A350
TECHNICAL TRAINING MANUAL
MAINTENANCE COURSE - T1+T2 - RR Trent XWB
Electrical Power

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It will not be updated.

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ELECTRICAL POWER

V2414251 - V00T0MM0

AC NORMAL GENERATION DESCRIPTION (2/3)

Overview

The primary function of the AC normal generation is to supply electrical power to the users on ground or in flight through the sources that follow:
- External power from Ground Power Unit(s) (GPU(s))
- Auto Transformer Units (ATUs)
- APU generator
- Variable Frequency Generators (VFGs).

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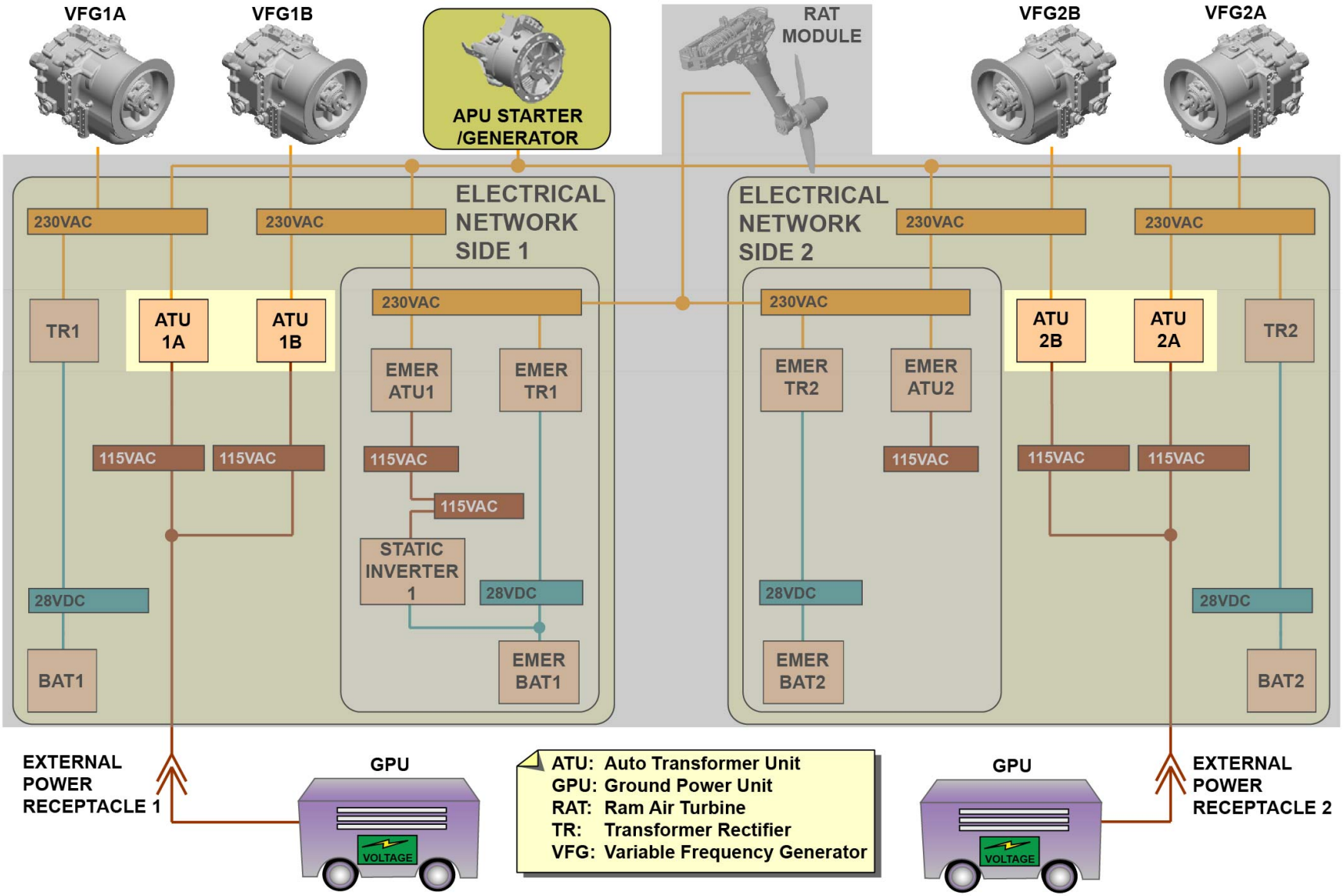
VFG1A
VFG1B
APU STARTER /GENERATOR
RAT MODULE
VFG2B
VFG2A
ELECTRICAL NETWORK SIDE 1
ELECTRICAL NETWORK SIDE 2
230VAC
TR1
ATU 1A
ATU 1B
EMER ATU1
EMER TR1
115VAC
STATIC INVERTER 1
28VDC
BAT1
EMER BAT1
EMER TR2
EMER ATU2
ATU 2B
ATU 2A
TR2
BAT2
EXTERNAL POWER RECEPTACLE 1
GPU
VOLTAGE
ATU: Auto Transformer Unit
GPU: Ground Power Unit
RAT: Ram Air Turbine
TR: Transformer Rectifier
VFG: Variable Frequency Generator
EXTERNAL POWER RECEPTACLE 2

OVERVIEW

AC NORMAL GENERATION DESCRIPTION (2/3)

External Power

Two External Power Receptacles (EXT PWR RCPTs) are available to connect one or two 115VAC 400Hz three-phases GPUs and to supply the aircraft electrical network on ground. The GPUs can supply all of the aircraft electrical network through the transfer circuit. If only one GPU is used, it can supply all of the aircraft electrical network but the automatic shedding inhibits some commercial (cabin) loads.
The minimum rating of each GPU must be 90 kVA.
The Electrical Power Distribution Centers (EPDCs) monitor the GPUs and control the External Power Line Contactors (EPLCs).

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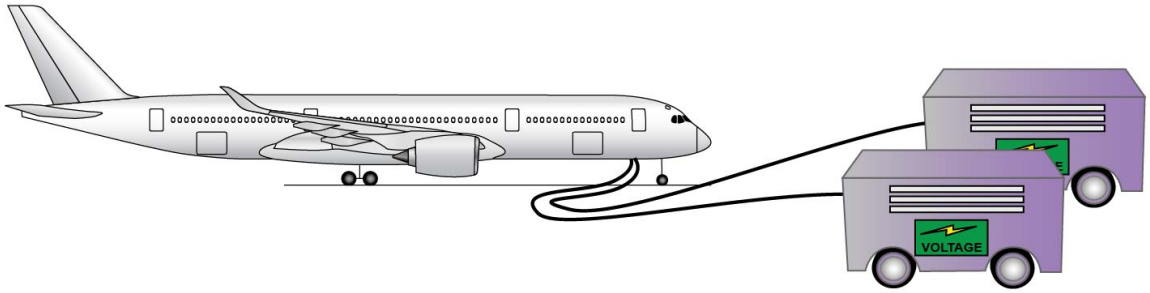
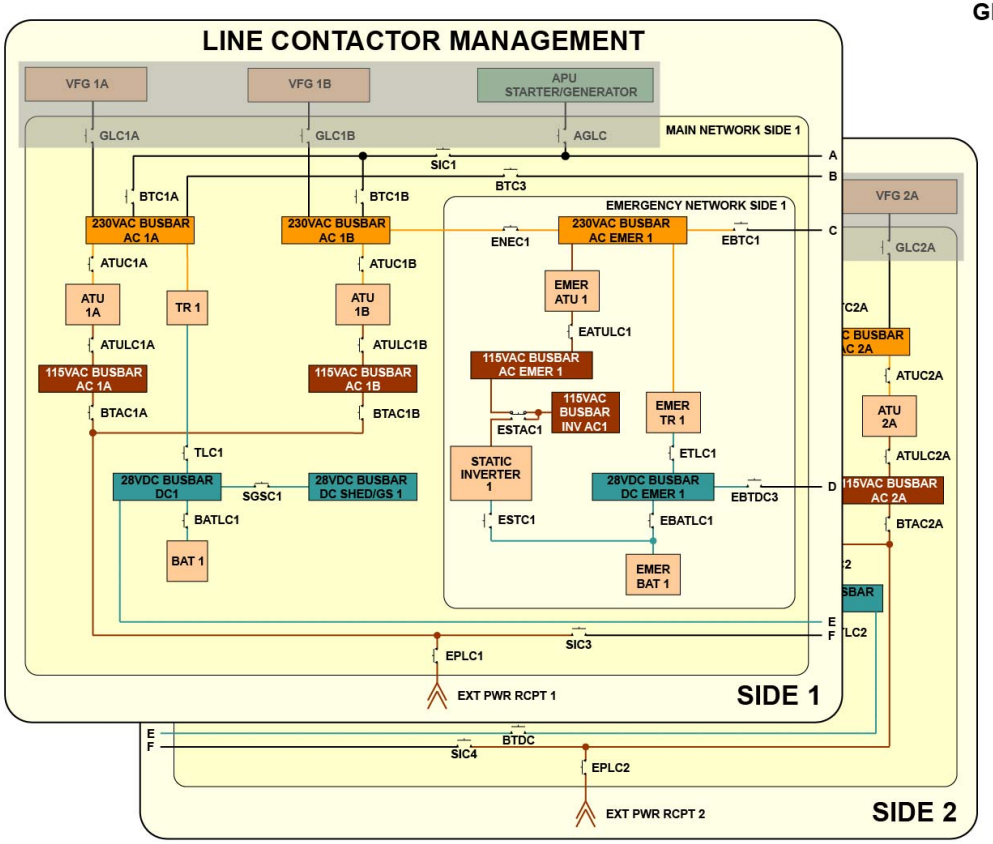


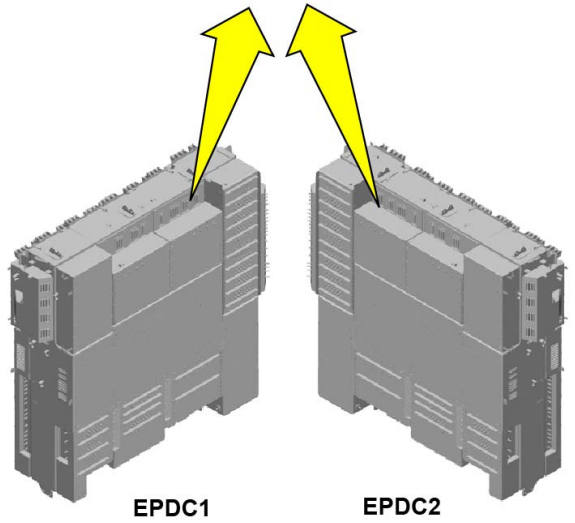
GPUs

- 1 or 2 GPU(s)
- 115VAC 400Hz
- 3 phases

Power rating:
- A minimum of 90 kVA each



- GPUs CONTROL
- EPLCs CONTROL



EPDC1 EPDC2

EPDC: Electrical Power Distribution Center
EPLC: External Power Line Contactor

EXTERNAL POWER

AC NORMAL GENERATION DESCRIPTION (2/3)

External Power (continued)

External Power Management

The EPDC1 (2) manage and control their related external power supply. The EPDCs include these components:
- The External Power Control Units (EPCU1 in EPDC1 and EPCU2 in EPDC2), with the functions that follow:
- GPU monitoring
- Protections.
- The Electrical Network Management Units (ENMU1A and ENMU1B in EPDC1, ENMU2A and ENMU2B in EPDC2) that host the Electrical Network Management Functions (ENMFs) applications, with the functions that follow:
- Connection and disconnection of the EPLCs
- Management of the network configuration in relation with the availability of the power sources and with the load consumption.
- The Electrical Distribution Monitoring Units (EDMU1A and EDMU1B in EPDC1, EDMU2A and EDMU2B in EPDC2) with the functions that follow:
- Load shedding commands
- External power parameters transmission.

A CAN interface between ENMU/ENMF is used for BITE test.

External Power Monitoring

The EXT 1 (2) P/BSWs control the connection and disconnection of the GPUs to/from the aircraft electrical network.
When a GPU is available and connected to an EXT PWR RCPT, the related EPCU monitors the parameters of the electrical power supply. If it finds no fault conditions, it sends discrete signals to the related EXT P/BSW and to the external power panel to show that the external power supply is available.
When the related EXT P/BSW is pushed, the EPLC closes and the GPU supplies 115VAC to the aircraft electrical network.

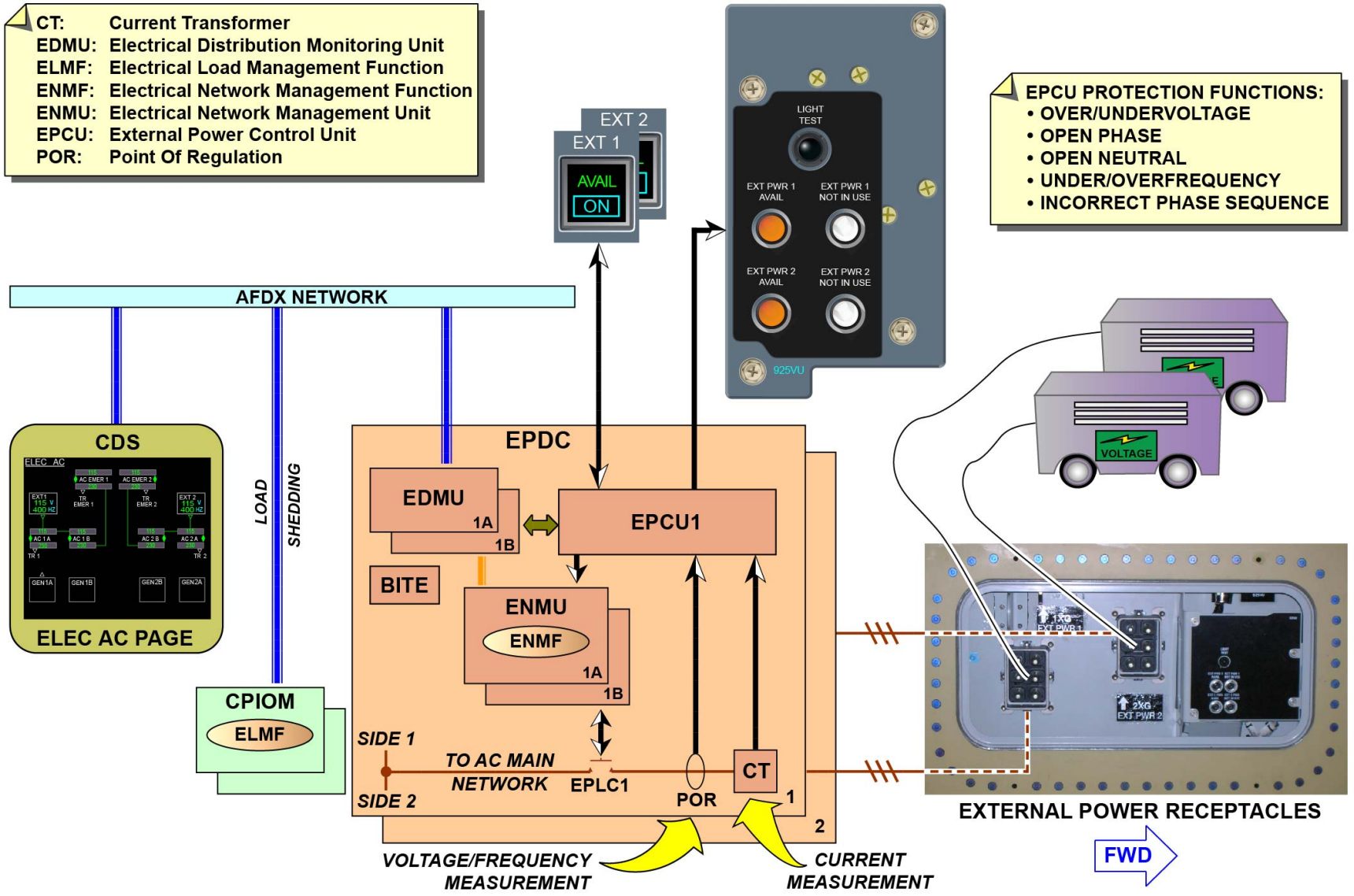
External Power Protections

The EPCU gives protection of the external power supply for:
- Over/undervoltage on any phase at the Point of Regulation (POR)
- Open neutral
- Over/underfrequency
- Incorrect phase frequency
- Open phase
- Overcurrent.

If one of these malfunctions occurs, the ENMU opens the applicable EPLC to isolate the aircraft electrical network from the GPU.

External Power Interface

For cockpit information function, the EPCU gives the status and parameters of the external power supply to the EDMUs. Then, the EDMUs send these data to the CDS through the AFDX network. This information is shown on the ELEC AC page of the ECAM SD.
For overload protection through automatic load shedding, the EDMUs have an interface, through the AFDX network, with the Electrical Load Management Function (ELMF) hosted in two CPIOMs.



EXTERNAL POWER - EXTERNAL POWER MANAGEMENT ... EXTERNAL POWER INTERFACE

AC NORMAL GENERATION DESCRIPTION (2/3)

Auto Transformer Units

There are four identical and interchangeable main ATUs.
The function of the ATUs is to change the 230VAC into 115VAC or the 115VAC into 230VAC.
Properties of the ATUs:
- Power: 60 kVA
- Frequency range: from 360Hz to 800Hz (the output frequency remains the same as the input frequency).

GPU Generation Configuration

In the ground configuration, when the GPUs supply the aircraft electrical network:
- The 115VAC busbar AC 1A supplies the ATU1A.
- The 115VAC busbar AC 1B supplies the ATU1B.
- The 115VAC busbar AC 2B supplies the ATU2B.
- The 115VAC busbar AC 2A supplies the ATU2A.

The ATUs supply 230VAC voltage:
- The ATU1A supplies the 230VAC busbar AC 1A.
- The ATU1B supplies the 230VAC busbar AC 1B.
- The ATU2B supplies the 230VAC busbar AC 2B.
- The ATU2A supplies the 230VAC busbar AC 2A.

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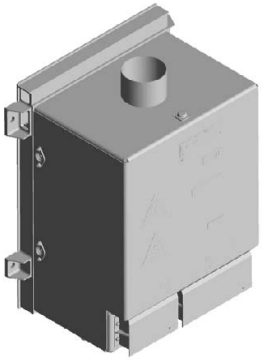
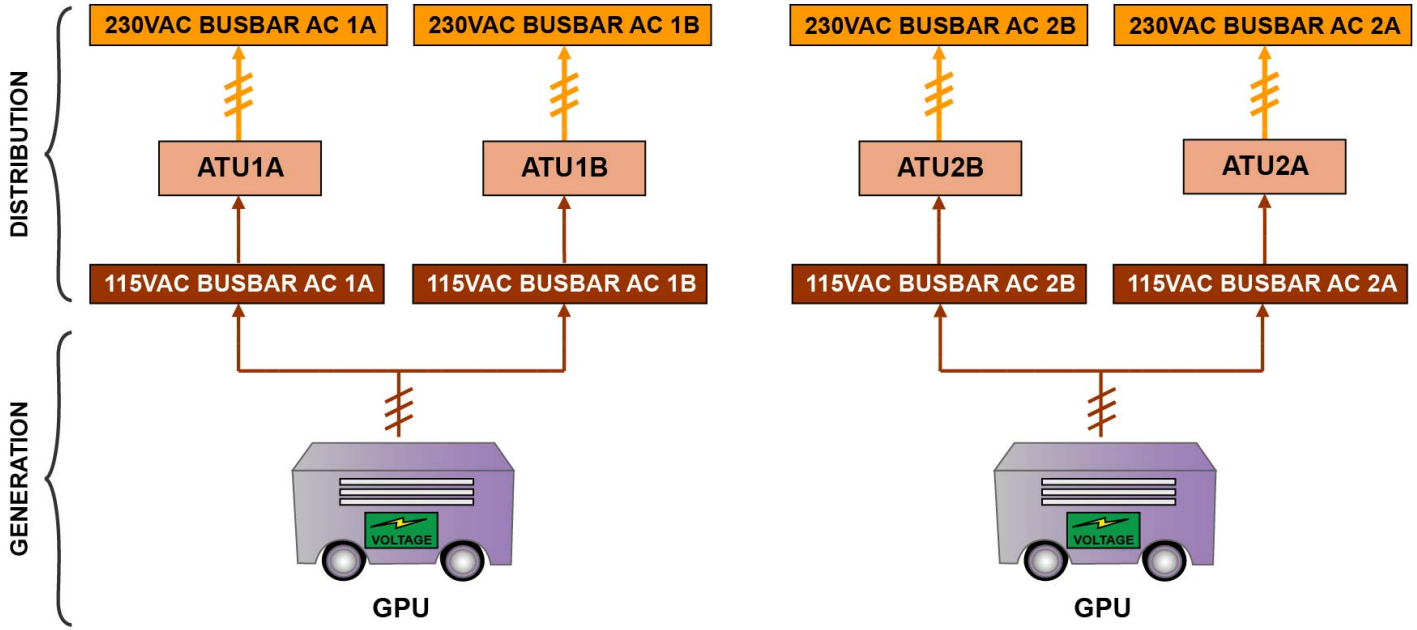
GPUs CONFIGURATION

	POWER	VOLTAGE	FREQUENCY RANGE
ATU	60 kVA	115VAC to 230VAC	360Hz to 800Hz



ATU



AUTO TRANSFORMER UNITS - GPU GENERATION CONFIGURATION

AC NORMAL GENERATION DESCRIPTION (2/3)

Auto Transformer Units (continued)

VFG/APU Configuration

In normal configuration, when the VFGs or the APU generator supply the aircraft electrical network:

- The 230VAC busbar AC 1A supplies the ATU1A.
- The 230VAC busbar AC 1B supplies the ATU1B.
- The 230VAC busbar AC 2B supplies the ATU2B.
- The 230VAC busbar AC 2A supplies the ATU2A.

The ATUs supply 115VAC voltage:

- The ATU1A supplies the 115VAC busbar AC 1A.
- The ATU1B supplies the 115VAC busbar AC 1B.
- The ATU2B supplies the 115VAC busbar AC 2B.
- The ATU2A supplies the 115VAC busbar AC 2A.

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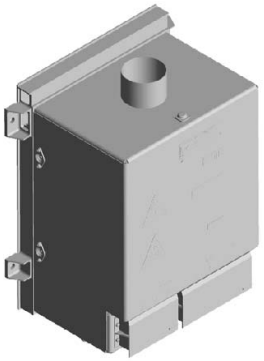
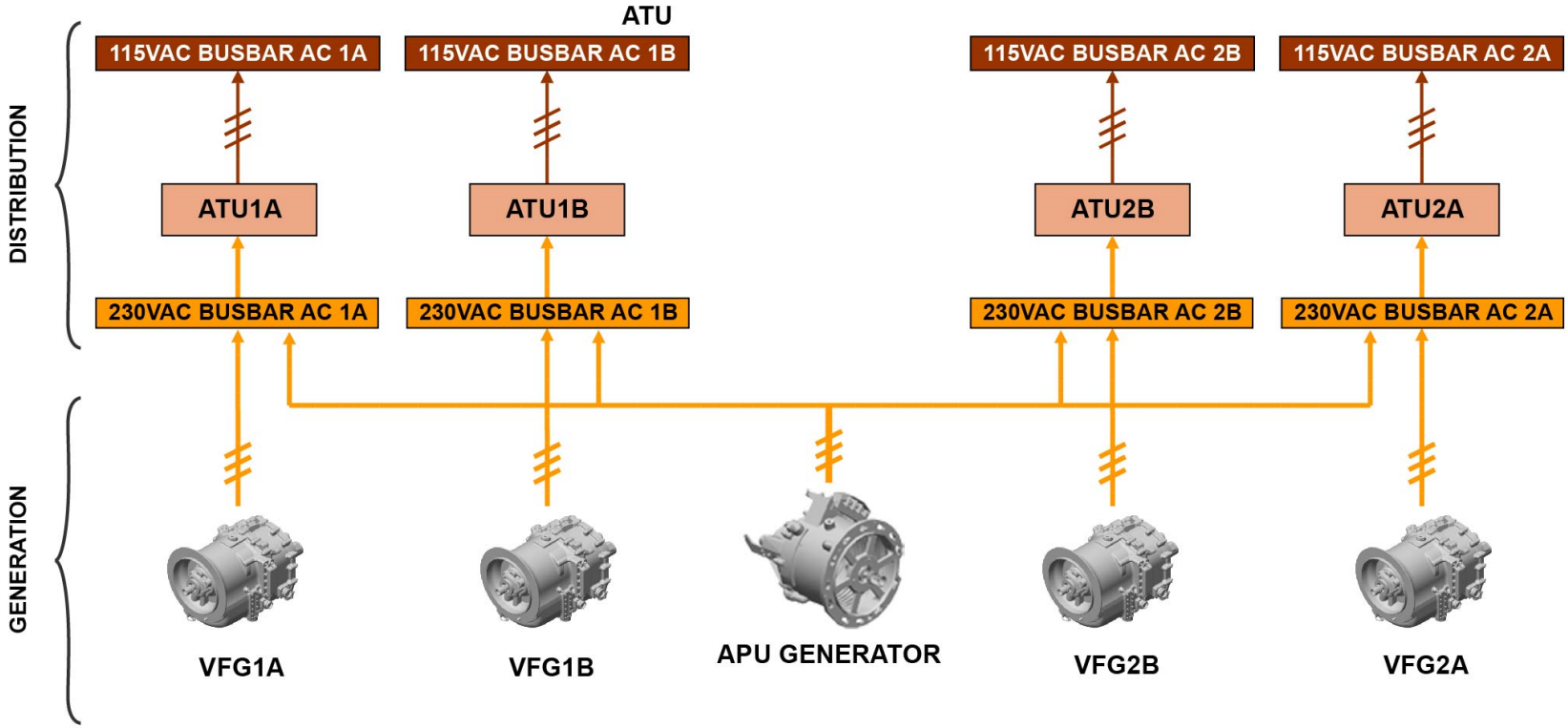
VFG/APU GENERATION CONFIGURATION



	POWER	VOLTAGE	FREQUENCY RANGE
ATU	60 kVA	230VAC to 115VAC	360Hz to 800Hz



AUTO TRANSFORMER UNITS - VFG/APU CONFIGURATION

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AC NORMAL GENERATION DESCRIPTION (2/3)

APU Generation

The APU has an equipment: the Starter Generator (SG). The SG has a start function and an electrical power-generation function.
In the Generate mode (auxiliary generation), the SG supplies power to the aircraft electrical network when the APU is available.

APU SG Description

The SG is a part of the APU system. A detailed description of the SG is given in the related ATA 49 chapter.
When the SG is in the Generate mode, the SG (as the VFGs) includes three generators on the same shaft in the same housing:
- A Permanent Magnet Generator (PMG)
- An exciter generator
- A main generator.

Properties of the SG:
- Maximum continuous power of 150 kVA on ground
- Three phases
- 230VAC
- 400Hz constant frequency.

APU SG Management

The Starter Generator Control Unit (SGCU) manages the regulation and protection for the Generate mode of the APU SG.
The voltage regulation is done by adjustment of the current supplied to the exciter generator, according to current and voltage values sensed by the Current Transformers (CTs) and the POR.
When the electrical parameters are correct, the SGCU sends the Power Ready signal to the ENMU. Then, the SGCU supplies 28VDC to the Auxiliary Generator Line Contactor (AGLC), and the ENMF hosted in the ENMU has full authority on the AGLC.
The manual control of the SG is done through the SGCU.
The APU GEN P/BSW, for the SG Generate mode, has two functions:
- Electrical connection/disconnection to/from the aircraft main electrical network, and
- Reset of the SGCU protection function.

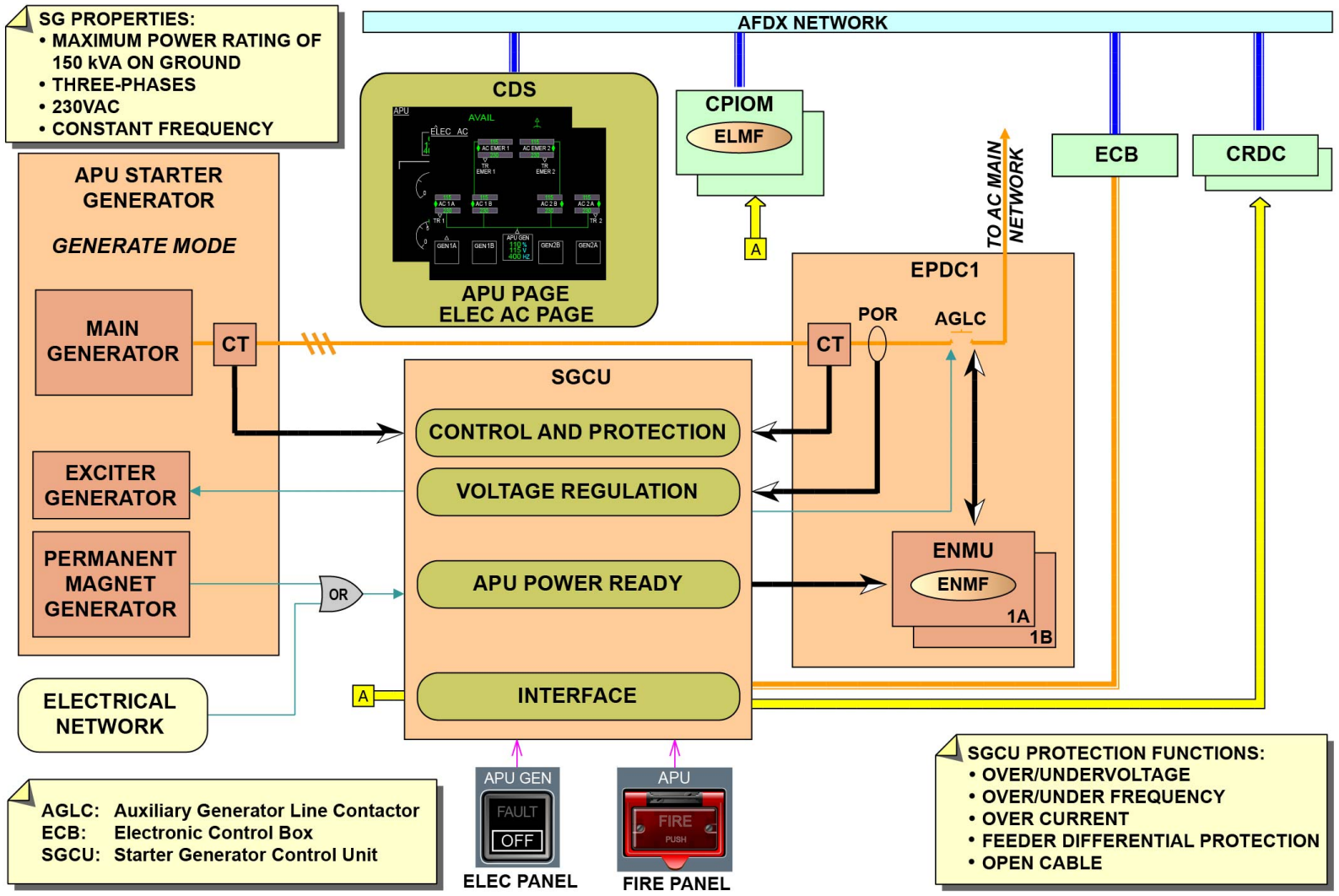
The APU FIRE P/BSW de-energizes and electrically disconnects the SG in the Generate mode.
The SGCU is energized from the aircraft electrical network when the SG is not in operation or from the PMG of the SG when the SG is in operation.

APU SG Protection Functions

The SGCU has the protection functions that follow:
- Over/undervoltage
- Over/underfrequency
- Overcurrent
- Feeder differential current
- Open cable.

APU SG Interface

The SGCU has an ARINC 429 interface with the ELMF that is hosted in two CPIOMs. The ELMF gives overload protection by automatic commercial-load shedding.
The SGCU has an ARINC 429 interface with the AFDX network through CRDCs to send the status and parameters of the SG in the Generate mode to the CDS.
The related data is shown on the ELEC AC and APU pages of the ECAM SD.
The SGCU has a CAN interface with the Electronic Control Box (ECB) of the APU to receive APU ready (N>95%) data.



APU GENERATION - APU SG DESCRIPTION ... APU SG INTERFACE

AC NORMAL GENERATION DESCRIPTION (2/3)

VFG Generation

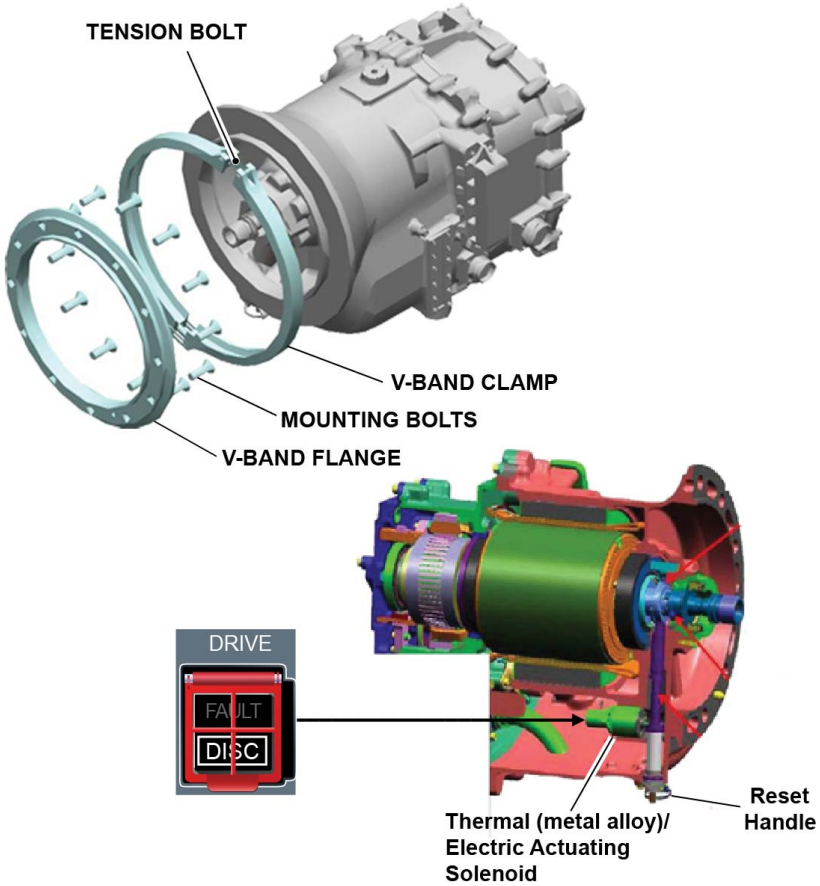
The AC main generation operates in normal configuration, in flight or on ground when the engines are in operation.
Four VFGs change the engine mechanical power into 230VAC electrical power.

VFG Description

Each engine gearbox operates two VFGs.
Properties of the VFGs:
- Maximum continuous power of 100 kVA
- Three phases
- 230VAC
- Frequency range from 360Hz and 800Hz depending on the N3 rotor speed from the idle to max take-off thrust.

All the VFGs are identical and interchangeable.
VFG installation:
Each VFG is installed on the engine gearbox with a V-band clamp fitting.
The V-band clamp assembly has:
- A V-band clamp
- A V-band flange
- A tension bolt
- Mounting bolts.

V-band clamp assembly is attached to the VFG mounting integral flange.
VFG disconnection/reconnection:
The DRIVE P/BSW controls the mechanical disconnection of the VFG.
The FAULT legend of the DRIVE P/BSW comes on when the VFG is mechanically defective. The cockpit crew must lift the safety guard and push the DRIVE P/BSW to energize the VFG-disconnect internal solenoid.
The defective VFG rotor is then mechanically disconnected from the engine accessory gearbox.
If the troubleshooting is satisfactory, the maintenance personnel can re-connect the VFG to the gearbox with the related reset handle.
The VFG also has an automatic thermal-disconnection mechanism that operates when overheating occurs.
It is not possible to do a reset after a thermal disconnection: it is necessary to remove the defective VFG and send it to the applicable workshop.



VFG DISCONNECT MECHANISM OVERVIEW

2 VFGs FOR EACH ENGINE

- 100 kVA
- 230VAC
- VARIABLE FREQUENCY (360Hz TO 800Hz)
- INTERCHANGEABLE VFGs

VFG DISCONNECTION

- MANUAL DRIVE GUARDED P/BSW TO ENERGIZE SOLENOID
  RECONNECTION : RESET HANDLE
- AUTOMATIC : THERMAL DEVICE
  RECONNECTION : ONLY ON SHOP

VFG GENERATION - VFG DESCRIPTION

AC NORMAL GENERATION DESCRIPTION (2/3)

VFG Generation (continued)

VFG Management

The VFG includes three generators on the same shaft in the same housing:
- A PMG
- An exciter generator
- A main generator.

Each Generator Control Unit (GCU) and Overvoltage Protection Unit (OPU) manage the regulation and the protection of their related VFG.
The voltage regulation is done by adjustment of the current supplied to the exciter generator, according to the current and voltage values sensed by the CTs and the PORs.
When the electrical parameters are correct, the GCU gives order to the OPU to close the Generator Line Contactor (GLC). The GCU sends a Power Ready signal to the ENMF (hosted in the ENMU) which gives the Ground/Open signal to the GLC. The GCU (through the OPU) has the full authority on the GLC.
The manual control of the VFG is done through the GCU:
- The DRIVE P/BSW for the mechanical disconnection of the VFG
- The GEN P/BSW for the electrical connection/disconnection of the VFG to/from the aircraft main electrical network and for the reset of GCU protection function
- The ENG 1 (2) FIRE P/BSWs to de-energize and to electrically disconnect the related VFG.

The GCU is electrically supplied from the aircraft electrical network when the VFG does not operate. When the VFG operates, the PMG supplies the GCU.

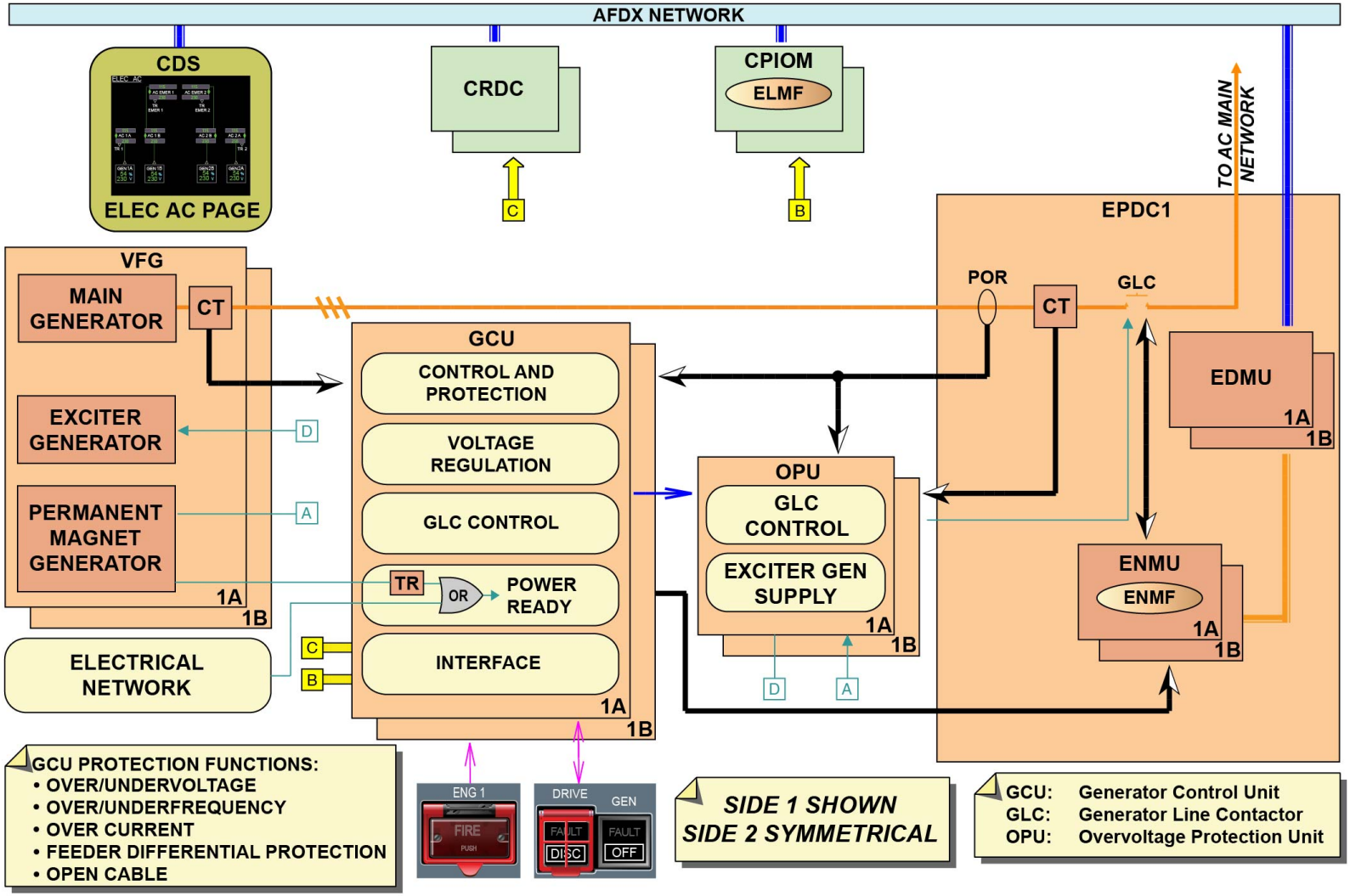
Protection Functions

The GCU has the protection functions that follow:
- Over/undervoltage
- Over/underfrequency
- Overcurrent
- Feeder differential protection
- Open cable.

When the GCU is not available, the OPU supplies overvoltage protection redundancy.
When an overvoltage occurs while the GCU is not available, the OPU opens the related GLC and de-energizes the applicable VFG.

Interface

Each GCU has an ARINC 429 interface with the ELMF hosted in two CPIOMs. The ELMF gives overload protection by automatic commercial-load shedding.
Each GCU has an ARINC 429 interface with the AFDX network through CRDCs to send the status and parameters of the related VFG to the CDS.
The related data is shown on the ELEC AC page of the ECAM SD.
The ENMUs have a CAN interface with their related EDMUs that gives the AFDX network interface with aircraft systems.



VFG GENERATION - VFG MANAGEMENT ... INTERFACE

DC NORMAL GENERATION DESCRIPTION (2/3)

Overview

The primary function of the DC normal generation is to supply electrical power to the users through the sources that follow:
- Two Transformer Rectifiers (TRs) that supply their related 28VDC busbars DC1 and DC2
- Two batteries that do the No Break Power Transfer (NBPT) function for the 28VDC busbars DC1 and DC2 and that supply DC electrical power for some ground tasks.

Each battery is permanently connected to its related 28VDC HOT BUS.

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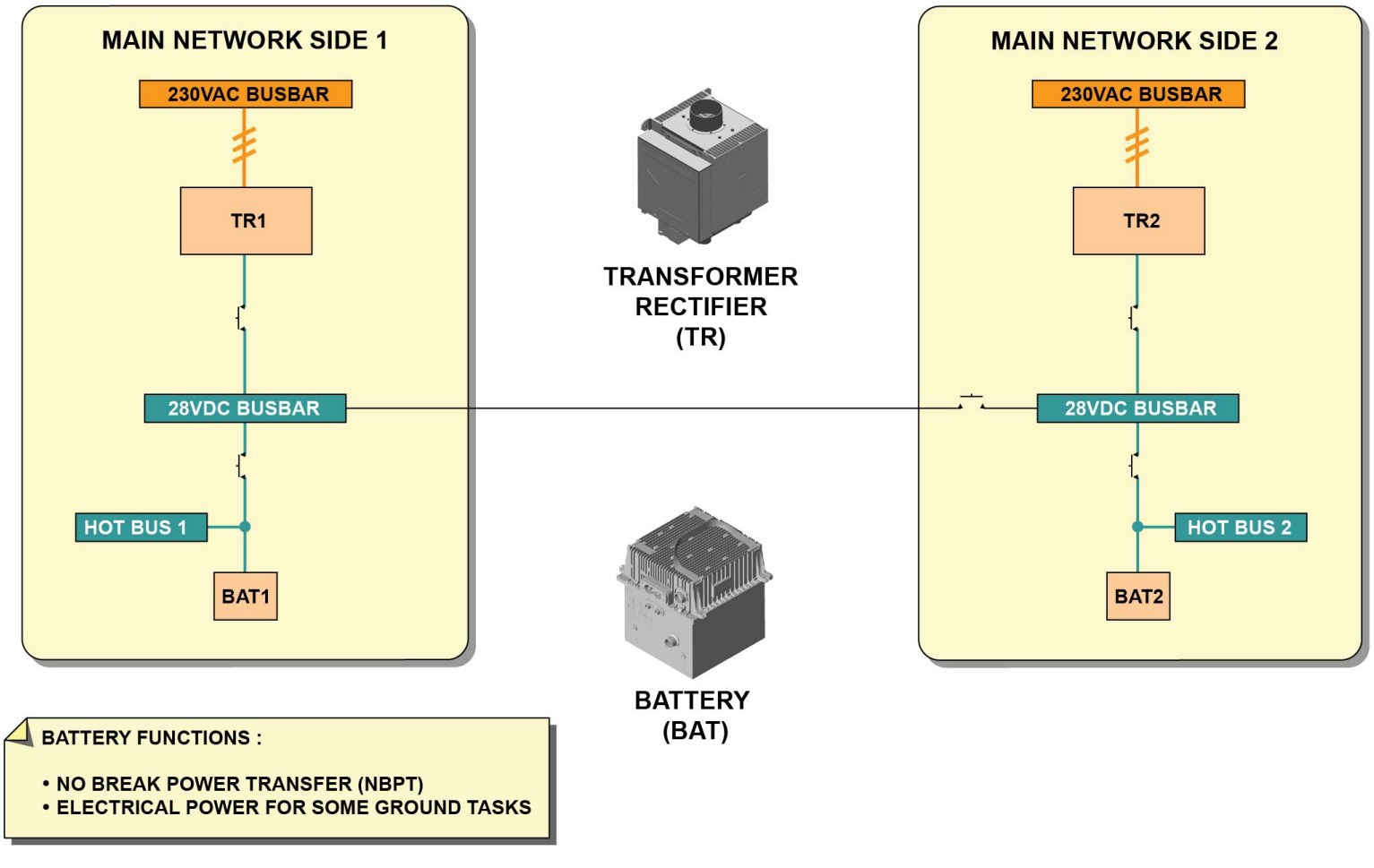
MAIN NETWORK SIDE 1
230VAC BUSBAR
TR1
28VDC BUSBAR
HOT BUS 1
BAT1
TRANSFORMER
RECTIFIER
(TR)
BATTERY
(BAT)
MAIN NETWORK SIDE 2
230VAC BUSBAR
TR2
28VDC BUSBAR
HOT BUS 2
BAT2
BATTERY FUNCTIONS :
• NO BREAK POWER TRANSFER (NBPT)
• ELECTRICAL POWER FOR SOME GROUND TASKS

OVERVIEW

DC NORMAL GENERATION DESCRIPTION (2/3)

Transformer Rectifiers

There are two identical TRs with the primary functions that follow:
- Conversion of the 230VAC into 28VDC
- Control of the related TR Line Contactor (TLC)
- Overcurrent protection
- Fault detection
- Interface with the ELEC DC page of the CDS through CRDCs.

Properties of the TRs:
- Input voltage of 230VAC, variable or fixed frequency
- Output voltage of 28VDC

On the overhead panel, on the RESET sections, TR1 and TR2 switches are used to do the reset of the TR protection functions.

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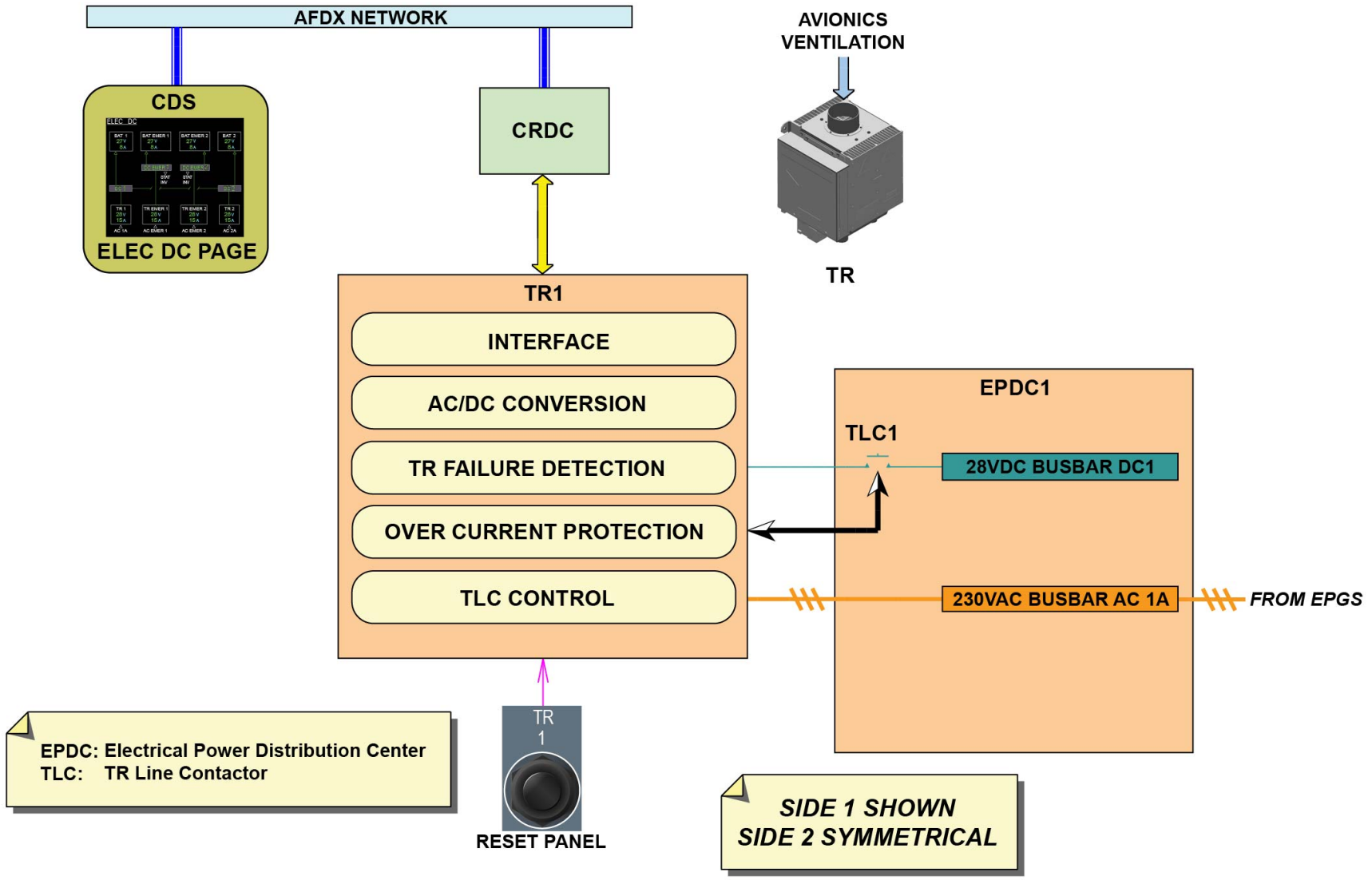

TRANSFORMER RECTIFIERS

DC NORMAL GENERATION DESCRIPTION (2/3)

Batteries

There are two identical batteries with the primary functions that follow:
- NBPT to keep the 28VDC available at the related 28VDC busbars during electrical power transfers and/or electrical network reconfigurations
- Start of the APU when no AC main power source (external power or Variable Frequency Generator (VFG)) is available
- Supply of part of the DC network for refuel on BAT and towing on BAT procedures
- Management of their charge status and related charge cycles
- Internal overcurrent and overdischarge protection
- On the overhead panel:
- The BAT section of the maintenance panels can give the voltage of all the batteries in all configurations
- The TOWING ON BAT section of the maintenance panels can give the charge level of the battery 1.
- Interface with the ELEC DC page of the CDS through the CRDCs
- Interface with the FWS and the CMS for failure detection and fault reporting analysis.

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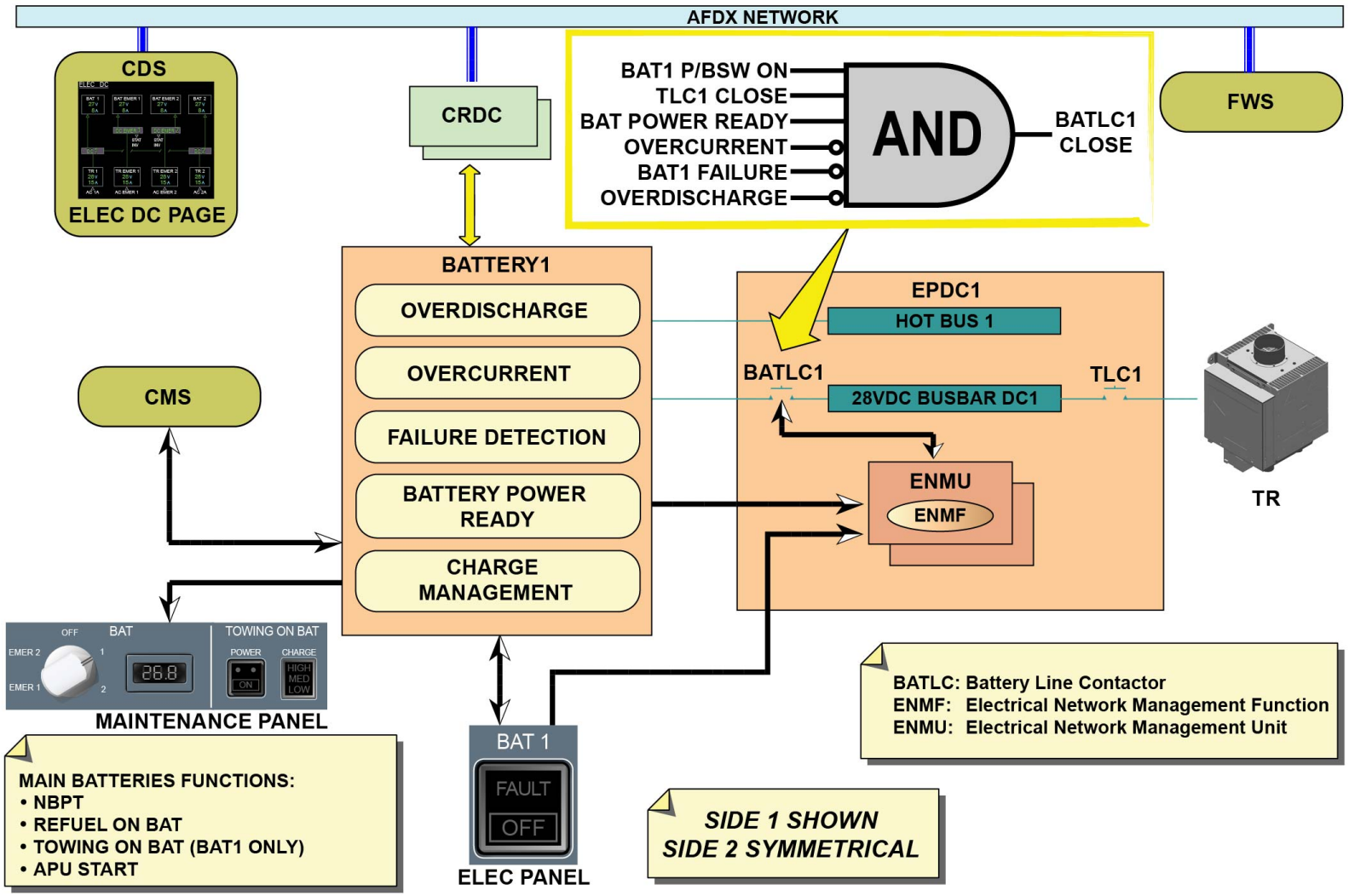

AFDX NETWORK
CDS
ELEC DC PAGE
CRDC
BAT1 P/BSW ON
TLC1 CLOSE
BAT POWER READY
OVERCURRENT
BAT1 FAILURE
OVERDISCHARGE
AND
BATLC1 CLOSE
FWS
BATTERY1
OVERDISCHARGE
OVERCURRENT
FAILURE DETECTION
BATTERY POWER READY
CHARGE MANAGEMENT
EPDC1
HOT BUS 1
BATLC1
TLC1
28VDC BUSBAR DC1
ENMU
ENMF
TR
CMS
OFF
BAT
TOWING ON BAT
EMER 2
EMER 1
26.8
POWER
CHARGE
ON
HIGH
MED
LOW
MAINTENANCE PANEL
BAT 1
FAULT
OFF
ELEC PANEL
BATLC: Battery Line Contactor
ENMF: Electrical Network Management Function
ENMU: Electrical Network Management Unit
MAIN BATTERIES FUNCTIONS:
• NBPT
• REFUEL ON BAT
• TOWING ON BAT (BAT1 ONLY)
• APU START
SIDE 1 SHOWN
SIDE 2 SYMMETRICAL

BATTERIES

DC NORMAL GENERATION DESCRIPTION (2/3)

Batteries (continued)

Battery Description

Properties of the batteries:
- Lithium-Ion technology
- Nominal voltage of 25.2VDC
- Capacity of 50 Ah
- Weight of 29 kg.

The upper part of the battery is referred to as the electronic part and has the functions that follow:
- Battery charger and charge control
- Battery management (protection, monitoring and fault detection)
- Interface with the aircraft systems.

The primary lower part of the battery is referred to as the power part and contains the Lithium-Ion cells that give the battery voltage and capacity.

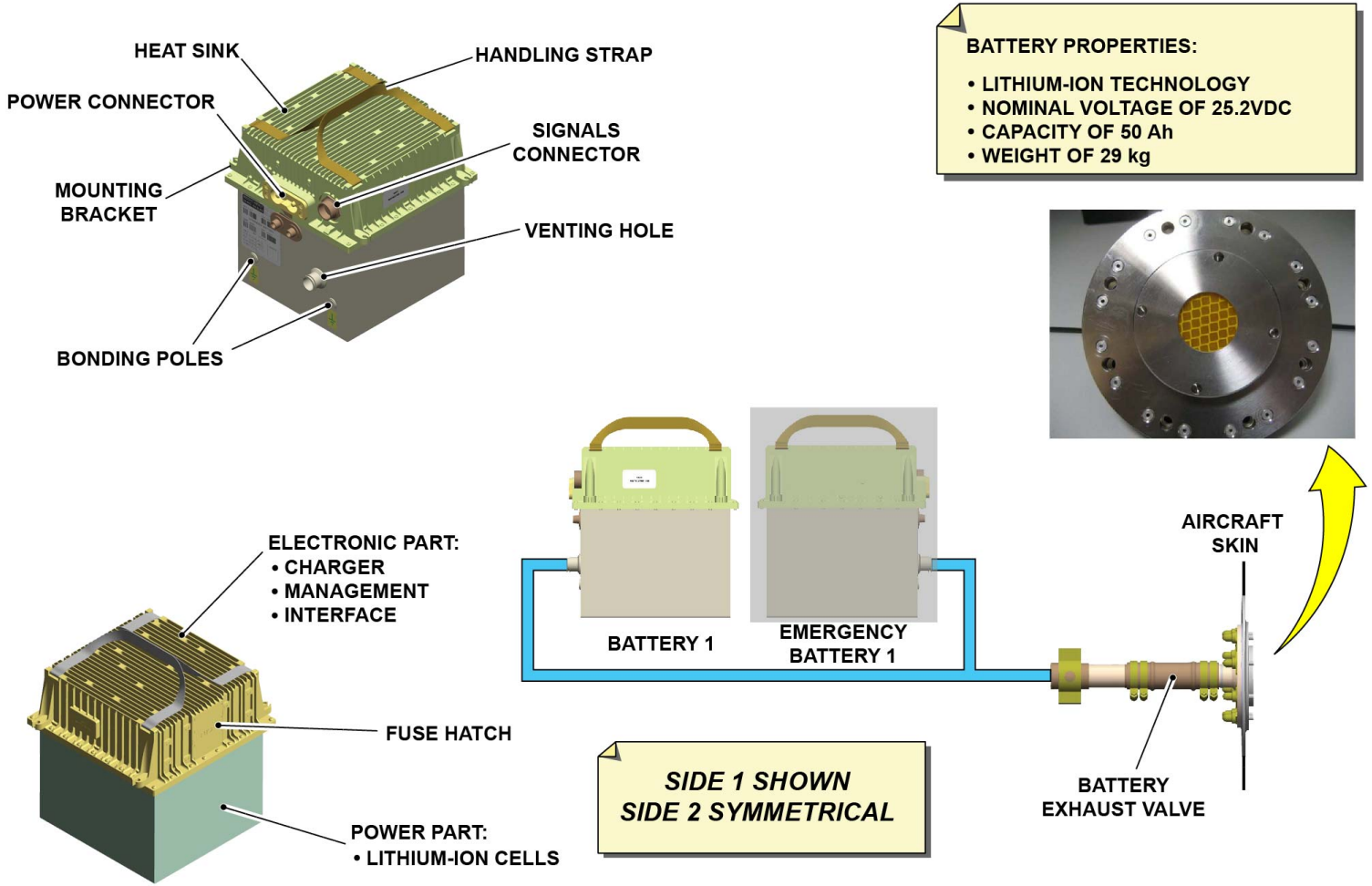
Each battery has two fuses for protection of the zone between the grounding and the battery contactor.

When a battery thermal runaway occurs (short circuit that causes fast gas generation), the battery exhaust system ensure the exhaust of gas concentration out of the pressurized fuselage. This system includes ducts that connect the main battery and the emergency battery of the same side to a single exhaust valve installed on the aircraft skin.

The battery exhaust valve is a mechanical valve that releases a very small flow of air during normal operation.

When an overpressure occurs in the ducts, the valve opens and releases the exhaust gas outboard the fuselage.

The closed position of the valve (when no overpressure occurred), is shown with a reflective orange color visible from out of the aircraft.



BATTERIES - BATTERY DESCRIPTION

AC AND DC EMERGENCY GENERATION DESCRIPTION (2/3)

General

There is an AC and DC emergency electrical generation system. The related emergency network is installed in the Electrical Power Distribution System (EPDS).
For the 230VAC power, in normal configuration, 230VAC busbar AC 1B, 2B supply the emergency network.
In emergency configuration, Total Engine Flame Out (TEFO) or Loss of Main Electrical Supply (LMES), with the Ram Air Turbine (RAT) deployed, the RAT generator supplies all of the AC and DC emergency network.
For the 115VAC power, in normal or emergency configuration with the RAT deployed, each emergency Auto Transformer Unit (ATU) supplies its 115VAC busbar AC EMER.
In emergency configuration during RAT deployment in flight, or on the ground in battery only configuration, the static inverter supplies 115VAC to a part of the AC emergency network on 115VAC busbar INV AC1.
For the 28VDC power, in normal or emergency configuration with the RAT deployed, the emergency Transformer Rectifiers (TRs) supply the DC emergency network.
In the emergency configuration, during RAT deployment in flight or on the ground in battery only configuration, each emergency battery supplies its related DC emergency network.

Ram Air Turbine Description

The RAT has these parts:
- A turbine
- A gearbox
- A generator.

The RAT Generator Control Unit (GCU) controls and monitors the RAT generator.

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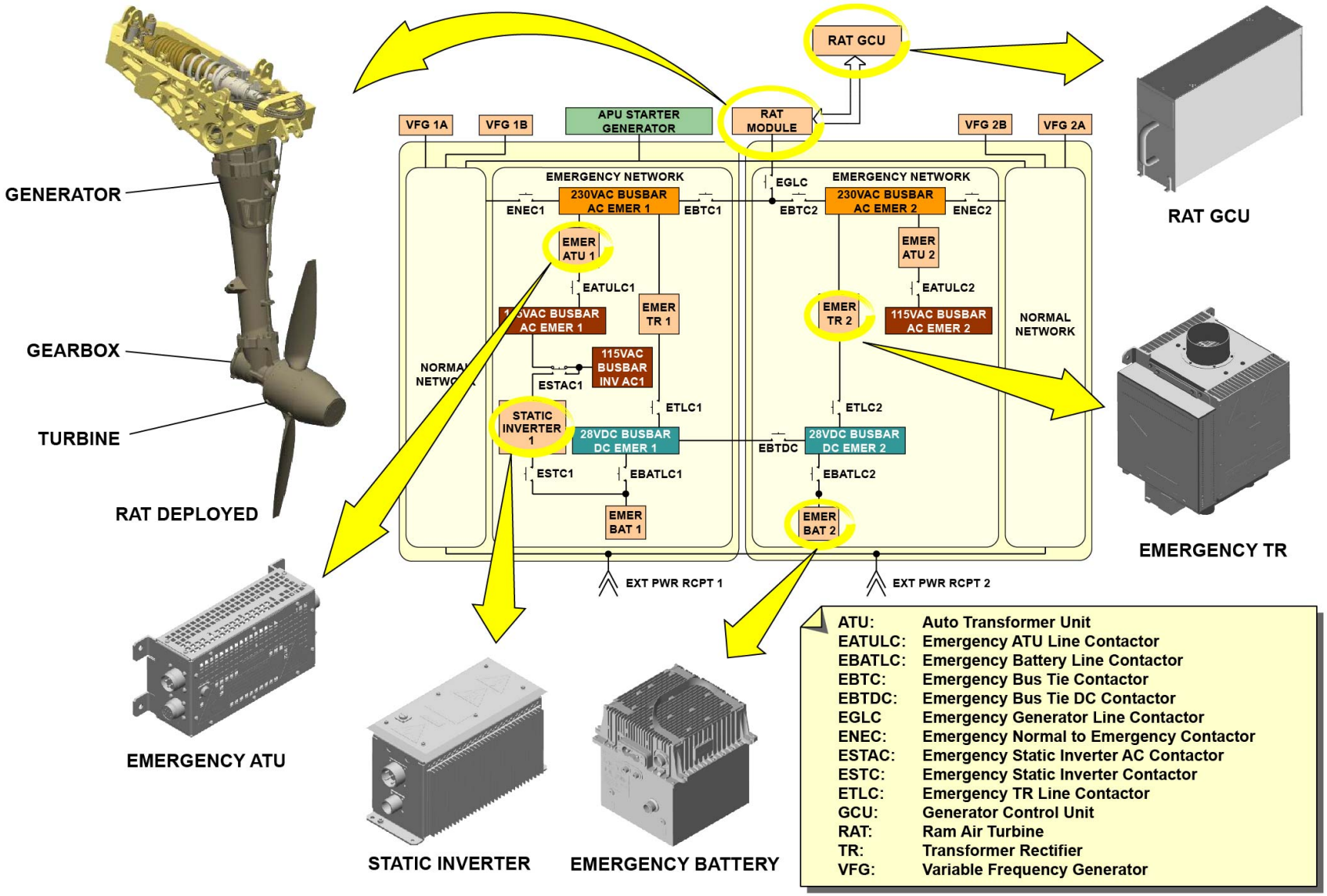


GENERAL - RAM AIR TURBINE DESCRIPTION

AC AND DC EMERGENCY GENERATION DESCRIPTION (2/3)

RAT Deployment and Generator Heating

The deployment of the RAT can be automatic or manual. Two solenoids control the deployment, one solenoid for the automatic control and one solenoid for the auto/manual control.

Automatic Deployment

RAT is deployed automatically, if there is one of the emergency conditions that follow in flight:
- LMES, related to a loss of the four main AC busbars, or
- TEFO, related to a loss of the two engines.

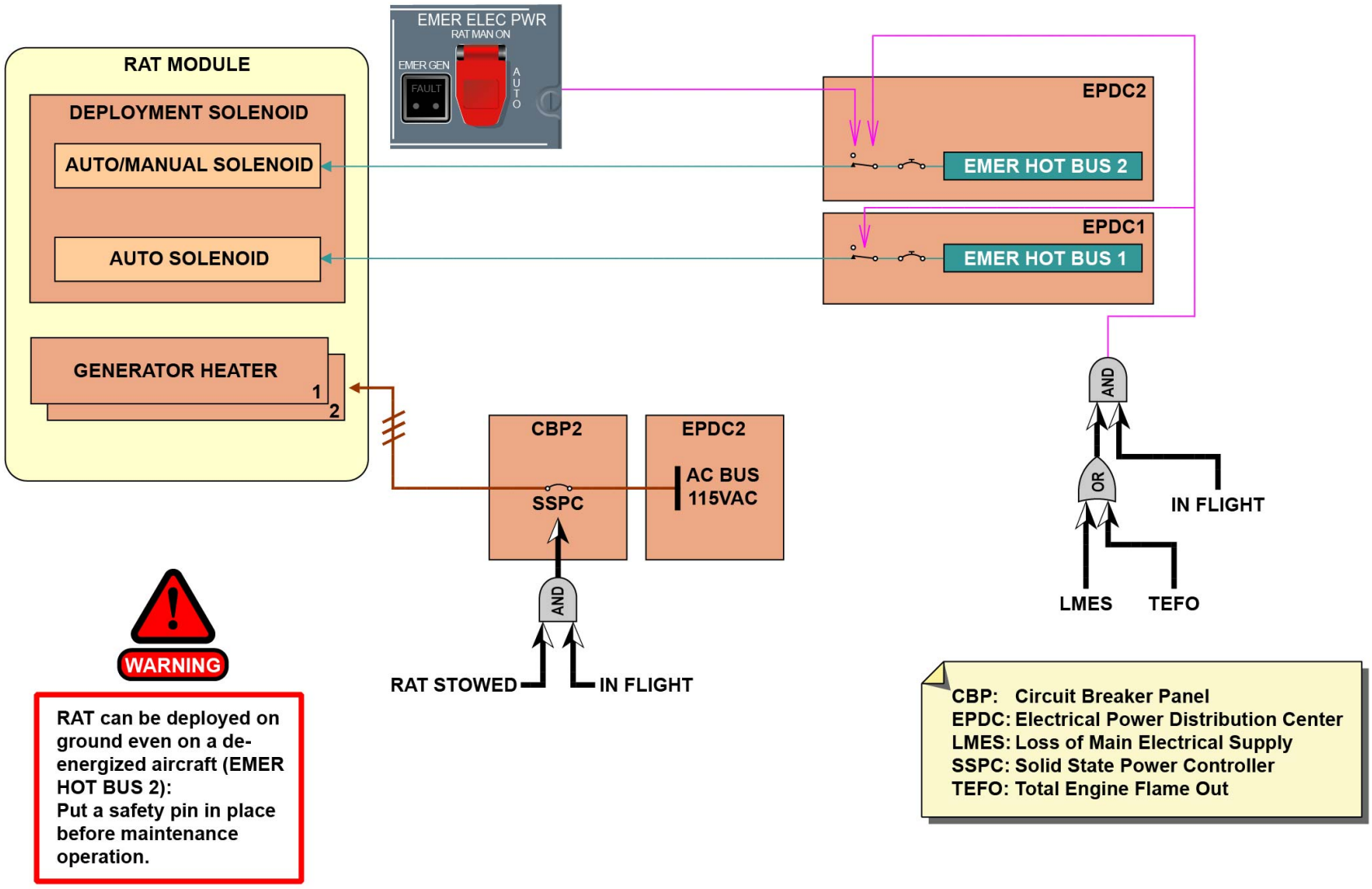
The Electrical Power Distribution Center (EPDC) receives emergency condition data and sends an output signal to control the automatic deploy solenoid and the auto/manual deploy solenoid.
EMER HOT BUS 1 energizes the automatic deploy solenoid. EMER HOT BUS 2 energizes the auto/manual deploy solenoid.

Manual Deployment

To deploy the RAT manually, the flight crew can push the guarded RAT MAN ON pushbutton switch.
The RAT must be deployed manually when the automatic deployment does not operate during emergency conditions (TEFO or LMES) or during the manual test procedure.
When the RAT MAN ON pushbutton switch is pushed, a discrete signal is sent to the EPDC, which supplies 28VDC to the auto/manual solenoid.
WARNING: It is possible to deploy the RAT on the ground, even on a de-energized aircraft because the auto/manual solenoid is supplied from EMER HOT BUS 2. Before you do a maintenance operation in the RAT area, you must put the RAT safety pin in position.

Heater

There are two RAT generator heaters that prevent generator icing.
Both generator heaters operate automatically when the aircraft is in flight and the RAT is stowed.
There are off when the aircraft is on the ground.
The generator heaters are supplied with 115VAC from EPDC2 through a Solid State Power Controller (SSPC) in Circuit Breaker Panel 2 (CBP2).



RAT DEPLOYMENT AND GENERATOR HEATING - AUTOMATIC DEPLOYMENT ... HEATER

AC AND DC EMERGENCY GENERATION DESCRIPTION (2/3)

RAT Deployment and Generator Heating (continued)

RAT Generator Management

The RAT generator includes three generators on the same shaft in the same housing:
- A Permanent Magnet Generator (PMG)
- An exciter generator
- A main generator.

The RAT GCU manages the regulation and protection for the RAT generator.
The voltage regulation is operated through the adjustment of the current supplied to the exciter generator in relation to current and voltage values sensed by the Current Transformers (CTs) and the Point Of Regulation (POR).
When the electrical parameters are correct, the RAT GCU causes the Emergency Generator Line Contactor (EGLC) to close.
The RAT GCU is energized from the aircraft electrical network (28VDC) for BITE when the RAT does not operate or by the PMG when the RAT operates.
The RAT generator properties are related to the aircraft speed:
- Output voltage three-phases 230VAC
- Frequency: from 360Hz to 800Hz
- Power rating: 50 kVA when the aircraft speed is more than 175 Kts.

Protection Functions

The RAT GCU has these protection functions:
- Overvoltage
- Undervoltage
- Differential current
- Overcurrent.

When the RAT GCU triggers protection function, the EGLC opens and the RAT generator is de-excited.
These protection functions are for the RAT generator ground tests only.
In flight and in emergency condition (information given by A/C systems), a protective inhibit signal is sent from EPDC2 to the RAT GCU to cancel all the RAT GCU protection functions.
In this configuration, the RAT generator continues to supply electrical power even in degraded mode.

Interface

The RAT GCU has an AFDX network interface with the CDS through the CRDC to send and show the RAT generator status and parameters on the ELEC AC page.
The RAT GCU has an interface with the cockpit EMER ELEC PWR panel to cause the FAULT light to come on when there is an electrical emergency condition and the EGLC contactor stays open.
This condition occurs during the RAT deployment, but when the EGLC is closed, the FAULT light goes off.

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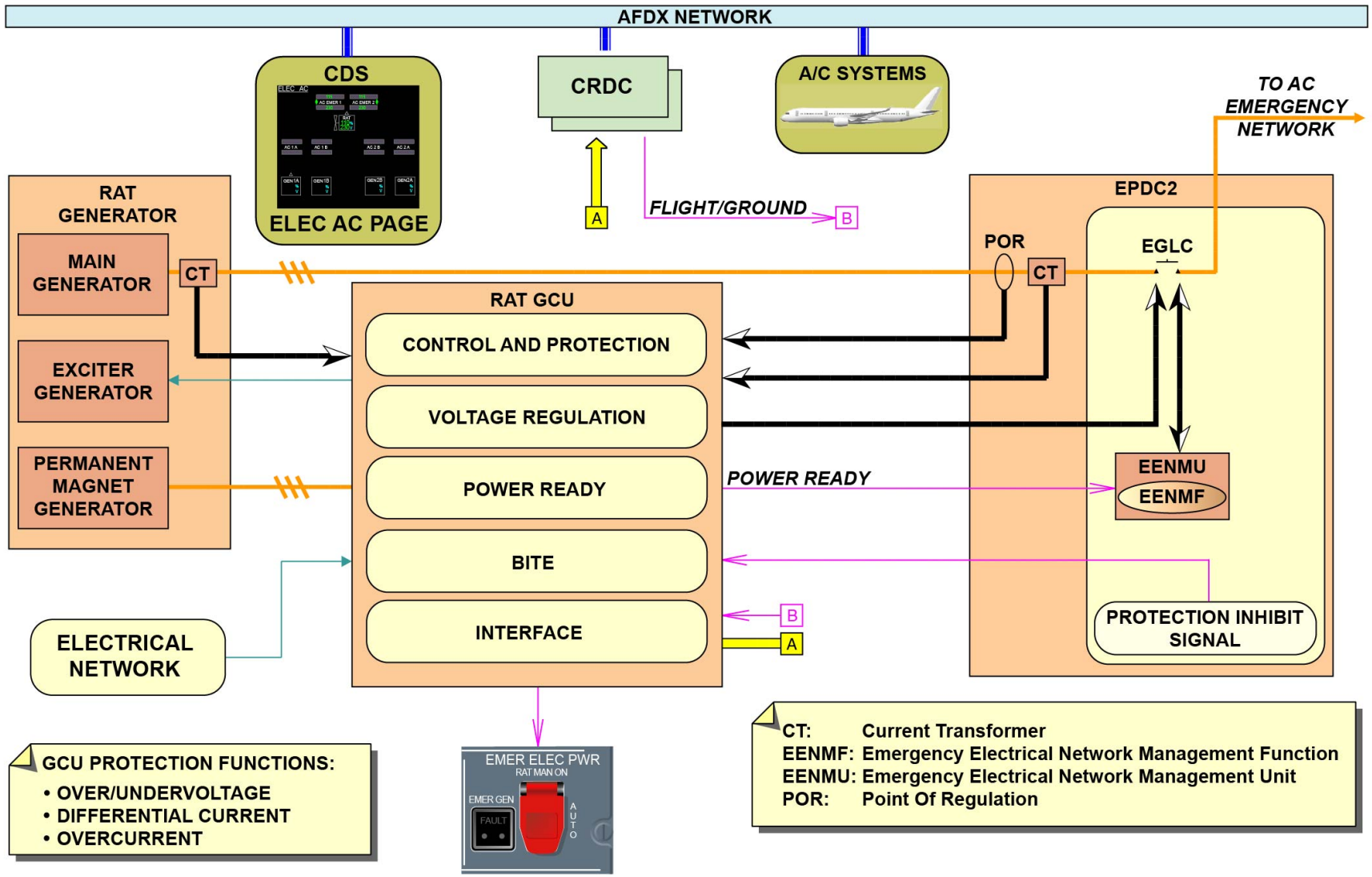


RAT DEPLOYMENT AND GENERATOR HEATING - RAT GENERATOR MANAGEMENT ... INTERFACE

AC AND DC EMERGENCY GENERATION DESCRIPTION (2/3)

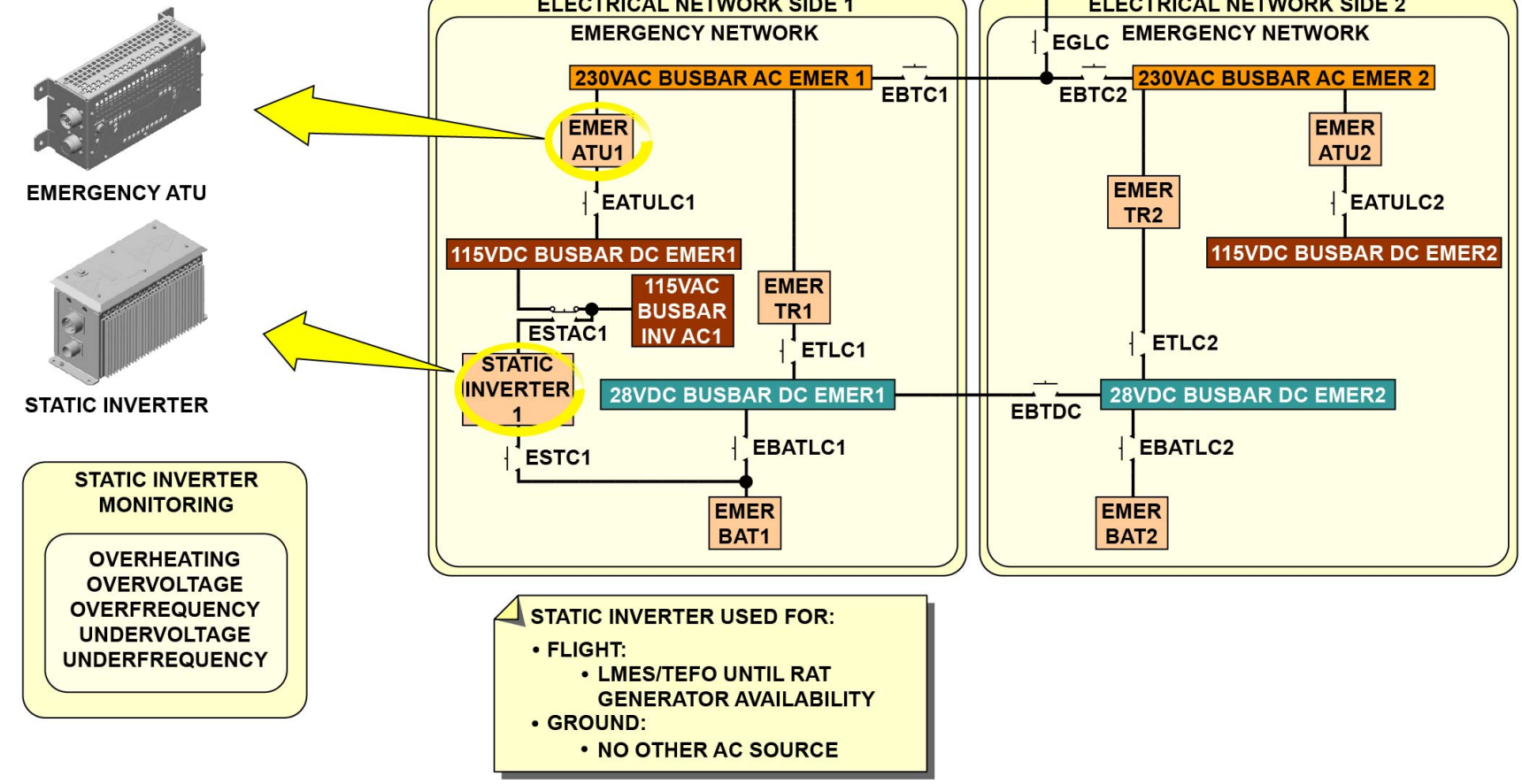
Static Inverter

The static inverter automatically supplies AC power, in emergency generation configuration, when only the batteries are available. It changes the 28VDC from emergency battery 1 into single phase 115VAC 400Hz. The static inverter is rated to 500 VA.
In flight, the primary function of the static inverter is to manage the time necessary between a major failure of the normal AC supply (LMES/TEFO condition) and the connection of the RAT generator to the emergency network.
The RAT generator is not available for some seconds before the RAT is fully deployed and turns in the air stream. During this short period of time, the static inverter keeps the AC electrical power available for some loads connected to the 115VAC busbar INV AC1.
The static inverter also supplies electrical power to some loads on the ground when the BAT EMER 1 pushbutton switch is pushed and no AC power is available.
The static inverter operates in the conditions that follow:
- In flight, when the main AC power is lost (LMES/TEFO), time necessary for RAT deployment and RAT generator connection.
- On the ground, if the BAT EMER 1 pushbutton switch is pushed, and no AC source is available, the static inverter automatically supplies the 115VAC busbar INV AC1 (for example, the cockpit preparation and the evacuation procedure).
Static inverter has monitoring for: overheating, overvoltage, undervoltage, overfrequency, underfrequency.

Emergency ATU

The two emergency ATUs are the same and interchangeable. Their operation is the same as that of the main ATUs but:
- The dimensions of the emergency ATUs are different.
- They have a different power rating.
- The emergency ATUs are used only for the transformation of the 230VAC into 115VAC.
Emergency ATUs' properties are:
- Power of 4 kVA
- Frequency range from 360Hz to 800Hz, the output frequency stays the same as the input frequency.

	POWER	VOLTAGE	FREQUENCY RANGE
EMERGENCY ATU	4 kVA	230VAC TO 115VAC	360Hz TO 800Hz



STATIC INVERTER & EMERGENCY ATU

V2414251 - V00T0MM0 - VM24D3EMERG3001

AC AND DC EMERGENCY GENERATION DESCRIPTION (2/3)

Emergency TR

The two emergency TRs are the same, their primary functions are:
- To change the 230VAC into 28VDC
- To control the related Emergency TR Line Contactor (ETLC)
- To give protection against overcurrent
- Fault detection
- Interface with the CDS ELEC DC page through the CRDCs.

The emergency TRs are the same as the main TRs but when installed as emergency TRs, they are not cooled from the avionics ventilation system.
Properties of the emergency TRs:
- Input voltage of 230VAC, variable or fixed frequency
- Output voltage of 28VDC
- Maximum continuous power (on the ground) of 155 A.

On the RESET sections of the overhead panel, the emergency TR1, 2 switches are used to do the reset of the protection functions of the emergency TRs.

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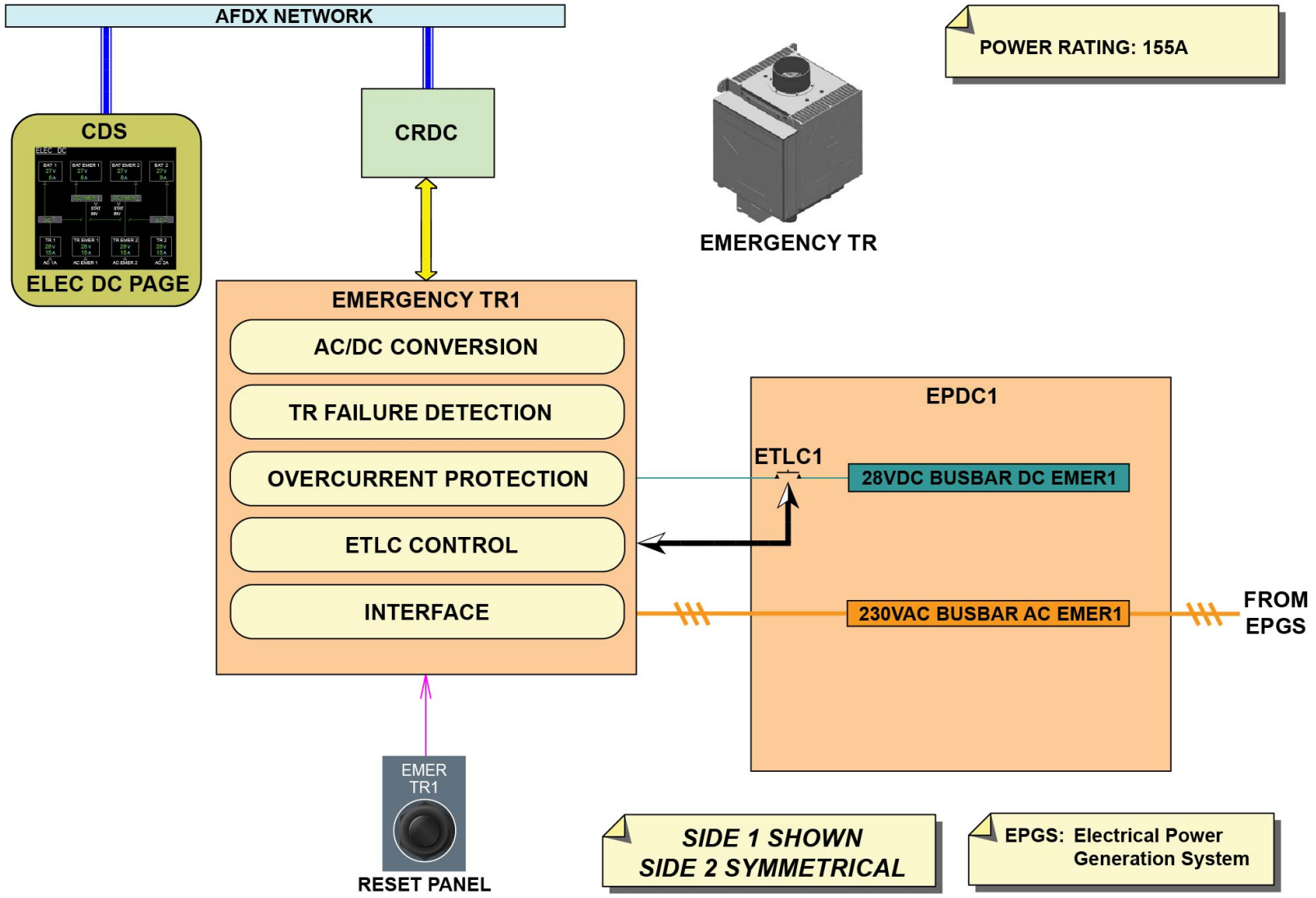


EMERGENCY TR

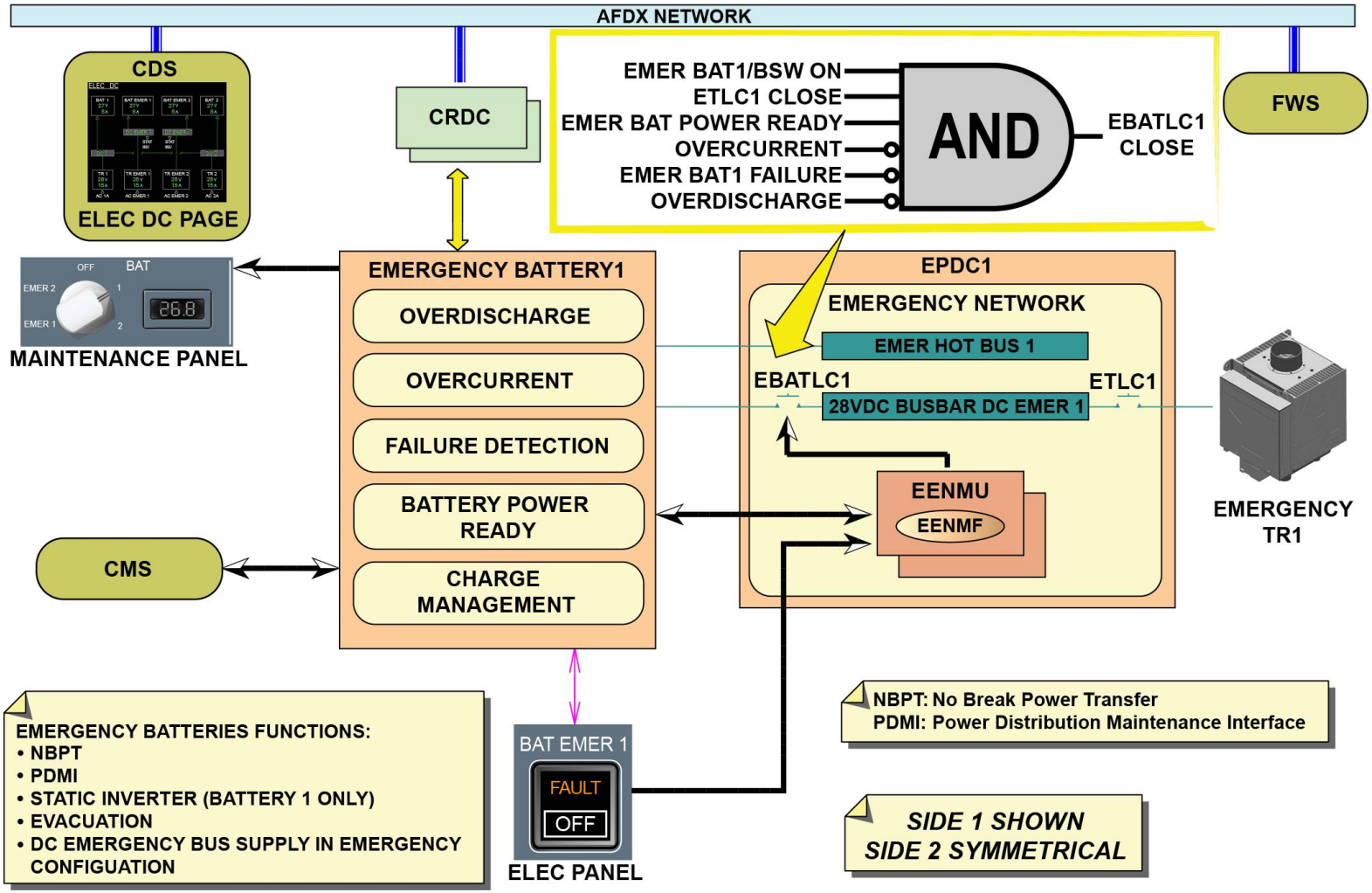
AC AND DC EMERGENCY GENERATION DESCRIPTION (2/3)

Emergency Battery

The two emergency batteries are the same. They have the primary functions that follow:
- No Break Power Transfer (NBPT) (to keep the 28VDC available at the related 28VDC busbars EMER during electrical power transfer and/or electrical network reconfigurations)
- Energizing of a part of the DC emergency network for specific modes: Power Distribution Maintenance Interface (PDMI) on battery and evacuation
- Supply of the static inverter when no AC power is available (emergency battery 1 only)
- Supply of their related 28VDC busbar DC EMER in emergency configuration (normally during RAT extension after LMES)
- Management of their charge status and related charge cycles
- Internal overcurrent and overdischarge protection
- Interface with the cockpit overhead maintenance panel for battery voltage
- Interface with the CDS ELEC DC page through the CRDCs
- Interface with the FWS and CMS application for failure detection and fault reporting/analysis.

The emergency batteries and the main batteries are fully interchangeable.

V2414251 - V00T0MM0 - VM24D3EMERG3001



EMERGENCY BATTERY

V2414251 - V00T0MM0 - VM24D3EMERG3001

AC AND DC EMERGENCY GENERATION DESCRIPTION (2/3)

Emergency Battery (continued)

Emergency Battery Description

Properties of the batteries:
- Lithium-Ion technology
- Nominal voltage of 25.2VDC
- Capacity of 50 Ah
- Weight of 29 kg.

The upper part of the emergency battery is referred to as the electronic part and has the functions that follow:
- Battery charger and charge control
- Battery management (protection, monitoring and fault detection)
- Interface with the aircraft systems.

The primary lower part of the emergency battery is referred to as the power part and contains the Lithium-Ion cells that give the emergency battery voltage and capacity.

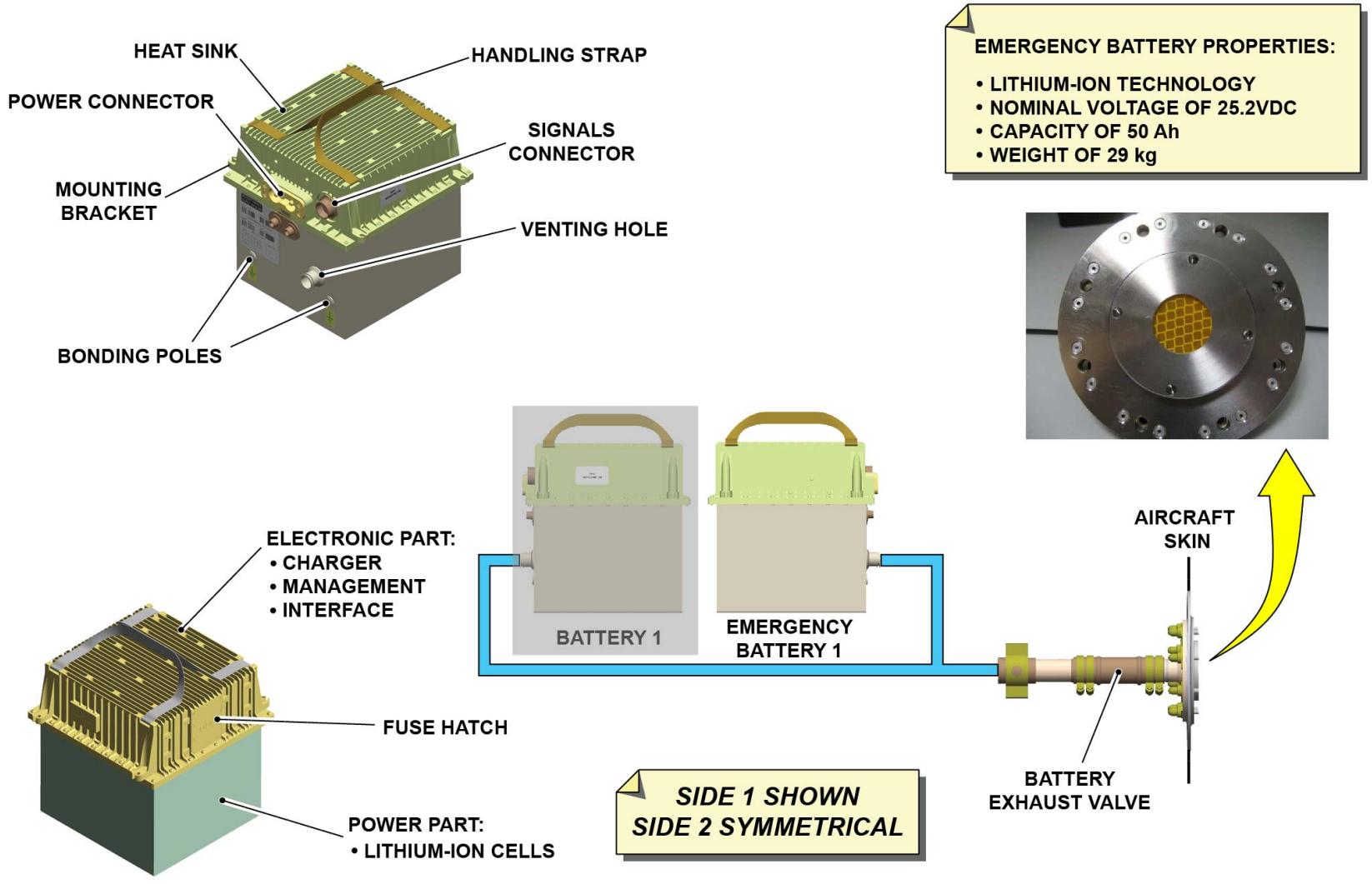
Each emergency battery has two fuses for protection of the zone between the grounding and the emergency battery contactor.

When an emergency battery thermal-runaway occurs (short circuit that causes fast gas generation), the battery exhaust system ensure the exhaust of gas concentrations out of the pressurized fuselage. This system includes ducts that connect the main battery and the emergency battery of the same side to a single exhaust valve installed on the aircraft skin.

The battery exhaust valve is a mechanical valve that releases a very small flow of air during normal operation.

When an overpressure occurs in the ducts, the valve opens and releases the exhaust gas outboard the fuselage.

The closed position of the valve (when no overpressure occurred), is shown with a reflective orange color visible from out of the aircraft.



EMERGENCY BATTERY - EMERGENCY BATTERY DESCRIPTION

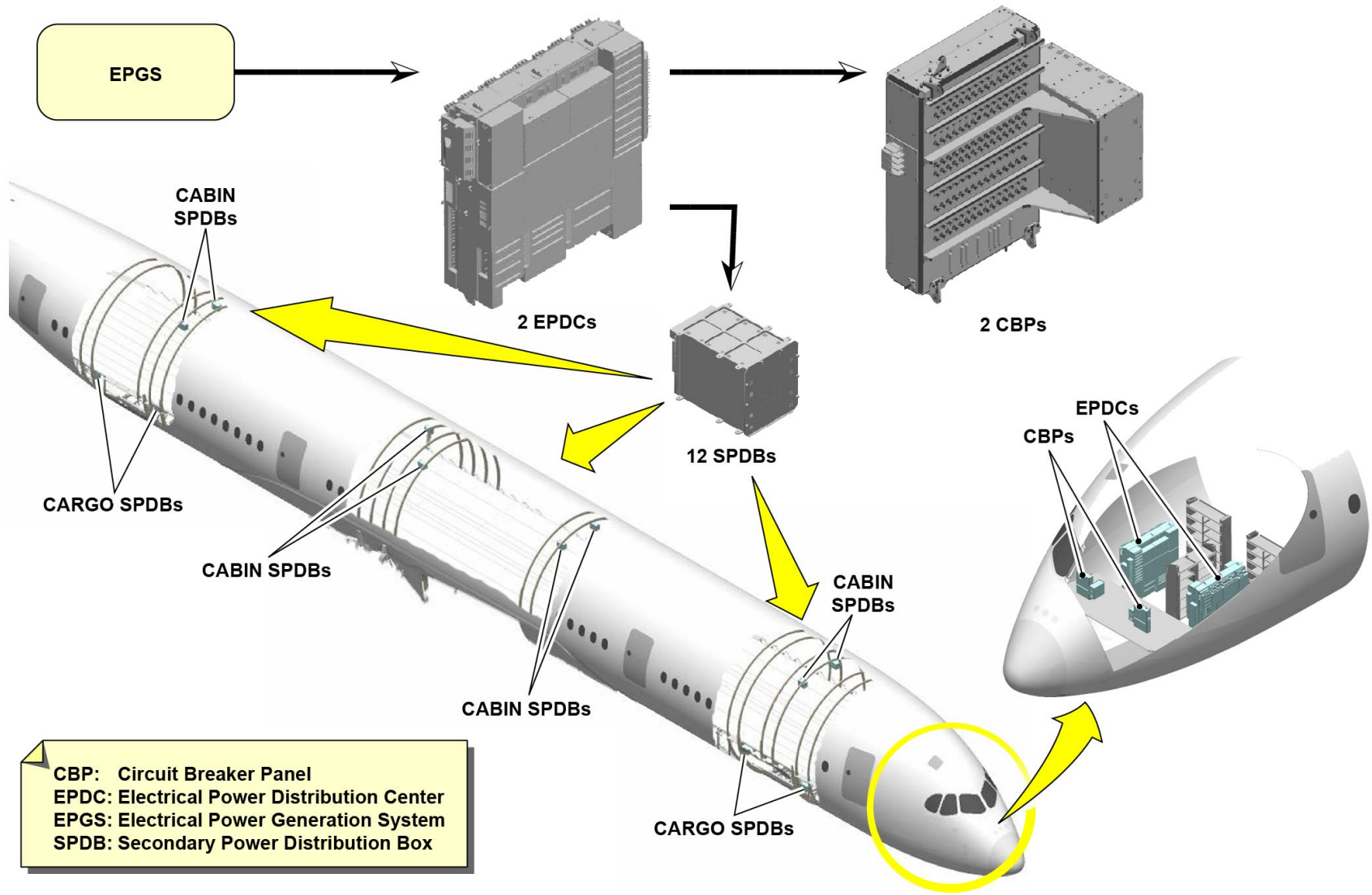
ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

General

The Electrical Power Distribution System (EPDS) supplies electrical power to all the users from the Electrical Power Generation System (EPGS).
The EPDS has two symmetrical sides: side 1 and side 2.
Each side of the EPDS has:
- One Electrical Power Distribution Center (EPDC)
- One Circuit Breaker Panel (CBP)
- Six Secondary Power Distribution Boxes (SPDBs): four cabin SPDBs and two cargo SPDBs.

The EPDCs and CBPs are installed in the avionics compartment.
The SPDBs are installed in the cabin and cargo compartments.

V2414251 - V00T0MM0 - VM24D4DISTR3001


EPGS
2 EPDCs
2 CBPs
12 SPDBs
CABIN SPDBs
CARGO SPDBs
CABIN SPDBs
CABIN SPDBs
CABIN SPDBs
CARGO SPDBs
EPDCs
CBPs
CBP: Circuit Breaker Panel
EPDC: Electrical Power Distribution Center
EPGS: Electrical Power Generation System
SPDB: Secondary Power Distribution Box

GENERAL

ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

EPDS Description

For each side of the EPDS, the primary distribution part of the EPDC supplies electrical power to technical loads which have an electrical power consumption of more than 15 A, through the protection and/or switching devices that follow:
- Contactors
- Remote Control Circuit Breakers (RCCBs)
- Circuit breakers (C/Bs).

Each EPDC primary-distribution part also supplies electrical power to:
- The related secondary and emergency distribution parts
- The six SPDBs for decentralized distribution.

For each side, the secondary distribution parts of the EPDC and CBP supply electrical power to the technical loads that have an electrical power consumption of less than or equal to 15 A through the protection and/or switching devices that follow:
- Solid State Power Controllers (SSPCs) and circuit breakers for the EPDC
- SSPCs for the CBP.

NOTE: The technical loads less than or equal to 15 A are non-commercial loads used for the aircraft systems.

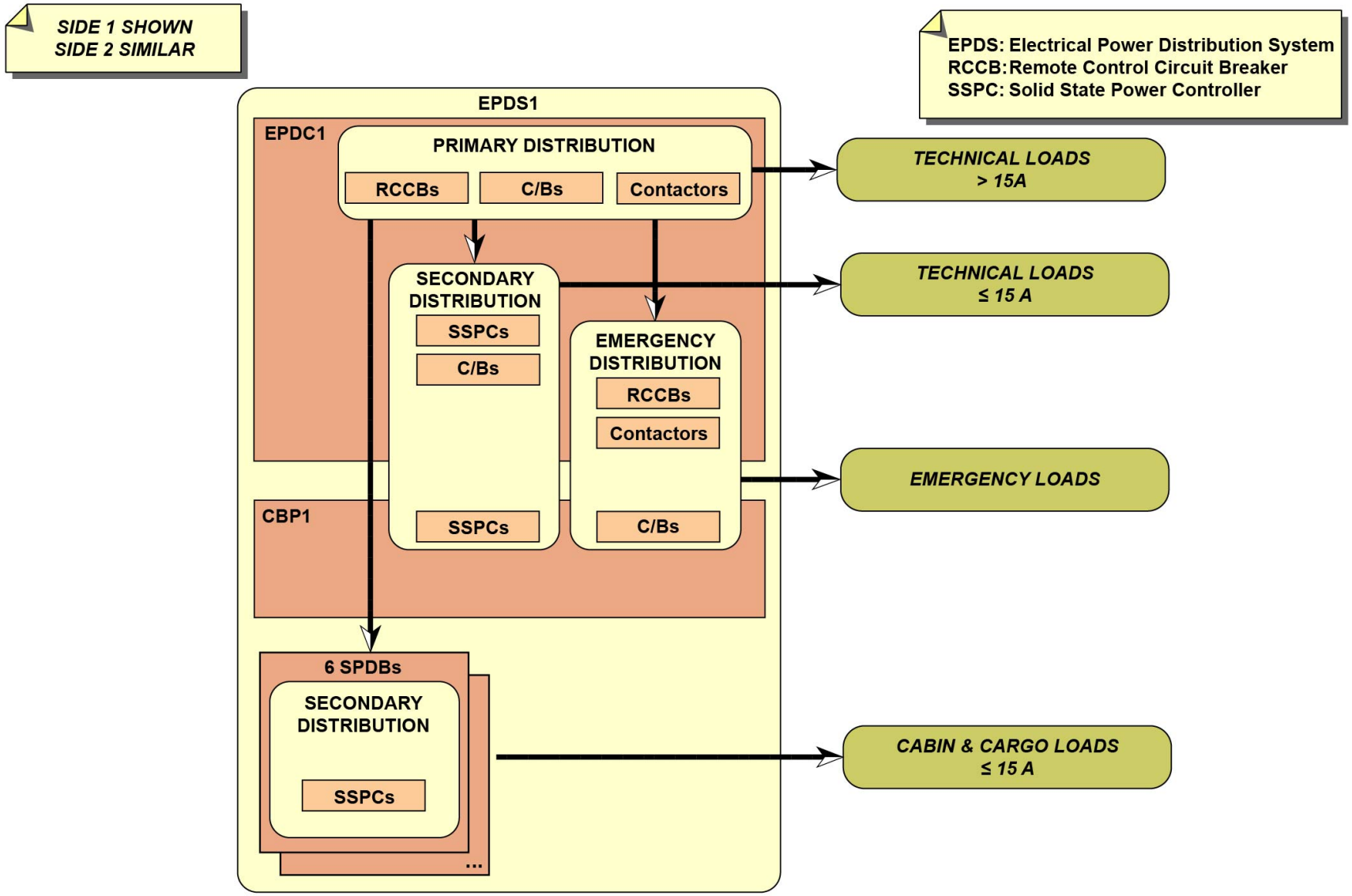
For each side, the emergency distribution parts of the EPDC and CBP supply electrical power to the emergency loads through the protection and/or switching devices that follow:
- RCCBs and contactors for the EPDC
- Circuit breakers for the CBP.

NOTE: The emergency loads must stay energized also in emergency electrical configuration.

On each side, six SPDBs supply remote electrical power to the cabin and cargo loads that have an electrical power consumption of less than or equal to 15 A, through the SSPCs.

The electrical power supplied by the SPDBs comes from the primary distribution part of each EPDC.

NOTE: The cabin and cargo loads are commercial loads (for example the In-Flight Entertainment (IFE)), seats equipment, cargo loading/unloading,...



EPDS DESCRIPTION

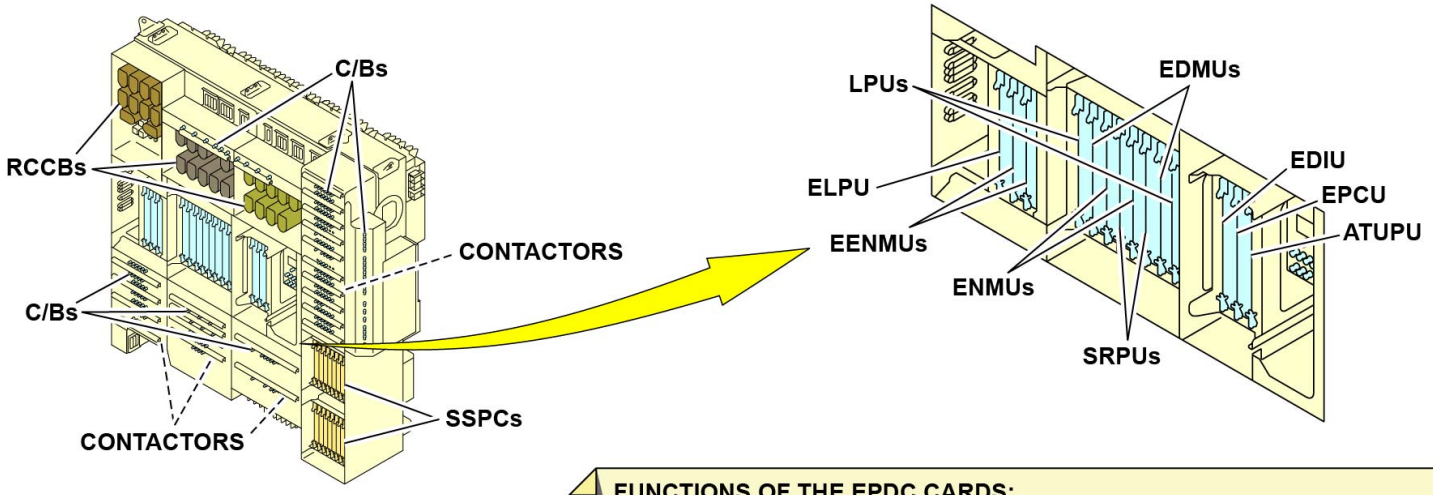
ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

EPDC Architecture

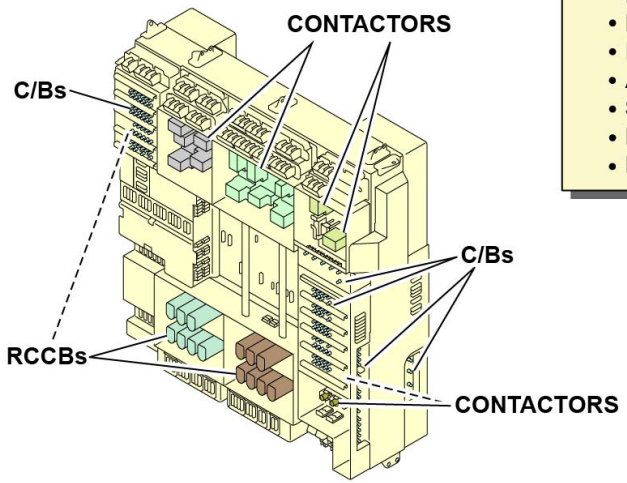
The heart of the EPDS is made of EPDC1 for side 1 and EPDC2 for side 2.
The EPDCs receive AC and DC electrical power from the different generators of the EPGS.
Each EPDC hosts the electrical protection and/or switching devices that follow (non exhaustive list):
- AC and DC contactors
- AC and DC circuit breakers
- AC and DC RCCBs
- Printed Circuit Boards (PCBs) that host SSPCs, also referred to as SSPC cards.

For the primary distribution part of the EPDS that receives electrical power from the normal generation system, each EPDC hosts a set of electronic cards with specific functions:
- Two Electrical Network Management Units (ENMUs), for management and protection of the primary distribution part of the EPDS
- Two Electrical Distribution Management Units (EDMUs), that are the interface between the EPDS and the aircraft systems and manage the EPDS electrical loads
- One Electrical Discrete Interface Unit (EDIU), for circuit breaker status acquisition, discrete direct commands used for the SSPCs and other discrete inputs for logics
- Two Safe Redundant Power Supply Units (SRPUs), that manage the supply to the electronic cards of the EPDC in relation to the available power sources
- One External Power Control Unit (EPCU), for protection of the related external power channel
- Two Lightning Protection Units (LPUs), for protection of the EPDS inputs from lightning or electrical damages.
- One ATU Protection Unit (ATUPU), for protection of the two Auto Transformer Units (ATUs) of the related side.

For the emergency distribution part of the EPDS that manages electrical power distribution for the emergency loads, each EPDC hosts other cards with specific functions:
- Two Emergency Electrical Network Management Units (EENMUs), equivalent to the ENMUs, for management and protection of the contactors in the emergency part of the EPDC
- One Emergency Power Unit (EPU), to manage the supply of the electronic cards of the EPDC emergency-distribution part
- One Emergency Lightning Protection Unit (ELPU), for protection of the inputs of the EPDS emergency part from lightning or electrical damage.



EPDC1 *(INBOARD FACE)*



EPDC1 *(OUTBOARD FACE)*

FUNCTIONS OF THE EPDC CARDS:

- ENMU/EENMU: MANAGEMENT AND PROTECTION OF ELECTRICAL DISTRIBUTION OF THE PRIMARY/EMERGENCY DISTRIBUTION PART
- EDMU: ELECTRICAL LOADS MANAGEMENT AND INTERFACE WITH THE AFDX NETWORK
- LPU AND ELPU: LIGHTNING OR ELECTRICAL DAMAGE PROTECTION
- ATUPU: PROTECTION OF THE ATUs
- SRPU AND EPU: EPDS COMPONENTS POWER SUPPLY
- EPCU: EXTERNAL POWER PROTECTION
- EDIU: PROTECTION AND/OR SWITCHING DEVICES STATUS AND CONTROL

ATUPU:	ATU Protection Unit
EDIU:	Electrical Discrete Interface Unit
EDMU:	Electrical Distribution Management Unit
EENMU:	Emergency Electrical Network Management Unit
ELPU:	Emergency Lightning Protection Unit
ENMU:	Electrical Network Management Unit
EPCU:	External Power Controller Unit
EPU:	Emergency Power Unit
LPU:	Lightning Protection Unit
SRPU:	Secondary Redundant Power Unit

EPDC ARCHITECTURE

ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

EPDC Functions

The EPDCs have the functions that follow to manage their related side:
- Protection of the distribution network
- Management of the distribution network
- Management of the electrical loads to prevent overload conditions through the Electrical Load Management Function (ELMF) hosted by the CPIOMs
- BITE function through the CPIOMs that host the Electrical System BITE Function (ESBF).

Communication

The EPDC and CBP components communicate inside and outside of the EPDCs and CBPs.
Internal communications:
- All the EPDC and CBP components (electronic cards) communicate internally through the EDMUs.

The external communications are between:
- The EDMUs and the AFDX network
- The EENMUs and the AFDX network through the CRDC.

The AFDX network is used for communications with:
- The OIS that hosts the Power Distribution Monitoring and Maintenance Function (PDMMF) and the DLCS
- The two CPIOMs that host the ESBF and the ELMF for overload management
- The CDS to show the status of the electrical distribution network and electrical parameters.

Electrical Network Management Function (ENMF)

The ENMF is hosted by the ENMUs.
The ENMF manages the connection and disconnection of the power sources in relation to their availability.
The ENMF controls the primary distribution contactors and thus determines the electrical network configuration and manages the reconfigurations as necessary.

Emergency Electrical Network Management Function(EENMF)

The EENMF is hosted by the EENMU.
The EENMF manages the connection and disconnection of the emergency power sources in relation to their availability.
The EENMF controls the emergency distribution contactors and thus determines the emergency electrical network configuration and manages the reconfigurations as necessary.

Electrical Load Management Function (ELMF)

The ELMF is hosted in two CPIOMs.
The ELMF manages the automatic shedding of some cabin loads to prevent overload of the EPGS generators in relation to their availability to supply the electrical network (for example before a high-consumption user such as an Electrical Motor Pump (EMP) is started to pressurize the hydraulic system).
To do this, the ELMF exchanges data through the AFDX network with:
- The EPDCs
- The ESBF
- The ENMF
- The CDS to show shedding data, as applicable.

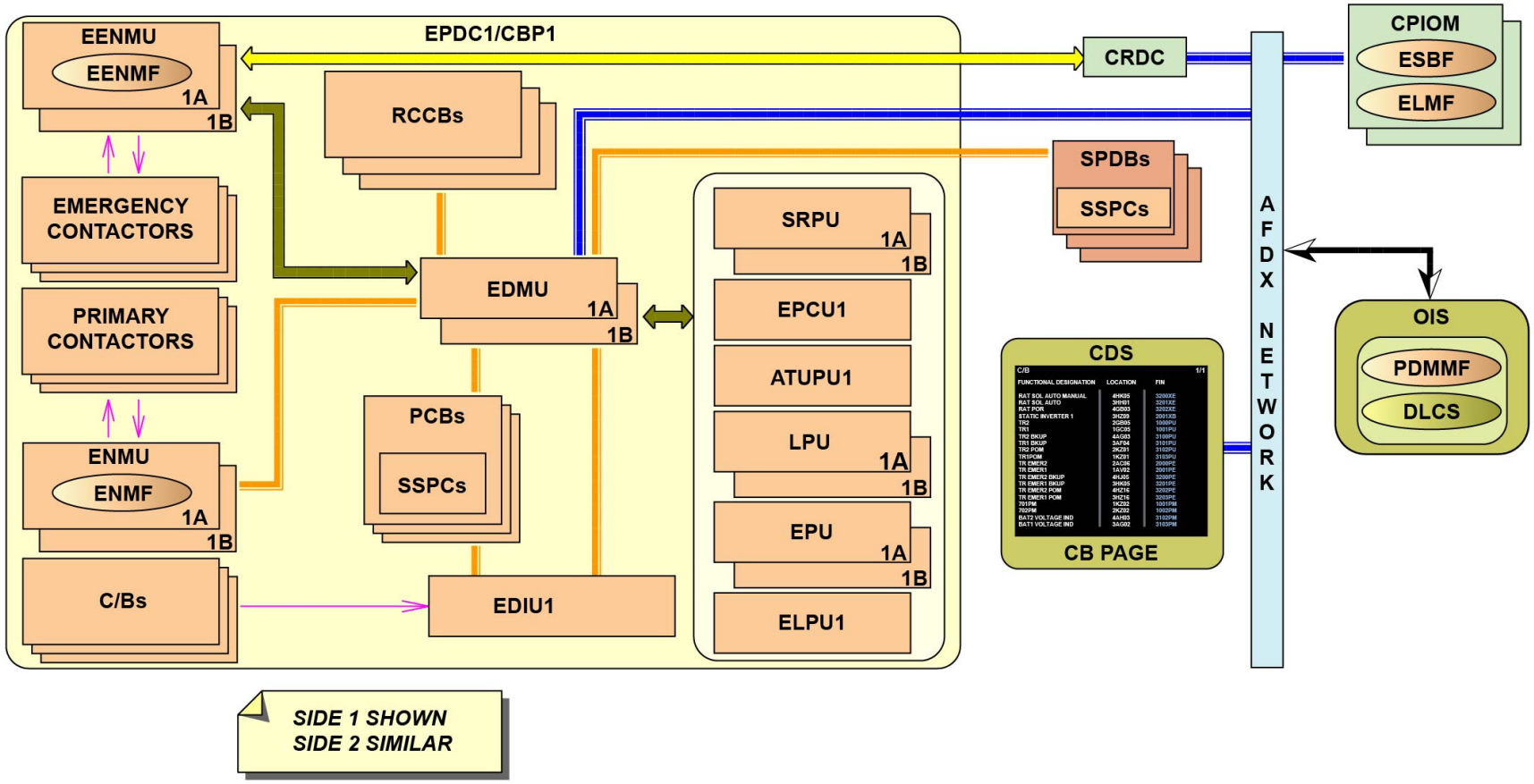
Electrical System BITE Function (ESBF)

The ESBF is hosted in two CPIOMs.
The ESBF receives data through the AFDX network from:
- The EPDCs and CBPs (ENMF and EENMF)
- The Local Power Management Function (LPMF) of the SPDBs (see the SPDBs topic that follows)
- The DLCS for configuration

- The ELMF hosted in the same CPIOMs.

The ESBF sends data through the AFDX network to:

- The EPDCs and CBPs for open/close orders
- The CDS for the status report and load shedding data
- The ENMF for reconnection data
- The ELMF hosted in the same CPIOMs.



DLCS: Data Loading and Configuration System
EENMF: Emergency Electrical Network Management Function
ELMF: Electrical Load Management Function
ENMF: Electrical Network Management Function
ESBF: Electrical System BITE Function
PDMMF: Power Distribution Monitoring and Maintenance Function

EPDS FUNCTIONS:
- NETWORK PROTECTION
- NETWORK MANAGEMENT
- ELECTRICAL LOADS MANAGEMENT
- BITE
- COMMUNICATION

EPDC FUNCTIONS - COMMUNICATION ... ELECTRICAL SYSTEM BITE FUNCTION (ESBF)

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ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

CBP Architecture

Each CBP receives AC and DC electrical power from its related EPDC. The CBPs are symmetrical. Each CBP has a cabinet that hosts all the protection/switching devices that follow:
- Protection/switching devices with four SSPC cards installed on the side partition of the cabinet for 115VAC secondary distribution.
- Protection devices with circuit breakers installed on the main part of the cabinet for DC emergency distribution.

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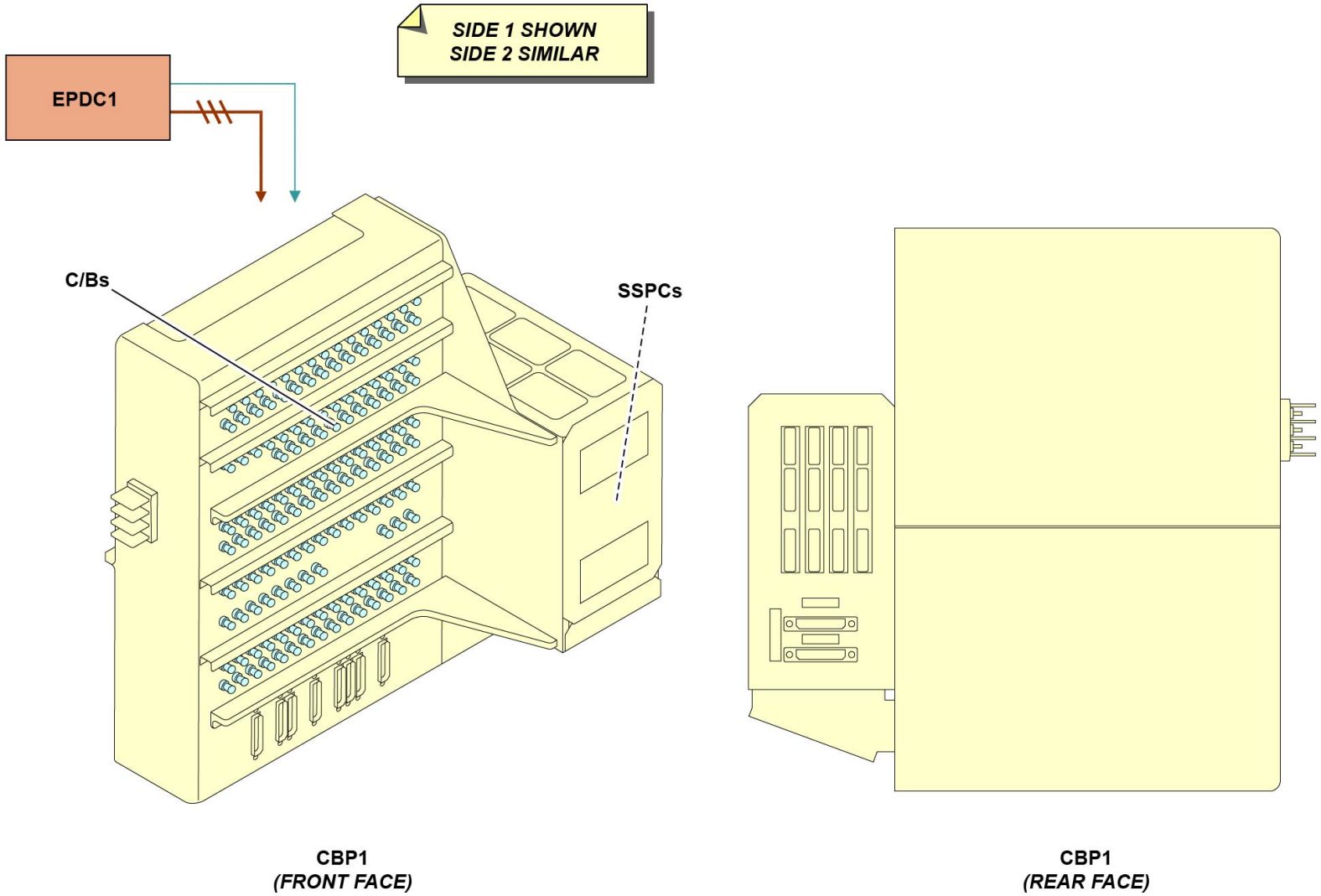


CBP ARCHITECTURE

ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

SPDBs

EPDC1 and EPDC2 supply 115VAC and 28VDC electrical power from the EPGS to the SPDBs to supply the cabin and cargo loads with an electrical power consumption of less than or equal to 15 A through AC and DC SSPCs.
SPDBs 1, 3, 5, 7, 11 and 13 supply side 1 loads and SPDBs 2, 4, 6, 8, 12 and 14 supply side 2 loads.
Numbers 9 and 10 are not used to make the difference between the cabin and cargo SPDBs:
- Numbers 1, 2, 3, 4, 5, 6, 7 and 8 identify the cabin SPDBs.
- Numbers 11, 12, 13 and 14 identify the cargo SPDBs.

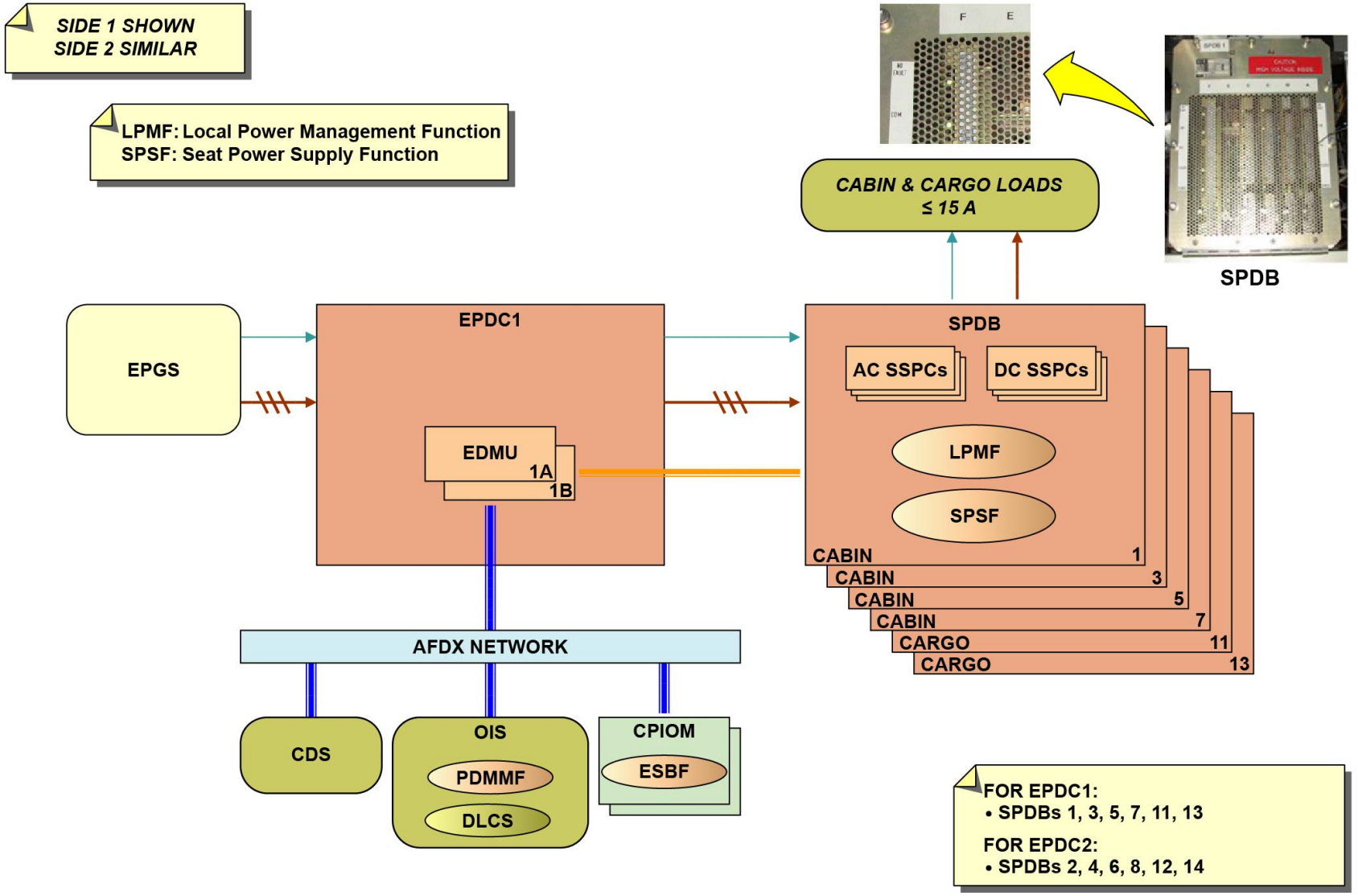
The SPDBs are connected through CAN buses to the EDMUs installed in the EPDCs.
The EDMUs give interface between the EPDS and other aircraft systems (CDS, DLCS, ESBF, PDMMF,...) through AFDX network.

Local Power Management Function (LPMF)

The LPMF is a function of the cabin and cargo secondary power-distribution system.
The LPMF prevents overloads and thus overheating of the feeders that supply the SPDBs from the EPDCs.

Seat Power Supply Function (SPSF)

The SPSF manages electrical power supply from the SPDBs to the related seats equipment in cabin.



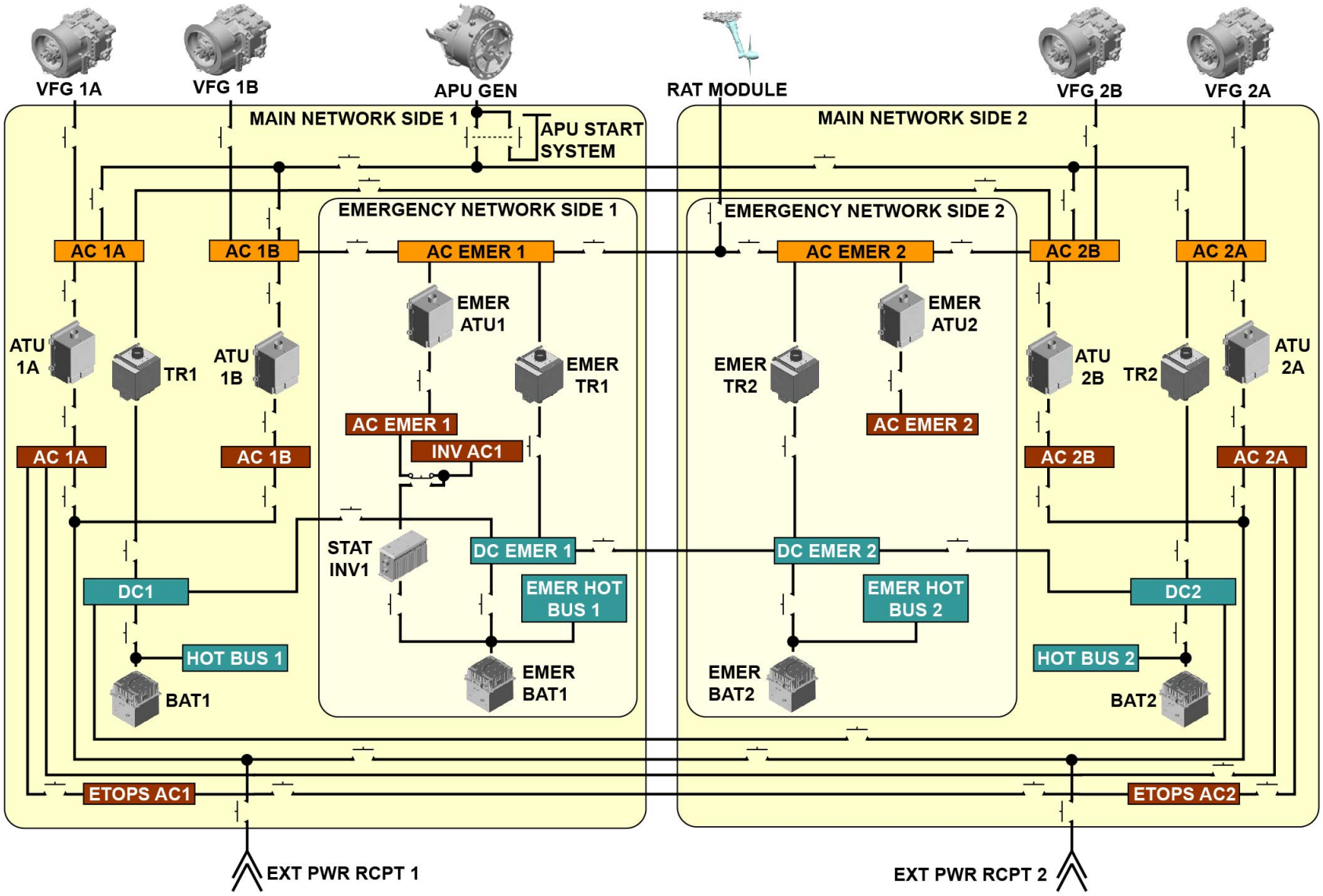
SPDBS - LOCAL POWER MANAGEMENT FUNCTION (LPMF) & SEAT POWER SUPPLY FUNCTION (SPSF)

ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

Electrical Network Architecture

The electrical network uses three sub-networks in relation to the different voltages available:
The 230VAC electrical sub-network is normally supplied by the VFGs. It can also be supplied by the APU Starter Generator (SG) in Generate mode or by the main ATUs on the ground when Ground Power Units (GPUs) are connected and supply 115VAC.
The related users are supplied from 230VAC busbar AC 1A, 1B, 2A, 2B.
The emergency loads are supplied from 230VAC busbar AC EMER 1, 2 normally supplied by the 230VAC busbar AC 1B, 2B) or directly by the Ram Air Turbine (RAT) generator in emergency configuration.
In addition, to supply the technical loads more than 15 A, the 230VAC sub-network also supplies electrical power to the 115VAC and 28VDC sub-networks.
The 115VAC electrical sub-network is normally supplied by the ATUs from the 230VAC electrical sub-network. It can also be supplied on the ground directly by the GPUs.
The related users are supplied from 115VAC busbar AC 1A, 1B, 2A, 2B.
The emergency loads are supplied by 115VAC busbar AC EMER 1, 2, each one supplied by an emergency ATU from the related 230VAC busbar AC EMER 1, 2.
In normal condition, the 115VAC busbar AC EMER 1 also supplies the 115VAC busbar INV AC1. If a full loss of the AC power occurs, this busbar stays supplied with 115VAC from 28VDC emergency battery 1 through static inverter 1.
Two independent 115VAC busbars ETOPS AC1, 2 supply electrical power to the loads that are necessary for the ETOPS flights. In normal condition, each 115VAC busbar ETOPS AC1, 2 is connected to its related 115VAC busbar AC 1A, 2A.
If a full loss of side 1 or side 2 of the electrical network occurs, the 115VAC busbars ETOPS AC1, 2 are automatically interconnected to keep the electrical power available for all the loads necessary for the ETOPS flights (for example loss of 3 Variable Frequency Generators (VFGs) in flight).
The 28VDC electrical sub-network is normally supplied by Transformer Rectifiers (TRs) from the 230VAC electrical sub-network. The related users are supplied from the 28VDC busbar DC1, 2, each one supplied by TR1, 2 from the related 230VAC busbar AC 1A, 2A.
The emergency DC loads are supplied from 28VDC busbars DC EMER 1, 2, each one supplied by emergency TR1, 2 from the related 230VAC busbar AC EMER 1, 2.
Each 28VDC busbar DC1, 2, EMER 1, EMER 2 is related to one battery (battery 1, battery 2, emergency battery 1, emergency battery 2) that provides:
- Electrical power when no other DC power source is available
- No Break Power Transfer Function (NBPT) to the DC network.

Each battery permanently supplies its related 28VDC HOT BUS.



ELECTRICAL NETWORK ARCHITECTURE

V2414251 - V00T0MM0 - VM24D4DISTR3001

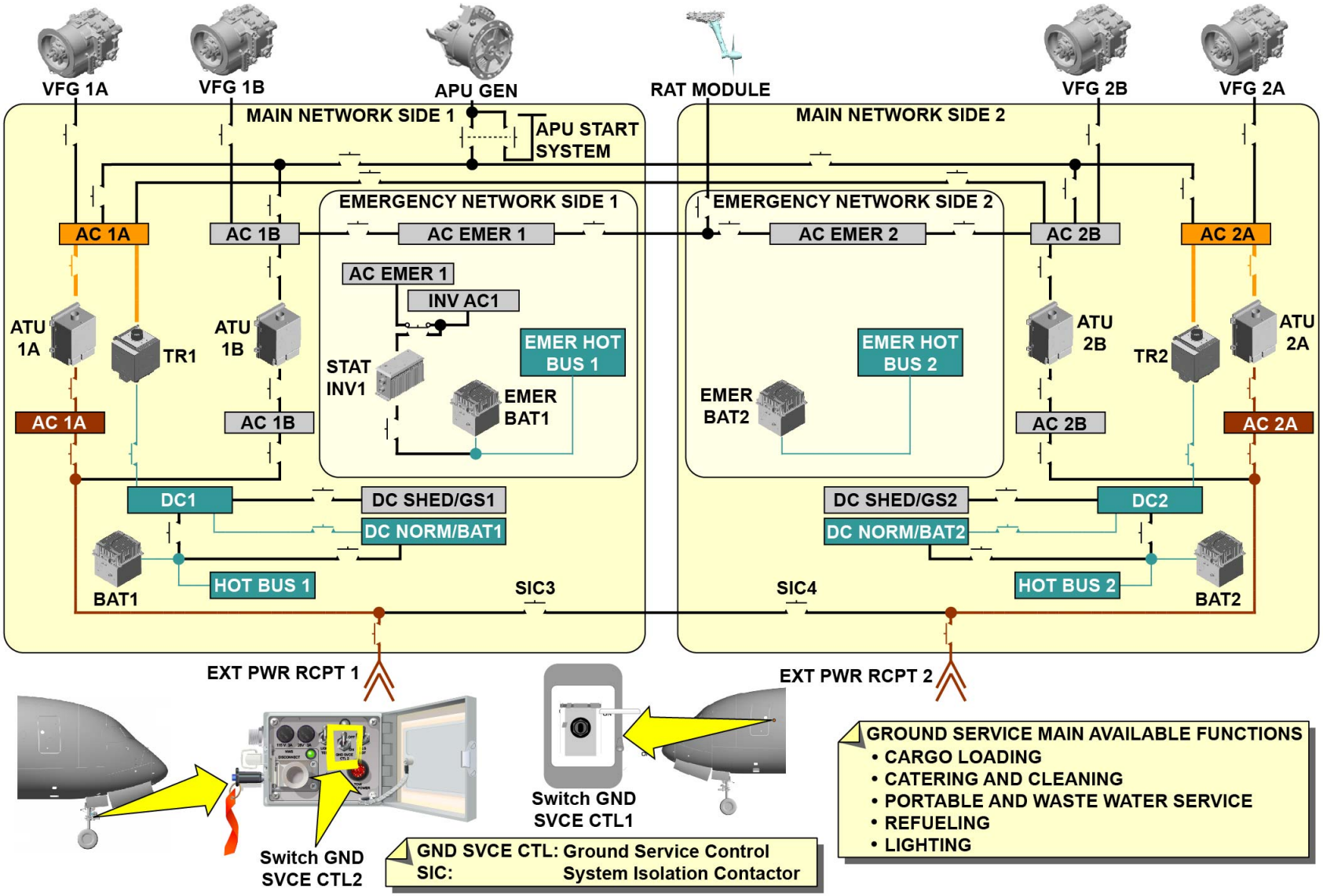
ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

Electrical Network Architecture (continued)

Ground Service Configuration

The electrical power supply that is necessary for the ground servicing comes from external power receptacle(s) 1 and/or 2.
There are two switches to supply power to the ground service loads:
- One switch on the nose landing gear
- One switch on the doorframe of door L 1 in the cabin.

When only one GPU is used, side 1 and side 2 of the network are interconnected through the System Isolation Contactors (SIC) 3 and 4.
There is no dedicated AC and DC network for the ground servicing configuration.
Because it is not necessary to energize the full electrical network, only the loads that are necessary for cargo loading and for cargo door operation, catering/cleaning, potable and waste water servicing, refueling and lighting are supplied.
No data is shown on the cockpit panels.
The loads to be supplied during the ground servicing are connected only to busbars 1A and 2A of the network.
Busbars 1B and 2B and the emergency network are not supplied.
In the ground servicing mode, the loads protected by SSPCs/RCCBs stay disconnected if they are not necessary, while the loads protected by circuit breakers cannot be disconnected even if they are not necessary.
For this reason, all the DC loads protected by circuit breakers, that are not used in the ground servicing mode, are connected to the 28VDC busbar DC SHED/GS1, 2.



ELECTRICAL NETWORK ARCHITECTURE - GROUND SERVICE CONFIGURATION

V2414251 - V00T0MM0 - VM24D4DISTR3001

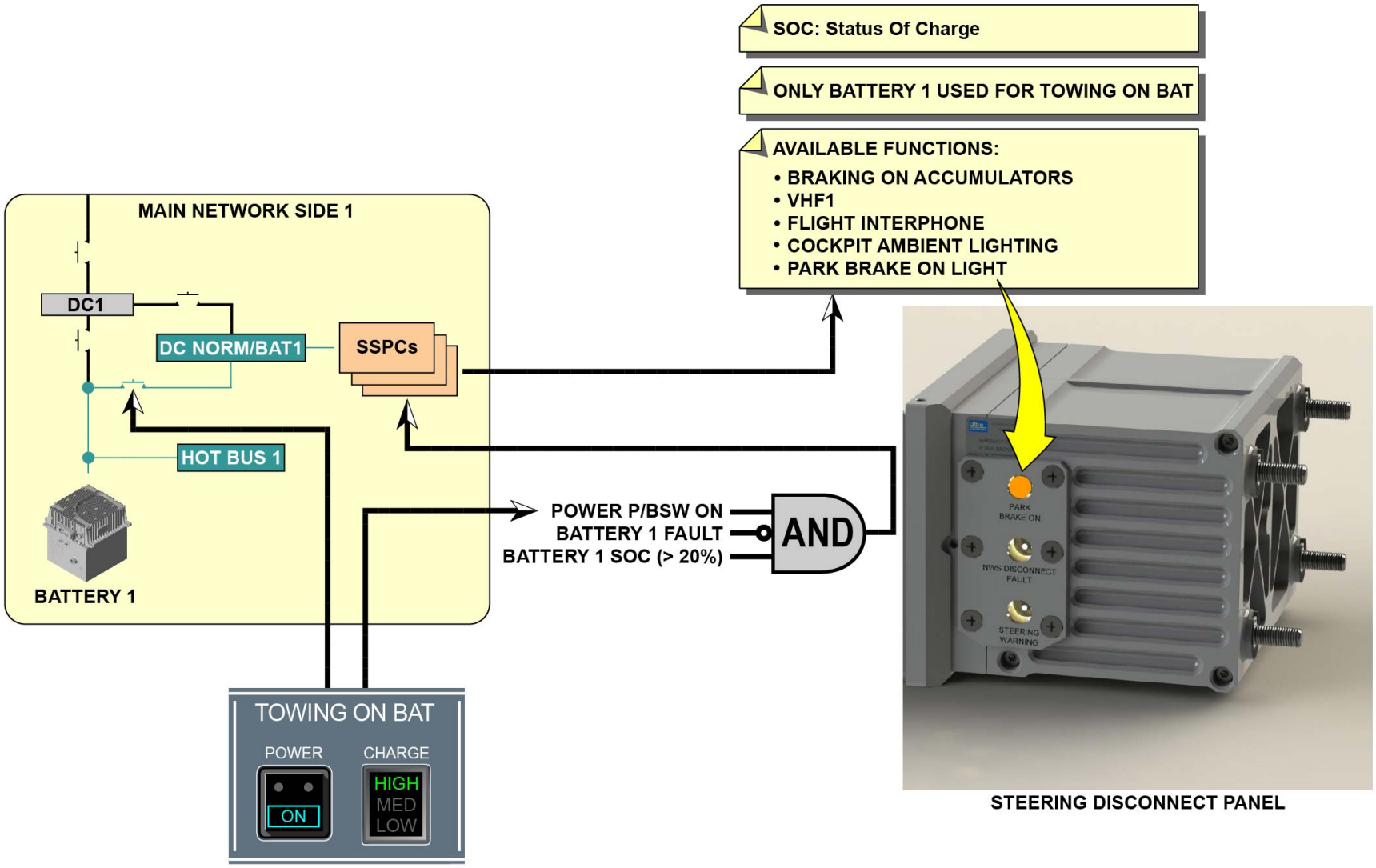
ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

Electrical Network Architecture (continued)

Towing on Battery Configuration

The towing on battery system uses only battery 1 that supplies electrical power to the 28VDC busbar DC NORM/BAT 1.
The system is active in the conditions that follow:
- On the TOWING ON BAT section of the maintenance panel, POWER P/BSW selected ON
- No battery 1 fault
- Battery 1 Status Of Charge (SOC) is sufficient (more than 20%), the SOC is shown by the CHARGE triple annunciator light of the TOWING ON BAT section of the maintenance panel.

The functions that follow, controlled by SSPCs, are then available:
- Alternate braking on accumulators
- VHF1
- Flight interphone
- Cockpit ambient lighting (limited)
- PARK BRAKE ON light (amber) on the steering disconnect panel (installed on the nose landing gear).



ELECTRICAL NETWORK ARCHITECTURE - TOWING ON BATTERY CONFIGURATION

V2414251 - V00T0MM0 - VM24D4DISTR3001

ELECTRICAL POWER DISTRIBUTION AC AND DC DESCRIPTION (2/3)

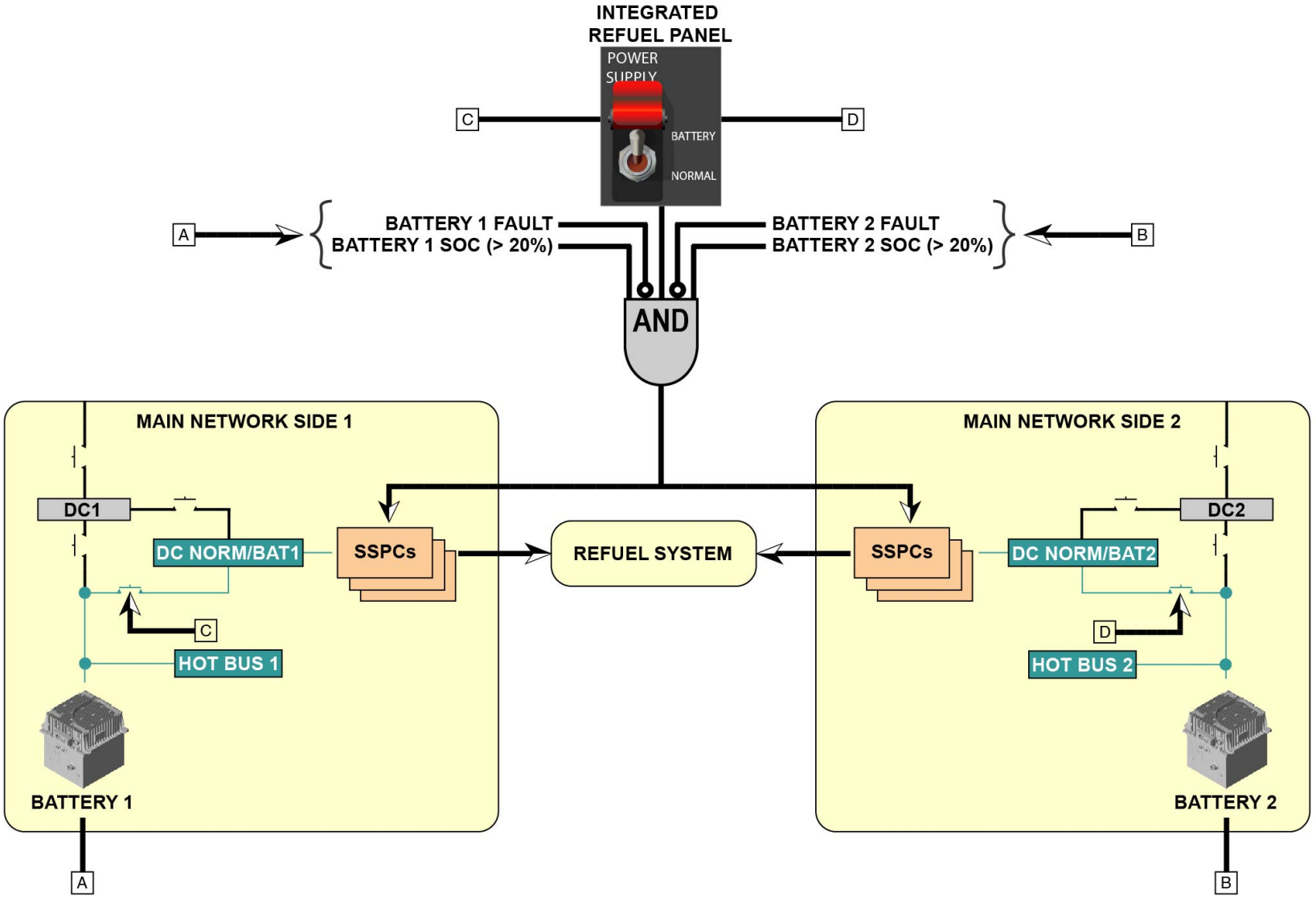
Electrical Network Architecture (continued)

Refuel on Battery Configuration

The refuel on battery system uses:
- Battery 1 that supplies electrical power to the DC NORM/BAT1 busbar, and
- Battery 2 that supplies electrical power to the DC NORM/BAT2 busbar.

The system is active in the conditions that follow:
- POWER SUPPLY switch of the Integrated Refuel Panel (IRP) in the BATTERY position
- No battery 1 fault
- No battery 2 fault
- Battery 1 SOC is sufficient (more than 20%).
- Battery 2 SOC is sufficient (more than 20%).

The refuel system loads, controlled by the SSPCs, are then available.



ELECTRICAL NETWORK ARCHITECTURE - REFUEL ON BATTERY CONFIGURATION

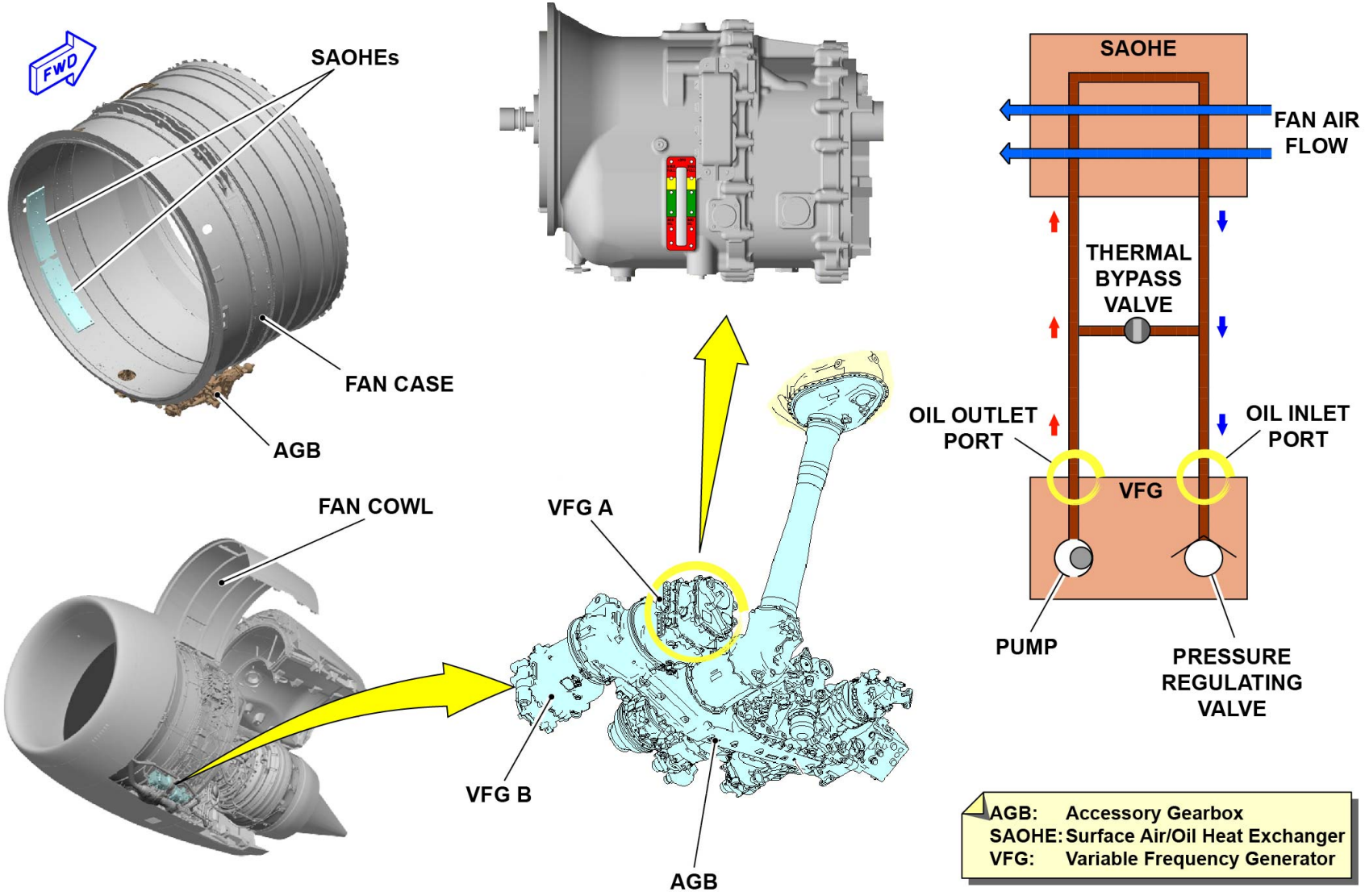
V2414251 - V00T0MM0 - VM24D4DISTR3001

VFG OIL SYSTEM COOLING AND SERVICING DESCRIPTION (2/3)

VFG Lubrication and Cooling

The Variable Frequency Generators (VFGs) are installed on the engine Accessory Gearbox (AGB). To do the servicing of the oil systems of the VFGs, it is necessary to open the left fan-cowl door for access.
For each VFG, a Surface Air/Oil Heat Exchanger (SAOHE) gives a thermal exchange between the VFG oil and the fan air flow, which keeps the VFG oil in a correct temperature range.
A thermal bypass valve is related to each SAOHE.
When the oil is cold (cold day operation before engine start) this valve is open; the oil flows from the VFG oil pump through the valve and goes back to the VFG through a VFG Pressure Regulating Valve (PRV).
In such conditions, the oil flow bypasses the heat exchanger and the oil temperature becomes correct for quicker lubrication. Then, the thermal bypass valve goes back to the closed position.

V2414251 - V00T0MM0 - VM24D5VFGSE3001



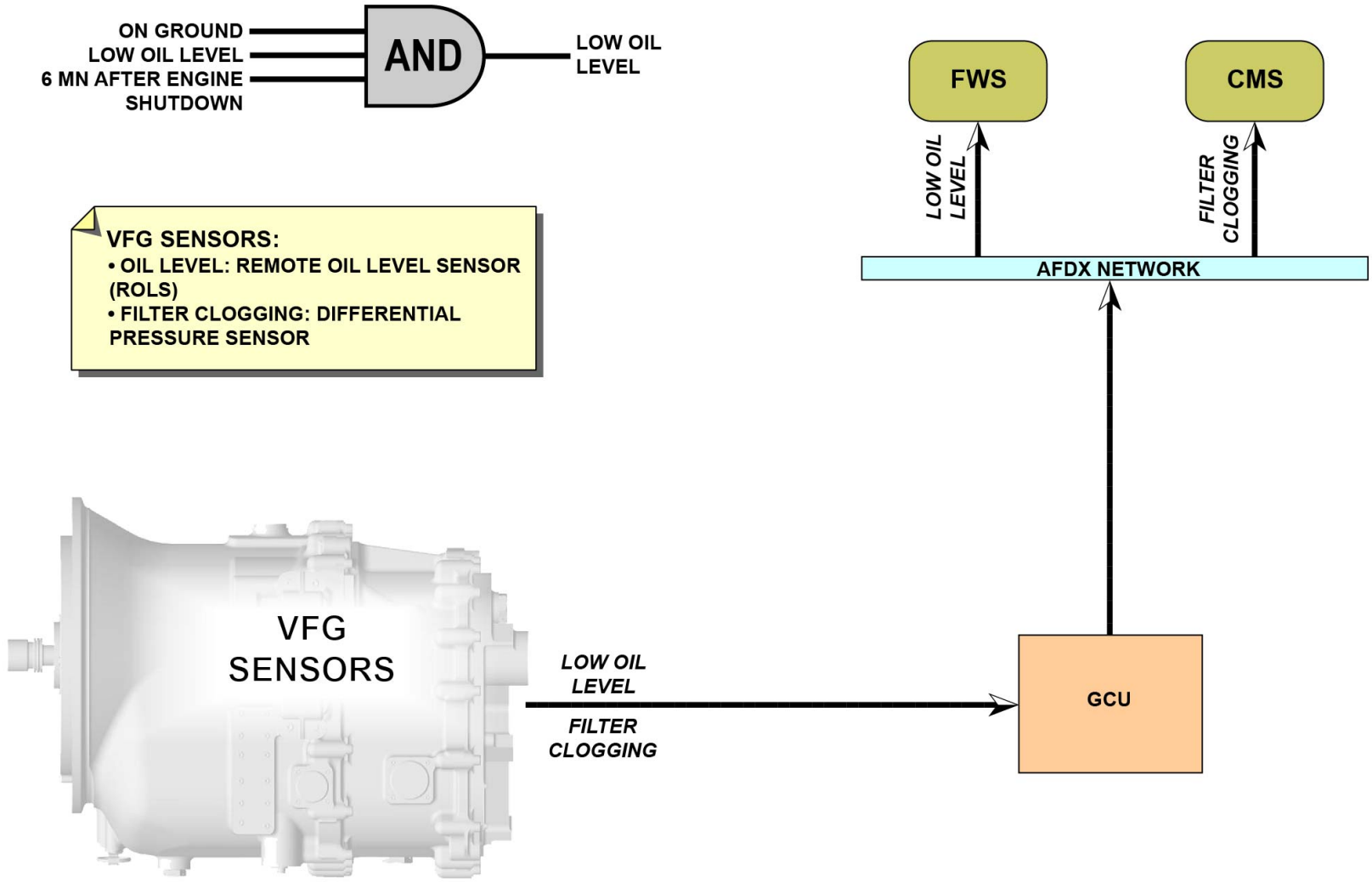
VFG LUBRICATION AND COOLING

VFG OIL SYSTEM COOLING AND SERVICING DESCRIPTION (2/3)

VFG Oil System Monitoring

VFG oil-level monitoring:
The low oil-level monitoring-function determines the low oil level condition through a Remote Oil Level Sensor (ROLS). The sensing process starts on the ground six minutes after engine shutdown and if there is a low oil level.
VFG oil-filter monitoring:
A delta pressure switch monitors the oil filter. It measures the oil pressure at the inlet and outlet of the filter and senses a possible filter clogging condition.
The VFG sensors send the low oil level and filter clogging signals to the related Generator Control Unit (GCU). Then, the GCU sends this data to the FWS for low oil level, and CMS for filter clogging.

V2414251 - V00T0MM0 - VM24D5VFGSE3001



VFG OIL SYSTEM MONITORING

VFG OIL SYSTEM COOLING AND SERVICING DESCRIPTION (2/3)

VFG Oil System Servicing

The servicing of the VFG oil system can be scheduled or unscheduled.

Scheduled Servicing

At the specified maintenance schedule interval:
- Drain and fill the VFG oil system.
- Replace the oil filter.

Unscheduled Servicing

You can do unscheduled servicing to:
- Add oil if the level is low, or if you replaced a system component.
- Drain the system before you replace the VFG.
- Fill the system if you drained a VFG, or after oil contamination.

Servicing Information

Overfill connection
The connection of an overfill drain hose to the overfill drain port depressurizes the VFG case.
When the oil flows from the overfill drain hose, you must continue to fill slowly until approximately one quart of oil drains into the oil container.

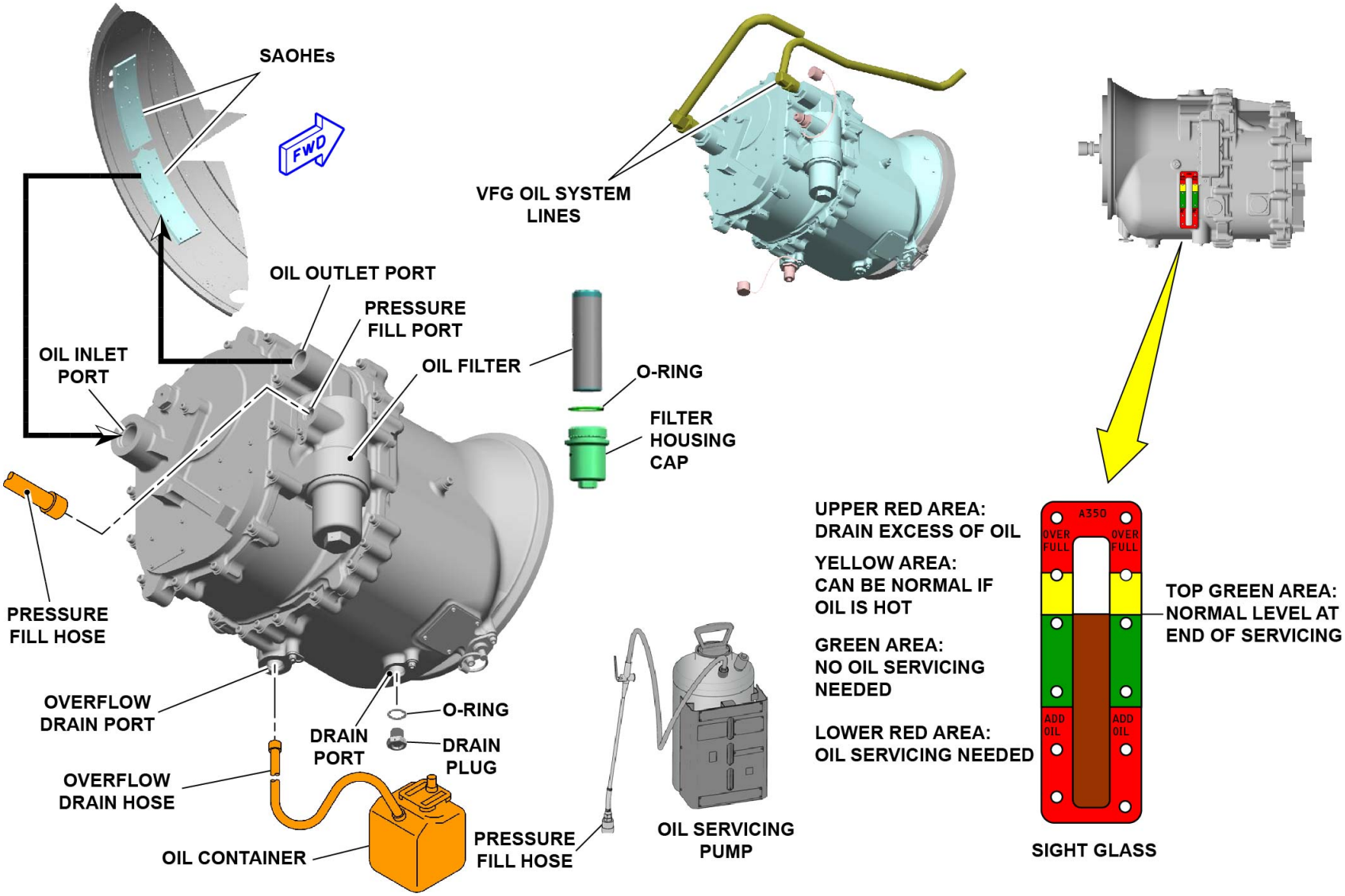
NOTE: Do not forget to connect the overfill drain hose before you fill the oil. If not, an overpressure of the VFG case will occur and cause a fault status of the VFG.

Pressure fill connection
An oil servicing pump is used to add oil or to fill the system. It is connected to the pressure fill port through a pressure fill hose.
Sight glass
The green area shows that the VFG oil level is correct. At the end of the servicing procedure, the oil level must be near the top of this green area.
The yellow area shows that the VFG oil level is above the normal level but not too high. This often occurs immediately after the engine shutdown when the engine oil is hot.
The upper red area shows that there is too much oil. You must drain oil to get the correct oil level.
The lower red area shows that the oil level is not sufficient. You must do the servicing and add oil until the oil level is at the top of the green area.
Magnetic drain plug
- Has a magnet that collects metal particles; to be checked in order to monitor the VFG status.
- Loosened: to decrease the oil level, if it is above the correct level after filling.
- Removed: to drain oil from the VFG or the system. Replace the related O-ring at the removal/installation.

Filter cartridge removed for:
- A scheduled replacement
- An inspection if there is oil contamination.

Replace the related O-ring at each removal/installation.

V2414251 - V00T0MM0 - VM24D5VFGSE3001



VFG OIL SYSTEM SERVICING - SCHEDULED SERVICING ... SERVICING INFORMATION

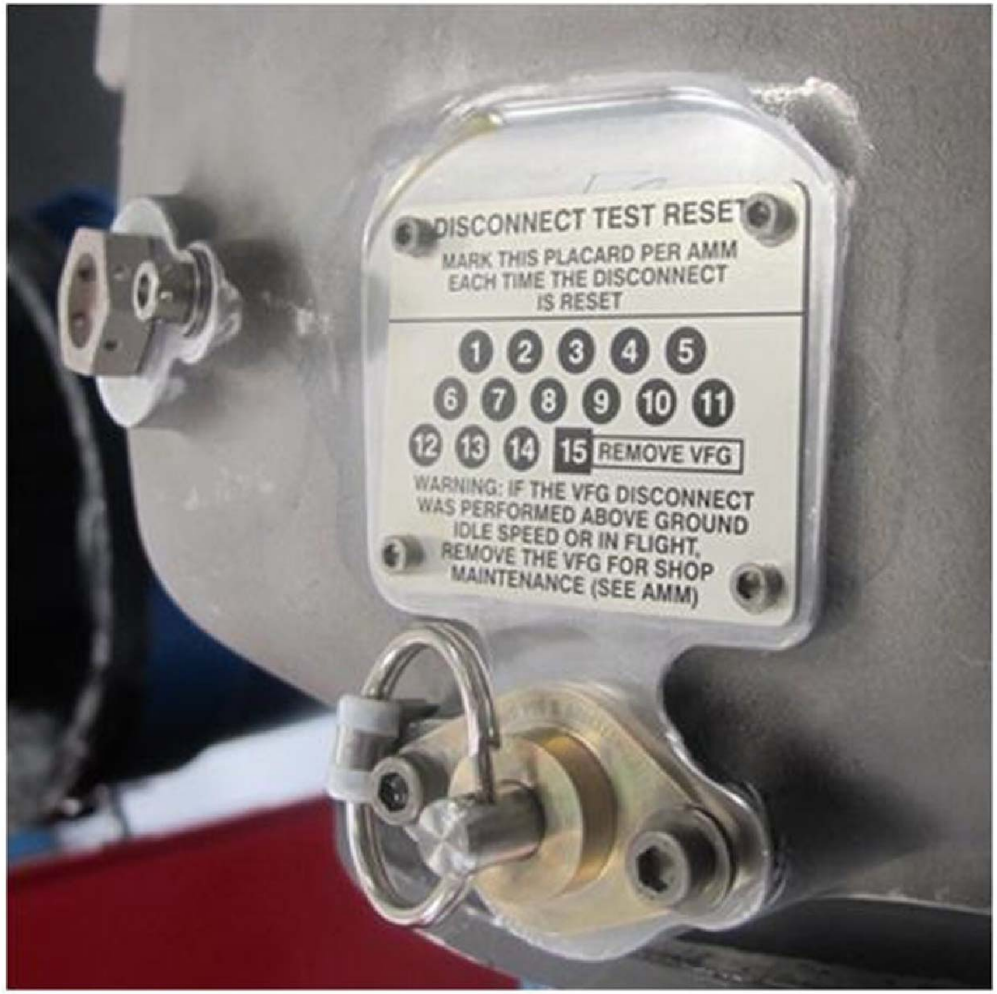
V2414251 - V00T0MM0 - VM24D5VFGSE3001

VFG OIL SYSTEM COOLING AND SERVICING DESCRIPTION (2/3)

VFG Disconnection

Ground check-out disconnects:
The VFG is capable of 15 manually requested disconnects without maintenance where maximum speed is limited to Engine ground idle.
A placard is used to track the number of low speed disconnects.
Following the 15th recorded disconnect the VFG must be replaced.
Reengagement of a disconnected unit is a ground operation conducted with the VFG installed while the engine is stopped.
In-flight disconnects:
The VFG is capable of mechanical disengagement within the normal speed range.
After initiating an in-flight mechanical disconnect within the normal speed range, the VFG must be replaced.

V2414251 - V00T0MM0 - VM24D5VFGSE3001



VFG DISCONNECTION

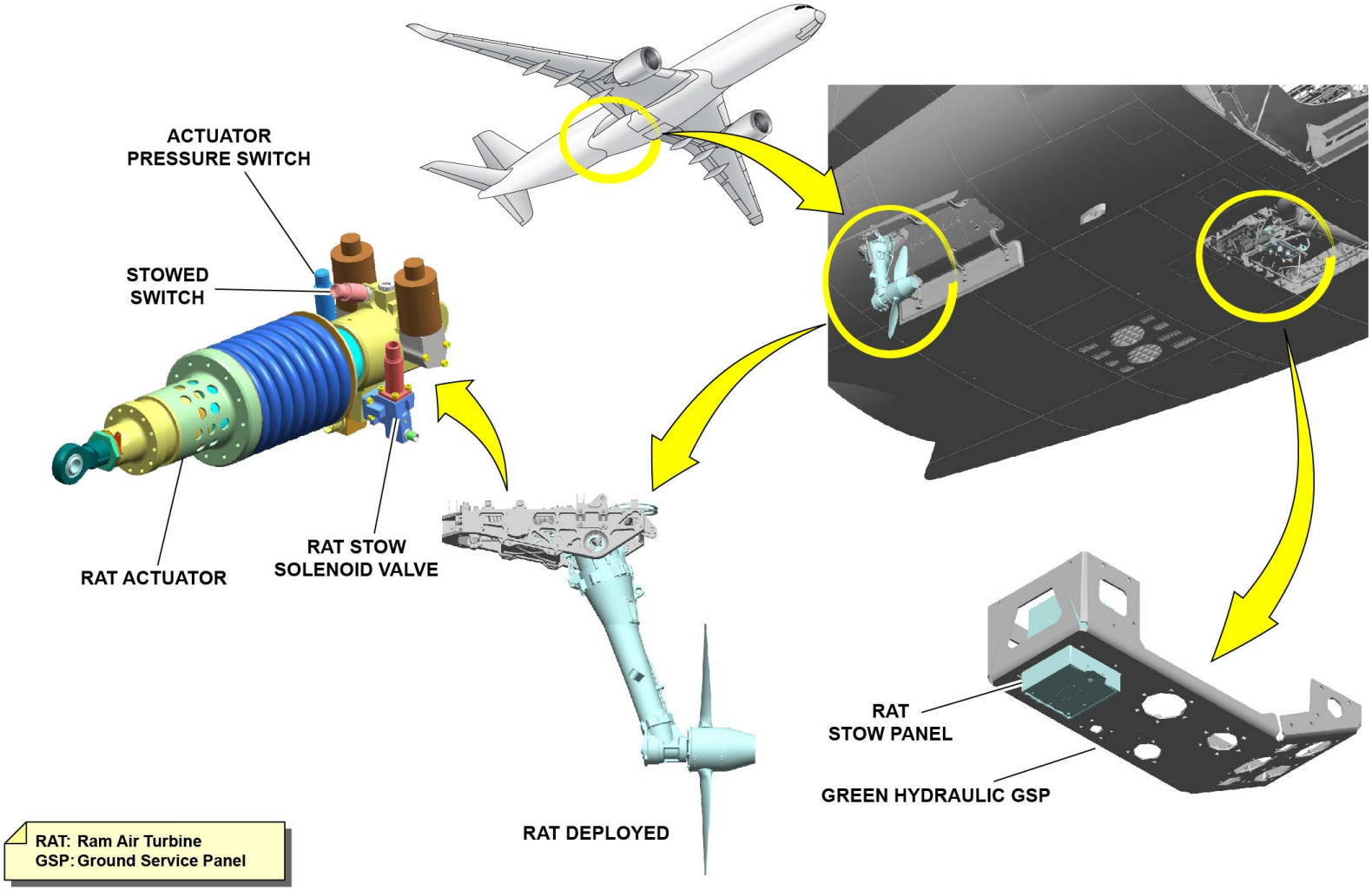
RAM AIR TURBINE STOWAGE DESCRIPTION (3)

RAT Stowage Components Description

The main components of the Ram Air Turbine (RAT) stowage system are:
- The RAT module with its related stowage actuator installed on the right side of the belly fairing
- The RAT stow panel installed on the Green hydraulic Ground Service Panel (GSP) in the belly fairing.

The components that follow are installed on the RAT module stowage-actuator:
- The RAT stow solenoid-valve, which gives hydraulic power to the actuator during retraction of the RAT module
- The actuator pressure switch
- The stowed switch.

The actuator pressure switch and the stowed switch are used to monitor the RAT stowage system.



RAT STOWAGE COMPONENTS DESCRIPTION

RAM AIR TURBINE STOWAGE DESCRIPTION (3)

RAT Stowage

Stow Panel Description

The RAT stow panel has two switches and two indicator lights that are used to control and monitor the RAT retraction sequence:
- The guarded ON/OFF switch is used to supply the RAT stow system with 28VDC.
- The combined STOW/LAMP TEST switch is a three-position switch, spring-loaded to the neutral center position:
- In the STOW position, the switch energizes a green hydraulic solenoid valve that allows to retract the RAT module.
- In the LAMP TEST position, the RAT STOWED and ACTUATOR PRESSURE indicator lights are on.
- The red ACTUATOR PRESSURE indicator light comes on when the actuator is pressurized.
- The green RAT STOWED indicator light comes on when the RAT is fully stowed and locked.

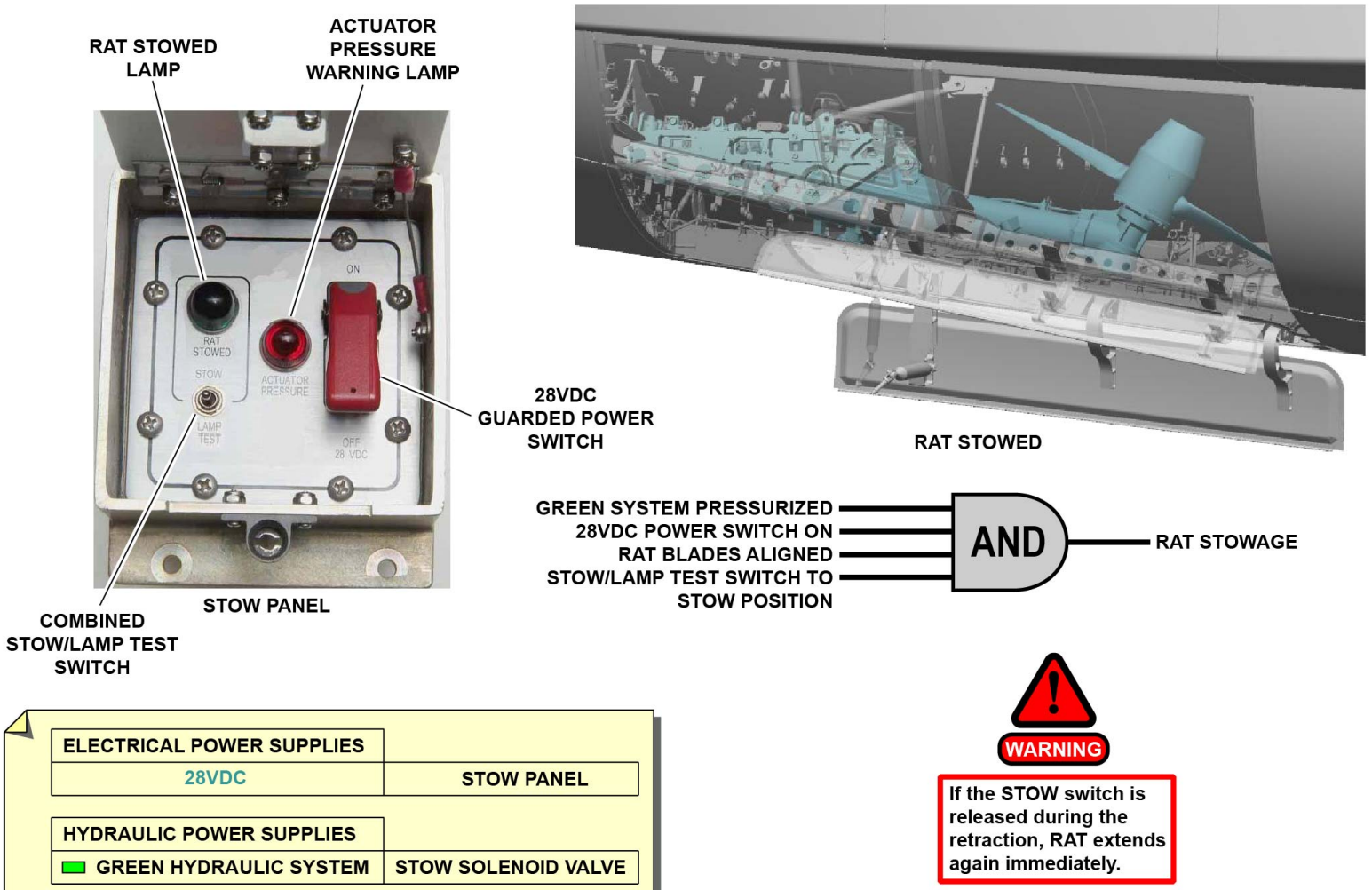
Retraction Sequence Description

The RAT can retract in the conditions that follow:
- The RAT turbine blades are correctly aligned.
- The 28VDC is available.
- The Green hydraulic system is pressurized.
- The STOW/LAMP TEST switch is in the STOW position.

Retraction sequence:
- Pressurize the Green hydraulic system (Electric Motor Pump (EMP) or hydraulic ground cart).
- Set the guarded ON/OFF switch to ON.
- Set the STOW/LAMP TEST switch to the STOW position to energize the RAT stow solenoid-valve. Then, the Green hydraulic pressure makes the actuator move the RAT module to the stowed position.
- The red ACTUATOR PRESSURE indicator light comes on.

NOTE: - If the STOW/LAMP TEST switch is released to the neutral center position during the stow sequence, the RAT retraction stops and the RAT extends again automatically.

- The green RAT STOWED indicator light comes on when the RAT module is fully stowed and locked.
- The red ACTUATOR PRESSURE light goes off.
- Release the STOW/LAMP TEST switch.
- Set the 28VDC guarded power switch to the OFF position.



RAT STOWAGE - STOW PANEL DESCRIPTION & RETRACTION SEQUENCE DESCRIPTION

POWER DISTRIBUTION MAINTENANCE INTERFACE DESCRIPTION (3)

Description

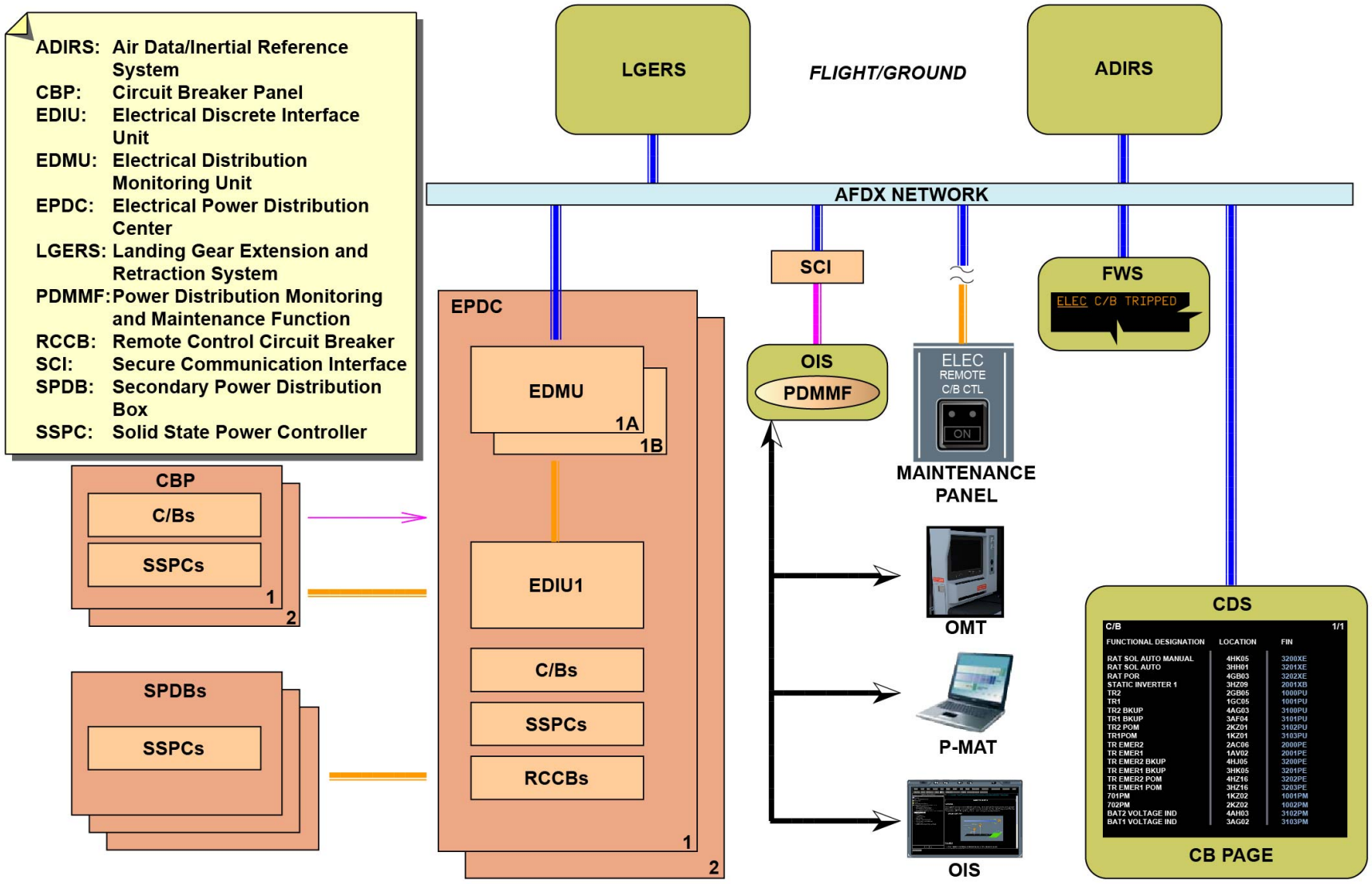
The Power Distribution Maintenance Interface (PDMI) is used for maintenance.
The PDMI can be operated only on the ground through the related ELEC REMOTE C/B CTL pushbutton switch set to ON.

NOTE: Because the ELEC REMOTE C/B CTL pushbutton switch is for on-ground use only, it is necessary to set it to the normal position (ON legend off) before the aircraft is released to flight.

The PDMI is used for the control and monitoring of the electrical protection equipment installed in the Electrical Power Distribution Centers (EPDCs), in the Circuit Breaker Panels (CBPs) and in the Secondary Power Distribution Boxes (SPDBs).
- The circuit breakers are only monitored.
- The Solid State Power Controllers (SSPCs) and Remote Control Circuit Breakers (RCCBs) are controlled and monitored.

The circuit breakers and the protection and/or switching devices have an interface with the Electrical Discrete Interface Unit (EDIU) and the Electrical Distribution Management Units (EDMUs) in each EPDC. The EDMUs are the interface with the dedicated application of the PDMI through the AFDX network.
The PDMI has the Power Distribution Monitoring and Maintenance Function (PDMMF). It is hosted on the OIS that makes possible the interface and communication with the different protection devices through the Secure Communication Interface (SCI).
The maintenance operators can get access to the PDMI through different Human Machine Interfaces (HMIs):
- The OMT
- The two OIS display units and keyboards
- The Portable Multipurpose Access Terminal (PMAT).

The status and the different symbols of the circuit breakers, SSPCs and RCCBs are shown on the HMI displays as applicable to the aircraft configuration.
The PDMI has these interfaces through the AFDX network:
- FWS to show the C/B TRIPPED Flight Deck Effect (FDE) when a protection device is open manually for maintenance or because of an overcurrent condition.
- The CDS to give the data about electrical-protection equipment status on the ECAM C/B page.
- Air Data and Inertial Reference System (ADIRS) and Landing Gear Extension Retraction System (LGERS) to receive the Flight/Ground aircraft status.



DESCRIPTION

POWER DISTRIBUTION MAINTENANCE INTERFACE DESCRIPTION (3)

PDMI on BAT

On the ground, when no electrical power is available, you can control and monitor the protection devices with the emergency batteries 1 and 2 as power sources to the PDMI.
You can:
- Do a check of the aircraft configuration before you energize the aircraft.
- Safety and tag the SSPCs and RCCBs if you removed equipment.

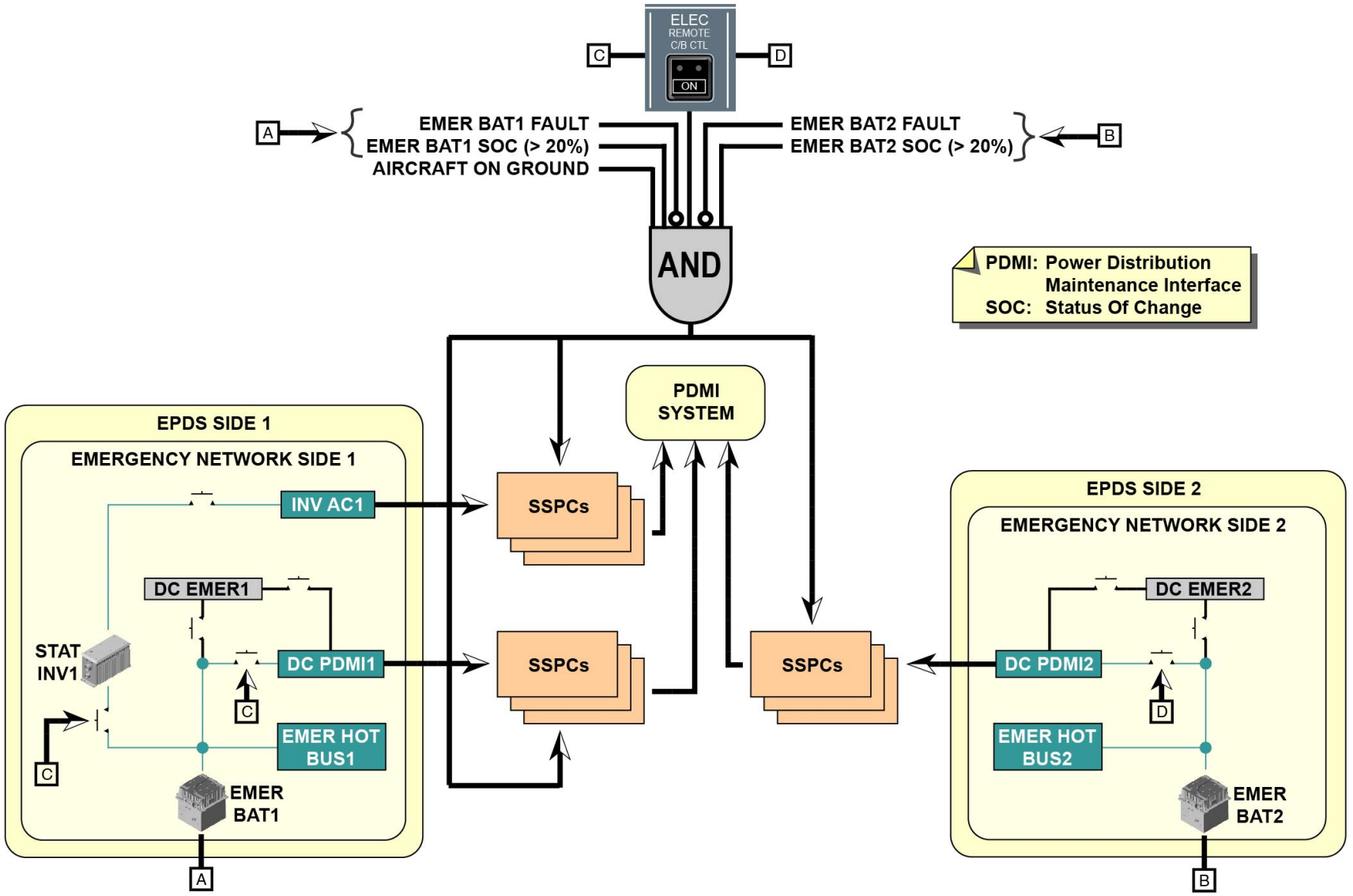
The PDMI on BAT mode is available in these conditions:
- The aircraft is on the ground.
- The ELEC REMOTE C/B CTL pushbutton switch is pushed and the ON legend is on.
- The emergency batteries 1 and 2 are available (no fault) and their Status Of Charge (SOC) is sufficient (more than 20%).

To use the PDMMF and the related HMIs, the 28VDC and 115VAC are necessary for the PDMI.
The emergency battery 1, 2 supply 28VDC to:
- The EMER HOT BUS 1, 2
- The DC PDMI 1, 2 busbars.

Battery 1 supplies the static inverter 1 which then supplies 115VAC to the INV AC 1 busbar.
When the SOC becomes too low (less than 20%), the batteries automatically stop the supply to the PDMI.

NOTE: The autonomy of the PDMI on BAT is approximately 30 minutes. It is recommended to use it during the shortest time possible and set the ELEC REMOTE C/B CTL pushbutton switch back to the OFF position immediately after the task.

V2414251 - V00T0MM0 - VM24D7PDMIB3001



PDMI ON BAT

V2414251 - V00T0MM0 - VM24D7PDMIB3001

ELECTRICAL STRUCTURE NETWORK MAINTENANCE (2/3)

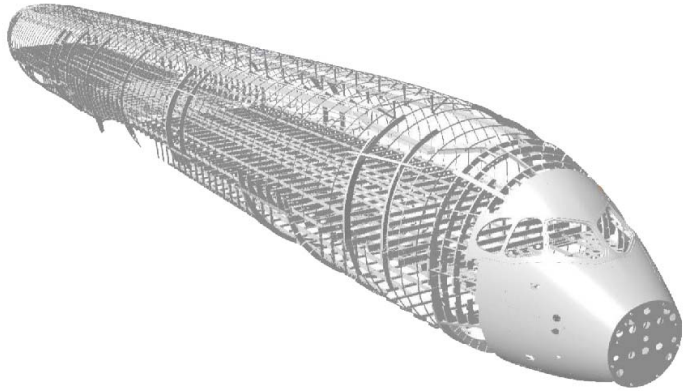
Electrical Structure Network (ESN) Introduction

The Electrical Structure Network (ESN) used in the composite fuselage gives to the electrical system almost the same environment as the one of a metal fuselage. It also gives limits for the current injection for the parts made of Carbon Fiber Reinforced Plastic (CFRP).
ESN is composed of different element families:
- Structure metallic elements that have ESN functions: for example, metallic frames and crossbeams, seat tracks, roller tracks, L-brackets... and their assembly.
- Mechanical elements: for example, avionics bay racks, mechanical junctions, cabin furnishing structures in the crown area... and their assembly.
- Specific ESN components : for example, raceways, flexible junctions, ESN cables... all along the fuselage.

For the repairs and tests of the ESN parts, refer to the Airn@v On-Line Documentation:
- The Aircraft Structure Repair (former SRM)
- The Standard Practices-Electrical (former ESPM)
- The Maintenance Procedures (MP) (former AMM).

V2414251 - V00T0MM0 - VM24M1MAINT3001

ESN ELEMENTS DIFFERENT FAMILIES



- **STRUCTURE METALLIC ELEMENTS:**
  FOR EXAMPLE, METALLIC FRAMES, CROSSBEAMS, SEAT/ROLLER TRACKS...
- **MECHANICAL ELEMENTS:**
  FOR EXAMPLE, AVIONICS BAY RACKS, MECHANICAL JUNCTIONS, CABIN FURNISHING STRUCTURE IN THE CROWN AREA...

- **SPECIFIC ESN COMPONENTS:**
  FOR EXAMPLE, RACEWAYS, FLEXIBLE FUNCTIONS, ESN CABLES...

TYPE-1 RACEWAY

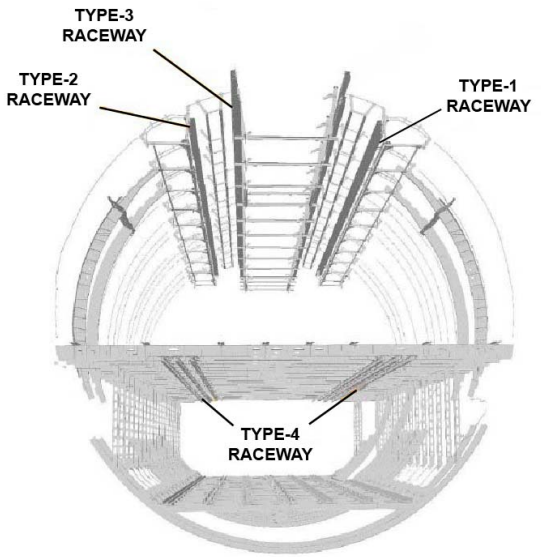
TYPE-2 RACEWAY

TYPE-3 RACEWAY

TYPE-4 RACEWAY

ESN: Electrical Structure Network

FOR THE REPAIR AND THE TESTS OF THE ESN PARTS, REFER TO THE AIRN@V ON-LINE DOCUMENTATION



ZONE WHERE THE RACEWAYS ARE INSTALLED

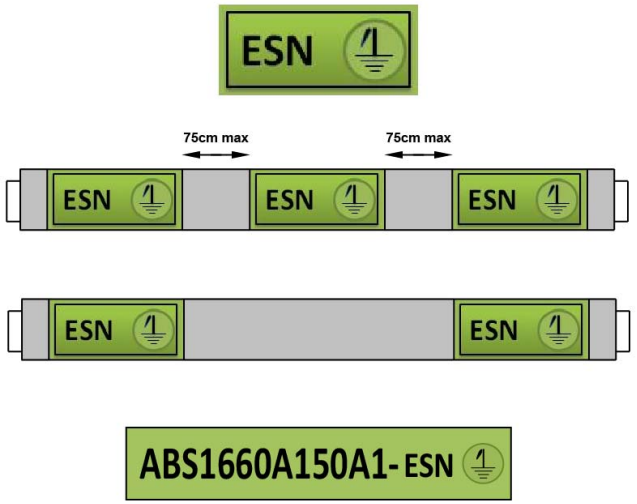
ELECTRICAL STRUCTURE NETWORK (ESN) INTRODUCTION

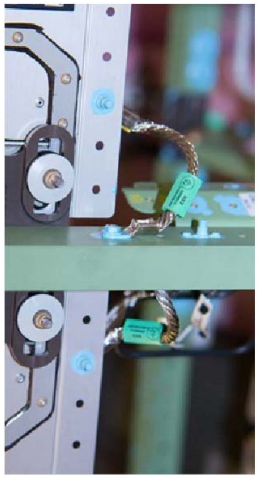
ELECTRICAL STRUCTURE NETWORK MAINTENANCE (2/3)

ESN Parts Identification

The ESN parts are identified with green labels and sleeves:
- The green identification labels are used for the ESN structure parts, raceways, brackets, bulkhead strips, ESN junction braids.
- The green identification sleeves are used for the ESN cables, drain cables, ESN junctions.

ESN PARTS	IDENTIFICATION SOLUTION
• MECHANICAL ELEMENTS • RACEWAYS • BRACKETS • BULKHEAD STRIP	GREEN IDENTIFICATION LABEL
• ESN CABLE • DRAIN CABLE • ESN JUNCTION	GREEN IDENTIFICATION SLEEVE
• ESN JUNCTION (BRAID)	GREEN IDENTIFICATION LABEL





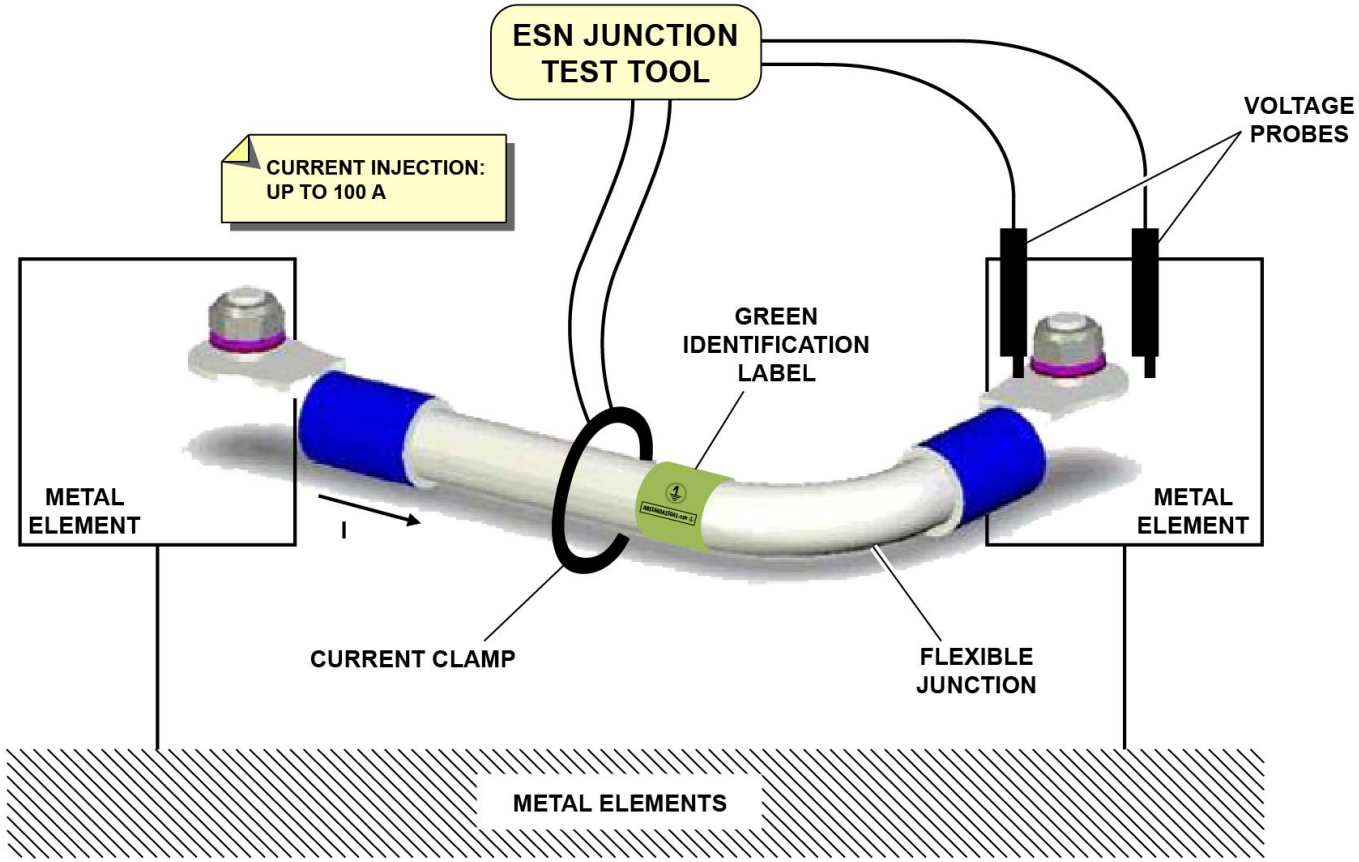
ESN PARTS IDENTIFICATION

ELECTRICAL STRUCTURE NETWORK MAINTENANCE (2/3)

ESN Measurement/Test

Unit tests are necessary for all the flexible junctions when you do ESN measurements and tests.
To do the tests of ESN junctions, you must use a special tool and high current values (up to 100 A).
Use a special current clamp for the current injection.
For the junction lugs, it is necessary to measure the contact resistance.
When you measure the voltage at the junctions, it can be necessary to remove the blue varnish to have a good conductivity for the voltage probes.
After the measurement, apply blue varnish on the applicable surfaces.
The test procedure is related to the type of ESN junctions.

V2414251 - V00T0MM0 - VM24M1MAINT3001



ESN MEASUREMENT/TEST

ELECTRICAL STRUCTURE NETWORK MAINTENANCE (2/3)

ESN Measurement/Test Tool, Aircraft Modification

Special tools are available for the ESN measurements/tests. You must use them with special current clamps for the current injection and current measurements.
Aircraft modification:
The ESN modification has to be treated with precaution. In case of operator modification needs, the following cases shall be considered:
- In case of system modification or addition, an electrical load analysis has to be done for return current in order to guarantee the performance of the ESN (current injection scenarios). This ESN Electrical Load Analysis is similar to the one performed for the electrical power generation and distribution system.
- Any ESN physical modifications have to be analyzed by Airbus before their implementation.

ESN JUNCTION TEST TOOLS

ATEQ LRT 6000

CURRENT CLAMP

FUCHS BLRT2 TESTER

- AN ESN ELECTRIC LOAD ANALYSIS (ELA) MUST BE PERFORMED IN CASE OF SYSTEM MODIFICATION OR ADDITION.
- AN AIRBUS ANALYSIS IS NECESSARY PRIOR TO ESN PHYSICAL MODIFICATION.

ESN MEASUREMENT/TEST TOOL, AIRCRAFT MODIFICATION

ELECTRICAL POWER CONTROL AND INDICATING (2/3)

Electrical System - General (2)

The electrical power system is controlled from different panels located on the cockpit overhead panel:
-The electrical section (ELEC) on the panel 225VM that gives main controls for the VFGs, the Batteries, loads shedding and reconfigurations.
-The emergency electrical power section (EMER ELEC PWR) on the panel 211VM that gives manual control on the RAT deployment.
-The MAINTENANCE panel 255VM that gives access to the batteries voltage indications and allows using the PDMI through the REMOTE C/B CTL pushbutton and towing on battery function through the TOWING ON BAT pushbutton and annunciator lights.
-The RESET panels 213VM and 232VM located on each side of the upper overhead panel that give reset capability for some electrical equipment (TRs).
On the center pedestal, the ECAM control panel (ECP) on the panel 135VM gives access to the ELEC AC and ELEC DC pages on the System Display (SD) through the corresponding ECP keys.
The SD rotary knob on the LH side of the ECP allows access to the C/B page (no dedicated ECP key).
The SD is normally shown on the upper center display unit (DU-UPPER, CENTER).
Two ground service control (GND SVCE CTL) switches give electrical power on ground to the related systems:
-One is installed on the RH side of the NLG.
-One is installed at door M1L inside the cabin.
A sight glass on each VFG allows to visually checking the VFG oil level.

Electrical System Supplied by Batteries (2)

The batteries section (BAT) located on the RH side of the MAINTENANCE panel 255VM allows reading the voltage of any of the main and emergency batteries.
The BAT 1 / BAT2 / EMER BAT 1/ EMER BAT 2 / OFF rotary selector has five positions, four related to each battery and the OFF position. The voltage related to the battery selection is shown on the LCD voltmeter.
The electrical section (ELEC) on the panel 225VM that gives access on its upper LH area to the four BAT push-buttons.
Each BAT push button (BAT 1, EMER BAT 1, EMER BAT 2, BAT 2) controls its associated battery (resp. BAT-1, BAT-EMER 1, BAT-EMER 2, BAT-2). These bi-stable push-buttons providing the following logic:
- ON position (pushed position): the "OFF" light is not illuminated, and the associated battery is connected to the electrical network if all connecting condition are true. It is the normal position of the push-button.
- OFF position (released position): the "OFF" light is illuminated white, and the associated battery is selected OFF.
- FAULT light is illuminated amber in case of associated battery is faulty. The amber light is associated to an ECAM alert. The fault lights goes off when the battery is selected OFF.
On the center pedestal, the ECAM Control Panel (ECP) through the EL/AC and EL/DC keys gives access to the ELEC AC and ELEC DC pages on the ECAM SD display unit (DU).
There is no dedicated C/B key on the A350 ECP, the access to the C/B ECAM page is given through the SD rotary knob located on the LH side of the ECP, the C/B page is then shown on ECAM SD DU.
On a cold aircraft, by selecting ON the ELEC REMOTE C/B CTL pushbutton on the maintenance section of the overhead panel, the EMER BAT1 and EMER BAT 2 give electrical power to the Power Distribution Maintenance Interface (PDMI) that can be used from the OMT.

Ground Service Configuration with GPU #1 (2)

Two Ground Service Control switches with the same function are available:
GND SVSE CTL1 inside the cabin, LH side of door 1L frame,
GND SVSE CTL2 outside the aircraft, RH side of nose landing gear (NLG) structure,

When a ground power unit (GPU) is connected to an EXT PWR receptacle, in this example GPU 1, by selecting to the ON position the GND SVSE CTL1 or GND SVSE CTL 2 switch, the loads that are concerned by ground servicing operation are/can be energized while all other loads will not receive electrical power.
On the EXT PWR panel 925VU located rear to the NLG bay, two lamps for EXT PWR 1 and two lamps for EXT PWR 2 give the electrical status of the connected GPU(s).
When illuminated, amber AVAIL lamp means that the corresponding GPU is ready to be used and its electrical parameters are correct.
- When illuminated, white NOT IN USE lamp means that the corresponding GPU is plugged to the EXT PWR receptacle but not connected to the whole aircraft electrical network.

Electrical System Supplied by GPU #1 (3)

On the EXT PWR panel 925VU located rear to the NLG bay, two lamps for EXT PWR 1 and two lamps for EXT PWR 2 give the electrical status of the connected GPU(s).
When illuminated, amber AVAIL lamp means that the corresponding GPU is ready to be used and its electrical parameters are correct.
- When illuminated, white NOT IN USE lamp means that the corresponding GPU is plugged to the EXT PWR receptacle but not connected to the whole aircraft electrical network.
The EXT 1 P/BSW is located on the electrical section (ELEC) of the panel 225VM; it is equipped with a green AVAIL legend and a blue ON legend. When illuminated, the AVAIL legend means that a GPU is connected to the EXT PWR 1 receptacle and its electrical parameters are correct. Once illuminated, the ON legend shows that the P/BSW has been depressed and the GPU is giving electrical power to the aircraft electrical network.
The electrical parameters of the GPU and the status of the AC and DC generation/distribution with EXT 1 P/BSW selected ON are shown on the ECAM ELEC AC and ELEC DC pages that can be selected from the ECAM Control Panel (ECP).

Electrical System Supplied by 2 GPUs (2)

On the electrical section (ELEC) of the panel 225VM the EXT 1 and EXT 2 pushbutton switches (P/BSW) allow to energize the entire aircraft electrical network from GPU(s) connected to the EXT PWR receptacles.
Each EXT 1(2) P/BSW is equipped with a green AVAIL legend and a blue ON legend.
When illuminated, the AVAIL legend means that a GPU is connected to an EXT PWR receptacle and its electrical parameters are correct.
Once illuminated, the ON legend shows that the P/BSW has been depressed and the corresponding GPU is giving electrical power to the aircraft electrical network.
The electrical parameters of the GPUs and the status of the AC and DC generation/distribution are shown on the ECAM ELEC AC and ELEC DC pages that can be selected from the ECP.

Electrical System Supplied by APU Starter/Generator and GPU (2)

On the electrical section (ELEC) of the panel 225VM the APU GEN P/BSW allows to energize the aircraft electrical network from the APU generator when the APU is available.
The APU generator electrical parameters are shown on the ECAM ELEC AC and APU pages.
Depending on priority logics and manual selection between EXT 1, EXT 2 and APU GEN, the status and reconfigurations of the AC and DC generation/distribution are shown on the ECAM ELEC AC and ELEC DC pages.
APU, ELEC AC and ELEC DC pages can be selected from the ECP.

Electrical Source Priority Demonstration (3)

The ECAM Control Panel (ECP) is located on the middle area of the center pedestal, it is equipped with various controls among which a set of hard keys give access to aircraft systems synoptic.

From the ECP you can select the synoptic relevant to the electrical power through the EL/AC and EL/DC keys.
Following the selection, the corresponding ECAM page is displayed on the System Display (SD) shown on the left hand side of the upper center display unit (DU).
According to priority logics the ELEC AC and ELEC DC pages show the (re)configurations of the electrical network depending on the available and selected power sources:
EXT PWR 1 / 2 from GPUs
APU S/G
VFGs

PDMMF in Search Mode (2)

The MAINTENANCE panel 255VM allows using the PDMI through the REMOTE C/B CTL pushbutton.
When selected ON this pushbutton gives access through the maintenance HMIs (OMT, CPT or F/O OIS display and optional PMAT) to the PDMMF application.
A PDMI session can be open by selecting the "C/B Management" tab either on the Function Shortcut list of the MAINTENANCE HOME PAGE or from the "Aircraft Management" scroll menu on the header of the same page.
From the same area, the "Utilities" scroll menu gives access to the "C/B Config Status" function.
Whatever the initial access, once a PDMMF session is open you can read the status of any protection device.
For the new technology ones (SSPCs and RCCBs) you can OPEN/LOCK/TAG/CLOSE them from the HMI.
For the classical circuit breakers (C/Bs) you still need to physically access and manually OPEN/CLOSE them, install/remove plastic safety clips and paper tags; most of the classical circuit breakers are installed on the EPDCs and CBPs located in the avionics bay.

PDMMF in AMM Mode (2)

The MAINTENANCE panel 255VM allows using the PDMI through the REMOTE C/B CTL pushbutton.
When selected ON this pushbutton gives access through the maintenance HMIs (OMT, CPT or F/O OIS display and optional PMAT) to the PDMMF application.
Thanks to the electronic documentation a PDMI session can be open by clicking on the tab shown prior to the protection device or the list of protection devices concerned by the maintenance task.
This action will give, by mean of symbols, the status of these protection devices and will allow through the PDMI to change this status for SSPCs and RCCBs.

Towing on BAT (2)

The MAINTENANCE panel 255VM allows using the TOWING ON BAT through the corresponding POWER pushbutton.
When selected ON this pushbutton gives electrical power from BAT 1 to the equipment that is necessary for towing on battery.
BAT 1 Status Of Charge (SOC) is reflected by the "CHARGE" triple annunciator located beside the POWER pushbutton.
The CHARGE annunciator is equipped with three lighted labels:
- HIGH (green color)
- MED (amber color)
- LOW (red color)

Single ATU Failure (3)

The ECAM Control Panel (ECP) is located on the middle area of the center pedestal.
The System Display (SD) is shown on the left hand side of the upper center display unit (DU).
The Warning Display (WD) is shown on the right hand side of the upper center display unit (DU).

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In case of a failure of the ATU 1A an ECAM failure message is shown on the WD.
From the ECP, by selecting the STS key, the status page on the SD shows the corresponding INOP system information.
By selecting the EL/AC key on the ECP the SD shows the configuration of the electrical network following the failure of the ATU 1A.

Dual ATU Failure (3)

The ECAM Control Panel (ECP) is located on the middle area of the center pedestal.
The System Display (SD) is shown on the left hand side of the upper center display unit (DU).
The Warning Display (WD) is shown on the right hand side of the upper center display unit (DU).
In case of a dual failure of the ATU 1A and ATU 1B an ECAM failure message is shown on the WD.
From the ECP, by selecting the STS key, the status page on the SD shows the corresponding INOP system information.
By selecting the EL/AC key on the ECP the SD shows the configuration of the electrical network following the failure of the ATU 1A and ATU 1B.

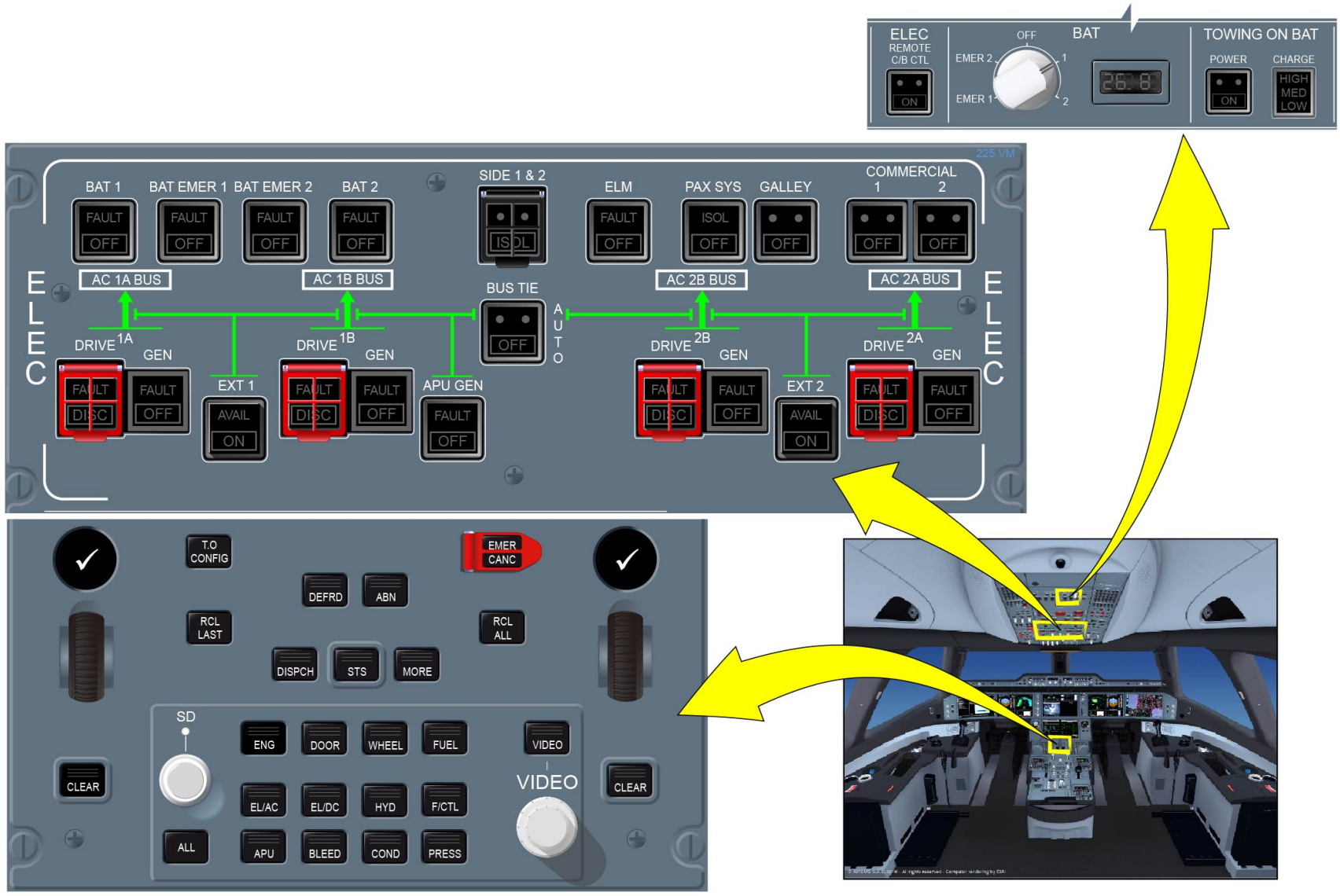
Emergency Electrical Generation (3)

The emergency electrical power section (EMER ELEC PWR) on the panel 211VM gives manual control on the RAT deployment through the guarded RAT MAN ON pushbutton.
The electrical section (ELEC) on the panel 225VM that gives main controls for the VFGs through the GEN 1A, 1B, 2A and 2B pushbutton switches.
The System Display (SD) is shown on the left hand side of the upper center display unit (DU).
The Warning Display (WD) is shown on the right hand side of the upper center display unit (DU).
In case of a total Loss of Main Electrical Power (LMES) in flight the RAT is automatically deployed and the RAT generator is connected to the electrical emergency network, the corresponding configuration and the RAT symbol/parameters are shown on the ELEC AC ECAM page.

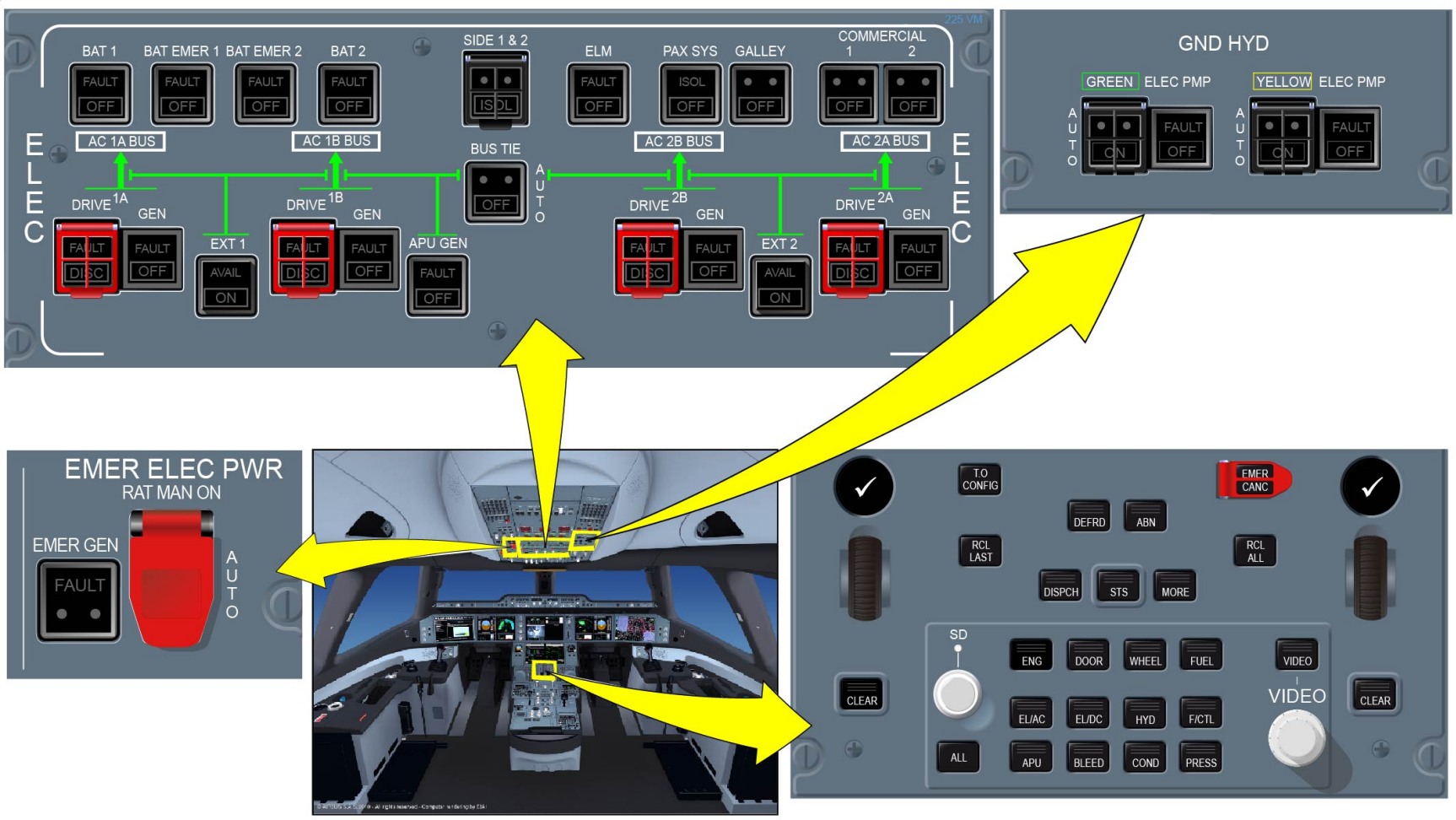
RAT Module & Stow Panel (3)

The RAT module is located on the right hand side AFT belly fairing.
The RAT Stow Panel is located in the Green Hydraulic Ground Service Panel (GSP) within the left hand belly fairing.
RAT alignment marks are located on the turbine hub and on the gearbox; they must be manually aligned in order to allow RAT module stowage.
On the Ground Hydraulic (GND HYD) section of the panel 222VM the GREEN ELEC PUMP guarded "AUTO" pushbutton switch gives control to pressurize the Green Hydraulic system that is needed for RAT stowage on ground.
On the RAT STOW panel the 28 VDC ON/OFF guarded switch must be selected to the ON position.
On the RAT STOW panel the STOW / LAMP TEST switch must be selected from the neutral center position to the upper STOW position in order to initiate the RAT stowage.
On the RAT STOW panel the green RAT STOWED light illuminates at the end of the RAT retraction when the RAT module is properly stowed and locked.

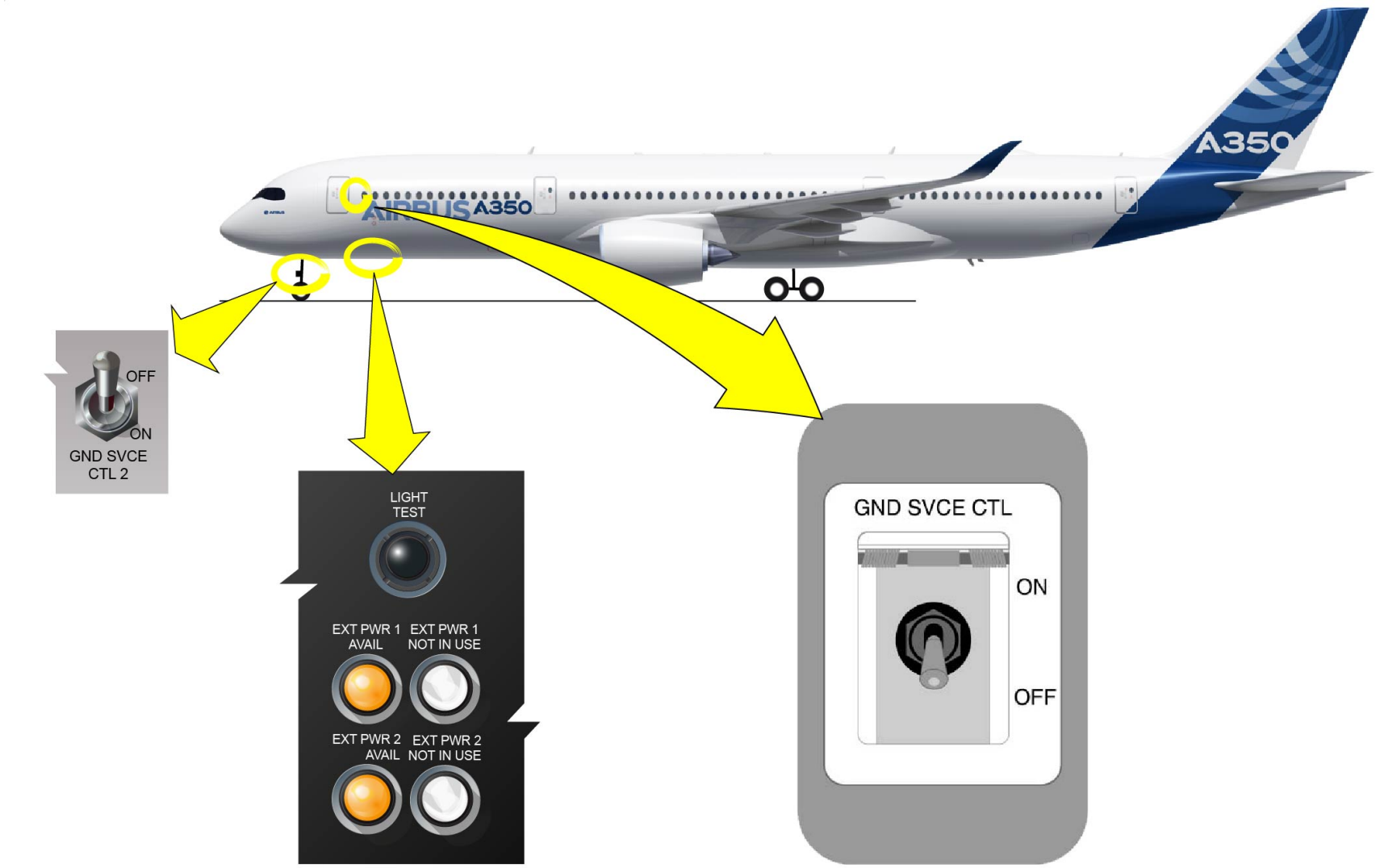
V2414251 - V00T0MM0 - VM2411000003001



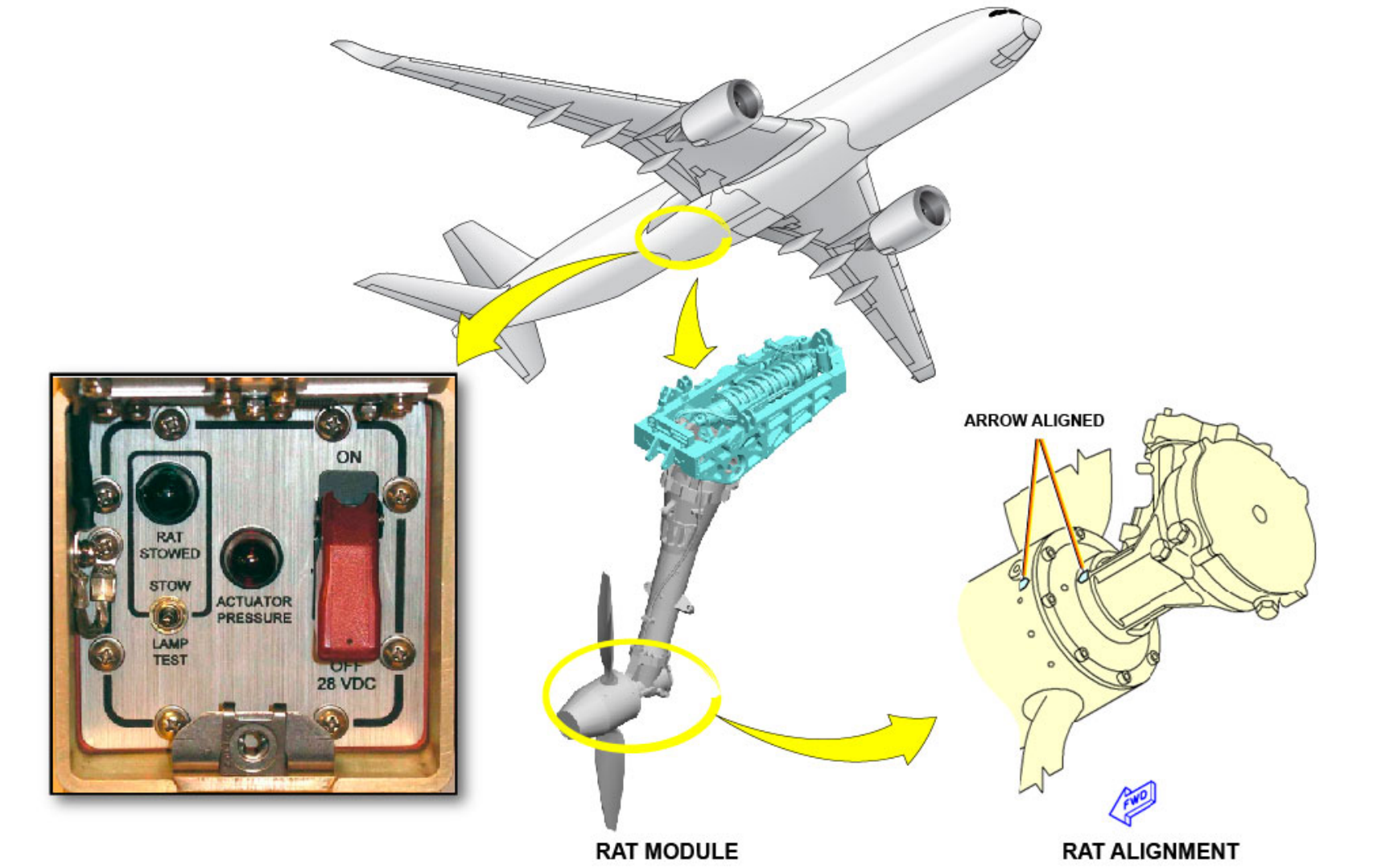
ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)



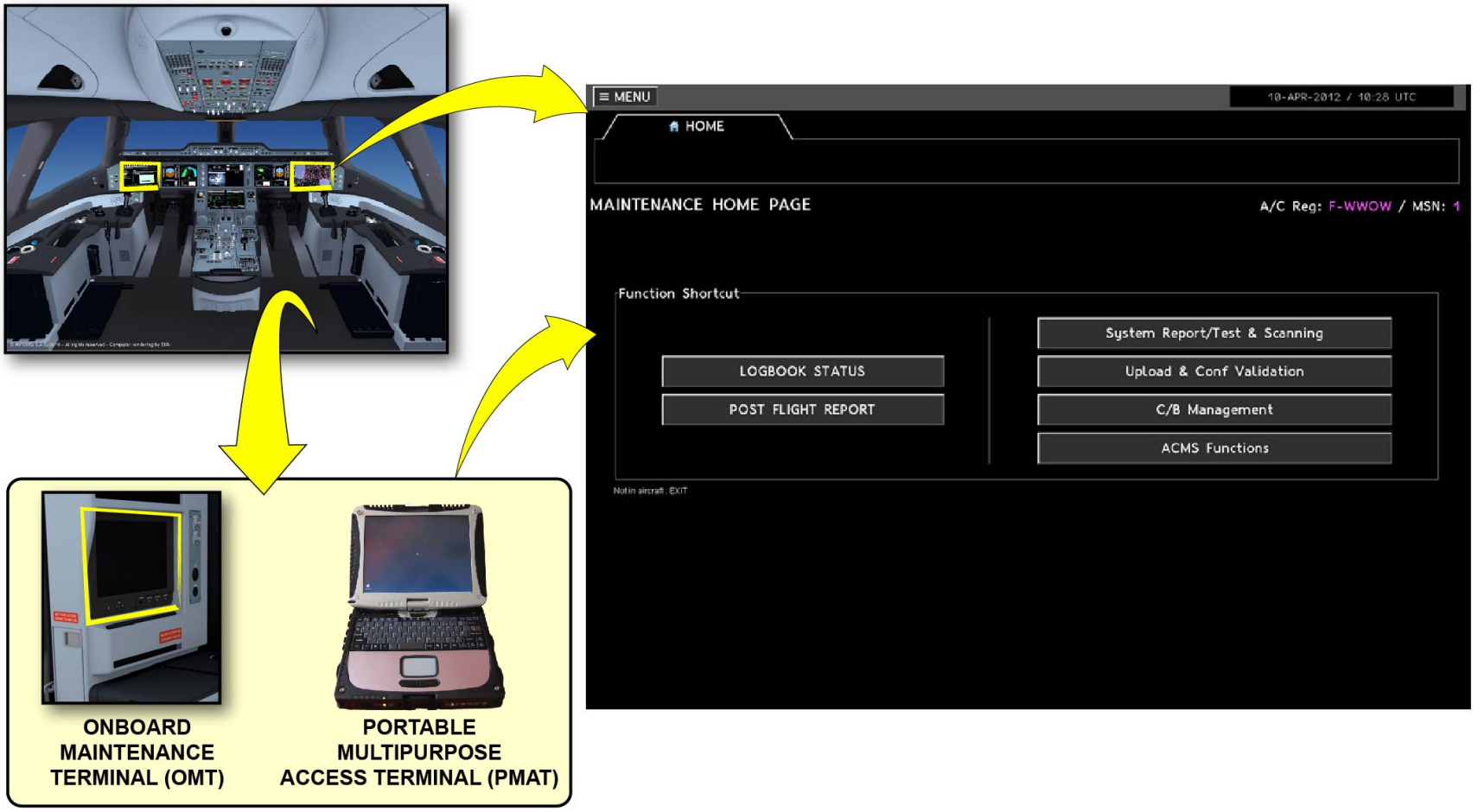
ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)



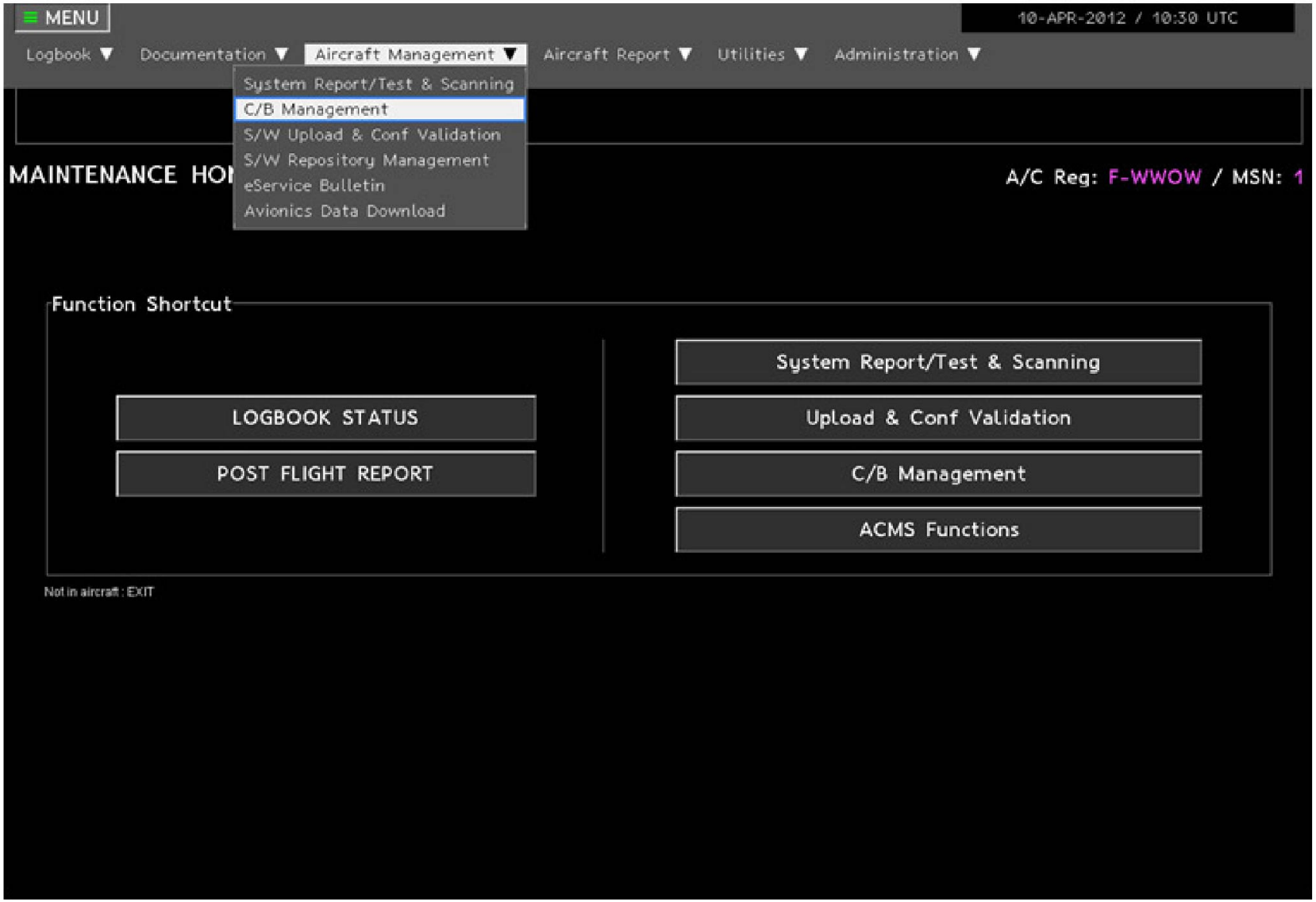
ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)



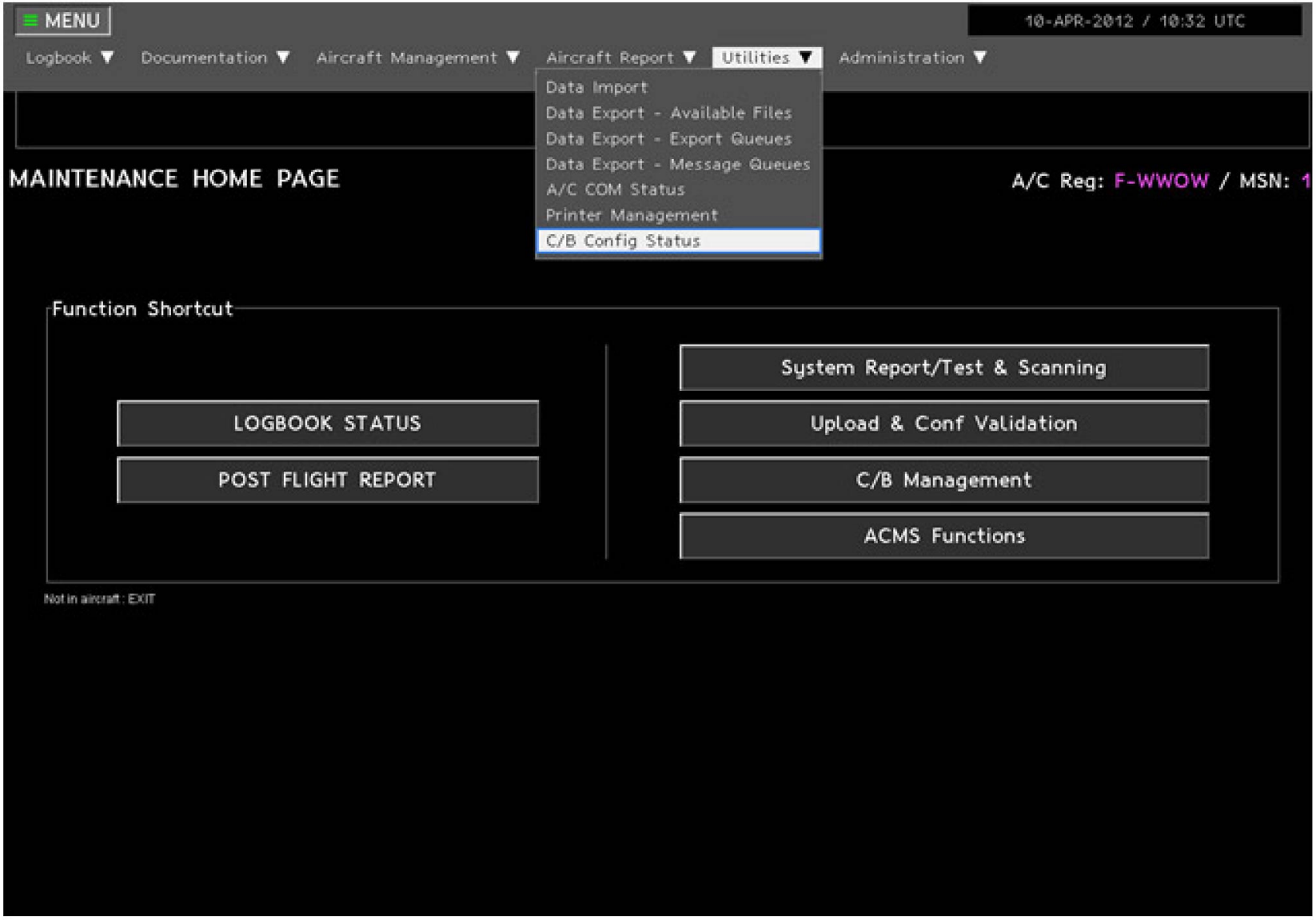
ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)



ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)



ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)



ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)

AIRCRAFT CONTROL DOMAIN

BREAKER STATUS SELECTION

BACK | PRINT | EXPORT | HIDE | CLOSE

Search

ATA - FIN - Functional Designation: adiru 1

Search | Clear | Advanced

408 occurrence(s) found

	ATA	FIN	FUNCTIONAL DESIGNATION	PANEL	LOCATION	STATUS	TAG
☑	34-11	805FP	ADIRU 1&3 SWTG	SEPDC1	3023XZ6	CLOSED	0 tag
☑	34-11	7FP1	ADIRU 1 28VDC ESS	2500VU	3361	CLOSED	CHE...
☑	34-11	4FP1	ADIRU 1 115VAC ESS	2500VU	866	CLOSED	CHE...
☑	34-11	43FP	ADIRU 1 28VDC BKUP	2500VU	2168	CLOSED	CHE...
☐	24-61	995PN1	105PP SPLY	PEPDC	side 1	CLOSED	CHE...
☐	27-92	42CE	ACCLRM LAF VERT L1	2500VU	2660	CLOSED	CHE...
☐	32-31	823GA1	BLG RET SELV SIDE1	SEPDC1	3123XZ7	CLOSED	0 tag
☐	24-72	905XZ2	SEPDC1 SPLY ON BAT	PEPDC	side 2	CLOSED	CHE...
☐	32-42	805GG1	N BRK FILL V WLG S1	SEPDC1	3108XZ3	CLOSED	0 tag
☐	24-61	993PN1	107PP SPLY	PEPDC	side 1	CLOSED	CHE...
☐	31-19	7VM	ICP 1212VM ESS	2500VU	3060	CLOSED	CHE...
☐	32-31	808GA1	DR UPLK ACTR R WLG S1	SEPDC1	3110XZ5	CLOSED	0 tag
☐	21-21	2HG10	LP RECIRC FAN 10	SEPDC2	4014XZ1	CLOSED	0 tag

Clear Basket | View | 4 item(s) | << | 1 / 5 | >> | Confirm Selection

ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)

AIRCRAFT CONTROL DOMAIN

BREAKER CONFIGURATION MANAGEMENT SELECTION

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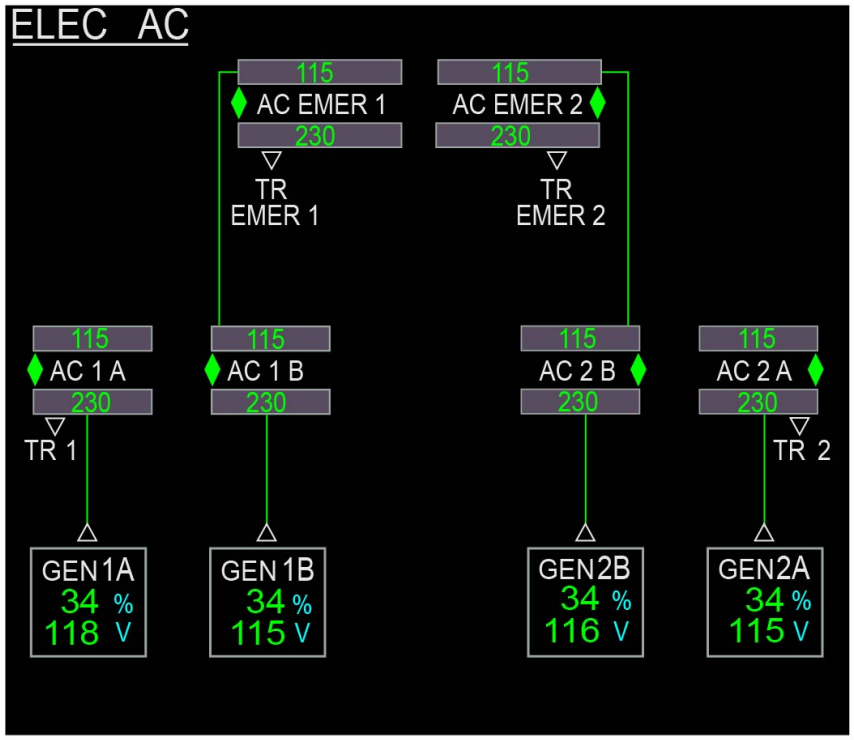
ATA - FIN | Functional Designation: adiru 1 | Search | Clear | Advanced

408 occurrence(s) found

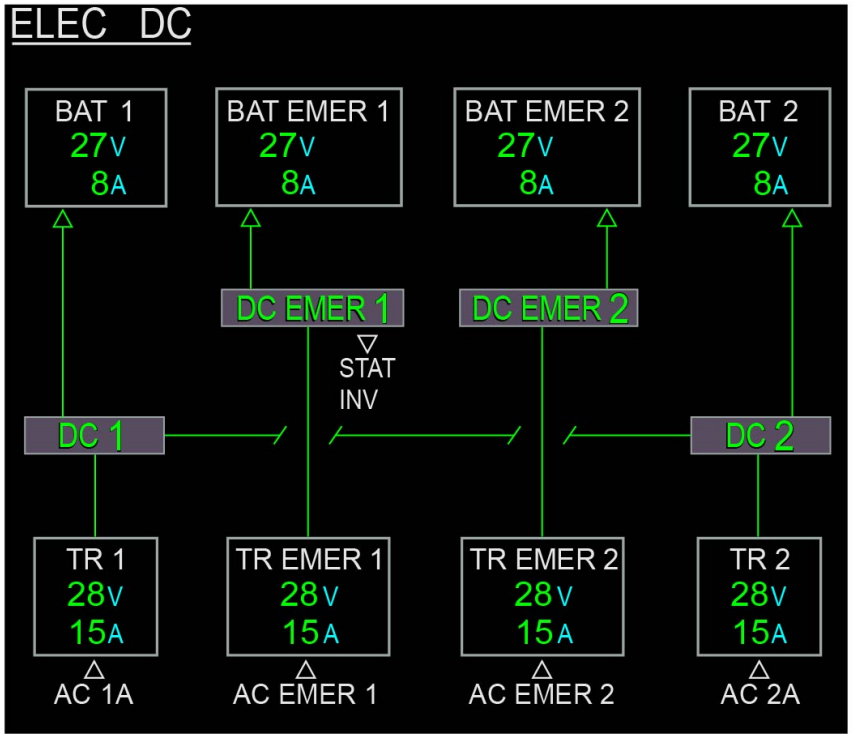
	ATA	FIN	FUNCTIONAL DESIGNATION	PANEL	LOCATION	STATUS	CONF. STATUS
☑	34-11	805FP	ADIRU 1&3 SWTG	SEPDC1	3023XZ6	CLOSED	Used
☐	34-11	7FP1	ADIRU 1 28VDC ESS	2500VU	3361	CLOSED	Used
☐	34-11	4FP1	ADIRU 1 115VAC ESS	2500VU	866	CLOSED	Used
☐	34-11	43FP	ADIRU 1 28VDC BKUP	2500VU	2168	CLOSED	Used
☐	24-61	995PN1	105PP SPLY	PEPDC	side 1	CLOSED	Used
☐	27-92	42CE	ACCLRM LAF VERT L1	2500VU	2660	CLOSED	Used
☐	32-31	823GA1	BLG RET SELV SIDE1	SEPDC1	3123XZ7	CLOSED	Used
☐	24-72	905XZ2	SEPDC1 SPLY ON BAT	PEPDC	side 2	CLOSED	Used
☐	32-42	805GG1	N BRK FILL V WLG S1	SEPDC1	3108XZ3	CLOSED	Used
☐	24-61	993PN1	107PP SPLY	PEPDC	side 1	CLOSED	Used
☐	31-19	7VM	ICP 1212VM ESS	2500VU	3060	CLOSED	Used
☐	32-31	808GA1	DR UPLK ACTR R WLG S1	SEPDC1	3110XZ5	CLOSED	Used
☐	21-21	2HG10	LP RECIRC FAN 10	SEPDC2	4014XZ1	CLOSED	Used

Clear | View | 1 item(s) | << | 1 / 5 | >> | Confirm Selection

ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)

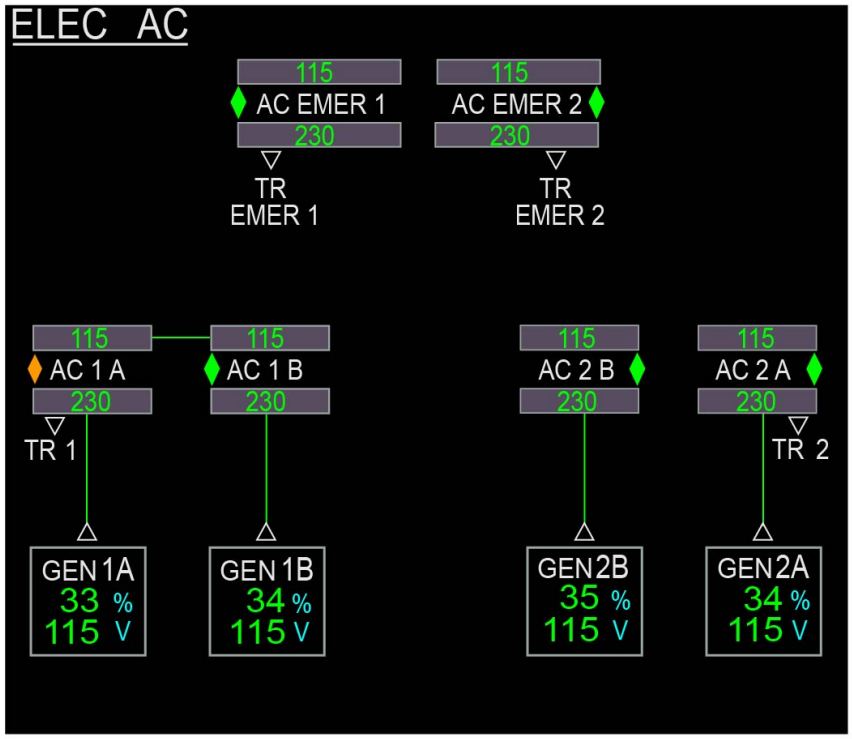


AC PAGE NORMAL CONFIGURATION



DC PAGE NORMAL CONFIGURATION

ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)



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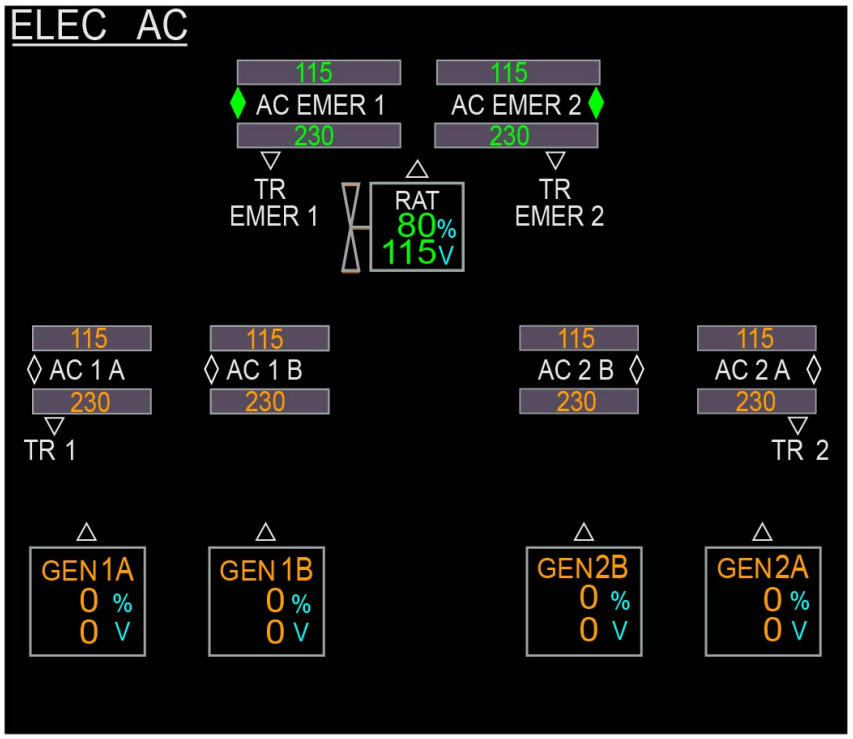

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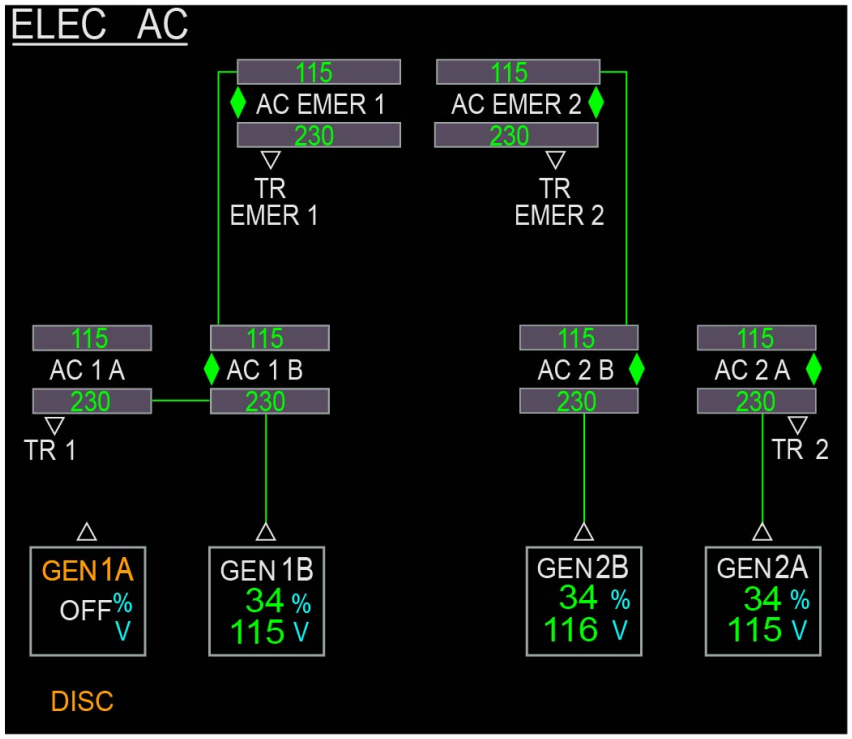

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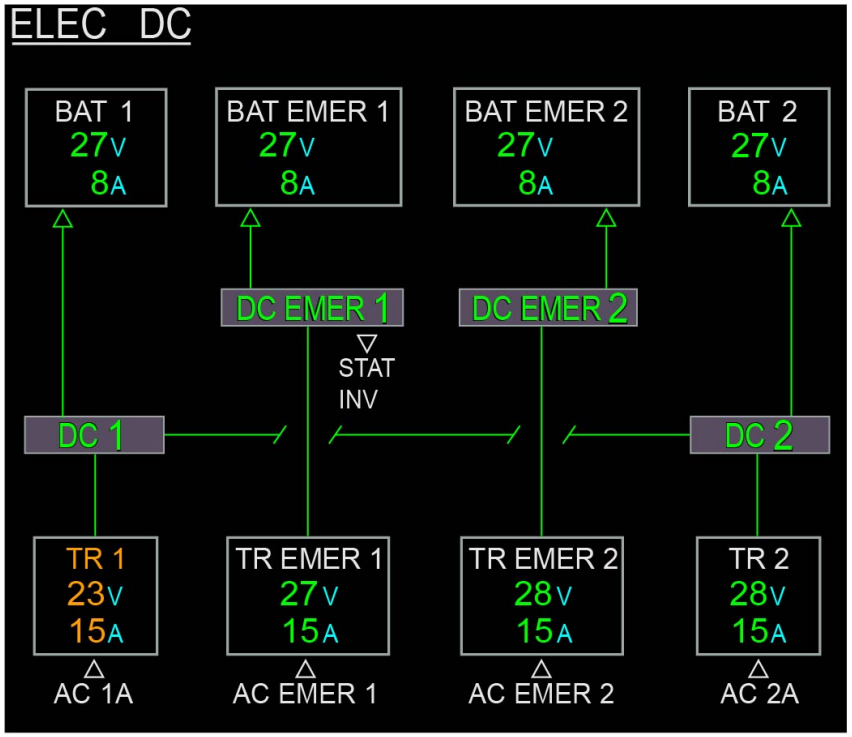
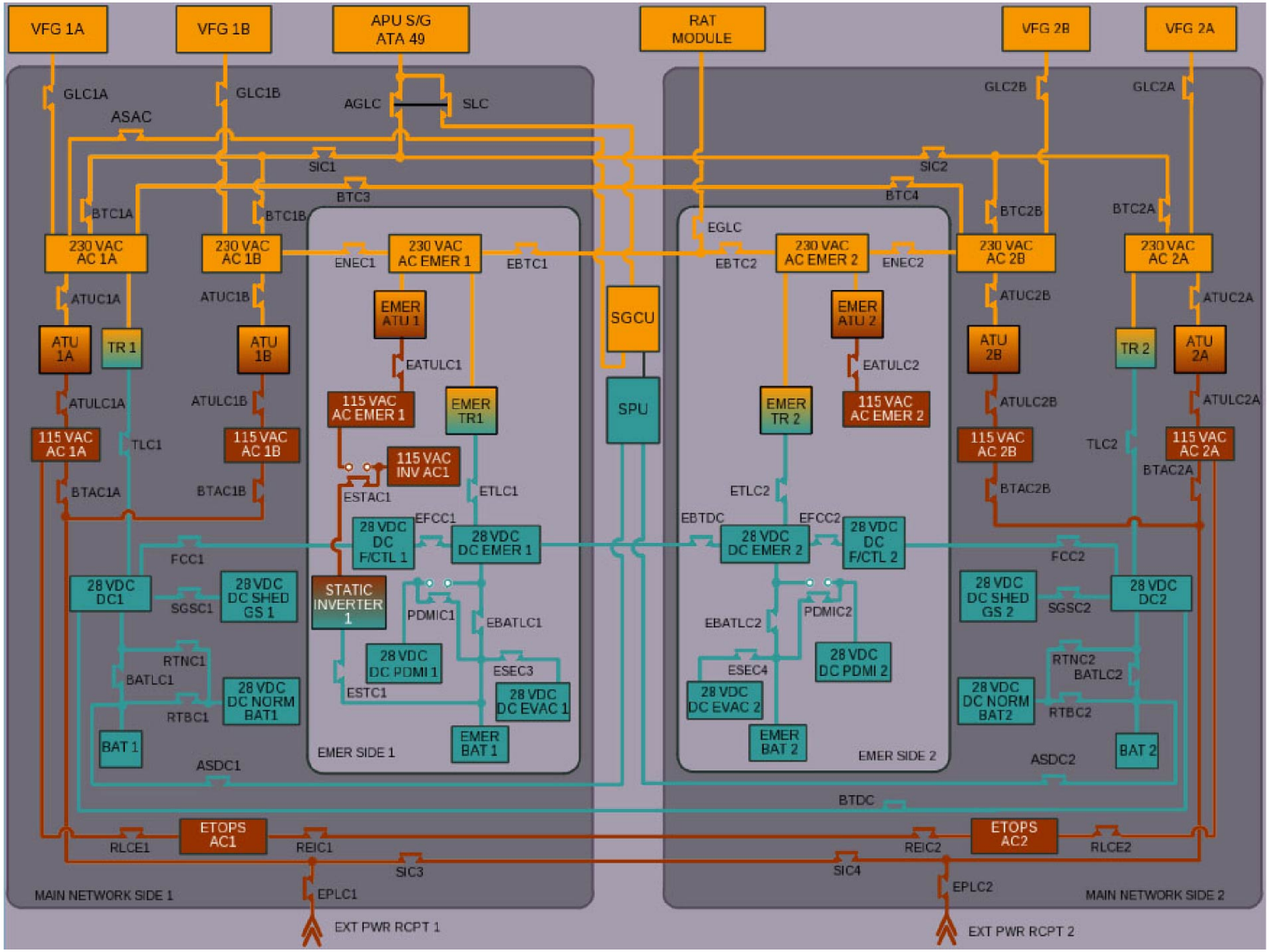


DC PAGE ABNORMAL CONFIGURATION (BACK UP)

ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)



ELECTRICAL SYSTEM - GENERAL (2) ... RAT MODULE & STOW PANEL (3)

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