A330-200
TECHNICAL TRAINING MANUAL

MECHANICS / ELECTRICS & AVIONICS COURSE

33 LIGHTS

GE Metric

For Training Purposes Only
Issued By SPL/GK March 2006

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Under no circumstances
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GENERAL

The cockpit lighting system enables the crew to easily see all equipment details, inscriptions and indications, whatever the level of darkness. It is especially used at night.

The cockpit lighting system comprises :

- Dome lights and lighting strips
- Map holder lighting
- Console and floor lighting
- Center instrument and standby compass lighting
- Reading lights and center pedestal lighting
- Outlet plugs and coat stowage lighting.

DOME LIGHTS AND LIGHTING STRIPS

Two dome lights and lighting strips provide shadowless general cockpit lighting.

Note : In electrical emergency configuration, the F/O side dome light remains available, provided the dome light control is not set to off.

MAP HOLDER LIGHTING

Map holder lighting is provided at the Captain and First Officer stations.

CONSOLE AND FLOOR LIGHTING

Briefcase stowage, side console and floor lighting is provided at the Captain and First Officer stations.

CENTER INSTRUMENT AND STANDBY COMPASS LIGHTING

The center instrument panel is illuminated by a set of lights located below the glareshield. The standby compass is provided with integral lighting. There are also two lights to illuminate the seat alignment indicator.

Note : In electrical emergency configuration, the LH CENTER lighting instrument panel remains available.

READING LIGHTS AND CENTER PEDESTAL

Individual reading lights are provided at the Captain and First Officer stations.

Located in the middle of the overhead panel, a flood light provides illumination of the center pedestal.

OUTLET PLUGS AND COAT STOWAGE

Two electrical plugs are located on the aft wall, left hand side. One for 28 VDC and one for 115 VAC. Two switches are also located on this wall, one for the dome lights control and one for the avionics compartment lighting control.

At the rear of the aft wall is the coat stowage compartment which is also provided with lights controlled by a switch located top right in this compartment.

INSTRUMENT AND PANEL INTEGRAL LIGHTING

All the instruments installed in the cockpit other than the cathode ray tubes are integrally lit.

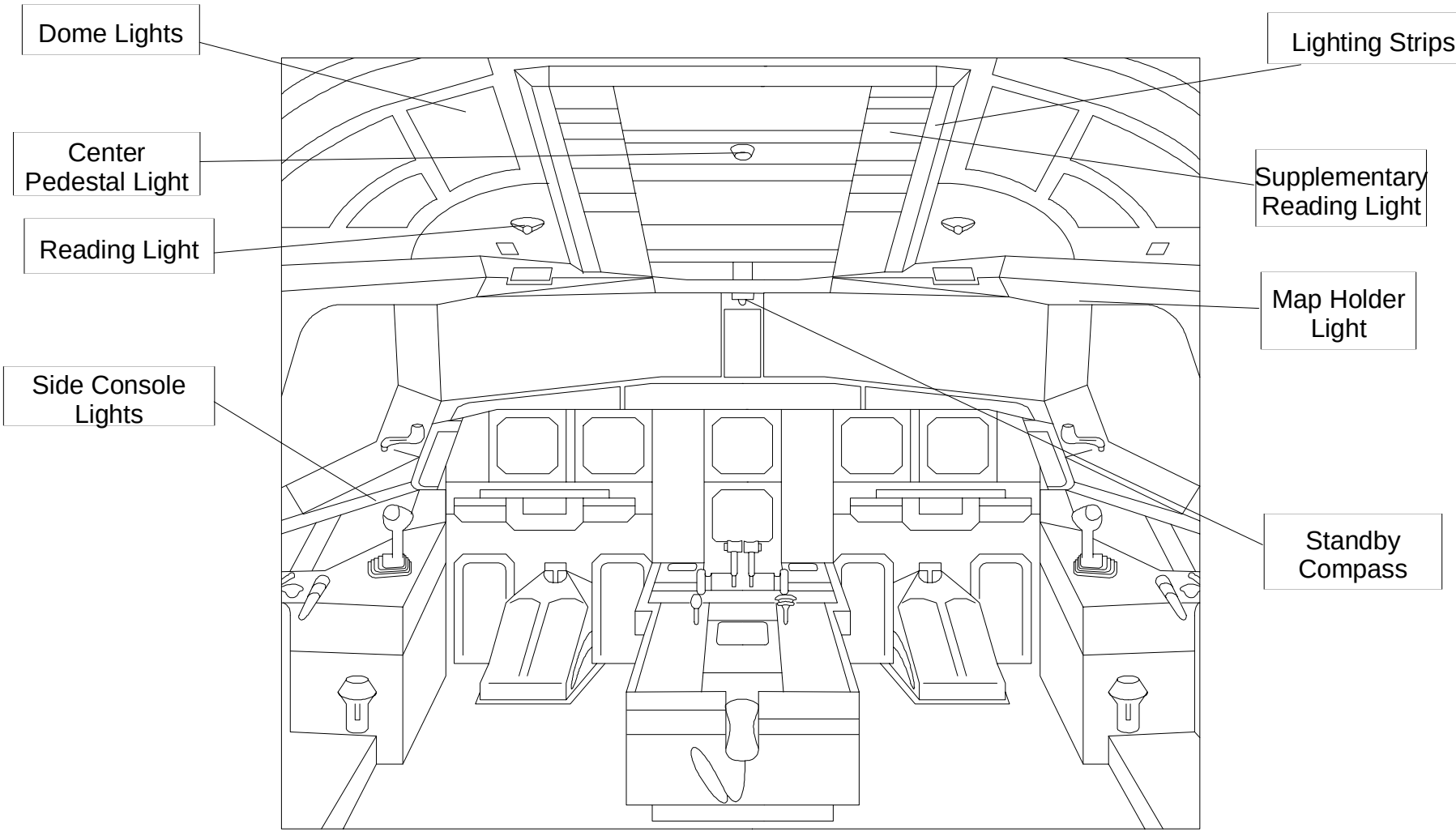
The lights, illuminating the instruments, are equipped with a dimming control. The instrument and panel integral lighting is achieved in two different ways :

- by the miniature lights
- by the Light Emitting Diodes (LEDs).

ANNUNCIATOR LIGHT TEST AND DIMMING

The integrity of all annunciator lights can be tested and their intensity can be dimmed.

There are four identical 115/5 V transformers to supply annunciator lights. Five annunciator light control units allow the annunciator lights to be illuminated.



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STUDENT NOTES:

COCKPIT LIGHT SYSTEM CONTROLS

General
Overhead Panel
Glareshield
Main Instrument Panel
Center Pedestal

GENERAL

All system controls are located on four different panels.
They are located on :

- the overhead panel
- the glareshield
- the main instrument panel
- the center pedestal.

OVERHEAD PANEL

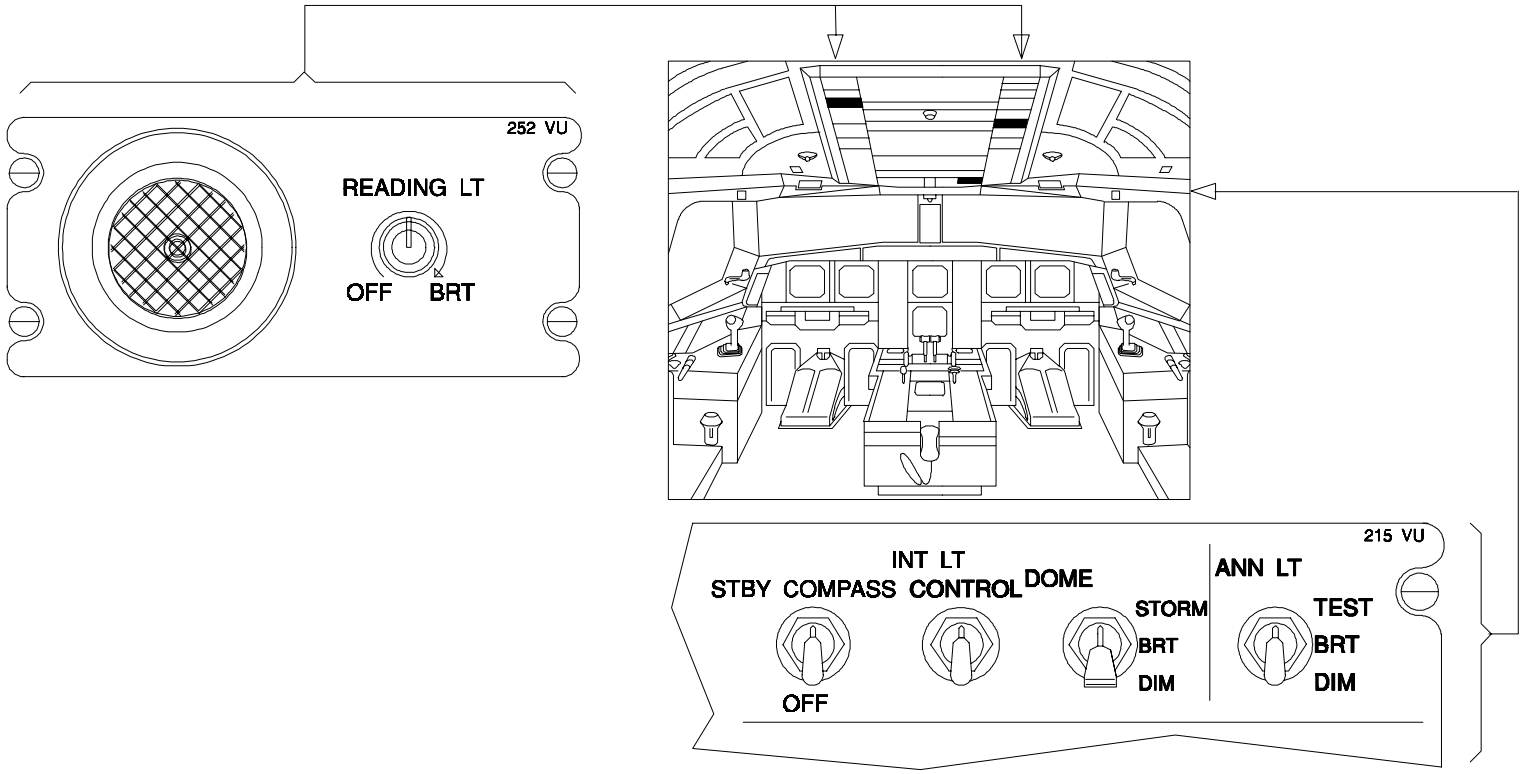
Several light switches and light control knobs are located on the overhead panel :

- Two supplementary reading light brightness knobs.

- One standby compass switch allows operation of standby compass integral lighting and seat alignment indicator lighting.

- Two dome switches serve to supply and to adjust the brightness of the two dome lights.
In the STORM position, the dome and main instrument panel lights come on at full intensity, independently of the CONTROL switch position.

- One annunciator light selector serves to test all annunciator lights and to adjust their brightness.
TEST : All annunciator lights come on. All Liquid Crystal Displays (LCDs) indicate "eight".
BRT : Full intensity.
DIM : The annunciator light power supply voltage is reduced.



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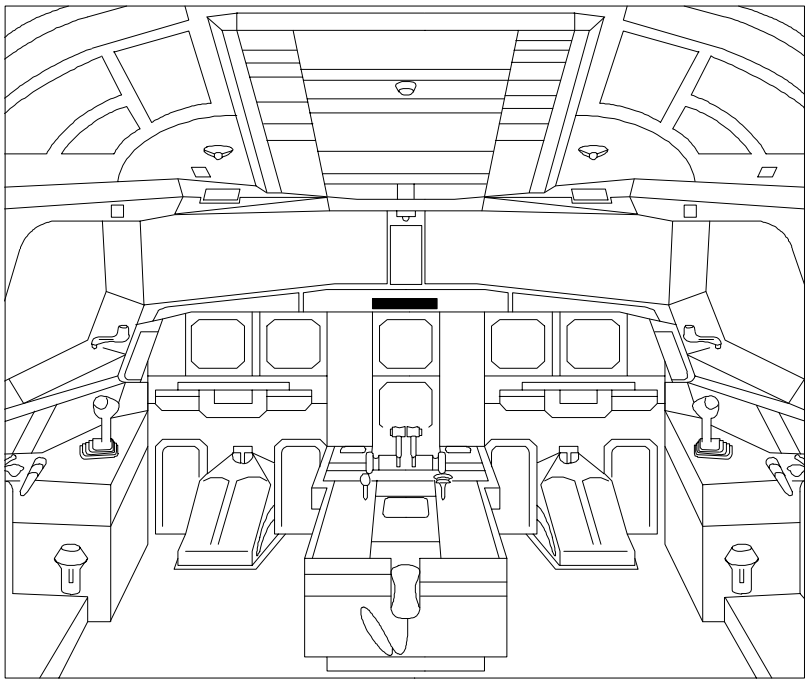
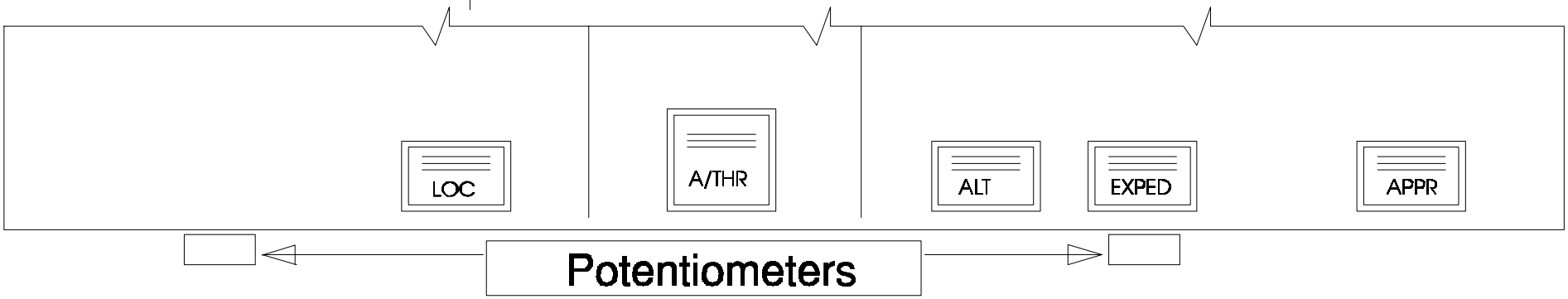
GLARESHIELD

Two sliding potentiometers are located under the glareshield :

- The left one allows glareshield integral lighting adjustment.
- The right one allows adjustment of the FLIGHT CONTROL UNIT display brightness.





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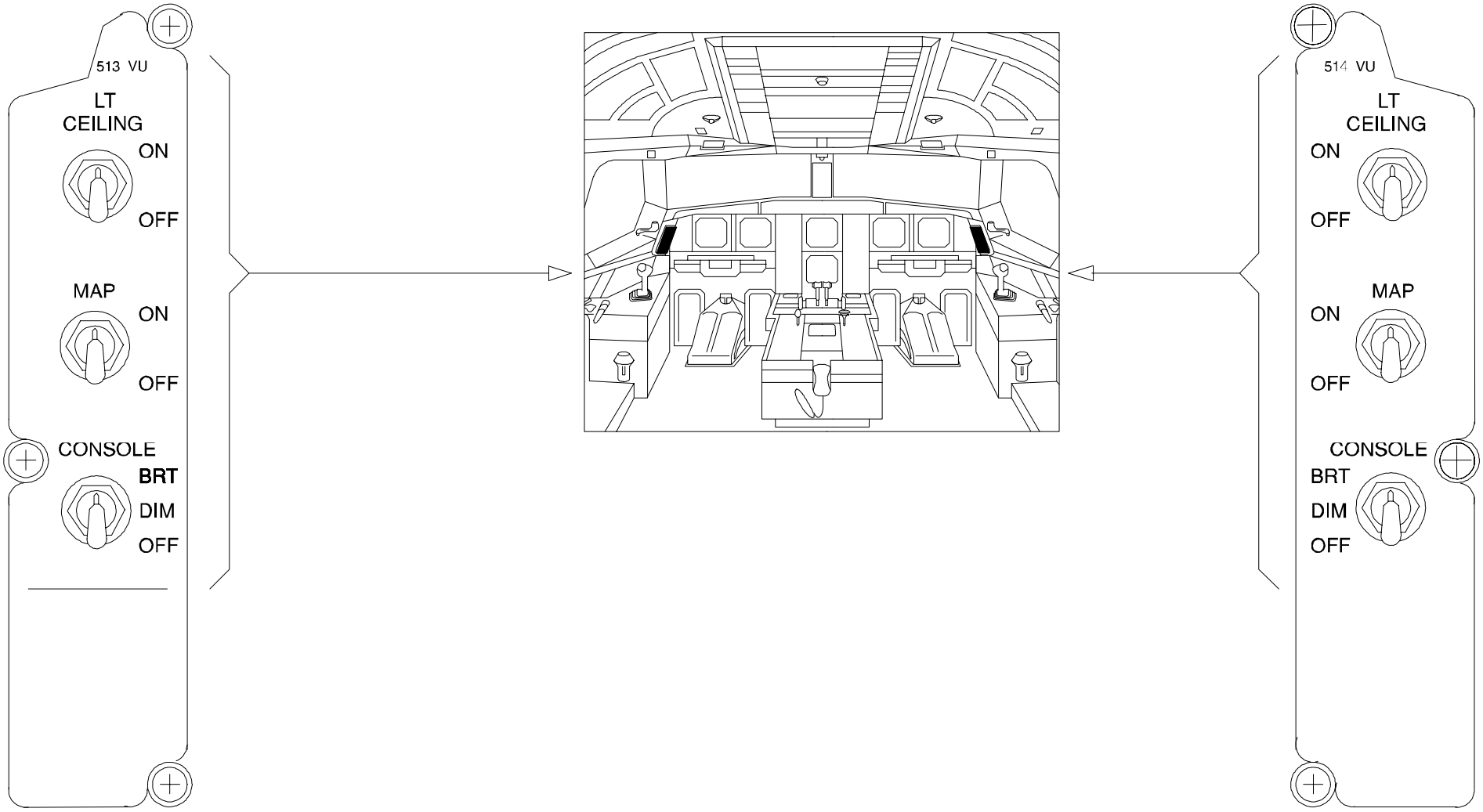
MAIN INSTRUMENT PANEL

Two sets of switches are located at each end of the main instrument panel. One to the left of the Captain and one to the right of the First Officer :

- CEILING switches enable illumination of the overhead panel lighting strips.
- MAP switches enable illumination of the map holder.
- CONSOLE switches enable dim and bright illumination of the side consoles, briefcases, and floor below the Captain and First Officer seats.



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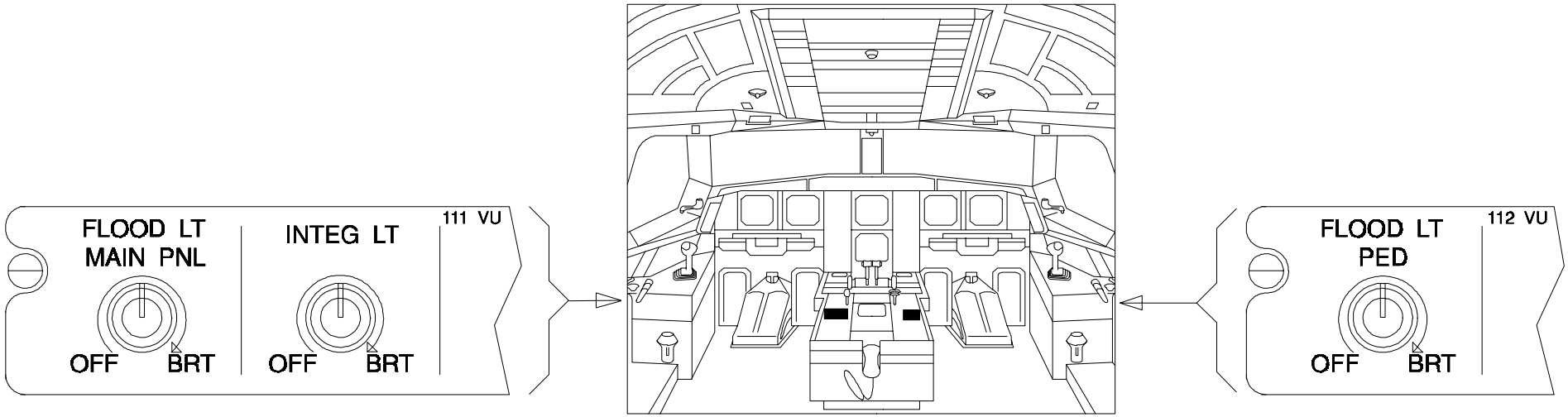
CENTER PEDESTAL

Several light control knobs are located on the center pedestal :

- FLOOD LIGHT MAIN PANEL knob allows the brightness of main panel flood lighting to be adjusted.
- INTEGRAL LIGHT knob allows the brightness of the flight deck instrument panel integral lighting to be adjusted.
- FLOOD LIGHT PEDESTAL knob allows the brightness of the center pedestal flood lighting to be adjusted.



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STUDENT NOTES

COCKPIT LIGHT COMPONENTS

Dome Lights
Reading and Map Holder Lights
Supplementary Reading Lights
Main and Center Instrument Panels
Center Pedestal
Console and Briefcase Lights
Ceiling Lights
Center Pedestal Knobs

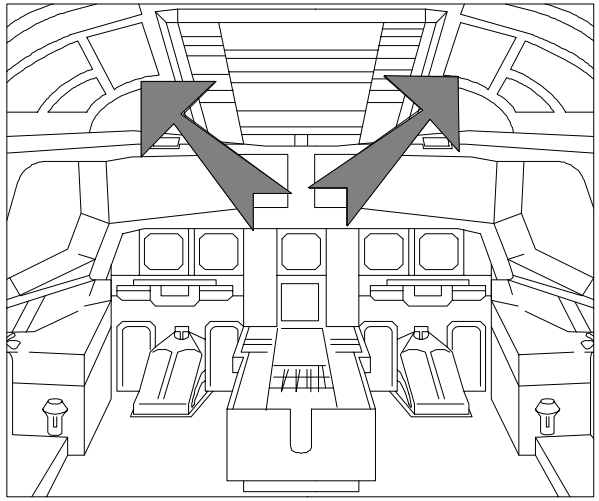
DOME LIGHTS

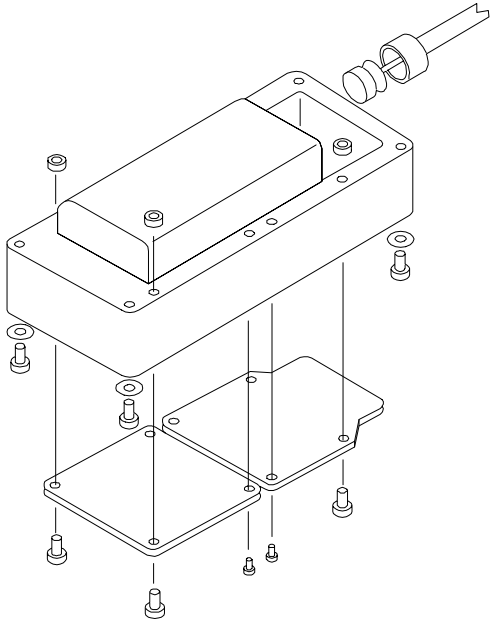
FIN : 161LE to 168LE

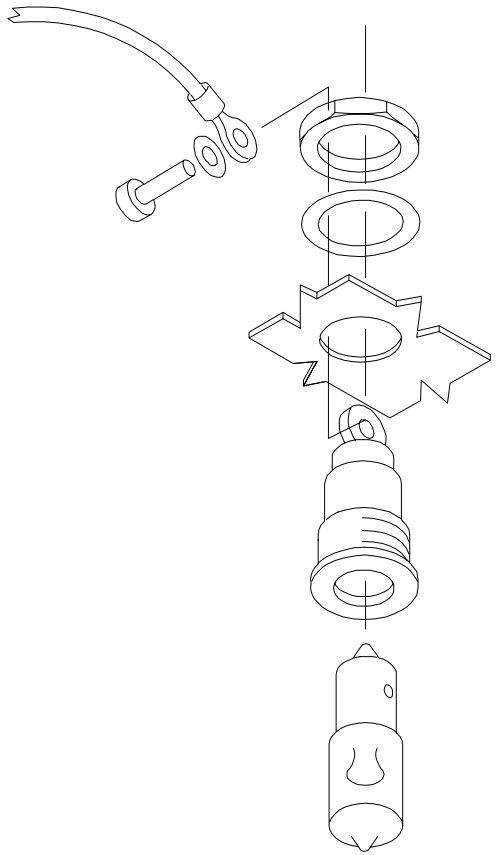
ZONE : 211, 212

COMPONENT DESCRIPTION

Each dome light has four halogen long life lamps (about 2000 hours).







READING AND MAP HOLDER LIGHTS

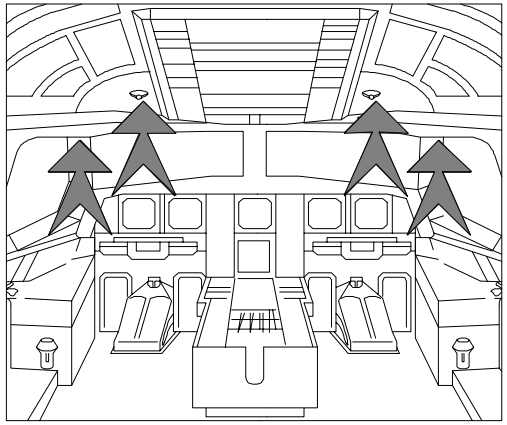
FIN : 16LE1, 16LE2, 21LE1, 21LE2

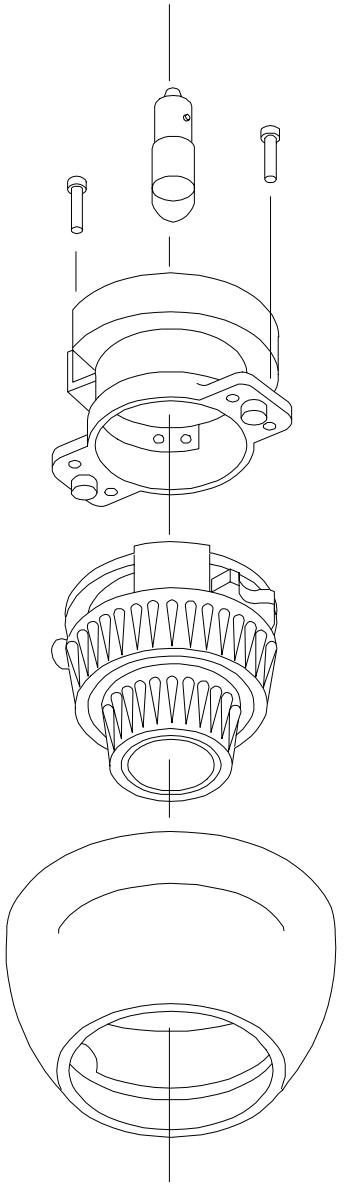
ZONE : 211, 212

COMPONENT DESCRIPTION

The reading lights are fitted to the overhead panel.
They swivel by 35 degrees with respect to the vertical axis and illuminate the sliding tables of the Captain and First Officer, and the consoles.

The map holder lights illuminate the map holders located under the side windows in the cockpit.





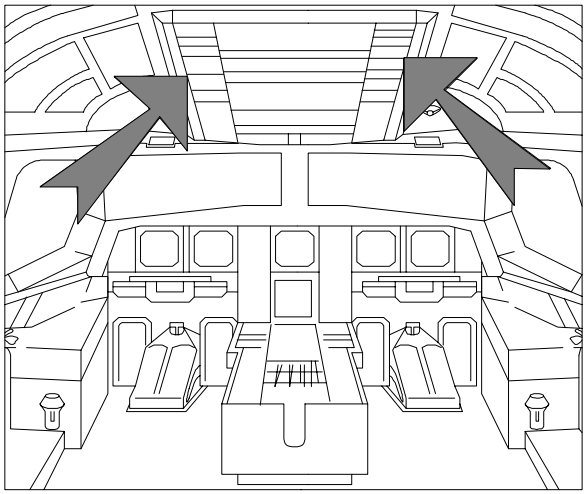
SUPPLEMENTARY READING LIGHTS

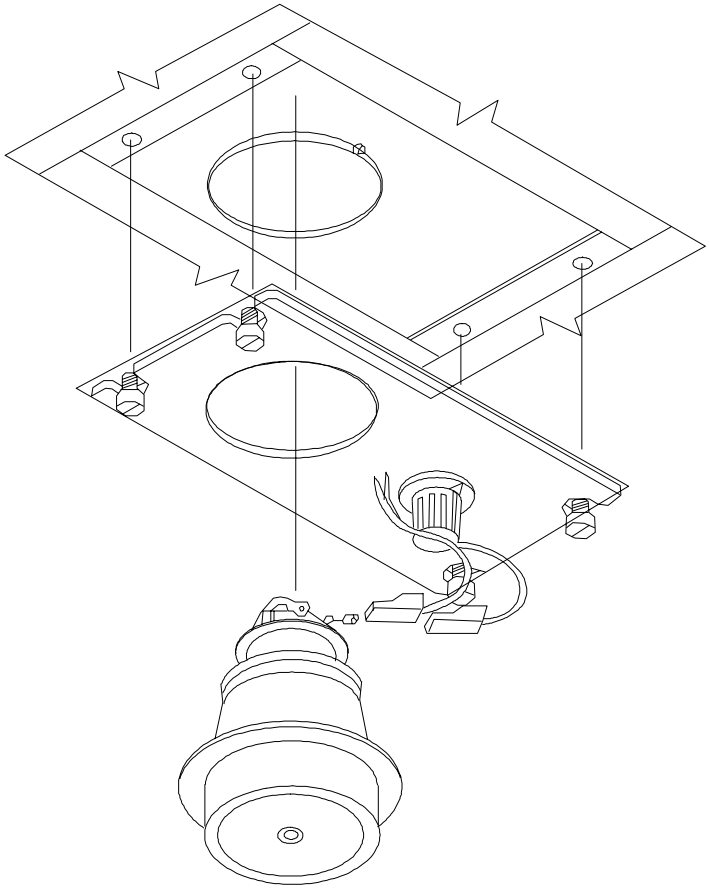
FIN : 18LE

ZONE : 210

COMPONENT DESCRIPTION

The supplementary reading lights are located on the overhead panel. These reading lights are equipped with a long life halogen lamp and swivel.





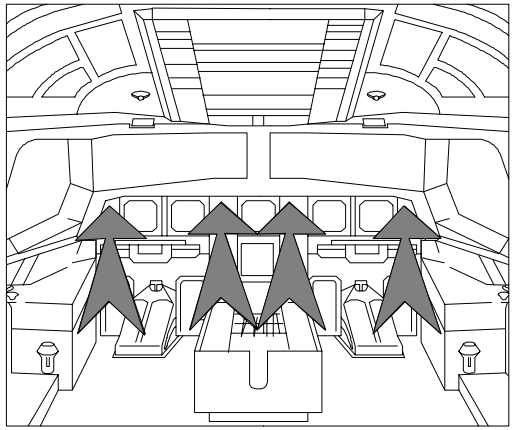
MAIN AND CENTER INSTRUMENT PANELS

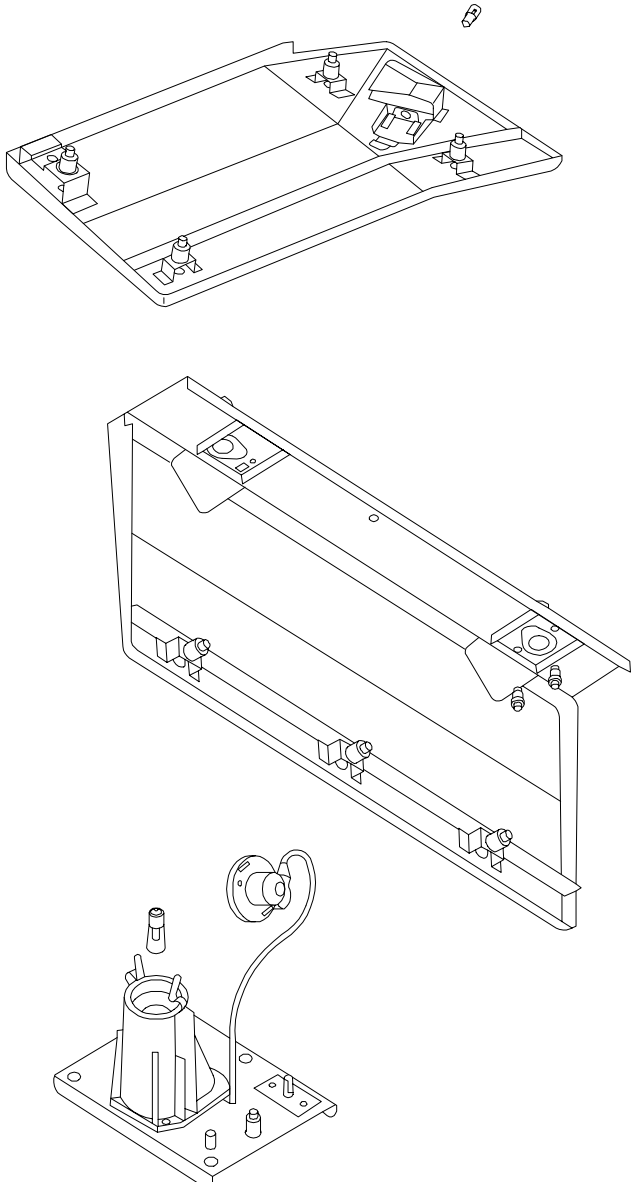
FIN : 14LE

ZONE : 210

COMPONENT DESCRIPTION

The main and center instrument panel lighting system has four halogen lamps : one for each instrument panel.





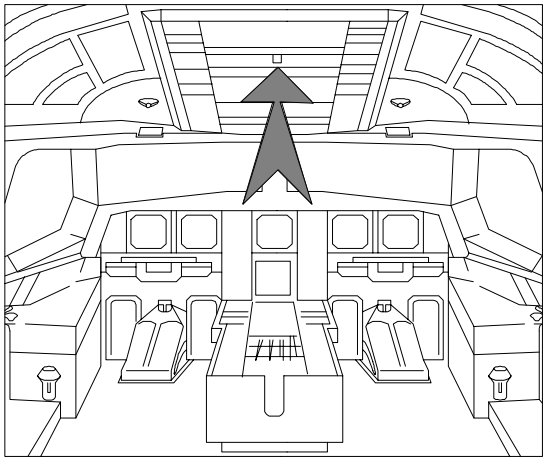
CENTER PEDESTAL

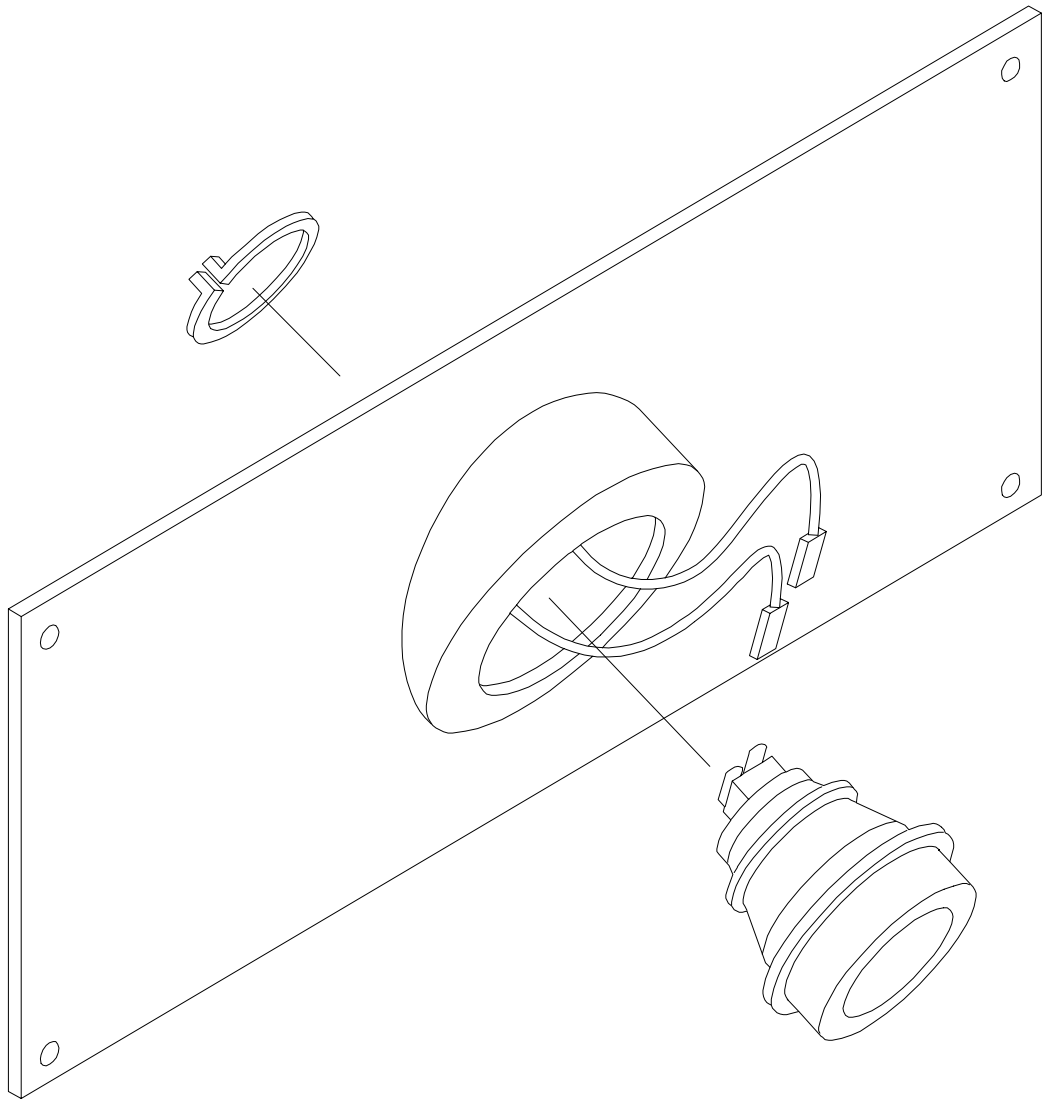
FIN : 24LE

ZONE : 210

COMPONENT DESCRIPTION

The center pedestal light is located on the overhead panel. This light is equipped with a long life lamp. It swivels towards the rear of the pedestal.





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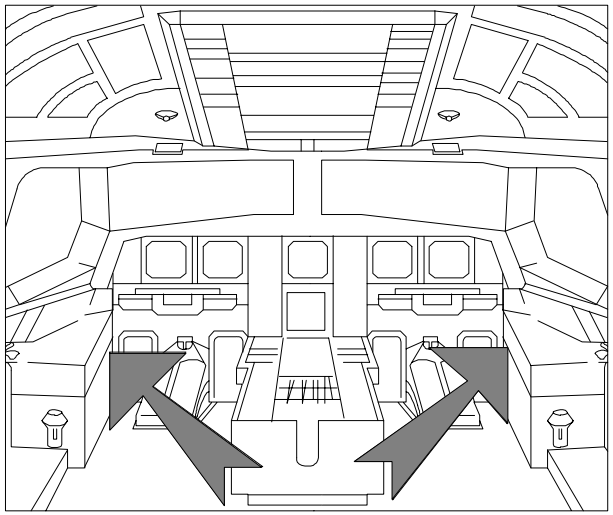
CONSOLE AND BRIEFCASE LIGHTS

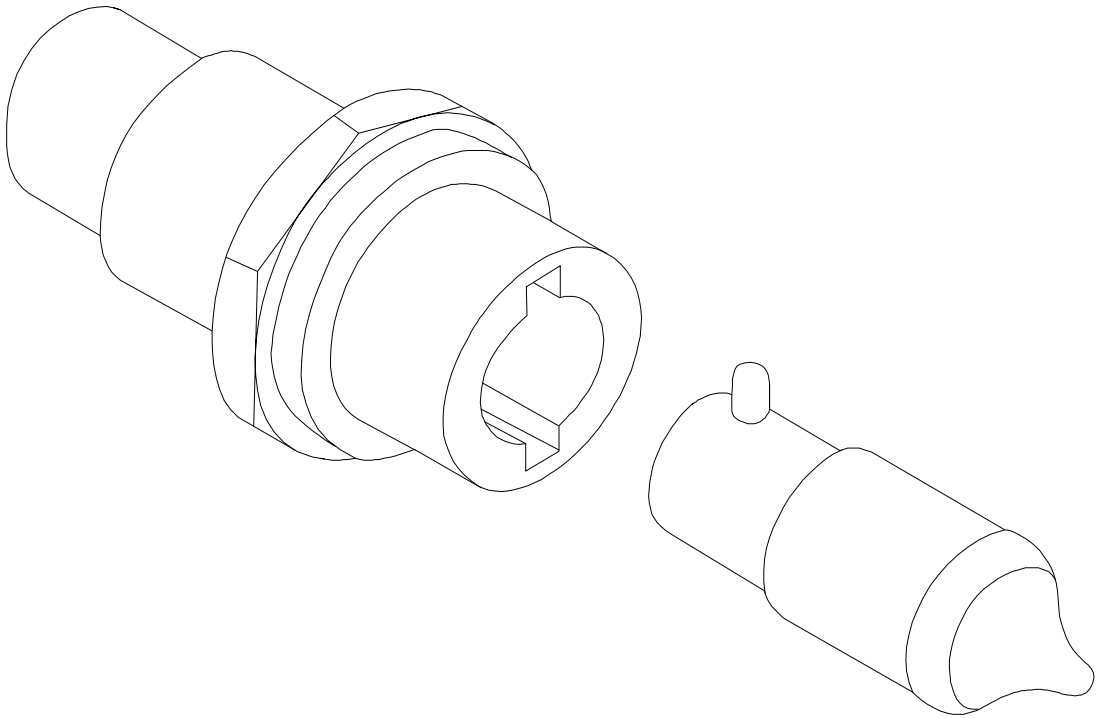
FIN : 9LE1 to 12LE1, 9LE2 to 12LE2

ZONE : 211, 212

COMPONENT DESCRIPTION

Four lights are used for the lighting of each console (3 for the console itself and 1 for the briefcase).





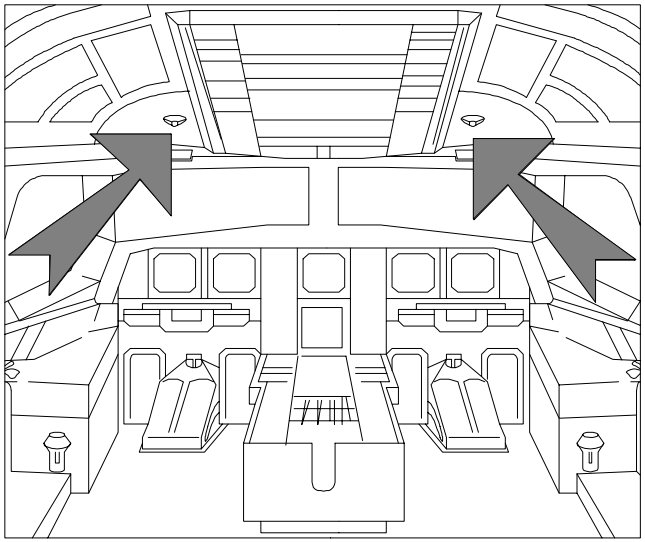
CEILING LIGHTS

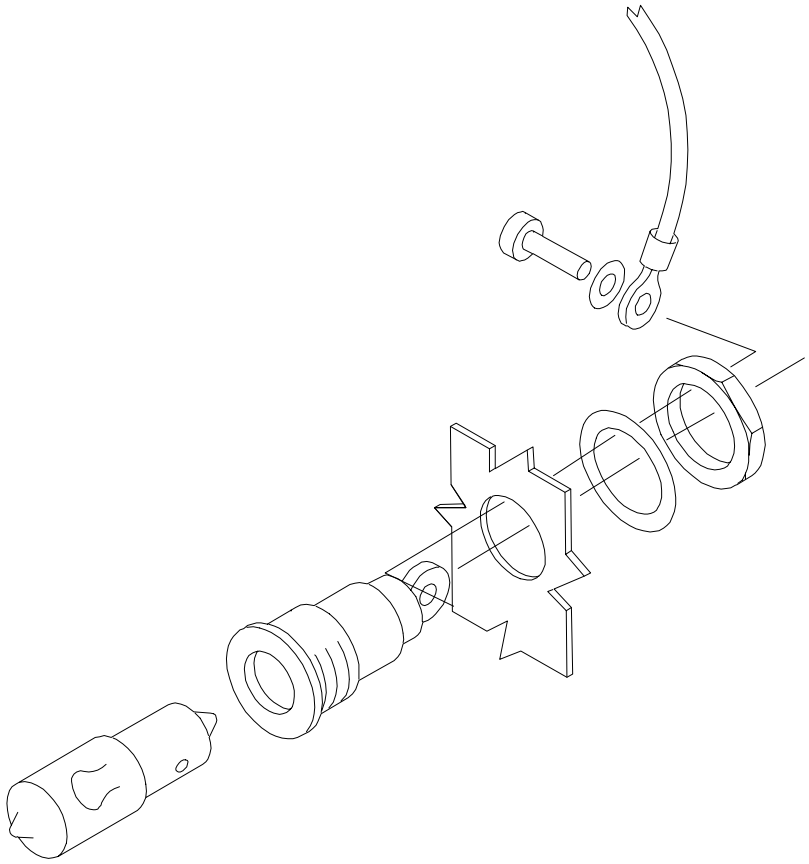
FIN : 35LE1 to 38LE1, 35LE2 to 38LE2

ZONE : 211, 212

COMPONENT DESCRIPTION

Each ceiling light strip, located on either side of the overhead panel, has four halogen lamps.





CENTER PEDESTAL KNOBS

FIN : 15LE, 22LE

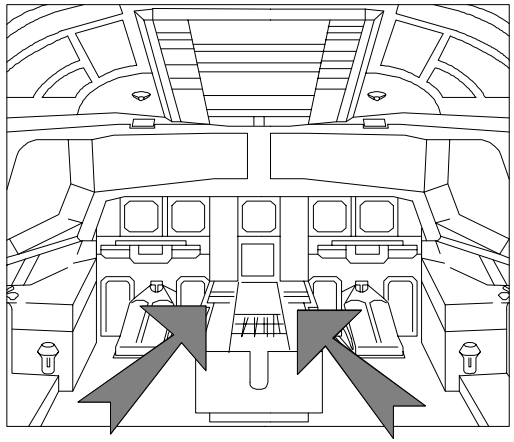
ZONE : 211, 212

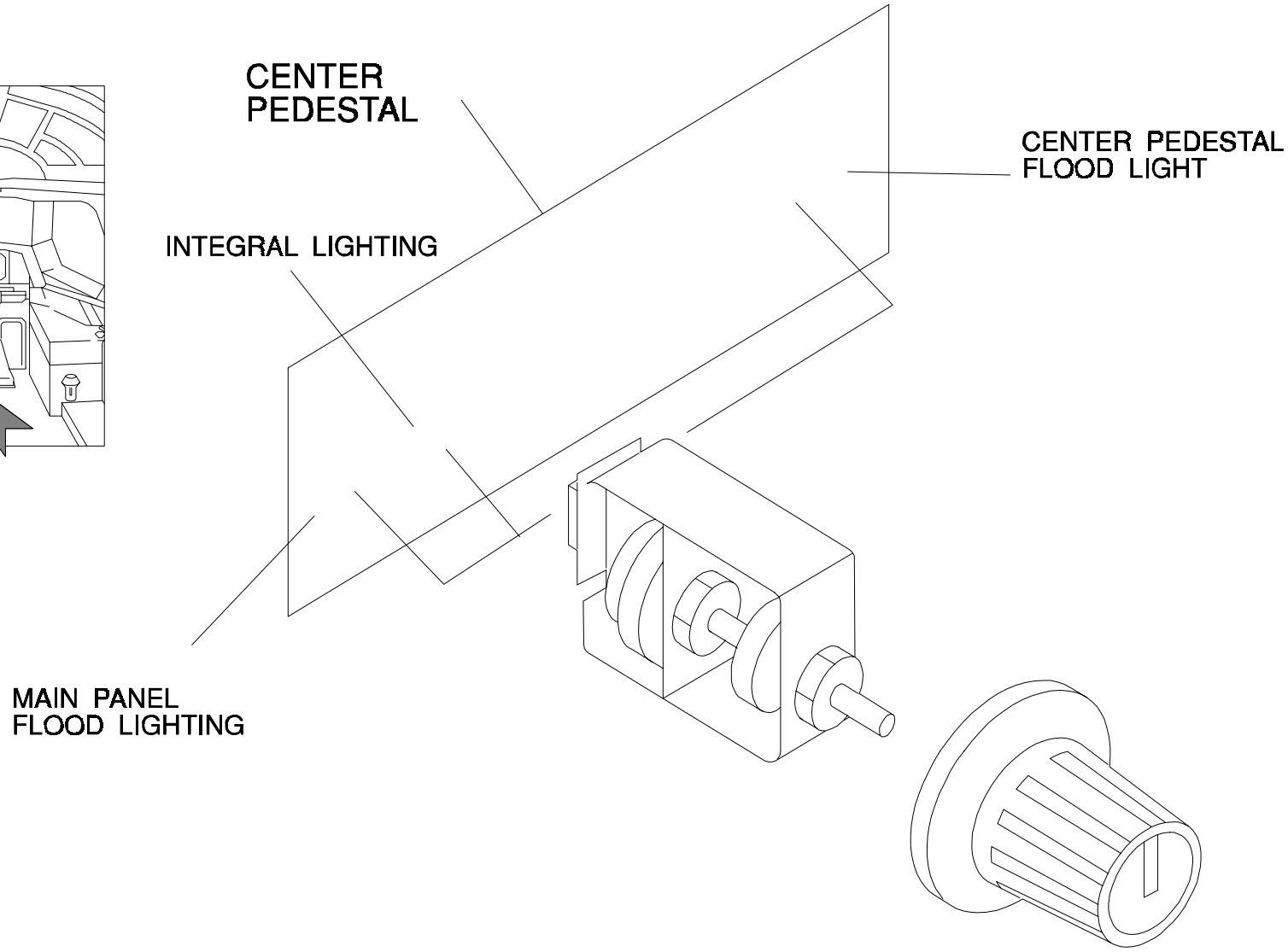
COMPONENT DESCRIPTION

Three potentiometers control :

- the center pedestal light intensity level
- the instrument panel lighting system intensity level
- the integral lighting system intensity level.

They adjust continuously the output voltage between 0 and 5 VAC.





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STUDENT NOTES

ANNUNCIATOR LIGHT TEST AND REMOVAL INSTALLATION

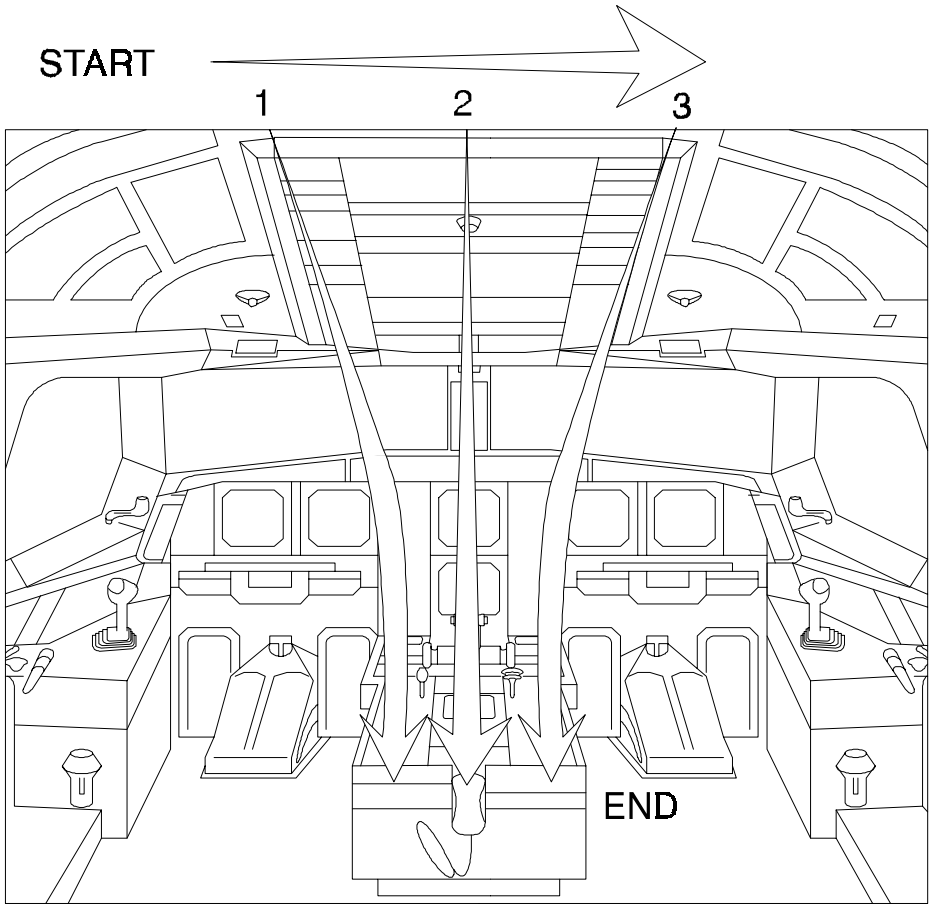
Panel Scanning
Bulb Change
Transformers
Control Unit Cards

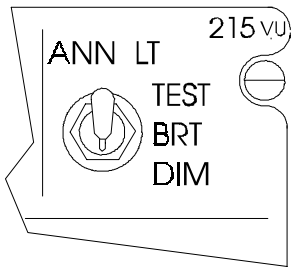
PANEL SCANNING

There is a special way to check the annunciator lights.

Set ANNunciator LIGHT TEST selector to the test position.

Check all the lights from upper left to bottom right following the way shown on the drawing.





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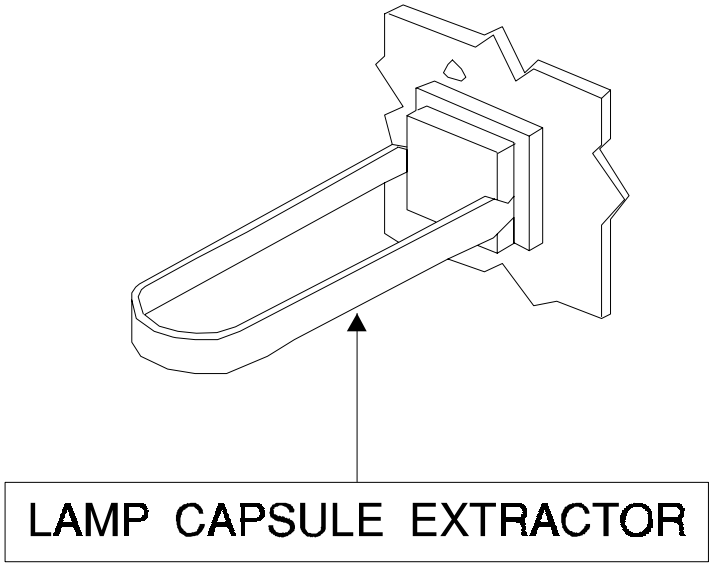
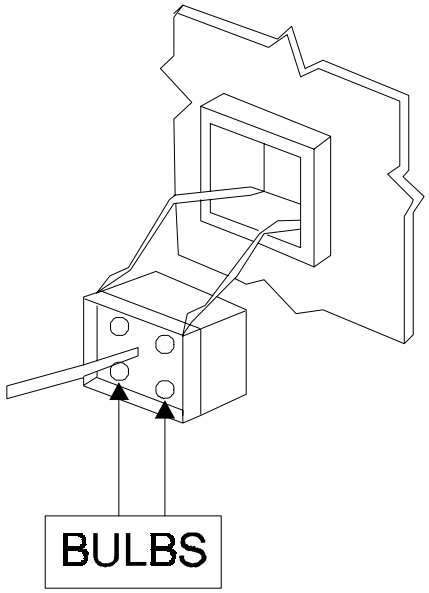
BULB CHANGE

A special tool, called lamp capsule extractor, is used to remove the annunciator light.





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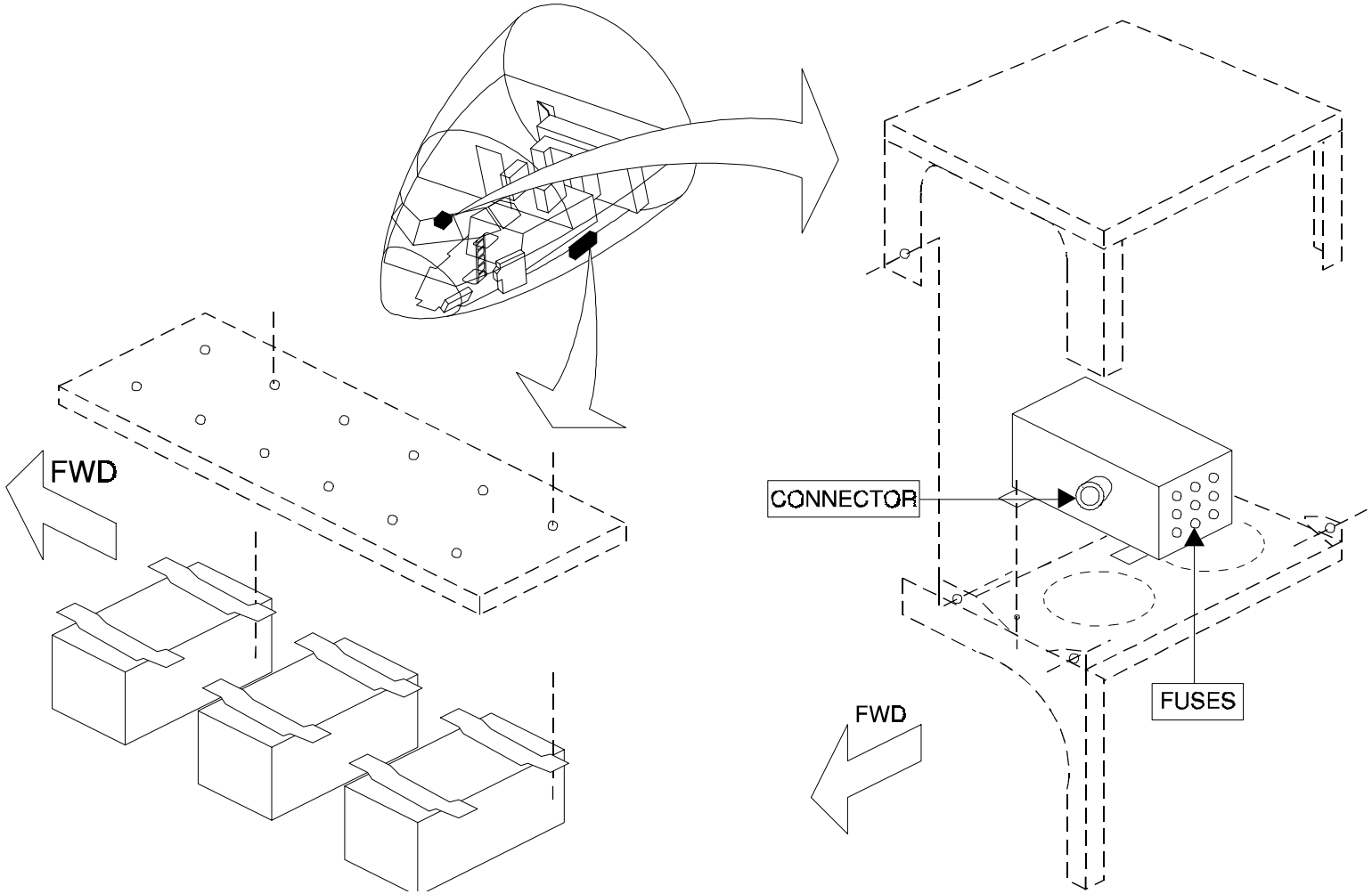
TRANSFORMERS

There are four identical transformers.
Nine fuses, located on the front side of each transformer, protect the outputs.
A connector, located on the left, powers the transformer.

Each transformer is fastened by four screws.



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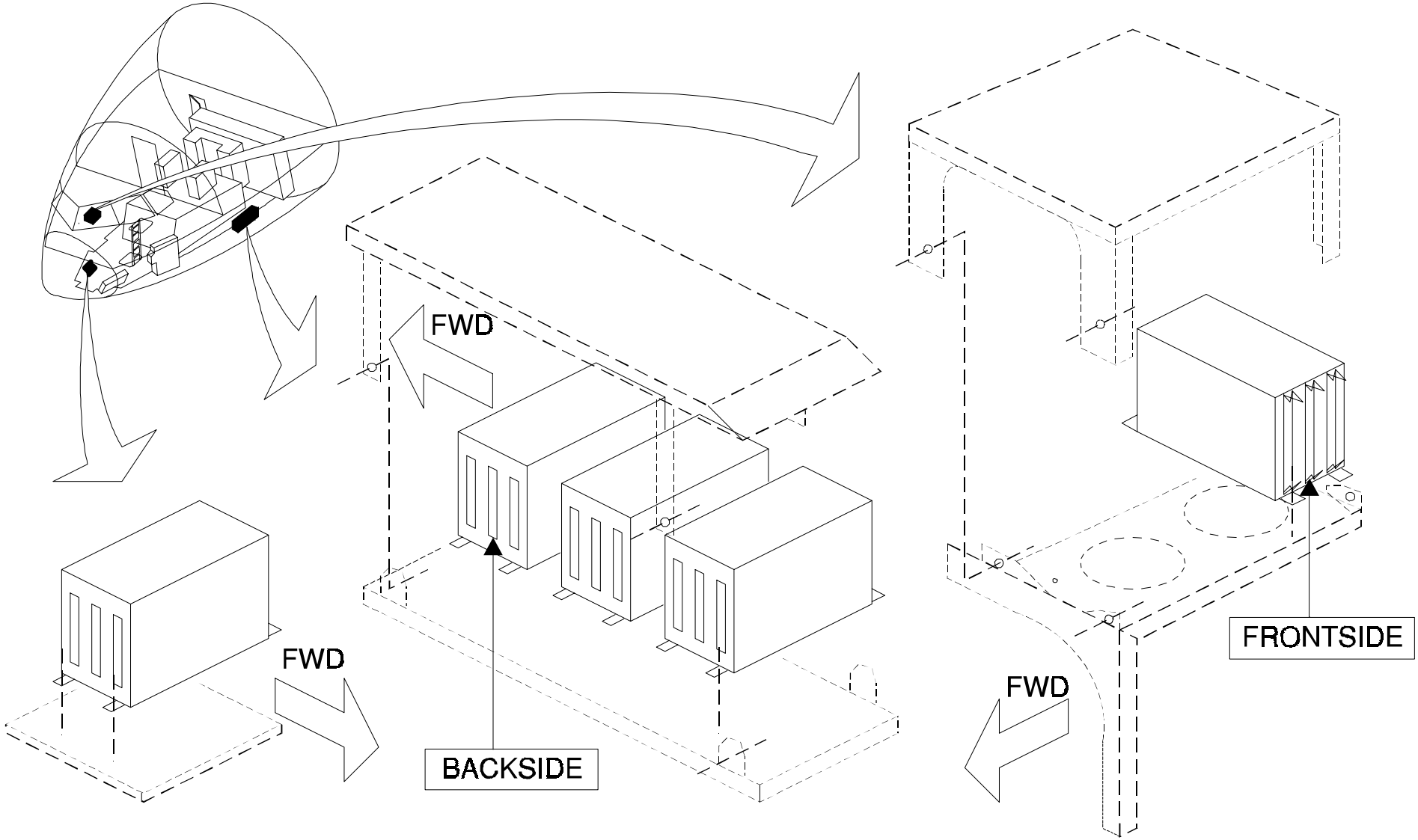
CONTROL UNIT CARDS

A control unit card can be removed without removing the control unit itself.



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STUDENT NOTES

CABIN LIGHT SYSTEM CONTROLS

General
ON OFF Pushbutton
Entry Light Pushbuttons
Cabin Light Pushbuttons
Lav Maint Pushbutton
Cabin Lighted Signs Controls

GENERAL

The cabin lighting is controlled from the Forward Attendant Panel by the LIGHT MODULE.
All the buttons can be activated by pushing them and deactivated by pushing them again, except for the ON OFF pushbutton.

The intensity level pushbuttons can also be deactivated by pushing another button in the same column.

ON OFF PUSHBUTTON

The ON function enables all cabin and entry lights to be illuminated at full intensity.

The OFF function can be performed, as soon as one light is on, to switch off all the cabin and entry lights.

ENTRY LIGHT PUSHBUTTONS

The ENTRY, DIM 1 and DIM 2 pushbuttons control the intensity of the entry area lighting.
The light intensity levels and their respective pushbuttons are :

- ENTRY for 100% light intensity,
- DIM 1 for 50%
  and DIM 2 for 10%.

Note : When the engines are running and the cockpit door is opened, The FWD left entry light automatically goes to DIM 2 level.

CABIN LIGHT PUSHBUTTONS

The system is divided into two zones :
- TCF : Tourist Class Forward
- TCR : Tourist Class Rearward.

The CABIN, DIM 1 and DIM 2 pushbuttons control the intensity of the window, center hatrack and aisle lights in the two cabin zones.

The WINDOW pushbutton controls the window lights (left and right).
The CENTER pushbutton controls the center hatrack lights.
The AISLE pushbutton controls the aisle lights (left and right).

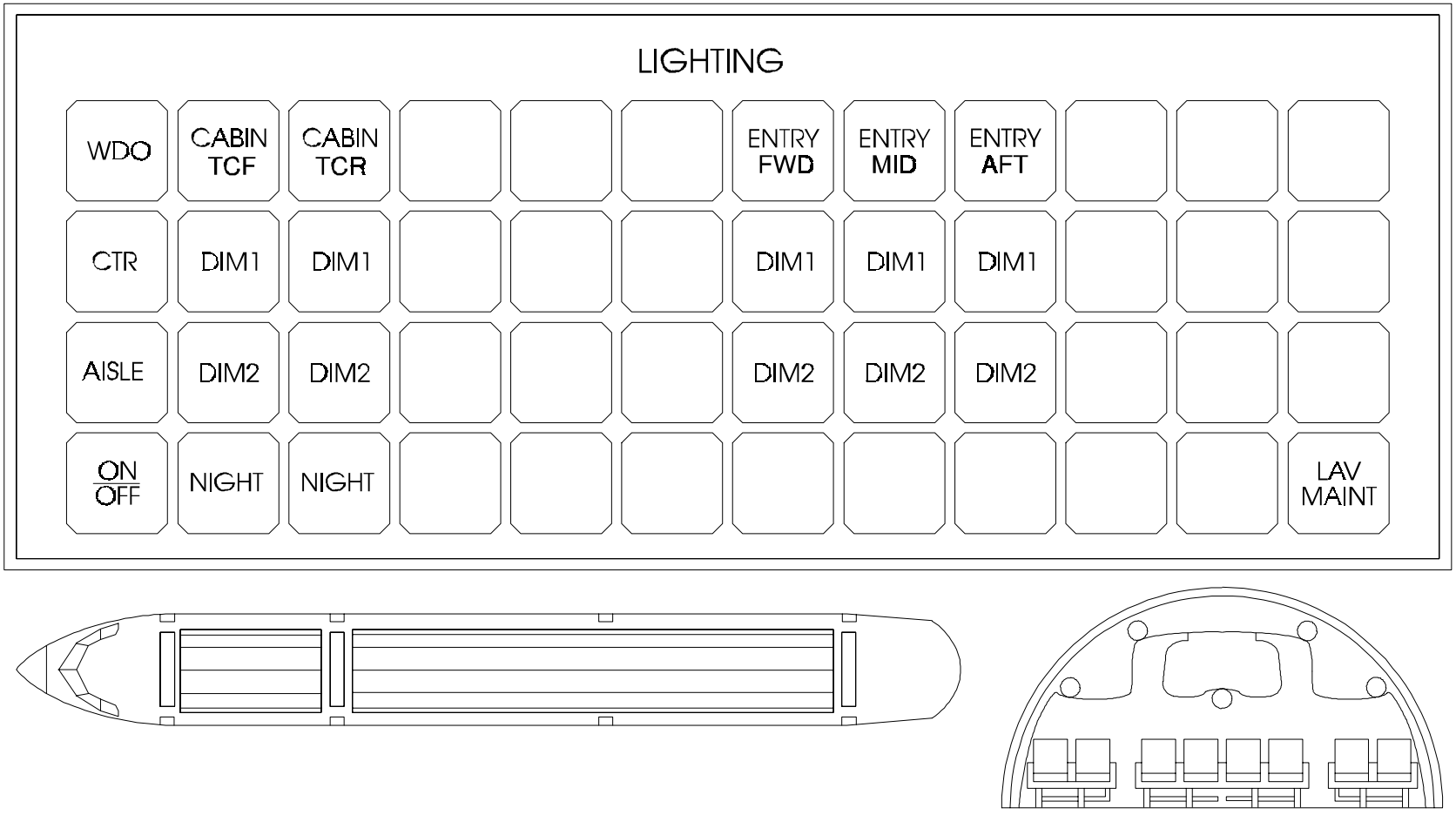
For the NIGHT lighting, all the fluorescent tubes in the ceiling panels are off and the night lights are on.

LAV MAINT PUSHBUTTON

When the lavatory door is open, the lavatory light is on at 50% intensity.

When the lavatory door is locked, the lavatory light is on at 100% intensity and the related lavatory occupied sign comes on.

The LAV MAINT pushbutton allows full lavatory illumination even if the door is open for maintenance facilities.



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CABIN LIGHTED SIGNS CONTROLS

Cabin lighted signs are controlled from the overhead panel.

SEAT BELTS switch :

ON : FASTEN SEAT BELT signs (in cabin) and RETURN TO YOUR SEAT signs (in lavatories) illuminate associated with low chime.

AUTO : FASTEN SEAT BELT signs and RETURN TO YOUR SEAT signs illuminate automatically associated with low tone chime when slats are extended (position 1,2,3 or FULL) or when main landing gear is extended. After landing, signs remain on even if slats are retracted.

OFF : Signs are off. Low tone chime sounds upon extinction.

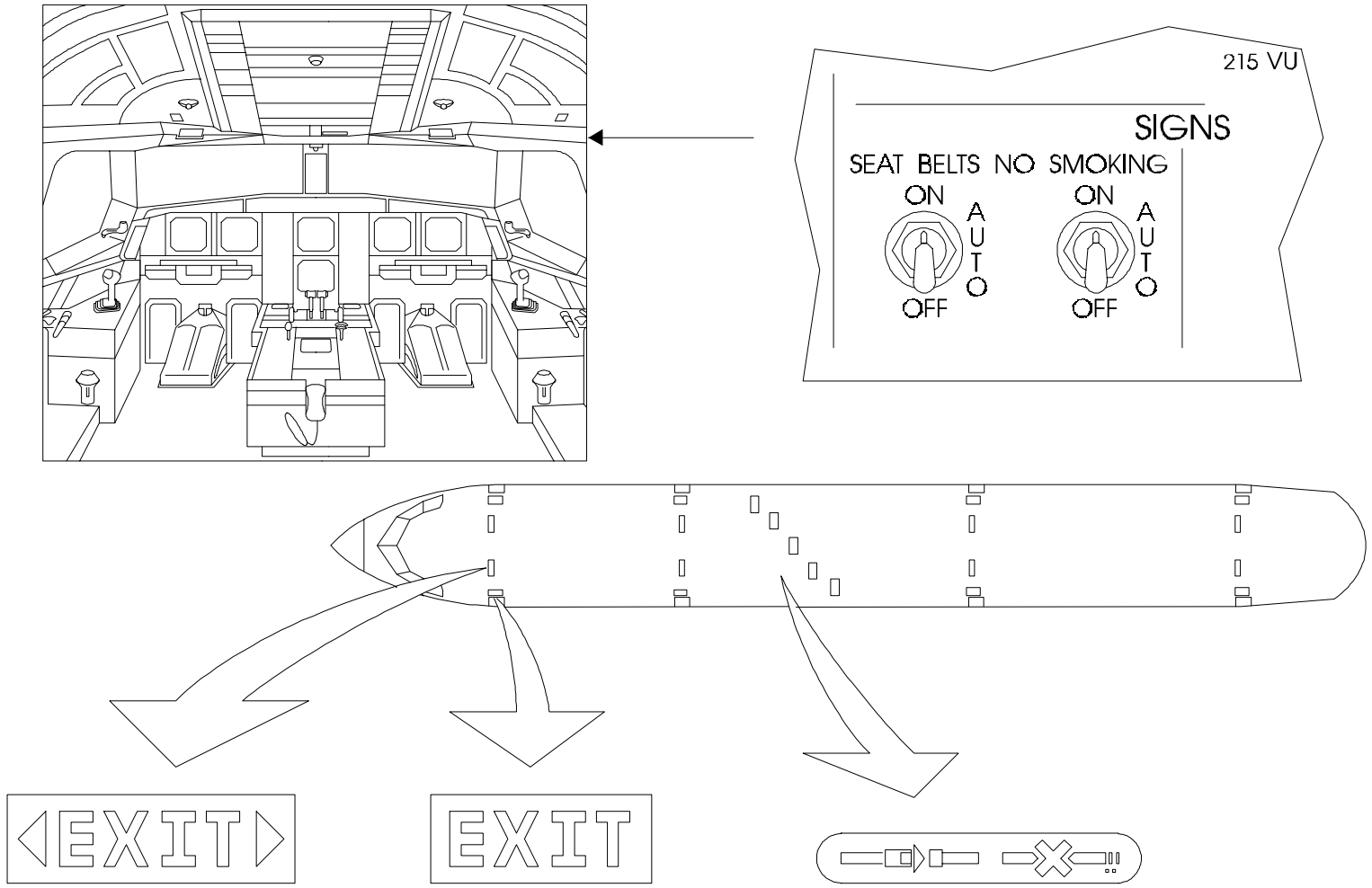
NO SMOKING switch :

ON : NO SMOKING and EXIT signs in cabin illuminate associated with low chime.

AUTO : NO SMOKING and EXIT signs in cabin illuminate when landing gear is extended and go off when landing gear is retracted. Low tone chime sounds upon illumination and extinction of lights.

OFF : Signs are off. Low tone chime sounds upon extinction.

In the event of excessive cabin altitude, the NO SMOKING, FASTEN SEAT BELTS and EXIT signs come on regardless of the position of the selector.



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STUDENT NOTES

SYSTEM BASIC ARCHITECTURE

General
Cabin General Lights
Entry Lights
Passenger Reading Lights
Attendant Work Lights

GENERAL

The cabin lights are controlled through the Cabin Intercommunication Data System (CIDS) which includes a Forward Attendant Panel, two directors and several Decoder Encoder Units (DEUs).
Up to fifty six DEUs are used for the light system. They are called TYPE A DEUs.
The Forward Attendant Panel (FAP) controls the cabin lights.
Signals from the FAP are processed by the directors.
The directors transmit these signals to each DEU. Each DEU controls its own power unit.

CABIN GENERAL LIGHTS

The related DEUs control the cabin fluorescent tubes according to the selection made on the FAP.
The FAP provides various possibilities of lighting intensity for the corresponding window, center hatrack and/or aisle lights.

ENTRY LIGHTS

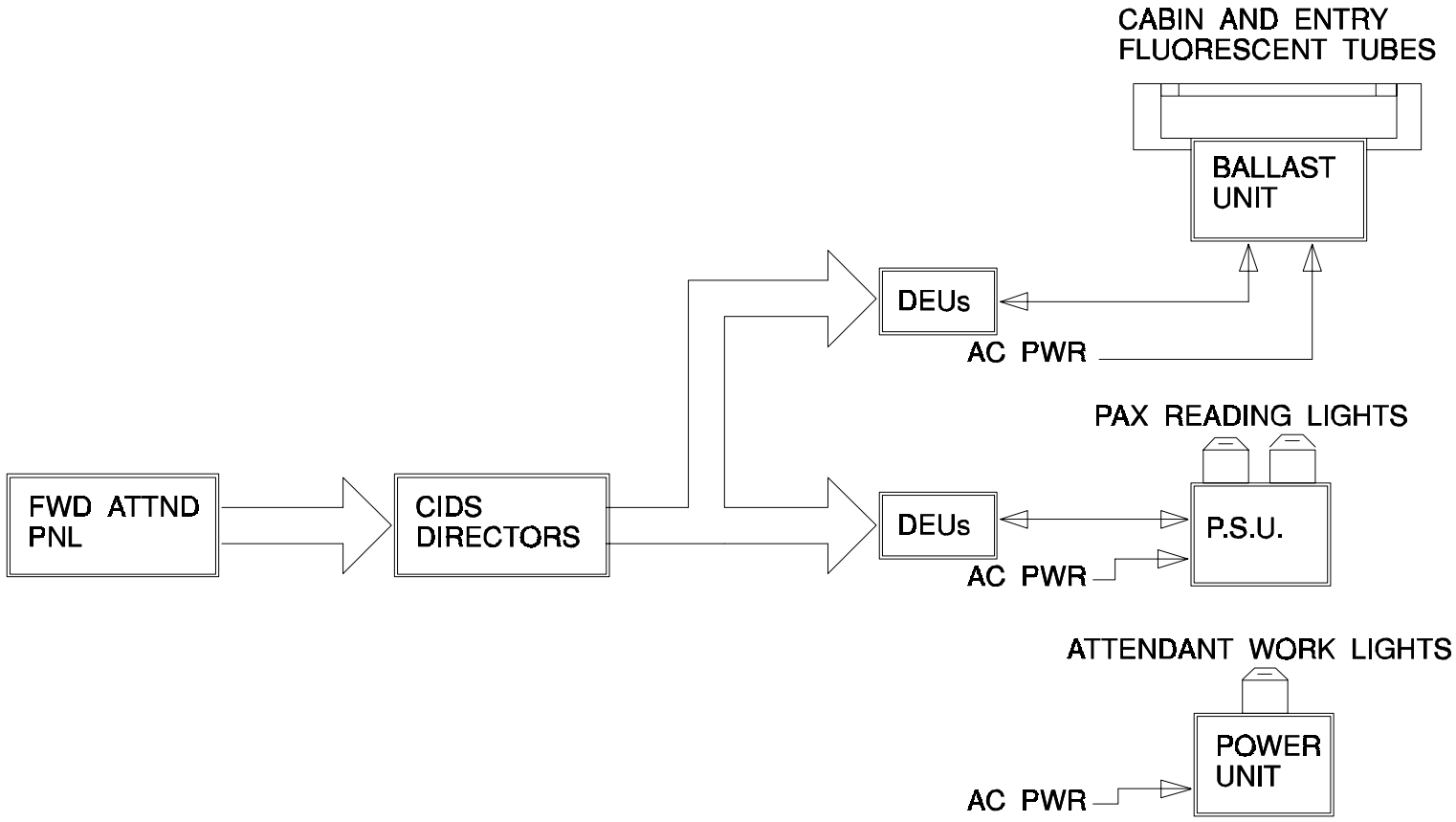
The related DEUs control the entry fluorescent tubes according to the selection made on the FAP.
The FAP provides various possibilities of lighting intensity in each entry area.
Note : If the engines are running and the cockpit door is open, the forward left entry light is automatically dimmed.

PASSENGER READING LIGHTS

The related DEU provides DC Control Power for individual switching.
There is one light for each passenger seat. Each passenger reading light is controlled with an integrated pushbutton.

ATTENDANT WORK LIGHTS

The attendant work lights are equipped with an integrated pushbutton.



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STUDENT NOTES:

CABIN LIGHTS SYSTEM DESCRIPTION

Cabin and Entrance Illumination
Passenger and Cabin Attendant Work Lights
Lavatory Lighting and Occupied Sign Lighting

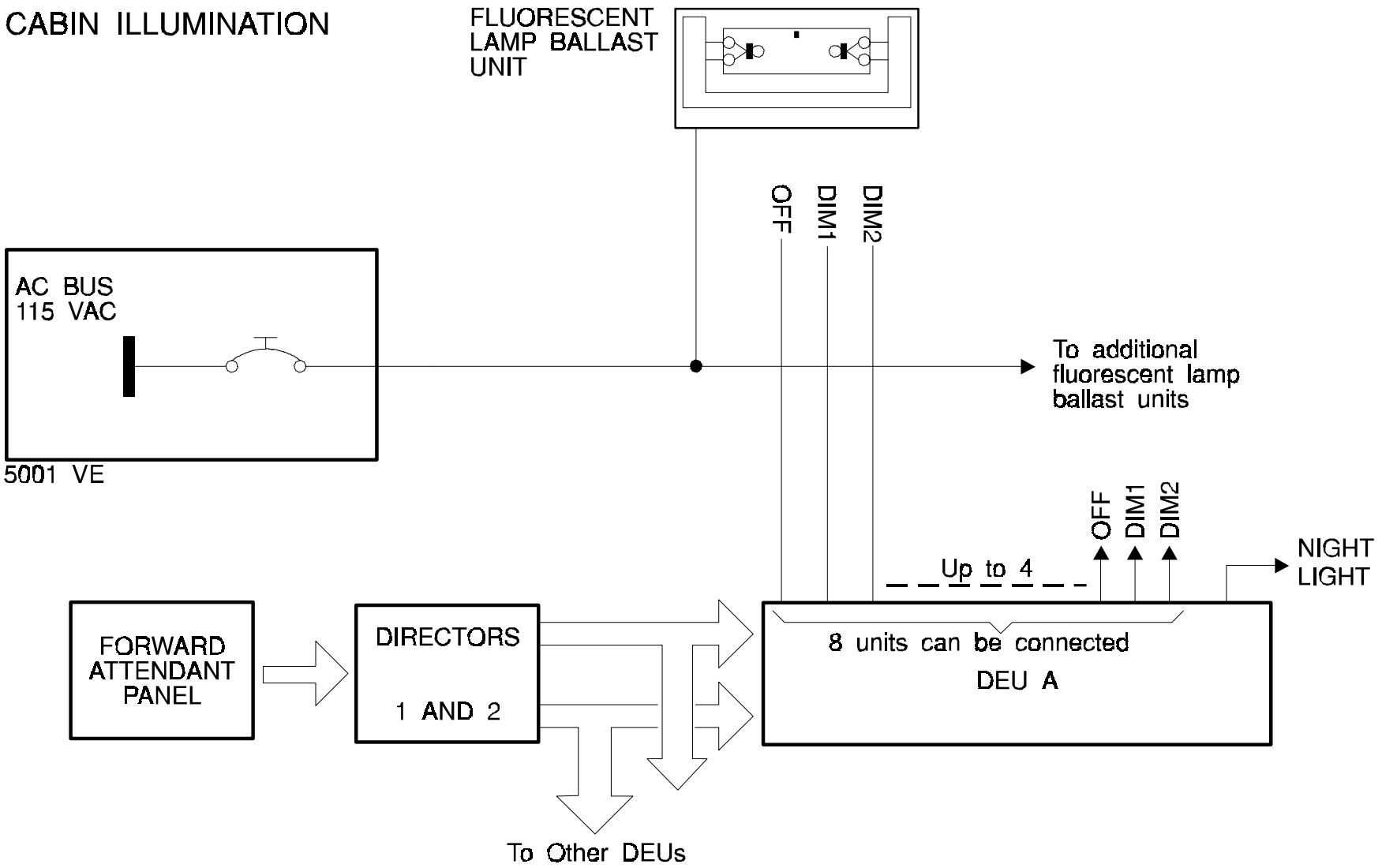
CABIN AND ENTRANCE ILLUMINATION

The Entrance and Cabin Illumination diagrams show a part of the whole cabin illumination system.

Up to 8 ballast units can be connected to one Decoder Encoder Unit A (DEU A), depending on cabin layout.

In fact, only up to 4 cabin ballast units are connected to one DEU A.

DIM1, DIM2 and OFF lines indicate the intensity level. Only one can be powered at the same time.
If no one is powered, the intensity level is bright.



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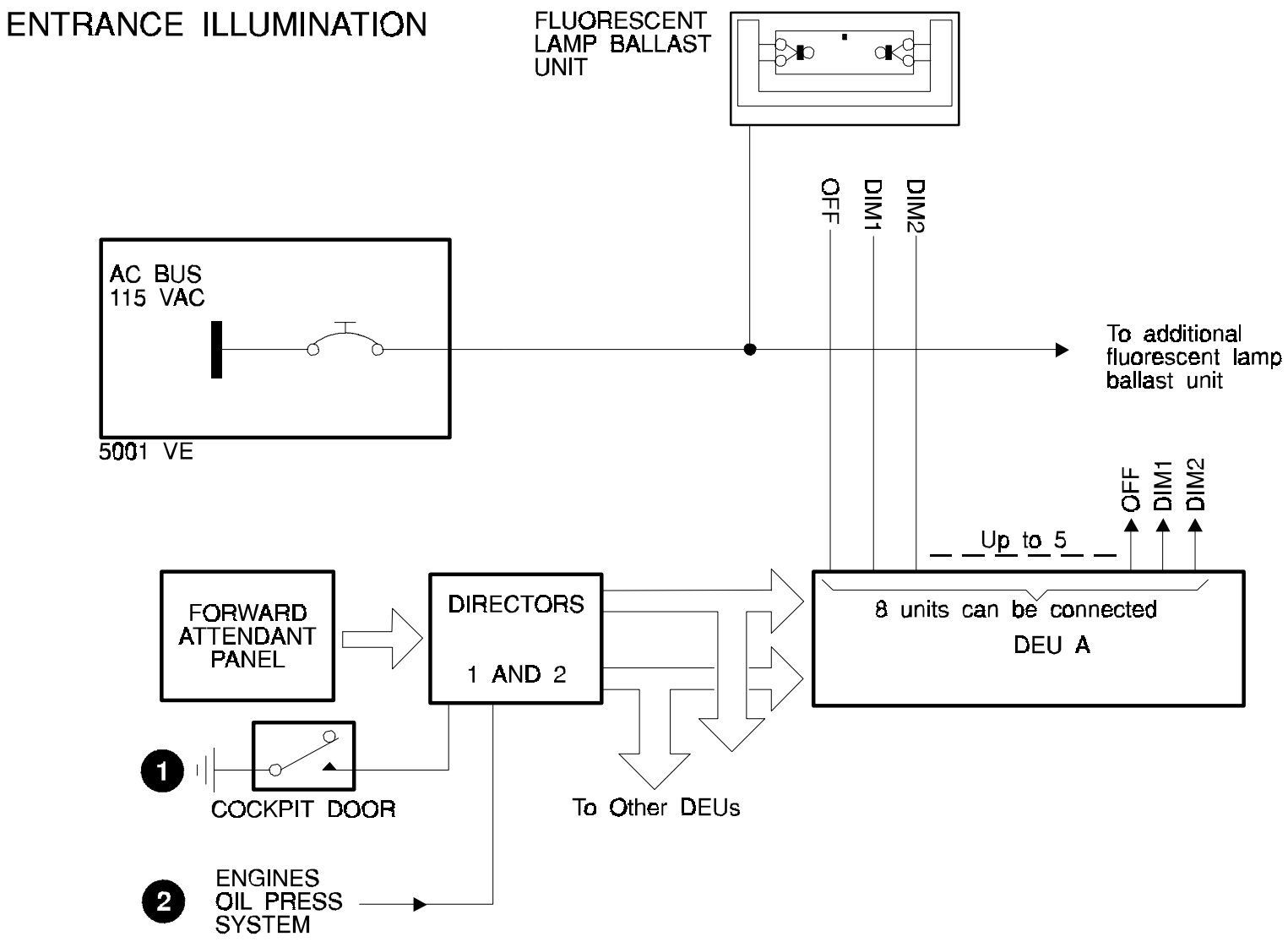
Only up to 5 entrance ballast units are connected to one DEU A.

If the engines are running and the cockpit door is open, the forward left entry light intensity level reduces to DIM 2 (10 % intensity level).

Checks if cockpit door is open or not.

❷ Checks if engines are running or not.

In case of a DEU failure or a data bus failure, the related ballast units come on with full intensity. The pre-selected mode is cancelled.



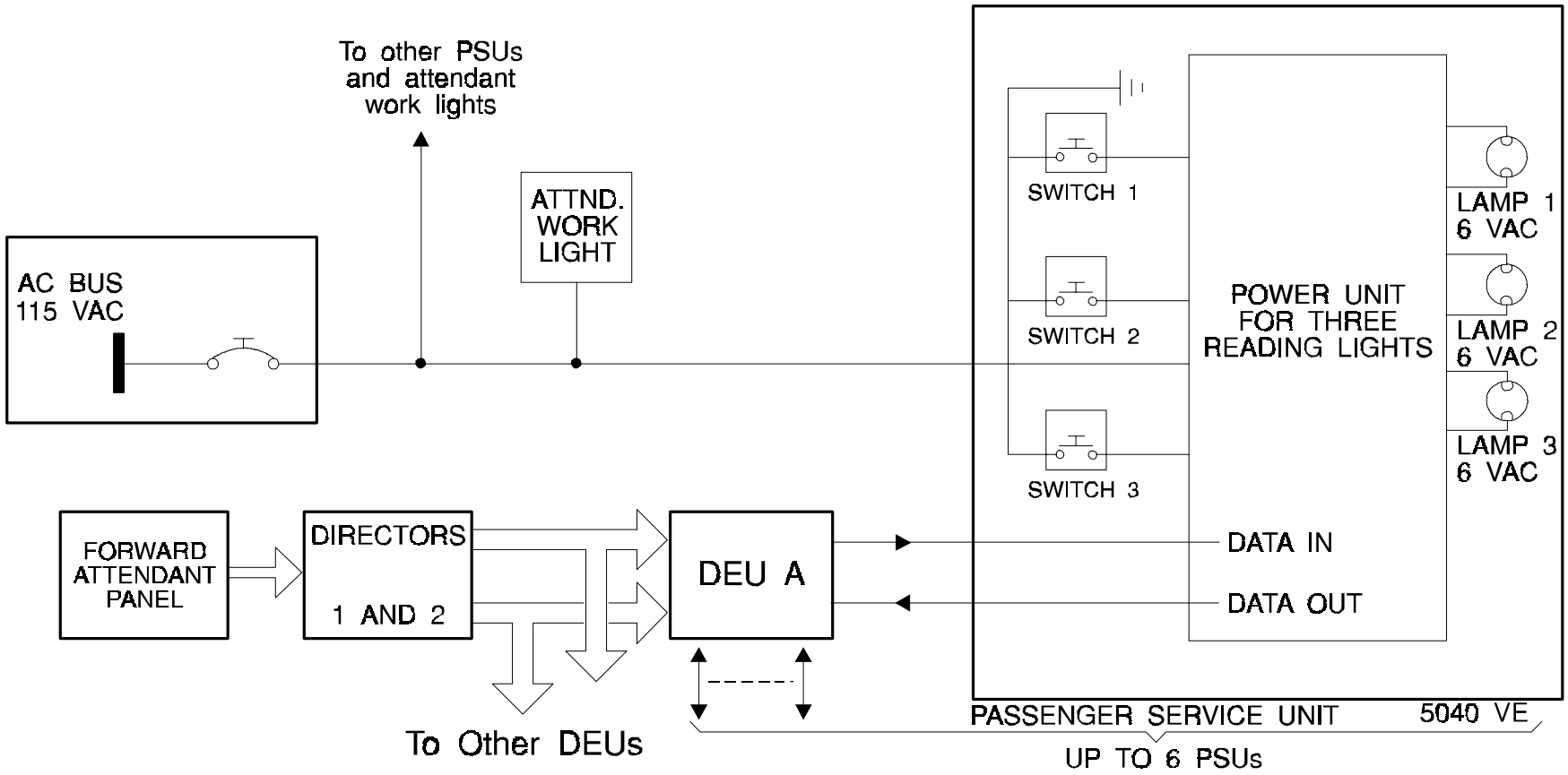
FQW4200 GE Metric

PASSENGER AND CABIN ATTENDANT WORK LIGHTS

This diagram shows a part of the whole passenger lighting system.

The basic attendant work lights are not linked to the CIDS.
The passenger reading lights can be controlled by the switches, integrated in the Passenger Service Unit.

The Power Units, in the Passenger Service Units (PSUs), change the 115 VAC to 6 VAC.
Up to 6 PSUs can be connected to one DEU A.



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LAVATORY LIGHTING AND OCCUPIED SIGN LIGHTING

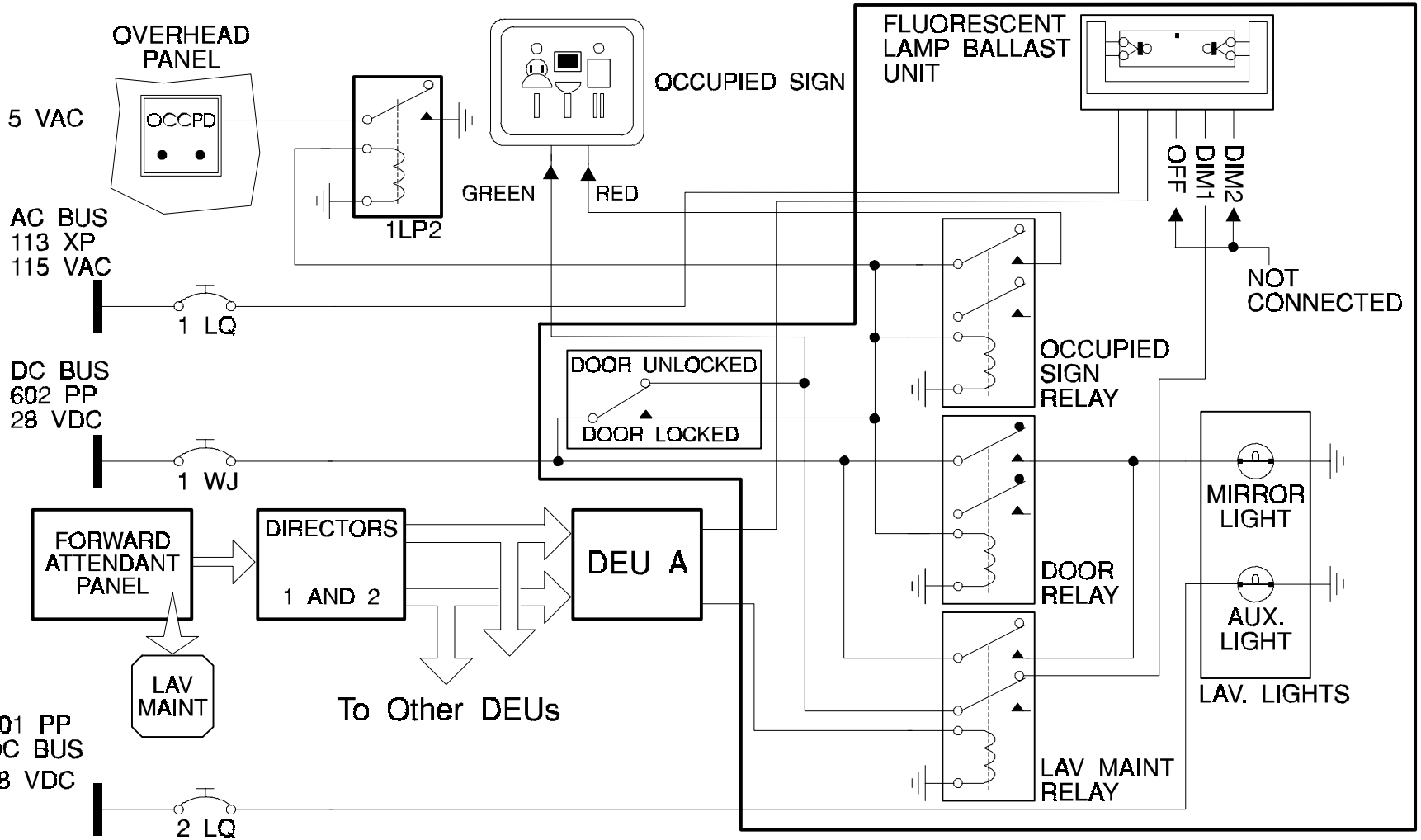
Only the DIM 1 line of the ballast unit is connected to provide 50 % illumination when the door is unlocked.

When the lavatory door is locked, the occupied sign and door relays are energized.

The mirror light and fluorescent lamp come on with full intensity. The related occupied sign comes on red.

An annunciator light on the overhead panel tells the flight crew if the forward lavatory is occupied or not.

When the LAV MAINT pushbutton is pressed, the mirror light and fluorescent lamp come on with full intensity when the door is unlocked.



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STUDENT NOTES:

CABIN LIGHT TEST USING MCDU

General

GENERAL

Each Power Unit has its own Built-In Test Equipment (BITE) function to test its lights.
Before performing the LIGHTS TEST, follow the procedure to obtain the CABIN INTERCOMMUNICATION DATA SYSTEM REPORT/TEST item on the MCDU.

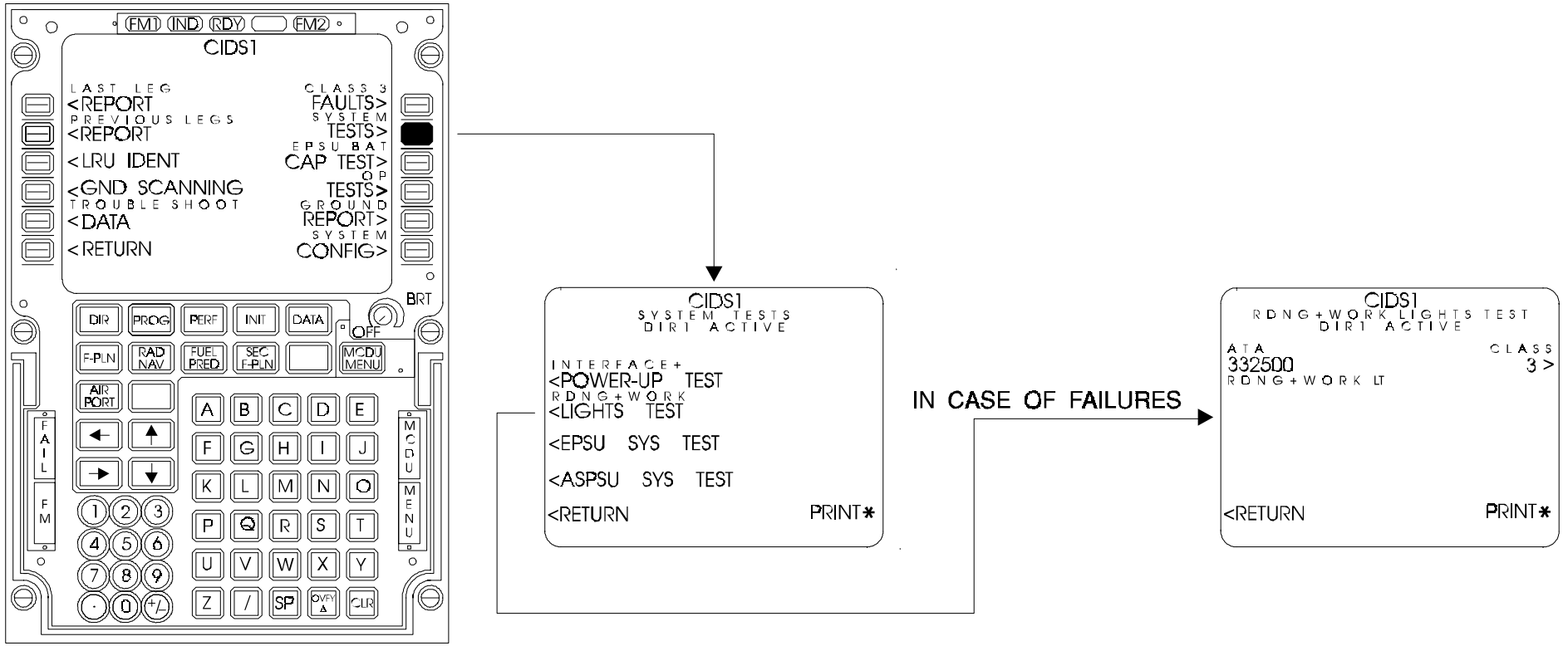
The BITE tests are made through the CABIN INTERCOMMUNICATION DATA SYSTEM and the DECODER ENCODER UNITS.

During the test, each light comes on automatically for a moment and cannot be controlled with the pushbutton switch.

Note : the test can only be performed on ground.

After approximately 5 seconds, the message TEST OK is displayed if no failures are detected.

In case of failure, several messages are possible depending on the failure.



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STUDENT NOTES

CABIN LIGHT COMPONENTS

Fluorescent Lamp Ballast Units
Lavatory Lighting
Lavatory Occupied Signs
Passenger Reading Lights
Cabin Attendant Work Lights

SAFETY PRECAUTIONS

DO NOT TOUCH ANY LAMP GLASS WITH YOUR FINGERS. THE OIL FROM THE SKIN WILL QUICLY CAUSE DETERIORATION OF THE LAMP.

IF YOU ACCIDENTALLY TOUCH THE LAMP GLASS, CLEAN IT WITH A LINT-FREE CLOTH.

STUDENT NOTES

FLUORESCENT LAMP BALLAST UNITS

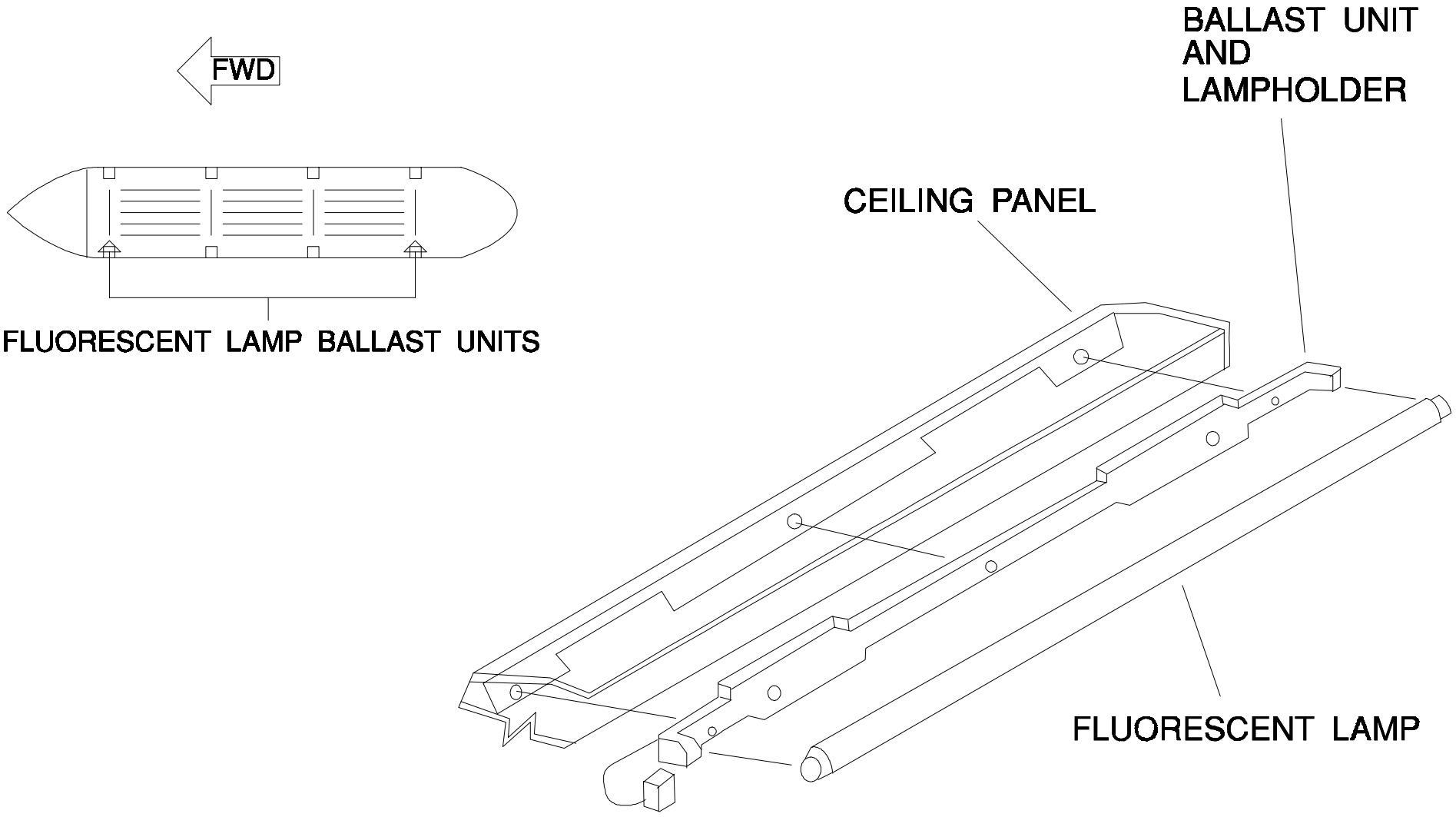
FIN : 1LG to 17LG, 21LG to 53LG, 57LG, 59LG to 82LG, 101LG to 184LG, 330LG to 347LG, 400LG to 403LG

ZONE : 200

COMPONENT DESCRIPTION

Each ballast unit supplies the fluorescent lamp with low voltage power (6 VAC) for the filament heating and with high voltage power (115 VAC) for lamp ignition.

Each ballast unit consists of two Printed Circuit Boards (PCBs) which control the fluorescent lamp power supply and the intensity level.



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LAVATORY LIGHTING

FIN : -

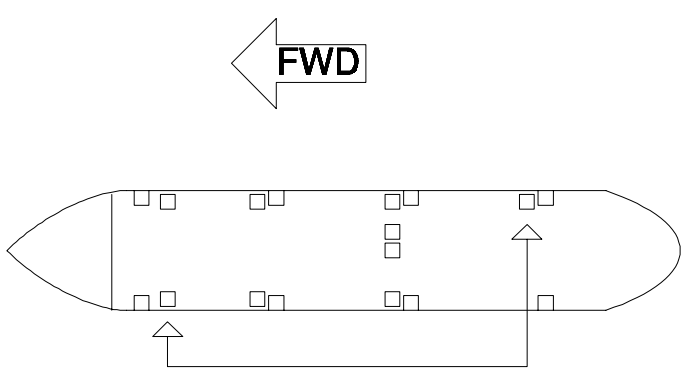
ZONE : 200

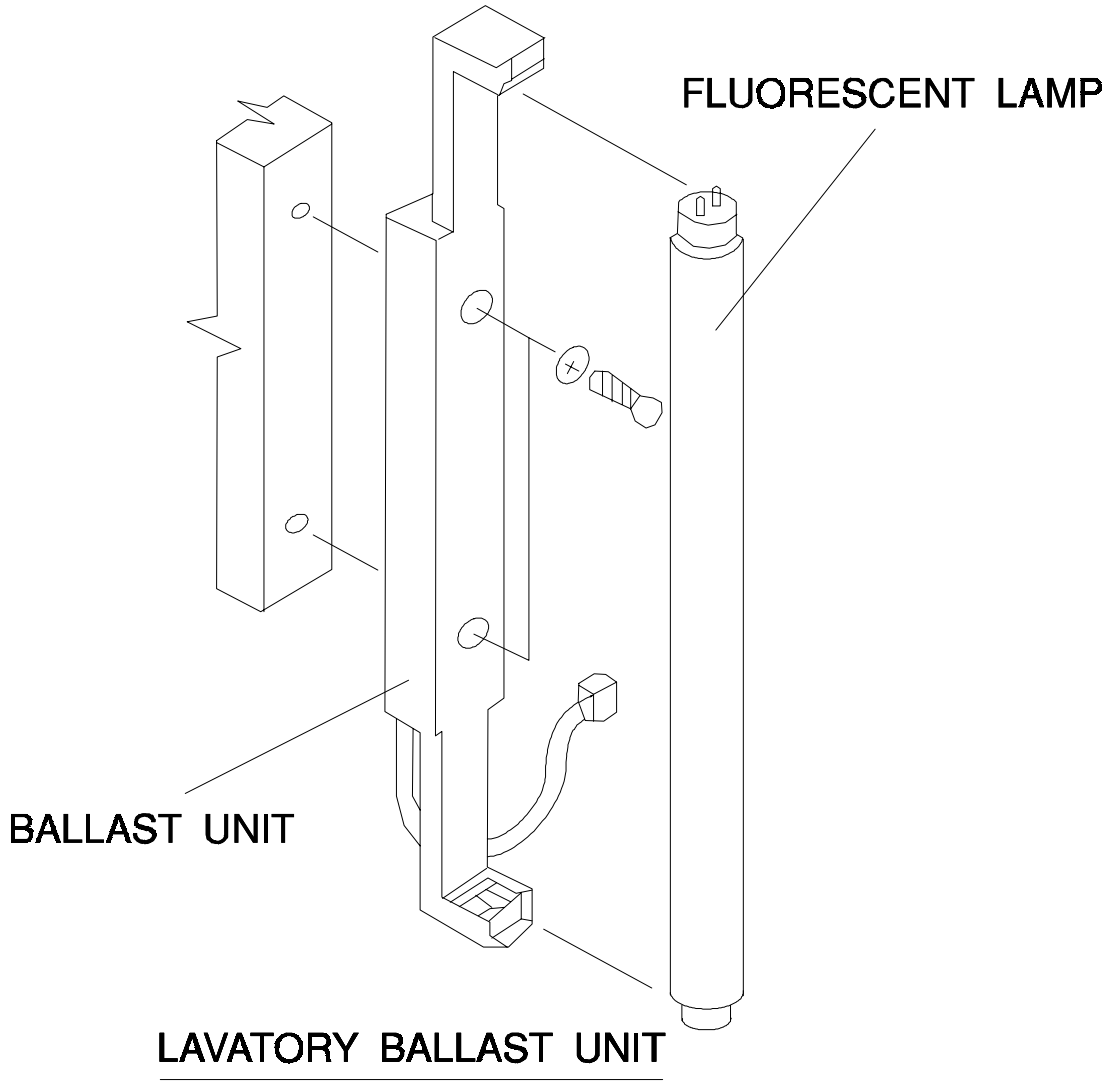
COMPONENT DESCRIPTION

Each lavatory lighting consists of a lamp ballast unit and a mirror light.

Each ballast unit supplies the fluorescent lamp with low voltage power (6 VAC) for the filament heating and with high voltage power (115 VAC)for lamp ignition.

Each ballast unit consists of two Printed Circuit Boards (PCBs) which control the fluorescent lamp power supply and the intensity level.





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LAVATORY OCCUPIED SIGNS

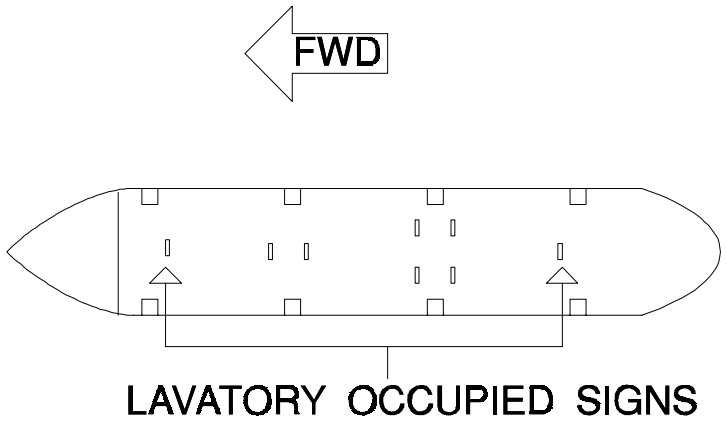
FIN : 50WJ to 62WJ

ZONE : 221, 231, 232, 253, 254, 261, 262, 272, 273

COMPONENT DESCRIPTION

The lavatory occupied sign shows the location of the lavatories and if they are occupied or not.

It is possible to install different lenses on the housing.



Removal / Installation

TBD

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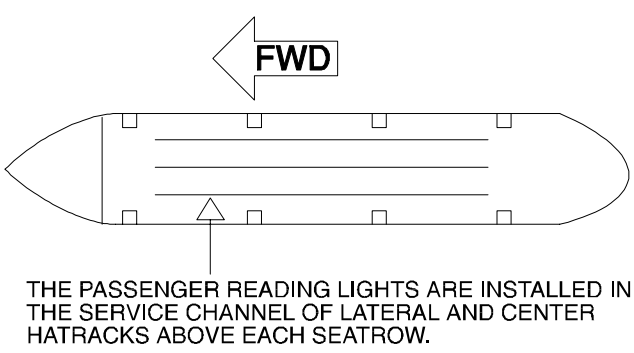
PASSENGER READING LIGHTS

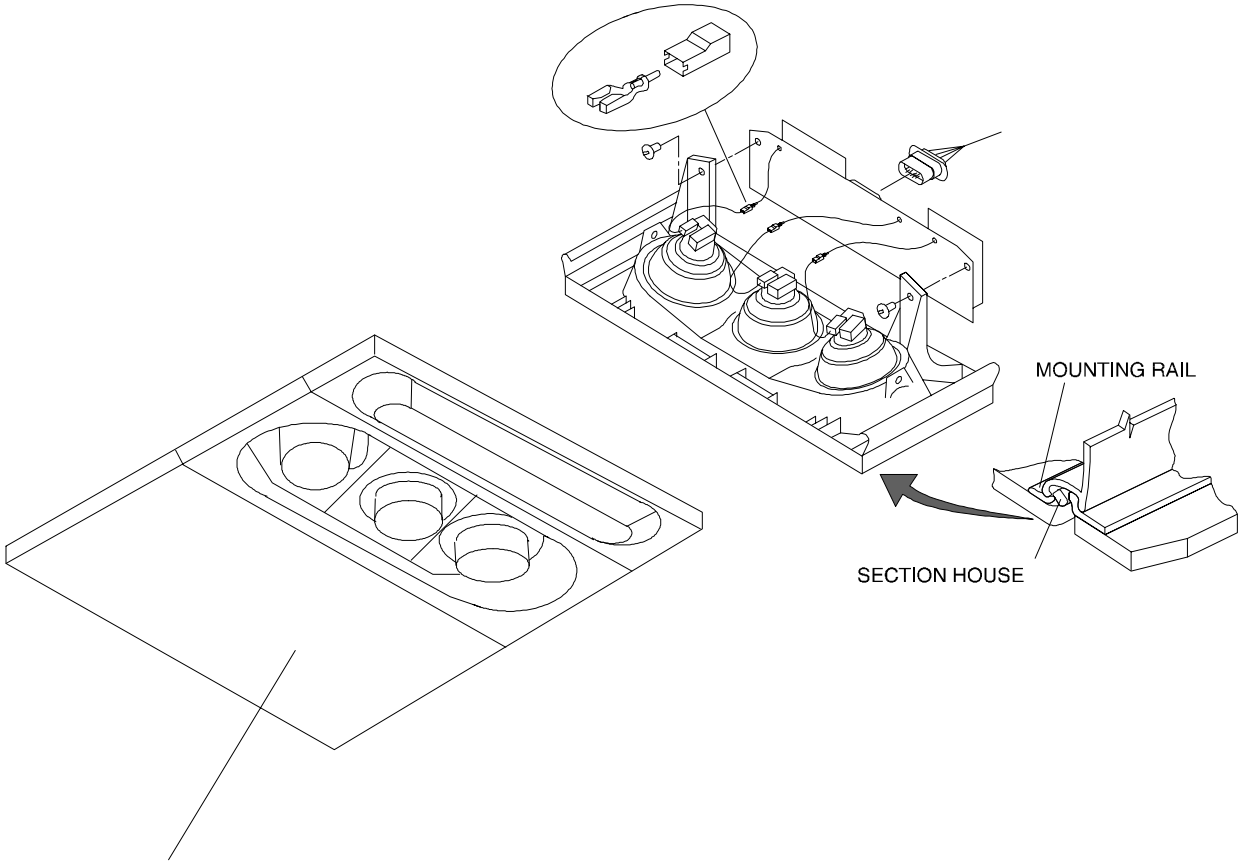
ZONE : 200

COMPONENT DESCRIPTION

Each passenger reading light can be switched ON or OFF with a pushbutton located in the armrest of the related passenger seat.

The voltage of the light is 6 VAC.





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CABIN ATTENDANT WORK LIGHTS

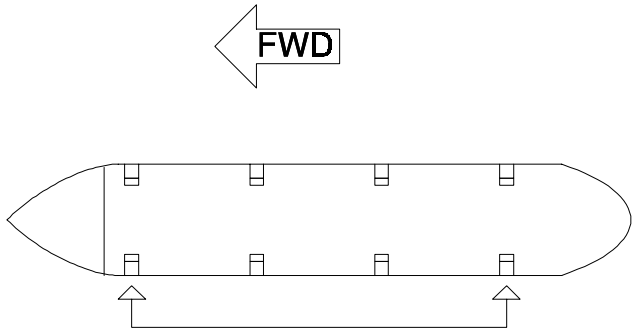
FIN : 20LW to 22LW, 80LW to 82LW

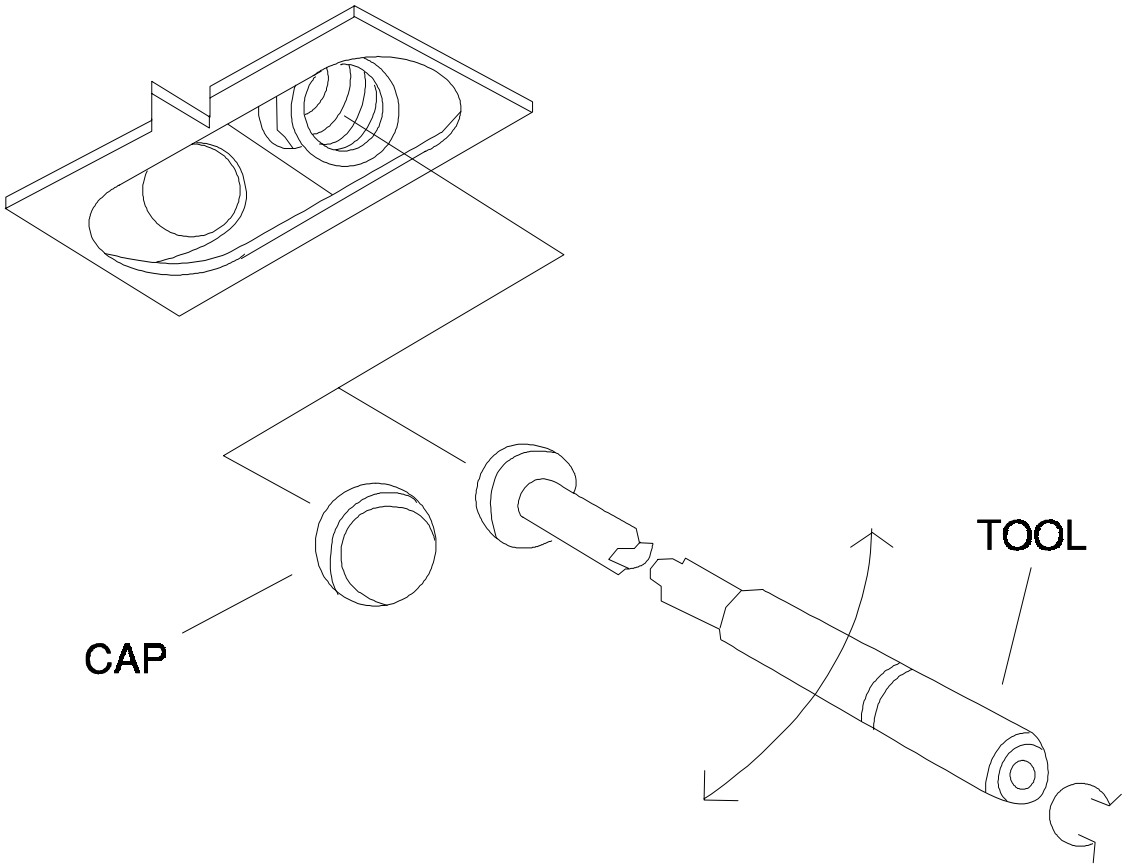
ZONE : 200

COMPONENT DESCRIPTION

Each cabin attendant work light can be switched ON or OFF with an integrated pushbutton located on the attendant work light assembly in the related door.

The voltage of the light is 6 VAC.





FQW4200 GE Metric

STUDENT NOTES

CARGO LIGHT SYSTEM PRESENTATION

General
Service Area Lighting
Air Conditioning Compartment Lighting
Cargo Compartment Lighting
Avionics Compartment Lighting
Wheel Well Lighting

GENERAL

To help servicing and maintenance operations, some of the compartments are equipped with lighting facilities.
The lighting system comprises lamps, fluorescent tubes, control switches and electrical outlets used for portable maintenance lights.

SERVICE AREA LIGHTING

The rear fuselage bay and the APU compartment are equipped with a lighting system.
The service area lighting comprises :

- lights installed in the APU compartment and in the rear fuselage bay
- three 28 VDC outlets provided for portable maintenance lights
- two switches to control the lights in each compartment.

AIR CONDITIONING COMPARTMENT LIGHTING

The air conditioning compartment is provided with a 28 VDC outlet for a portable maintenance light and with two lights controlled by a switch.

CARGO COMPARTMENT LIGHTING

Forward, aft and bulk cargo compartments are lit by fluorescent tubes. Lighting is also available at each loading area.
The fluorescent tubes are installed in the ceilings of the FWD, AFT and BULK cargo compartments. They are controlled by three switches, located close to the doors.
Each loading area light is controlled by a switch, located close to the cargo door. The loading area light is bracket mounted and its direction can be adjusted.

AVIONICS COMPARTMENT LIGHTING

Dome lights provide illumination of the avionics compartment.
Two switches control the dome lights, one is located on the aft panel of the cockpit, the other one close to the avionics compartment door.
One AC and two DC outlets are located in the avionics compartment.

WHEEL WELL LIGHTING

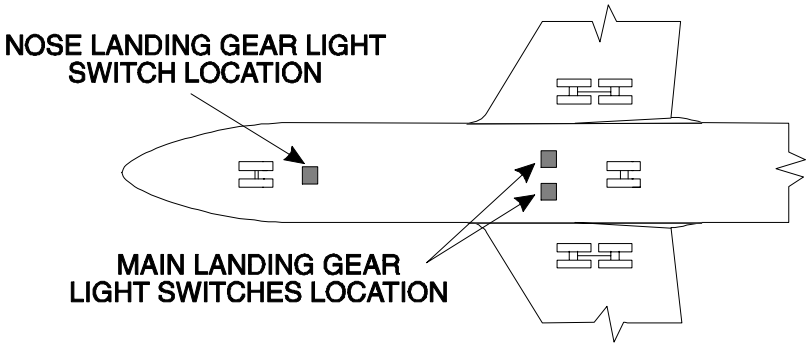
Lighting is available in the nose and main landing gear wells, and in the hydraulic compartment.

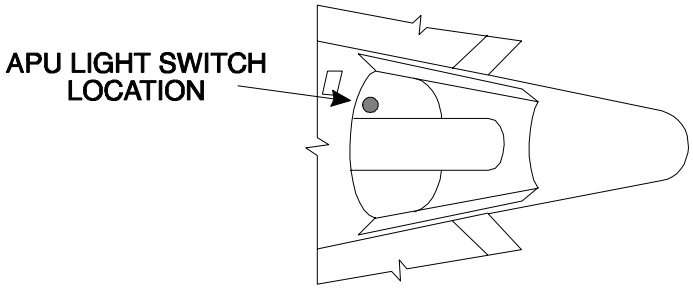
Wheel well lighting consists of :

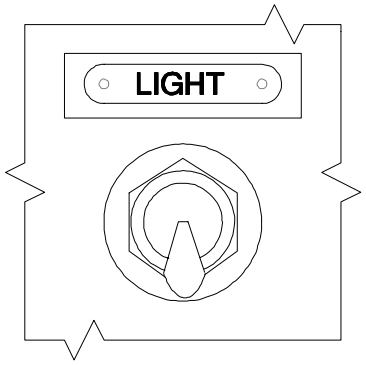
- one light in the nose landing gear wheel well
- four lights, one in each main landing gear wheel well and two in the hydraulic compartment (LH and RH)

- one switch on the external power panel 925VU,
- two switches in the main wheel wells.

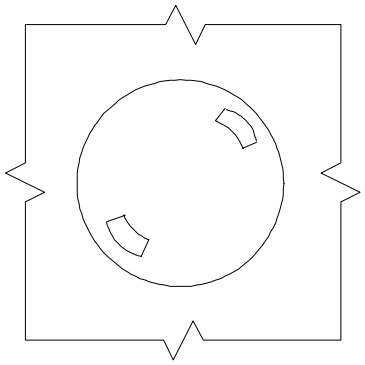
One 28 VDC outlet in the nose landing gear well and two 28 VDC outlets in the hydraulic compartment are also provided.



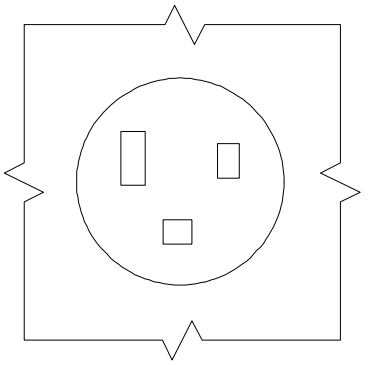




LIGHT SWITCH



28 VDC OUTLET



115 VAC OUTLET

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STUDENT NOTES

CARGO LIGHT COMPONENTS

Cargo Compartment Lights
Service Area Lights
Avionics Compartment Dome Lights
Wheel Well Lights

SAFETY PRECAUTIONS

MAKE SURE THAT THE CIRCUITS IN MAINTENANCE ARE ISOLATED BEFORE YOU SUPPLY ELECTRICAL POWER TO THE AIRCRAFT.

MAKE SURE THAT THE SAFETY DEVICES AND THE WARNING NOTICES ARE IN POSITION BEFORE YOU START A TASK NEAR :

- THE FLIGHT CONTROLS
- THE FLIGHT CONTROL SURFACES
- THE LANDING GEAR AND THE RELATED DOORS
- COMPONENTS THAT MOVE.

MOVEMENT OF COMPONENTS CAN KILL OR INJURE PERSONS.

DO NOT TOUCH A LAMP WITH YOUR FINGERS. THE OILS FROM YOUR SKIN WILL QUICKLY CAUSE DETERIORATION OF THE LAMP.

IF YOU ACCIDENTALLY TOUCH A LAMP GLASS, CLEAN IT WITH A LINT-FREE CLOTH.

STUDENT NOTES

CARGO COMPARTMENT LIGHTS

FIN : 8LU1 to 8LU12

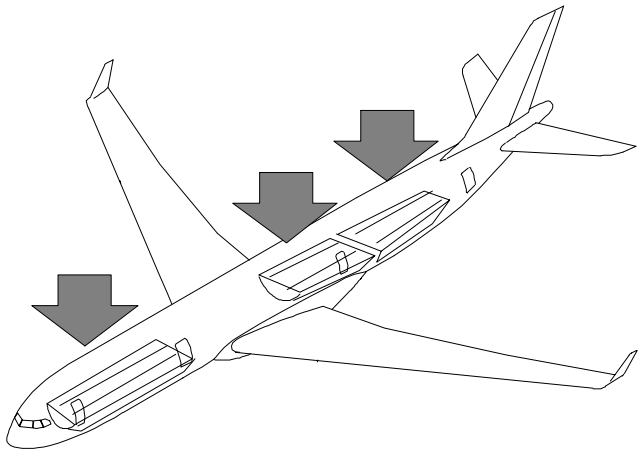
ZONE : 132, 152, 162

COMPONENT DESCRIPTION

Each cargo compartment light consists of :

- a housing
- two ballast units and lampholders
- two fluorescent lamps
- a cover.

The cargo compartment lights are designed to enable easy removal and installation of the ballast unit and lampholder and/or fluorescent lamps.



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SERVICE AREA LIGHTS

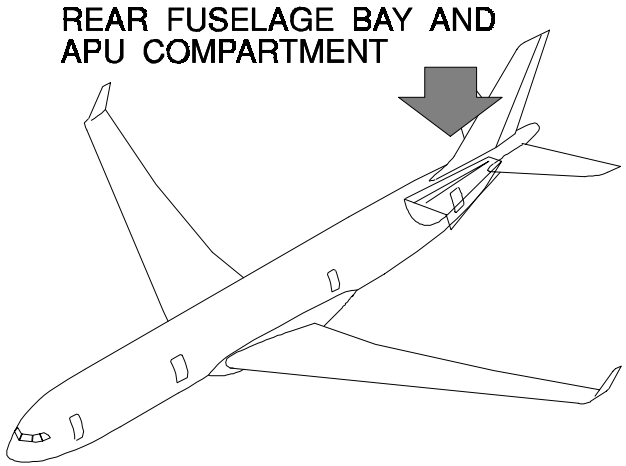
FIN : 5LJ to 9LJ

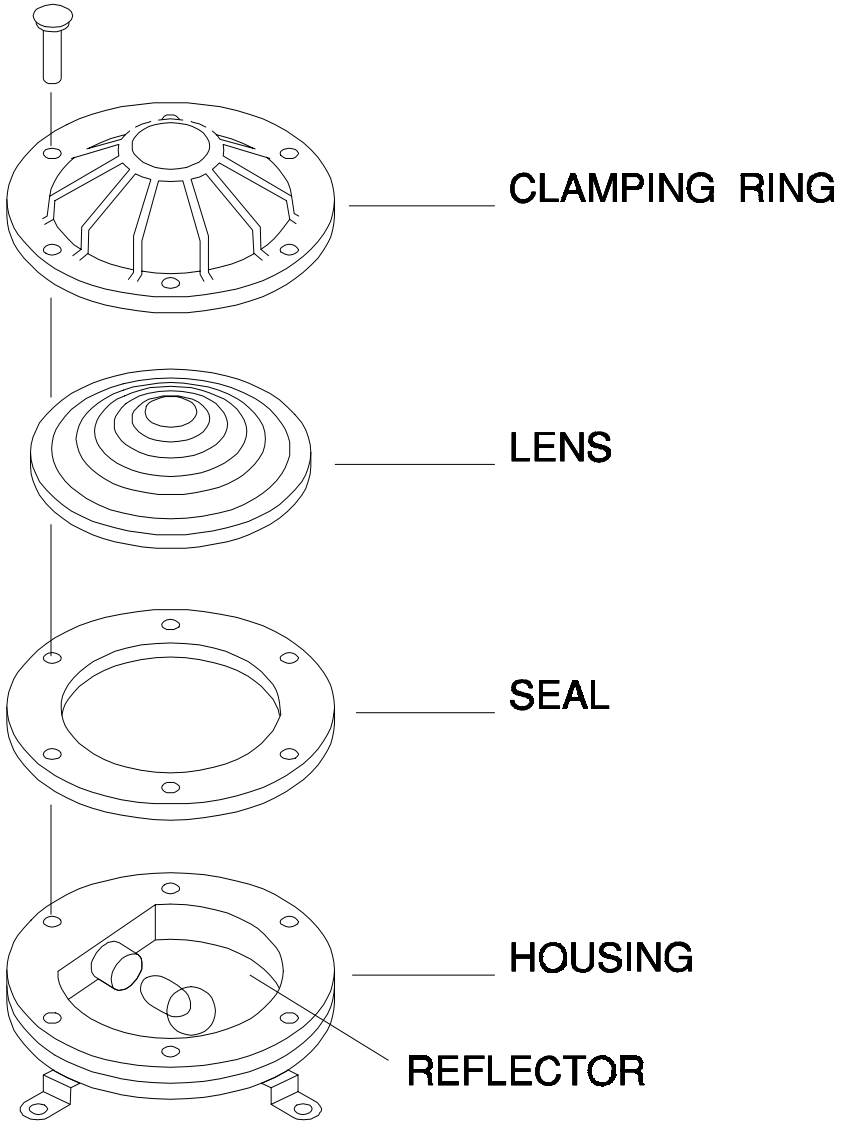
ZONE : 311, 312, 315

COMPONENT DESCRIPTION

Each Service Area Light consists of :

- a housing
- a lens
- a seal
- a clamping ring
- a reflector
- a bulb.





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AVIONICS COMPARTMENT DOME LIGHTS

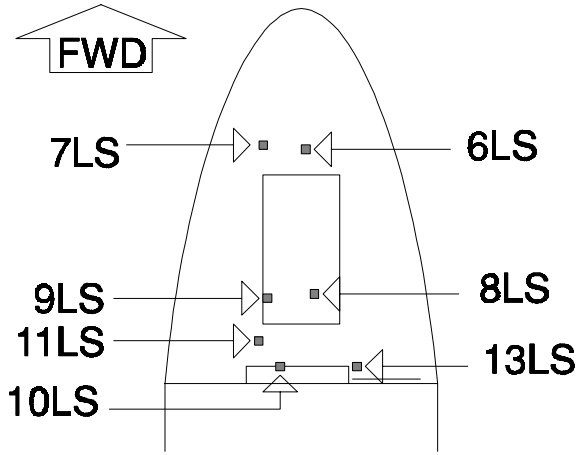
FIN : 6LS to 11LS, 13LS

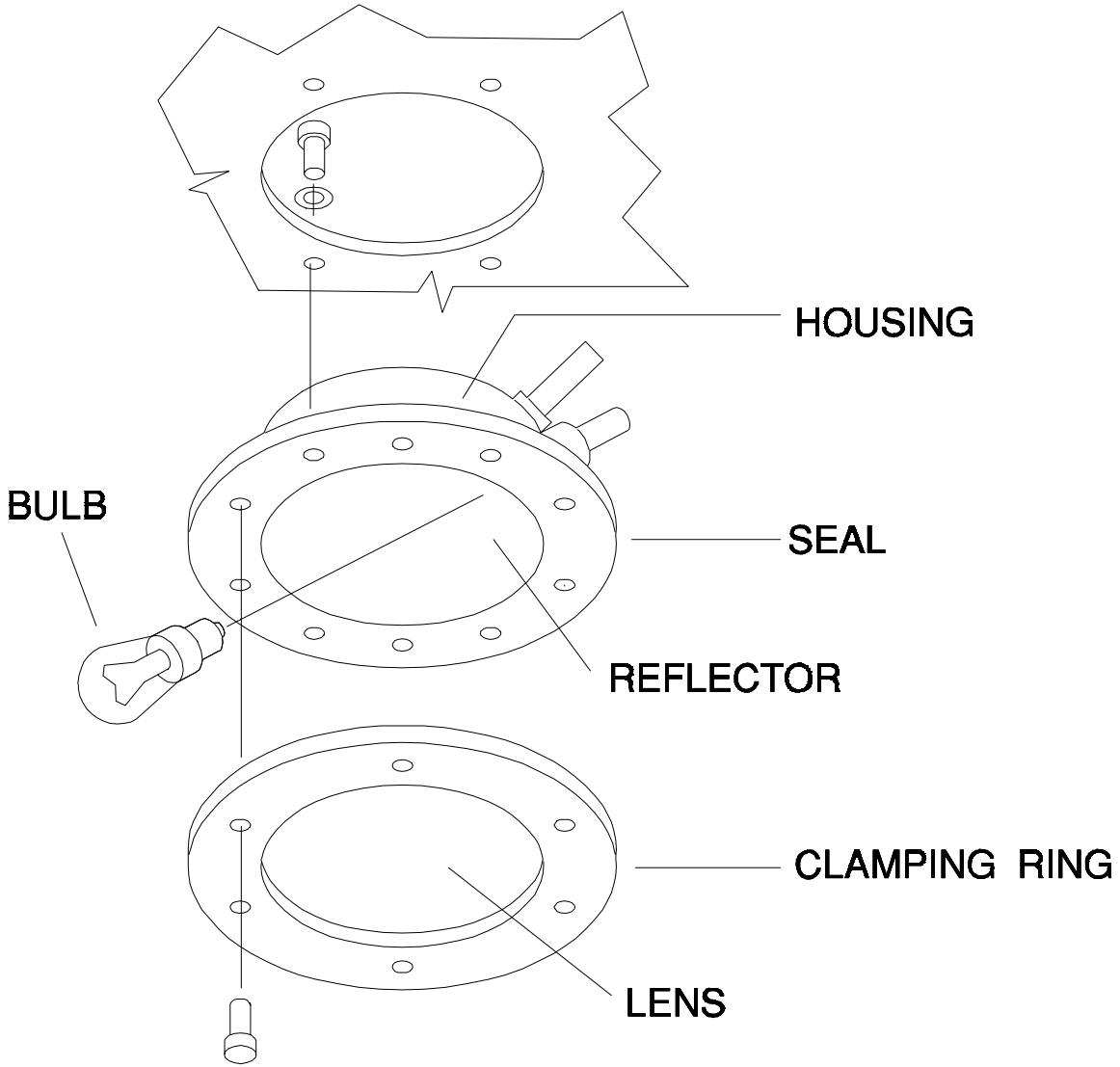
ZONE : 120, 121, 122

COMPONENT DESCRIPTION

Each Dome Light consists of :

- a housing
- a lens
- a seal
- a clamping ring
- a reflector
- a bulb.





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WHEEL WELL LIGHTS

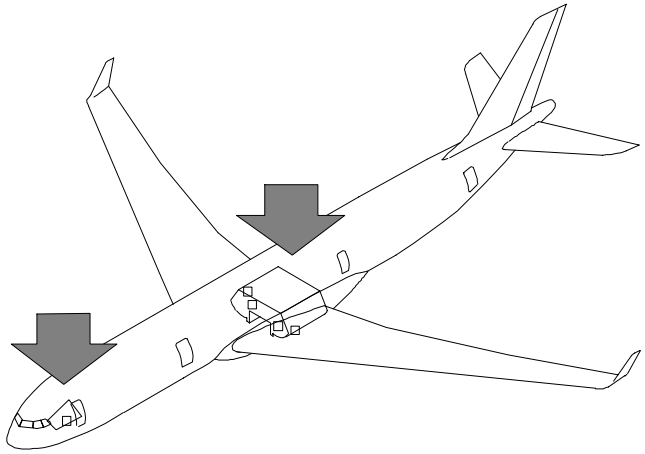
FIN : 5LL, 11LL1, 11LL2, 13LL1, 13LL2

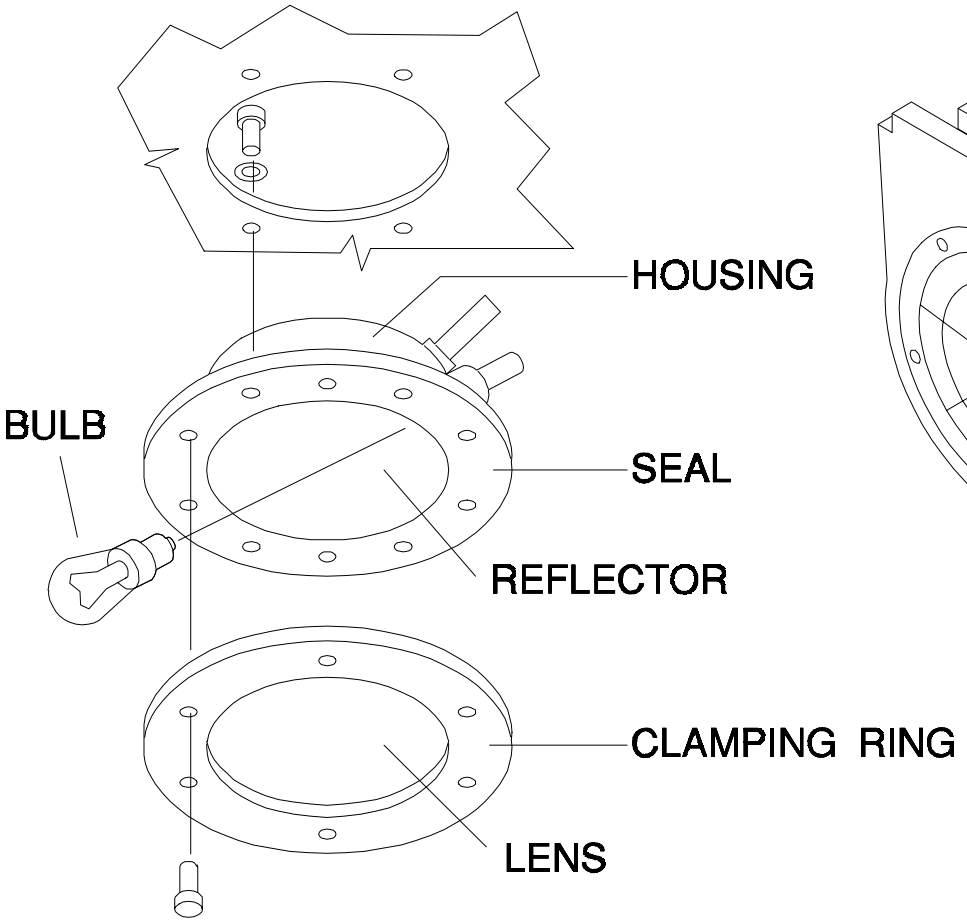
ZONE : 123, 195, 196, 147, 148

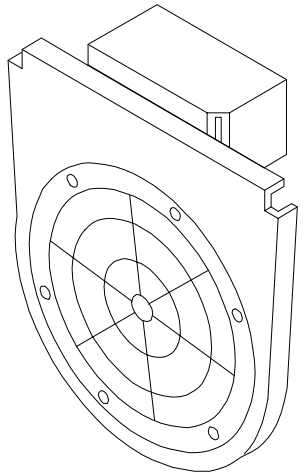
COMPONENT DESCRIPTION

Each Wheel Well Light consists of :

- a housing
- a lens
- a seal
- a clamping ring
- a reflector
- a bulb.







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STUDENT NOTES

EXTERIOR LIGHT SYSTEM PRESENTATION

General
Anti-Collision Strobe Lights
Anti-Collision Beacon Lights
Runway Turn-Off Lights
Landing Lights
Take-Off and Taxi Lights
Wing and Engine Scan Lights
Navigation Lights
Logo Lights

GENERAL

The exterior lighting system fulfils various functions :
- illuminating the runway and taxiway
- illuminating the wing leading edges and engine air intakes
- indicating the aircraft position and direction
- reducing collision risk in flight and on ground.

ANTI-COLLISION STROBE LIGHTS

Two white flashing strobe lights are installed in each wing tip leading edge and one in the tailcone, facing rearward.

They are controlled by the STROBE selector :

ON : Strobe lights flash

AUTO : Strobe lights flash only if the shock absorbers are not compressed

OFF : Strobe lights are off.

When anticollision strobe lights and anticollision beacon lights flash, a timing system controls them in order to flash alternately in a synchronized fashion.

ANTI-COLLISION BEACON LIGHTS

Two red flashing anticollision beacon lights are installed: one on the lower and one on the upper fuselage at the aircraft center line.
They are controlled by the BEACON switch.

RUNWAY TURN-OFF LIGHTS

Two fixed position runway turn off lights illuminate the lateral areas of the runway. They are installed on the nose landing gear.
The lights are controlled by the RWY TURN-OFF switch :

ON : Both lights are on, only if the nose landing gear is downlocked

OFF : Both lights are off.

LANDING LIGHTS

A fixed landing light is installed on each wing.
They are controlled by the LAND switch.

TAKE-OFF AND TAXI LIGHTS

Two take-off and taxi lights are installed on the nose landing gear in a fixed position.

They are controlled by the NOSE selector :

T.O. : Taxi and Take-Off lights are on

TAXI : Taxi lights are on

OFF : All lights are off.

All lights go off automatically when the landing gear is retracted.

WING AND ENGINE SCAN LIGHTS

Two fixed position wing and engine scan lights are installed on each side of the fuselage to enable the flight crew to visually detect ice on engine air intakes and leading edges.
The lights are controlled by the WING switch.

NAVIGATION LIGHTS

The navigation lights give an external visual indication of the position of the aircraft and its direction of flight.

The navigation lights system consists of 2 sets of 3 lights.
It is controlled by the NAV & LOGO switch :

2 : The second set is supplied

1 : The first set is supplied

OFF : The navigation lights are off.

The navigation lights can also be supplied from the tractor for towing.

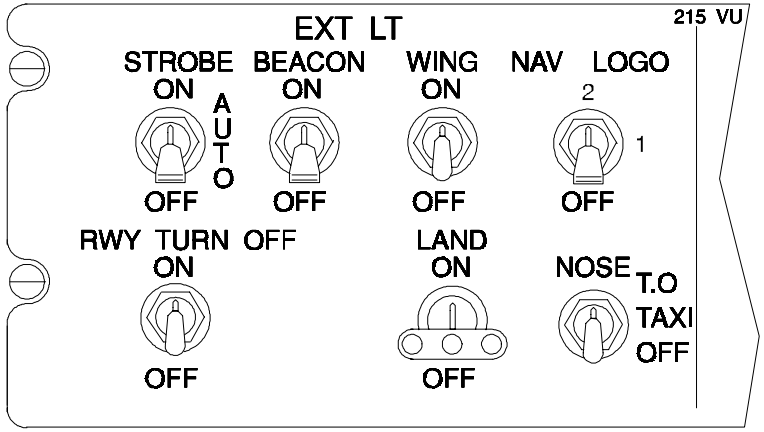
LOGO LIGHTS

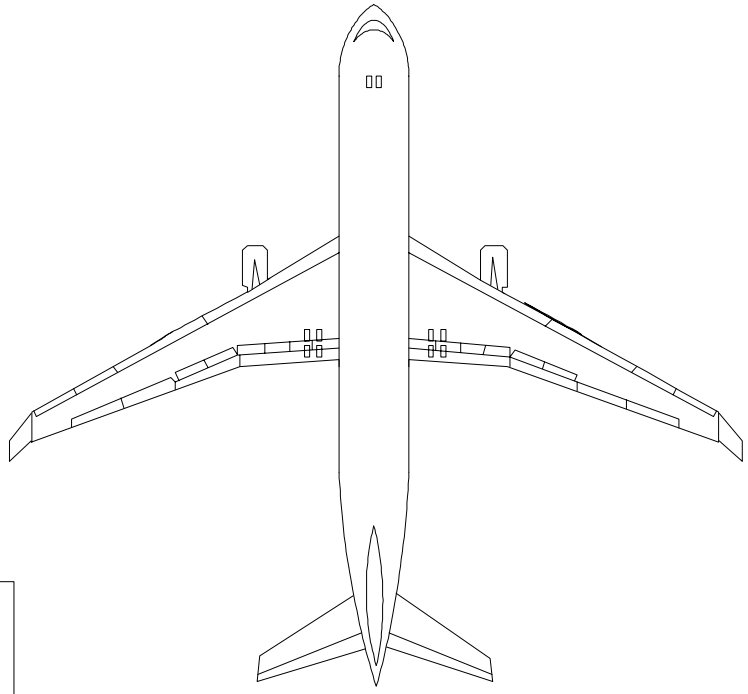
Two lights are installed on the horizontal stabilizer to illuminate the company logo.

They are controlled by the NAV & LOGO switch :

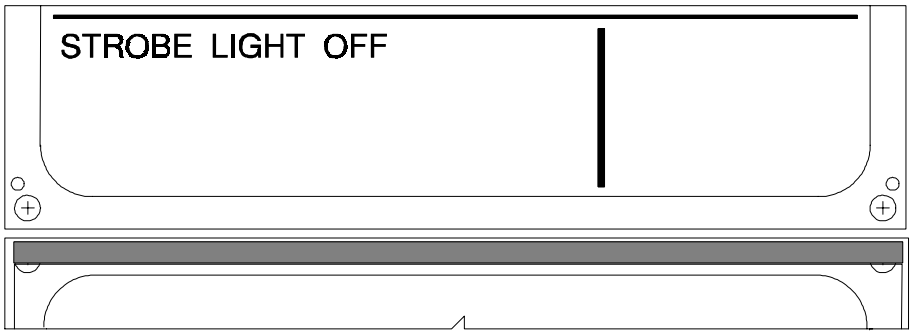
1 or 2 : The logo lights are on, only if the landing gear is compressed or flaps are extended at 15 degrees or more

OFF : The logo lights are off.





If the strobe lights are OFF during the cruise phase, a memo is displayed on the Engine Warning Display.



FQW4200 GE Metric

STUDENT NOTES:

EXTERIOR LIGHTS SYSTEM DESCRIPTION

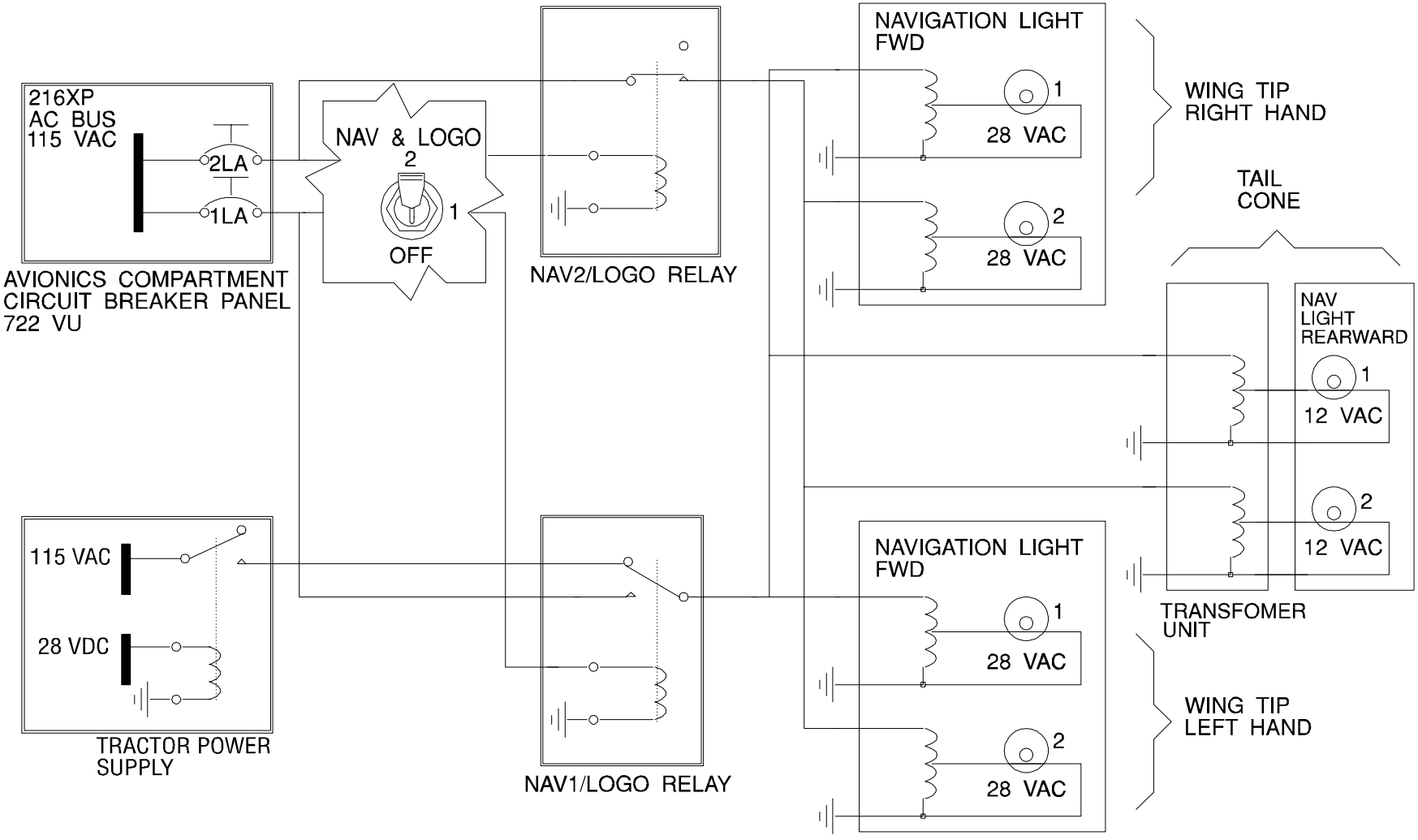
General
Navigation Lights
Landing Lights
Runway Turn Off Lights
Taxi and Take Off Lights
Logo Lights
Beacon and Strobe Lights.
Wing and Engine Scan Lights

GENERAL

All the circuit breakers for the Exterior Lighting System are installed on a circuit breaker panel in the avionics compartment.

NAVIGATION LIGHTS

Each Navigation Light has two low voltage quartz lamps and two transformers.



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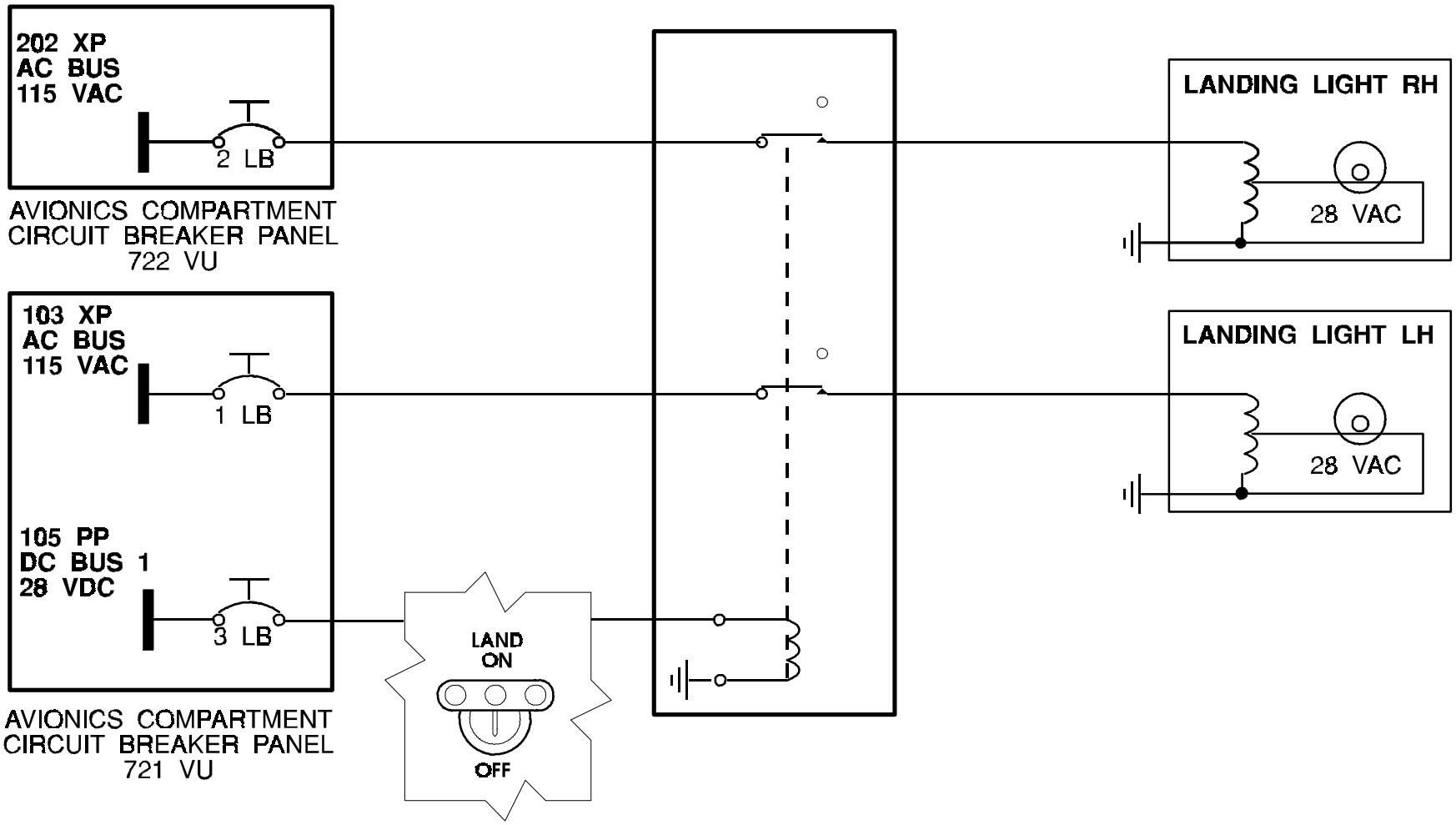
LANDING LIGHTS

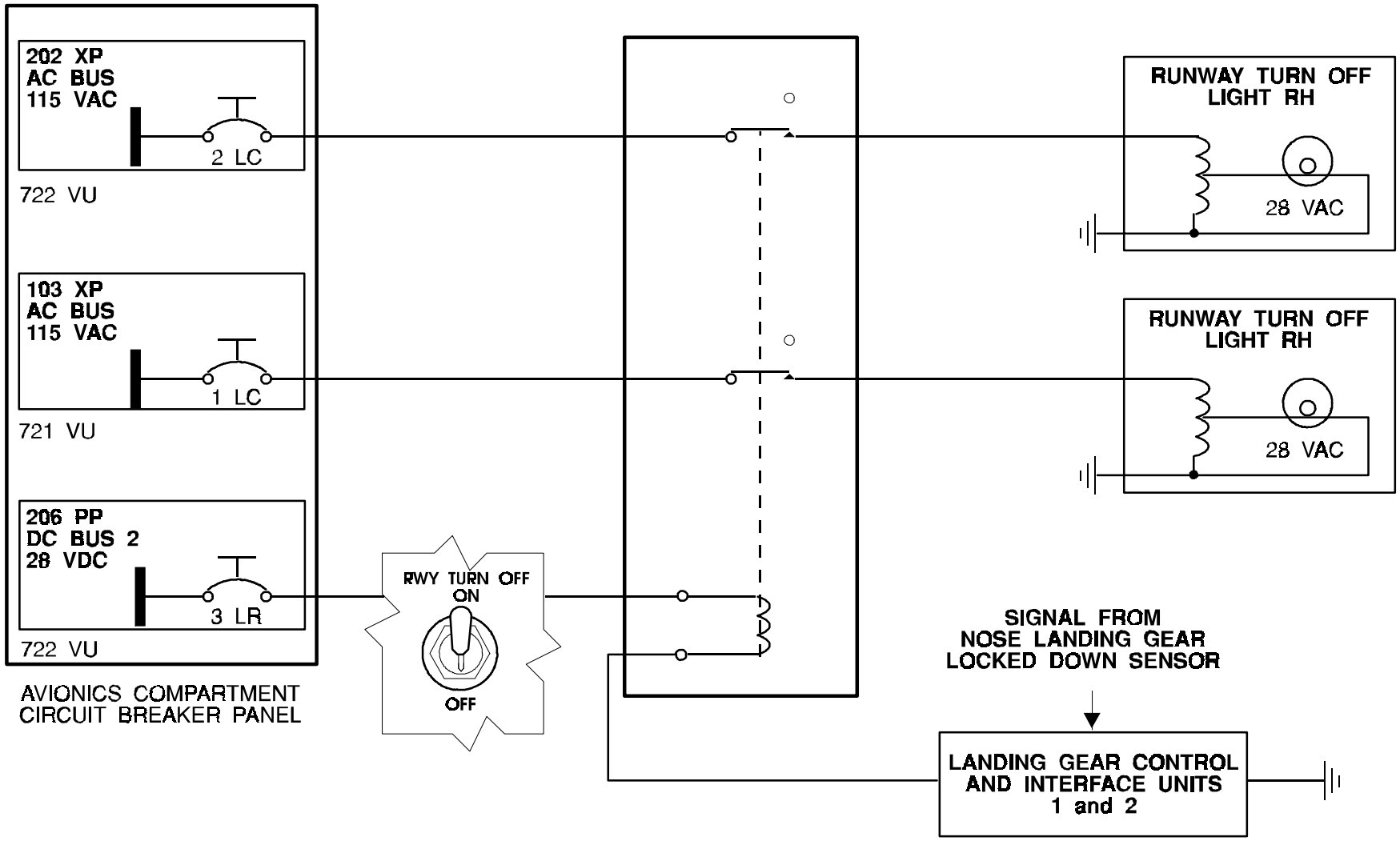
Each Landing Light contains a step-down transformer.



FQW4200 GE Metric

RUNWAY TURN OFF LIGHTS

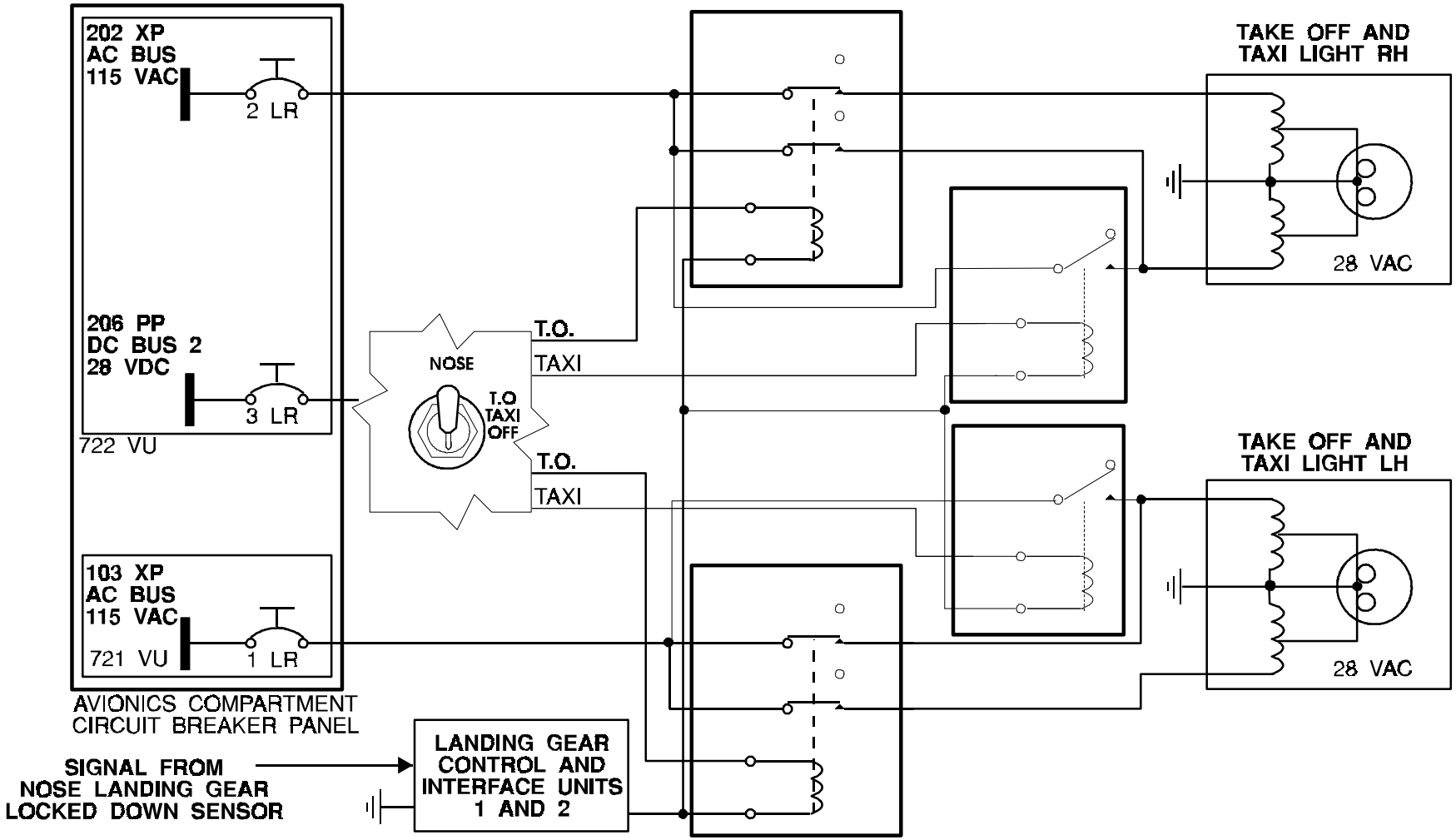
The LANDING GEAR CONTROL and INTERFACE UNITS 1 and 2 provide a ground signal to the relay when landing gear is extended.



FQW4200 GE Metric

TAXI AND TAKE OFF LIGHTS

The LANDING GEAR CONTROL and INTERFACE UNITS 1 and 2 provide a ground signal to the relays when landing gear is extended.



FQW4200 GE Metric

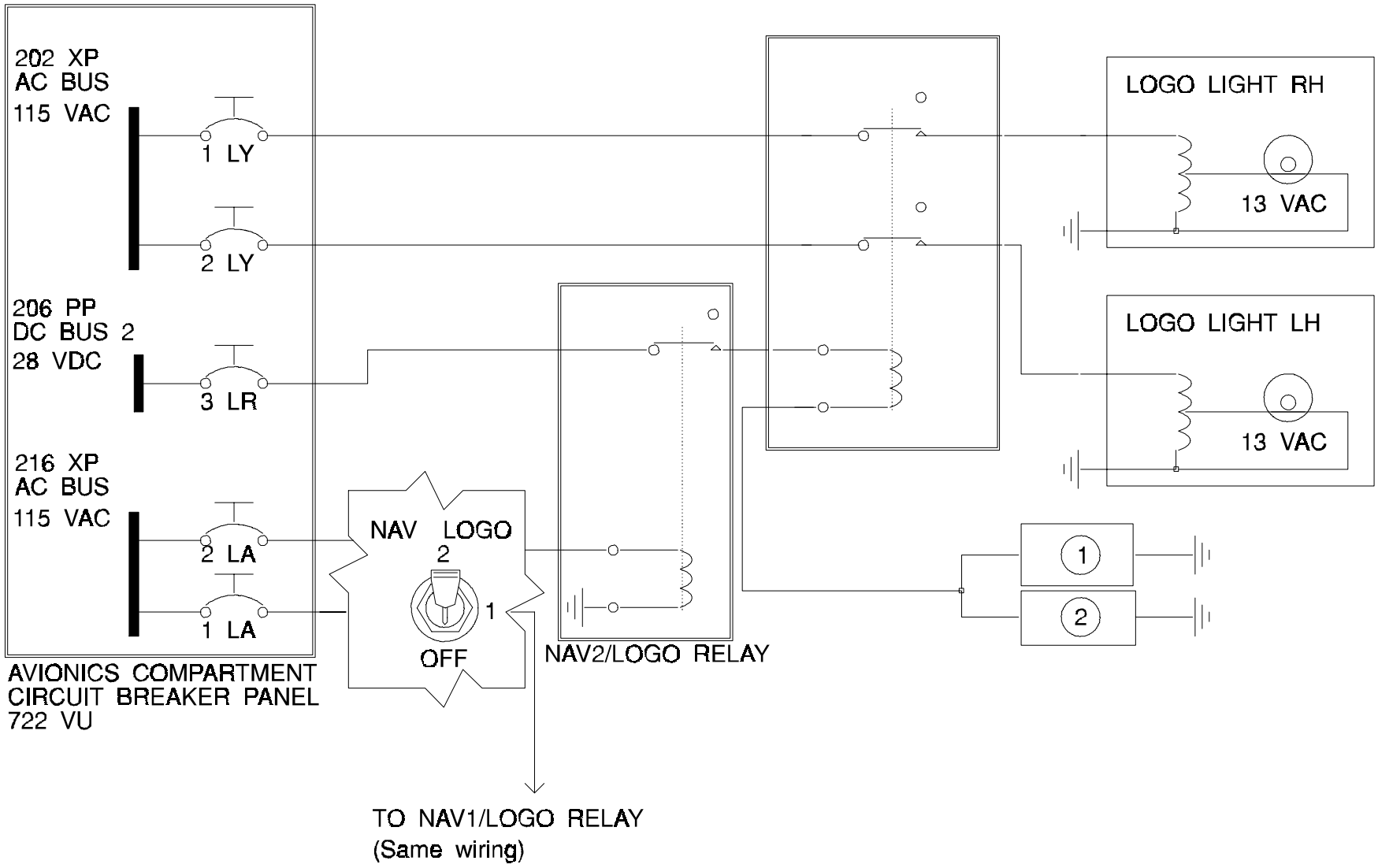
LOGO LIGHTS

The LOGO Lights come on automatically, when the NAV and LOGO switch is in the position 1 or 2 during these phases :

- taxiing,
- take off,
- landing.

The SLATS FLAPS CONTROL COMPUTERS 1 and 2 provide a ground signal when the flaps are lowered to 15 degrees or more.
The LANDING GEAR CONTROL and INTERFACE UNIT 2 provides a ground signal when the landing gear struts are compressed.

1. Slats Flaps Control Computers 1 and 2
2. Landing Gear Control and Interface Unit 2

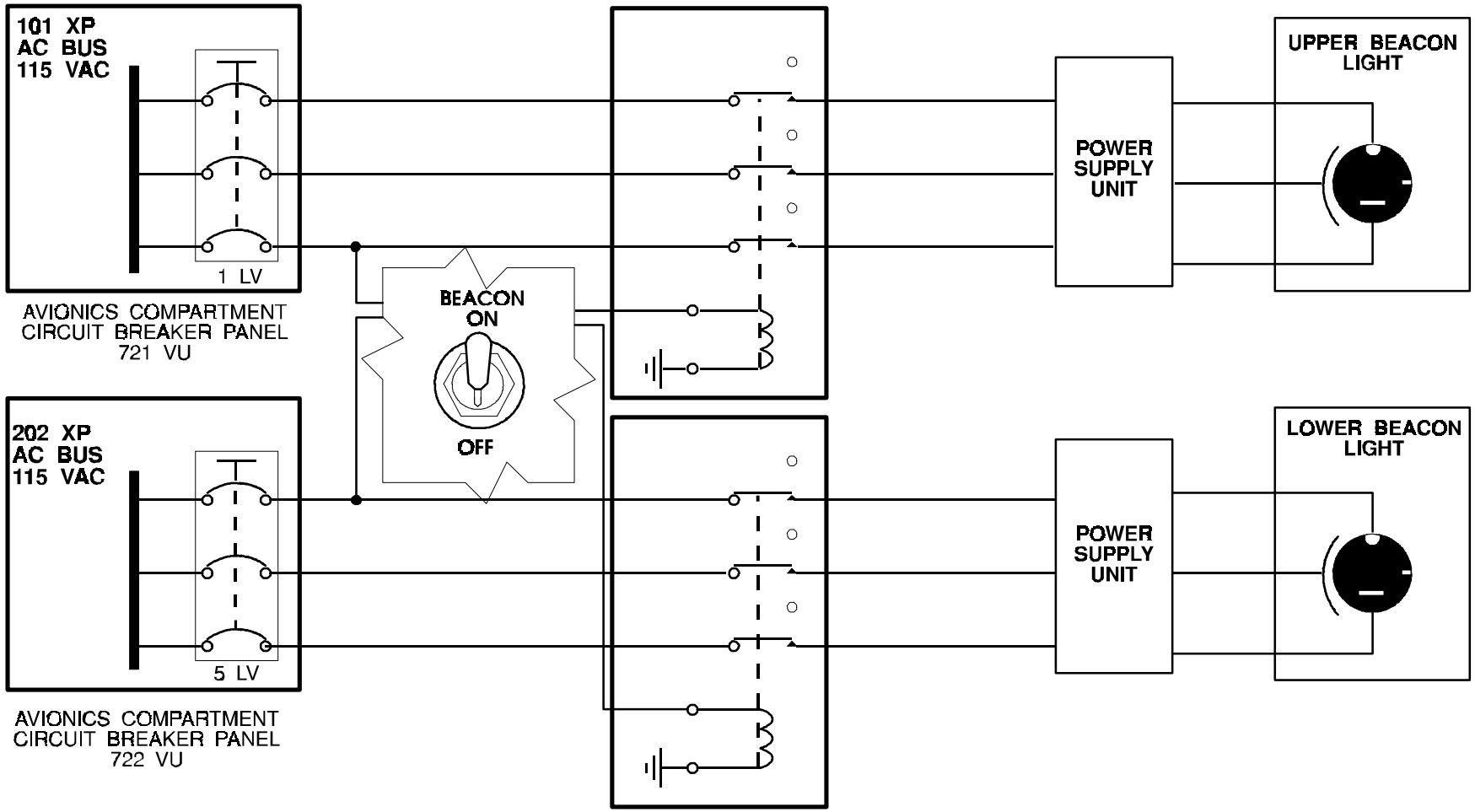


FQW4200 GE Metric

BEACON AND STROBE LIGHTS

There is no automatic control of the beacon lights.

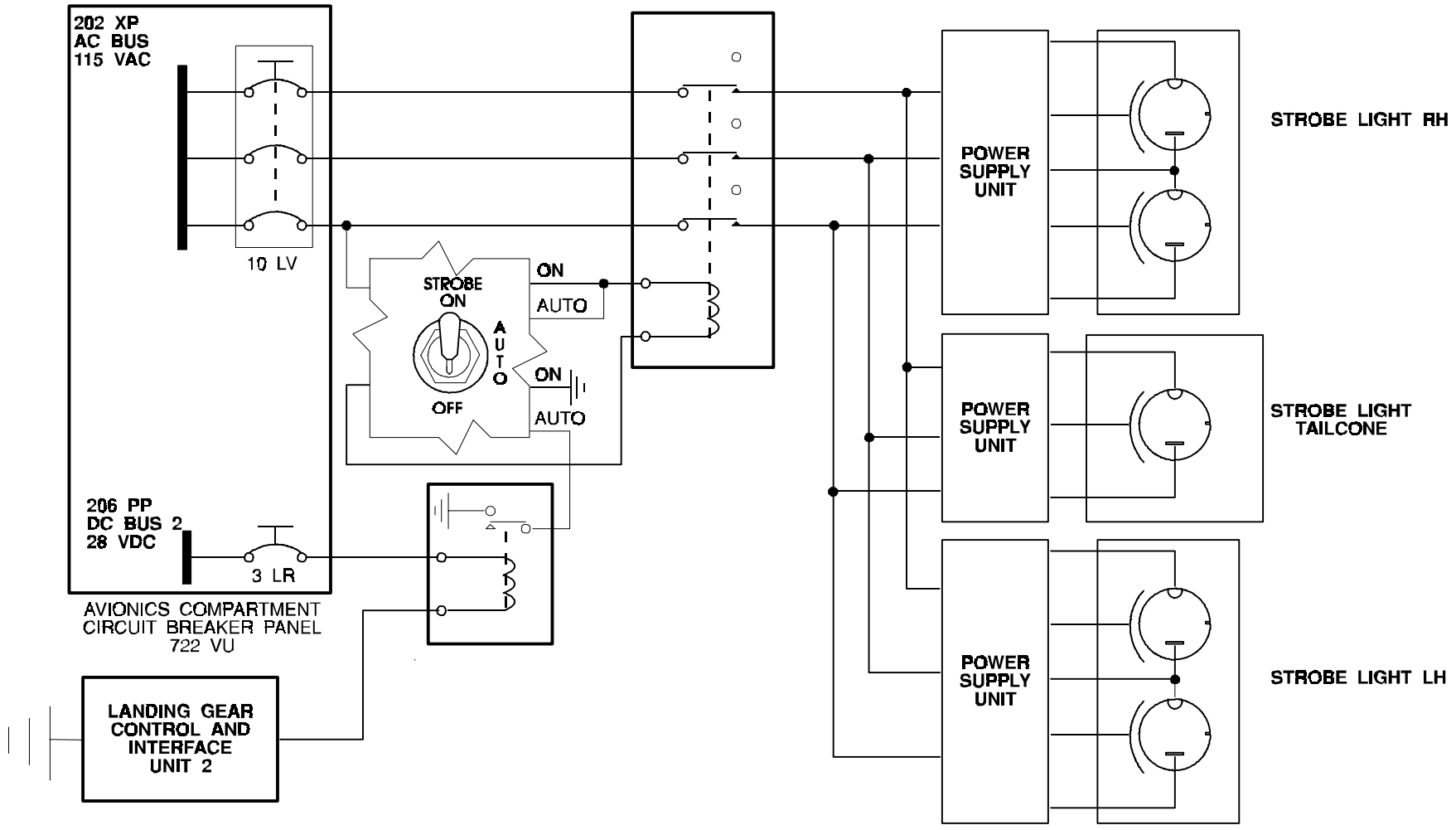
The Beacon Lights flash at a rate of 60 +/- 10 flashes per minute.



FQW4200 GE Metric

A ground signal from the LANDING GEAR CONTROL and INTERFACE UNIT 2 is sent to the relay when the main landing gear struts are compressed.

The Strobe Lights flash at a rate of 60 +/- 10 flashes per minute.

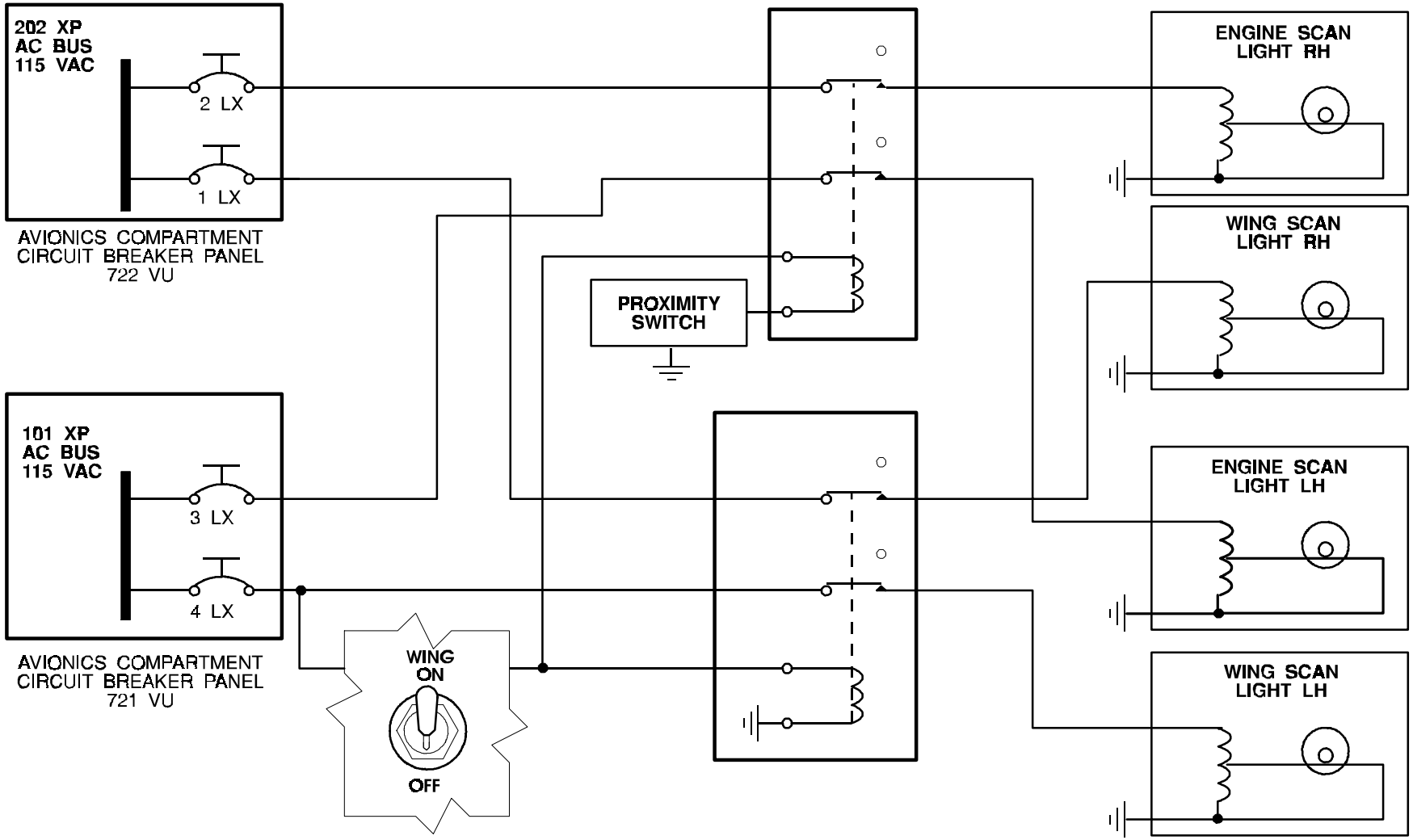


FQW4200 GE Metric

WING AND ENGINE SCAN LIGHTS

The Wing and Engine Scan Lights can be switched ON, on ground for maintenance purposes, for a maximum of two hours of continuous operation.

When the right hand and left hand mid passenger doors are open, the Engine Scan Lights do not operate to avoid door contact with the hot beam of the light.
This is performed by the door proximity switch.



FQW4200 GE Metric

STUDENT NOTES:

EXTERIOR LIGHT COMPONENTS

Strobe and Beacon Light Power Units
Beacon Lights
Strobe Lights
Runway Turn-Off Lights
Landing Lights
Take-Off and Taxi Lights
Wing and Engine Scan Lights
Navigation Lights
Logo Lights

SAFETY PRECAUTIONS

DO NOT REMOVE A FLASHING LIGHT FOR AT LEAST TEN MINUTES AFTER DE-ENERGIZING THE ELECTRICAL CIRCUITS. THE HIGH VOLTAGE ELECTRICAL CURRENT IN THE CAPACITOR OF THE LIGHT IS DANGEROUS.

DO NOT LOOK DIRECTLY AT A FLASHING LIGHT DURING ITS TEST. THE FLASH CAN BLIND YOU. SUPPLY A COVER, OR SHIELD, TO GIVE PROTECTION FROM THE LIGHT FLASH TO PERSONS IN THE TEST AREA.

USE SOLVENTS/CLEANING AGENTS, SEALANTS AND OTHER SPECIAL MATERIALS ONLY WITH A GOOD FLOW OF AIR THROUGH THE WORK AREA. THESE MATERIALS ARE POISONNOUS, FLAMMABLE AND SKIN IRRITANTS. OBEY THE MANUFACTURERS INSTRUCTIONS. PUT ON PROTECTIVE CLOTHING. DO NOT GET THEM IN YOUR MOUTH. DO NOT SMOKE. DO NOT BREATHE THE GAS. GET MEDICAL HELP IF YOUR SKIN OR EYES BECOME IRRITATED.

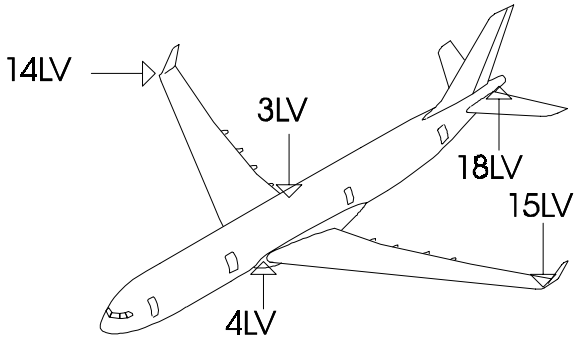
DO NOT TOUCH THE LAMP GLASSES WITH YOUR FINGERS.
THE OIL FROM YOUR SKIN WILL QUICKLY CAUSE DETERIORATION OF THE LAMP. IF YOU ACCIDENTALLY TOUCH A LAMP GLASS, CLEAN IT WITH A LINT-FREE CLOTH.

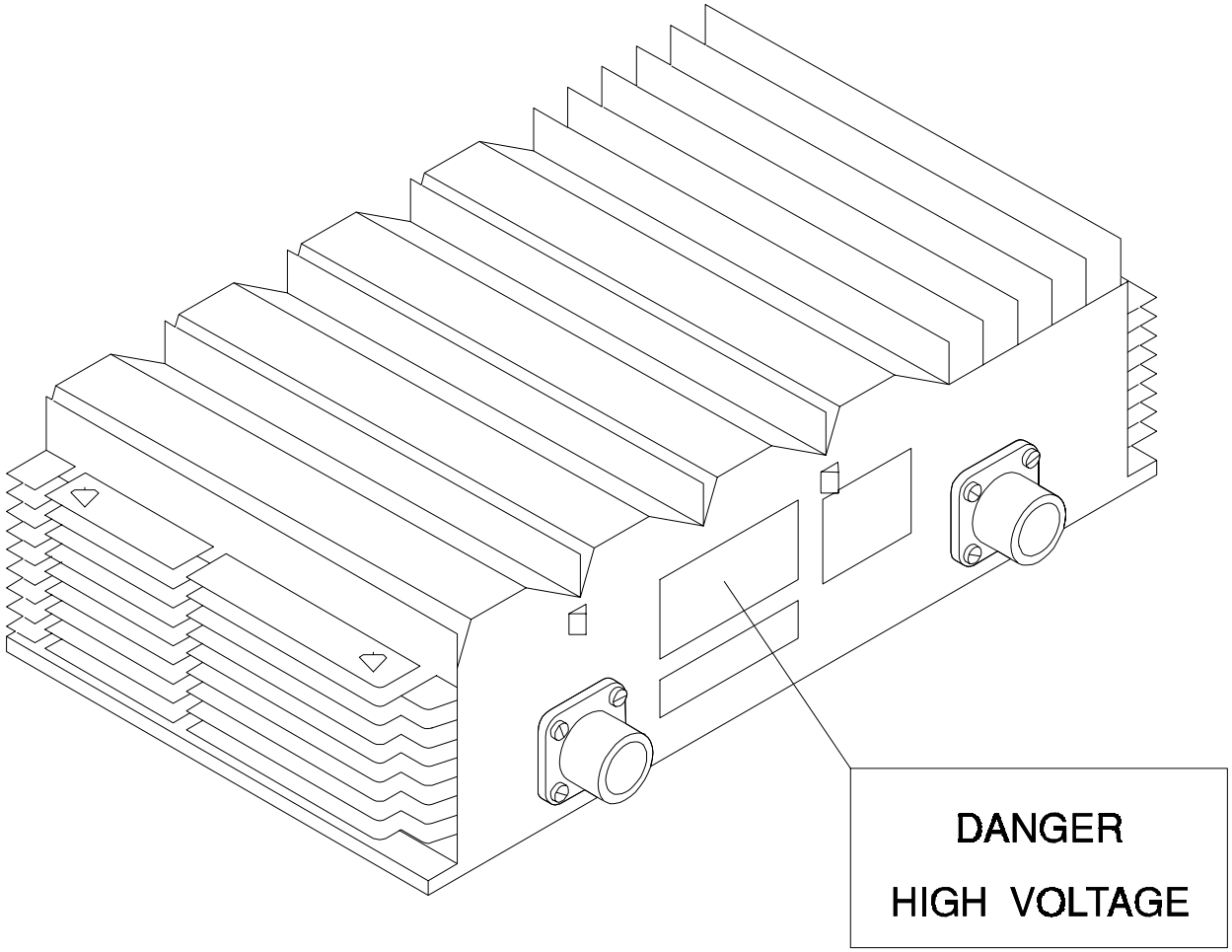
STUDENT NOTES

STROBE AND BEACON LIGHT POWER UNITS

FIN : 3LV, 4LV, 14LV, 15LV, 18LV

ZONE : 240, 140, 675, 575, 313





FQW4200 GE Metric

BEACON LIGHTS

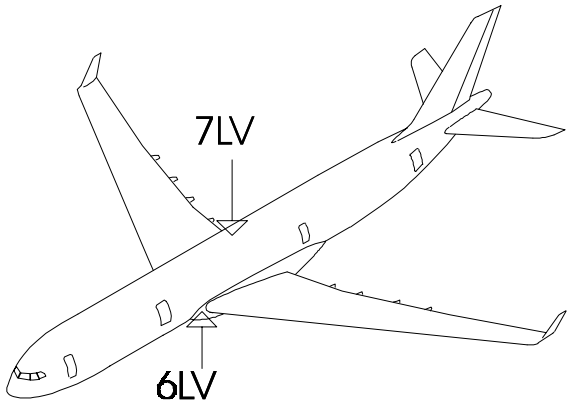
FIN : 6LV, 7LV

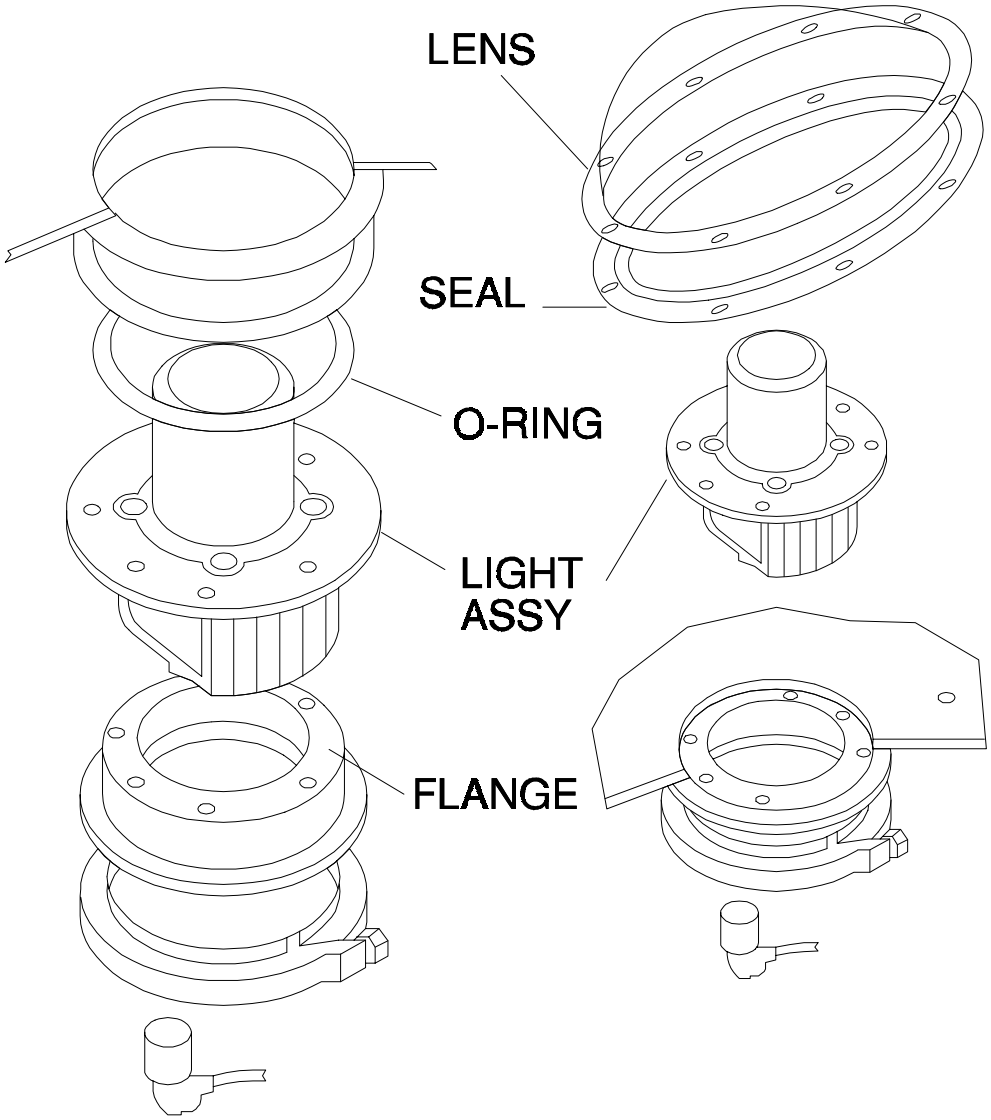
ZONE : 240, 140

COMPONENT DESCRIPTION

Each beacon light has :

- a faraday cage
- a reflector system (Xenon flash tube, reflector and connectors for the transformer)
- a plate
- a housing with cooling fins for the transformers
- a red lens.





FQW4200 GE Metric

STROBE LIGHTS

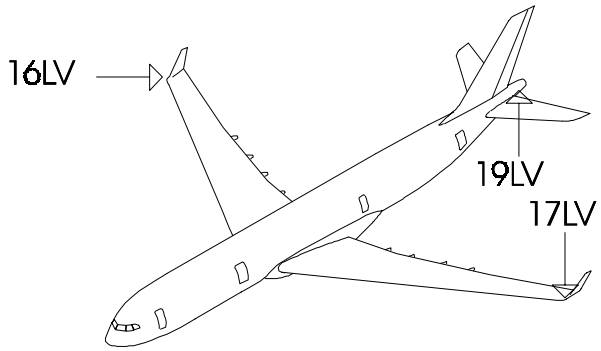
FIN : 16LV, 17LV, 19LV

ZONE : 675, 575, 317

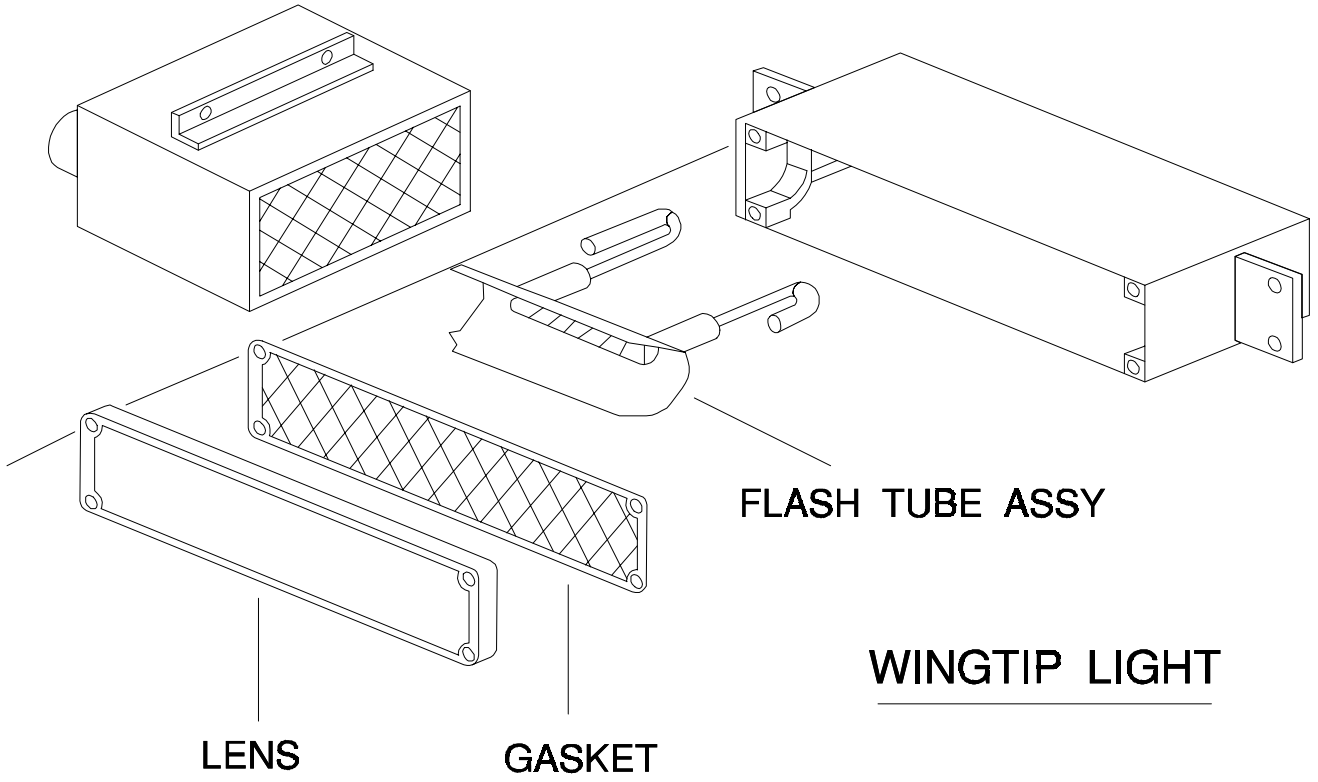
COMPONENT DESCRIPTION

Each strobe light has :

- a faraday cage
- a reflector
- two flash tubes and two transformers (for wing strobe light)
- one flash tube and one transformer (for tailcone strobe light)
- a housing
- a white lens.



TAIL CONE LIGHT



FQW4200 GE Metric

RUNWAY TURN-OFF LIGHTS

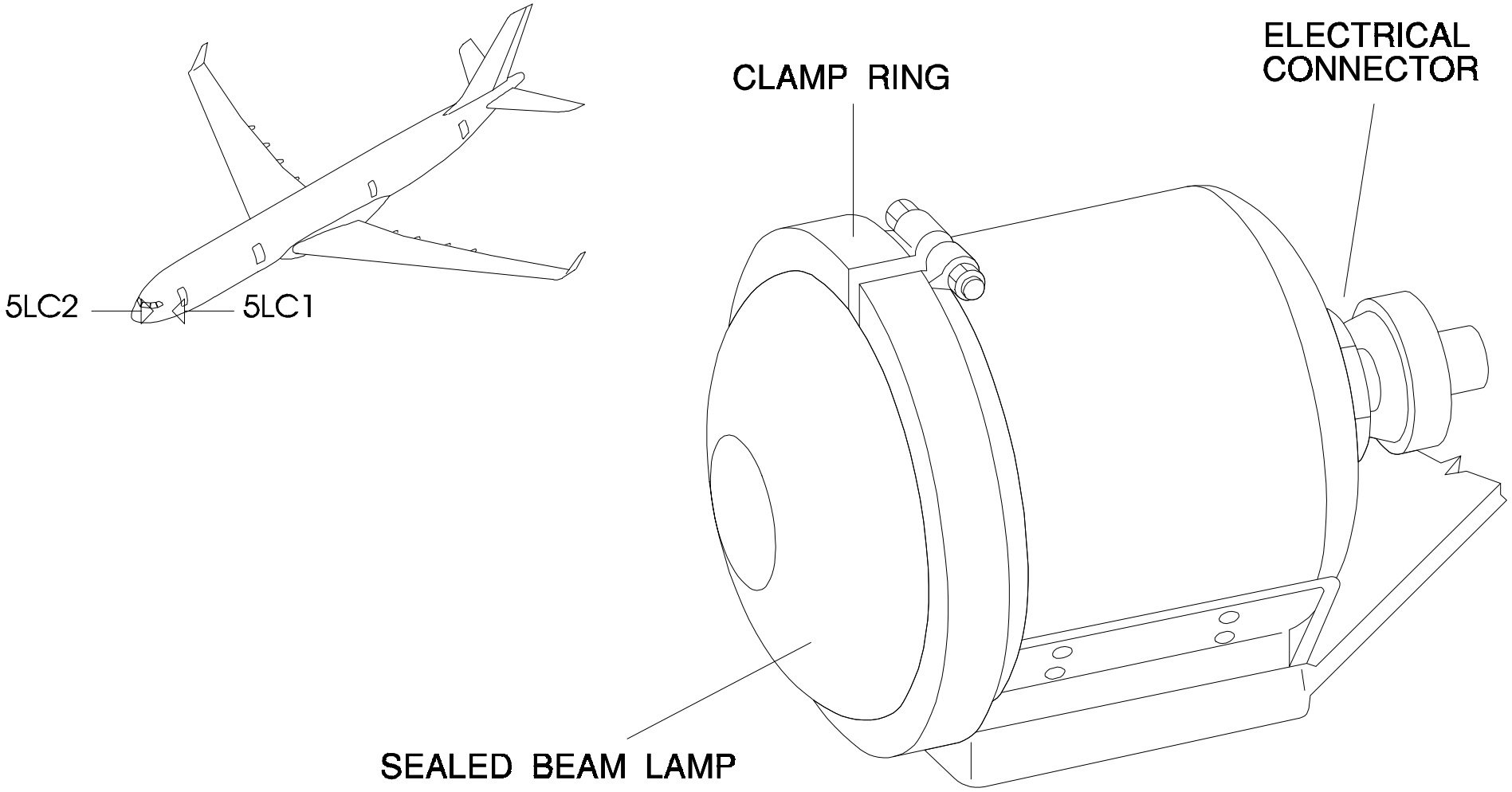
FIN : 5LC1, 5LC2

ZONE : 711

COMPONENT DESCRIPTION

Each light unit has a light alloy housing which contains :

- an annular step-down tranformer
- a selected beam lamp unit with a 28 VAC 150 Watts single-filament lamp
- an electrical connector
- a clamp ring and attached clamp screw.



FQW4200 GE Metric

LANDING LIGHTS

FIN : 6LB1, 6LB2

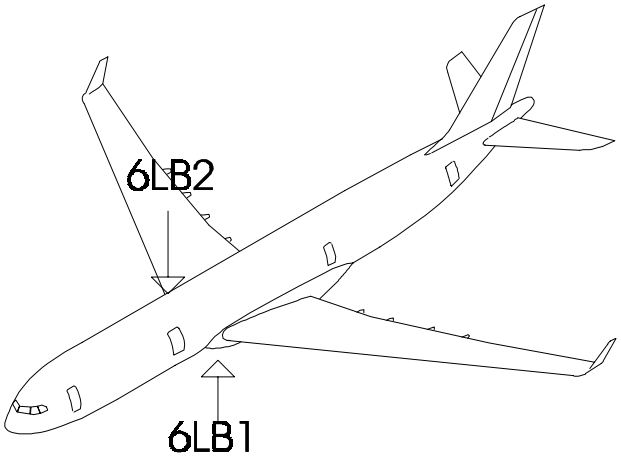
ZONE : 191, 192

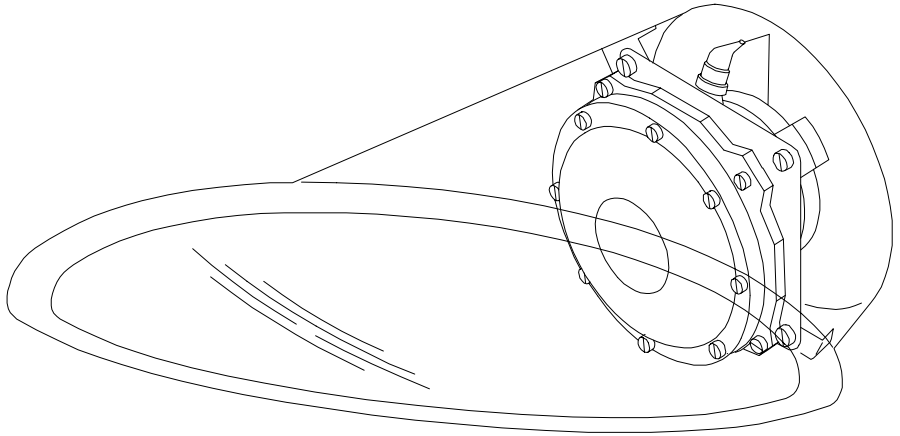
COMPONENT DESCRIPTION

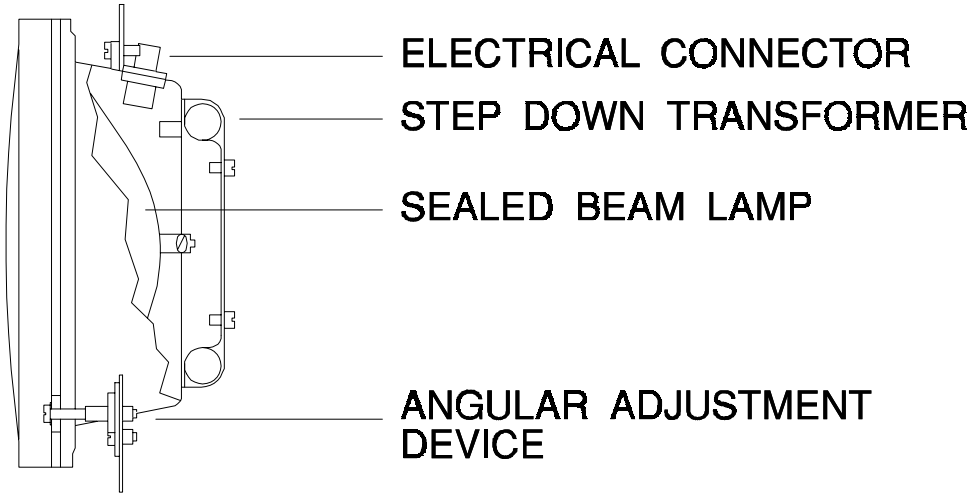
Each landing light assembly has :

- four adjustment devices
- a rigid main-housing
- an attachment plate
- a halogen sealed-beam lamp (600 Watts)
- a step-down transformer
- an electrical connector.

The four adjustment devices allow the light to be adjusted around its horizontal and vertical axes in a range of 5 degrees.







FQW4200 GE Metric

TAKE-OFF AND TAXI LIGHTS

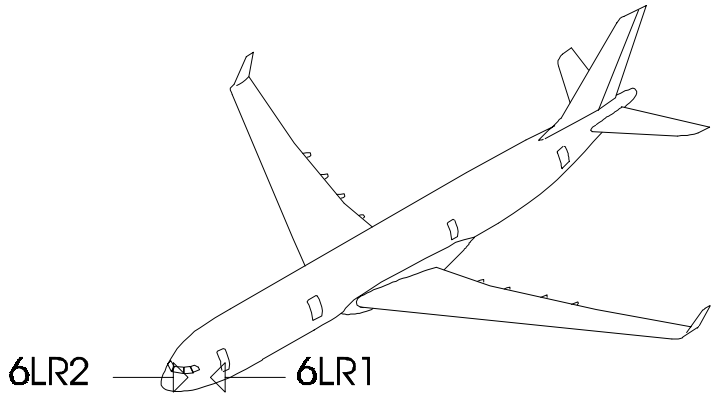
FIN : 6LR1, 6LR2

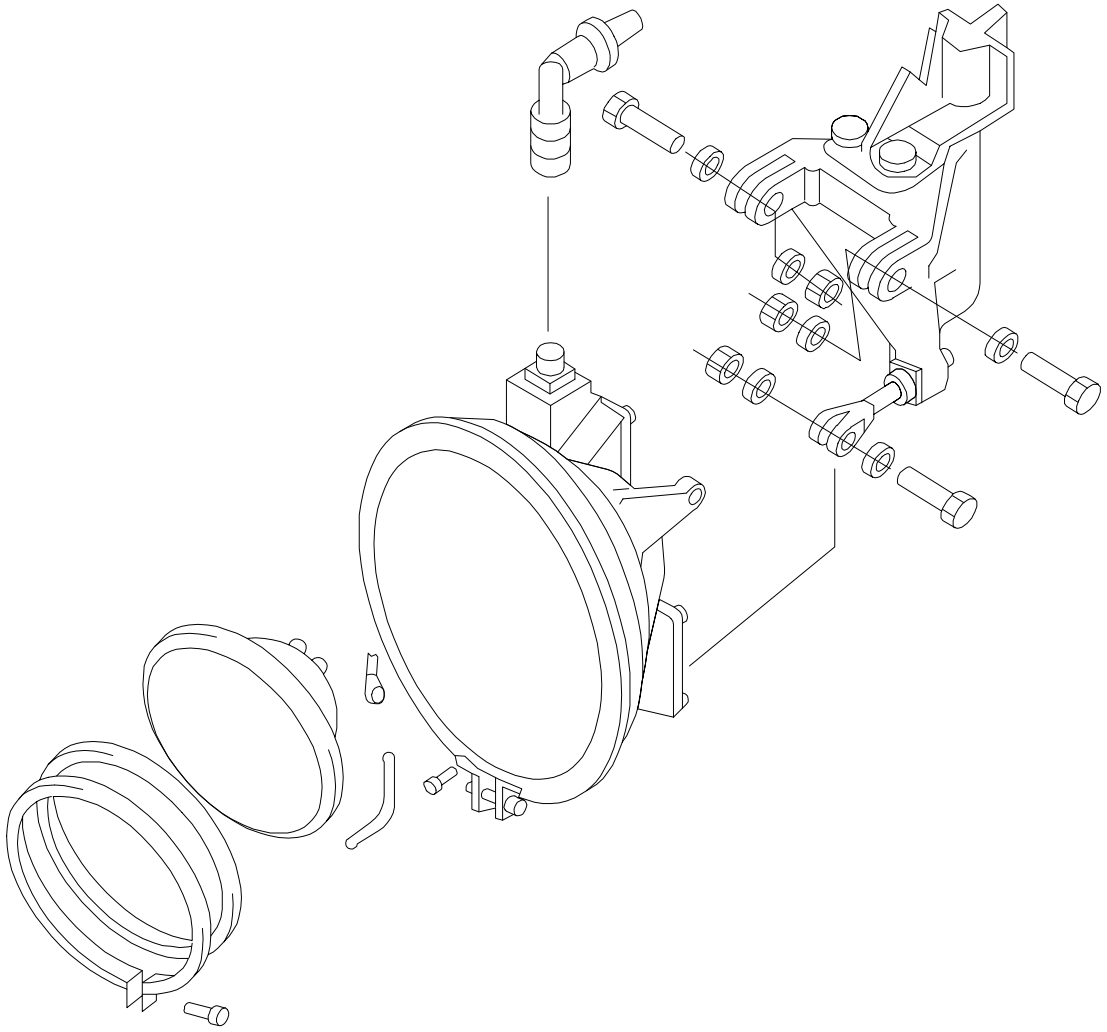
ZONE : 711

COMPONENT DESCRIPTION

Each taxi and take-off light has :

- a cone-shape housing with a three position bracket
- two step-down transformers
- a double filament (400 Watts and 600 Watts) sealed beam lamp
- a bayonet-type electrical connector.





FQW4200 GE Metric

WING AND ENGINE SCAN LIGHTS

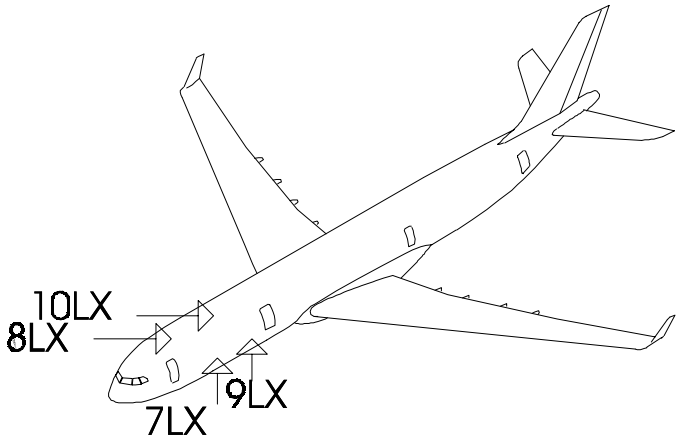
FIN : 7LX, 8LX, 9LX, 10LX

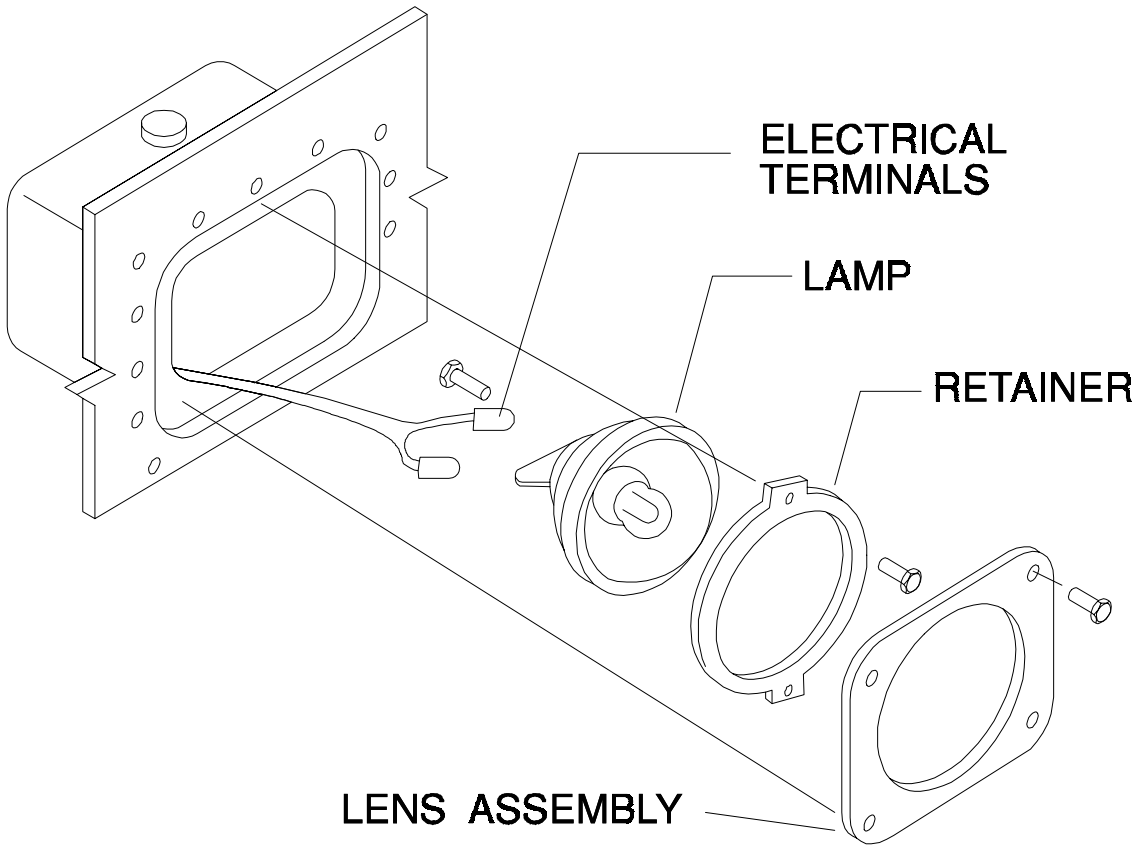
ZONE : 131, 132

COMPONENT DESCRIPTION

Each Wing/Engine scan light consists of :

- a housing
- a lamp
- a lens
- a retainer
- a lens assembly.





FQW4200 GE Metric

NAVIGATION LIGHTS

FIN : 7LA, 8LA, 10LA

ZONE : 535, 635, 317

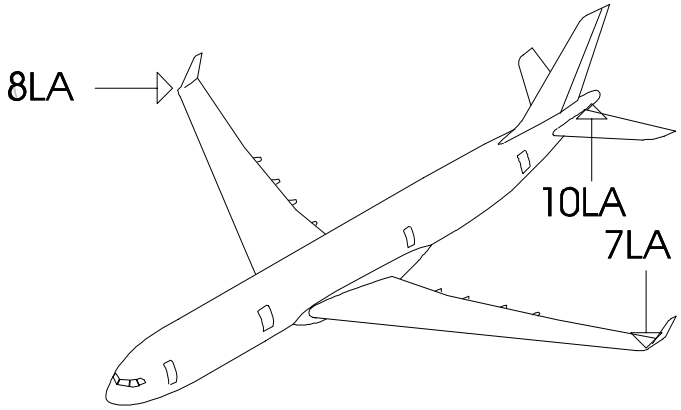
COMPONENT DESCRIPTION

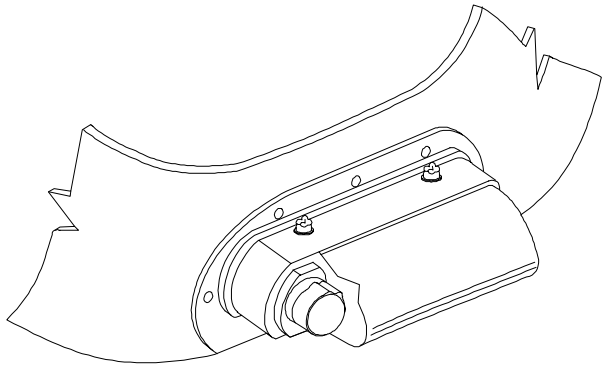
Each wing navigation light unit contains :

- a rear housing
- a lamp housing
- two quartz lamps.

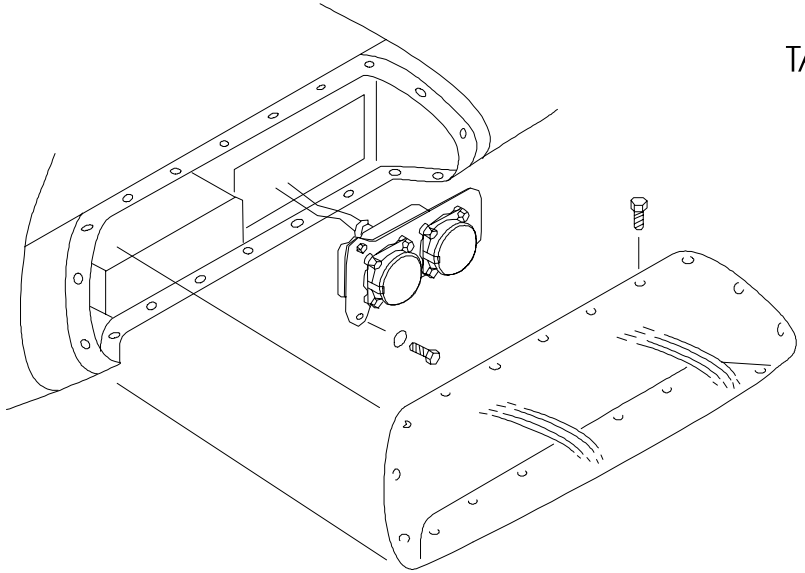
The tailcone navigation light unit contains :

- a housing assembly
- two quartz lamps
- an internal clear lens
- an external clear lens.





TAILCONE NAVIGATION LIGHT



WING TIP NAVIGATION LIGHT

FQW4200 GE Metric

LOGO LIGHTS

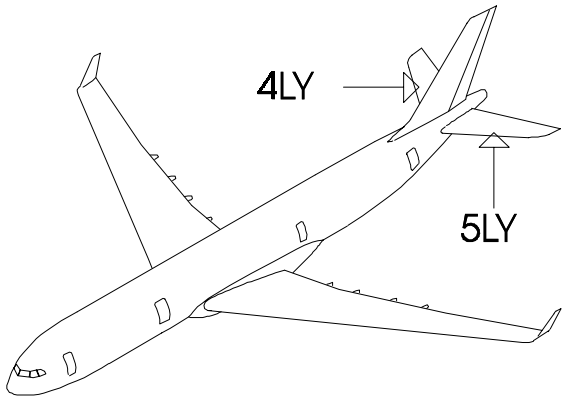
FIN : 4LY, 5LY

ZONE : 340, 330

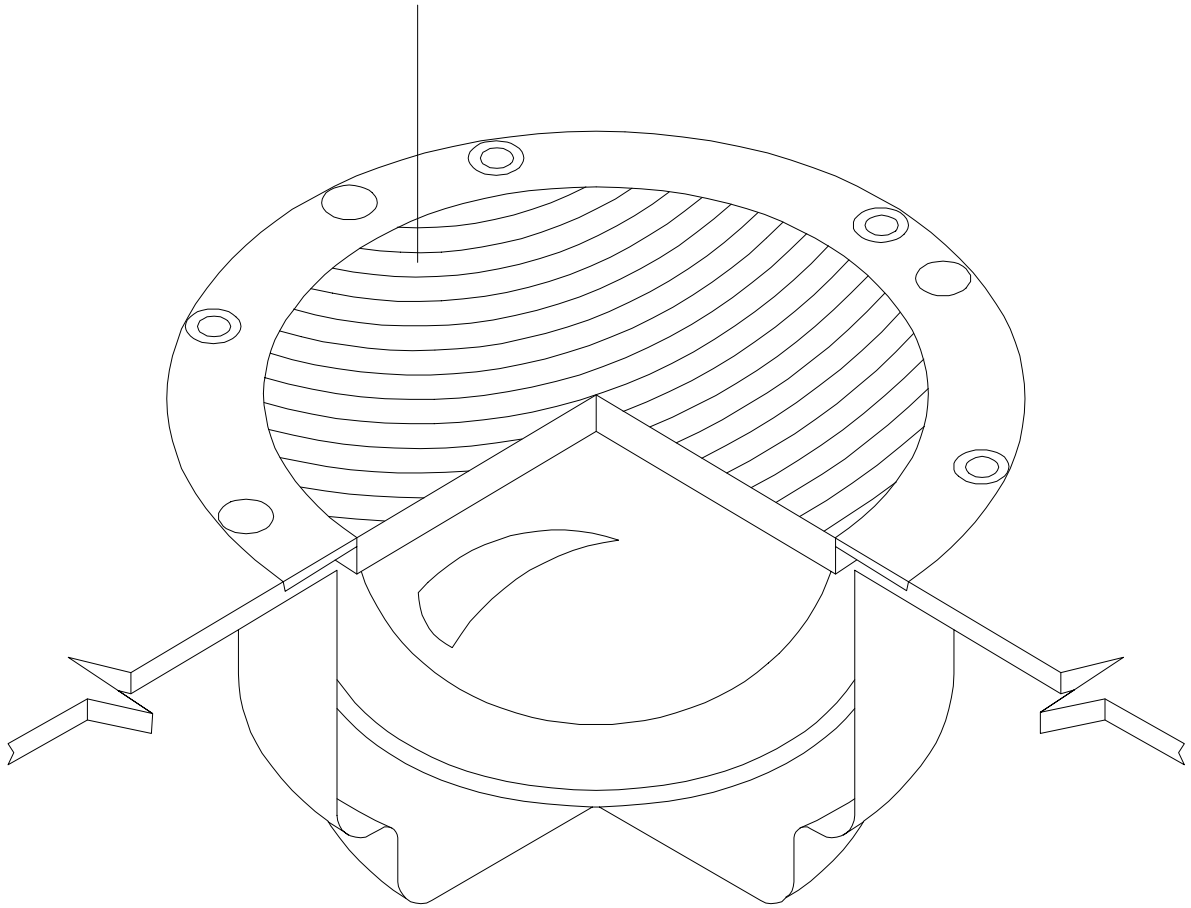
COMPONENT DESCRIPTION

Each logo light consists of :

- a housing which contains the lamp assembly
- an autotransformer which lowers the 115 VAC to 13 VAC power supply.



PRISMATIC LENS



FQW4200 GE Metric

STUDENT NOTES

EMERGENCY LIGHT SYSTEM PRESENTATION

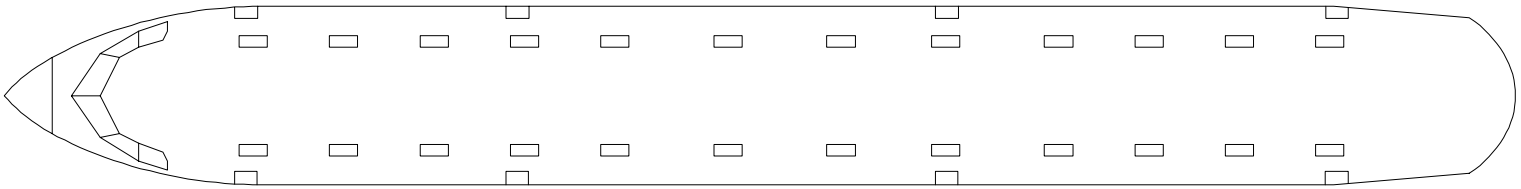
General
Cabin
Exits
Slides
Escape Path
Lavatories
Emergency Power Supply Units
Controls

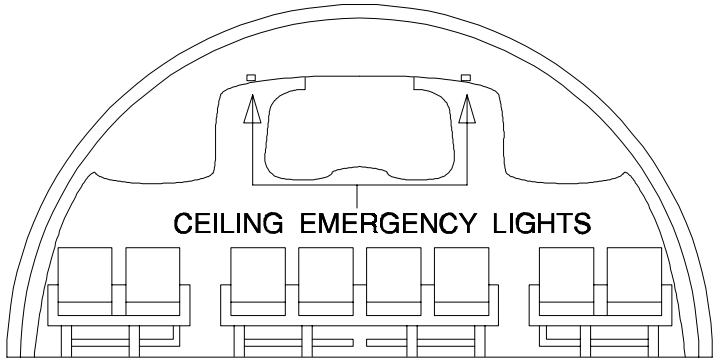
GENERAL

The cabin emergency lighting system enables the cabin to be lit, the emergency exits and the evacuation devices to be located in case of emergency.

CABIN

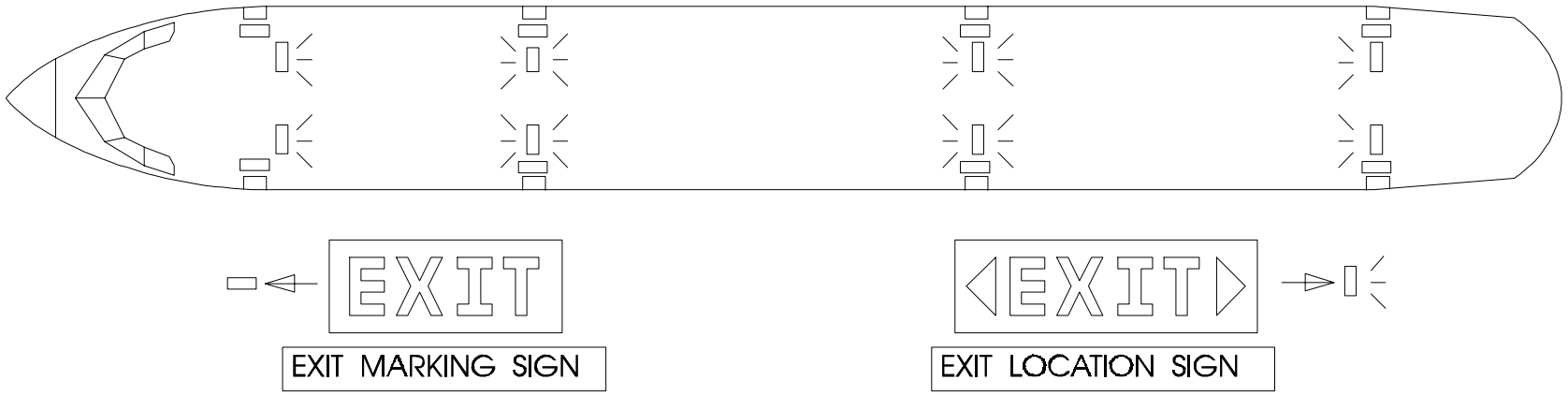
The emergency lighting system illuminates the cabin in the event of a failure of the general lighting system. The emergency lights are installed in the main and cross aisle ceiling panels.




CEILING EMERGENCY LIGHTS

EXITS

The emergency lighting system illuminates the exit location signs and exit marking signs at each cabin door.



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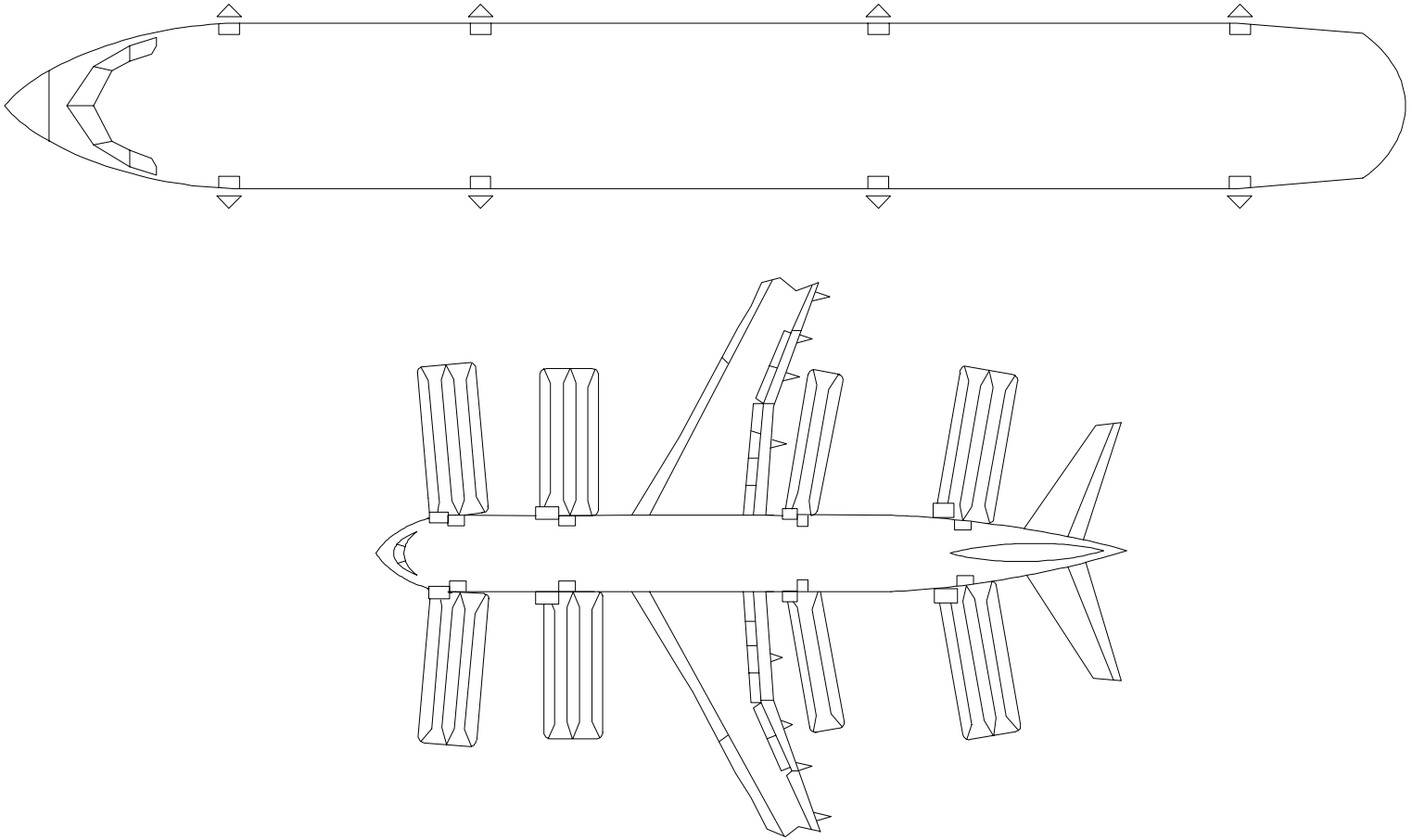
SLIDES

The emergency lighting system powers the evacuation device integral lights.



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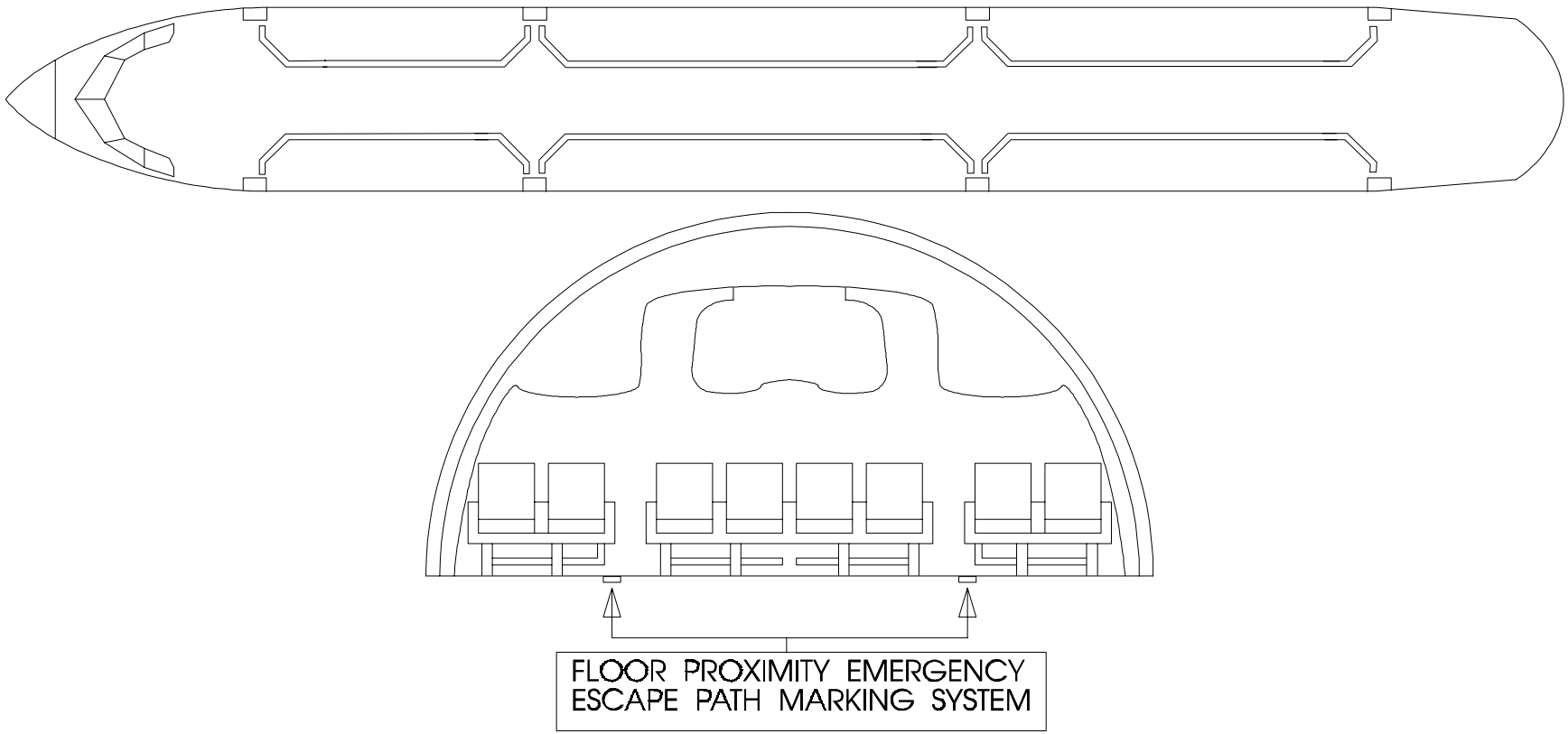
ESCAPE PATH

The escape path lighting system is provided to direct evacuees for emergency cabin evacuation.

The emergency escape path is marked by electroluminescent light strips, which are installed on the floor in the main aisles and cross-aisles.



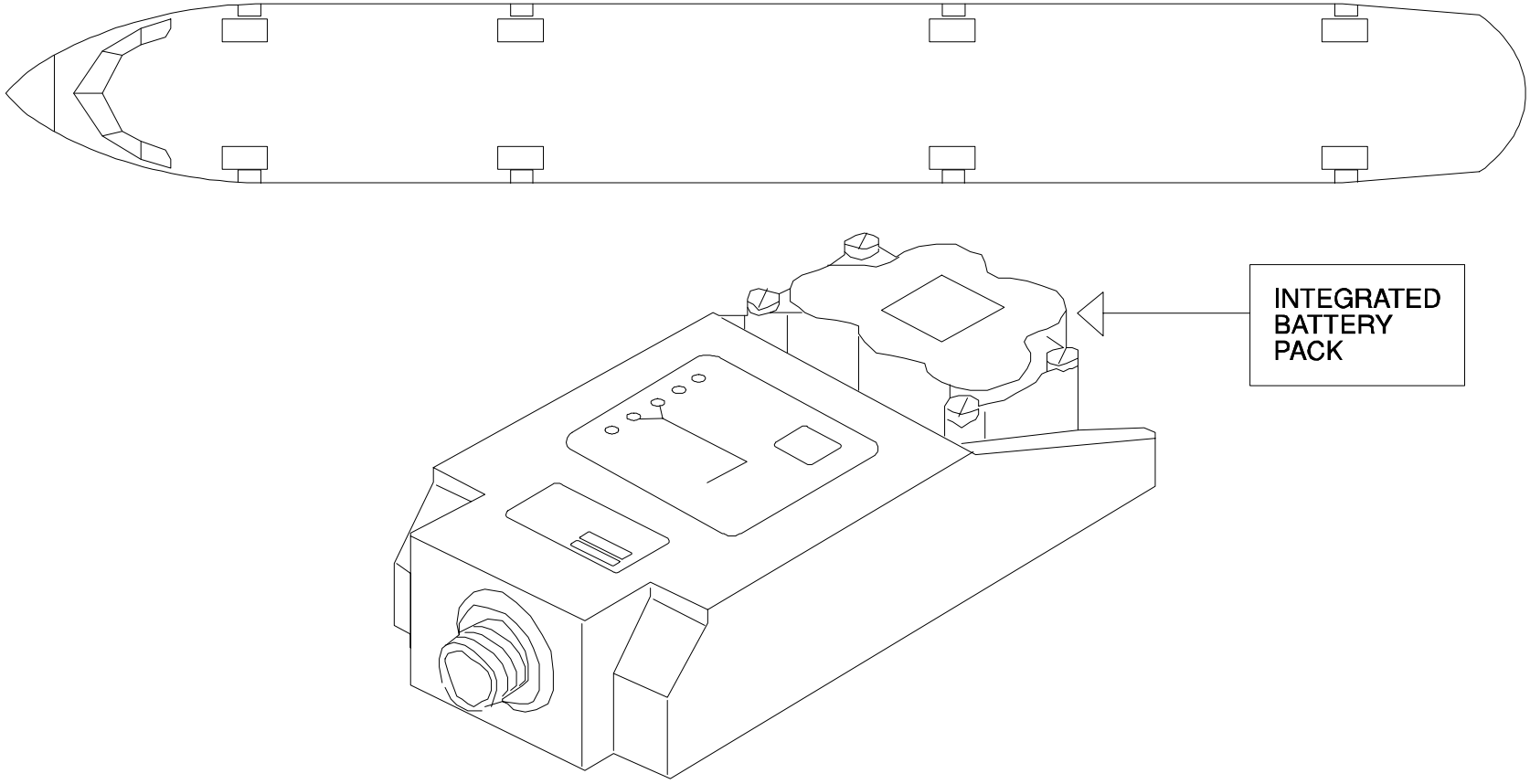
FQW4200 GE Metric

LAVATORIES

An auxiliary light is installed in each lavatory.
The auxiliary light is on as long as the 101 PP DC BUS is available.

EMERGENCY POWER SUPPLY UNITS

The eight Emergency Power Supply Units allow the associated emergency lights and signs to be electrically supplied by DC ESSential BUS or integrated battery pack.
The integrated battery packs can supply the cabin emergency lighting system for at least 10 minutes, if DC ESS BUS fails, even if the aircraft has crashed and fuselage has broken.
Each battery pack is charged from a battery charging device. The battery charging device is part of the EPSU. The charging device makes sure that the maximum power from the battery pack is available at all times.



EMERGENCY POWER SUPPLY UNIT (EPSU)

FQW4200 GE Metric

CONTROLS

The emergency lighting system is controlled from the cockpit or from the cabin.

The EMER EXIT LIGHT selector allows the emergency lights and signs to be activated from the cockpit :

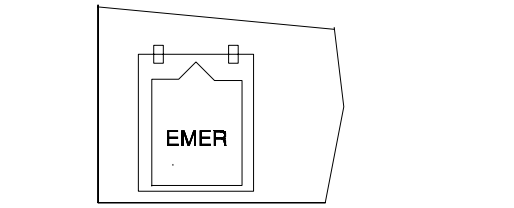
ON : Emergency lights, exit signs and escape path markings come on.

ARM : Emergency lights, exit signs and escape path markings automatically come on in case of emergency.
Power is supplied by DC ESS BUS through the EPSUs.
If DC ESS BUS fails the emergency lighting system is powered by the EPSU integrated battery packs.

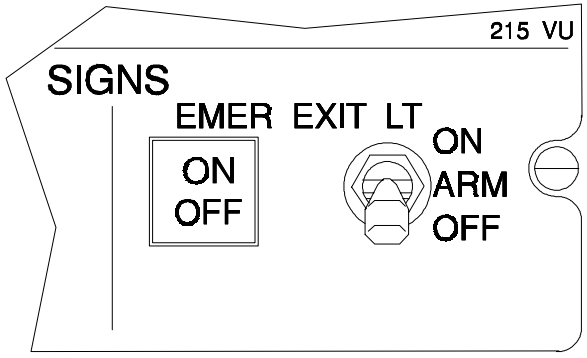
OFF : Lights are off and the amber OFF light comes on.

The emergency lighting system can be activated from the Forward Attendant Panel EMER pushbutton, independently of the position of the EMER EXIT LIGHT selector.

If the EMER pushbutton is pressed the escape path markings, cabin emergency lighting and exit signs come on.
If the EMER pushbutton is pressed again, all these lights go off.



FORWARD ATTENDANT PANEL



OVERHEAD PANEL

FQW4200 GE Metric

STUDENT NOTES:

EMERGENCY LIGHT TEST USING MCDU

General
EPSU Test
EPSU BAT Test

GENERAL

Before performing Emergency Power Supply Units test, follow the procedure to obtain the CABIN INTERCOMMUNICATION DATA SYSTEM 1 REPORT/TEST item on the MCDU.

Make sure that the EMER EXIT LT selector and the NO SMOKING selector on the cockpit overhead panel are set to the OFF position.

Make sure that the EMERG ON pushbutton on the Forward Attendant Panel is set to the OFF position.

All the reported failures are : CLASS 1 FAILURES.

They are only reported after the MCDU test and not, as usually for class 1 failures, during the flight.

The failures which are reported before the beginning of the test are called PRETENDED FAILURES.

The failures which are reported when the test is completed are called REAL FAILURES.

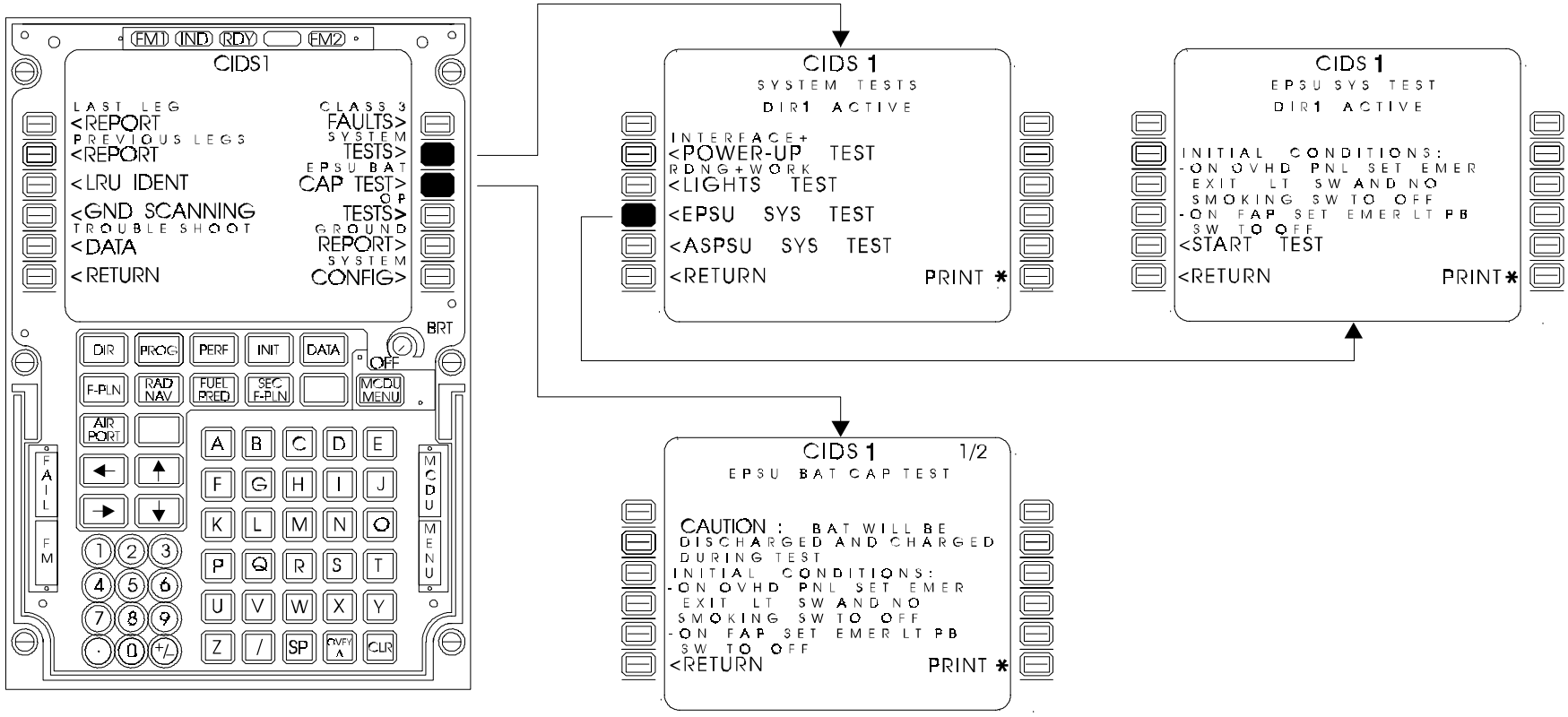
EPSU TEST

The EPSU test is performed through the CIDS and takes up to 20 seconds. During its self-test, the EPSU tests also the connected equipment except for the battery capacity.

EPSU BAT TEST

Make sure that the aircraft power supply stays on during the full test time. The test takes up to 3 hours.
The batteries are discharged and charged during the test.

Before performing the EPSU BAT CAP TEST, the system automatically performs the EPSU TEST.
To make sure that the test is done by the right person, the code **3351** has to be enterred.



FQW4200 GE Metric

STUDENT NOTES

EMERGENCY LIGHT COMPONENTS

Emergency Power Supply Units
Emergency Exit Signs
Floor Proximity Emergency Escape Path Marking System
Cabin Emergency Lights
Auxiliary Lavatory Lights

EMERGENCY POWER SUPPLY UNITS

FIN : 11WL to 18WL

ZONE : 222

COMPONENT DESCRIPTION

Each Emergency Power Supply Unit has:

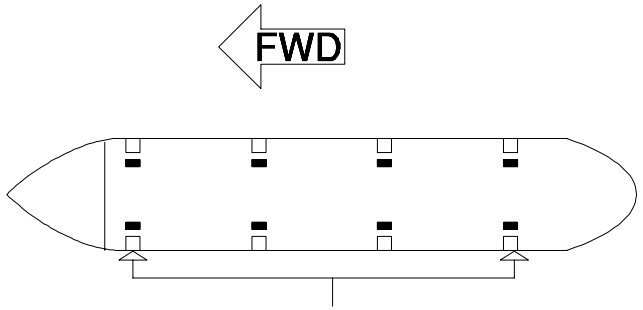
- a test function (BITE)
- a microprocessor (CMOS)
- a backup circuit
- a Ni-Cad battery pack (5 cells of 4 Ah). It can be removed from the unit itself. When the electronic packs are removed from the unit, the batteries are not discharged
- a DC/DC converter (28 VDC to 6 VDC)
- a DC/AC inverter (6 VDC to 115 VAC).

A rapid charging device is installed in the EPSU. It ensures that the EPSU can supply its load for a minimum of 10 minutes. The function automatically starts after an installation of a new battery pack or a new EPSU. Its duration is at least 60 minutes (30 minutes for discharging and 30 minutes for charging).

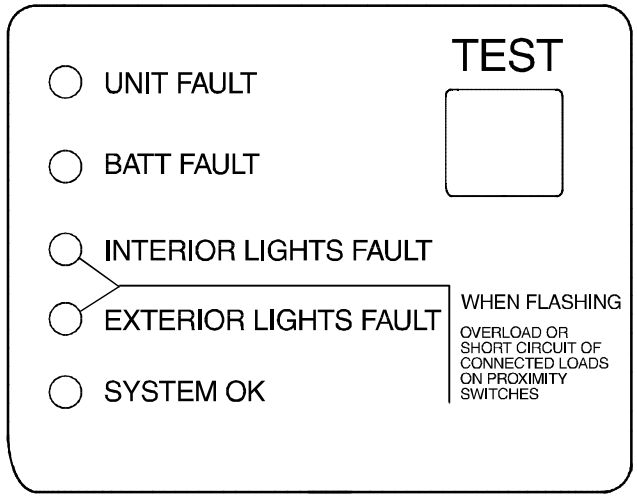
IN SITU TEST

In the event of a failure of the CIDS, you can start a local system test on each EPSU by pressing the related TEST switch.

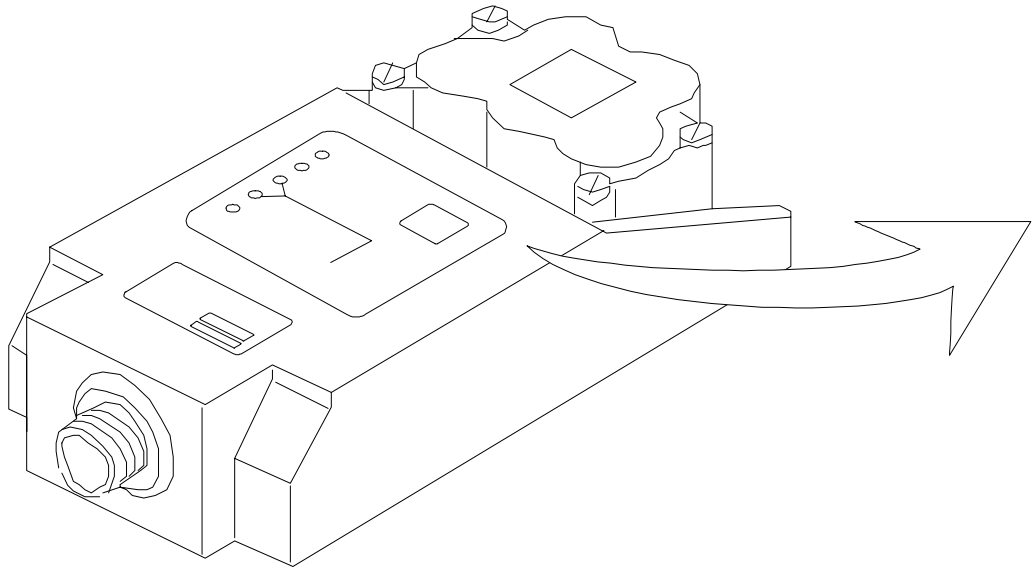
Five LEDs, installed near the TEST switch show the status of the EPSU.



ABOVE EACH PASSENGER DOOR



INTEGRATED BATTERY PACK



EMERGENCY POWER SUPPLY UNIT (EPSU)

FQW4200 GE Metric

EMERGENCY EXIT SIGNS

FIN : 20WL to 27WL, 54WL to 61WL

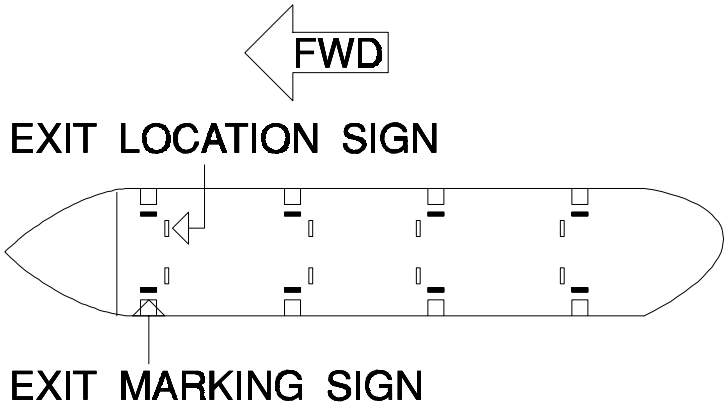
ZONE : 221, 222, 241, 242, 261, 262, 271, 272

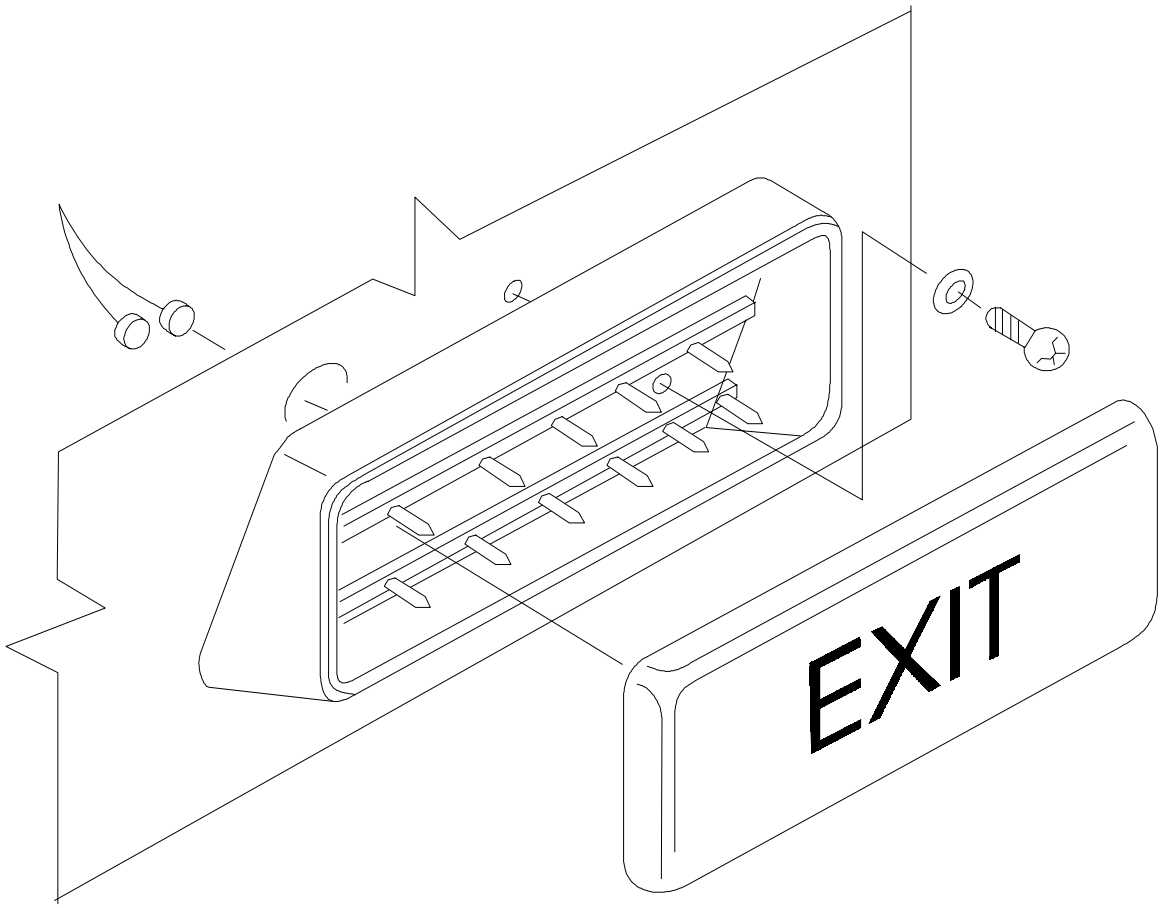
COMPONENT DESCRIPTION

Each EXIT MARKING sign (above each door) has :
- a housing
- a lens with the imprint EXIT
- thirteen 6 VDC bulbs (connected in parallel)
- an additionnal lens (installed in the bottom of the housing) to give illumination to the stair and the exit area.

Each single-sided EXIT LOCATION sign (wall mounted) has :
- a housing
- a lens with the imprint EXIT
- nine 6 VDC bulbs (connected in parallel).

Each double-sided EXIT LOCATION sign (ceiling mounted) has :
- a housing
- two lenses with the imprint EXIT
- twelve 6 VDC bulbs (connected in parallel)





EXIT MARKING SIGN

FQW4200 GE Metric

FLOOR PROXIMITY EMERGENCY ESCAPE PATH MARKING SYSTEM

FIN : 120WL1 to 120WL76, 120WL1 to 121WL76

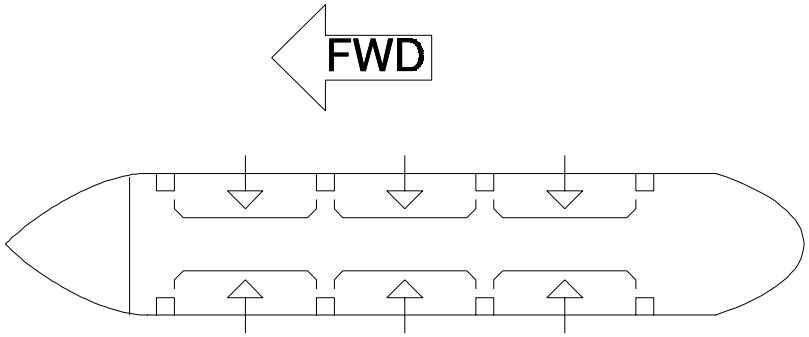
ZONE : 200

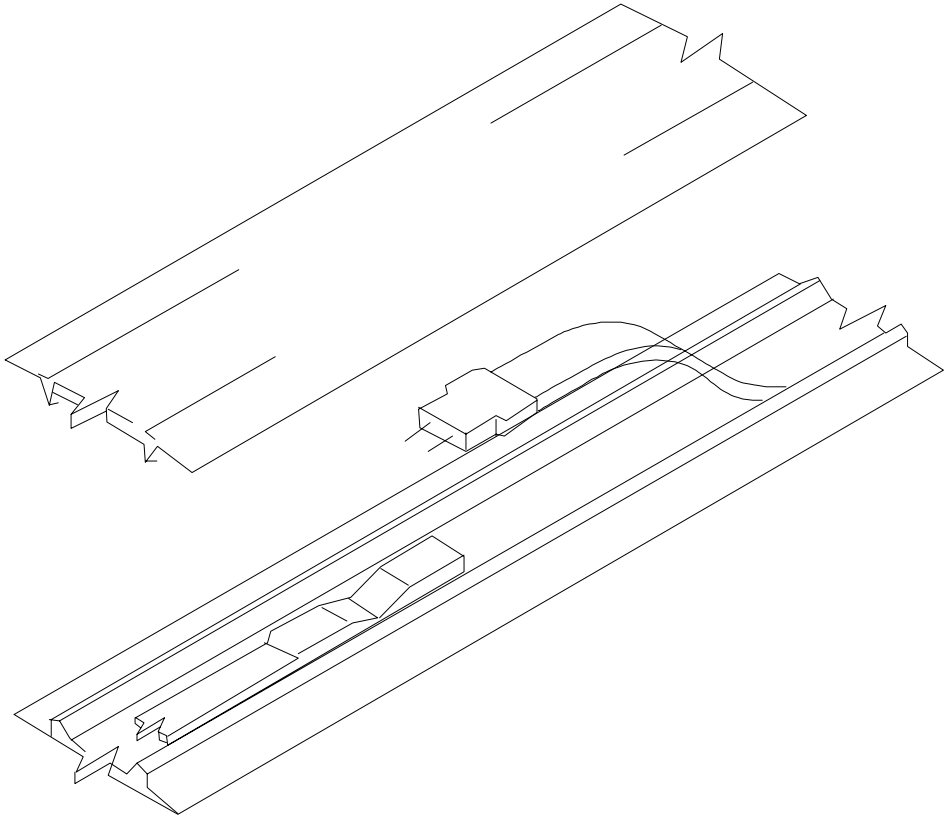
COMPONENT DESCRIPTION

The Floor Proximity Emergency Escape Path Marking System uses flexible Electro Luminescent (EL) lamps to mark the path to the exits. When the lamps are activated, they illuminate a thermally cool green light which is highly visible under bad conditions.

The EL flexible lamps are installed in the textile floor covering of the cabin aisles. They make a continuous strip of lights and have :

- a track housing
- a transparent top cover
- 2 or 3 flexible lights (115 VAC)
- a lead assy cable installed below the carpet.





Floor Proximity Emergency
Escape Path Marking System

FQW4200 GE Metric

CABIN EMERGENCY CEILING LIGHTS

FIN : 30WL to 53WL

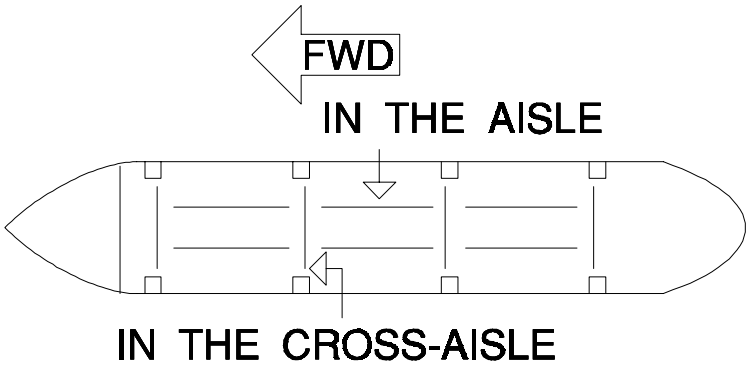
ZONE : 200, 220, 240, 270

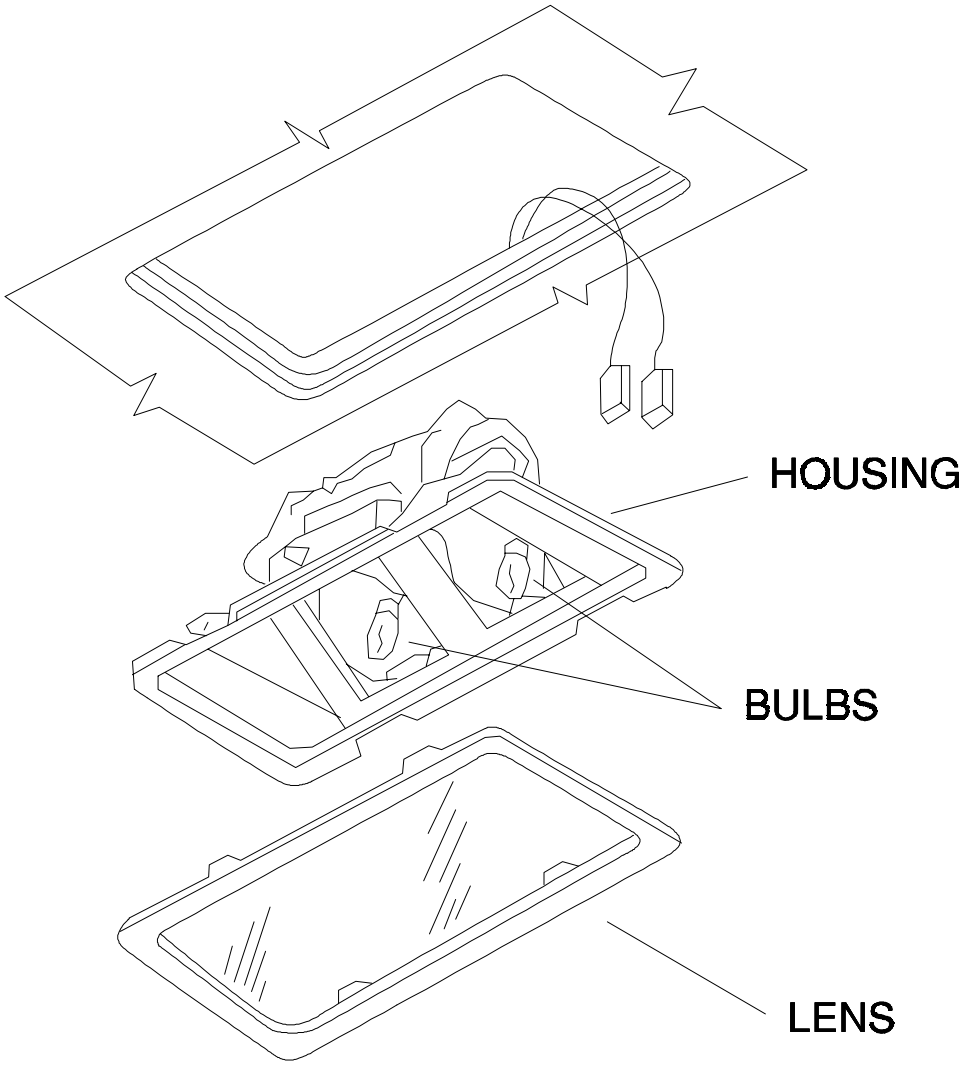
COMPONENT DESCRIPTION

The cabin emergency ceiling lights are installed to give sufficient illumination in emergency conditions.
They are supplied with 6 VDC from the converters or the battery packs of the EPSUs.

Each ceiling emergency light has :

- a housing
- a lens
- two 6 VDC bulbs (connected in parallel).





FQW4200 GE Metric

AUXILIARY LAVATORY LIGHTS

FIN : TBD

ZONE : 200

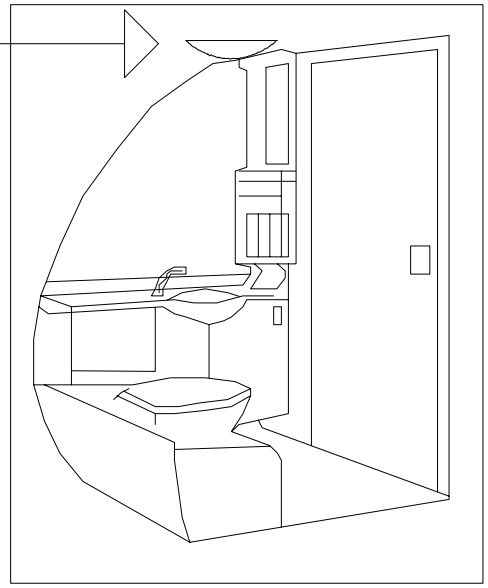
COMPONENT DESCRIPTION

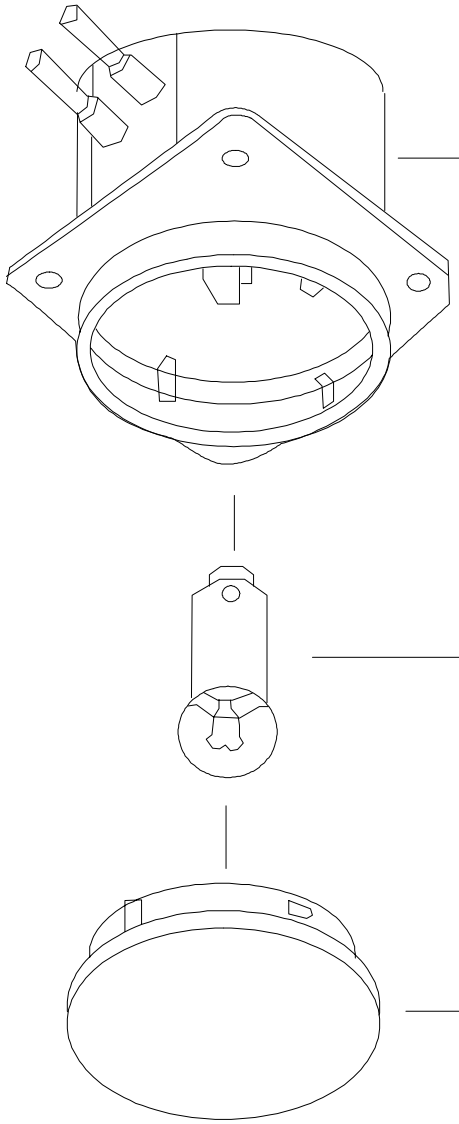
The auxiliary lavatory lights are installed to give sufficient illumination in emergency conditions.
They are supplied with 28 VDC from the 101 PP DC BUS.

Each lavatory auxiliary light has :

- a housing
- a lens
- one 28 VDC bulb.

LAVATORY AUXILIARY LIGHT





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STUDENT NOTES

PUSHBUTTON REMOVAL/INSTALLATION

Before starting a pushbutton removal installation procedure, make sure that the lamp capsule is in the delatched(up) position when you remove it from an alternate action switch.
If the lamp capsule is not delatched(up) when you remove it the switch cannot operate.

Then open the circuit breaker of the circuit related to the pushbutton switch.

Put the removal tool lamp capsule extractor in the notches on the side of the head of the pushbutton switch.
Carefully pull the tool to remove the head of the pushbutton switch. The head stays attached to the body of the pushbutton switch by the rods that turn.

Now you have to remove the body of the pushbutton switch.
First, fully loosen the two screws of the body but do not lock them.
After, pull the head to remove the body.

Before starting the installation of a pushbutton switch, clean and make an inspection of the component interface and of the adjacent area.

Now, put the TOP mark in the up position and push the body of the pushbutton switch fully into its housing.

Torque the two screws of the body of the pushbutton switch.

Now, install the head in the body of the pushbutton switch. To do this, push the head until it touches the stop.

To finish the installation task close the circuit breaker of the circuit related to the pushbutton switch.
After that, make sure that the work area is clean and clear of tools and other items.