26.00 CONTENTS

DESCRIPTION

Aircraft fire protection systems comprise :
— Fire and overheat detection and extinguishing systems for :
  · the engines
  · the APU
— Smoke detection and extinguishing for :
  · the cargo compartments
  · the lavatories
— Smoke detection for :
  · the avionic bay
— Portable fire extinguishers for :
  · the flight compartment
  · the passenger cabin
  · the avionic bay ◁

DESCRIPTION

DETECTION

Each engine and the APU is equipped with a fire and overheat detection system consisting of :
— Two identical gas detection loops (A and B) mounted in parallel.
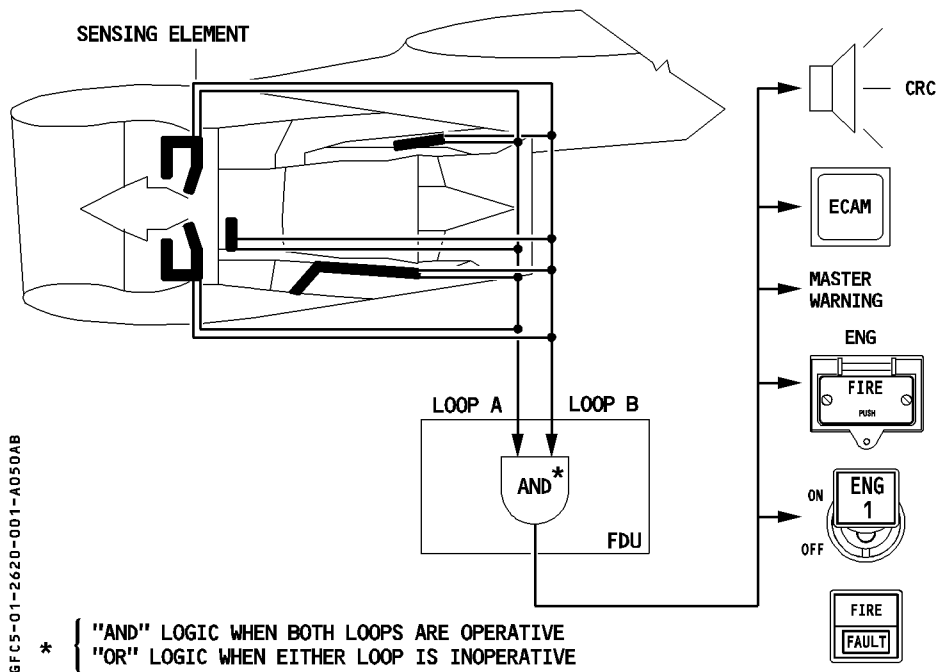— A Fire Detection Unit (FDU).
Each detection loop consists of :
— Five sensing elements for the engine, located in the pylon nacelle and engine core, compressor and fan sections.
— One for the APU, located in the APU compartment.
When a sensing element is subject to heat, a signal is transmitted to the fire detection unit.
As soon as a preset level of temperature is detected by loop A and B, the fire warning system is triggered.
A fault in one loop (break or electrical supply loss) will not affect the warning system. Fire detection is provided by the non affected loop.
If an APU fire is detected on ground an APU automatic shut down and agent discharge will occur.

SENSING ELEMENT

CRC

ECAM

MASTER WARNING

ENG
FIRE
PUSH

LOOP A   LOOP B

AND*

FDU

ENG
1
ON
OFF

FIRE
FAULT

GFC5-01-2620-001-A050AB

* "AND" LOGIC WHEN BOTH LOOPS ARE OPERATIVE
   "OR" LOGIC WHEN EITHER LOOP IS INOPERATIVE

EXTINGUISHING

R Each engine has two extinguisher bottles equipped with electrically operated squibs to
R discharge their contents. Each squib has a dual electric supply. The flight crew controls the
R discharge from the ENG FIRE panel in the cockpit.
R The APU has one fire extinguisher bottle that has an electrically operated squib to
R discharge its agent. The flight crew controls the discharge from the APU FIRE panel in the
R cockpit. This bottle also discharges automatically if there is an APU fire when the aircraft
R is on the ground.

FIRE WARNINGS AND LOOP CAUTIONS

R Fire detection units process all the warnings and cautions originating in the sensing
R elements :
R — The fire warning appears in case of :
R · a fire signal from both loop A and B or,
R · a fire signal from one loop when the other is faulty, or
R · breaks in both loops occuring within 5 seconds of each other (flame effect), or
R · a test performed on the control panel.
R — The loop-fault cautions appear if :
R · one loop is faulty or,
R · both loops are faulty or,
R · the fire detection unit fails.

CONTROLS AND INDICATORS

OVERHEAD PANEL

ENG FIRE PANEL
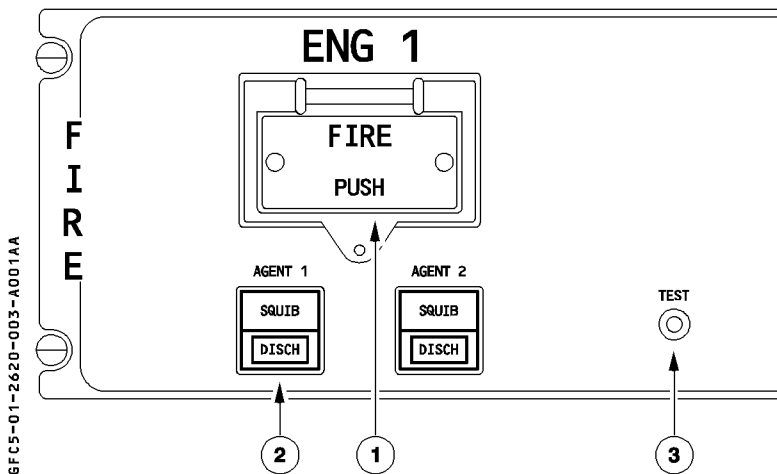
The aircraft has two identical ENG FIRE panels, which contain the following switches and indicators and include a single TEST pushbutton :

(1) ENG 1 (2) FIRE pb

This pushbutton's normal position is in and guarded.
The pilot pushes it to release it. It pops out, sending an electrical signal that performs the following for the corresponding engine :
— Silences the aural fire warning
— Arms the fire extinguisher squibs
— Closes the low-pressure fuel valve
R   — Closes the hydraulic fire shut off valve
— Closes the engine bleed valve
— Closes the pack flow control valve
— Cuts off the FADEC power supply.
R   — Deactivates the IDG
ENG 1 (2) FIRE lt
This red light comes on, regardless of the pushbutton's position, whenever the fire warning for the corresponding engine is activated.

② AGENT 1 and AGENT 2 pb

R Both of these pushbuttons become active when the flight crew pops the ENG FIRE button
R for the associated engine.
R A brief push on the pushbutton discharges the corresponding fire bottle.
R — "SQUIB" comes on white when the flight crew pops the ENG FIRE button for its engine
R to help the flight crew identify the AGENT pushbutton to be activated.
R — "DISCH" comes on amber when its fire extinguisher bottle has lost pressure.

③ TEST pb

R This pushbutton permits the flight crew to test simultaneously the operation of the fire
R detection and extinguishing system for both engines.
R — When the flight crew presses it :
R — A continuous repetitive chime sounds.
R — The MASTER WARN lights flash.
R — ENG FIRE warning appears on ECAM.
R On the FIRE panel :
R — The ENG FIRE pushbutton comes on red.
R — The SQUIB lights come on white if discharge supplies are available.
R — The DISCH lights come on amber.
R On the ENG panel (pedestal) :
R — The FIRE lights come on red.

APU FIRE PANEL

GFC5-01-2620-005-A001AA

APU

FIRE

TEST

PUSH

AGENT

SQUIB

DISCH

③ ① ②
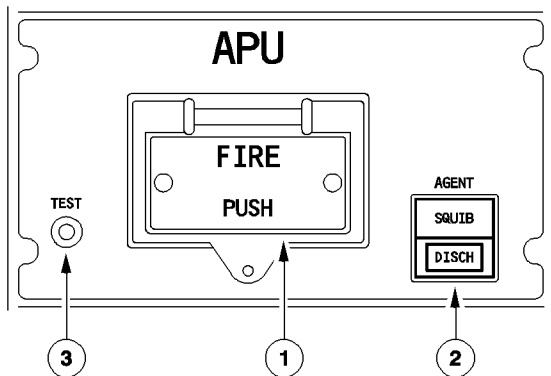
① APU FIRE pb

R   This pushbutton's normal position is in and guarded.
R   The pilot pushes it to release it. It pops out, sending an electrical signal that performs
R   the following for the APU :
R   − shuts down the APU
R   − silences the aural warning
R   − arms the squib on the APU fire extinguisher
R   − closes the low-pressure fuel valve
R   − shuts off the APU fuel pumps (aft and forward).
R   − closes the APU bleed valve and X bleed valve and deactivates the APU generator.
R   The red APU FIRE light comes on when the APU fire warning is activated, regardless of
R   the position of the pushbutton.

② AGENT pb

R   This pushbutton becomes active when the pilot pops the APU FIRE button.
R   The flight crew presses it briefly to discharge the fire bottle.
R   − SQUIB comes on white when the pilot pops the APU FIRE button.
R   − DISCH comes on amber when the fire extinguisher bottle has lost pressure.

R   *Note : A red disk, which is outside at the rear of the fuselage, signals that the agent*
R   *   is not discharged overboard due to bottle overpressure.*

③ <u>TEST pb</u>

R This pushbutton permits the flight crew to test the operation of the fire detection and
R extinguishing system for the APU.
R — When the flight crew presses it :
R   — A continuous repetitive chime sounds.
R   — The MASTER WARN lights flash.
R   — APU FIRE warning appears on ECAM.
R   On the APU FIRE panel :
R   — The APU FIRE pushbutton comes on red.
R   — The SQUIB light comes on white.
R   — The DISCH light comes on amber.

R *<u>Note</u> : The automatic shutdown of the APU on the ground will not occur while the flight*
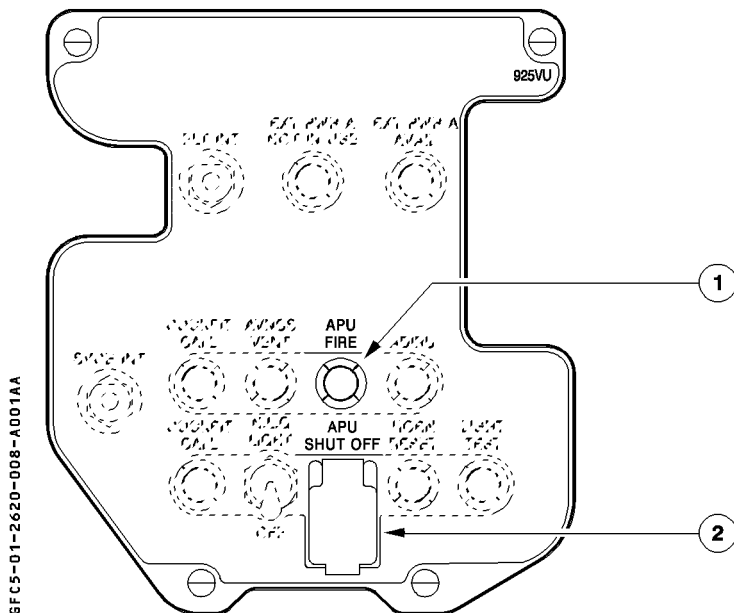R *   crew is performing this test.*

PEDESTAL
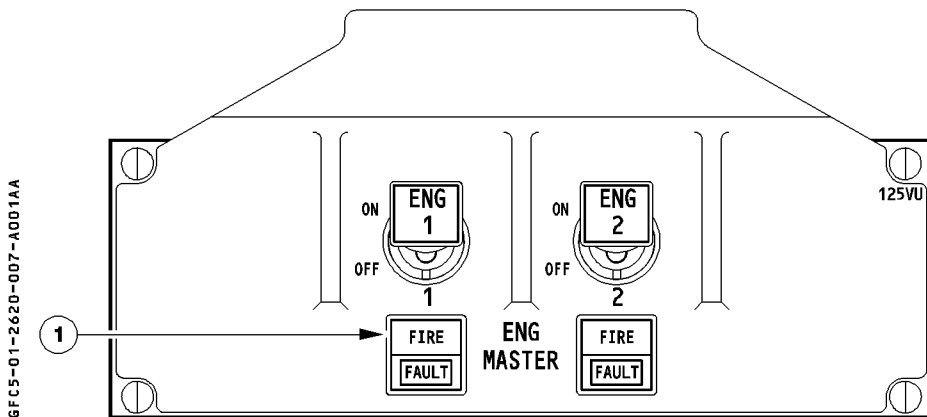
① **FIRE lt**

Identifies the engine to be shutdown.
Illuminates red as long as fire is detected on the respective engine.

EXTERNAL POWER PANEL

On ground only, an additional external warning is provided in the event of an APU FIRE.

(1) APU FIRE lt

The APU FIRE light illuminates red, accompanied by an external horn warning when an APU fire is detected.
The APU fire extinguisher will automatically discharge 3 seconds after the fire warning appearance.
The light will go off after extinction of the fire.

(2) APU SHUT OFF pb

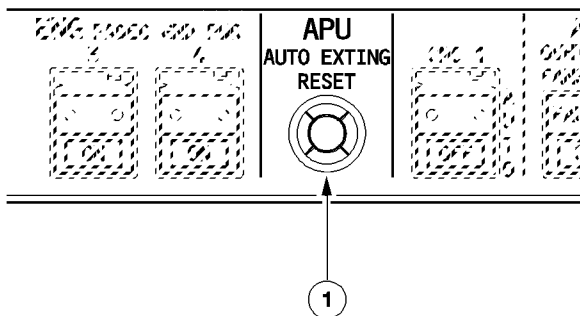The pushbutton is guarded by a flap. When it is pressed in the event of an APU fire, automatic shutdown is confirmed and external horn warning is silenced.
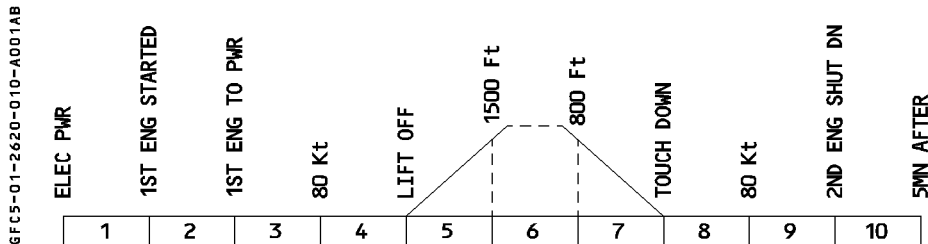
MAINTENANCE PANEL

(1) APU AUTO EXTING RESET pb

When pressed all ECB (Electronic Control Box) output signals are reset and the automatic shut down function is reinitialized.
The reset is inoperative during the test or if the fire signal is active.

WARNINGS AND CAUTIONS

GFC5-01-2620-010-A001AB

	ELEC PWR	1ST ENG STARTED	1ST ENG TO PWR	80 Kt	LIFT OFF	1500 Ft	800 Ft	TOUCH DOWN	80 Kt	2ND ENG SHUT DN	5MN AFTER
	1	2	3	4	5	6	7	8	9	10	

R

E / WD: FAILURE TITLE conditions	AURAL WARNING	MASTER LIGHT	SD PAGE CALLED	LOCAL WARNING	FLT PHASE INHIB
ENG 1 (2) FIRE Fire detected by both loops or by one loop, the other one being faulty or break in both loops within 5 seconds	CRC	MASTER WARN	ENGINE	FIRE lts on ENG FIRE pb and on ENG panel	NIL
APU FIRE Fire detected by both loops or by one loop, the other one being faulty			APU	FIRE lt on APU FIRE pb	
ENG 1 (2) (APU) FIRE DET FAULT Both loops inoperative or Fire Detector Unit inoperative	SINGLE CHIME	MASTER CAUT	NIL	NIL	3, 4, 5, 7, 8
ENG 1 (2) (APU) LOOP A (B) FAULT	NIL	NIL			

DESCRIPTION

Avionics smoke detection is provided by :
— Two smoke detectors (optical type) installed in the air extraction duct of the avionics ventilation system. Each detector is linked to one of the two detection loops of the system (dual loop principle).
— The Smoke Detection Control Unit (SDCU), receives signals from the two detectors, and transmits them to the ECAM, which displays a warning in the cockpit.
Smoke activates the avionics smoke warning, if :

R   — Both detectors detect it for more than 5 seconds, or
R   — One smoke detector detects it for more than 5 seconds, and the other is inoperative.
When smoke is detected :
— The Repetitive Chime sounds.
— The MASTER WARNING light, on the glareshield, comes on.
— The ECAM displays a caution on the E/WD.
— The SMOKE light, on the VENTILATION panel, comes on.

R
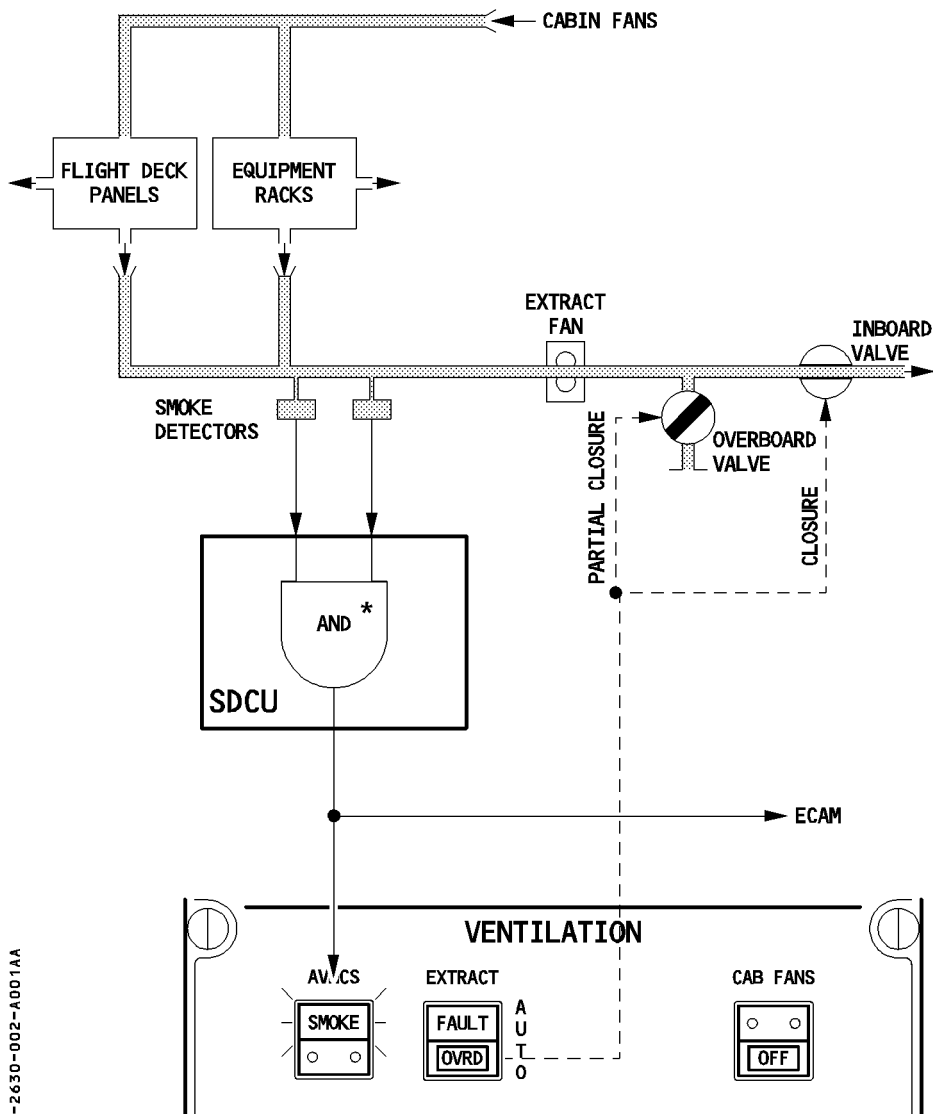
"AND" LOGIC WHEN BOTH DETECTORS ARE OPERATIVE
* "OR" LOGIC WHEN EITHER DETECTOR IS INOPERATIVE

GFC5-01-2630-002-A001AA

CONTROLS AND INDICATORS

OVERHEAD PANEL
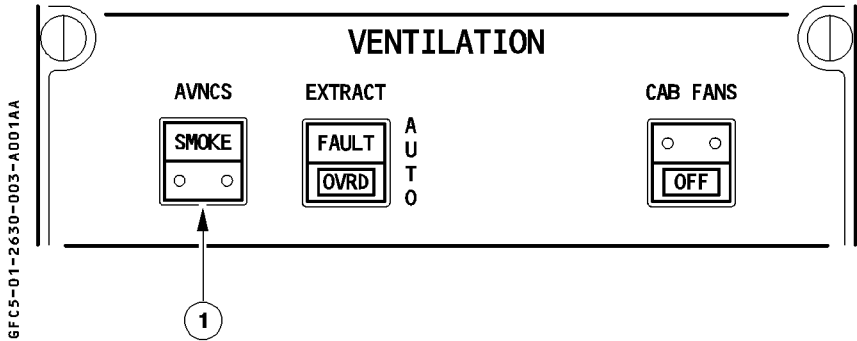
① AVNCS SMOKE

SMOKE lt : Illuminates red associated with an ECAM caution when smoke is detected in the avionics ventilation duct.

Note : For test, see CONTROLS AND INDICATORS (Refer to 1.26.50).

WARNINGS AND CAUTIONS

GFC5-01-2630-004-A001AA
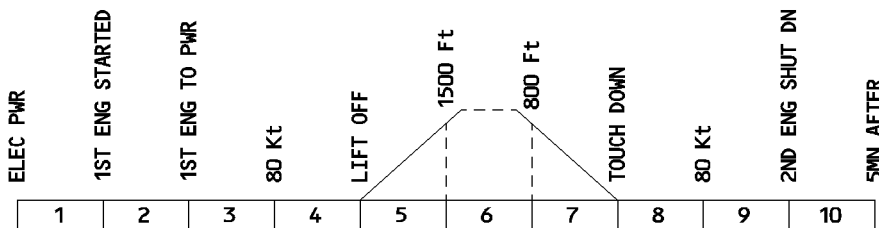
ELEC PWR	1ST ENG STARTED	1ST ENG TO PWR	80 Kt	LIFT OFF	1500 Ft	800 Ft	TOUCH DOWN	80 Kt	2ND ENG SHUT DN	5MN AFTER
1	2	3	4	5	6	7	8	9	10	

E / WD: FAILURE TITLE conditions	AURAL WARNING	MASTER LIGHT	SD PAGE CALLED	LOCAL WARNING	FLT PHASE INHIB
AVNCS VENT SMOKE Smoke detected in the ventilation extraction duct	REPETITIVE CHIME	MASTER WARN	NIL	SMOKE lt on VENTILATION panel	4, 5, 7, 8
AVIONICS DET FAULT Loss of the avionics smoke detectors	NIL	NIL	NIL	NIL	3, 4, 5, 7, 8

DESCRIPTION

SMOKE DETECTION

The system consists of :
— ionization type smoke detectors (one in each lavatory air extraction duct)
— a double channel Smoke Detection Control Unit (SDCU).
When smoke is detected in a lavatory, the detector sends a signal to SDCU which transmits it to FWC (for warning display in the cockpit) and to CIDS (for warning in the cabin)

GFC5-01-2640-001-A001AA

LAVATORY SMOKE DETECTOR → SDCU → COCKPIT WARNING

→ CABIN WARNING
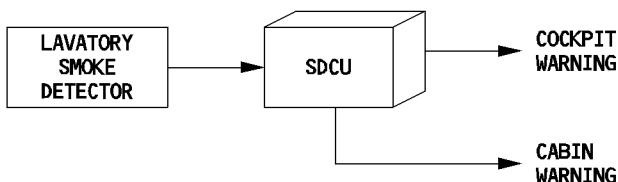
WASTE BIN FIRE EXTINGUISHING

Each lavatory waste bin is equipped with an automatic fire extinguishing system.

WARNINGS AND CAUTIONS

GFC5-01-2640-002-A001AB

	ELEC PWR	1ST ENG STARTED	1ST ENG TO PWR	80 Kt	LIFT OFF	1500 Ft	800 Ft	TOUCH DOWN	80 Kt	2ND ENG SHUT DN	5MIN AFTER
	1	2	3	4	5	6	7	8	9	10	

R

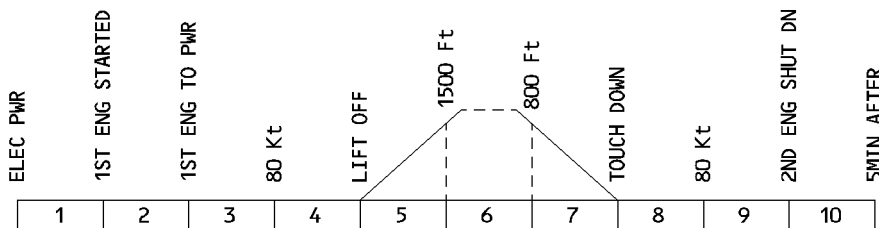| E / WD: FAILURE TITLE conditions	AURAL WARNING	MASTER LIGHT	SD PAGE CALLED	LOCAL WARNINGS	FLT PHASE INHIB
LAVATORY SMOKE Smoke detected in a lavatory	CRC	MASTER WARN	NIL	NIL	4, 5, 7, 8
LAVATORY DET FAULT Loss of the lavatory smoke detection	NIL	NIL	NIL	NIL	3, 4, 5, 7, 8
LWR STOWAGE SMOKE ◁ Smoke detected in lower deck lavatory stowage	CRC	MASTER WARN	NIL	NIL	4, 5, 7, 8
LWR STOWAGE DET FAULT ◁ Loss of lower deck lavatory stowage smoke detection	NIL	NIL	NIL	NIL	3, 4, 5, 7, 8

SMOKE DETECTION

R The cargo compartments have a smoke detection system.
R — Cavities in the cargo compartment ceiling panels hold smoke detectors (ionization type).
R   Each cavity has two smoke detectors, and each detector is linked to one of the two
R   detection loops (dual loop principle).
R — The forward cargo compartment has two cavities.
R — The bulk cargo compartment has one cavity.
R — The aft cargo compartment has two cavities.
R — The Smoke Detection Control Unit (SDCU) receives signals from the detectors and
R   transmits them to ECAM, which displays a warning in the cockpit. The SDCU has two
R   identical channels.
R Smoke in one cavity activates the cargo smoke warning if :
R — both smoke detectors detect it, or
R — one smoke detector detects it and the other is inoperative.
R When the cargo smoke warning is activated, the isolation valves (if installed) of the
R affected compartment close automatically and the extraction fan stops.
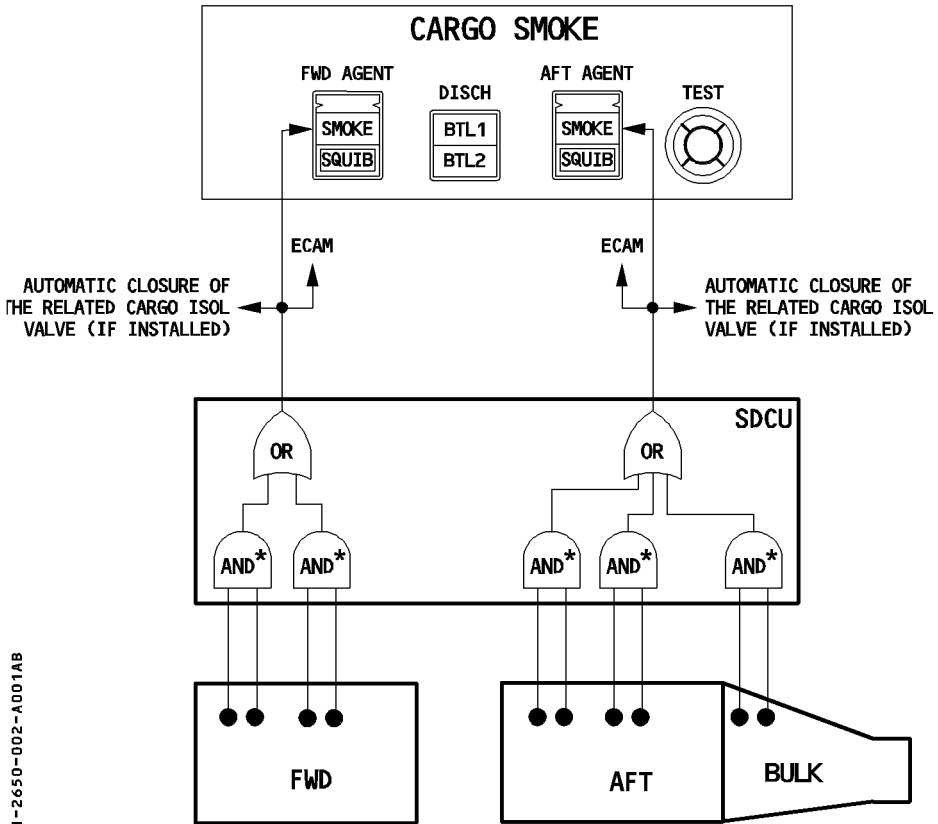
CARGO SMOKE

FWD AGENT — SMOKE / SQUIB
DISCH — BTL1 / BTL2
AFT AGENT — SMOKE / SQUIB
TEST

ECAM

ECAM

AUTOMATIC CLOSURE OF THE RELATED CARGO ISOL VALVE (IF INSTALLED)

AUTOMATIC CLOSURE OF THE RELATED CARGO ISOL VALVE (IF INSTALLED)

SDCU

OR

OR

AND* AND*

AND* AND* AND*

FWD

AFT

BULK

* "AND" LOGIC WHEN BOTH DETECTORS ARE OPERATIVE
  "OR" LOGIC WHEN EITHER DETECTOR IS LOST
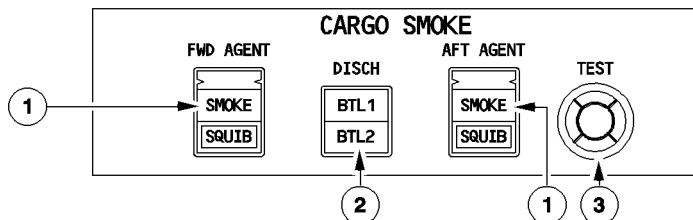
GFC5-01-2650-002-A001AB

FIRE EXTINGUISHING

R   A fire extinguishing system protects the cargo compartments. Two fire extinguishing
R   bottles are installed, and their contents can be discharged into either the FWD or the AFT
R   (including BULK) cargo compartment. Each bottle has two discharge heads, one for each
R   compartment.
R   Pressing the AGENT pushbutton associated to the FWD (AFT / BULK) compartment ignites
R   the squib of the two bottles and the bottle 1 discharges extinguishing agent into that
R   compartment, which takes about 60 seconds.
R   The discharge cartridge of bottle 2 comprises a flow metering system, and so fire
R   extinguishing agent is discharged slowly in the compartment to ensure sufficient agent
R   concentration for 120 minutes.
R   The SDCU monitors the squib integrity and bottle pressure.
R   When bottle 1 (2) is discharged, BTL 1 (BTL 2) light comes on white.
R
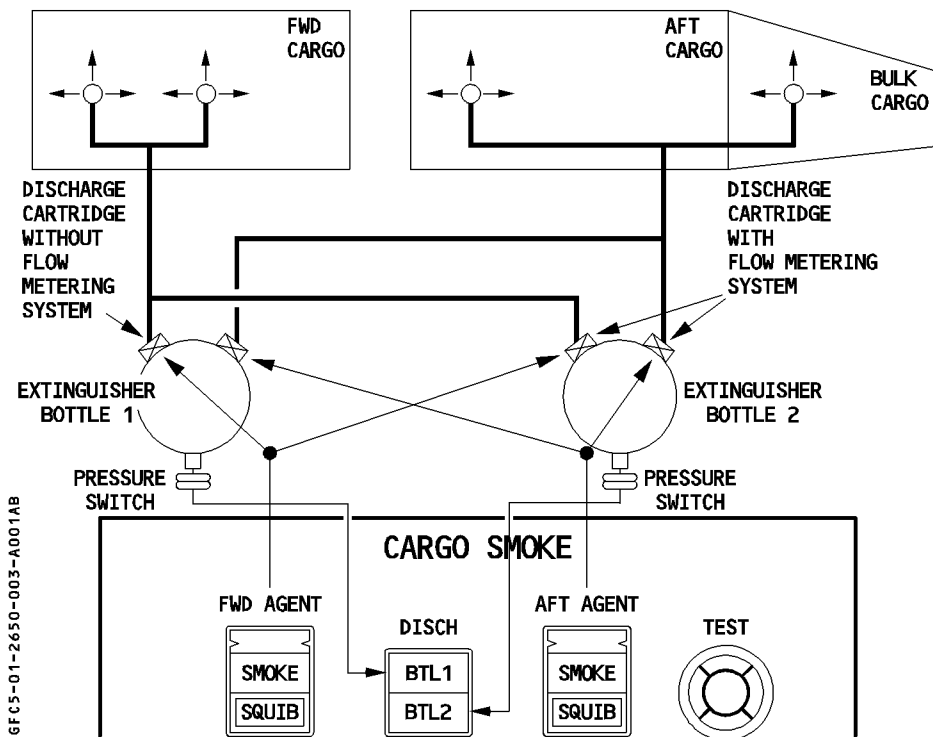
GFC5-01-2650-003-A001AB

CONTROLS AND INDICATORS

OVERHEAD PANEL

① FWD (AFT) AGENT pb

When pressed, the associated squib is ignited for discharge of the extinguishing agent in the associated cargo compartment (FWD or AFT/BULK).
SMOKE lt : It comes on red, along with an associated ECAM warning, when smoke is detected in the associated compartment.
SQUIB lt : It comes on white, in case of a positive test.

② DISCH 1 (2) lt

The BTL1 or BTL2 light comes on white, when the associated bottle has discharged.

R ③ TEST pb

When pressed for at least 3 seconds, and until it is released :
— The smoke detectors in the FWD, AFT, and BULK CARGO compartment and the avionic bay are tested by the SDCU in sequence.
— The ventilation system's isolation valves close.
— BTL 1 (2) lights come on white.
— SQUIB lights come on white, provided one of the two squib filaments is serviceable.
— SMOKE lights (AFT, FWD CARGO and AVNCS) come on red on the overhead panel, and are associated with ECAM warnings, and a continuous repetitive chime.

 Note : Each SDCU channels sends its own warning.
 Each warning has a duration of about 25 seconds with a delay of about 30 seconds between both.

WARNINGS AND CAUTIONS
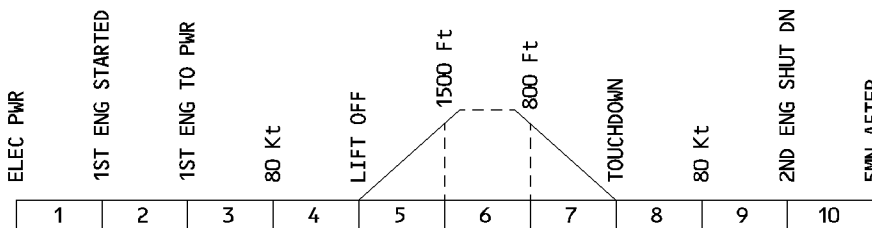
GFC5-01-2650-005-A001AB

	ELEC PWR	1ST ENG STARTED	1ST ENG TO PWR	80 Kt	LIFT OFF	1500 Ft	800 Ft	TOUCHDOWN	80 Kt	2ND ENG SHUT DN	5MN AFTER
	1	2	3	4	5	6	7	8	9	10	

R

E / WD: FAILURE TITLE conditions	AURAL WARNING	MASTER LIGHT	SD PAGE CALLED	LOCAL WARNING	FLT PHASE INHIB
FWD (AFT/BULK) CARGO SMOKE Smoke detected in the corresponding cargo	CRC	MASTER WARN		SMOKE lt on CARGO SMOKE panel	4, 5, 7, 8
DET FAULT Both SDCU channels fault or loss of all smoke detectors	SINGLE CHIME	MASTER CAUT	NIL	NIL	3, 4, 5, 7, 8
FWD (AFT) CRG BTL 1 (2) FAULT Loss of forward or aft BTL 1 (2)					
FWD (AFT/BULK) CRG DET FAULT Loss of the smoke detection in the corresponding cargo	NIL	NIL			

LEFT INTENTIONALLY BLANK

BUS EQUIPMENT LIST

R

			NORM			EMER ELEC		
			AC	DC	DC BAT	AC ESS	DC ESS	HOT
ENG/APU	FIRE DETECTION	ENG LOOP A					X	
		ENG LOOP B		DC2				
		APU LOOP A					X	
		APU LOOP B			X			
	FIRE EXTINGUISHING	ENGINES						
		BTL 1 SQUIB A						HOT 2
		BTL 1 SQUIB B		DC 2				
		BTL 2 SQUIB A						HOT 1
		BTL 2 SQUIB B		DC 2				
		APU						
		BTL SQUIB A						HOT 1
		BTL SQUIB B			X			
		APU AUTO EXT						HOT 2
CARGO LAV AVIONICS		SDCU 1					SHED	
		SDCU 2		DC 2				
		CARGO SQUIB A						HOT 1
		CARGO SQUIB B		DC 2				
LDMCRC ◁	SMOKE DETECTION	SDCU 1					SHED	
		SDCU 2		DC 2			SHED	
	FIRE EXTINGUISHING			DC 2				
FCRC ◁	SMOKE DETECTION	SDCU 1					SHED	
		SDCU 2		DC 2				