

Avoiding Fuel Spills on A320 Family Aircraft

Cases of fuel spillage have been reported to Airbus on A320 family aircraft equipped with fuel transfer jet-pumps in the center tank.

This article recalls the protections available against tank overfill. It explains why fuel spillage happened on the reported events and provides recommendations on how to avoid it.

OVERFILL AND OVERFLOW PROTECTION AND MONITORING

Fuel tanks on Airbus aircraft are designed so that fuel spills into the vent tank through their vent line in the event of a tank overflow. Each vent tank is equipped with a NACA duct where fuel can flow out and onto the ground if the vent tank is full.

Refuel valves automatic closure

On A320 family aircraft, the refuel valve for a fuel tank will automatically close when the targeted fuel quantity is reached, or fuel is detected by the high level sensor fitted in the tank during refuelling.

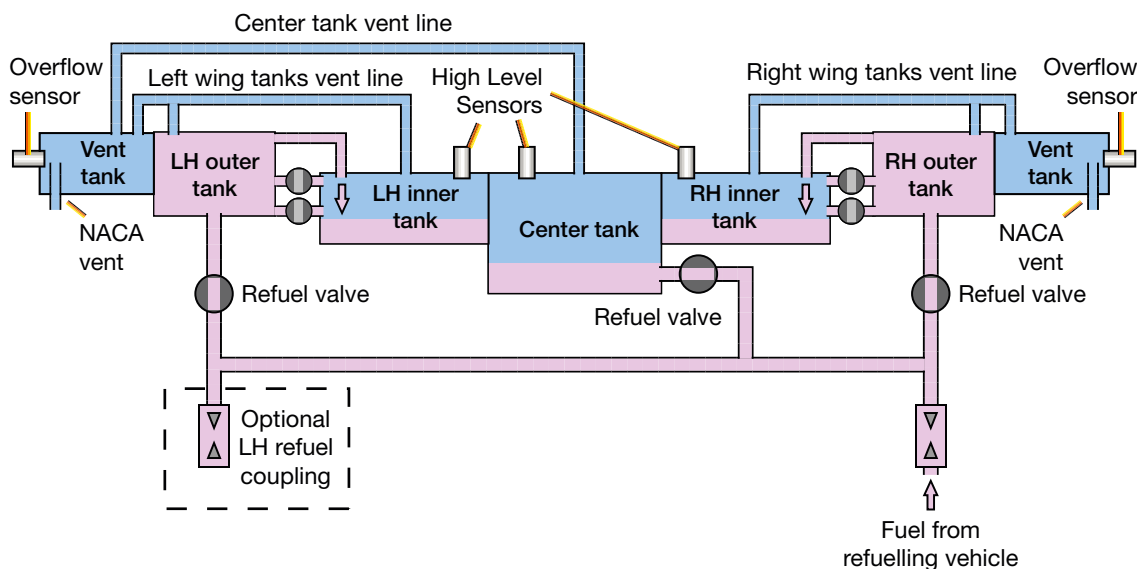


NOTE

The test of overfill protection must be done before every refuelling operation by pushing the TEST switch of the refuel/defuel panel, first to the LTS position to check the integrity of the indication lights, and then to the HI LVL position to test the protection and the overflow sensor located in each vent tank.

(fig.1)

Functional schematic of the refuelling and venting system of an A320 aircraft



Fuel Overflow monitoring function

A monitoring function was first introduced on A321 aircraft to trigger a **FUEL L(R) WING TK OVERFLOW** ECAM alert in the case of a fuel overflow detected in the vent tank by the overflow sensor. The ECAM alert (Modification 154427) is now also installed in production on A319/A320 aircraft since May 2013 (aircraft serial number 5597 and onward). It can be installed on previously built A318/A319/A320 aircraft with Service Bulletin A320-28-1216. ■

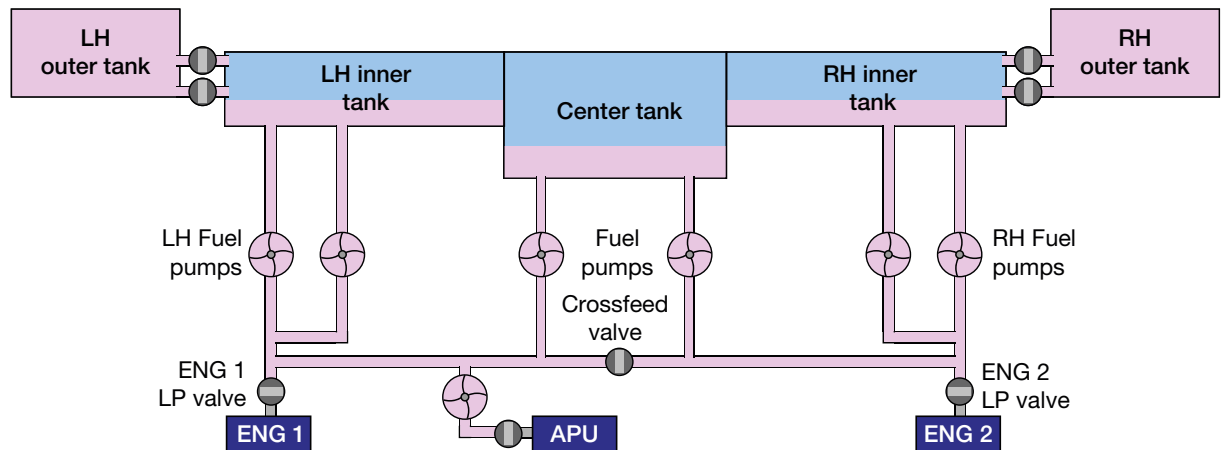
A319/A320/A321 AIRCRAFT FITTED WITH TRANSFER JET-PUMPS IN THE CENTER TANK

(fig.2)

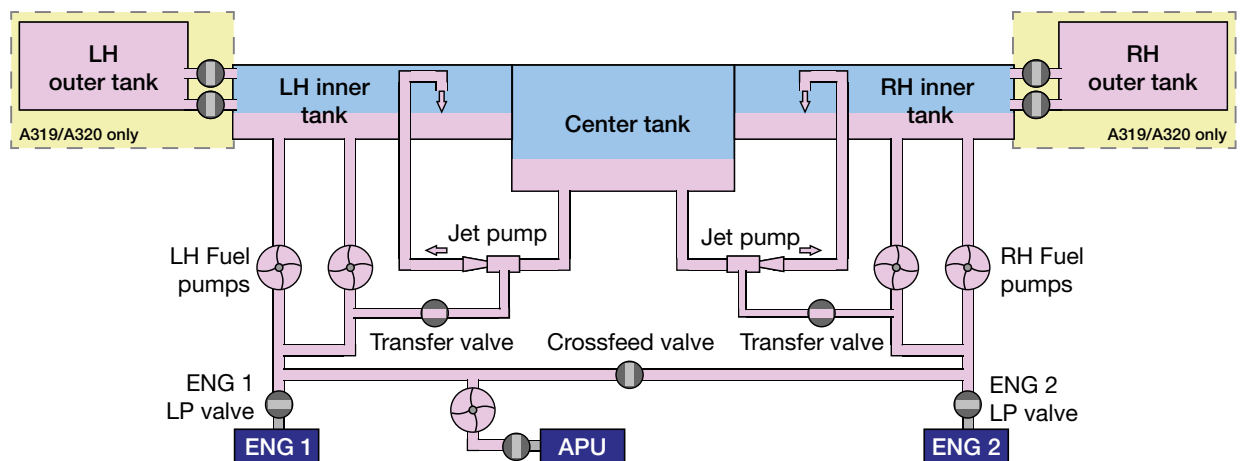
Comparison of the fuel feeding system of A320 family aircraft equipped with or without fuel transfer jet-pumps

Transfer jet-pumps were introduced on the A321 aircraft at its entry into service to simplify the fuel system, replacing the center tank electrical fuel boost pumps previously used on A320 family aircraft **(fig.2)**. To take advantage of this simplification, the transfer jet-pumps were introduced in the center tank of A319ceo and A320ceo aircraft delivered from 2014. and are standard on all A319neo, A320neo, and A321neo aircraft.

A318/A319/A320 aircraft without fuel transfer jet pumps



A321 and A319/A320 aircraft with fuel transfer jet pumps



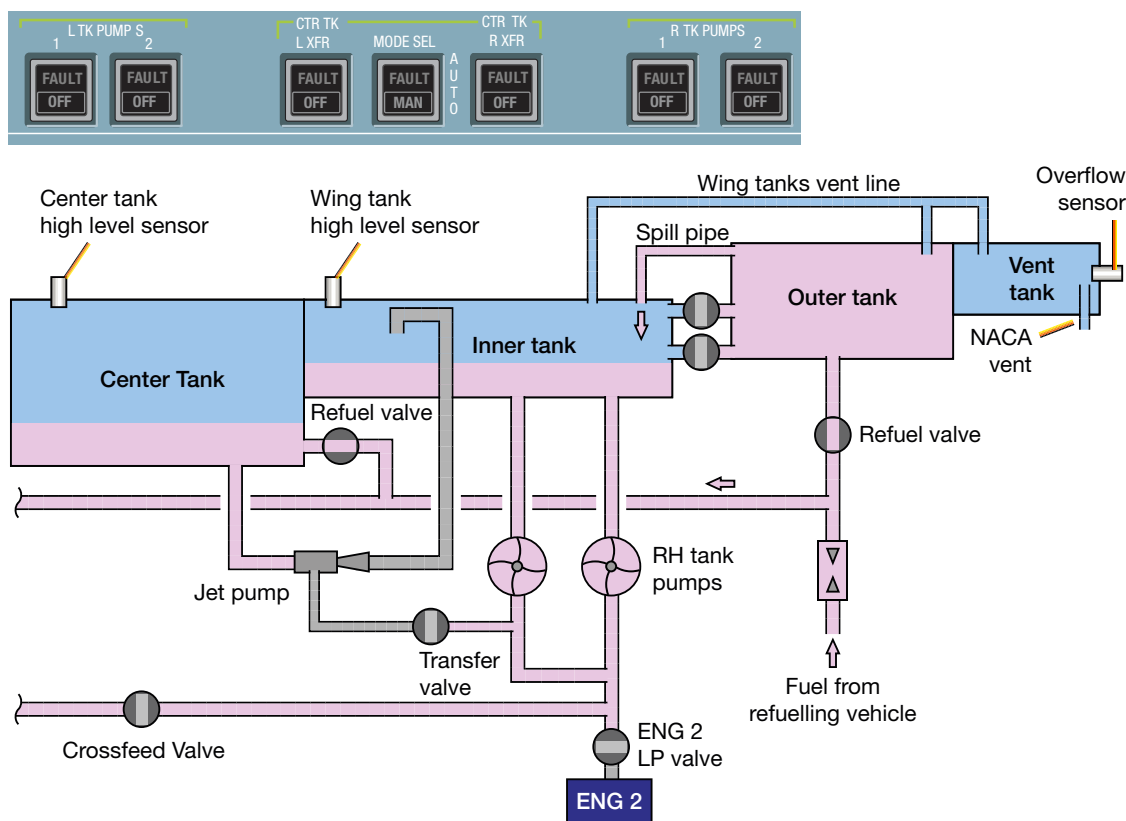
Refuelling operation

The center tank transfer mode selector should be in the AUTO position (no light) during the refuelling operation. This means the left and right transfer valves will remain closed. The fuel pumps and the Left and Right CTR TK XFR pushbutton switches can be ON or OFF. The switches will be OFF (no light) if the flight crew has already performed their cockpit preparation.

The center tank and the outer wing tanks are filled first in a normal refuelling operation. Once the outer tank is full of fuel, the inner wing tank will be filled with fuel passing through the spill pipe (**fig.3**).

(fig.3)

Normal refuelling on A320 family aircraft equipped with transfer jet-pumps (Cockpit preparation already done in this example)



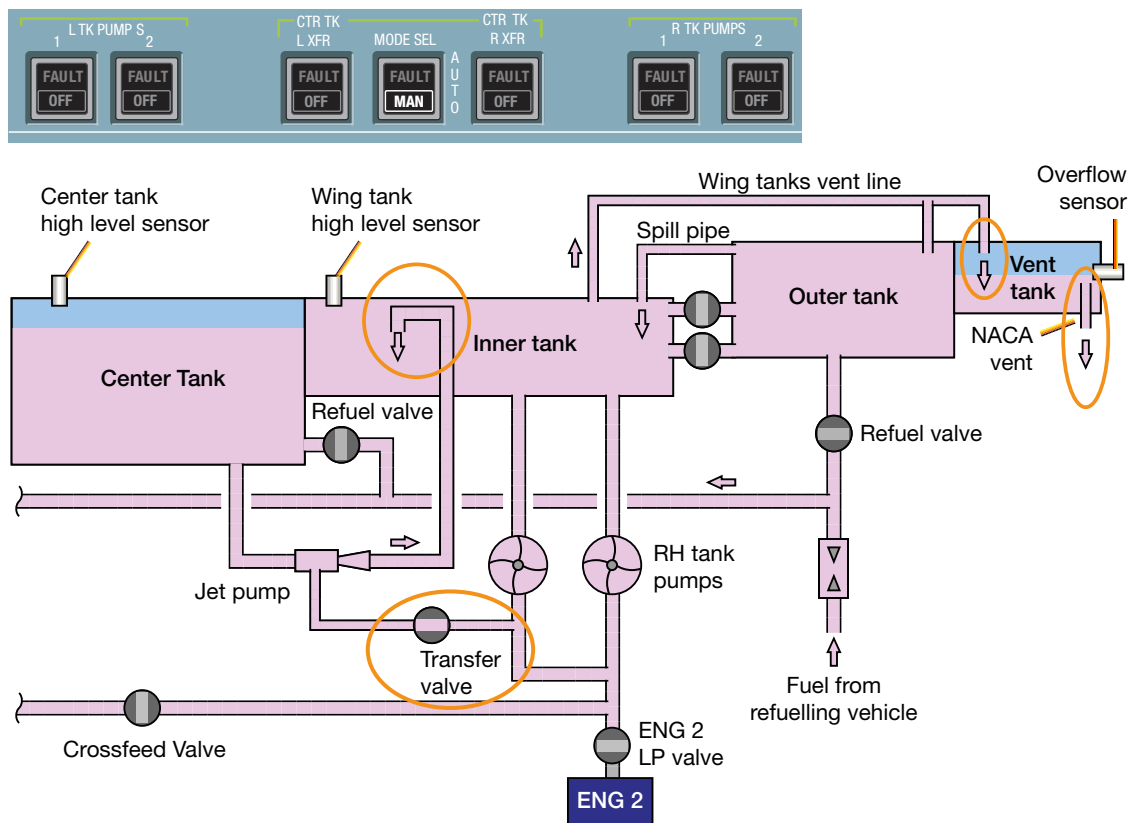
Scenario of fuel spill incidents due to transfer mode selector in manual mode during automatic refilling operations

Cases of fuel spillage were reported to Airbus during refuelling of A320 family aircraft equipped with transfer jet-pumps in the center tank. The transfer mode selector was left in the **MAN** position during the refuelling operation of the reported events. This condition forced the transfer valves to open and fuel was supplied to the jet-pumps (**fig.4**). With the jet pumps ON and fuel flow provided by the fuel pumps, fuel was moved from the center tank to the wing tanks. Even though the refuel valves automatically closed when the preselected quantity of fuel was reached, the transfer valves remained open and the jet-pumps continued to transfer the fuel out of the center tank into the inner tank. When the wing tanks were completely full, fuel was pushed through the wing tank vent lines into the vent tanks and eventually overflowed from the NACA vent causing fuel to spill to the ground.

“ The center tank transfer mode selector should be in the AUTO position (no light) during the refuelling operation. ”

OPERATIONS

Avoiding Fuel Spills on A320 Family Aircraft



(fig.4)

Fuel spillage due to mode selector left on the manual position on A320 family aircraft equipped with transfer jet-pumps

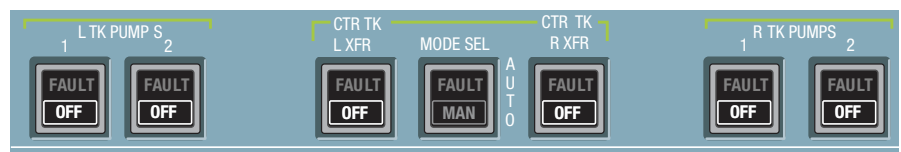
Adherence to SOP prevents leaving the FUEL MODE SEL in **MAN** position

PARKING procedure

The parking SOP requests the flight crew to set the fuel pumps and center transfer valves OFF. This means that the fuel pumps and the Left and Right CTR TK XFR pushbutton switches should be in the **OFF** position. The fuel mode selector should be in AUTO mode.

(fig.5)

Configuration of the FUEL Overhead panel as per PARKING SOP

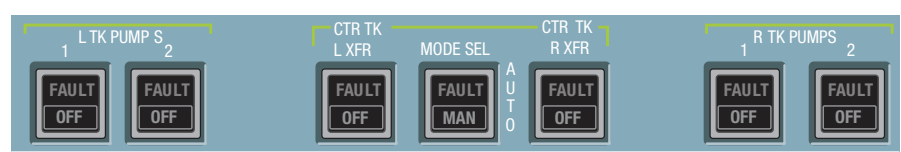


COCKPIT PREPARATION procedure

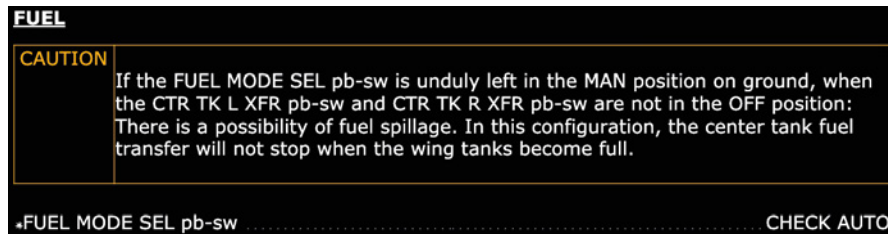
Before the next flight, the flight crew must extinguish all white lights from the overhead panel during the cockpit preparation following the “dark cockpit” philosophy. The fuel pumps are switched ON and the Left and Right CTR TK XFR pushbutton switches should be pushed to extinguish their OFF light **(fig.6)**. If the flight crew observes the FUEL MODE SEL **MAN** light ON, it must be switched OFF at this stage.

(fig.6)

Configuration of the FUEL Overhead panel as per COCKPIT PREPARATION SOP (all lights OFF)



In addition, SOP requests specifically to check that the FUEL MODE SEL is set to AUTO in the FUEL section of the cockpit preparation **(fig.7)**. A dedicated caution warns the flight crew of the potential fuel spillage if the FUEL MODE SEL is set to **MAN** position on ground with the CTR TK L XFR and TR TK R XFR pushbutton switches not in the **OFF** position. ■



(fig.7)

Extract from the A320 FCOM
PRO-NOR-SOP Cockpit preparation - Fuel

WHAT TO DO IN THE CASE OF A FUEL SPILLAGE?

In the event of a fuel spillage, Airbus recommends the following actions:

1. Perform TSM Task "Refuel - Fuel Spillage From NACA Vent During Refuel" to identify the root cause of the spillage
2. Notify Airbus about the fuel spillage event and provide the following information:
 - Fuel Spillage Sheet (available in the TSM task)
 - Fault Reports
 - Shop Reports of replaced components if any, including Part Number and Serial Number. ■



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Protection is available to prevent fuel spill incidents from Airbus aircraft during refuelling. Sensors fitted to the center tank and wing tanks will automatically close the refuel valves to stop the refuelling operation in the case of overfill. Fuel spills are avoided if these protections are operating correctly and this should be checked by a quick test just before refuelling the aircraft.

Fuel spillages were reported to Airbus on A320 family aircraft fitted with transfer jet pumps where the fuel transfer mode selection was mistakenly left in MANUAL. Ensuring that the FUEL MODE SElector is set to AUTO before refuelling the aircraft will avoid a fuel spill incident.

Safety first, #30 March, 2020. Safety first is published by Airbus S.A.S. - 1, rond point Maurice Bellonte - 31707 Blagnac Cedex/France. Publisher and Editor: Yannick Malinge, Chief Product Safety Officer. Concept Design by Airbus MultiMedia Studio 20192534. Reference: X00D16031905 Issue 30. Photos by Airbus, A. Doumenjou, P. Masclet.

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