7.8 - ELECTRICAL SYSTEM (Figures 7.8.1 and 7.8.5)

The airplane is fitted with a direct-current electrical system rated to 28 volts with negative pole at ground.

Airplane mains supply is obtained from various power supplies :

- an engine driven starter generator
- a stand-by generator driven by the engine through a belt
- a battery located in engine compartment
- a ground power receptacle located in engine compartment, on L.H. side. It is accessible from outside through a door.

Connection relays, main bus bar, generator regulation and protection systems and control logic systems are grouped in electrical power center attached to front baggage compartment upper section.

Indicating and checking warning lights are grouped on advisory panel.

STARTER GENERATOR

The starter generator is the main electrical power source. It only performs its generator function when starting sequence is completed.

Generator connection with main bus bar is controlled through "GENERATOR" selector set to "MAIN" position. It will be effective when connection conditions are met. Generator connection is indicated by "MAIN GEN" warning light extinguishing.

STAND-BY GENERATOR

Stand-by generator supplies a 28-volt stand-by direct current which may be used in case of main generator failure.

Generator connection with main bus bar is controlled through "GENERATOR" selector set to "ST-BY", it will be effective when connection conditions are met.

NOTE :
In order to prevent possible errors during flight, access to "ST-BY" position requires a double action from the pilot (pull to unlock).

BATTERY

The battery provides the power required for starting when no ground power unit is available and is a power supply source when engine driven generators are stopped.

The battery is always connected to "BAT BUS" bus bar except when CRASH lever is pulled down.

Battery connection to main bus bar is controlled through "SOURCE" selector set to "BAT" position.

"BAT OFF" warning light is illuminated when battery is isolated from the main bus and when main bus is supplied through another source.

GROUND POWER RECEPTACLE

The ground power receptacle allows connection to a ground power unit. Ground power receptacle connection with main bus bar is controlled through "SOURCE" selector when set to "GPU" position, it will be effective when connection conditions are met.

NOTE :
Ground power receptacle has priority on other generators.

Ground power receptacle door opening is indicated by "GPU" warning light illumination.

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DISTRIBUTION

Airplane electrical systems are connected to "BUS" bars and protected by circuit breakers located on L.H. side panel, near the pilot (See Figure 7.8.3) or on R.H. side panel, if "pilot" door installed (See Figure 7.8.3A). In case of overload of a system, the circuit breaker triggers and switches the system off. Allow it to cool for about three minutes, then the circuit breaker may be reengaged (pressed down). Some systems are equipped with "pull off" type circuit breakers which allow the pilot to insulate, if necessary, the corresponding equipment.

"BUS 1", "BUS 2" and "BUS 3" bus bars are directly connected to main bus bar and protected by fuses located in electrical power center.

"ESS 1" and "ESS 2" essential bus bars are connected to main bus bar through "ESS BUS TIE" selector set to "NORM" position. "ESS BUS TIE" selector is attached to circuit breaker panel, "NORM" position is protected and locked by a cover. Common power supply to both essential bus bars is protected by a fuse, each bar being individually protected by a circuit breaker.

"BUS BAT" bar is directly connected to the battery, it is protected by a fuse located in electrical power center.

NOTE :
The electrical distribution of bus bars is described in Figure 7.8.2.

EMERGENCY USE

With both generators de-activated in flight, it is still possible to use battery power to supply all airplane systems maintaining "SOURCE" selector on "BAT" position.

In order to save battery power, it is possible to shed the charges which are not essential for flight safety, for that set :

- "ESS BUS TIE" selector to "EMER" position

In this configuration, only "ESS 1", "ESS 2" and "BAT BUS" bars are supplied.

NOTE :
Supplying "BUS 1", "BUS 2" and "BUS 3" bars is always possible, resetting temporarily "ESS BUS TIE" selector to "NORM" position.

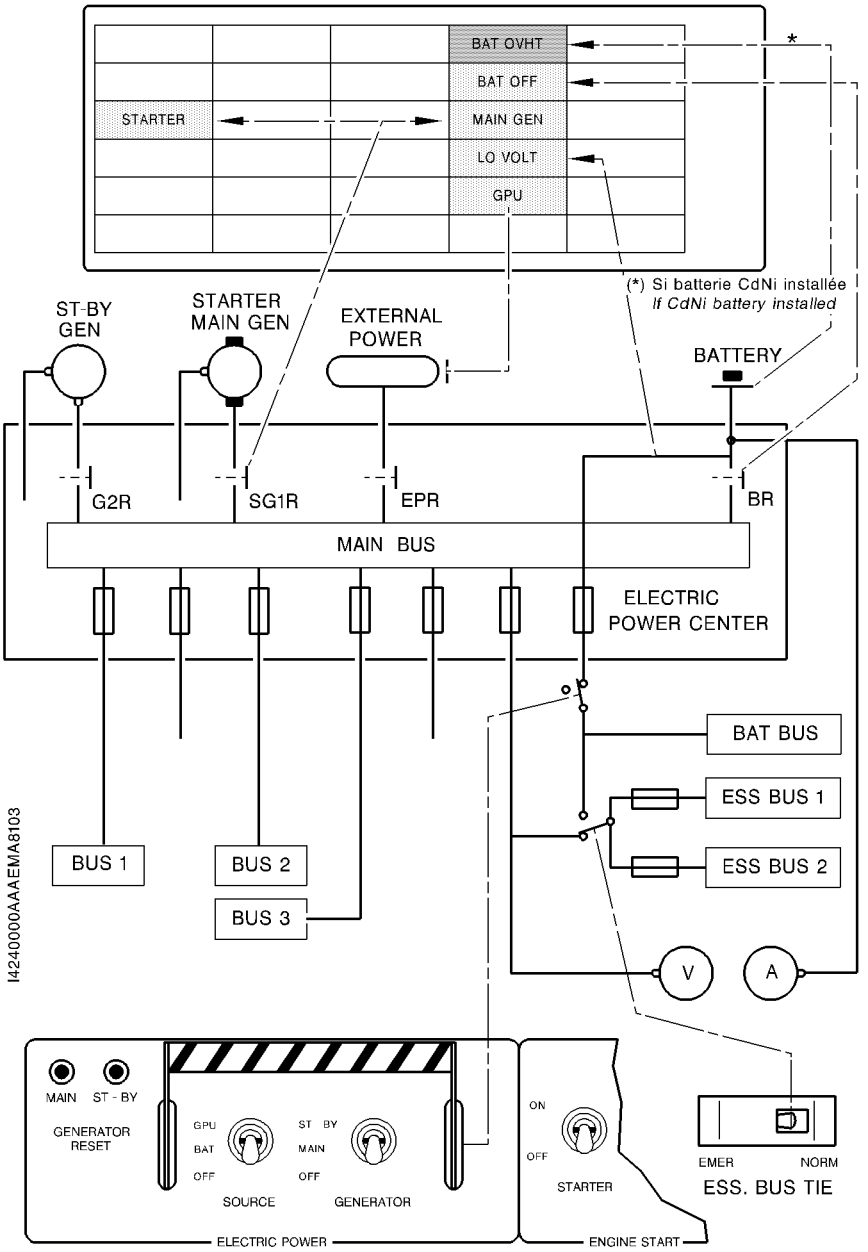


Figure 7.8.1 - ELECTRICAL DIAGRAM

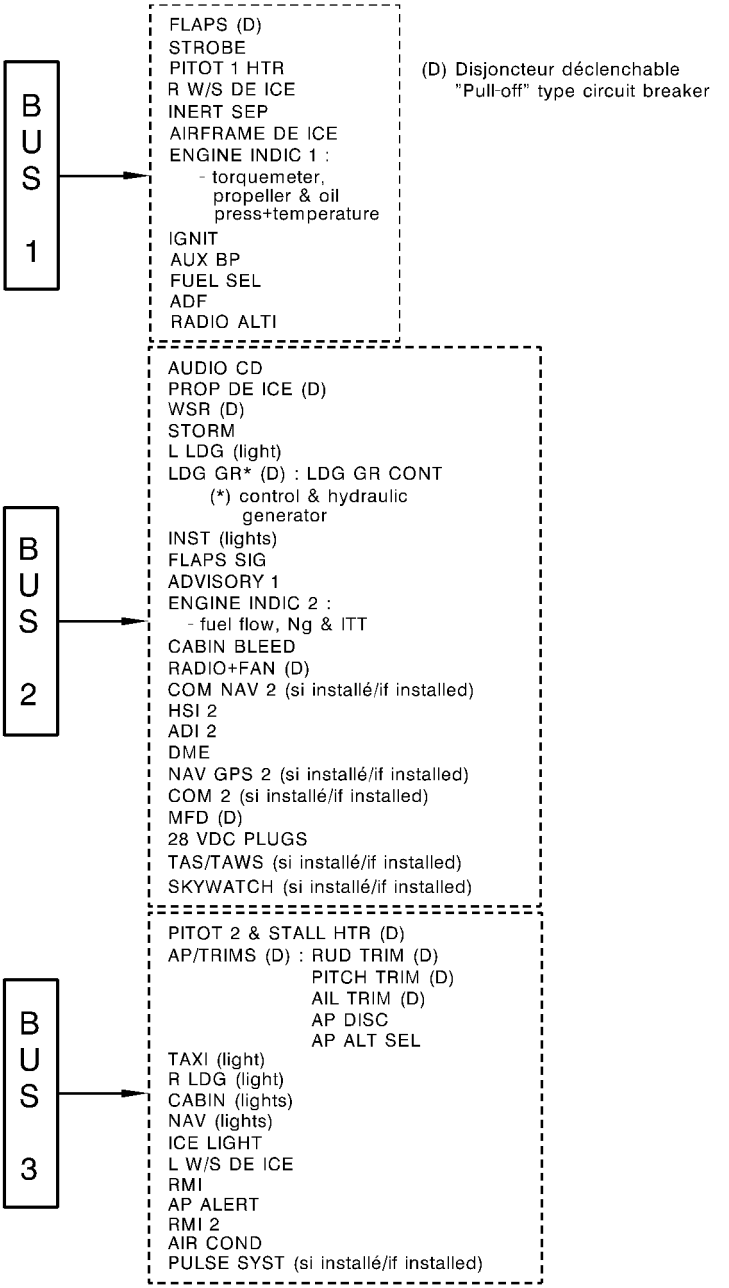


Figure 7.8.2 (1/2) - ELECTRICAL DISTRIBUTION OF BUS BARS

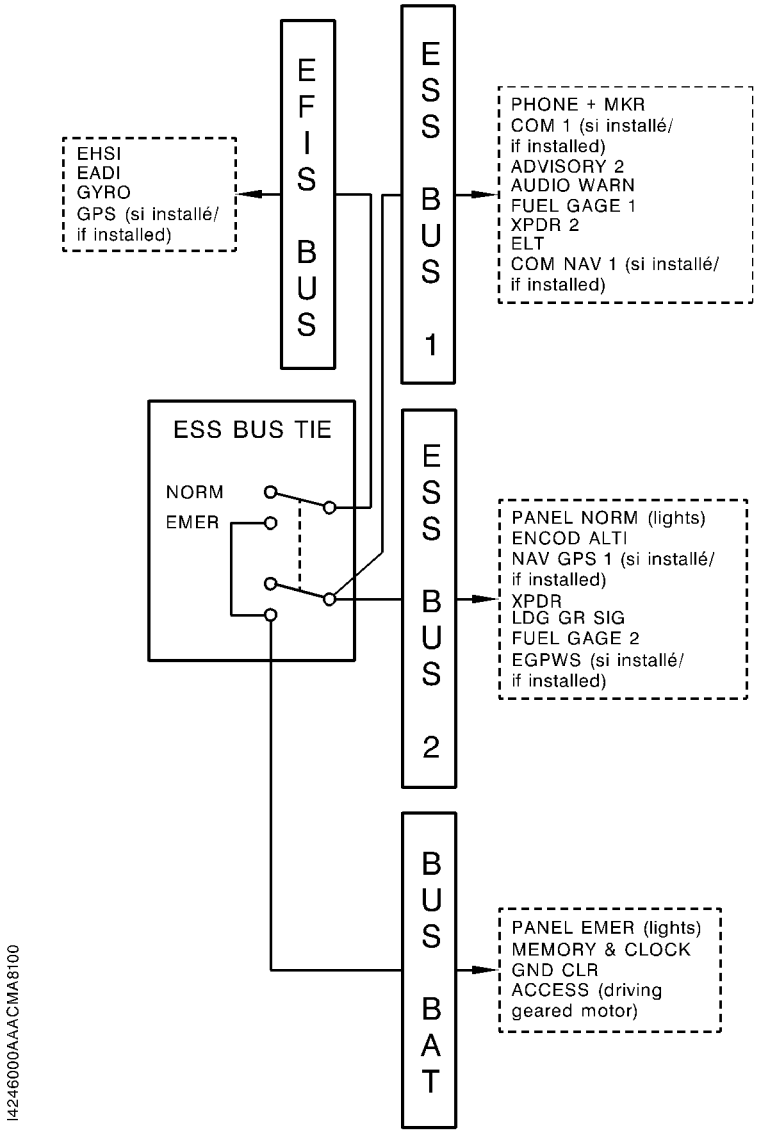
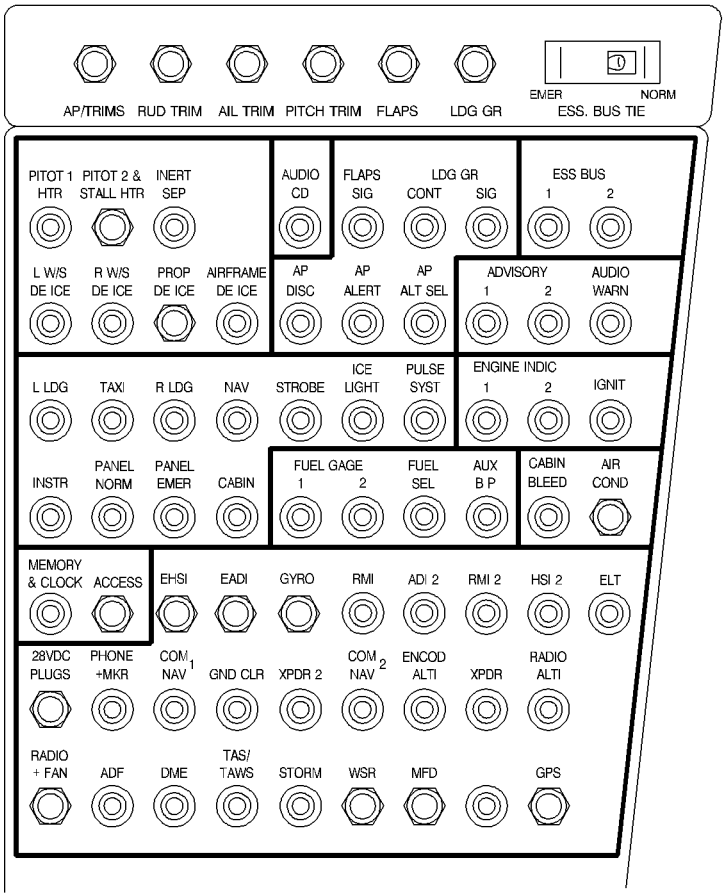


Figure 7.8.2 (2/2) - ELECTRICAL DISTRIBUTION OF BUS BARS

AP / TRIMS	AP & trims general protec.
RUD TRIM	Rudder trim protection
AIL TRIM	Aileron trim protection
PITCH TRIM	Pitch trim protection
FLAPS	Flaps protection
LDG GR	Landing gear general protec.
ESS BUS TIE	Essential bus NORM & EMER switch
PITOT 1 HTR	Pitot 1 deicing protection
PITOT 2 & STALL HTR	Pitot 2 and stall warning deicing protection
INERT SEP	Inertial separator protection
LW/S DE ICE	L.H. windshield deicing protection
RW/S DE ICE	R.H. windshield deicing protection
PROP DE ICE	Propeller deicing protection
AIRFRAME DE ICE	Empennage and wing leading edges deicing protection
AUDIO CD	CD reader protection (if installed)
FLAPS SIG	Flaps signalization protec.
LDG GR CONT	Landing gear control protection
LDG GR SIG	Landing gear signalization protection
AP DISC	Trim and AP cont. protection
AP ALERT	Trim and AP audio signalization protection
AP ALT SEL	Altitude selector protection
ESS BUS 1	Essential bus 1 circuit protection
ESS BUS 2	Essential bus 2 circuit protection
ADVISORY 1	Visual warnings protection
ADVISORY 2	Visual warnings protection
AUDIO WARN	Audio warnings protection
L LDG	L.H. landing light protection
TAXI	Taxi light protection
R LDG	R.H. landing light protection
NAV	Navigation lights protection
STROBE	Strobe lights protection
ICE LIGHT	L.H. wing leading edge light. and lighting test protection
PULSE SYST	Pulse lite system (if installed) protection
INSTR	Instruments lighting protec.
PANEL NORM	Instrument panel normal lighting protection
PANEL EMER	Instrument panel emergency lighting protection
CABIN	Passenger's reading lamps protection

FUEL GAGE 1	L.H gage protection
FUEL GAGE 2	R.H gage protection
FUEL SEL	Timer protection
AUX BP	Fuel pump protection
ENGINE INDIC 1	Power plant cont. protec. : Oil temp. & pres., torque, propeller
ENGINE INDIC 2	Power plant cont. protection : Ng, flowmeter & ITT
IGNIT	Power plant ignit. protection
CABIN BLEED	Cabin air bleed valve protec.
AIR COND	Cabin ventilation and vapor cycle cooling system protec.
MEMORY & CLOCK	Stop watch and flowmeter protec.
ACCESS	Cabin lightings & access door closing geared motor protec.
EHSI	EHSI protection
EADI	EADI protection
GYRO	EFIS static converter protection
RMI	RMI 1 protection
ADI 2	ADI No. 2 protection
RMI 2	RMI 2 protection
HSI 2	HSI 2 protection
ELT	Emergency beacon protection
28VDC PLUGS	28 volts plugs protection
PHONE+MKR	Reception line and loudspeaker + MKR protection
COM NAV 1	HONEYW. COM NAV 1 protec. (if installed)
NAV GPS 1	GARMIN NAV GPS 1 protec. (if installed)
GND CLR	Ground communication protec.
XPDR 2	Transponder 2 protection
COM NAV 2	HONEYW. COM NAV 2 protec. (if installed)
NAV GPS 2	GARMIN NAV GPS 2 protec. (if installed)
ENCOD ALTI	Encoding altimeter protection
XPDR	Transponder 1 protection
RADIO ALTI	RADIO ALTI protection
RADIO + FAN	Radio ventilation + radio master protection
ADF	ADF protection
DME	DME protection
TAS/TAWS	TAS/TAWS protec. (if installed)
STORM	Stormscope protection
WSR	Weather radar protection
MFD	Multi-function display protec.
GPS	HONEY. GPS protec. (if insta.)
COM 1	VHF 1 protection (if installed)
COM 2	VHF 2 & radio protection (if installed)

Figure 7.8.3 (1/3) - CIRCUIT BREAKER PANEL (Typical arrangement)



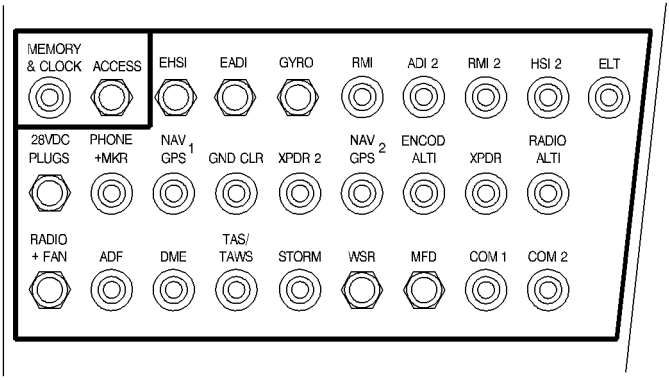
I4255004AAAGMA18103

Disjoncteur déclenchable
"PULL-OFF" type circuit breaker

Disjoncteur non déclenchable
Circuit breaker which cannot be pulled off

NOTE :
If an additional equipment is installed, its circuit breaker is installed on a free location.

Figure 7.8.3 (2/3) - CIRCUIT BREAKER PANEL
("HONEYWELL" typical arrangement)



I4255004AAAGMA18203

Disjoncteur déclenchable
"PULL-OFF" type circuit breaker

Disjoncteur non déclenchable
Circuit breaker which cannot be pulled off

NOTE :
If an additional equipment is installed, its circuit breaker is installed on a free location.

Figure 7.8.3 (3/3) - CIRCUIT BREAKER PANEL
("GARMIN" typical arrangement)

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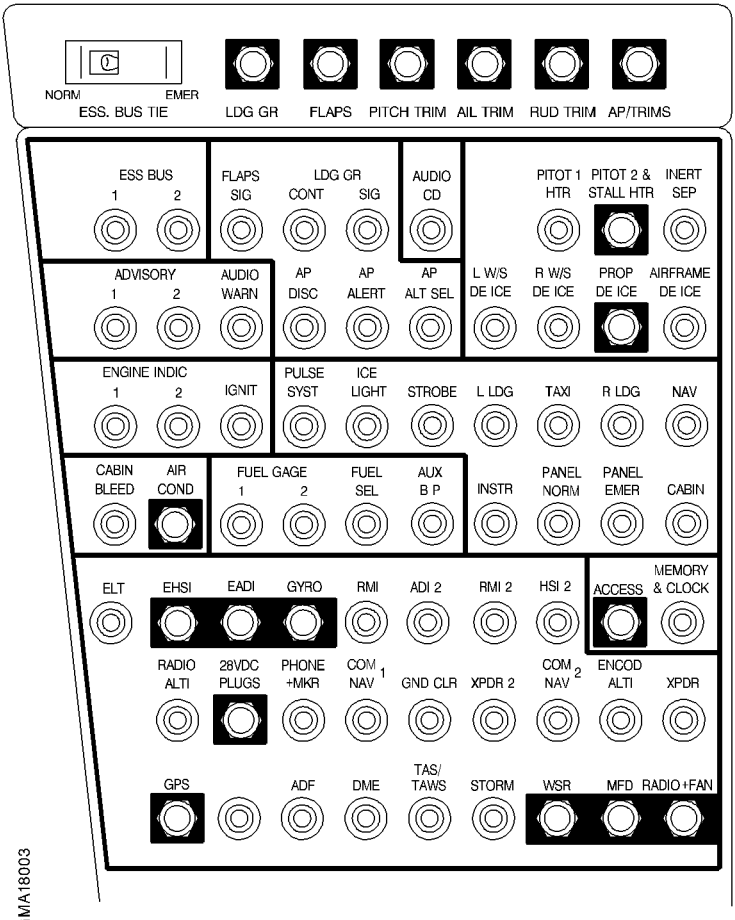
ESS BUS TIE	Essential bus NORM & EMER switch
LDG GR	LDG general protection
FLAPS	Flaps protection
PITCH TRIM	Pitch trim protection
AIL TRIM	Aileron trim protection
RUD TRIM	Rudder trim protection
AP / TRIMS	AP & trims general protec.
ESS BUS 1	Essential bus 1 circuit protection
ESS BUS 2	Essential bus 2 circuit protection
ADVISORY 1	Visual warnings protection
ADVISORY 2	Visual warnings protection
AUDIO WARN	Audio warnings protection
FLAPS SIG	Flaps signalization protec.
LDG GR CONT	Landing gear control protection
LDG GR SIG	Landing gear signalization protection
AP DISC	Trim and AP cont. protection
AP ALERT	Trim and AP audio signalization protection
AP ALT SEL	Altitude selector protection
AUDIO CD	CD reader protection (if installed)
PITOT 1 HTR	Pitot 1 deicing protection
PITOT 2 & STALL HTR	Pitot 2 and stall warning deicing protection
INERT SEP	Inertial separator protection
LW/S DE ICE	L.H. windshield deicing protection
RW/S DE ICE	R.H. windshield deicing protection
PROP DE ICE	Propeller deicing protection
AIRFRAME DE ICE	Empennage and wing leading edges deicing protection
ENGINE INDIC 1	Power plant contr. protec. : Oil T° & pres., torque,propel.
ENGINE INDIC 2	Power plant cont. protec. : Ng, flowmeter & ITT
IGNIT	Power plant ignit. protection
CABIN BLEED	Cabin air bleed valve protec.
AIR COND	Cabin ventilat. and vapor cycle cooling system protec.
FUEL GAGE 1	L.H gage protection
FUEL GAGE 2	R.H gage protection
FUEL SEL	Timer protection
AUX BP	Fuel pump protection
PULSE SYST	Pulse lite system (if installed) protection
ICE LIGHT	L.H. wing leading edge lighting and lighting test protection
STROBE	Strobe lights protection
L LDG	L.H. landing light protection
TAXI	Taxi light protection
R LDG	R.H. landing light protection
NAV	Navigation lights protection
INSTR	Instruments lighting protec.
PANEL NORM	Instrument panel normal lighting protection
PANEL EMER	Instrument panel emergency lighting protection
CABIN	Passenger's reading lamps protection
ACCESS	Cabin lightings & access door closing geared motor protec.
MEMORY & CLOCK	Stop watch and flowmeter protec.
ELT	Emergency beacon protection
EHSI	EHSI protection
EADI	EADI protection
GYRO	EFIS static converter protection
RMI	RMI 1 protection
ADI 2	ADI No. 2 protection
RMI 2	RMI 2 protection
HSI 2	HSI 2 protection
RADIO ALTI	RADIO ALTI protection
28VDC PLUGS	28 volts plugs protection
PHONE+MKR	Reception line and loudspeaker + MKR protection
COM NAV 1	HONEYW. COM NAV 1 protec. (if installed)
NAV GPS 1	GARMIN NAV GPS 1 protec. (if installed)
GND CLR	Ground communication protec.
XPDR 2	Transponder 2 protection
COM NAV 2	HONEYW. COM NAV 2 protec. (if installed)
NAV GPS 2	GARMIN NAV GPS 2 protec. (if installed)
ENCOD ALTI	Encoding altimeter protection
XPDR	Transponder 1 protection
GPS	HONEYW. GPS protection (if installed)
COM 1	VHF 1 protection (if installed)
COM 2	VHF 2 & radio (if insta.) protec.
ADF	ADF protection
DME	DME protection
TAS/TAWS	TAS/TAWS (if installed) protec.
STORM	Stormscope protection
WSR	Weather radar protection
MFD	Multi-function display protection
RADIO+ FAN	Radio ventilation + radio master protection

Figure 7.8.3A (1/3) - CIRCUIT BREAKER PANEL (Typical arrangement)



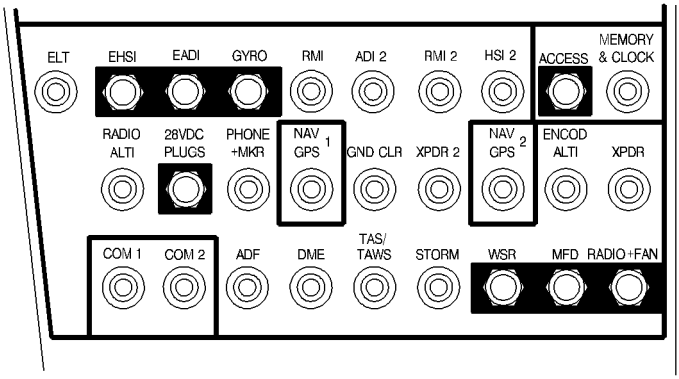
I4255004AAAGMA18003

Disjoncteur déclenchable
"PULL-OFF" type circuit breaker

Disjoncteur non déclenchable
Circuit breaker which cannot be pulled off

NOTE :
If an additional equipment is installed, its circuit breaker is installed on a free location.

Figure 7.8.3A (2/3) - CIRCUIT BREAKER PANEL
("HONEYWELL" typical arrangement)



I4255004AAGMA8303

Disjoncteur déclenchable
"PULL-OFF" type circuit breaker

Disjoncteur non déclenchable
Circuit breaker which cannot be pulled off

NOTE :
If an additional equipment is installed, its circuit breaker is installed on a free location.

Figure 7.8.3A (3/3) - CIRCUIT BREAKER PANEL
("GARMIN" typical arrangement)

INDICATING (Figure 7.8.4)

Electrical system indicating consists of a voltmeter and an ammeter located on the upper panel, as well as warning lights grouped on advisory panel.

The **voltmeter** indicates the voltage with generator connected to main bus bar. When the starter generator or stand-by generator are operating normally, the voltmeter needle will be in green sector.

The **ammeter**, graduated from - 200 to + 200 amperes, indicates the battery charge and discharge. The needle indicates a positive value when battery and starter generator (or stand-by generator) are connected to main bus bar.

Indications provided by warning light illumination are as follows :

"BAT OVHT" : Overheat inside the battery (if Cadmium-Nickel battery installed)

"BAT OFF" : Battery is not connected to main bus bar and the latter is supplied by another power source

"MAIN GEN" : Starter generator is not connected to main bus bar

"LO VOLT" : Battery voltage is below the minimum value and main bus bar is supplied

"GPU" : Ground power receptacle access door is not closed

Moreover, the indicating system may be completed by a battery temperature indicator located on the R.H. lower part of the R.H. instrument panel. This indicator is connected to a probe installed on the battery. A "BAT TEMP TEST" push-button located near the indicator allows to test the illumination of the "BAT OVHT" warning light and to check simultaneously, on the indicator, the increase of the indicated temperature.

PROTECTION - SAFETY (Figure 7.8.5)

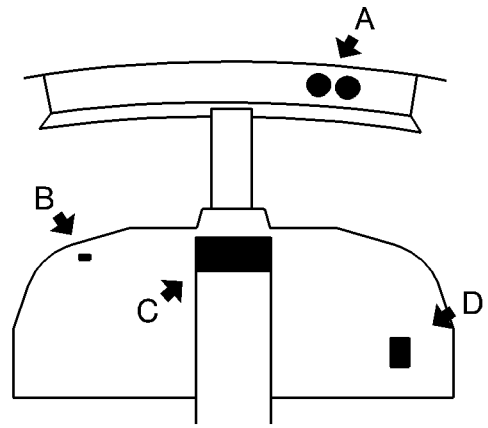
The electrical power center provides systems protection in case of :

- overvoltage coming from the starter generator, the stand-by generator or the ground power receptacle
- short-circuit in starter generator feeder
- starter generator undervoltage

In case of disconnection of starter generator or stand-by generator following a failure, it is possible to re-activate the system by pressing on "MAIN" or "ST-BY" knob of "GENERATOR RESET".

A **crash lever** located on upper panel center part allows isolating simultaneously "BUS BAT" bar and setting to "OFF", "SOURCE" and "GENERATOR" selectors when lowered. All bus bars are isolated from generators.

1) Ammeter
2) Voltmeter
3) General flashing red and amber warning lights
4) Electric system warning lights on the "ADVISORY PANEL"
5) Battery temperature indicator (if installed)
6) "BAT TEMP TEST" push-button (if installed)



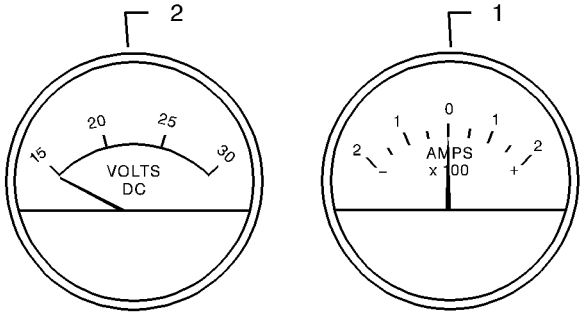


Figure 7.8.4 (1/2) - INDICATING

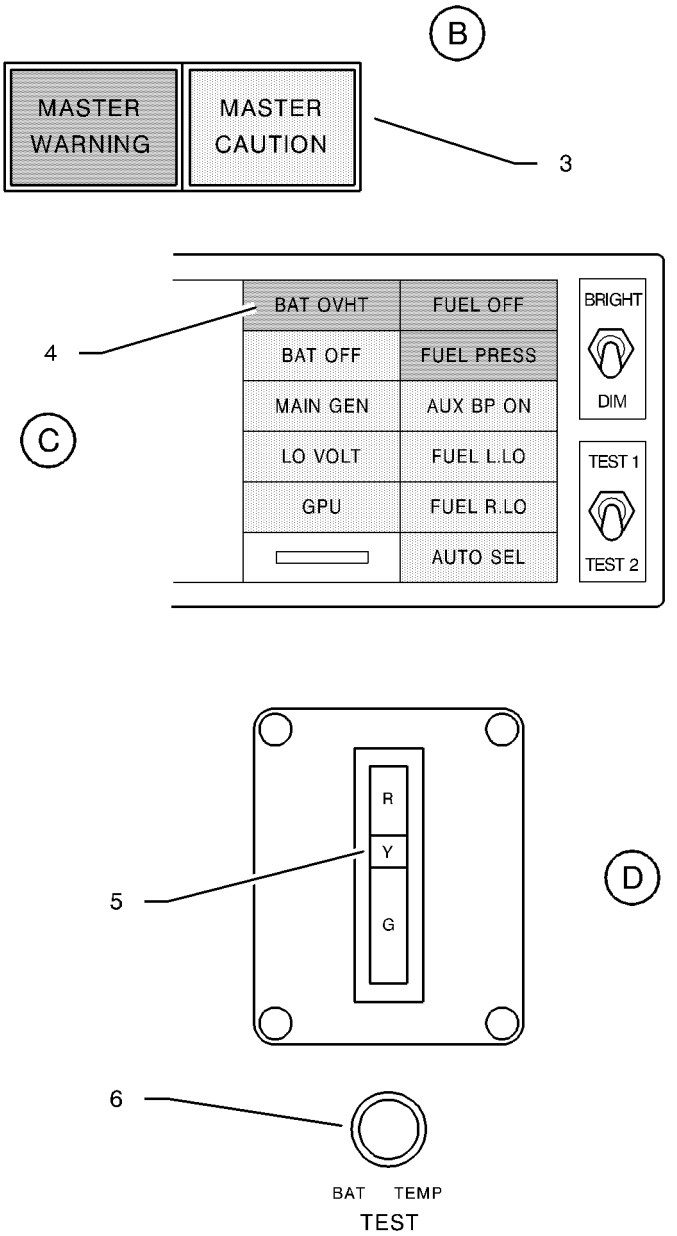
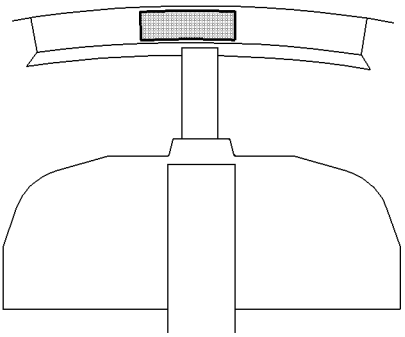


Figure 7.8.4 (2/2) - INDICATING



1) "MAIN" reset knob
2) "ST-BY" reset knob
3) Crash lever
4) "SOURCE" selector
5) "GENERATOR" selector

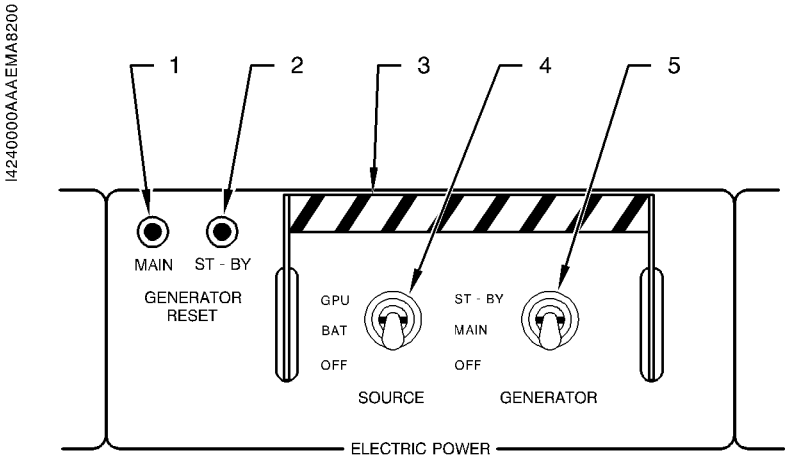


Figure 7.8.5 - ELECTRICAL CONTROL

EXTERIOR LIGHTING (Figure 7.8.6)

The airplane is equipped with two navigation lights, two strobe lights, two landing lights, a taxi light, a wing leading edge icing inspection light.

A "LTS TEST" test-knob located above lights switches allows checking proper operation of warning lights ; their brightness may be dimmed by main "DIM" switch on advisory panel.

Landing lights

Landing lights are located at each wing tip and located in leading edges. Lights illumination is controlled by "L. LDG" and "R. LDG" switches located on upper panel. A warning light is incorporated in each switch to indicate proper operation of used landing light.

The Pulse lite system (if installed) enables the pilot to control landing light flashing to be seen by the control tower or in heavy traffic areas.

Taxi light

The taxi light is attached to the nose gear, it is controlled by "TAXI" switch located on upper panel. A warning light is incorporated in this switch to indicate proper operation of used light.

Navigation lights and strobe lights

Navigation lights and strobe lights are installed on wing tips. They are controlled by "NAV" and "STROBE" switches located on upper panel.

NOTE :
By night, do not use anticollision lights in fog, clouds or mist as light beam reflexion may lead to dizziness and loss of sense of orientation.

Leading edge icing inspection light

The leading edge icing inspection light is installed on fuselage L.H. side, its beam illuminates the wing leading edge. It is controlled by the "ICE LIGHT" switch installed on "DE-ICE SYSTEM" panel (Figure 7.13.1).

FWD compartment light

The dome light of the FWD compartment has two positions :

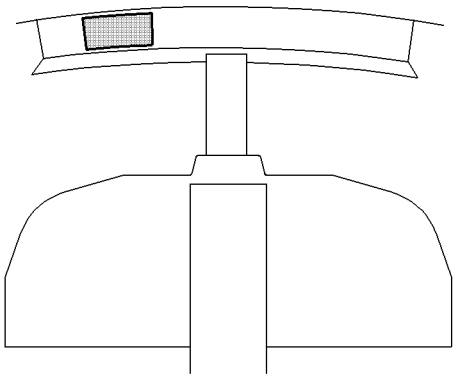
- the first allows automatic illumination via the switch located in the upper section of the door frame,
- the second maintains the dome light permanently off regardless of the door position.

Fuel unit compartment light

The lighting of the fuel unit compartment allows improving the visibility of the clogging indicator by pressing the push-button located besides the inspection door.

1) L.H. landing light switch
2) Test knob (test light integrated to switches)
3) Taxi light switch
4) R.H. landing light switch
5) Navigation lights switch
6) Strobe lights switch
7) Pulse lite system switch (if installed)

Figure 7.8.6 (1/2) - EXTERNAL LIGHTING CONTROLS



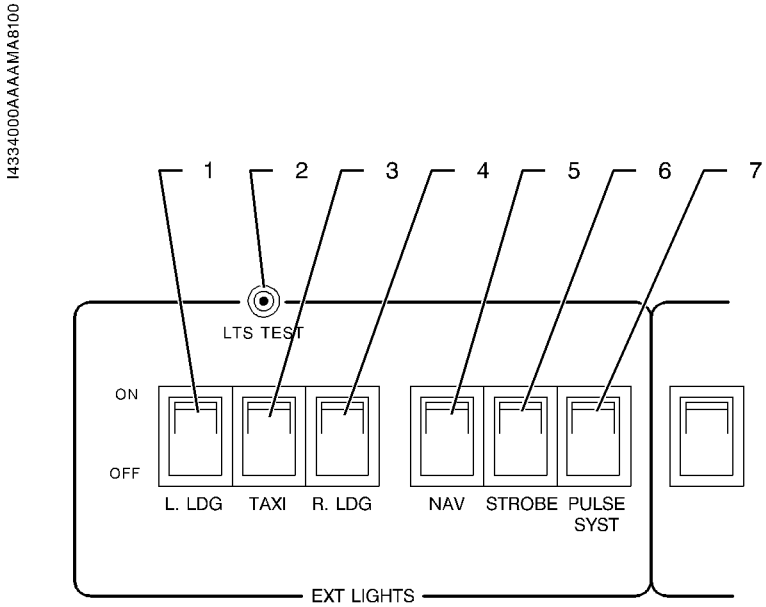


Figure 7.8.6 (2/2) - EXTERNAL LIGHTING CONTROLS

INTERIOR LIGHTING (Figure 7.8.7)

Interior lighting consists of access, cabin, instrument panel, instruments, baggage compartment and emergency lighting.

Access lighting

Access lighting consists of two floodlights located on the ceiling upholstering (one at the level of the access door, the other at the level of the storage cabinet) and the L.H. dome light of baggage compartment. "ACCESS" push-button on "INT LIGHTS" panel and the push-button located on access door rear frame control these 3 lights via a delayed breaker.
If the CRASH lever is down, access lighting is automatically cut out after 3 minutes.
If the CRASH lever is up, there is no access lighting automatic cut out.

Cabin lighting

Cabin lighting consists of two swiveling floodlights for front seats, six individual floodlights for rear passenger seats and the baggage compartment R.H. dome light. Each floodlight is controlled by a switch located on side upholstering strip. The floodlight above the table is controlled by two switches which are two-way switches type. The pilot can switch off the cabin floodlights and the baggage compartment dome light with the "CABIN" switch.

Instrument panel lighting

Instrument panel lighting is controlled by the "PANEL" rheostat located on "INT. LIGHTS" panel. This lighting consists of visor lighting and the two postlights located on the upper duct (forward of emergency floodlights).

Instruments and radio equipment lighting

The lighting, controlled by the "INSTR" rheostat located on "INT. LIGHTS" panel is integrated in instruments and radio equipment.

NOTE :
"PANEL" and "INSTR" rheostats control lighting operation and intensity. Clockwise rotation of control knob allows changing from "OFF" position to maximum lighting. Counterclockwise rotation reduces lighting to minimum brightness.

Emergency lighting

Emergency lighting consists of two swiveling floodlights located on the upper duct above front seats. It illuminates instrument panel assembly in case of visor lighting and / or instrument integrated lighting failure.

The rheostat located near R.H. floodlight controls emergency lighting operation and intensity. Forward rotation of control knob allows changing from "OFF" position to minimum lighting then increasing lighting to maximum brightness.

Map reading light illumination

The illumination of the map reading lights located on control wheels is controlled by the switch (rheostat) located on each light.

1) Instrument lighting switch (rheostat)
2) Instrument panel lighting switch (rheostat)
3) Cabin lighting switch (rear seats reading light)
4) Access door, baggage compartment and FWD dome light (delayed breaker) push-button
5) Emergency lighting switch (rheostat)

Figure 7.8.7 (1/2) - INTERNAL LIGHTING CONTROLS

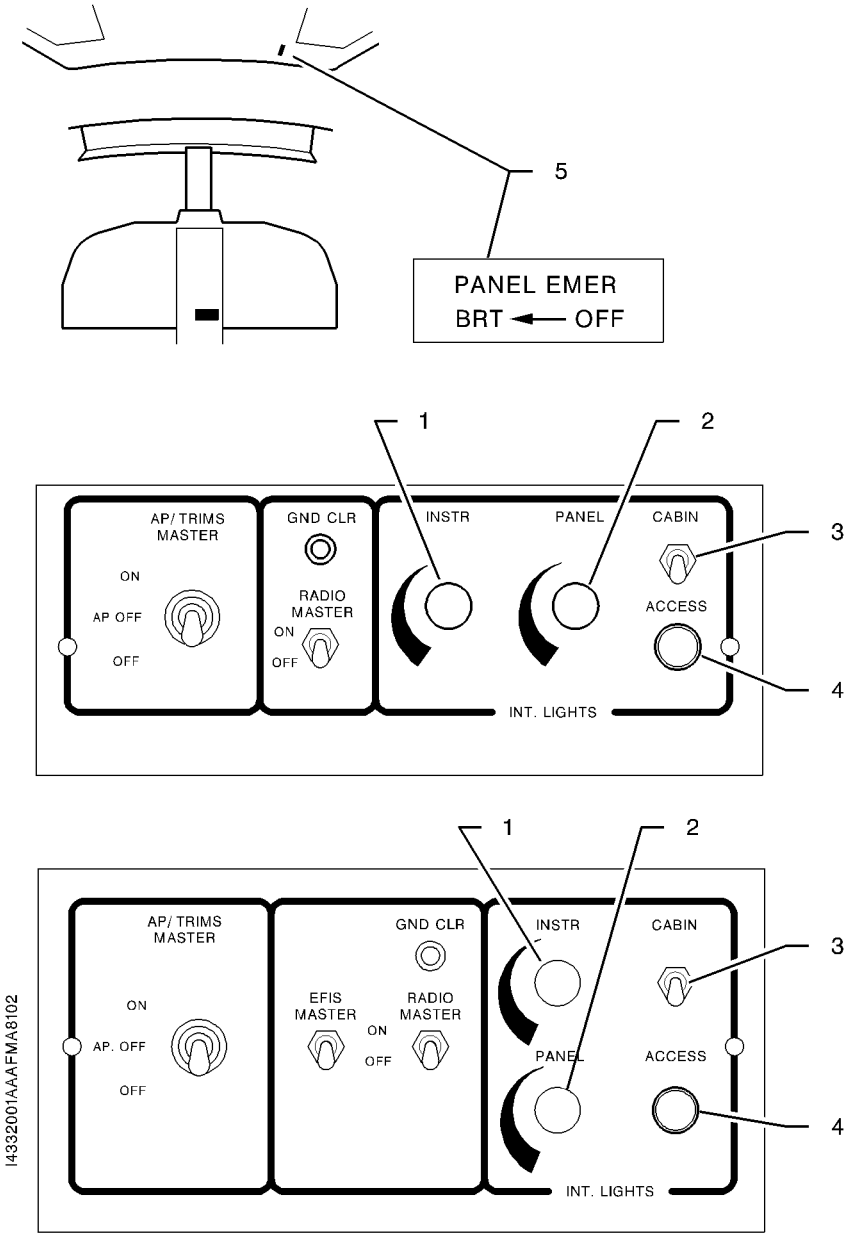


Figure 7.8.7 (2/2) - INTERNAL LIGHTING CONTROLS

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