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 AIRBUS TRAINING A340 SIMULATOR FLIGHT CREW OPERATING MANUAL	FIRE PROTECTION		1.26.10	P 1
	GENERAL		SEQ 001	REV 17

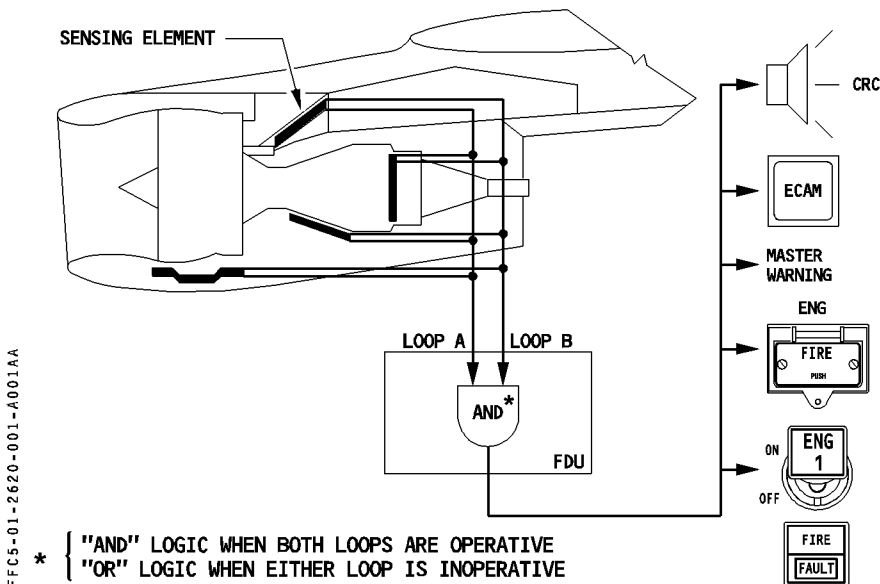
DESCRIPTION

Aircraft fire protection systems include :

- Fire and overheat detection and extinguishing systems for the :
 - Engines
 - APU
- Smoke detection and extinguishing for the :
 - Cargo compartments
 - Lavatories
- Smoke detection for the :
 - Avionic bay
- Portable fire extinguishers for the :
 - Flight compartment
 - Passenger cabin

DESCRIPTION**DETECTION**

- R The engines and the APU each have a fire and overheat detection system consisting of :
- R – Two identical gas detection loops (A and B) mounted in parallel.
 - R – A Fire Detection Unit (FDU).
- R The gas detection loops consist of :
- R – Four sensing elements for each engine, located in the pylon nacelle, in the engine core and in the engine fan sections.
 - R – One sensing element in the APU compartment.
- R When a sensing element is subjected to heat, it sends a signal to the fire detection unit.
- R As soon as loops A and B detect temperature at a preset level, it triggers the fire warning system.
- R A fault in one loop (break or loss of electrical supply) does not affect the warning system.
- R The unaffected loop still protects the aircraft.
- R If the system detects an APU fire while the aircraft is on the ground, it shuts down the APU automatically and discharges extinguishing agent.

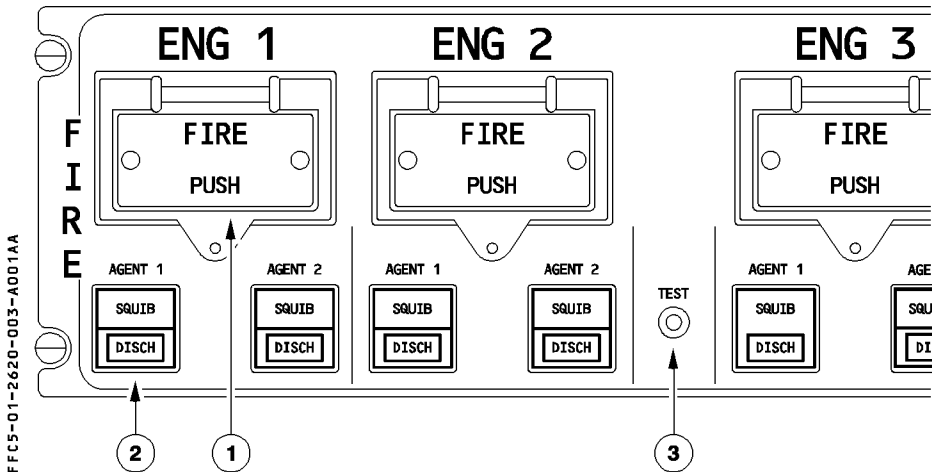


**EXTINGUISHING**

- 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 occurring 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 four identical ENG FIRE panels, which contain the following switches and indicators and include a single TEST pushbutton :

① ENG 1 (2, 3, 4) 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
- Closes the engine fuel return valve
- Closes the hydraulic fire shut off valve
- Closes the engine bleed valve (on the related and adjacent engine)
- Closes the pack flow control valve
- Cuts off the FADEC power supply
- Deactivates the IDG.

R

ENG 1 (2, 3, 4) FIRE It

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.

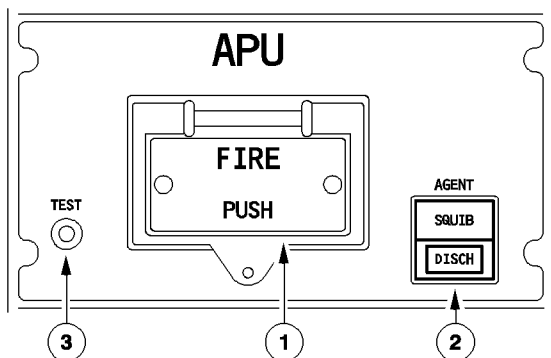
③ TEST pb

- R This pushbutton permits the flight crew to test simultaneously the operation of the fire
 R detection and extinguishing system for the four 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

FFCS-01-2620-005-A001AA



① APU 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 APU :

- shuts down the APU
- silences the aural warning
- arms the squib on the APU fire extinguisher
- closes the low-pressure fuel valve
- shuts off the APU fuel pumps (aft and forward).
- closes the APU bleed valve and X bleed valve and deactivates the APU generator.

The red APU FIRE light comes on when the APU fire warning is activated, regardless of the position of the pushbutton.

② AGENT pb

This pushbutton becomes active when the pilot pops the APU FIRE button.

The flight crew presses it briefly to discharge the fire bottle.

- SQUIB comes on white when the pilot pops the APU FIRE button.
- DISCH comes on amber when the fire extinguisher bottle has lost pressure.

R
R

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

③ TEST pb

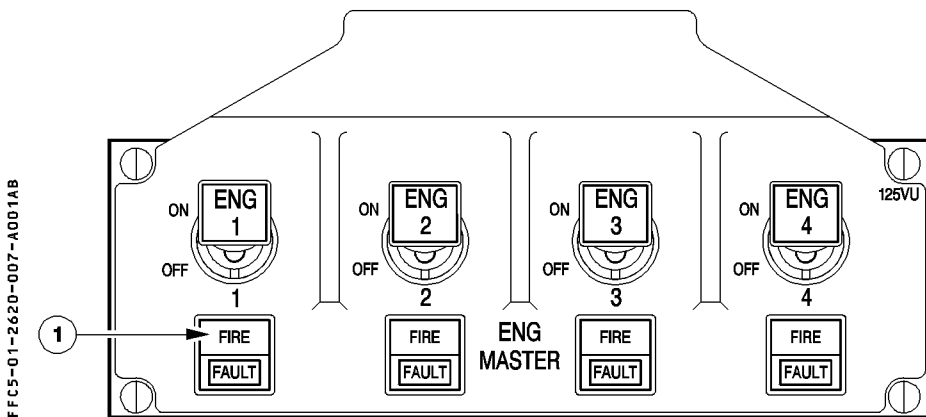
R This pushbutton permits the flight crew to test the operation of the fire detection and
 R extinguishing system for the APU.

- 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.

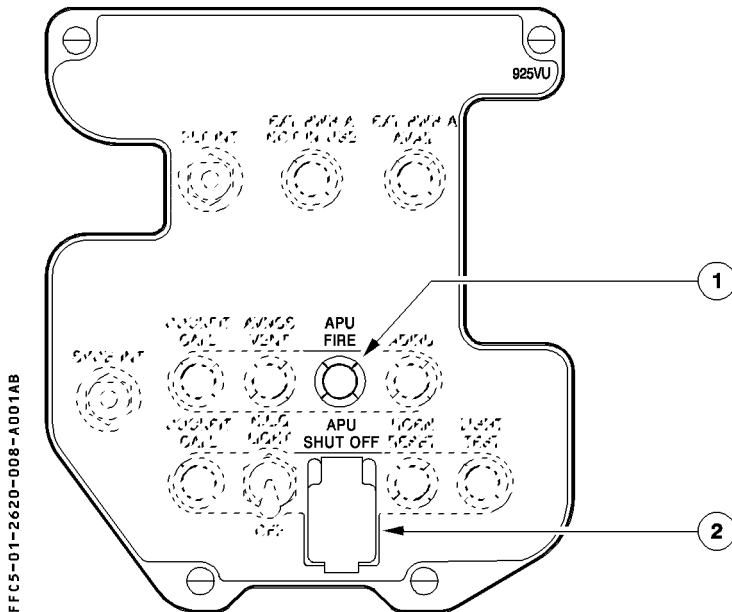
R On the APU FIRE panel :

- R – The APU FIRE pushbutton comes on red.
- R – The SQUIB light comes on white.
- R – The DISCH light comes on amber.

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

PEDESTAL**① FIRE It**

- R This light identifies the engine to be shutdown because of fire.
 R The light comes on red when an engine fire warning is triggered.

EXTERNAL POWER PANEL

R When the aircraft is on the ground, an APU fire causes an additional external warning.

① APU FIRE It

R The APU FIRE light comes on red and an external warning horn sounds when the system detects an APU fire.

R The APU fire extinguisher discharges automatically three seconds after the appearance of the fire warning.

R The light goes out when the fire has been extinguished.

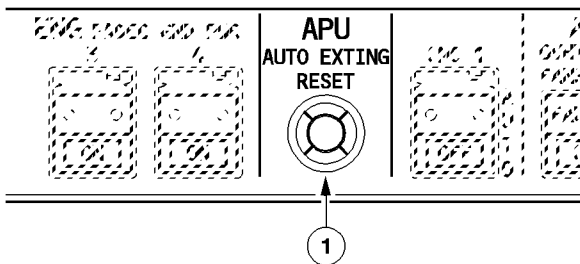
② APU SHUT OFF pb

R A flap guards this pushbutton. When there is an APU fire and someone outside the aircraft presses this button, it confirms that the APU has shut down automatically and silences the external warning horn.



MAINTENANCE PANEL

FFCS-01-2620-009-A001AA



① APU AUTO EXTING RESET pb

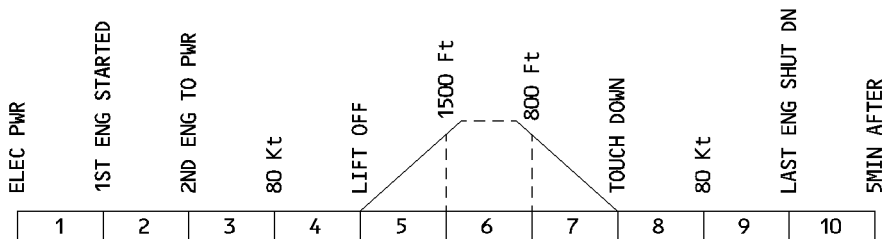
- R Pressing this button resets the automatic shutdown function.
- R During the test or if the fire signal is active, the reset is inoperative.



WARNINGS AND CAUTIONS

R

FFCS-01-2620-010-A001AB



R

E / WD: FAILURE TITLE conditions	AURAL WARNING	MASTER LIGHT	SD PAGE CALLED	LOCAL WARNING	FLT PHASE INHIB
ENG 1 (2, 3, 4) FIRE Fire detected by both loops or by one loop, the other one being faulty, or break in both loops occurring within 5 seconds	CRC	MASTER WARN	ENGINE	FIRE Its 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 It on APU FIRE pb	
ENG 1 (2, 3, 4) (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, 3, 4) (APU) LOOP A (B) FAULT	NIL	NIL			

AIRBUS TRAINING  A340 SIMULATOR FLIGHT CREW OPERATING MANUAL	FIRE PROTECTION AVIONICS BAY	1.26.30	P 1
		SEQ 001	REV 18

DESCRIPTION

Avionics smoke detection is provided by :

- Two smoke detectors (ionization type), in the air extraction duct of the avionics ventilation system. Each detector is linked to one of the two detection loops (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.

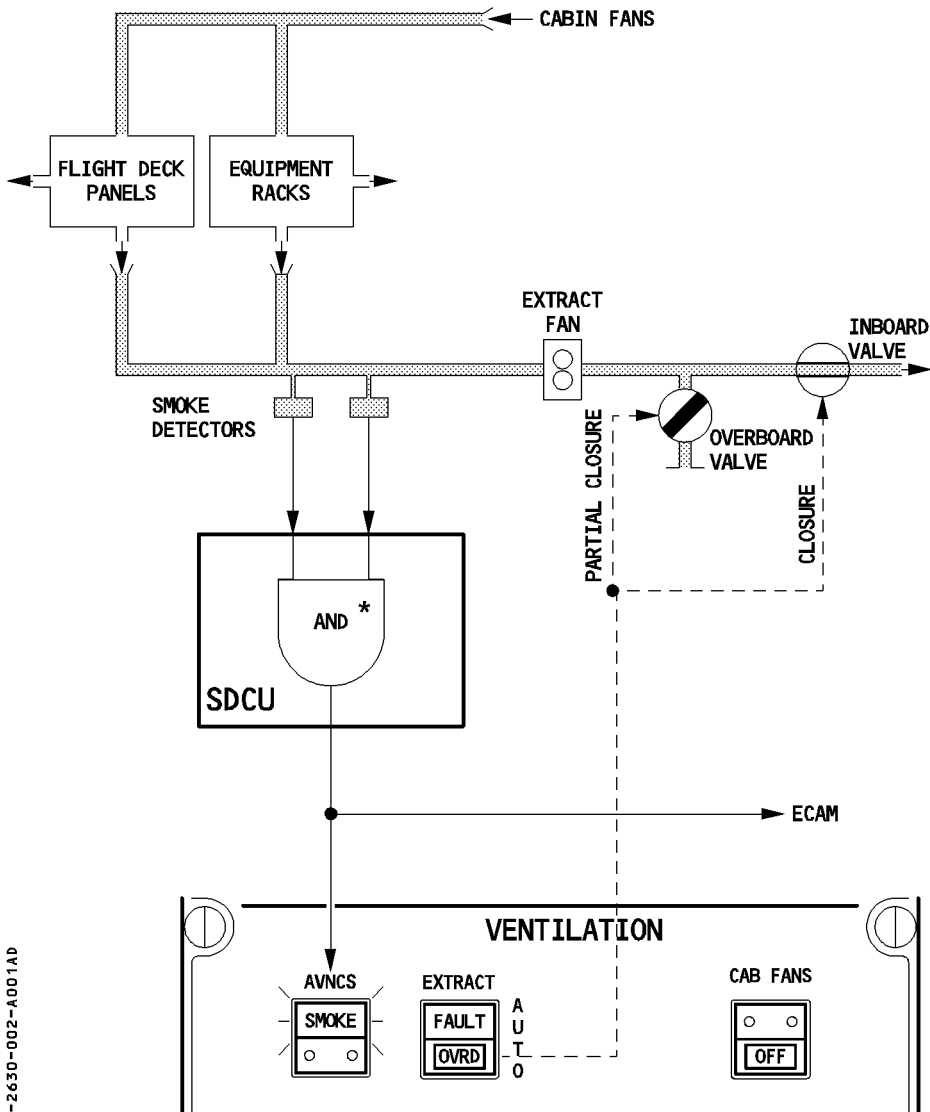
Smoke activates the avionics smoke warning, if :

- 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



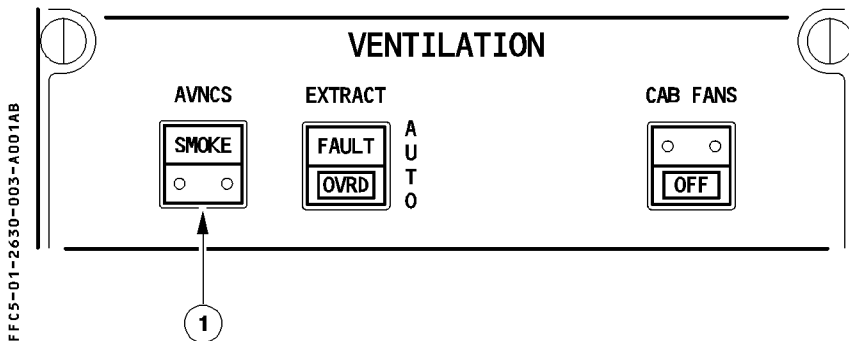
FFCS-01-2630-002-A001AD

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



CONTROLS AND INDICATORS

OVERHEAD PANEL



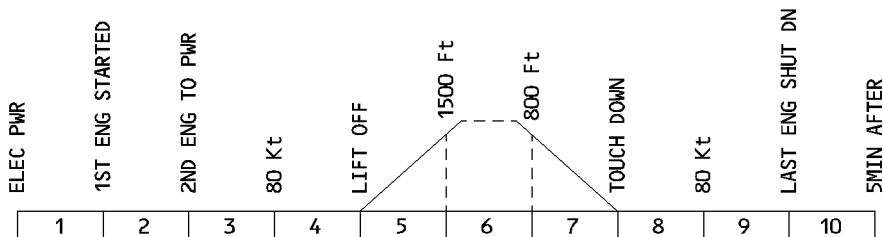
① AVNCS SMOKE

- R SMOKE It : Comes on red along with a warning on ECAM, when smoke is detected in the avionics ventilation duct.
- R *Note : For test, see CARGO COMPARTMENTS, CONTROLS AND INDICATORS (Refer to 1.26.50)*
- R

WARNINGS AND CAUTIONS

R

FFCS-01-2630-004-A001AB



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 It on VENTILATION panel	4, 5, 7, 8
AVIONICS DET FAULT Loss of the avionic smoke detectors	NIL	NIL	NIL	NIL	3, 4, 5, 7, 8



DESCRIPTION

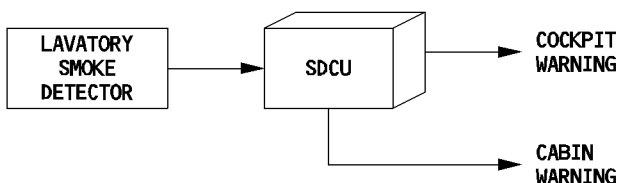
SMOKE DETECTION

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)

FFCS-01-2640-001-A001AA



WASTE BIN FIRE EXTINGUISHING

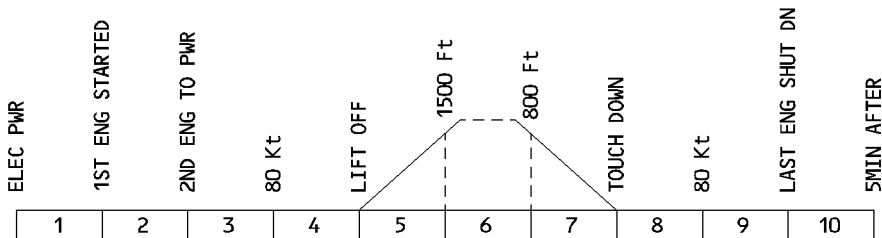
Each lavatory waste bin is equipped with an automatic fire extinguishing system.




WARNINGS AND CAUTIONS

R

FFCS-01-2640-002-A001AB



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

 AIRBUS TRAINING A340 SIMULATOR FLIGHT CREW OPERATING MANUAL	FIRE PROTECTION	1.26.50	P 1
	CARGO COMPARTMENTS	SEQ 001	REV 17

SMOKE DETECTION

The cargo compartments have a smoke detection system.

- Cavities in the cargo compartment ceiling panels hold smoke detectors (ionization type). Each cavity has two smoke detectors, and each detector is linked to one of the two detection loops (dual loop principle).
- The forward cargo compartment has two cavities.
- The bulk cargo compartment has one cavity.
- The aft cargo compartment has two cavities.
- The Smoke Detection Control Unit (SDCU) receives signals from the detectors and transmits them to ECAM, which displays a warning in the cockpit. The SDCU has two identical channels.

Smoke in one cavity activates the cargo smoke warning, if :

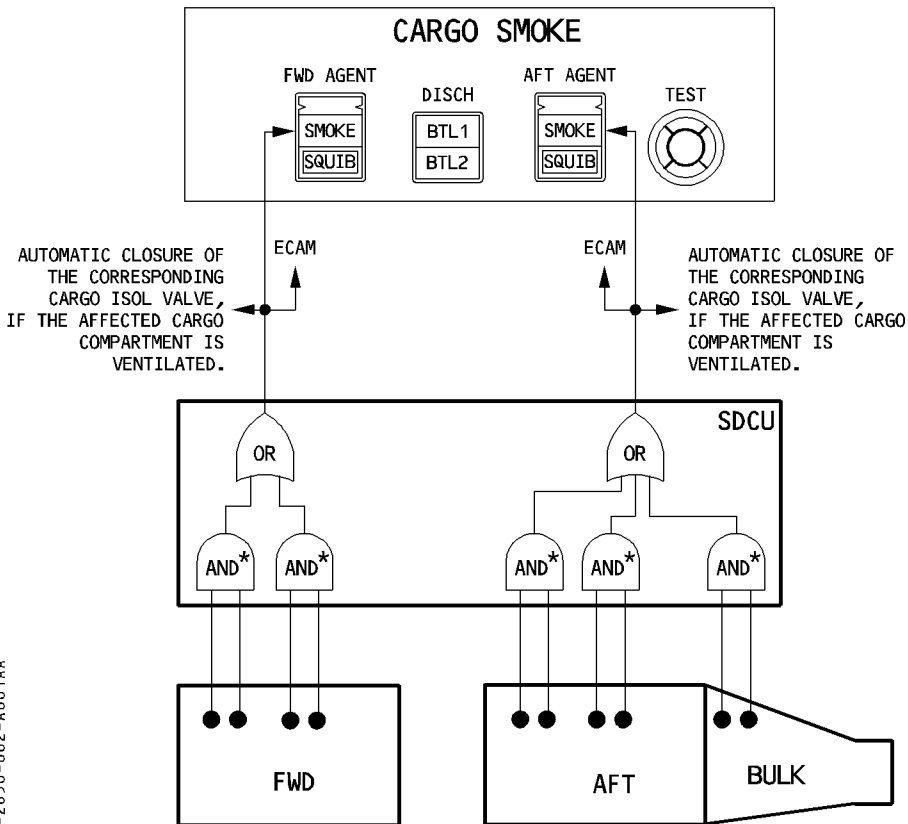
- Both smoke detectors detect it, or
- One smoke detector detects it, and the other is inoperative.

- R When the cargo smoke warning is activated, the isolation valves of this compartment close
- R automatically and the extraction fan stops, if the affected compartment is ventilated.



LEFT INTENTIONALLY BLANK

R

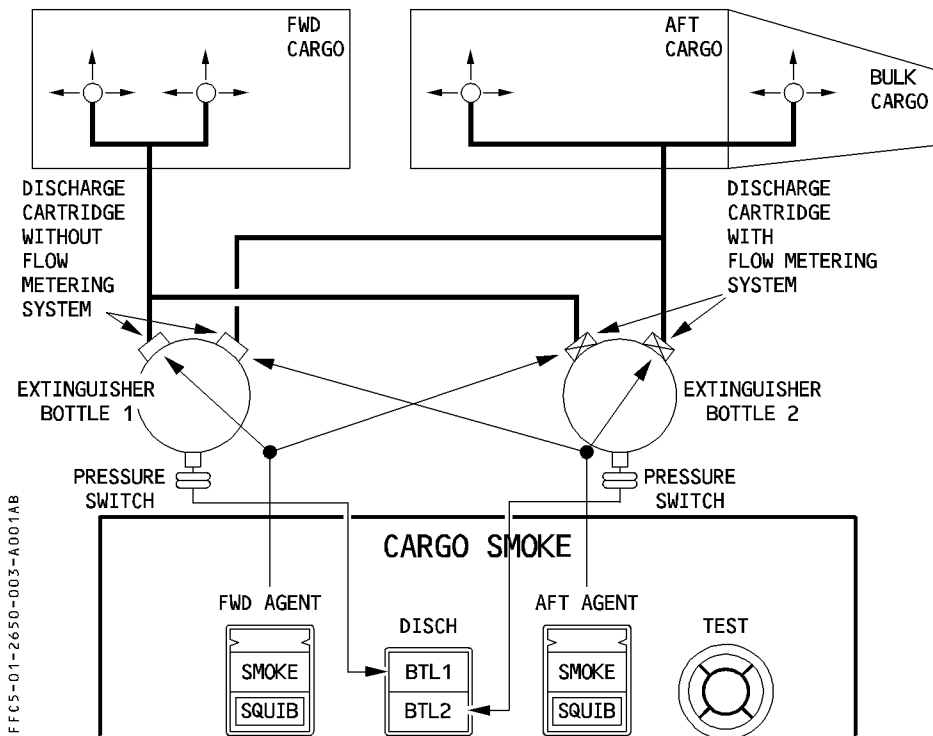


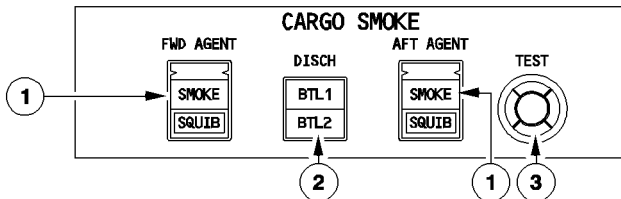
FFCS-01-2650-002-A001AA

- * { "AND" LOGIC, IF BOTH DETECTORS ARE OPERATIVE
- "OR" LOGIC, IF EITHER DETECTOR IS INOPERATIVE

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



CONTROLS AND INDICATORS**OVERHEAD PANEL**

FFCS-01-2650-004-1001AB

① FWD (AFT) AGENT pb

Pressing this pushbutton ignites the associated squib to discharge the extinguishing agent in the respective compartment (FWD or AFT).

The SMOKE light comes on red, and the ECAM displays a warning when the system detects smoke in the indicated compartment.

In case of a positive test, the SQUIB light comes on white.

② DISCH It

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

③ TEST pb

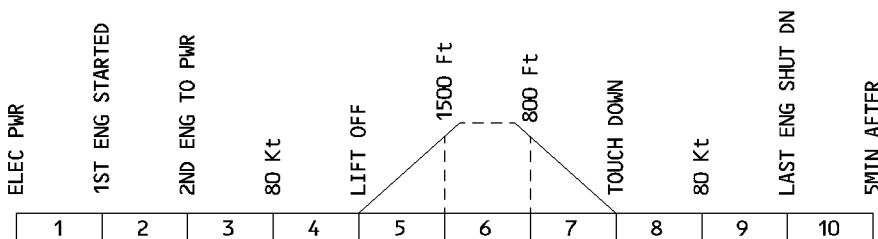
R Pressing this pushbutton for at least 3 seconds, and until it is released :

- Tests the smoke detectors in sequence,
- Turns on the white BTL lights,
- Closes the ventilation system's isolation valves.
- Turns on the white SQUIB lights, if one of the two SQUIB filaments is serviceable,
- Turns on the red SMOKE lights (AFT, FWD, CARGO and AVNCS), displays the ECAM warnings, and a continuous respective chime sounds.

Note : Each SDCU channel sounds its own warning, which lasts about 25 seconds, with a delay of about 30 seconds in between.


WARNINGS AND CAUTIONS

FFCS-01-2650-005-A001AB



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	NIL	SMOKE It on CARGO SMOKE	4, 5, 7, 8
DET FAULT Both SDCU channels fault or Loss of all smoke detectors	SINGLE CHIME	MASTER CAUT		NIL	3, 4, 5, 7, 8
FWD (AFT) CRG BTL 1 (2) FAULT Loss of FWD or AFT bottle 1(2)					
FWD (AFT/BULK) CRG DET FAULT Loss of the smoke detection in the corresponding cargo	NIL	NIL			



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	ENG 1 + 4						
		BTL 1 SQUIB A						HOT 2
		BTL 1 SQUIB B		DC 2				
		BTL 2 SQUIB A						HOT 1
		BTL 2 SQUIB B		DC 2				
		ENG 2 + 3						
		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				
BCRC ◀	SMOKE DETECTION	SDCU 1					SHED	
		SDCU 2		DC 2				
	FIRE EXTINGUISHING			X				
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				