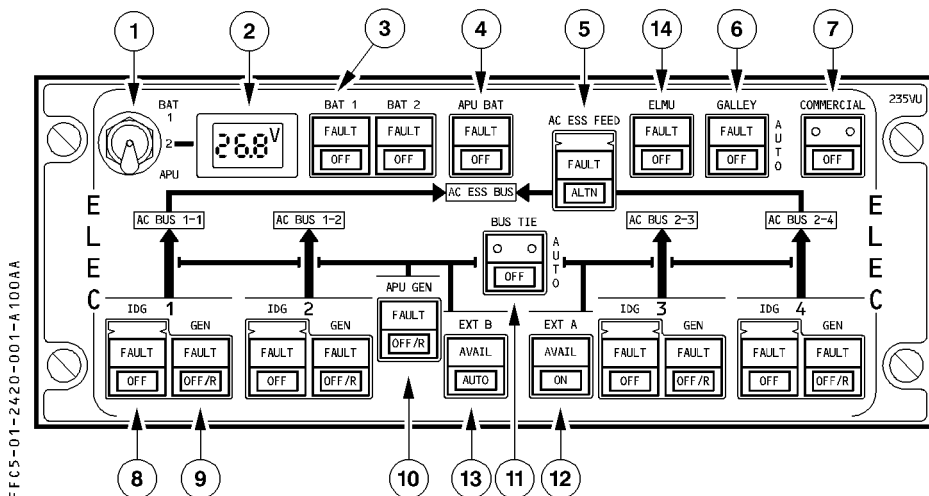


OVERHEAD PANEL



①BAT 1 (2 or APU) sel

Selects the battery for voltage indication.

②BAT 1 (2 or APU) voltage indication

Selected battery voltage.

	ELECTRICAL CONTROLS AND INDICATORS	1.24.20	P 2
		SEQ 001	REV 08

③BAT 1 (2) pb sw

Controls the operation of the corresponding Battery Charge Limiter.

- Auto :
- The Battery Charge Limiter controls automatically the connection and the disconnection of the corresponding battery to the DC BAT BUS by closing and opening of the battery line contactor.
 - The batteries are connected to the DC BAT BUS in the following cases :
 - Battery voltage below 26.5 volt (battery charge). The charging cycle ends when battery charge current goes below 4 Amperes (for 10 seconds on ground, 30 minutes in flight).
 - On the ground (with speed below 50 knots), when batteries only are supplying the aircraft.
 - In flight DC generation lost (limited to 7 seconds).
 - The batteries are connected to the DC ESS BUS when batteries only are supplying :
 - in flight
 - on the ground (speed below 50 knots) provided they are both selected auto.

Note : 1. In normal configuration the batteries are disconnected most of the time.

2. A battery automatic cut off logic prevents batteries from discharging completely discharge when the aircraft on the ground (parking).

Automatic battery contactors open when :

- The aircraft is on the ground.
- The main power supply (external power plus all generators) is cut off.
- The battery voltage is lower than 23 volt for more than 16 seconds.

The flight crew can reset the contactors by switching the BAT pushbutton switch to OFF then AUTO.

- OFF :
- The Battery Charge Limiter is not operating, the DC ESS BUS is not connected to the battery (except in flight in emergency configuration).
 - OFF comes on white if the DC BAT BUS is powered.
 - Hot buses remain supplied.
- FAULT It :
- Comes on amber accompanied by an ECAM caution, when the charging current for corresponding battery is outside limits.
 - In this case the battery contactor opens.

	ELECTRICAL CONTROLS AND INDICATORS	1.24.20	P 3
		SEQ 100	REV 13

④APU BAT pb sw

Controls the operation of the APU Battery Charge Limiter.

AUTO : The APU Battery Charge Limiter automatically controls the closure/opening of the line APU BAT contactor.
The battery is connected in the following cases :

- To ensure battery charge (as for BAT 1 or 2)
- When the APU start sequence is initiated.

Note : Automatic cut off, as for BAT 1 or 2, is provided.

OFF : The Battery Charge Limiter is not operating, the battery line contactor is open.
OFF light illuminates.

FAULT It : Illuminates amber associated to ECAM caution activation as for BAT 1 or 2.
In this case the battery contactor opens.

⑤AC ESS FEED pb sw

Normal : The AC ESS BUS is supplied from AC BUS 1.1.
It is automatically supplied by the AC BUS 2.4 when the AC BUS 1.1 is lost.

ALTN : The AC ESS BUS is supplied from AC BUS 2.4.

FAULT It : Comes on amber accompanied by ECAM activation when the AC ESS BUS is not electrically supplied.

Note : In case of total loss of main generators the AC ESS BUS is automatically supplied by the emergency generator or by the static inverter if the emergency generator is not available.

⑥GALLEY pb sw

AUTO : The galleys are normally supplied. The ECMU automatically controls the shedding of one or more galleys in case of generator(s) failure or in case of overload detection. On ground when APU generator or the external power supplies, all galleys are supplied provided no overload is detected.

OFF : All galleys are shed and water/waste (drain mast) ice protection is lost.

FAULT It : Illuminates amber associated with ECAM in case of overload detection if the automatic shedding is not performed.

Note : Switching OFF then AUTO resets the galleys which have been automatically shed by the ECMU.

	ELECTRICAL CONTROLS AND INDICATORS	1.24.20	P 4
		SEQ 001	REV 17

⑦ COMMERCIAL pb

- OFF :
- The following equipment is shed :
- Galleys
 - Passenger entertainment system (music and video)
 - Cargo loading system
 - Electrical service
 - Water/waste (drain mast) ice protection
 - Lavatory and cabin lights
 - Water heater

⑧ IDG 1 (2, 3 or 4) (Integrated Drive Generator) pb

Normally springloaded out.

When pressed, the IDG is disconnected from its drive shaft and can only be reconnected by maintenance action on ground.

CAUTION

1. If the pushbutton is pressed for more than about 3 seconds, damage may occur to the disconnection mechanism.
2. IDG disconnection is inhibited when engine N2 is below the low speed threshold.

- FAULT It :
- It comes on amber, along with an ECAM caution, in case of :
- IDG oil outlet overheat (above 185° C), or
 - IDG oil pressure low. Inhibited at low engine speed (N2 below 14 %).
- It goes off when the IDG is disconnected.

⑨ GEN 1 (2, 3 or 4) pb

- On :
- The generator field is energized and the line contactor closes, provided electrical parameters are normal.
- OFF/R :
- The generator field is de-energized and the line contactor opens.
- The fault circuit is reset.
- FAULT It :
- Comes on amber, along with an ECAM caution, in the event of protection trip initiated by the associated Generator Control Unit (GCU).
- The line contactor opens.

Note : *If the protection trip is initiated by a differential fault, the reset action has no effect after two attempts.*

	ELECTRICAL CONTROLS AND INDICATORS	1.24.20	P 5
		SEQ 001	REV 09

⑩ APU GEN pb sw

- On : The APU generator field is energized and the line contactor closes provided parameters are normal.
Each bus tie contactor 1, 2, 3 and (or) 4 automatically close if its associated generator is not operative.
- OFF/R : The generator field is de-energized and the line contactor opens. The fault circuit is reset.
- FAULT It : Same as GEN FAULT.
APU GEN FAULT light is inhibited when APU speed is too low.

⑪ BUS TIE pb sw

- AUTO : The five BUS TIE contactors open or close automatically according to the priority logic in order to maintain power supply to all AC buses.
- When a generator is lost, the associated AC BUS bar remains supplied through its associated BUS TIE contactor and the adjacent one which will automatically close.
 - When the aircraft is supplied only by APU generator or single ground power unit, the five contactors close.
 - When the aircraft is supplied by only two generators located on the same side the following contactors will close :
 - the two contactors associated to both lost generators
 - the contactor associated to the external running generator
 - the fifth contactor (located between left and right side).
- OFF : The five BUS TIE contactors open.

Note : *Selecting the BUS TIE pushbutton to OFF then AUTO on the ground inhibits the NBPT function.*

The function may be recovered by switching OFF all aircraft electrical sources and resetting GPCU with ground power unit disconnected.

⑫ EXT A pb : (momentary action)

- AVAIL It : Illuminates green provided external power parameters are normal.
- Momentarily pressed :
 - If the AVAIL light was on :
 - The external power line contactor closes
 - The AVAIL light goes off
 - The ON light comes on blue
 - If the ON light was illuminated :
 - The external power line contactor opens
 - The ON light goes off
 - The AVAIL light comes on.

	ELECTRICAL CONTROLS AND INDICATORS	1.24.20	P 6
		SEQ 100	REV 15

⑬EXT B pb : (momentary action)

- AVAIL lt : Illuminates green provided external power parameters are normal.
- Momentarily pressed :
 - If the AVAIL light was on :
 - Provided the APU generator is off the external power line contactor closes
 - The AVAIL light goes off
 - The AUTO light comes on.
 - If the AUTO light was on :
 - The external power line contactor opens
 - The AUTO light goes off
 - The AVAIL light comes on.

Note : *The APU generator has priority over external power (A and B) for AC BUS 1.1 and AC BUS 1.2.*

The external power A has priority over the APU GEN for AC BUS 2.3 and 2.4.

APU generator has priority over external power B for AC BUS 2.3 and 2.4.

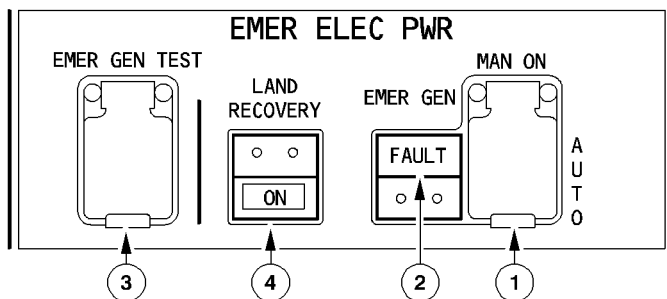
The engine generators have priority over the external powers or APU.

The external power B has priority over external power A for AC Bus 1.1 and AC BUS 1.2.

When external power B is selected AUTO, AUTO light remains illuminated even when the APU generator has taken over.

⑭ELMU pb sw

- OFF : The electrical load management unit is not operating. All the load consumers managed by the ELMU are power supplied according to their own manual selection. This is called the backup mode. Nevertheless, ECMU and GCU are still insuring power sources protection against overload : ECMU perform global load shedding when it is informed by GCU of a power source overload.
- FAULT light : Comes on amber accompanied by an ECAM caution, when the ELMU is detected failed. In this case, the ELMU automatically goes in back up mode.



FFCS-01-2420-007-A305AA

① MAN ON pb (guarded)

- AUTO : In case of normal AC supply loss in flight, the emergency generator starts automatically.
- Pressed : The emergency generator runs and is connected to the aircraft network.

② EMER GEN FAULT It

The light comes on red, when the emergency generator is not supplying and normal AC supply is lost in flight.

③ TEST pb (guarded)

- Pressed : The emergency generator runs (provided the green hydraulic system is pressurized) and supplies the DC ESS BUS and the AC ESS BUS.

④ LAND RECOVERY pb

- ON : When pressed in electrical emergency configuration, the DC LAND RECOVERY buse is recovered and the following equipment is restored :
- LGCIU 1
 - SFCC 1 (flap channel is not recovered, if the emergency generator is powered by the RAT).
- The remaining fuel pump (if any) is lost.

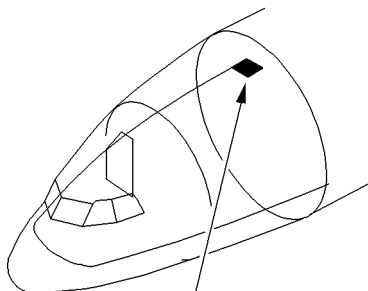
Note : The remaining fuel pump will be shed at 260 knots, if the emergency generator is powered by the RAT, or upon LAND RECOVERY selection, whichever occurs first.

virgin atlantic A340-600 <i>Flight crew operating manual</i>	ELECTRICAL CONTROLS AND INDICATORS	1.24.20 P 8	
		SEQ 001	REV 09

FORWARD CABIN

GND SELECT CTL sel

FFCS-01-2420-008-A001A



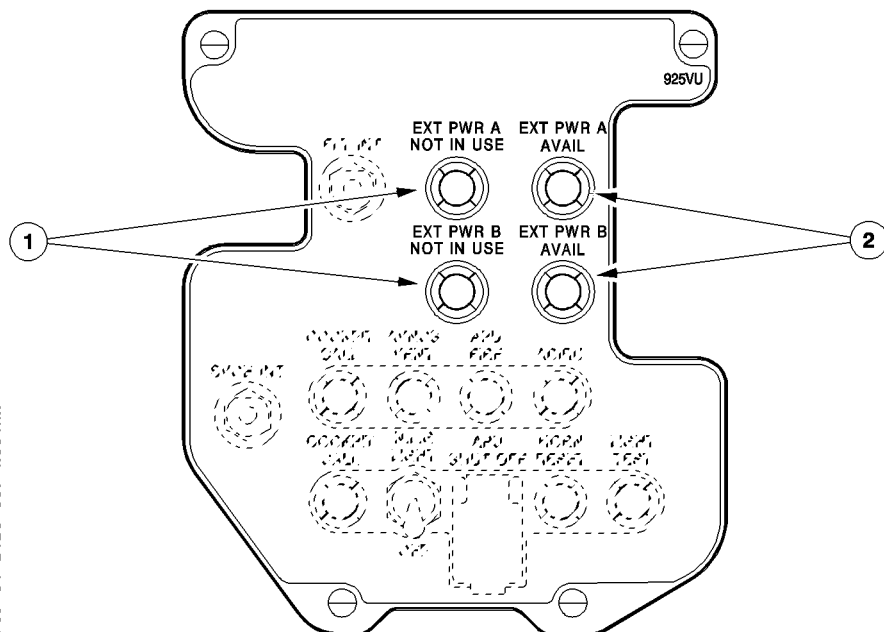
GND SELECT CTL SELECTOR

Allows electrical buses for ground servicing to be energized without supplying entire aircraft electrical network.

- ON** : The selector is magnetically latched provided the external power A parameters are normal (AVAIL light on). The AC and DC GRND / FLT bus bars are supplied and the following services can be energized :
- passenger compartment lighting
 - galley lighting
 - entrance area lights
 - lavatory lighting and service
 - vacuum cleaner outlets
 - flight compartment service outlets
 - flight compartment flood lighting
 - fuel quantity indications
 - refueling
 - lower deck cargo compartment lighting and power outlets.
 - main and nose landing gear compartment lighting
 - hydraulic compartment lighting
 - landing gear compartment service outlets
 - ground call
 - equipment compartment lights and service outlets
 - navigation lights
 - escape slide locking mechanism ice protection 
 - parking brake
 - cargo door hydraulic pump
- the selector trips when the external source is removed or in case of TR 2 fault.
- OFF** : The AC and DC GRND / FLT bus bars are connected to normal AC buses and DC BUS 2.

EXTERNAL POWER PANEL

(This panel is located closed to the external power connector)



① EXT PWR A (B) NOT IN USE

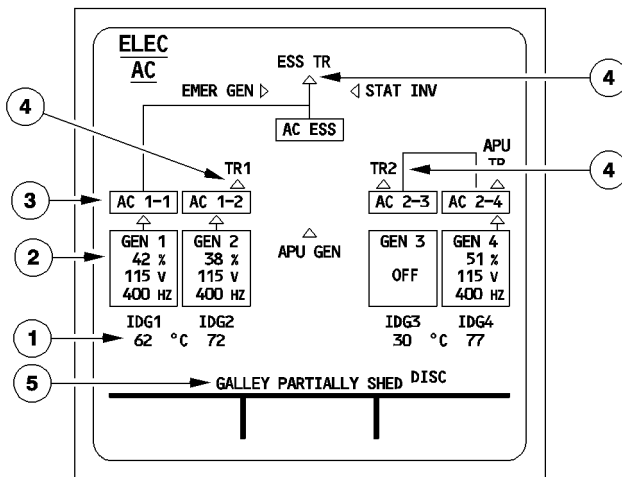
This white light comes on to inform the ground personnel that the ground power unit is not supplying the aircraft network and can be disconnected. It goes off if EXT A(B) is in use.

② EXT PWR A (B) AVAIL

This amber light comes on to indicate that external power is available and the voltage is correct.

ELEC AC ECAM PAGE

FLIGHT CONFIGURATION

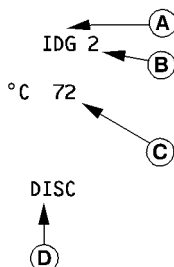


FFCS-01-2420-010-A001AB

virgin atlantic A340-600 <i>Flight crew operating manual</i>	ELECTRICAL CONTROLS AND INDICATORS	1.24.20 P 11	
		SEQ 001	REV 15

① IDG indications

FFCS-01-2420-011-A001AA



Ⓐ IDG indication :

- normally white
- amber in case of :
 - IDG outlet temperature overheat (above 185 °C) or,
 - IDG oil low pressure or,
 - IDG disconnection.

Ⓑ IDG number :

- white if associated engine is running
- amber if stopped.

Ⓒ Outlet oil temperature :

- Normally green.
- Green, pulsing in case of advisory (above 142 °C).
- Amber in case of overheat (above 185 °C).

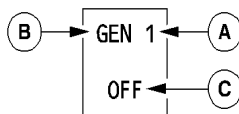
Ⓓ DISC / LO PR indication :

- DISC appears in amber, if the IDG is disconnected.
- LO PR appears in amber, if an oil low pressure occurs when the IDG is connected. It is inhibited at low engine speed (N2 below 14 %).

	ELECTRICAL CONTROLS AND INDICATORS	1.24.20	P 12
		SEQ 001	REV 15

② GEN 1 (2, 3 and 4) indications

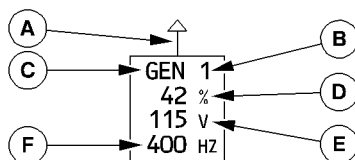
When the GEN pb is OFF :



- ①. GEN number :
- White when the associated engine is running
 - Amber when it is stopped.

②. GEN indication : Amber

③. OFF indication : White
When the GEN pb is ON :



①. Arrow indication : appears green when the generator line contactor is in line

②. GEN number : as above

③. GEN indication :
 – normally white ; amber when the generator is failed

④. GEN load :
 – normally green
 – amber in case of overload (above 108% for more than 10 seconds)

⑤. GEN voltage :
 – normally green
 – amber below 110 V or above 120 V

⑥. GEN frequency :
 – normally green
 – amber below 390 Hz or above 410 Hz

③ AC 1.1 (or 1.2, 2.3, 2.4)

- normally green
- amber when the bar is not powered

④ TR

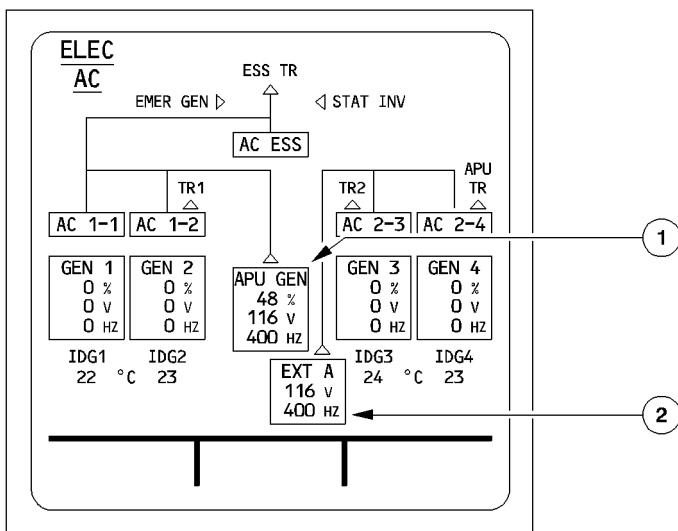
- normally white
- amber when the TR is failed or in case of abnormal current.

⑤ Galley indication

If applicable one of the following messages appears in white, according to the priority order (1 : highest priority).

1. COMMERCIAL PARTIALLY SHED
2. COMMERCIAL OFF
3. GALLEY SHED
4. GALLEY PARTIALLY SHED

GROUND CONFIGURATION

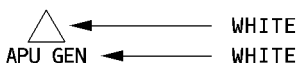


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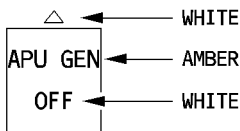
	ELECTRICAL CONTROLS AND INDICATORS	1.24.20	P 14
		SEQ 001	REV 15

① APU Generator

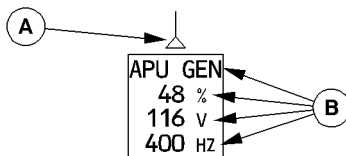
- When APU MASTER SW is off :



- When APU MASTER SW is ON and APU GEN pb sw is OFF :



- When APU MASTER SW is ON and APU GEN pb sw is on :



- ① – green when APU generator supplies one or more AC bus bar
– white otherwise
- ② same logic as engine generator

	ELECTRICAL CONTROLS AND INDICATORS	1.24.20	P 15
		SEQ 001	REV 15

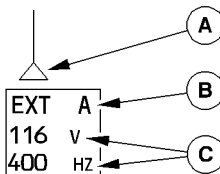
② External power A (External power B symbol appears beside with the same principle) :

(only displayed when aircraft is on ground)

- When external power is not available


 : WHITE

- When external power is available

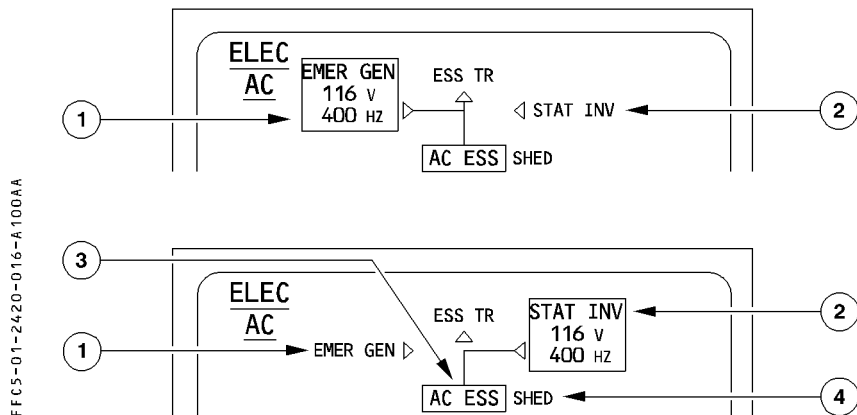


- Ⓐ – green when external power supplies one or more bus bar
 – white otherwise

Ⓑ white

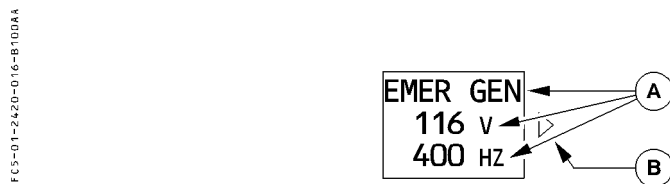
Ⓒ same as engine generator

EMER CONFIGURATION



① Emergency generator

- When the emergency generator contactor is closed :



Ⓐ Same logic as the engine generator.

Ⓑ Green :

- When the Emer Gen Contactor is open :

EMER GEN ▷	:	It is white.
EMER GEN	:	It becomes amber when faulty.

② Static inverter

Same logic as the emergency generator.

③ AC ESS BUS

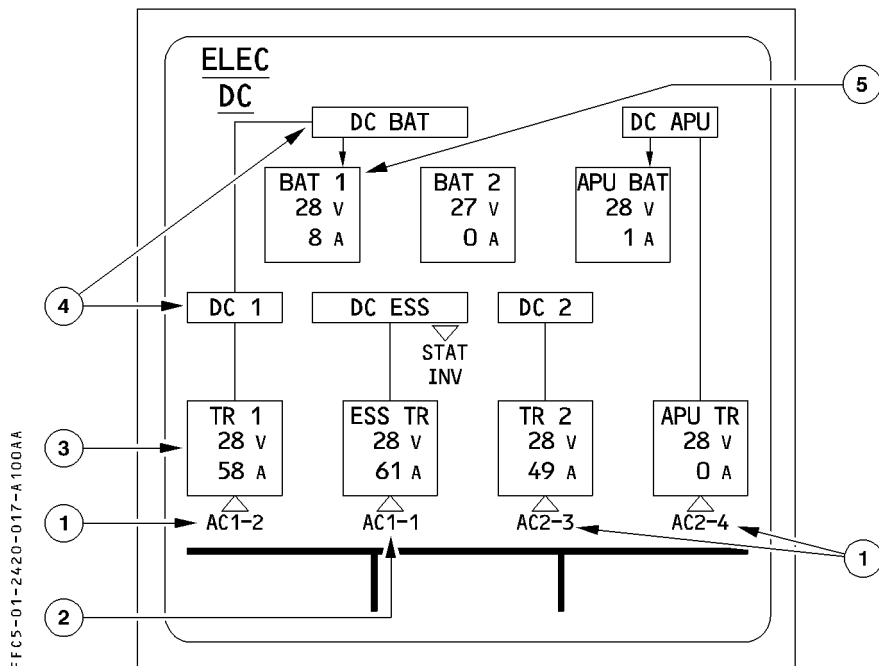
- It is normally green
- It becomes amber when the bus is not supplied.

④ SHED indication

It appears in amber, when the AC ESS SHED BUS is not supplied.

ELEC DC ECAM PAGE

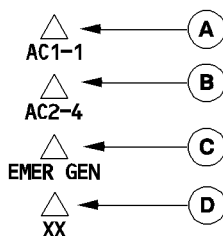
NORMAL CONFIGURATION



① TR 1 (or TR 2 or APU TR) power supply

- It is normally white.
- It becomes amber when the busbar is not powered.

② ESS TR power supply



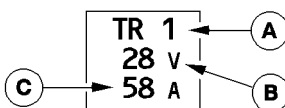
Ⓐ appears in white when AC 1.1 bus bar supplies the ESS TR.

Ⓑ appears in white when AC 2.4 bus bar supplies the ESS TR.

Ⓒ appears : in white when the emergency generator supplies the ESS TR and is not faulty.
in amber when the emergency generator is connected to the ESS TR and is faulty.

Ⓓ appears amber in all other cases (ESS TR not supplied or information not available).

③ Transformer rectifier (1, 2, APU and ESS)



Ⓐ TR indication

- normally white
- amber when the voltage or the current value are abnormal or when the TR is faulty (overheat, minimum current, overcurrent or open or short circuit)

Ⓑ Voltage

- normally green
- amber below 25V or above 31V

Note : For APU TR, voltage remains green even if abnormal during APU start.

Ⓒ Current
green

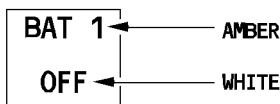
	ELECTRICAL CONTROLS AND INDICATORS	1.24.20	P 19
		SEQ 001	REV 07

④DC BUS bars

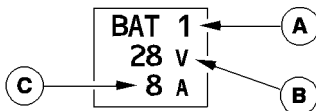
- normally green
- amber if no voltage on the bar

⑤Batteries

- if BAT pb is selected OFF



- if BAT pb is selected AUTO



ⒶBAT indication

- normally white
- amber if the battery is faulty

ⒷVoltage

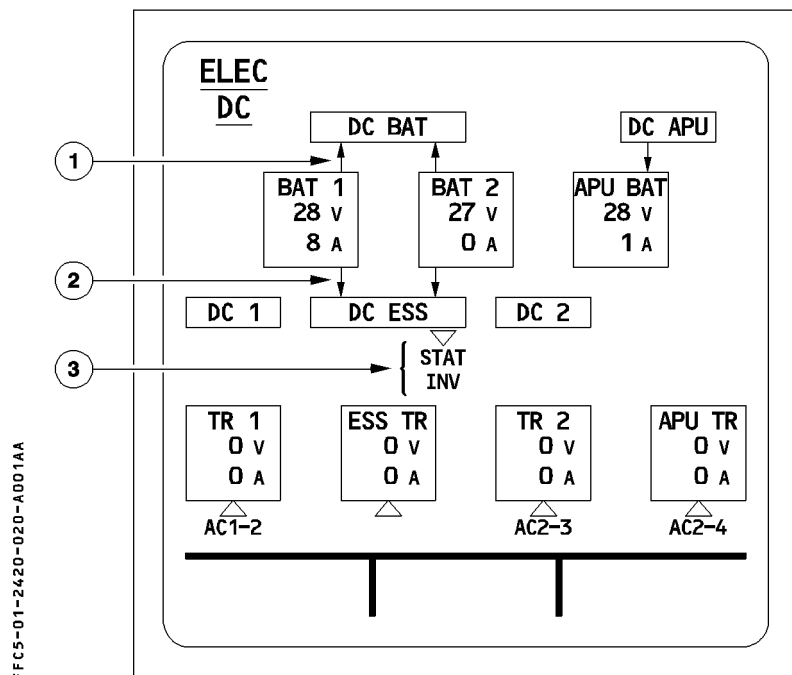
- normally green
- amber below 25V or above 31V

ⒸCurrent (charge or discharge) :

- normally green
- amber if discharge current is above 5A.

Note : For APU battery, even if voltage or current is abnormal, the values remain green during APU start.

EMERGENCY CONFIGURATION



① DC BAT – BAT connection

- Battery Line Contactor open :
nothing displayed
- Battery Line Contactor closed :
↓ green : battery charge
↑ amber : battery discharge

② DC ESS – BAT connection

- ↓ amber : appears when the contactor is closed. (Batteries supplying DC ESS bus)

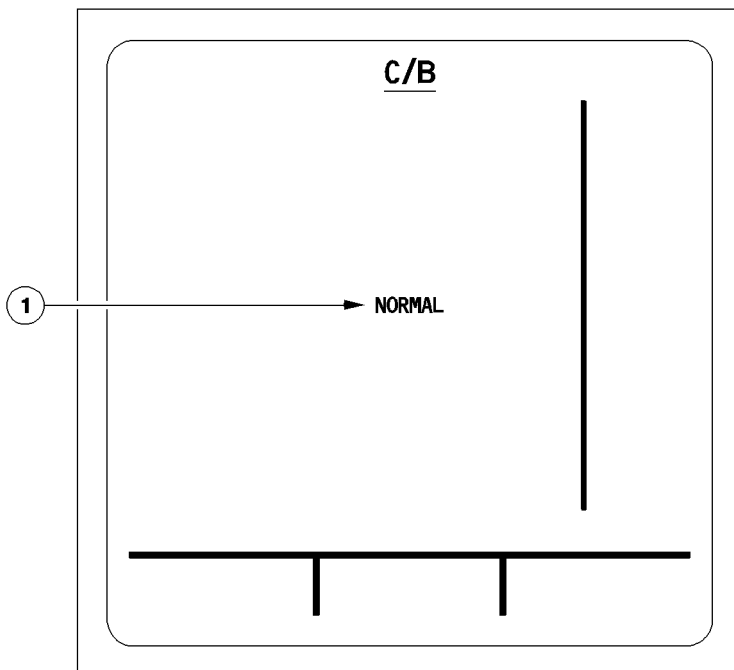
③ Static inverter

- normally white
- amber when the static inverter is faulty.

virgin atlantic A340-600 <i>Flight Crew Operating Manual</i>	ELECTRICAL CONTROLS AND INDICATORS	1.24.20 SEQ 001	P 21 REV 07
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C / B ECAM PAGE

NO C / B PULLED



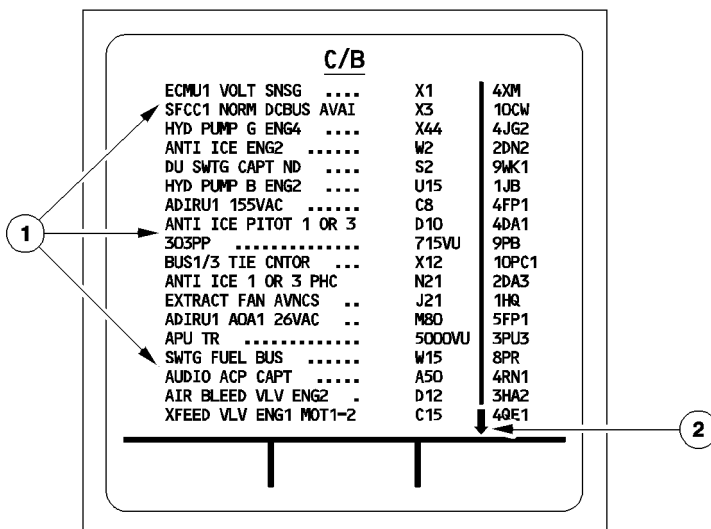
FFC5-01-2420-021-A001AA

①NORMAL

Displayed in green when no circuit breaker is pulled.

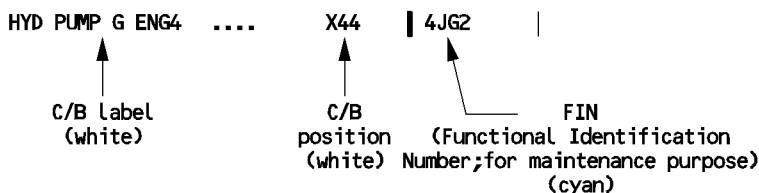
C / B PULLED

FFCS-01-2420-022-A001AA



① Open circuit breaker identification

FFCS-01-2420-022-B001AA



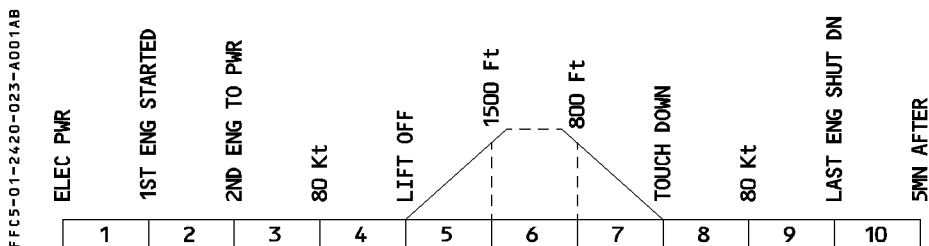
The last tripped Circuit Breakers is displayed on the top of the screen.
All Circuit Breakers are monitored except commercial Circuit Breakers.

② Circuit Breakers page overflow symbol

Displayed in green when pulled Circuit Breakers list is not closed.

- Note :** 1. To display the next page, press again Circuit Breaker pushbutton or CLEAR pushbutton on the ECAM control panel.
2. A maximum of three pages is available.

WARNINGS AND CAUTIONS



E / WD: FAILURE TITLE conditions	AURAL WARNING	MASTER LIGHT	SD PAGE CALLED	LOCAL WARNINGS	FLT PHASE INHIB
EMER CONFIG Loss of main generators. The four normal AC BUS are lost	CRC	MASTER WARN	Nil *	EMER GEN FAULT It	4, 8
AC BUS 1-1 FAULT AC BUS 1-2 FAULT AC BUS 2-3 FAULT AC BUS 2-4 FAULT Busbar(s) is (are) no longer supplied	SINGLE CHIME	MASTER CAUT	ELEC AC	NIL	
AC ESS BUS FAULT Busbar is no longer supplied				AC ESS FEED FAULT It	
AC ESS BUS SHED Busbar is no longer supplied				NIL	
GEN 1(2) (3)(4) FAULT . Protection trip initiated by associated GCU . Or opening of line contactor with GEN pb at ON				GEN 1(2)(3)(4) FAULT It	1, 3, 4, 5, 7, 8, 10
GEN 1(2)(3)(4) OFF GEN 1(2)(3)(4) pb at OFF with no FAULT				NIL	3, 4, 5 7, 8
APU GEN FAULT . Protection trip initiated by associated GCU . Or opening of line contractor with APU GEN pb at ON				APU GEN FAULT It	
GEN 1(2)(3)(4) or APU GEN OVERLOAD Load of one generator is above 100 % of rated output				GALLEY FAULT It	3 to 8
EXT PWR A (B) OVERLOAD Load of external power is above 100 % of rated output				IDG 1(2)(3)(4) FAULT It	
IDG 1(2)(3)(4) OIL LO PR IDG oil pressure low. Inhibited if N2 < 14%				IDG 1(2)(3)(4) FAULT It	1, 4, 5, 7, 8, 10
IDG 1(2)(3)(4) OIL OVHT IDG outlet oil temp. above 185°C				IDG OFF It	3 to 10
IDG 1(2)(3)(4) DISCONNECTED on ground				NIL	3, 4, 5, 7, 8
ECMU 1(2) FAULT				NIL	

* ELEC pages can be called up on the upper ECAM by pressing and holding the ELEC pushbutton on the ECAM control panel.

	ELECTRICAL CONTROLS AND INDICATORS	1.24.20 P 24	
		SEQ 100	REV 16

E / WD: FAILURE TITLE conditions	AURAL WARNING	MASTER LIGHT	SD PAGE CALLED	LOCAL WARNINGS	FLT PHASE INHIB	
C / B TRIPPED One C / B tripped.	SINGLE CHIME	MASTER CAUT	NIL	NIL	3, 4, 5, 7, 8	
BAT 1(2) FAULT Charging current increases at an abnormal rate.			ELEC DC	BAT 1(2) FAULT It		
APU BAT FAULT Charging current increases at an abnormal rate.				APU BAT FAULT It		
DC BUS 1 FAULT DC BUS 2 FAULT DC BUS 1 + 2 FAULT DC ESS BUS FAULT Busbar(s) is (are) no longer supplied.				NIL	4, 8	
DC ESS BUS SHED Busbar is no longer supplied.						
DC BAT BUS FAULT Busbar is no longer supplied.			3, 4, 8, 9			
BUS TIE OFF The BUS TIE pb is abnormally OFF.			NIL		3,4,5 7,8	
AC ESS BUS ALTN AC ESS BUS is abnormally supplied by AC 2-4 bus.			ELEC AC		4 to 8	
PART GALLEY SHED					3,4,5 7,8,9	
BAT 1(2) or APU BAT OFF BAT pb at OFF without fault.			ELEC DC		3, 4, 5 7, 8, 9, 10	
TR 1 (2), APU TR or ESS TR FAULT BCL 1 (2) or APU BCL FAULT						
STATIC INV FAULT C/B MONITOR FAULT Loss of CBMU.			NIL		3, 4, 5, 7, 8	
IDG 1 (2) (3) (4) OIL SYS FAULT						2,3,4, 5,6, 7,8
IDG 1 (2) (3) (4) OIL LO LVL						1,2,3, 4,5,6, 7,8
ELMU		ELMU FAULT	3,4,5, 7,8,9			

MEMO DISPLAY

- EMER GEN is displayed in green, when the emergency generator is running.
- ELEC EXT PWR is displayed in green, if external power is available. This message becomes amber, if more than one engine is running.
- PART GALLEY SHED FOR TO is displayed in green.