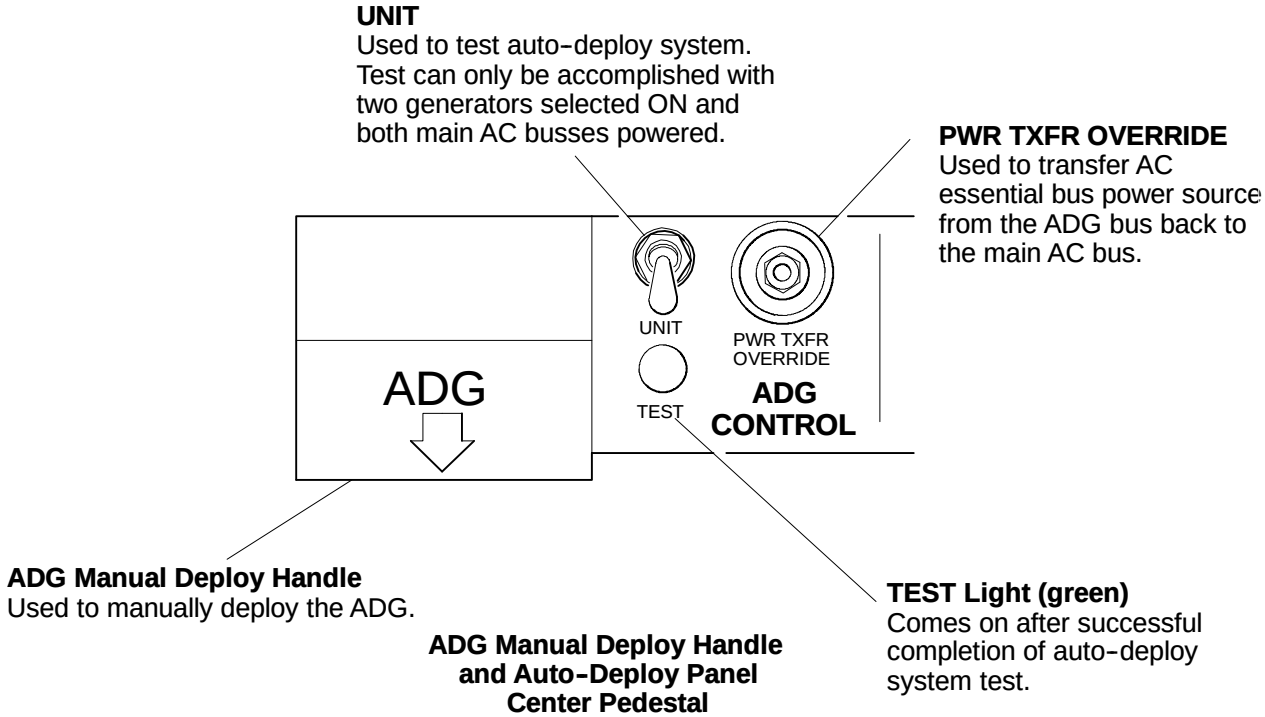
The ADG is heated in flight by an internal heater. The heater protects against frost or ice formation which could prevent the ADG from deploying in an emergency. The heater is continuously powered in flight from AC Bus 1 when the nose gear is up and locked. On landing, when the nose gear is extended, power is removed from the heater.

The ADG bus will supply power to the 3B hydraulic pump, flaps and slats and pitch trim channel 2. If either main generator is restored, the crew can override the ADG by pressing the PWR TXFR OVERRIDE button on the ADG control panel. This will reconnect the restored IDG to power AC bus 1 and 2. The ADG will continue to power the critical flight controls and the ADG bus. The flaps and slats will move at half speed when powered from the ADG bus.

The ADG generator, voltage, frequency and ADG bus indications on the EICAS, AC ELECTRICAL synoptic page are only displayed when the ADG bus is powered.

The ADG will continue to operate and supply power to the ADG bus until the airspeed decreases below 135 kts. At that point, if the APU generator or IDG has not been restore, the only power available will be from the batteries.

The ADG cannot be restowed in flight. It is restowed manually, on the ground, by maintenance personnel.



ADG Manual Deploy Handle and Auto-Deploy Panel Center Pedestal

Air Driven Generator (ADG)
Figure 07–20–6

F. System Circuit Breakers

SYSTEM	SUB-SYSTEM	CB NAME	BUS BAR	CB PANEL	CB LOCATION	NOTES
AC Electrical Power	Generators	IDG 1 DISC	BATTERY BUS	1	P10	
		IDG 2 DISC			P11	
	Generator Control	GCU 1			Q9	
		GCU 2			Q10	
		GCU 3			Q11	
	AC Bus 1	PWR SENS	AC BUS 1		C14	
	ADG	ADG HEATER			C13	
	AC Bus 2	PWR SENS	AC BUS 2	2	C14	
	AC Essential Bus	AC ESS FEED	AC ESSENTIAL	1	S2	
		PWR SENS			S11	
	AC Service Bus	PWR SENS	AC SERVICE	2	D10	
		AC SERVICE FEED			E2	
	AC Power Center	ACPC CONT 1	DC BUS 1	1	D13	
		ACPC CONT 2	DC BUS 2	2	L9	
		ACPC CONT 3	BATTERY BUS		N1	
	ADG Deploy	ADG DEPLOY AUTO			N6	
		ADG DEPLOY MAN			N7	
	External AC Power	EXT AC PWR	APU BATT DIRECT BUS	5	A8	
		EXT AC PWR 1	MAIN BATTERY DIRECT BUS	6	A8	

1. DC ELECTRICAL SYSTEM

Four transformer rectifier units (TRU) and two batteries (Main and APU) provide the aircraft with DC electrical power.

A. Transformer Rectifier Units (TRU)

AC power from AC bus 1, AC bus 2 and from the AC essential bus is converted by four transformer rectifier units to 28VDC and supplied to DC bus 1, DC bus 2, DC essential bus, battery bus, DC service bus and the DC utility bus. Normal distribution of the TRU outputs is shown in the following table:

INPUT BUS	TRU	OUTPUT BUS
AC Bus 1	TRU 1	DC Bus 1
AC Bus 2	TRU 2	DC Bus 2 / DC Utility Bus
	Essential TRU 2	DC Battery Bus
AC Essential Bus	Essential TRU 1	DC Essential Bus

ESS TRU 2 is normally supplied AC power from AC BUS 2. If AC BUS 2 is not available, ESS TRU 2 will be automatically supplied from the AC ESS BUS, via the ESS TRU 2 XFR switch.

B. Batteries

There are two nickel-cadmium batteries installed in the aircraft, an APU battery and a main battery. The APU battery is located in the aft equipment compartment and provides DC power to the APU battery direct bus. The APU batery has a nominal output voltage of 24 Vdc with a capacity of 43 ampere-hours. The main battery is located in the nose avionics compartment and provides DC power to the main battery direct bus. The main batery has a nominal output voltage of 24 Vdc with a capacity of 17 ampere-hours.

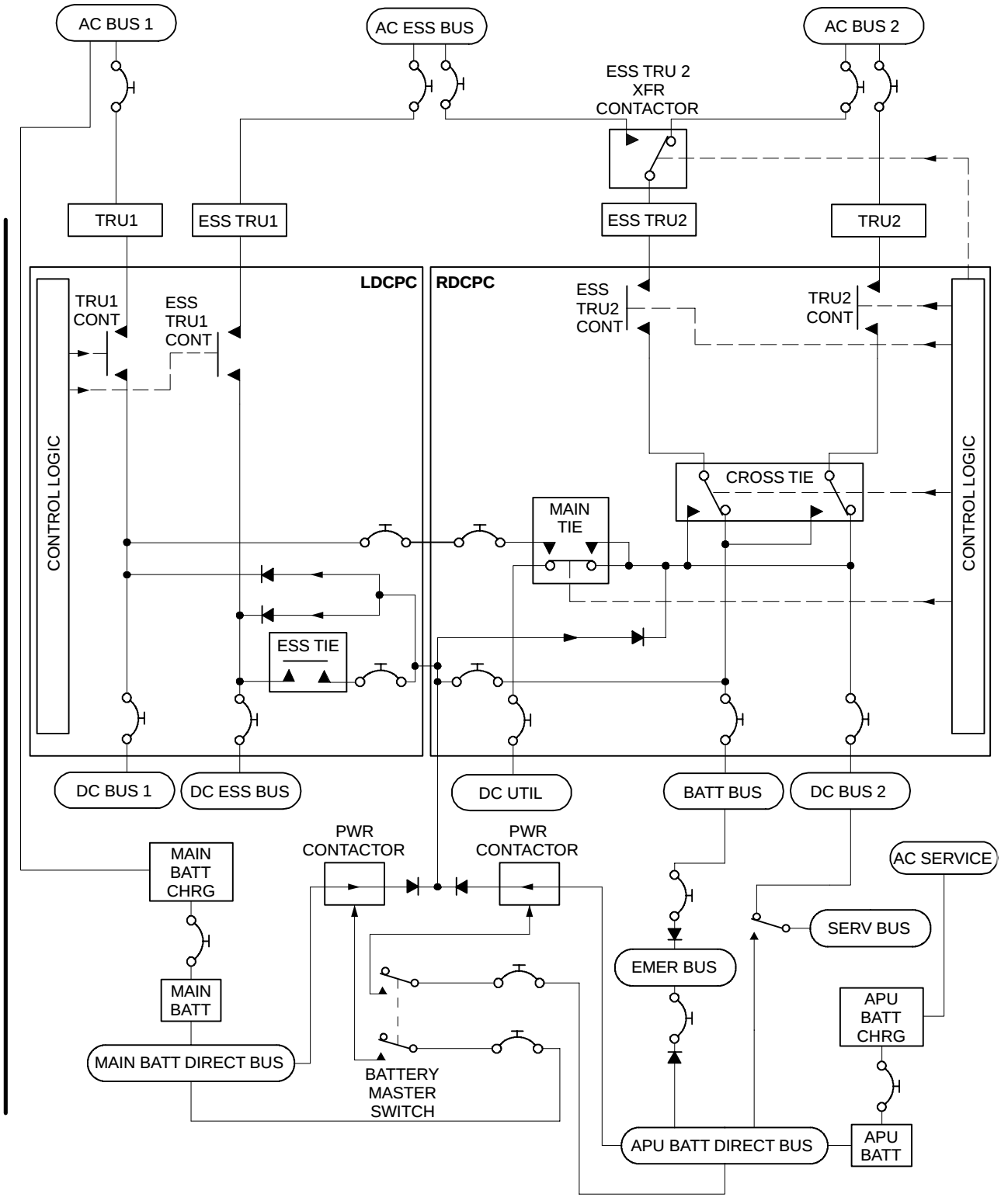
Each battery is maintained at full charge by its related battery charger. The main battery charger is powered from AC bus 1 and the APU battery charger is powered from the AC service bus. Battery charging is controlled automatically. Each charger monitors the battery voltage and temperature to control the charge rate and prevent overheating (thermal runaway).

C. DC Distribution

DC power is distributed through two DC power centers (DCPCs) located in the avionics compartment. DC bus 1 and DC bus 2 are powered from TRU 1 and TRU 2 respectively with connection controlled by the DCPC control logic. The DC essential, battery and DC emergency buses are normally powered from the essential TRUs. In the event that both essential TRUs fail, the DC essential, battery and emergency bus will be powered by TRU 2 via the automatic CROSS TIE.

The Main battery direct bus, APU battery direct bus, and the emergency bus are all hot buses (they are continuously powered at all times from the batteries). When the BATTERY MASTER switch is selected ON, an input signal is supplied to the two power controllers (PC) to connect their respective batteries to the DCPCs for power distribution. Each battery direct bus can power the DC battery bus. Both the battery bus and the APU battery direct bus feed the DC emergency bus. The DC service bus is normally powered from DC bus 2. If the DC SERVICE switch on the electrical power panel is selected ON, the DC service bus is powered from the APU battery direct bus.

If a complete loss of AC power occurs, the ESS TIE will close to connect the DC essential bus to the battery bus for emergency power. If TRU 1 or TRU 2 fails, the MAIN TIE will close to connect DC Bus 1 and DC Bus 2 to functioning TRU (1 or 2) When the MAIN TIE closes, the DC utility bus is shed to reduce load draw on the remaining TRUs. When both essential TRUs fail or when both TRU 1 and TRU 2 fail, the CROSS TIE closes. If AC bus 2 fails, essential TRU 2 will be powered from the AC essential bus.

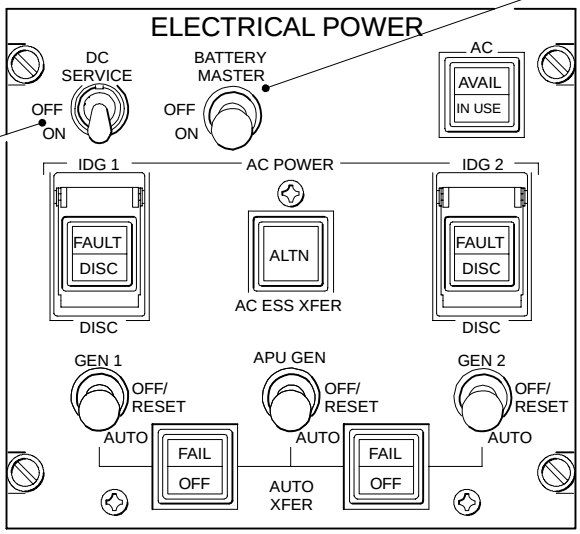


DC Electrical System – Schematic
Figure 07–30–1

BATTERY MASTER
Used to connect the APU and main battery direct busses to the battery bus.

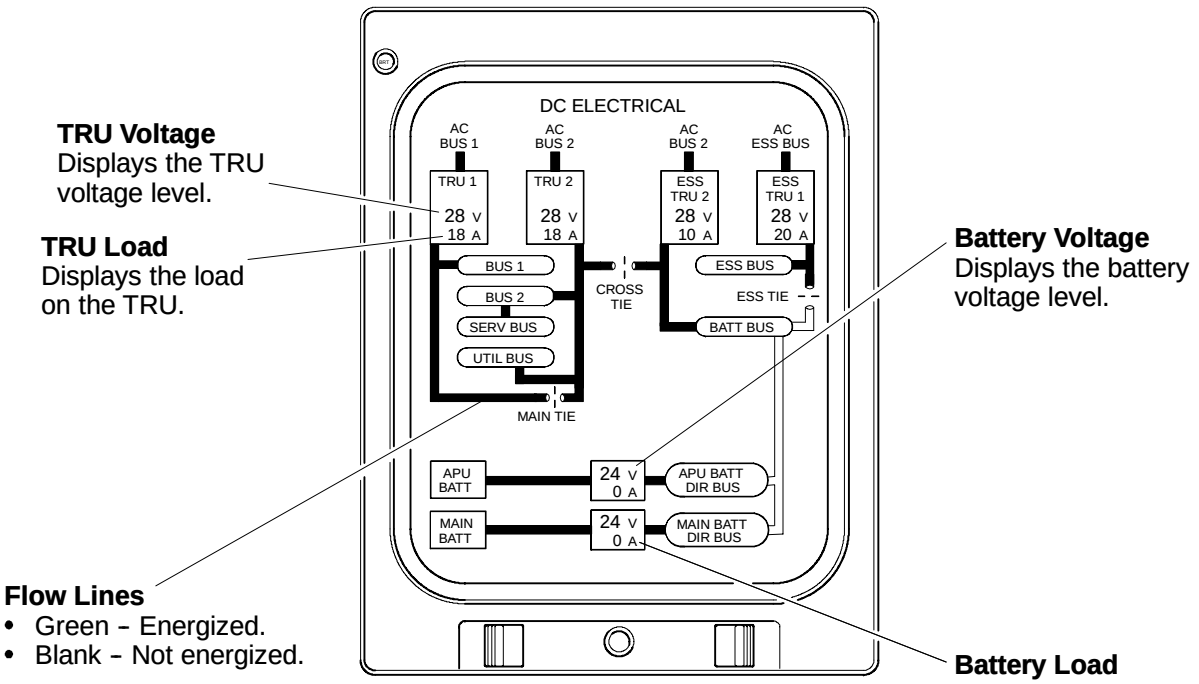
NOTE
Battery master should always be in the ON position in flight.

DC SERVICE
Used to connect the DC service bus to the APU battery direct bus.



Electrical Power Panel
Overhead Panel

Electrical Power Overhead Panel
Figure 07–30–2

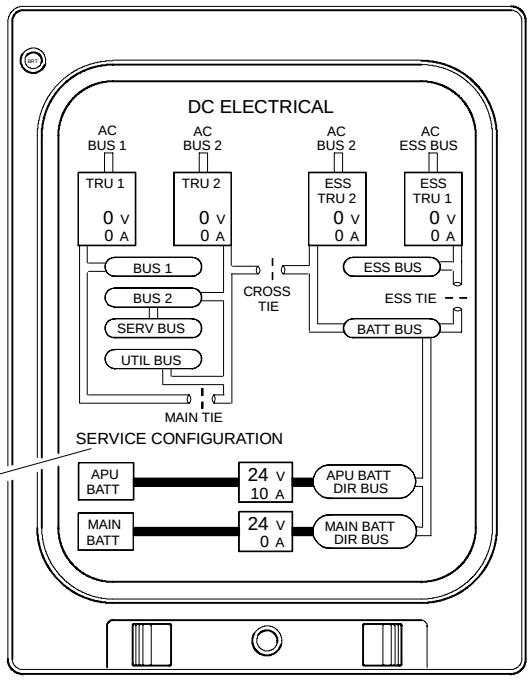


DC ELEC Page
EICAS Secondary Display
Center Instrument Panel

EICAS DIGITAL READOUT	GREEN	WHITE	AMBER DASHES
xx V (TRU)	Between 22 and 29 volts	Less than 22 volts or more than 29 volts	Invalid data
xx V (BATT)	Between 18 and 32 volts	Less than 18 volts or more than 32 volts	Invalid data
xx A (TRU)	Between 3.7 and 120.7 amps	Less than 3.7 amps or more than 120.7 amps	Invalid data
xx A (BATT)	Not less than 1.7 amps or not less than 12 volts	Less than 1.7 amps and less than 12 volts	Invalid data

EICAS OUTLINE	GREEN	AMBER	WHITE	HALF INTENSITY MAGENTA
BUS	Bus powered	Bus not powered	–	Invalid data
DIR BUS	Not less than 18 volts	Less than 18 volts	–	Invalid data
TRU	Not less than 3.7 amps and not less than 18 volts	–	Less than 3.7 amps and less than 18 volts	Invalid data
BATT	Not less than 18 volts	Less than 18 volts	–	Invalid data

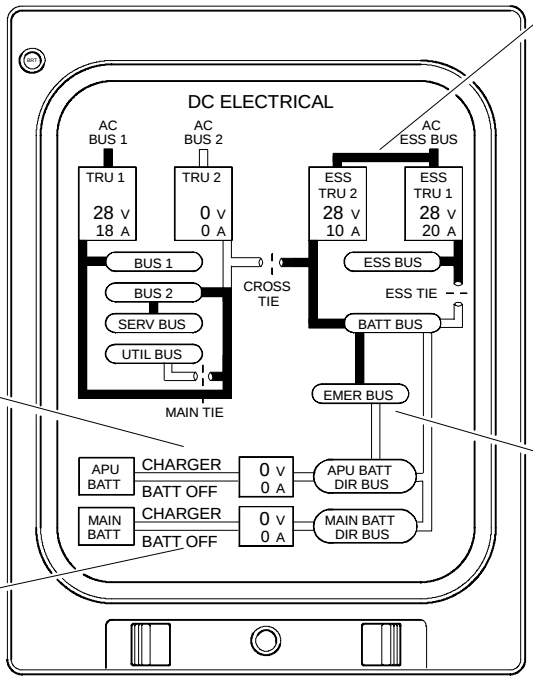
DC Electrical Page Tru Voltage
Figure 07–30–3



DC Electrical Page

SERVICE CONFIGURATION (amber)
Indicates that the DC SERVICE has been selected on.

Alternate AC Essential Flow Lines
Displayed only when AC bus 2 is not available.



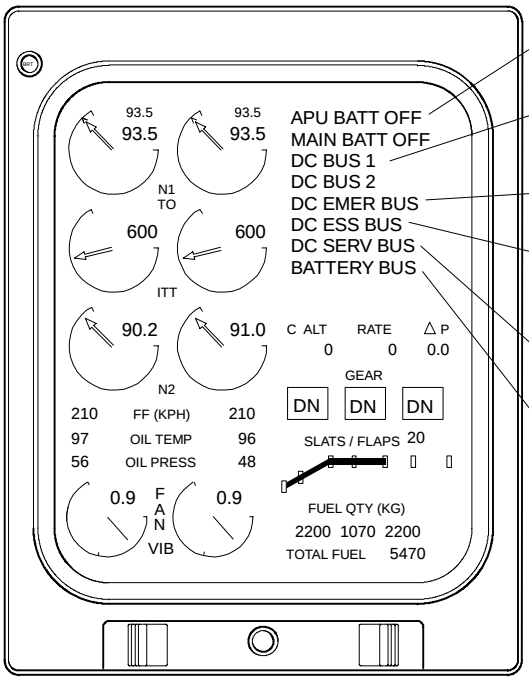
DC Electrical Page

CHARGER (white)
Indicates that the corresponding charger is not charging.

DC Emergency Bus and Flow Lines
Displayed only when the emergency bus is not powered by both the battery bus and the APU battery direct bus.

BATT OFF (amber)
Indicates that the corresponding battery is not available.

DC Electrical Page Service Configuration
Figure 07–30–4



Primary Page

APU or MAIN BATT OFF caution (amber)
Indicates that APU or main battery is not available.

DC BUS 1 or 2 caution (amber)
Indicates that the corresponding DC bus is not powered with either AC bus 1 or 2 on line.

DC EMER BUS caution (amber)
Indicates that emergency bus is not powered.

DC ESS BUS caution (amber)
Indicates that essential bus is not powered in flight or essential bus is not powered on the ground with either AC essential bus or APU generator on line.

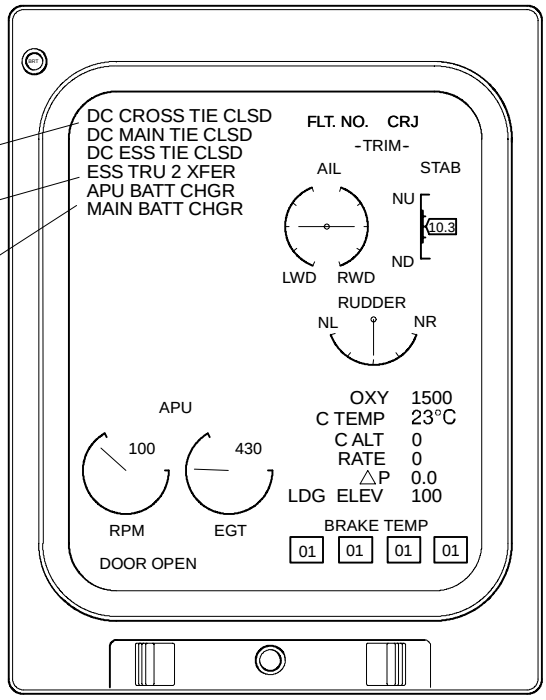
DC SERV BUS caution (amber)
Indicates that service bus is not powered with either DC bus 2 powered or DC SERVICE selected on and APU voltage ≥18 volts.

BATTERY BUS caution (amber)
Indicates that battery bus is not powered.

DC CROSS, MAIN or ESS TIE CLSD status (white)
Indicates that the corresponding bus tie is closed.

ESS TRU 2 XFER status (white)
Indicates that essential TRU 2 is powered by AC essential bus.

APU or MAIN BATT CHGR status (white)
Indicates that the corresponding battery is overheating or not charging.



Status Page

EICAS Primary Display Auxiliary Power Unit / Main Battery off <1001>
Figure 07-30-5

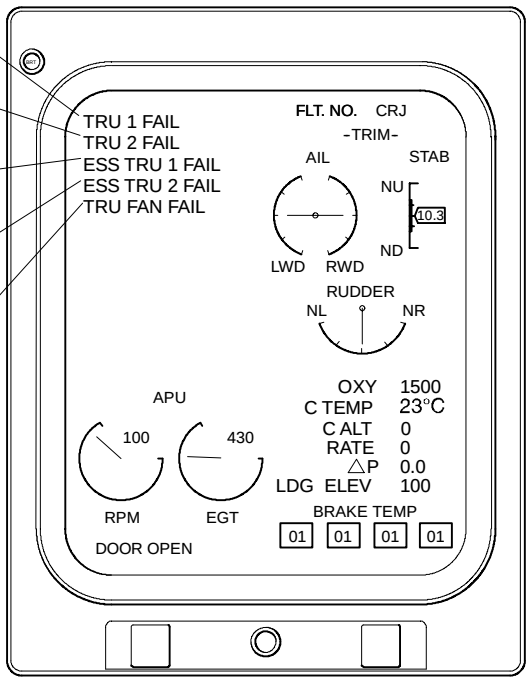
TRU 1 FAIL status (white)
Indicates that TRU 1 voltage is
< 18 volts with AC bus 1 on line
or
main tie is closed with TRU 1 load
< 3.7 amps.

TRU 2 FAIL status (white)
Indicates that TRU 2 voltage is
< 18 volts with AC bus 2 on line
or
main tie is closed with TRU 2 load
< 3.7 amps.

ESS TRU 1 FAIL status (white)
Indicates that essential TRU 1 voltage
is < 18 volts with AC essential bus on line
or
essential tie is closed with essential
TRU 1 load < 3.7 amps.

ESS TRU 2 FAIL status (white)
Indicates that essential TRU 2 voltage is
< 18 volts with AC bus 2 on line or essential
TRU 2 is powered by AC essential bus
or
essential tie is closed with essential
TRU 2 load < 3.7 amps.

TRU FAN FAIL status (white)
Indicates that any of 4 TRU fans have failed.



Status Page

Transformer Rectifire Unit Fail – Status Page
Figure 07–30–6

D. DC Loads Distribution

DC BUS 1		
Flight Recorder Control	ACS Control 2 Channel A	Brake Pressure Application
EICAS Primary Display	Lavatory Smoke Detector	PSEU Channel A
EICAS Secondary Display	SSCU 1 Channel A	Nose Wheel Steering
Left Lamp Driver Unit	Pitch Feel 1	Anti-Skid
EICAS Dimming	Radio Altimeter 1	Left Cabin Reading Lights
Data Loader	Hydraulic Pump 2 and 3B Control	Cockpit Dome Light
Left IAPS	Hydraulic System Fan Control	Taxi Lights
Boarding Music	Hydraulic System 2 Indication	Nose Landing Lights
Passenger Door Actuator	Anti-Ice Control Channel A	Cockpit Floor Lights
ACPC Control 1	Left T2 Heater	Rear Anti-Collision Lights
Baggage Compartment Control	Pilot Windshield Wiper	Wing Inspection Lights
Fan Monitor	Left Windshield Heater Control	Maintenance Lights
Cabin Pressure Control 1	ADS Heater Control 2	GPS 1
Cockpit Temperature Sensors	Right Static Heaters	DME 1
Aft Cabin Temperature Sensors		Weather Radar

DC BUS 2		
Right IAPS	SSCU 1 Channel B	Right Window Heater Control
Right AFCS	Aileron and Rudder Trim	PSEU Channel B
Right IAPS Fan	Clock 2	Nose Wheel Steering
Observer Audio	Radio Altimeter 2 <1045>	Brake Pressure Indication
VHF Communication 2	Air Data Computer 2	Anti-Skid
RTU 2	Primary Flight Director 2	Chart Holder Lights
Service Bus Feed	Multifunctional Display 2	Copilot Map Light
ACPC Control 2	EFIS Control Panel 2	Wing Anti-Collision Lights
Left ACS Pressure Sensors	Attitude Heading 2	ADF 2
Cabin Pressure Control 2	Right Fuel Pump and Control	Transponder 2
Galley Heater Control	Hydraulic System 1 Indication	VHF Navigation 2
Fwd Cabin Temperature Sensors	Hydraulic Pump 1 and 3A Control	DME 2
ACS Control 1 Channel B	Right T2 Heater	AHRS Fan 2
Right ACS Manual	Copilot Windshield Wiper	GPS 2 <1027>
	Right Windshield Heater Control	
	Right EFIS CRT Dimming	

EMERGENCY BUS	SERVICE BUS	UTILITY BUS
APU Battery Direct Bus Feed	Service Lights	Right Cabin Reading Lights
FIREX	Boarding Lights	
Engine and APU Fuel SOVs	Navigation Lights	
Hydraulic SOVs	Toilet Lights	
	Galley Area Lights	
	Beacon Lights	
	Water System	

ESSENTIAL BUS		
EICAS DCU 1	Stall Protection Right Channel	Anti-Ice Control Channel B
RTU 1	Left EFIS CRT Dimming	Instrument Flood Lights
Pilot Audio	EFIS Control Panel 1	Emergency Lights
Cockpit Voice Recorder	Air Data Computer 1	ADF 1
Door Indication 1 and 2	Primary Flight Director 1	Transponder 1
ACS Control 2 Channel B	Multifunctional Display 1	VHF Navigation 1
Left ACS Manual	Crossflow Pump Control	Attitude Heading 1
Display Fan Control	Fuel System Control	AHRS Fan 1
Right ACS Pressure Sensors	Left Static Heater	Bleed Air SOVs
Flap and Slat Control Channel 1	ADS Heater Control 1	Thrust Reversers
SSCU 2	ADS Standby Heater Control	Right Engine Oil Pressure
Pitch Feel 2 Rudder Travel Limit	Left Window Heater Control	Left T2 Heater

BATTERY BUS		
EICAS DCU 1 and 2	ACPC Control 3	Gravity Fuel Crossflow
EICAS Primary Display	ADG Deployment	Fuel Transfer SOVs
EICAS Secondary Display	ACS Control 1 Channel A	APU Fuel Pump
EICAS Control Panel	Ram Air SOV	Hydraulic System 3 Indication
Right Lamp Driver Unit	Manual Cabin Pressure Control	Cowl Anti-Ice Valves
EICAS Dimming	Passenger Oxygen Deployment	Wing Anti-ice Isolation Valve
Left AFCS	Crew Oxygen Monitor	PSEU Channel A and B
MDC	Cargo Smoke Detection	Weight-On-Wheels
Left IAPS Fan	Fire Detection	Passenger Signs
APU Control	MLG Bay Overheat Detection	Wing Landing Lights
APU ECU Primary	Flap and Slat Control Channel 2	Map Lights
VHF Communication 1	Aileron and Rudder Trim Indication	Cabin Utility Lights
Emergency Tuning	Stall Protection Stick Pusher	Overhead Panel Lights
Pilot, Copilot and Observer Audio	Stall Protection Left Channel	EICAS and RTU Dimming
Cabin Interphone	Standby Instrument	Left Engine Oil Pressure
Passenger Address	Clock 1	Engine Starting
Emergency Bus Feed	Left Fuel Pump and Control	FADEC
IDG Disconnect	Fuel System Control	Engine Ignition B
Generator Control Units	Right T2 Heater	

MAIN BATTERY DIRECT BUS	APU BATTERY DIRECT BUS	
Main Battery Power Sensors	APU ECU Secondary	Service Bus Feed
Main Battery Control	APU Door Actuator	Emergency Bus Feed
External AC Power	APU Battery Power Sensors	Refuel/Defuel Control
DCPC 2	APU Battery Control	Emergency Refuel
Main Battery Charger Output	DCPC 1	Engine Oil Indication
Clocks	External AC Power	Engine Oil Replenishment <1213>
Cockpit Dome Lights		

E. System Circuit Breakers

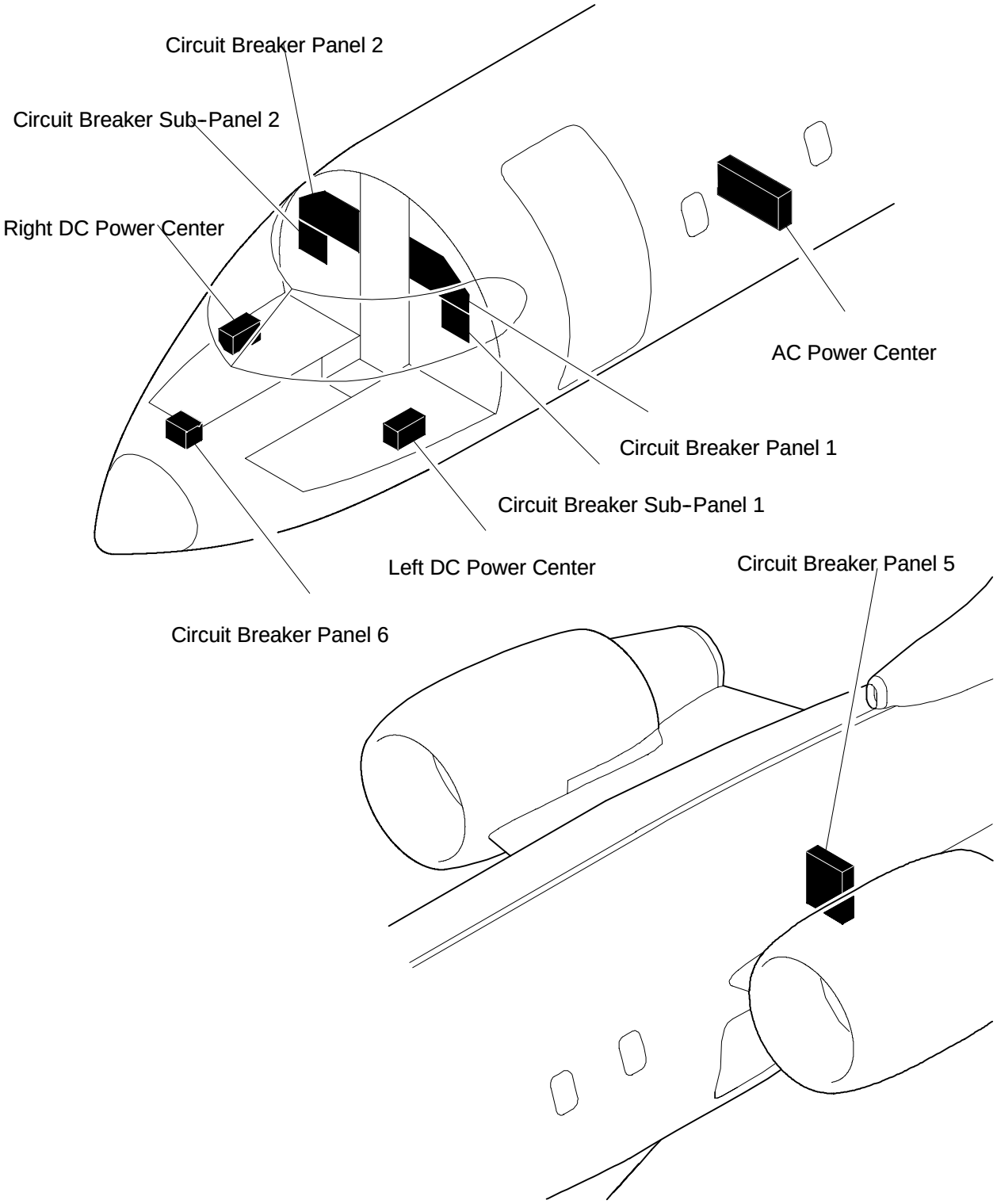
SYSTEM	SUB-SYSTEM	CB NAME	BUS BAR	CB PANEL	CB LOCATION	NOTES
DC Electrical Power	Transformer Rectifier Units	TRU 1	AC BUS 1	1	B5	
		ESS TRU 1	AC ESSENTIAL		T2	
		ESS TRU 2B			T5	
		TRU 2	AC BUS 2	2	B5	
		ESS TRU 2A			C5	
	DC Bus 1	DC 1 FEED	DC BUS 1	1	D6	
		PWR SENS			D14	
		RCCB DC 1			D3	
	DC Bus 2	DC 2 FEED	DC BUS 2	2	L8	
		PWR SENS			L10	
		RCCB DC 2		1	D4	
	DC Essential Bus	DC ESS FEED	DC ESSENTIAL	2	R6	
		PWR SENS			R11	
		RCCB DC ESS		1	D5	
	DC Emergency Bus	EMER BUS FEED	APU BATT DIRECT BUS	5	A10	
		EMER BUS FEED	BATTERY BUS	1	L10	
		PWR SENS	DC EMERGENCY		R11	
	DC Service Bus	SERV BUS FEED	APU BATT DIRECT BUS	5	A9	
		SERV BUS FEED	DC BUS 2	2	F5	
		PWR SENS	DC SERVICE		M11	
	DC Utility Bus	PWR SENS	DC UTILITY		L1	
		DC UTILITY FEED			L7	
	Battery Bus	BATT BUS FEED	BATTERY BUS		N2	
		PWR SENS		1	L3	
	DC Power Center	DCPC	APU BATT DIRECT BUS	5	A4	
		DCPC 2	MAIN BATTERY DIRECT BUS	6	B1	

SYSTEM	SUB-SYSTEM	CB NAME	BUS BAR	CB PANEL	CB LOCATION	NOTES
DC Electrical Power	APU Battery	APU BATT DIR FEED	DC EMERGENCY	1	R1	
		APU BATT CONT	APU BATT DIRECT BUS	5	A3	
		APU BATT PWR SENS			A1	
		APU BATT PWR SENS REF			A2	
		RCCB APU BATT		1	D2	
	Main Battery	MAIN BATT CONT	MAIN BATTERY DIRECT BUS	6	A3	
		MAIN BATT PWR SENS			A1	
		MAIN BATT PWR SENS REF			A2	
		RCCB MAIN BATT		1	D1	
	Battery Charging	APU CHARGER	AC SERVICE	2	E5	
		MAIN BATTERY CHARGER	AC BUS 1	1	C5	
		MAIN BATT CHARGER OUTPUT	MAIN BATTERY DIRECT BUS	6	B6	

1. CIRCUIT BREAKER PANELS

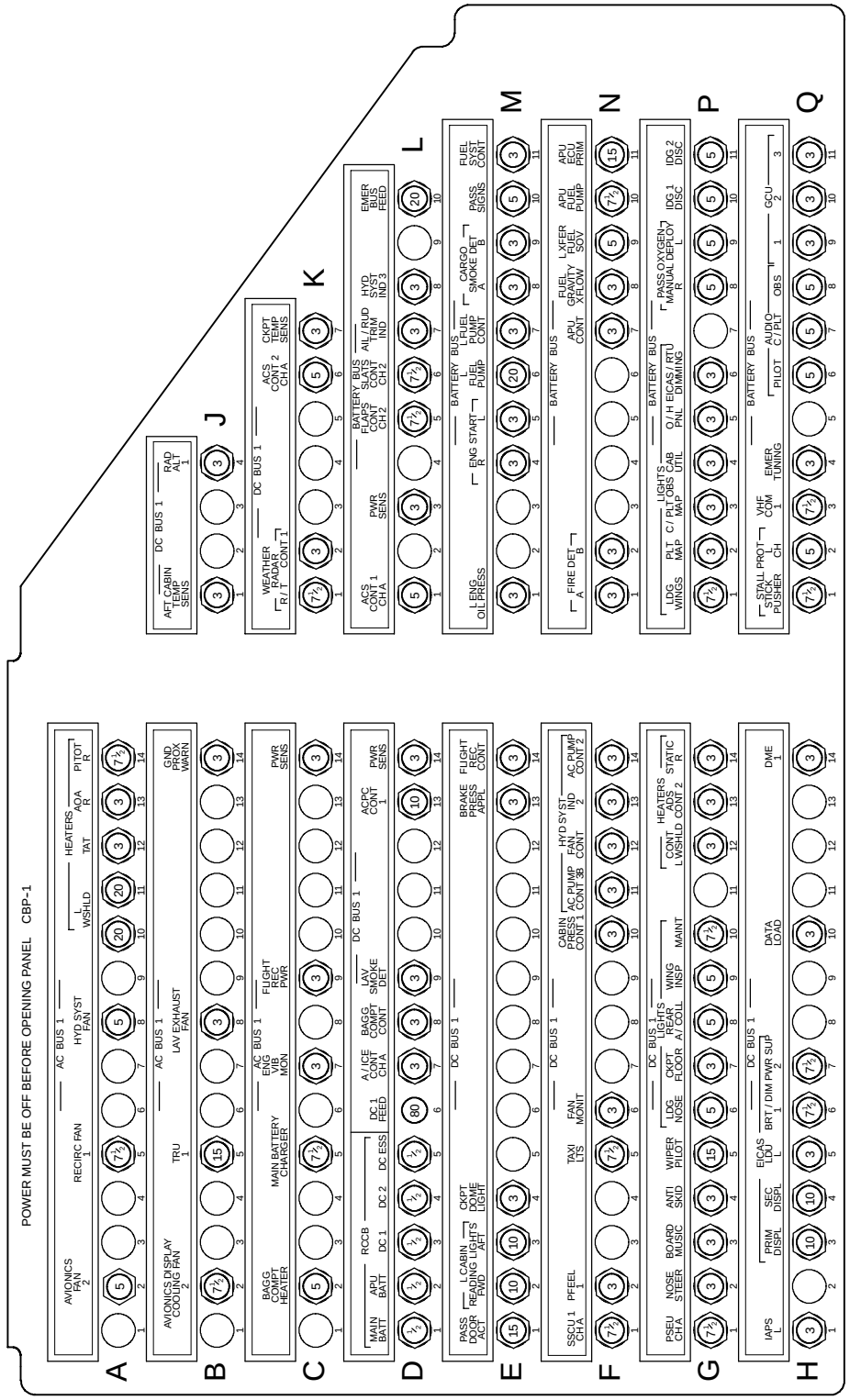
There are eight circuit breaker panels (CBP's) located in the aircraft (Refer to figure 1). There are two circuit breaker panels, identified as CBPs 1 and 2, located in the flight compartment. A circuit breaker panel, identified as CBP-5, is located in the aft equipment compartment. Another circuit breaker panel, identified as CBP-6, is located in the forward equipment compartment. Circuit breakers are also installed on the AC power center, the left and right DC power centers and on the galley control panel (not shown). Circuit breaker panels 1, 2 and the galley circuit breakers are crew accessable during flight. Circuit breaker panels 5, 6, and the circuit breakers on the AC and DC power centers are only accessable on the ground.

The circuit breakers are clearly identified. For circuit breaker referencing, each circuit breaker panel is laid out in an alphanumeric grid with letters running down the side of the panel and numbers running across each row (Refer to figure 2). For example, the location of a circuit breaker on circuit breaker panel 1, in the 4th row, column 2, would be identified as CBP1-D2. In this instance, D2 is the circuit breaker for the APU BATT.



Panel Overview
Figure 07–40–1

CIRCUIT BREAKER PANEL 1
(Behind Pilot's Seat)



Circuit Breaker Panel 1 (For Reference Only)
Figure 07–40–2

2. ATA NUMBERING AND CIRCUIT BREAKER LOCATION

The aircraft circuit breakers are listed in this chapter by ATA as follows:

SUBJECT	ATA	FCOM 1 CHAPT
AIR CONDITIONING	21	8
AUTO FLIGHT	22	3
COMMUNICATIONS	23	5
ELECTRICAL	24	7
EQUIPMENT	25	9 & 10
FIRE PROTECTION	26	10
FLIGHT CONTROLS	27	11
FUEL	28	13
HYDRAULICS	29	14
ICE & RAIN	30	15
INDICATING & RECORDING	31	2
LANDING GEAR	32	16
LIGHTING	33	17
NAVIGATION	34	12 & 18
OXYGEN	35	9
PNEUMATICS	36	19
WATER & WASTE	38	21
MDC (DIAGNOSTICS)	45	2
APU	49	4
DOORS	52	6
POWERPLANT	71 TO 80	20

The circuit breakers for each ATA are listed by sub-section and alphabetically as follows:

3. ATA 21 - AIR CONDITIONING

A. AVIONICS COOLING

CB IDENT	LOCATION
AVIONICS DISPLAY COOLING FAN 1	CBP1-U2
AVIONICS DISPLAY COOLING FAN 2	CBP1-B2 (3-PHASE)

AVIONICS COOLING FAN 1	CBP1-V2
AVIONICS COOLING FAN 2	CBP1-A2
DISPLAY FAN CONT	CBP2-T10
FAN MONIT	CBP1-F6

B. BAGGAGE COMPARTMENT

CB IDENT	LOCATION
BAGG COMPT CONT	CBP1-D8
BAGG COMPT HEATER <1201>	CBP1-C2 (3-PHASE)

C. GALLEY AND LAVATORY SYSTEM

CB IDENT	LOCATION
GALLEY EXHAUST FAN	CBP2-B8 (3-PHASE)
GALLEY HEATER	CBP2-B11 (3-PHASE)
GALLEY HEATER CONT	CBP2-F11
LAV EXHAUST FAN	CBP1-B8 (3-PHASE)

D. PRESSURIZATION

CB IDENT	LOCATION
CABIN PRESS CONT 1	CBP1-F10
CABIN PRESS CONT 2	CBP2-F10
CABIN PRESS MAN CONT	CBP2-P5

E. RAM AIR AND RECIRC SYSTEM

CB IDENT	LOCATION
RAM AIR SOV	CBP2-P4
RECIRC FAN 1	CBP1-A5
RECIRC FAN 2	CBP2-A5

F. TEMPERATURE CONTROL

CB IDENT	LOCATION
ACS CONT 1 CH A	CBP1-L1
ACS CONT 1 CH B	CBP2-J4
ACS CONT 2 CH A	CBP1-K6
ACS CONT 2 CH B	CBP2-K7
ACS L MAN	CBP2-T8
ACS R MAN	CBP2-K6
ACS L PRESS SENS	CBP2-F6
ACS R PRESS SENS	CBP2-T11
AFT CABIN TEMP SENS	CBP1-J1
CKPT TEMP SENS	CBP1-K7
FWD CABIN TEMP SENS	CBP2-J1

4. ATA 22 - AUTO FLIGHT

CB IDENT	LOCATION
IAPS L or (IAPS L FMS)	CBP1-H1
IAPS L AFCS/MDC	CBP2-P6
IAPS L FAN	CBP2-P7
IAPS R	CBP2-H1
IAPS R AFCS	CBP2-H2
IAPS R FAN	CBP2-H3

5. ATA 23 - COMMUNICATIONS

A. AUDIO INTEGRATING SYSTEM

CB IDENT	LOCATION
AUDIO - C/PLT	CBP1-Q7
AUDIO - PILOT	CBP1-Q6
AUDIO PILOT	CBP2-V2
AUDIO - OBS	CBP1-Q8 and CBP2-H4
CABIN INPH	CBP2-Q3
PASS ADDR	CBP2-Q4

B. ANNOUNCEMENT AND BOARDING MUSIC SYSTEM

CB IDENT	LOCATION
BOARD MUSIC	CBP1-G3

C. VHF

CB IDENT	LOCATION
EMER TUNING	CBP1-Q4
RTU 1	CBP2-U9
RTU 2	CBP2-K7
VHF COM 1	CBP1-Q3
VHF COM 2	CBP2-H10

6. ATA 24 - ELECTRICAL

A. AC SYSTEM

CB IDENT	LOCATION
AC ESS FEED	CBP1-S2
AC ESS FEED 1	AC PWR CTR
AC ESS FEED2	AC PWR CTR
ACPC CONT 1	CBP1-D13
ACPC CONT 2	CBP2-L9
ACPC CONT 3	CBP2-N1
AC SERVICE FEED	CBP2-E2
APU GEN POR	AC PWR CTR
CABIN FEED 1	AC PWR CTR
BATT BUS FEED	CBP2-N2
CABIN FEED 2	AC PWR CTR
CTRL PWR 1	AC PWR CTR
CTRL PWR 2	AC PWR CTR

CTRL PWR 3	AC PWR CTR
EXT AC POR	AC PWR CTR
EXT AC PWR 1	CBP6-A8
EXT AC PWR	CBP5-A8
EXT AC V/F SENSE	AC PWR CTR
GCU - 1	CBP1-Q9
GCU - 2	CBP1-Q10
GCU - 3	CBP1-Q11
GEN 1 POR	AC PWR CTR
GEN 2 POR	AC PWR CTR
IDG 1 DISC	CBP1-P10
IDG 2 DISC	CBP1-P11
PWR SENS	CBP1-S11 and C14
PWR SENS	CBP2-D10 and C14
SERVICE BUS FEED	AC PWR CTR
TRU EMP IN	AC PWR CTR
TRU EMP OUT	AC PWR CTR

B. ADG

CB IDENT	LOCATION
AC ESS FEED	ADG PWR CTR
ADG DEPLOY - AUTO	CBP2-N6
ADG DEPLOY - MAN	CBP2-N7
ADG HEATER	CBP1-C13
ADG LOADS 1	ADG PWR CTR
ADG LOADS 2	ADG PWR CTR
ADG V/F SENSE	ADG PWR CTR

C. DC SYSTEM

CB IDENT	LOCATION
APU BATT CONT	CBP5-A3
APU BATT DIR FEED	CBP1-R1

APU BATT PWR SENS	CBP5-A1
APU BATT PWR SENS REF	CBP5-A2
APU CHARGER	CBP2-E5
BATT/ESS XFEED	R DC PWR CTR
DC 1 FEED	CBP1-D6
DC1/2 XFEED	R DC PWR CTR
DC 2 FEED	CBP2-L8
DC ESS FEED	CBP2-R6 and DC PWR CTR
DC UTILITY FEED	CBP2-L7
DCPC 1	CBP5-A4
DCPC 2	CBP6-B1
EMER BUS FEED	CBP1-L10
EMER BUS FEED	CBP5-A10
ESS TRU 1	CBP1-T2
ESS TRU 1 – LOGIC PWR	L DC PWR CTR
ESS TRU 1 – SENSE HI	L DC PWR CTR
ESS TRU 1 – SENSE LO	L DC PWR CTR
ESS TRU 2A	CBP2-C5
ESS TRU 2B	CBP1-T5
ESS TRU 2 – LOGIC PWR	R DC PWR CTR
ESS TRU 2 – SENSE HI	R DC PWR CTR
ESS TRU 2 – SENSE LO	R DC PWR CTR
FEED – BATT BUS	R DC PWR CTR
FEED – DC 2	R DC PWR CTR
FEED – DC UTIL	R DC PWR CTR
MAIN BATT CHARGER OUTPUT	CBP6-B6
MAIN BATT CONT	CBP6-A3
MAIN BATT PWR SENS	CBP6-A1
MAIN BATT PWR SENS REF	CBP6-A2
MAIN BATTERY CHARGER	CBP1-C5
PWR SENS	CBP1-D14, L3, R11
PWR SENS	CBP2-L1, L10, M11, R11
RCCB – APU BATT	CBP1-D2
RCCB – DC 1	CBP1-D3
RCCB – DC 2	CBP1-D4
RCCB – DC ESS	CBP1-D5

RCCB – MAIN BATT	CBP1–D1
SERV BUS FEED	CBP2–F5 and CBP5–A9
TRU 1	CBP1–B5
TRU 1 – LOGIC POWER	L DC PWR CTR
TRU 1 – SENSE HI	L DC PWR CTR
TRU 1 – SENSE LO	L DC PWR CTR
TRU 2	CBP2–B5
TRU 2 – LOGIC POWER	R DC PWR CTR
TRU 2 – SENSE HI	R DC PWR CTR
TRU 2 – SENSE LO	R DC PWR CTR
XFEED – BATT/ESS	L DC PWR CTR
XFEED – DC 1/2	L DC PWR CTR

7. ATA 25 – EQUIPMENT AND FURNISHINGS

CB IDENT	LOCATION
COFFEE MAKER 1	GALLEY CONTROL PANEL
COFFEE MAKER 2	GALLEY CONTROL PANEL
OUTLET	GALLEY CONTROL PANEL
OVEN 1	GALLEY CONTROL PANEL
OVEN 2	GALLEY CONTROL PANEL

8. ATA 26 – FIRE PROTECTION

A. DETECTION

CB IDENT	LOCATION
CARGO – SMOKE DET A	CBP1– M8
CARGO – SMOKE DET B	CBP1–M9
FIRE DET – A	CBP1–N1
FIRE DET – B	CBP1–N2
LAV SMOKE DET	CBP1–D9
MLG BAY OVHT DET	CBP2–N9

B. EXTINGUISHING

CB IDENT	LOCATION
FIREX – A	CBP1–R2
FIREX – B	CBP1–R3

9. ATA 27 – FLIGHT CONTROLS

A. AILERONS

CB IDENT	LOCATION
AIL TRIM	CBP2– F3
AIL/RUD TRIM IND	CBP1–L7

B. ELEVATORS

CB IDENT	LOCATION
P FEEL 1 RTL 1	CBP1–F2
P FEEL 2 RTL 2	CBP2–R5

C. FLAPS

CB IDENT	LOCATION
FLAPS 1	AC PWR CTR
FLAPS 2	AC PWR CTR
FLAPS CONT CH 1	CBP2–R1
FLAPS CONT CH 2	CBP1–L5

D. HORIZONTAL STABILIZER

CB IDENT	LOCATION
P FEEL 1 RTL 1	CBP1–F2
P FEEL 2 RTL 2	CBP2–R5
PITCH TRIM 1	AC PWR CTR
PITCH TRIM 2	AC PWR CTR

SSCU 1 CH A	CBP1-F1
SSCU 1 CH B	CBP2-F1
SSCU 2 CH A	CBP2-R3
SSCU 2 CH B	CBP2-R4

E. RUDDER

CB IDENT	LOCATION
AIL/RUD TRIM IND	CBP1-L7
RUDDER TRIM	CBP2-F2

F. SLATS

CB IDENT	LOCATION
SLATS CONT CH 1	CBP2-R2
SLATS CONT CH 1	CBP1-L6
SLATS 1	AC PWR CTR
SLATS 2	AC PWR CTR

G. SPOILERS

CB IDENT	LOCATION
SSCU 1 CH A	CBP1-F1
SSCU 1 CH B	CBP2-F1
SSCU 2 CH A	CBP2-R3
SSCU 2 CH B	CBP2-R4

H. STALL PROTECTION

CB IDENT	LOCATION
STALL PROT - L CH	CBP1-Q2
STALL PROT - R CH	CBP2-U5
STALL PROT - STICK PUSHER	CBP1-Q1

10. ATA 28 - FUEL

A. DISTRIBUTION

CB IDENT	LOCATION
APU FUEL PUMP	CBP1-N10
FUEL SOV - L ENG	CBP1-R8
FUEL SOV - R ENG	CBP1-R7
FUEL SOV - APU	CBP1-R9
L FUEL PUMP	CBP1-M6
L FUEL PUMP CONT	CBP1-M7
R FUEL PUMP	CBP2-G9
R FUEL PUMP CONT	CBP2-G10

B. MANAGEMENT

CB IDENT	LOCATION
CROSSFLOW PUMP	CBP1-S5
CROSSFLOW PUMP CONT	CBP2-R7
FUEL GRAVITY XFLOW	CBP1-N8
L XFER FUEL SOV	CBP1-N9
R XFER FUEL SOV	CBP2-P8

C. REFUELING/DEFUELING

CB IDENT	LOCATION
EMER REFL	CBP5-B5
FUEL DEFL	CBP5-B4

D. INDICATION

CB IDENT	LOCATION
FUEL SYST CONT	CBP1-M11
FUEL SYS CONT	CBP2-U11

11. ATA 29 - HYDRAULICS

A. SYSTEMS 1 AND 2

CB IDENT	LOCATION
HYD SOV – L ENG	CBP1-R6
HYD SOV – R ENG	CBP1-R5
HYD SYST – AC PUMP CONT 1	CBP2-F13
HYD SYST – AC PUMP CONT 2	CBP1-F14
HYD SYST FAN	CBP1-A8
HYD SYST – FAN CONT	CBP1-F12
HYD SYST – IND 1	CBP2-F12
HYD SYST – IND 2	CBP1-F13

B. SYSTEM 3

CB IDENT	LOCATION
HYD SYST – AC PUMP CONT 3A	CBP2-F14
HYD SYST – AC PUMP CONT 3B	CBP1-F11
HYD SYST IND 3	CBP1-L8

12. ATA 30 - ICE & RAIN

A. AIR DATA ANTI-ICE

CB IDENT	LOCATION
HEATERS – ADS CONT 1	CBP2-S2
HEATERS – ADS CONT 2	CBP1-G13
HEATERS – ADS CONT STBY	CBP2-S3
HEATERS – AOA L	CBP1-T8
HEATERS – AOA R	CBP1-A13
HEATERS – PITOT L	CBP1-T7
HEATERS – PITOT R	CBP1-A14
HEATERS – PITOT STBY	CBP1-T9
HEATERS – STATIC L	CBP2-S1
HEATERS – STATIC R	CBP1-G14
HEATERS – TAT	CBP1-A12

B. COWL ANTI-ICE

CB IDENT	LOCATION
A/ICE – VALVE L ENG	CBP2–N3
A/ICE – VALVE R ENG	CBP2–N4

C. ICE DETECTION

CB IDENT	LOCATION
ICE DET 1	CBP1–T11
ICE DET 2	CBP2–A14

D. WING ANTI-ICE

CB IDENT	LOCATION
A/ICE CONT CH A	CBP1–D7
A/ICE CONT CH B	CBP2–T1
WING A/ICE ISOL	CBP2–N5

E. WINDSHIELD ANTI-ICE

CB IDENT	LOCATION
HEATERS – CONT L WIND	CBP2– S4
HEATERS – CONT L WSHLD	CBP1–G12
HEATERS – CONT R WIND	CBP2–G14
HEATERS – CONT R WSHLD	CBP2–G13
HEATER – L WIND	CBP1–U10
HEATERS – L WSHLD	CBP1–A10
HEATERS – L WSHLD	CBP1–A11
HEATER – R WIND	CBP2–C7
HEATERS – R WSHLD	CBP2–A10
HEATERS – R WSHLD	CBP2–A11

F. WINDSHIELD WIPERS

CB IDENT	LOCATION
WIPER C/PILOT	CBP2-G5
WIPER PILOT	CBP1-G5

13. ATA 31 - INDICATING & RECORDING

A. CLOCKS

CB IDENT	LOCATION
CLOCK 1	CBP2-N11 and CBP6-B7
CLOCK 2	CBP2-H5 and CBP6-B8

B. EICAS

CB IDENT	LOCATION
EICAS - CONT PNL	CBP2-Q7
EICAS - DCU 1	CBP2-Q1, U8
EICAS - DCU 2	CBP2-H13, Q2
EICAS - LDU L	CBP1-H5
EICAS - LDU R	CBP2-Q8
EICAS - PRIM DISPL	CBP1-H3 and CBP2-Q5
EICAS - SEC DISPL	CBP1-H4 and CBP2-Q6

C. RECORDERS

CB IDENT	LOCATION
	LOCATION
CKPT VOICE REC	CBP2-V7
CREW FORCE SYST <2222>	CBP1-E12
DATA LOAD <1018>	CBP1-H10
FLIGHT REC CONT	CBP1-E14

FLIGHT REC PWR	CBP1-C9
QAR <1204>	CBP2-C13

14. ATA 32 - LANDING GEAR

A. BRAKES

CB IDENT	LOCATION
ANTI-SKID	CBP1-G4 and CBP2-G4
BRAKE PRESS APPL	CBP1-E13
BRAKE PRESS IND	CBP2-G3

B. NOSE WHEEL STEERING

CB IDENT	LOCATION
NOSE STEER	CBP1-G2 and CBP2-G2

C. PROXIMITY SENSING

CB IDENT	LOCATION
PSEU CH A	CBP1-G1 and CBP2-P1
PSEU CH B	CBP2-G1 and CBP2-P2
WOW RELAY	CBP2-P3

15. ATA 33 - LIGHTING

A. EMERGENCY LIGHTING

CB IDENT	LOCATION
EMER LTS	CBP2- U3

B. EXTERNAL LIGHTING

CB IDENT	LOCATION
BEACON LIGHTS	CBP2-M8

LIGHTS – LDG NOSE	CBP1–G6
LIGHTS – LDG WINGS	CBP1–P1
LIGHTS – NAV	CBP2–M4
LIGHTS – REAR A/COLL	CBP1–G8
LIGHTS – WING A/COLL	CBP2–G8
LIGHTS – WING INSP	CBP1–G9
LOGO LIGHTS <1020>	CBP2–D11
TAXI LTS	CBP1–F5

C. FLIGHT COMPARTMENT LIGHTING

CB IDENT	LOCATION
CKPT DOME LIGHTS	CBP1–E4 and CBP6–B5
L EFIS CRT DIMMING	CBP2–U4
EICAS – BRT / DIM PWR SUP 1	CBP1–H6 and CBP2–Q10
EICAS – BRT / DIM PWR SUP 2	CBP1–H7 and CBP2–Q11
INST FLOOD LTS	CBP2–U2
INTEG LTS – C/PLT PNLS	CBP2–B14
INTEG LTS – CB PNLS	CBP1–V4
INTEG LTS – CTR PNLS	CBP1–V6
INTEG LTS – O/H PNLS	CBP1–V7
INTEG LTS – PLT PNLS	CBP1–V5
LIGHTS – CHART HOLDER	CBP2–G6
LIGHTS – CKPT FLOOR	CBP1–G7
LIGHTS – C/PLT MAP	CBP2–G7
LIGHTS – C/PLT OBS MAP	CBP1–P3
LIGHTS – EICAS/RTU DIMMING	CBP1–P6
LIGHTS – O/H PNL	CBP1–P5
LIGHTS – PLT MAP	CBP1–P2
R EFIS CRT DIMMING	CBP2–J3

D. PASSENGER COMPARTMENT LIGHTING

CB IDENT	LOCATION
CABIN LIGHTING CEILING	CBP1–T10

CABIN LIGHTING CEILING L	CBP2-D14
CABIN LIGHTING CEILING R	CBP2-D13
CABIN LIGHTING SIDEWALL L	CBP2-E14
CABIN LIGHTING SIDEWALL R	CBP2-D13
L CABIN - READING LIGHTS - AFT	CBP1-E8
L CABIN - READING LIGHTS - FWD	CBP1-E6
L CABIN - READING LIGHTS - MID	CBP1-E7
LIGHTS - BOARD	CBP2-M3
LIGHTS - CABIN UTIL	CBP1-P4
LIGHTS - GALLEY AREA	CBP2-M6
LIGHTS - TOILET	CBP2-M5
PASS SIGNS	CBP1-M10
R CABIN - READING LIGHTS AFT	CBP2-L4
R CABIN - READING LIGHTS FWD	CBP2-L3

E. SERVICE AND MAINTENANCE LIGHTING

CB IDENT	LOCATION
LIGHTS - AFT SERV	CBP2-M2
LIGHTS - FWD SERV	CBP2-M1
LIGHTS - MAINT	CBP1-G10
LIGHTS - SERV AREA	CBP2-M7

16. ATA 34 - NAVIGATION

A. AIR DATA SYSTEM

CB IDENT	LOCATION
ADC 1	CBP2-V3
ADC 2	CBP2-H6

B. AUTOMATIC DIRECTION FINDER (ADF)

CB IDENT	LOCATION
ADF 1	CBP2-V4
ADF 2	CBP2-H7

C. AIR TRAFFIC CONTROL TRANSPONDER SYSTEM (ATC)

CB IDENT	LOCATION
XPDR 1	CBP2-V5
XPDR 2	CBP2-H8

D. INERTIAL REFERENCE SYSTEM (IRS) <1025>

CB IDENT	LOCATION
AHRS FAN 1	CBP2-V9
AHRS FAN 2	CBP2-K5
ATT HDG 1	CBP2-V8
ATT HDG 2	CBP2-K4
IRU FAN <1025>	CBP2-C12

E. DISTANCE MEASURING EQUIPMENT (DME)

CB IDENT	LOCATION
DME 1	CBP1-H14
DME 2	CBP2-H14

F. ELECTRONIC FLIGHT INSTRUMENT SYSTEM (EFIS)

CB IDENT	LOCATION
EFIS CONT PNL 1	CBP2-U7
EFIS CONT PNL 2	CBP2-K3
EFIS CRT DIMMING	CBP2-U4
MFD 1	CBP2-V11

MFD 2	CBP2-K2
PFD 1	CBP2-V10
PFD 2	CBP2-K1

G. FLIGHT MANAGEMENT SYSTEM (FMS)

CB IDENT	LOCATION
CDU 1 < 1214>	CBP1-H9
CDU 2 < 1214>	CBP2-H9
FMS 1 <1214>	CBP1-H12
FMS 2 <1214>	CBP2-H12

H. GLOBAL POSITIONING SYSTEM (GPS)

CB IDENT	LOCATION
GPS 1	CBP1-G11
GPS 2 <1027>	CBP2-G11

I. GROUND PROXIMITY WARNING SYSTEM (GPWS)

CB IDENT	LOCATION
GND PROX WARN	CBP1-B14

J. RADIO ALTIMETER

CB IDENT	LOCATION
RAD ALT 1	CBP1-J4
RAD ALT 2 <1045>	CBP2-J2

K. STANDBY INSTRUMENTS

CB IDENT	LOCATION
INT STBY INST	CBP2-N10

L. TRAFFIC COLLISION AVOIDANCE SYSTEM (TCAS)

CB IDENT	LOCATION
TCAS	CBP1-V10

M. VHF NAVIGATION

CB IDENT	LOCATION
VHF NAV 1	CBP2-V6
VHF NAV 2	CBP2-H11

N. WEATHER RADAR

CB IDENT	LOCATION
WEATHER RADAR - CONT 1	CBP1- K2
WEATHER RADAR - R/T	CBP1-K1

17. ATA 35 - OXYGEN

CB IDENT	LOCATION
CREW OXYGEN MONITOR	CBP2-P11
PASS OXYGEN - AUTO DEPLOY L	CBP2-P10
PASS OXYGEN - AUTO DEPLOY R	CBP2-P9
PASS OXYGEN - MANUAL DEPLOY L	CBP1-P9
PASS OXYGEN - MANUAL DEPLOY R	CBP1-P8

18. ATA 36 - PNEUMATICS

CB IDENT	LOCATION
ACS - L PRESS SENSE	CBP2-F6
ACS R PRESS SENS	CBP2-T11
BLEED SOV L	CBP2-S10
BLEED SOV R	CBP2-S11

19. ATA 38 - WATER AND WASTE

CB IDENT	LOCATION
AC POWER	GALLEY CONTROL PANEL
AFT DRAIN MAST	GALLEY CONTROL PANEL
FWD DRAIN MAST	GALLEY CONTROL PANEL
TOILET	CBP2-D5
WASTE SYST	CBP2-M9
WATER CONT	CBP2-M10
WATER SYSTEM	CBP2-D8 (3 PHASE)

20. ATA 45 - MDC (DIAGNOSTICS)

CB IDENT	LOCATION
DATA LOAD <1018>	CBP1-H10
IAPS L AFCS / MDC	CBP2-P6

21. ATA 49 - APU

CB IDENT	LOCATION
APU CONT	CBP1-N7
APU DOOR ACT	CBP5-B1
APU ECU PRIM	CBP1-N11
APU ECU SEC	CBP5-A6
APU FUEL PUMP	CBP1-N10
FUEL SOV - APU	CBP1-R9

22. ATA 52 - DOORS

CB IDENT	LOCATION
DOOR IND 1	CBP2-R8
DOOR IND 2	CBP2-R9
PASS DOOR ACT	CBP1-E1

23. ATA 71 TO 80 - POWERPLANT

A. CONTROLS

CB IDENT	LOCATION
FADEC - L CH A	CBP5-B8
FADEC - L CH B	CBP5-B9
FADEC - R CH A	CBP5-B6
FADEC - R CH B	CBP5-B7
T2 HEATER L	CBP2-S8
T2 HEATER R	CBP2-N8

B. IGNITION AND STARTING

CB IDENT	LOCATION
ENG IGN A	CBP1-U7
ENG IGN B	CBP5-B10
ENG START - L	CBP1-M5
ENG START - R	CBP1-M4

C. INDICATING

CB IDENT	LOCATION
ENG VIB MON	CBP1-C7

D. OIL SYSTEM

CB IDENT	LOCATION
ENG OIL IND	CBP5-B2
ENG OIL REPL <1213>	CBP5-B3
L ENG OIL PRESS	CBP1-M1
R ENG OIL PRESS	CBP2-S7

E. THRUST REVERSER

CB IDENT	LOCATION
THRUST REV 1	CBP2-S5
THRUST REV 2	CBP2-S6

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