FUEL
NORMAL
OPERATION

During the walk around, you must check several items which are part of the fuel system.

These items are not major components but a check of their condition is very important.

Fuel can be measured manually by the magnetic fuel level indicators located in each fuel tank.

We are looking at a magnetic fuel level indicator in the right inner tank. It should be flush with the aircraft surface.

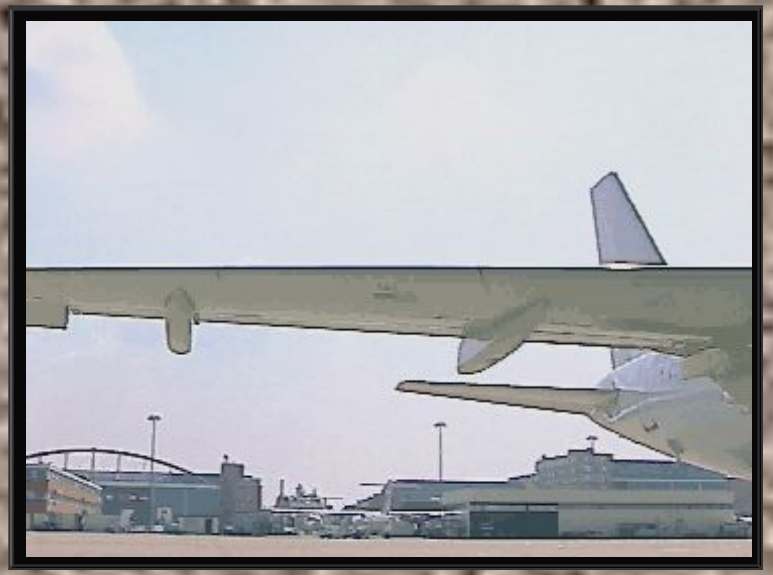
We are looking at the water drain valve in the right inner tank. Each tank has a water drain valve.

You should check that there is no water leaking from the valve.

If there is a leak call maintenance.

A refuel panel is located on the fuselage side beneath the right wing.

You should check that the REFUEL panel access door is closed.



A single refueling point is installed under the right wing.

You should check that the refuel coupling door is closed.

Note : Another refueling point can be installed under the left wing as an option.

There is one surge tank connected to the outer tank in each wing tip. These small tanks protect the system against overpressure and thermal expansion.

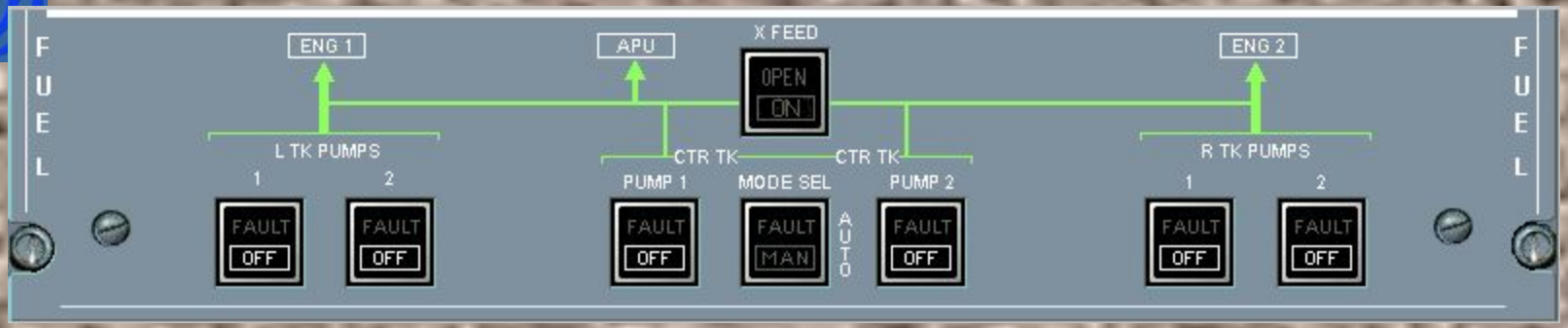
You cannot monitor or control surge tanks from the cockpit.

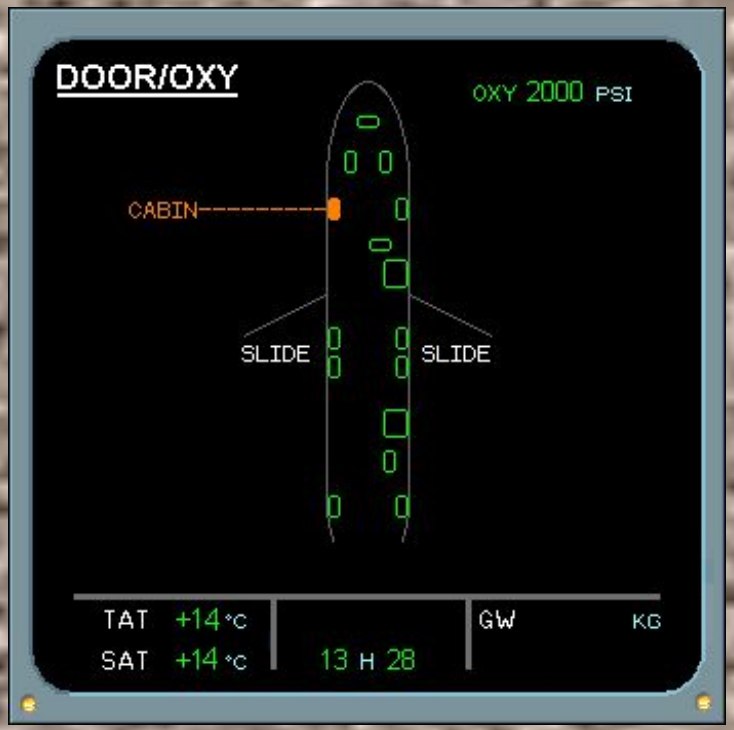
The surge tank inlet should be clear of any blockage.

There is also a shroud drain mast. It drains fuel that could leak from the system.

You should check that there is no fuel leaking from the mast.

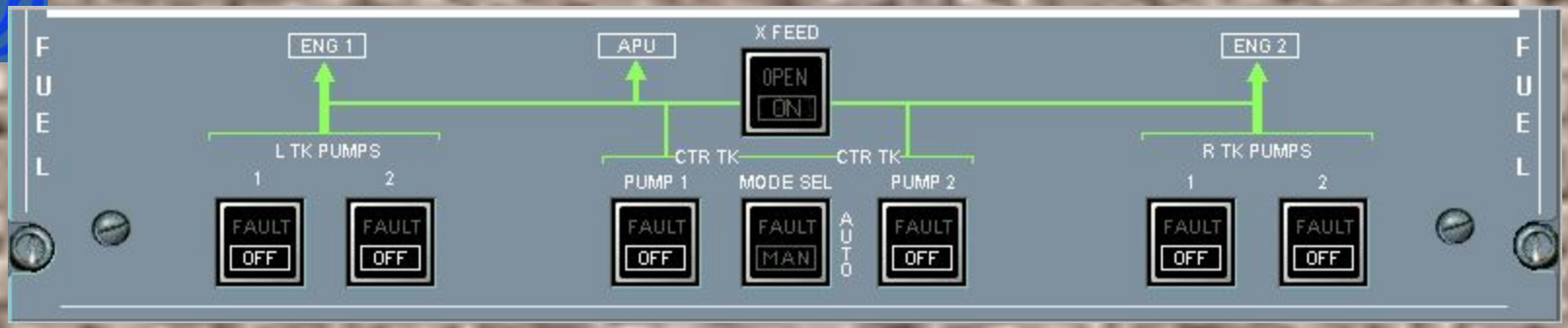
The items related to the fuel system during the walk around are complete.

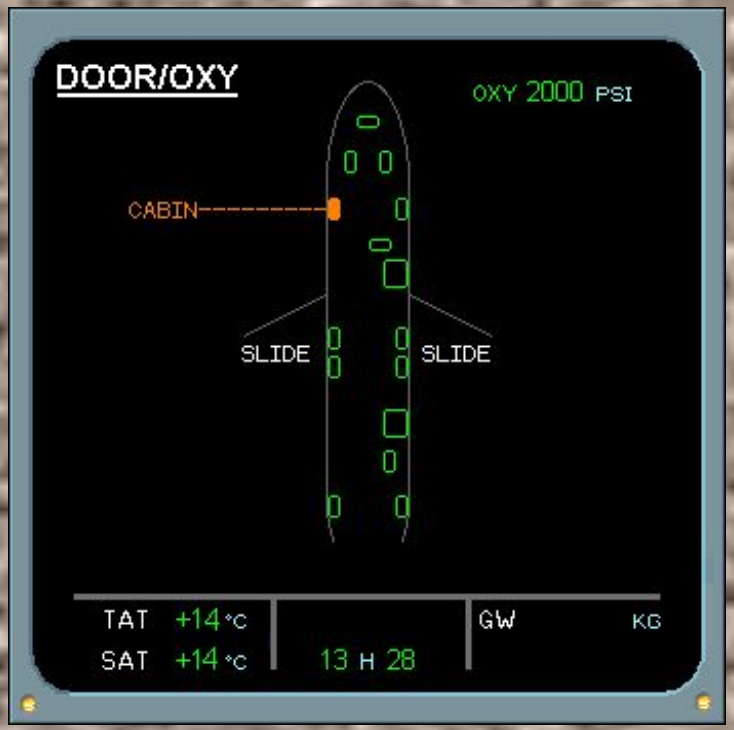




We will now discuss items related to the fuel system that you will encounter during cockpit preparation.

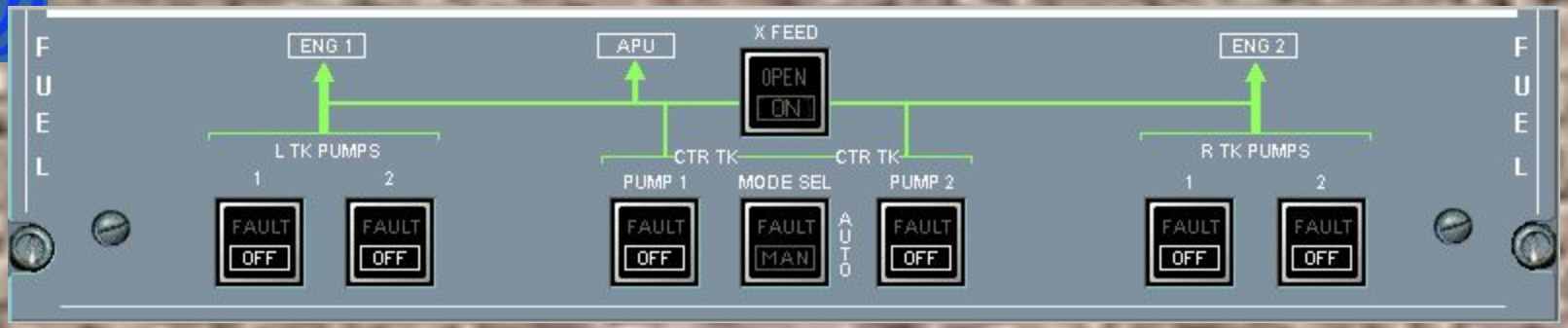
To better illustrate what occurs in the fuel system, select the ECAM FUEL page using the ECAM control panel.

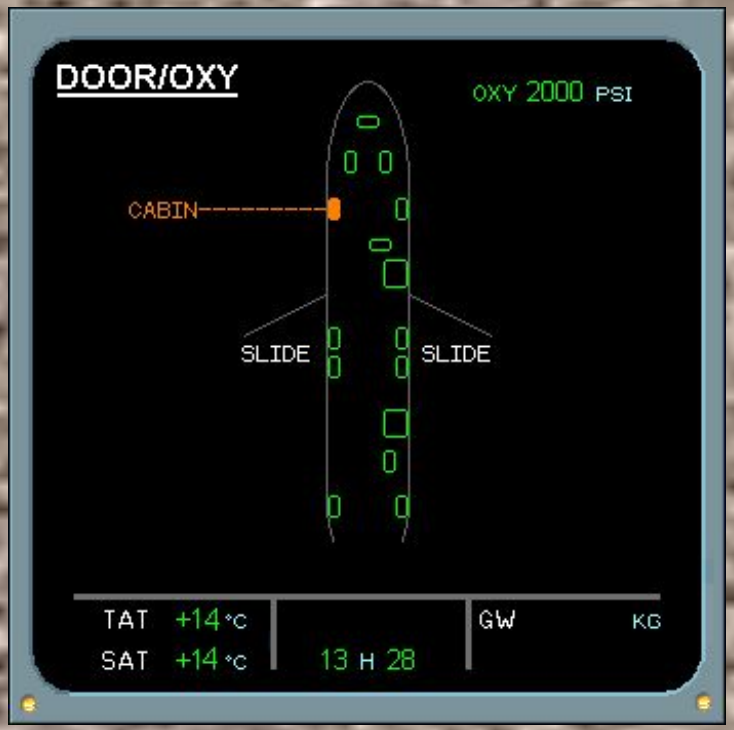




We will now discuss items related to the fuel system that you will encounter during cockpit preparation.

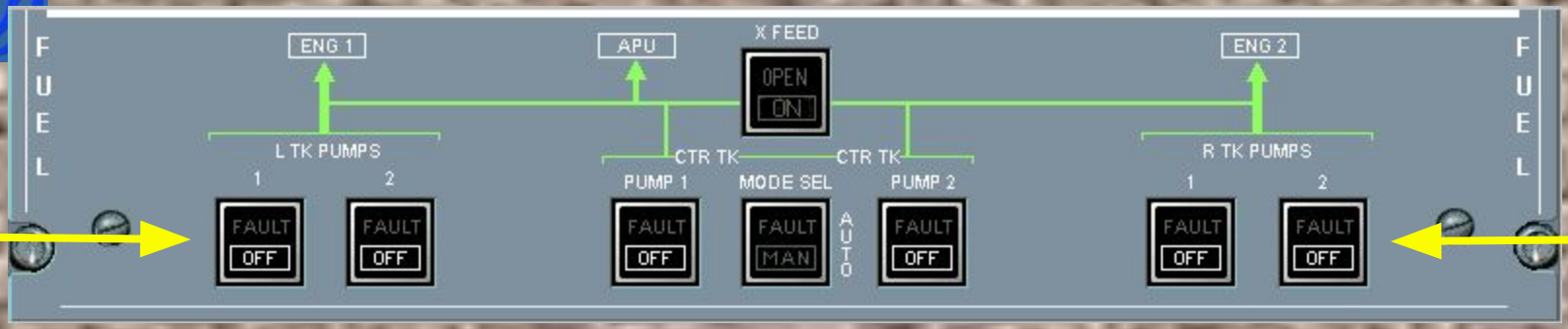
No. Press the FUEL key.

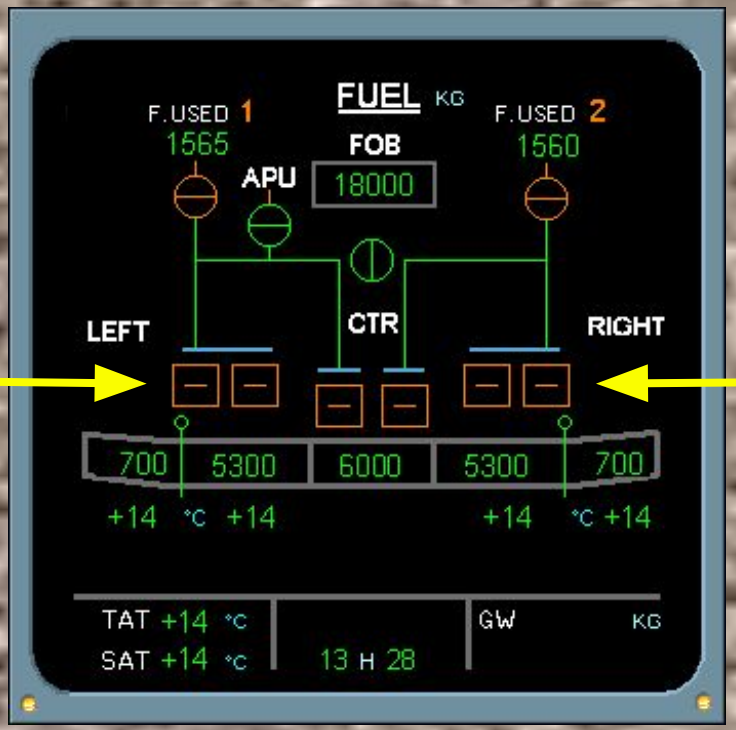




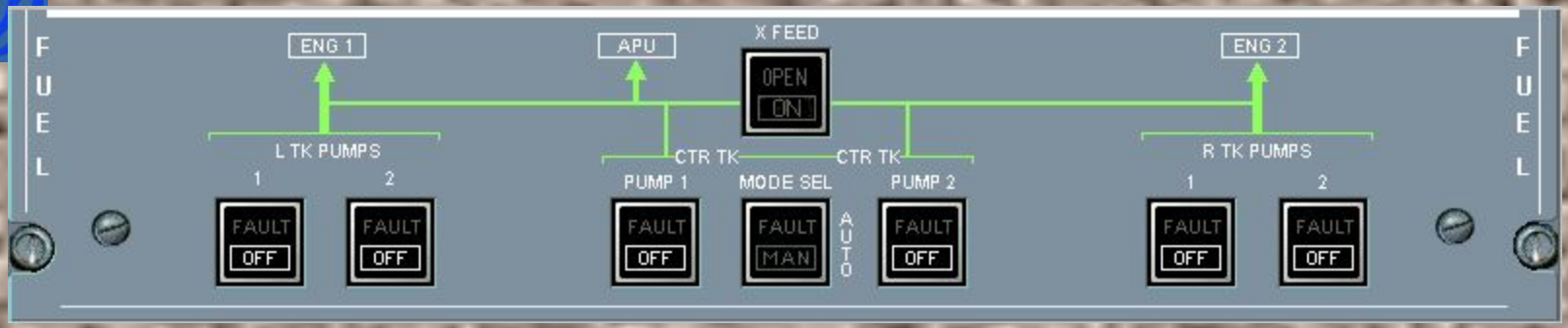
We will now discuss items related to the fuel system that you will encounter during cockpit preparation.

No. Press the FUEL key.



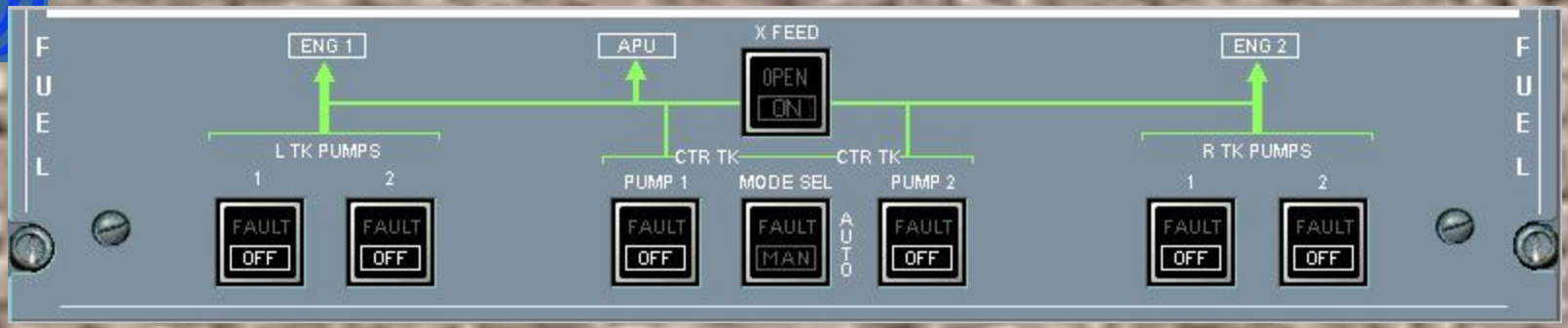


With the pumps in the OFF position, observe the symbology on the ECAM.
The pumps are cross-line amber.



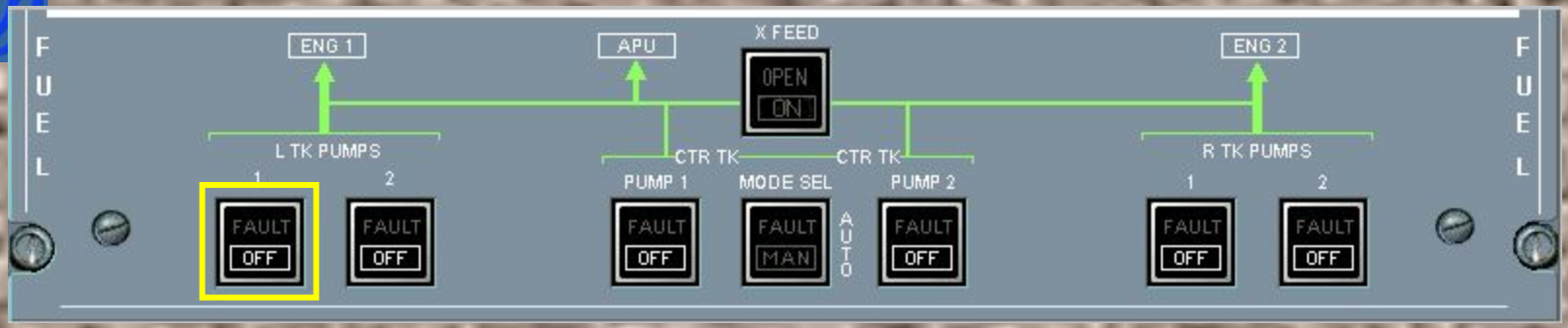
During cockpit preparation, all white ligths in the cockpit must be extinguished.

Switch ON the left tank pump 1 and observe the ECAM indications.



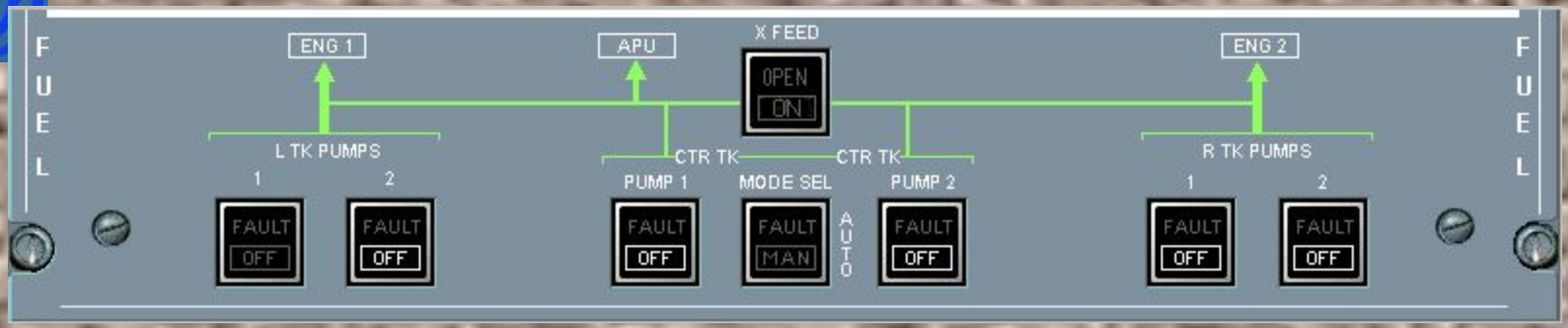
During cockpit preparation, all white ligths in the cockpit must be extinguished.

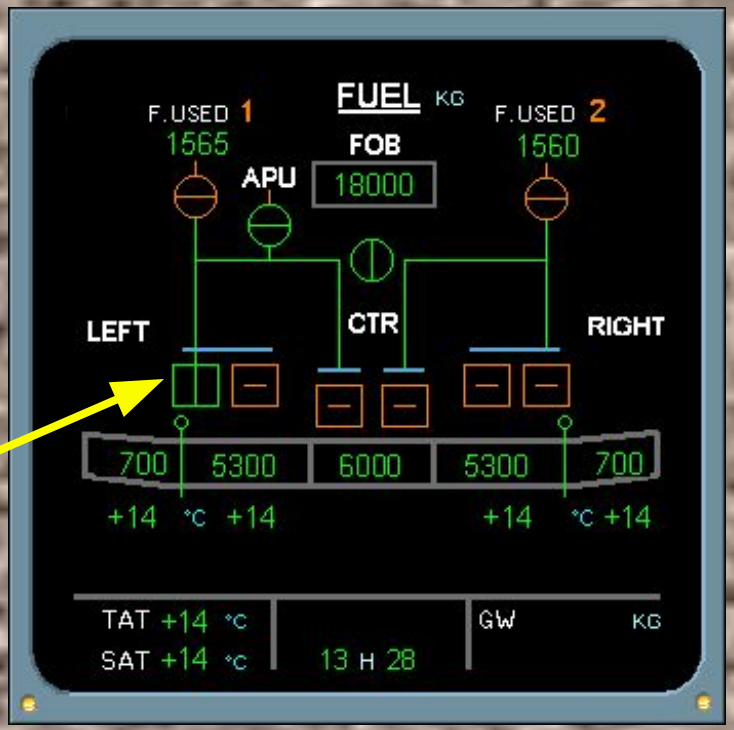
No. Press the L TK PUMP 1 pb sw.



During cockpit preparation, all white ligths in the cockpit must be extinguished.

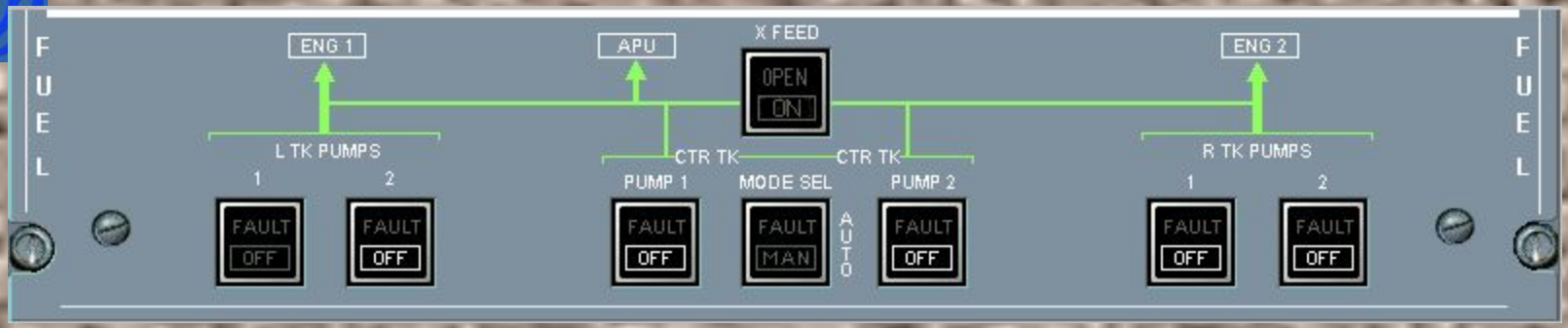
No. Press the L TK PUMP 1 pb sw.

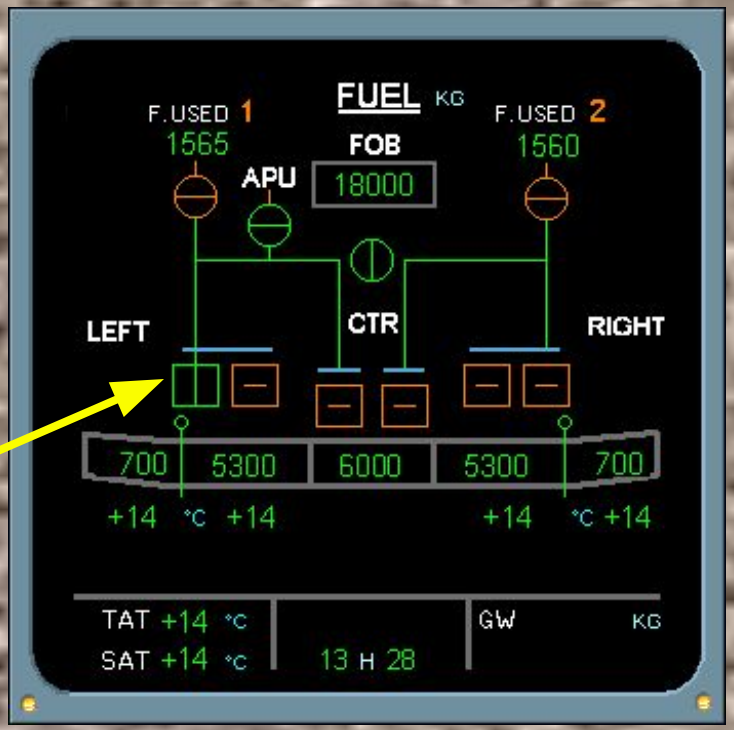




The left tank pump 1 on the ECAM FUEL page is in-line green, indicating that the pump is running.

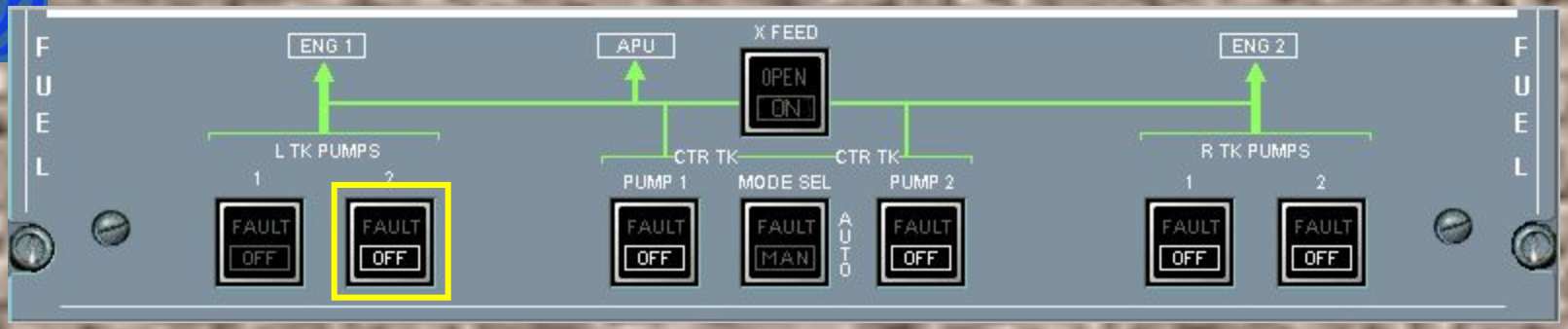
Continue by switching ON the left tank pump 2.

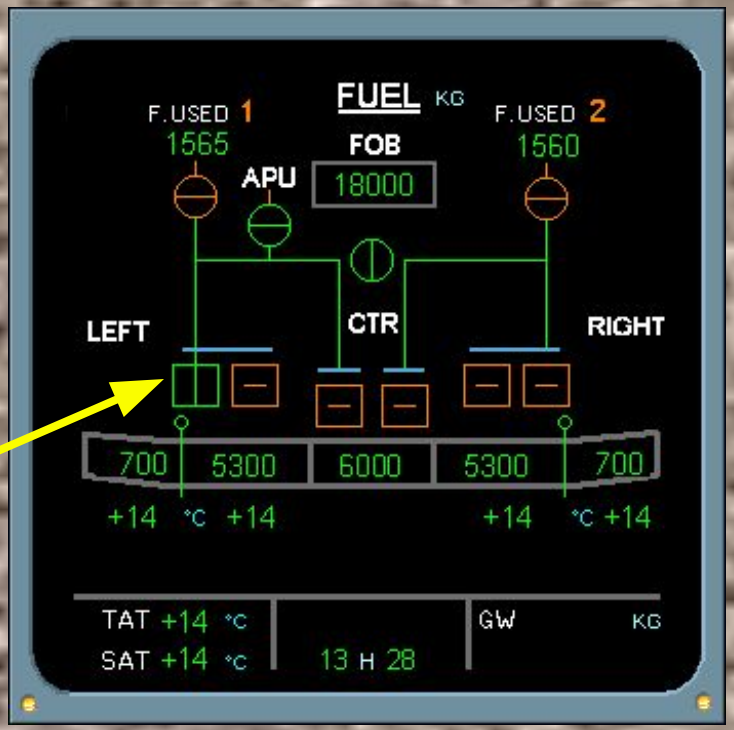




The left tank pump 1 on the ECAM FUEL page is in-line green, indicating that the pump is running.

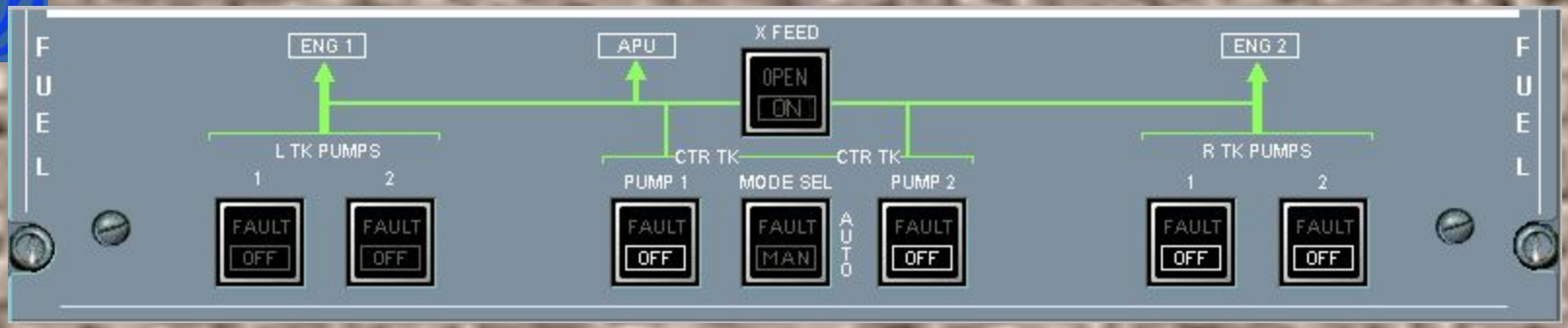
No. Press the L TK PUMP 2 pb sw.

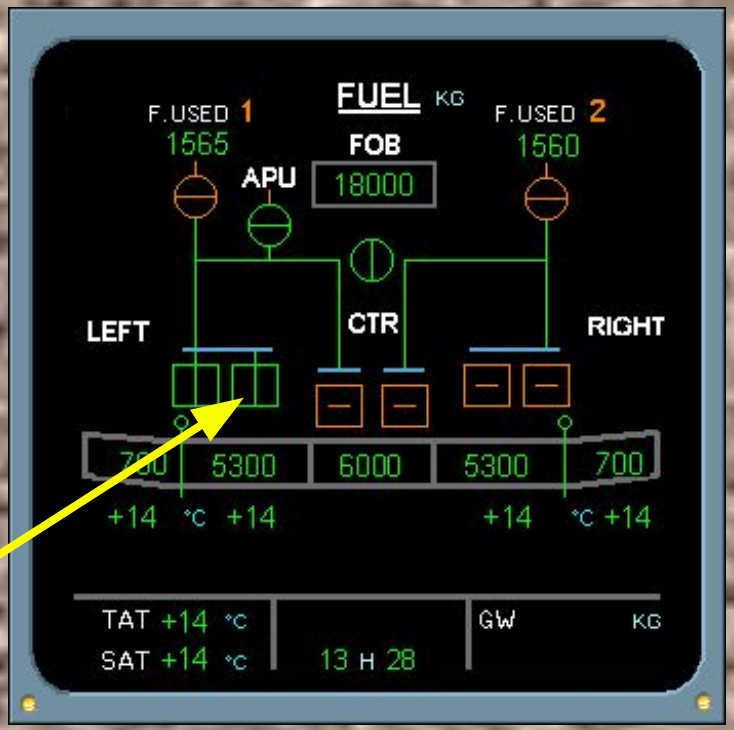




The left tank pump 1 on the ECAM FUEL page is in-line green, indicating that the pump is running.

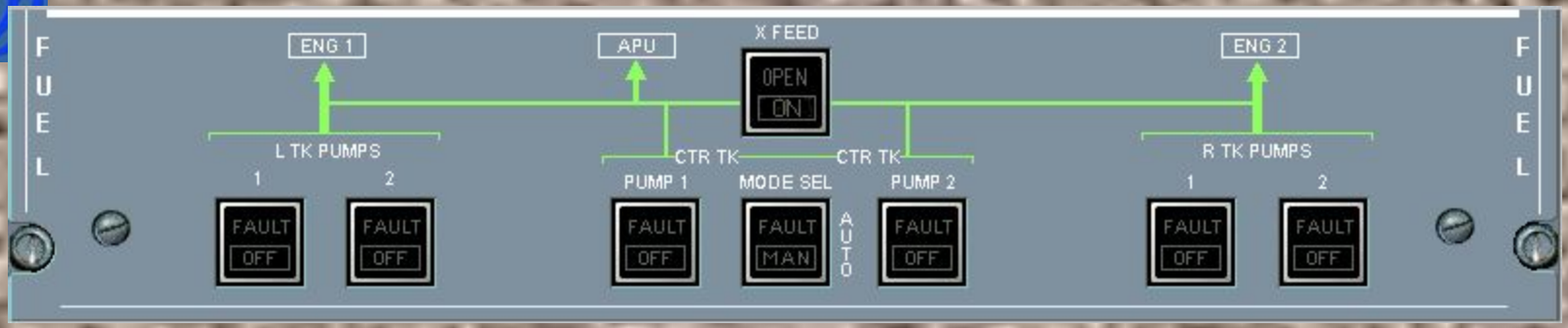
No. Press the L TK PUMP 2 pb sw.





The left tank pump 2 is now also running.

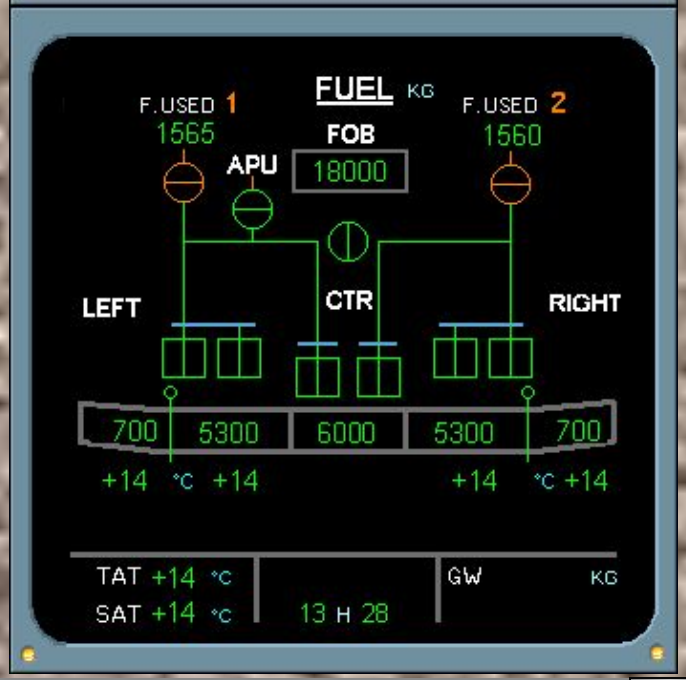
Click on the forward arrow to finish swicthing the center and right tank pumps on.



All the pumps are now running.

Before you continue, you observe a message on the E/WD.

Click on the forward arrow to display the E/WD.



The message "REFUELG" displayed on the E/WD indicates that the refuel control panel door is open.

Now let's continue the preflight by inserting the fuel weight in the MCDU.

We have typed the fuel weight in the scratch pad for you.

Note : You can insert the fuel weight in the MCDU while refueling is in progress.

Enter the Fuel weight in the MCDU .

We have typed the fuel weight in the scratch pad for you.

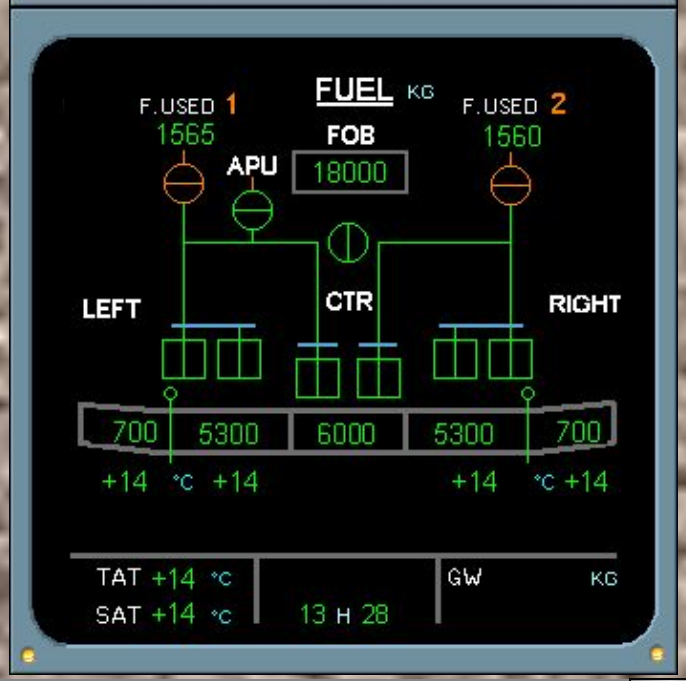
Note : You can insert the fuel weight in the MCDU while refueling is in progress.

No. Press the Line Select Key 2R.

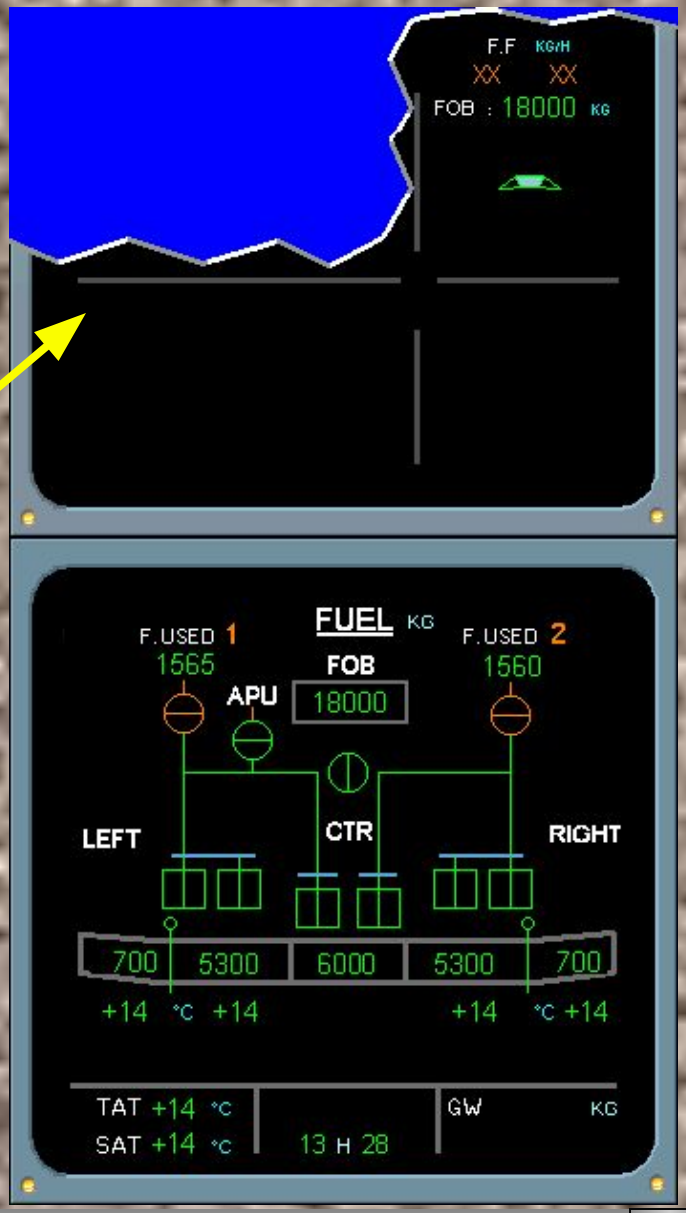
We have typed the fuel weight in the scratch pad for you.

Note : You can insert the fuel weight in the MCDU while refueling is in progress.

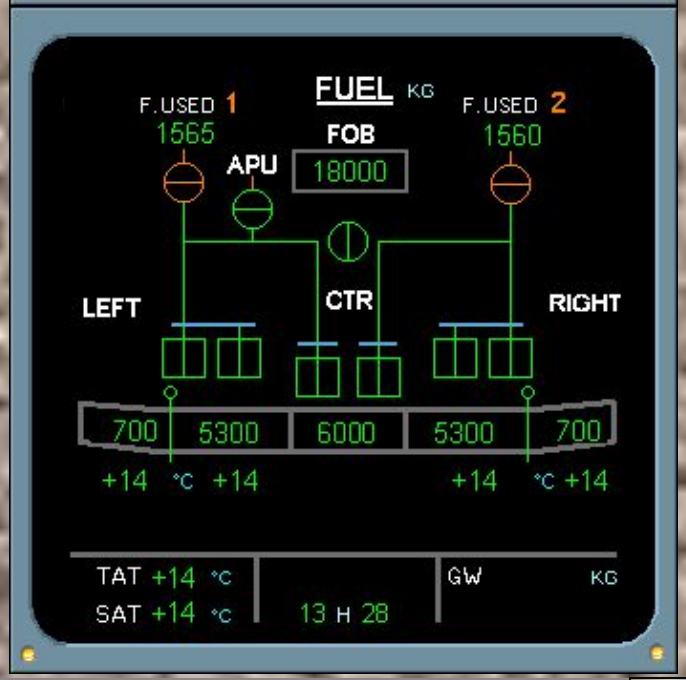
No. Press the Line Select Key 2R.



Click on the forward arrow to continue.

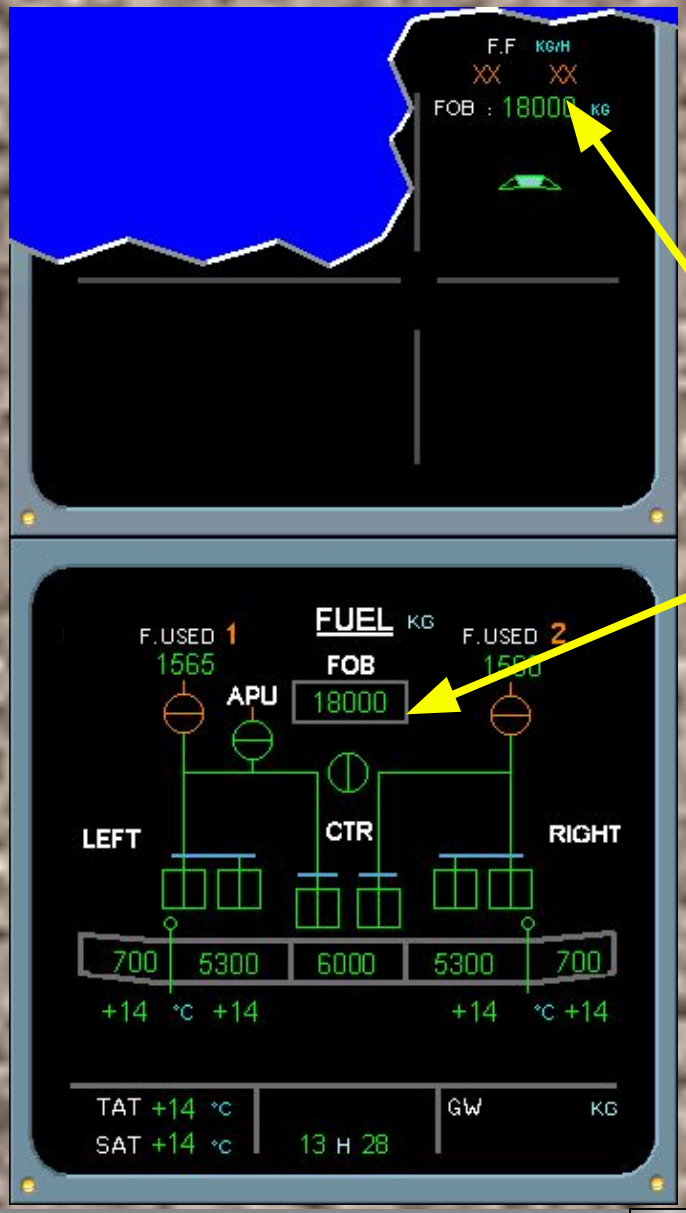


A few minutes later you observe that the refueling message on the E/WD has disappeared, indicating that refueling is complete and the refueling control panel door is closed.



Now that the fuel weight has been entered, let's verify the FOB.

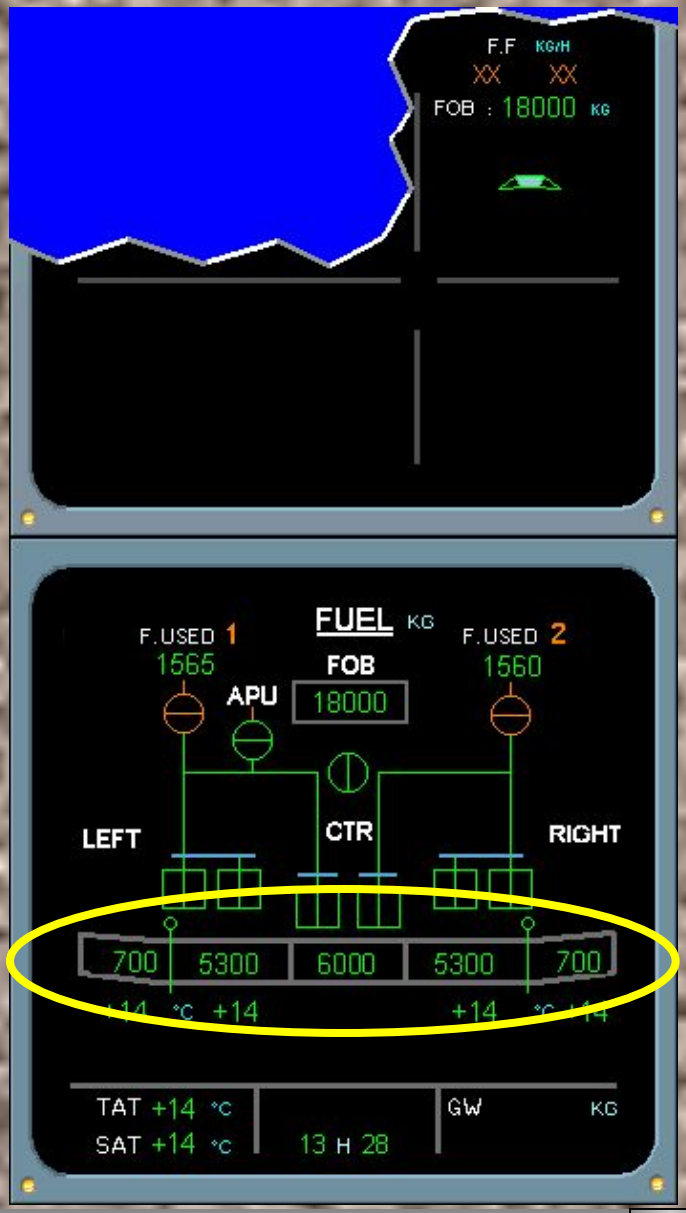
Note : the minimum fuel quantity for take-off is 1500 kg.



DISPATCH PAPERS

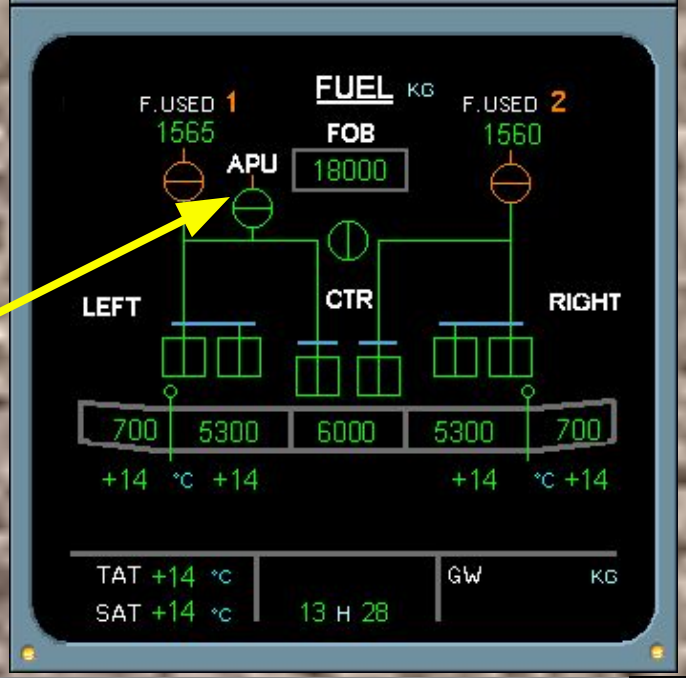
TOTAL FUEL	18000

Verify that the Fuel On Board quantity on the E/WD and on the ECAM FUEL page corresponds to the fuel required by the computerized flight-plan.

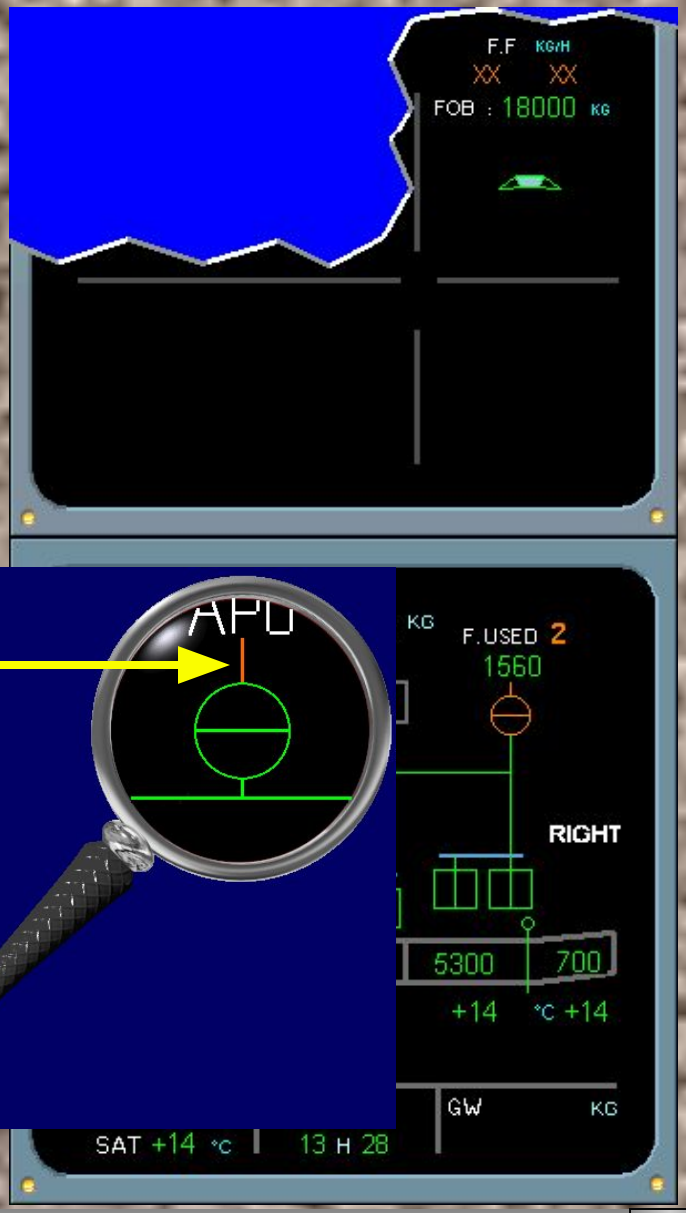


Verify also the fuel distribution in the different tanks.


F.F KG/H
XX XX
FOB : 18000 KG


FUEL KG
F.USED 1
1565
APU
FOB
18000
F.USED 2
1560
LEFT
CTR
RIGHT
700
5300
6000
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG


A320
F-WWAI



It's now time to start the APU.
Before we start it, notice that :

- the APU low pressure valve is closed (cross-line green),
- and the fuel line dowstream from the low pressure valve is amber indicating the APU is not running.

We have started the APU for you.

On the ECAM FUEL page you can see that the APU is running because :

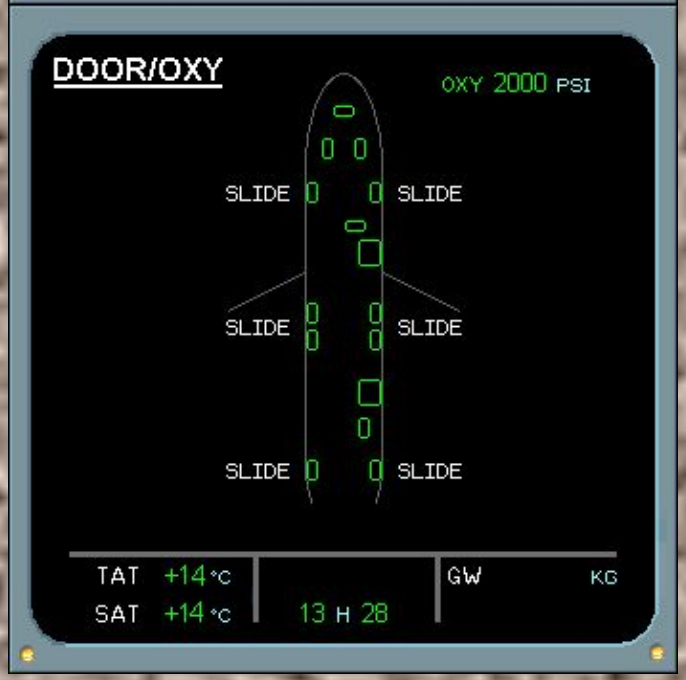
- the APU Low Pressure valve has opened (in- line green),
- and the fuel line dowstream is green.

The items related to the fuel system during cockpit preparation are complete.

We will now discuss items related to the fuel system that you will encounter during engine start.

The indications and starting procedures are the same for both engines.

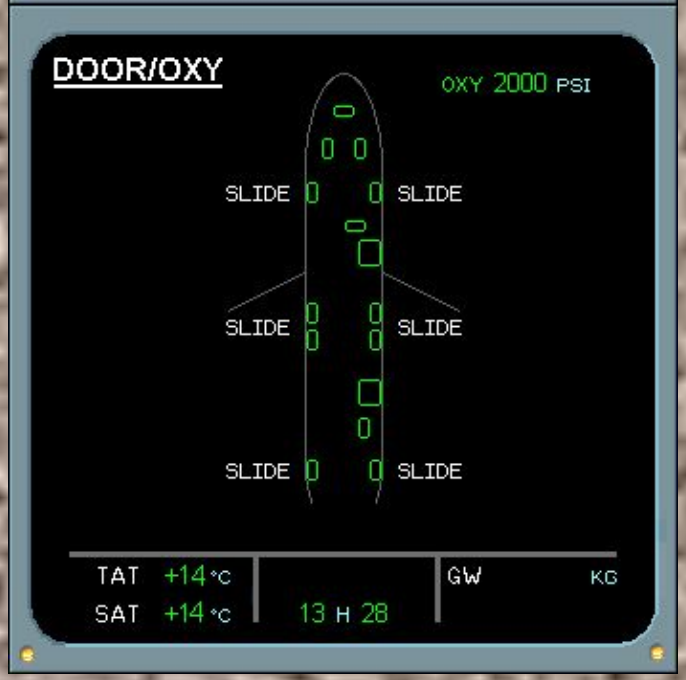
In our example we will start engine 2 first.



Normally, during engine start, the ECAM ENGINE page will be automatically displayed.

For training purposes only, to better illustrate what occurs in the fuel system, the ECAM FUEL page will be presented.

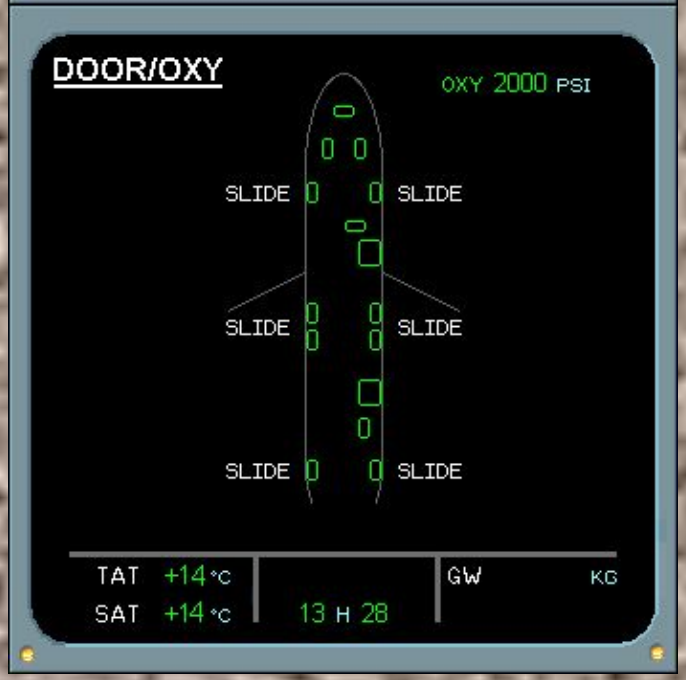
Select the ECAM FUEL page on the ECAM control panel.



Normally, during engine start, the ECAM ENGINE page will be automatically displayed.

For training purposes only, to better illustrate what occurs in the fuel system, the ECAM FUEL page will be presented.

No. Press the FUEL key.



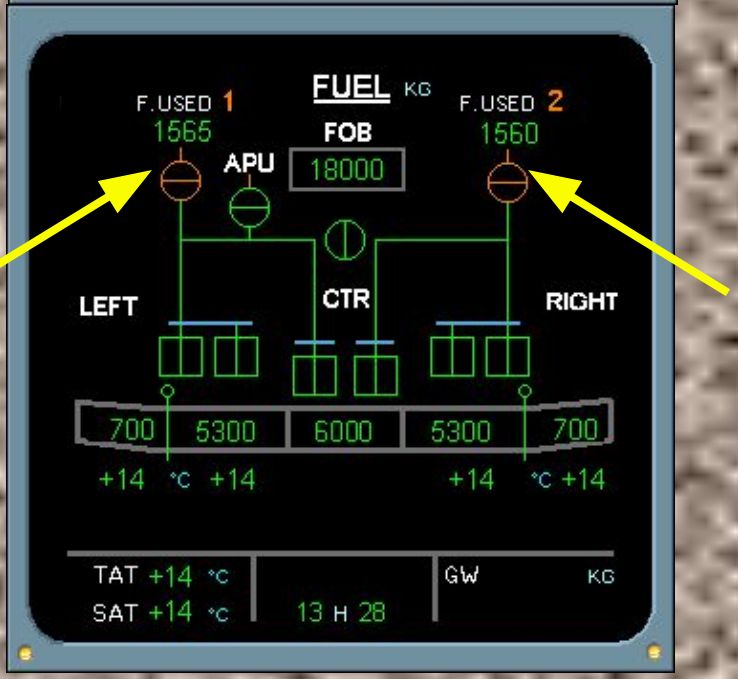
Normally, during engine start, the ECAM ENGINE page will be automatically displayed.

For training purposes only, to better illustrate what occurs in the fuel system, the ECAM FUEL page will be presented.

No. Press the FUEL key.

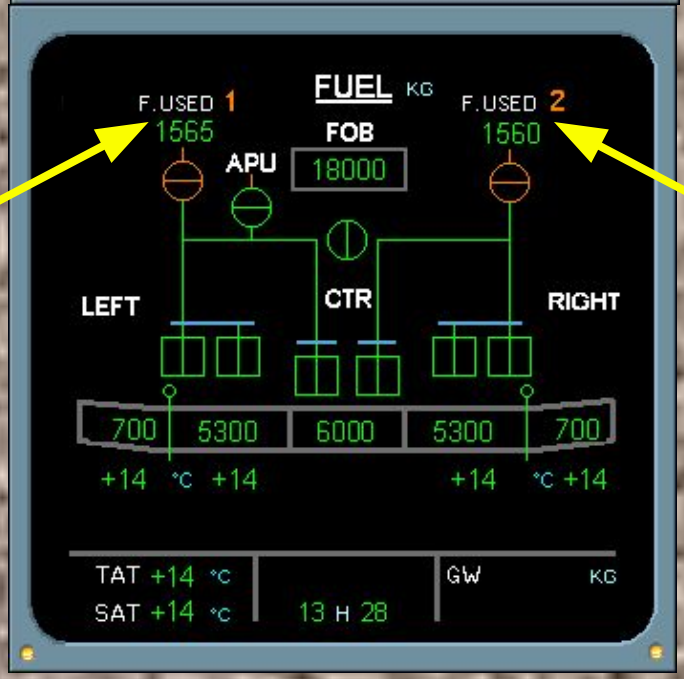

F.F KG/H
XX XX
FOB : 18000 KG


T.O. CONFIG
EMER CANC
ENG
BLEED
PRESS
ELEC
HYD
FUEL
APU
COND
DOOR
WHEEL
F/CTL
ALL
CLR
STS
RCL
CLR


FUEL KG
F.USED 1
1565
F.USED 2
1560
FOB
18000
APU
LEFT
CTR
RIGHT
700
5300
6000
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG

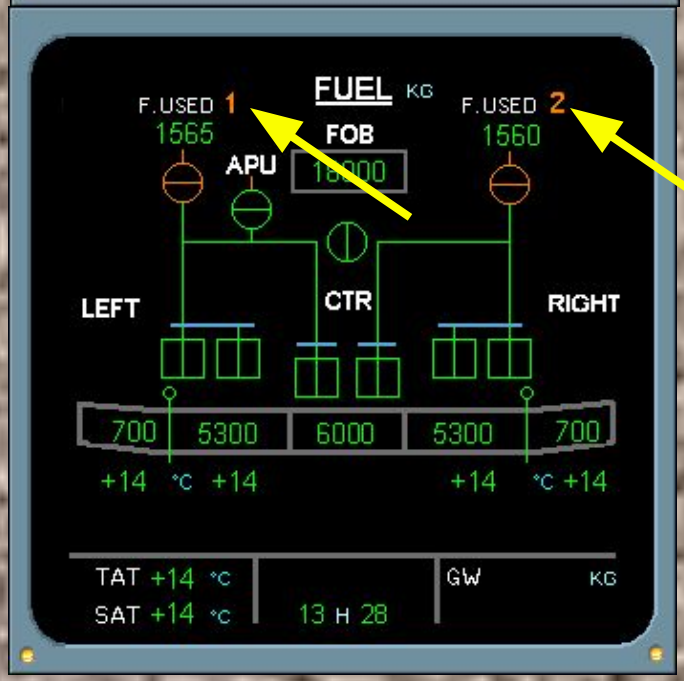

F.F KG/H
XX XX
FOB : 18000 KG

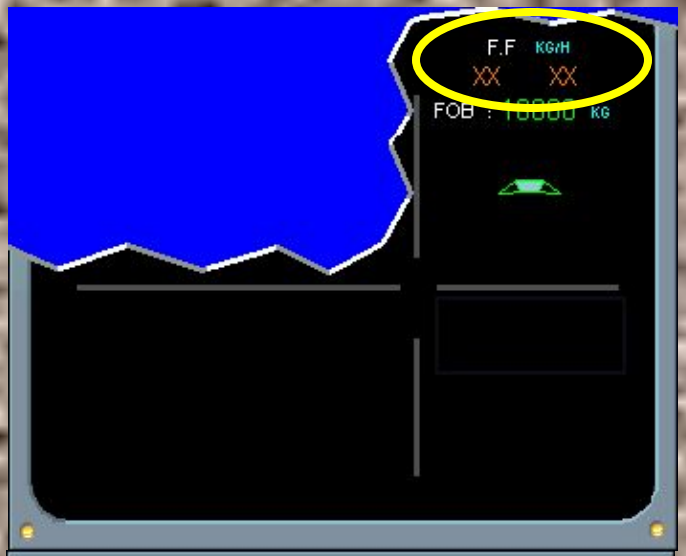

T.O. CONFIG
EMER CANC
ENG
BLEED
PRESS
ELEC
HYD
FUEL
APU
COND
DOOR
WHEEL
F/CTL
ALL
CLR
STS
RCL
CLR


FUEL KG
F.USED 1
1565
F.USED 2
1560
FOB
18000
APU
LEFT
CTR
RIGHT
700
5300
6000
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG


F.F KG/H
XX XX
FOB : 18000 KG

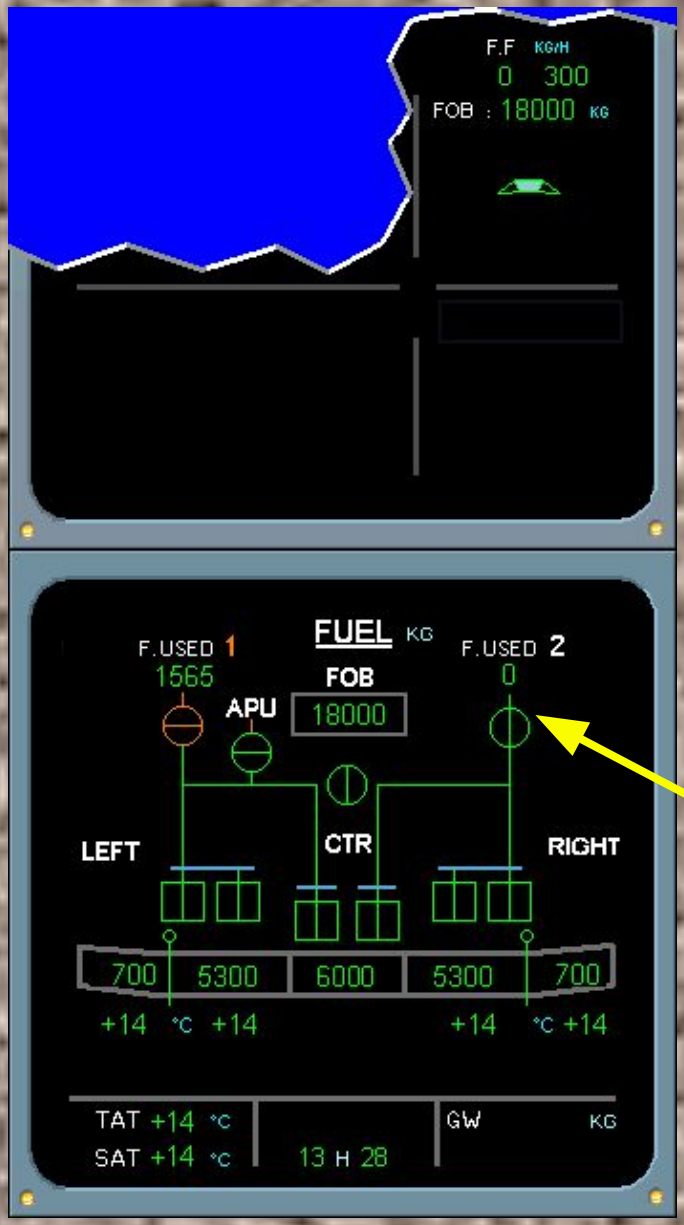

T.O. CONFIG
EMER CANC
ENG
BLEED
PRESS
ELEC
HYD
FUEL
APU
COND
DOOR
WHEEL
F/CTL
ALL
CLR
STS
RCL
CLR

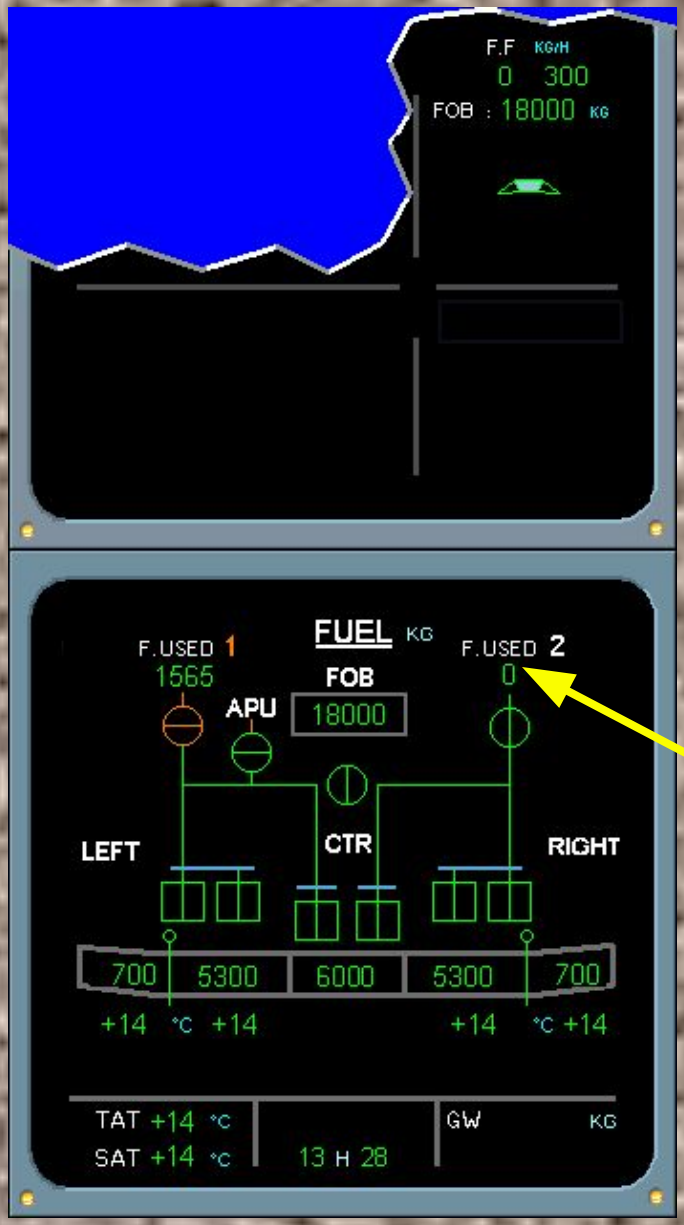

FUEL KG
F.USED 1
1565
F.USED 2
1560
FOB
APU
CTR
LEFT
RIGHT
700
5300
6000
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG

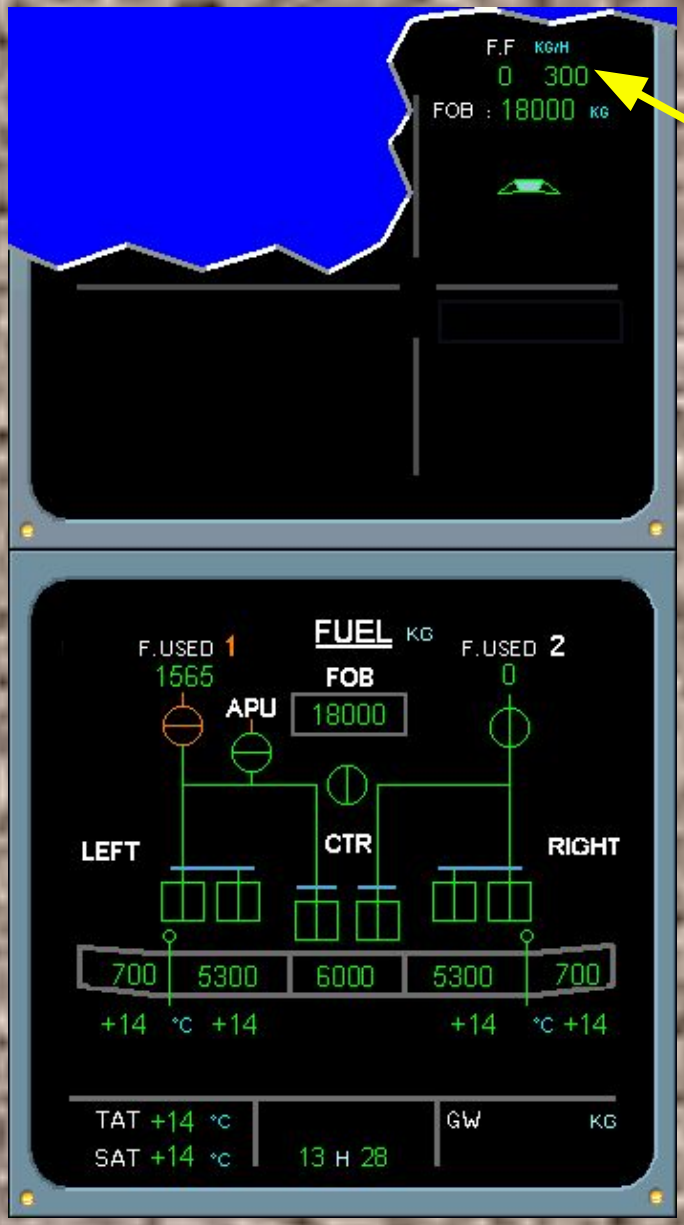


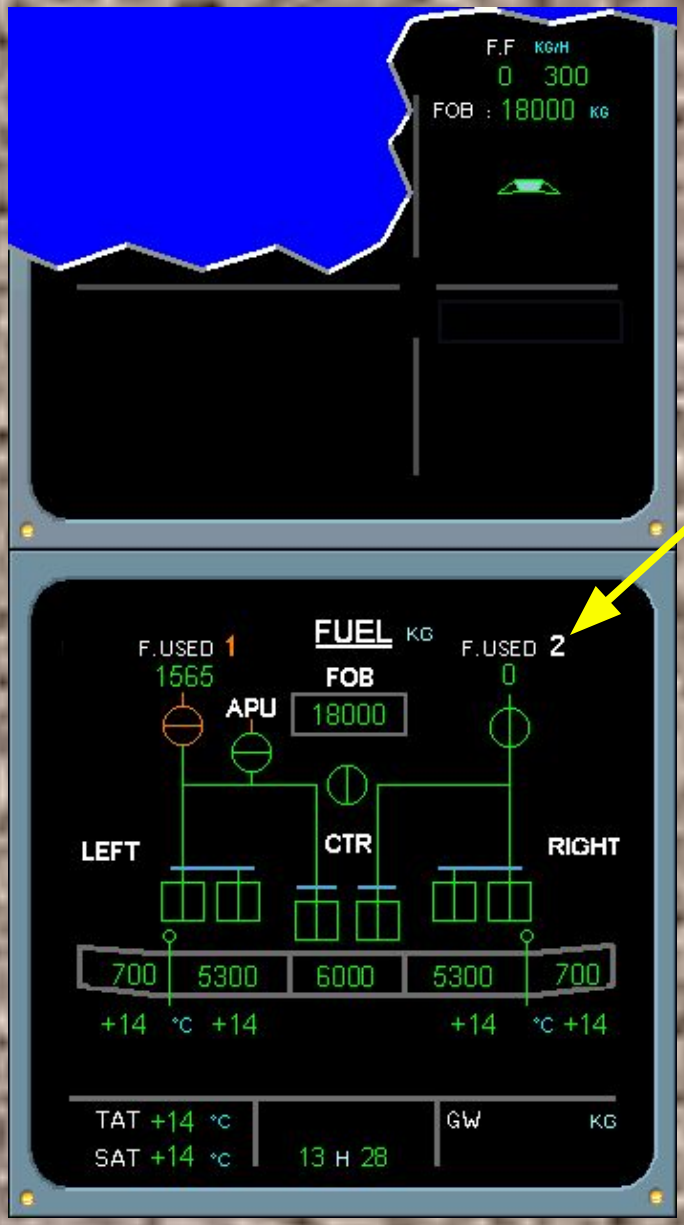
Before we start the engine observe the following :

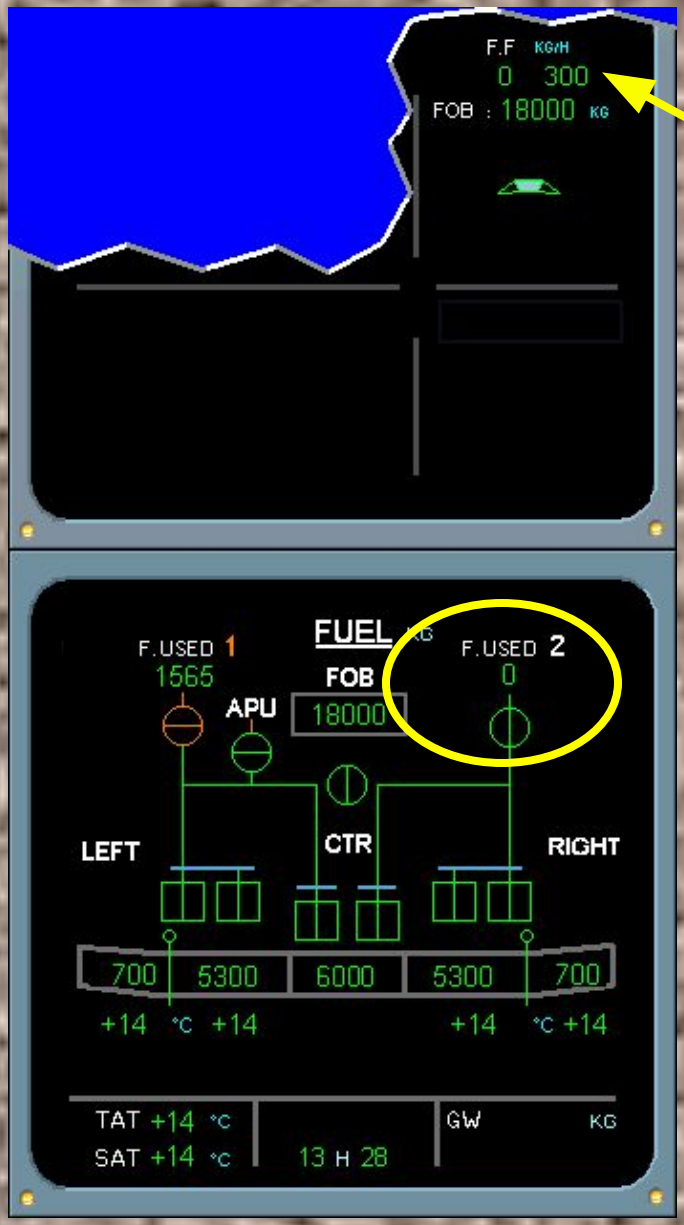
- the engine low pressure valves are cross-line amber to indicate closure,
- The fuel used quantities remain from the previous flight,
- Engine identification numbers are amber. (This is because the engines are not running),
- On the E/WD, the Fuel Flow (F.F.) indicates amber crosses.


F.F KG/H
0 300
FOB : 18000 KG
FUEL KG
F.USED 1
1565
APU
FOB
18000
F.USED 2
0
LEFT
CTR
RIGHT
700
5300
6000
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG


F.F KG/H
0 300
FOB : 18000 KG
FUEL KG
F.USED 1
1565
APU
FOB
18000
F.USED 2
0
LEFT
CTR
RIGHT
700
5300
6000
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG


F.F KG/H
0 300
FOB : 18000 KG
FUEL KG
F.USED 1
1565
F.USED 2
0
FOB
18000
APU
LEFT
CTR
RIGHT
700 5300 6000 5300 700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG

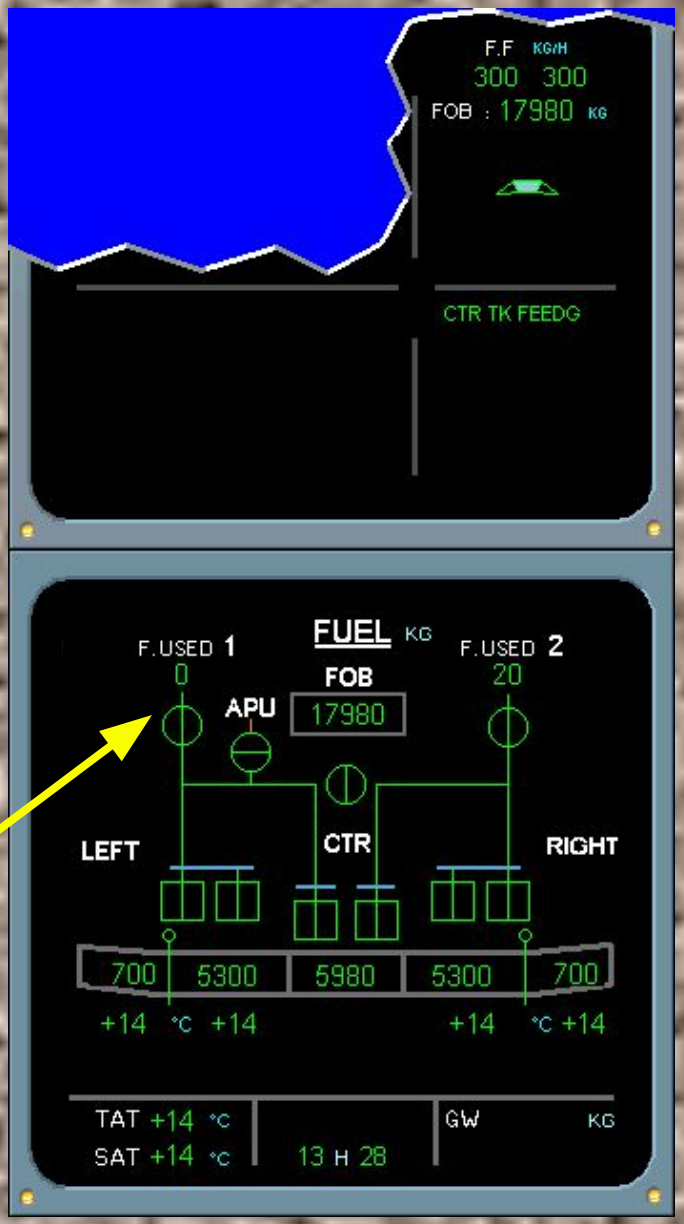

F.F KG/H
0 300
FOB : 18000 KG
FUEL KG
F.USED 1
1565
APU
FOB
18000
F.USED 2
0
LEFT
CTR
RIGHT
700 5300 6000 5300 700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG

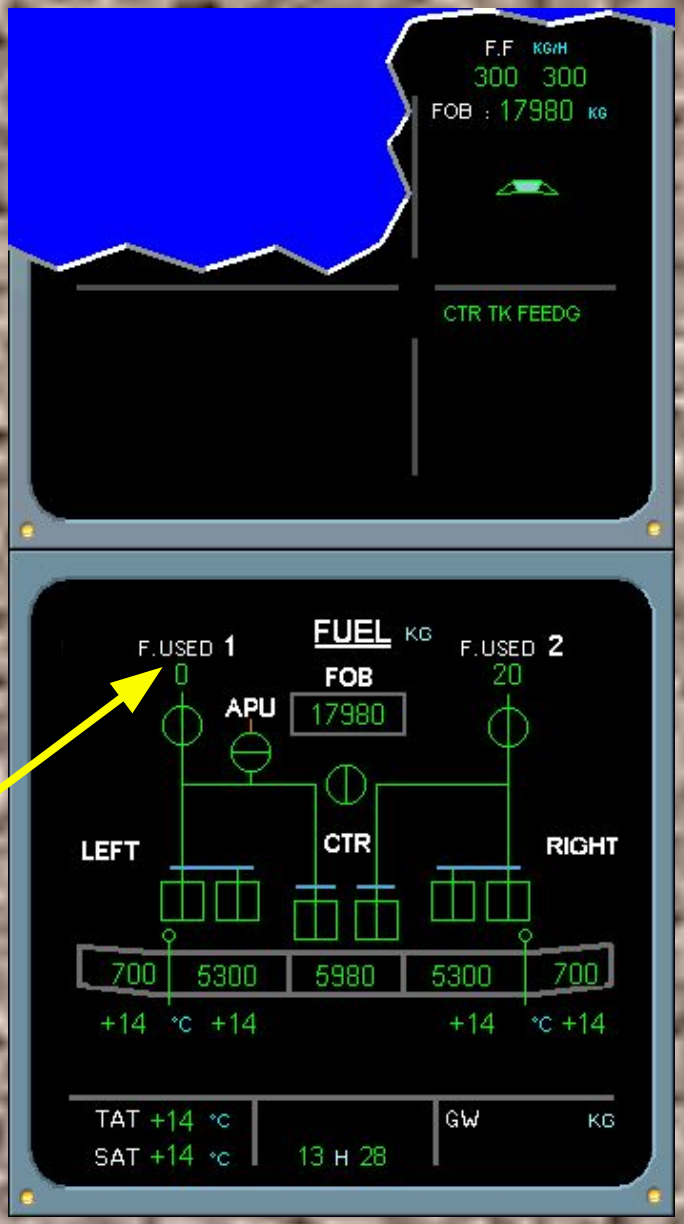


Engine 2 is starting, observe :

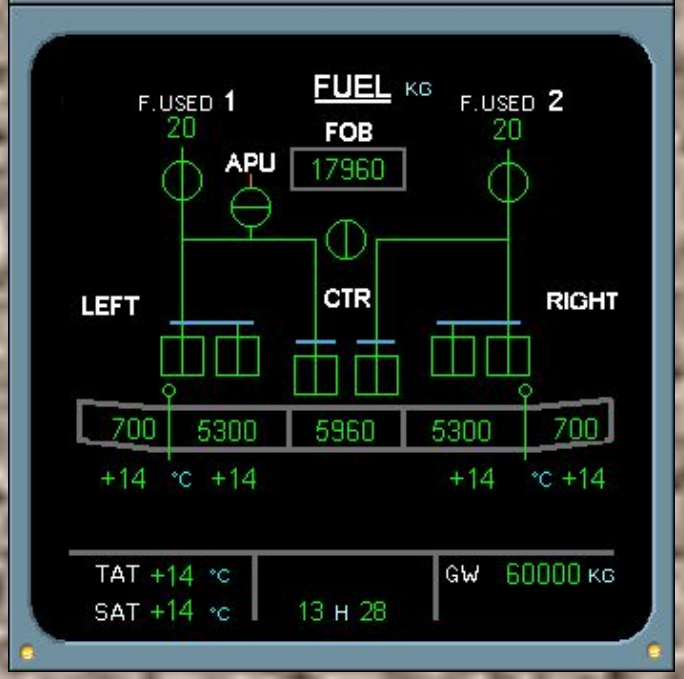
- The Low Pressure valve is in-line green,
- Fuel used indication automatically resets to 0,
- On the E/WD, Fuel Flow starts,
- Engine identification number 2 changes to white.

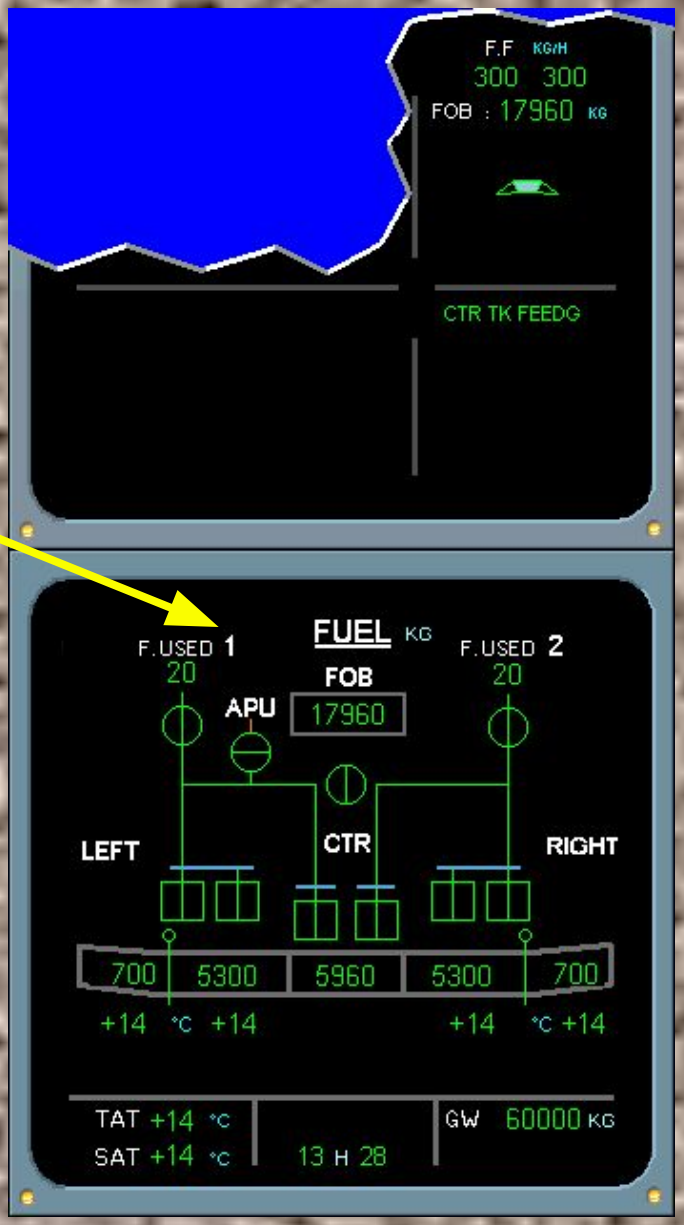
Click on the forward arrow to start engine number 1.

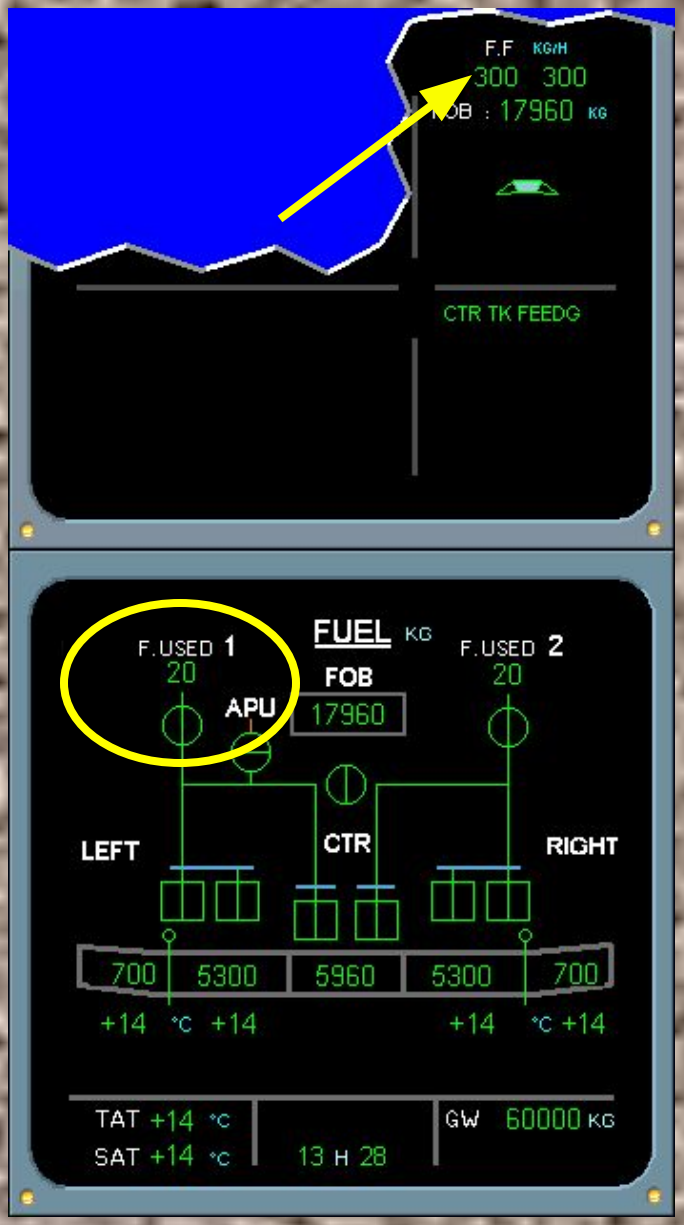

F.F KG/H
300 300
FOB : 17980 KG
CTR TK FEEDG
FUEL KG
F.USED 1
0
F.USED 2
20
FOB
17980
APU
LEFT
CTR
RIGHT
700 5300 5980 5300 700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG


F.F KG/H
300 300
FOB : 17980 KG
CTR TK FEEDG
FUEL KG
F.USED 1
0
FOB
17980
F.USED 2
20
APU
LEFT
CTR
RIGHT
700
5300
5980
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW KG


F.F KG/H
300 300
FOB : 17960 KG
CTR TK FEEDG

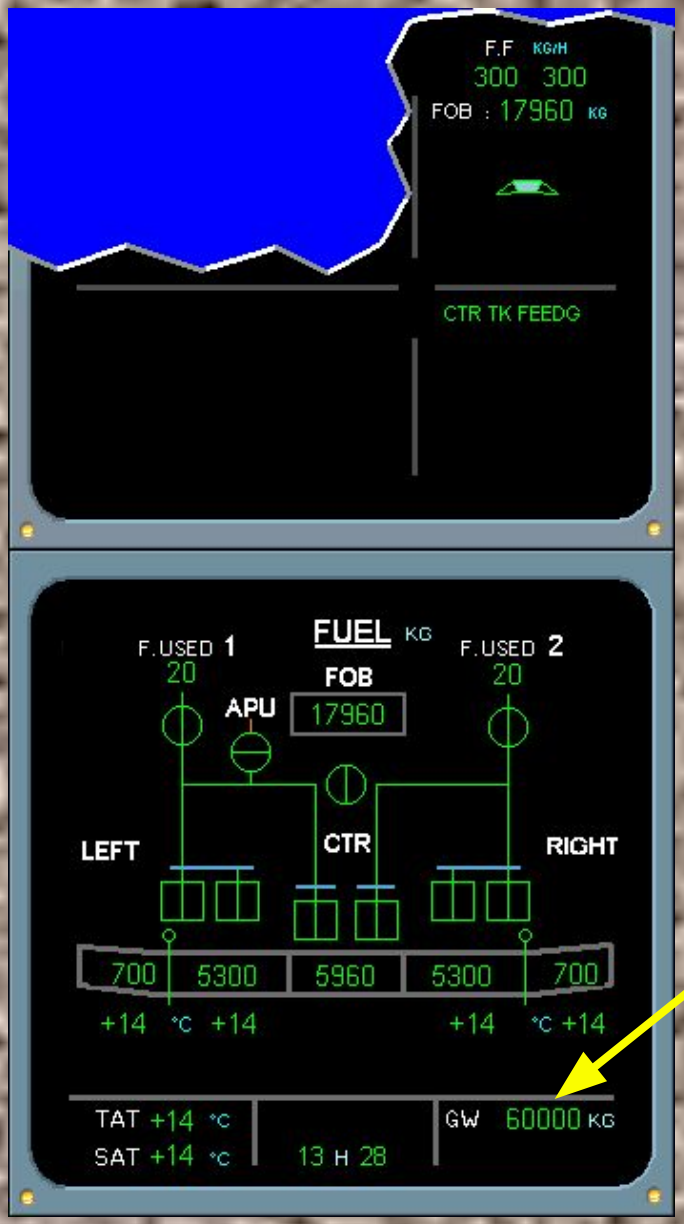

FUEL KG
F.USED 1
20
F.USED 2
20
FOB
17960
APU
LEFT
CTR
RIGHT
700
5300
5960
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW 60000 KG


F.F KG/H
300 300
FOB : 17960 KG
CTR TK FEEDG
FUEL KG
F.USED 1
20
F.USED 2
20
FOB
17960
APU
LEFT
CTR
RIGHT
700 5300 5960 5300 700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW 60000 KG

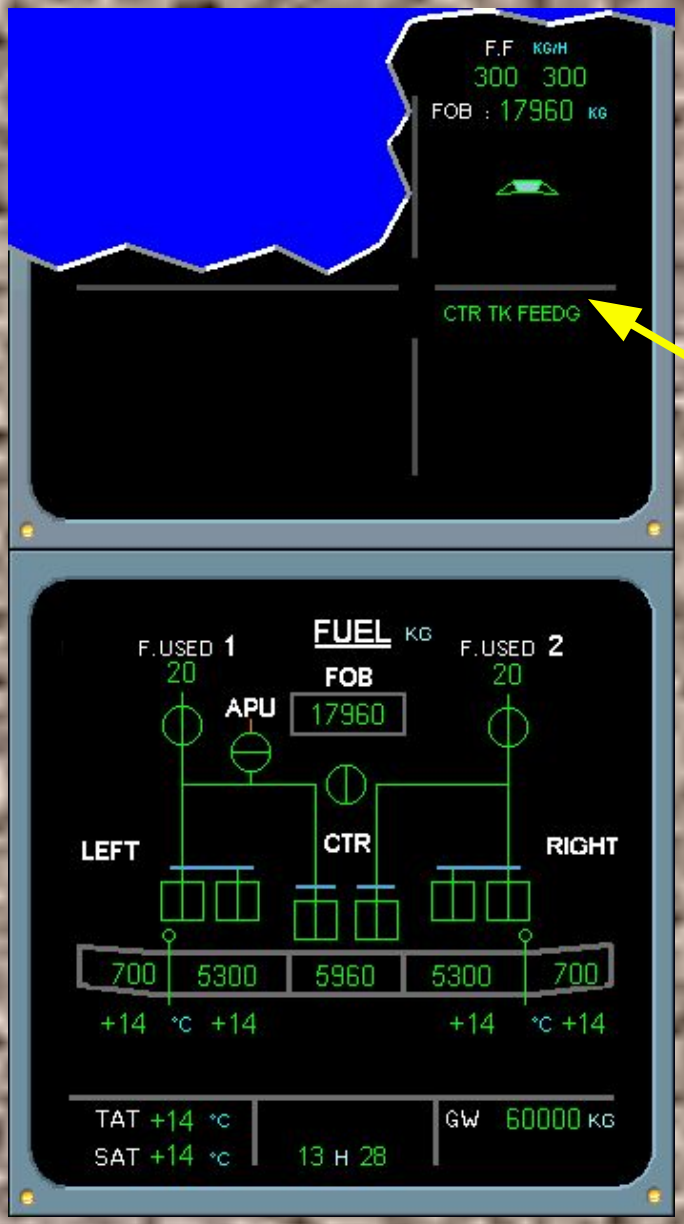


Engine 1 is starting, observe :

- The LP valve is in- line green,
- Fuel used indication automatically resets to 0,
- On the E/WD, fuel flow starts,
- Engine identification number 1 changes to white.



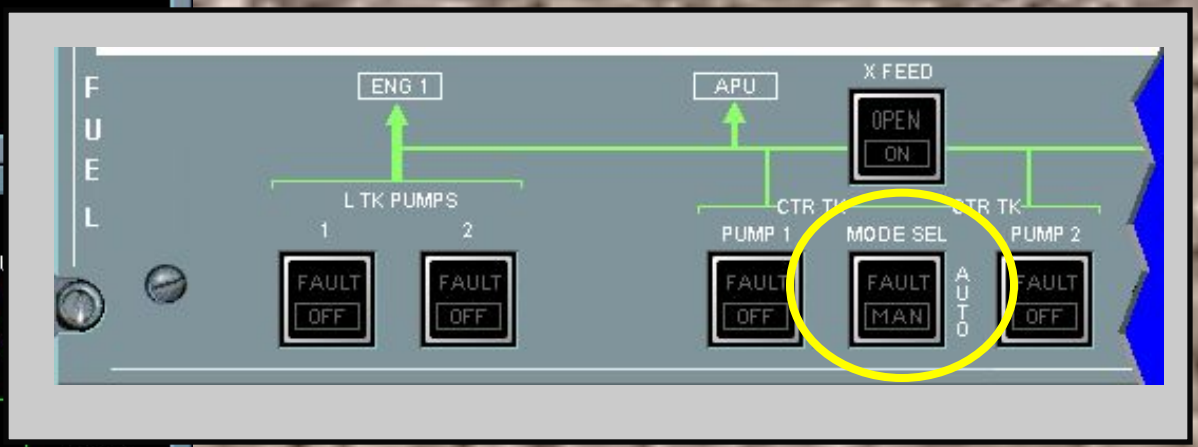
The Gross Weight (GW) has now appeared . This indication is not available until after the second engine is started.



Observe the message CTR TK FEEDG has appeared on the ECAM E/WD. This indicates that the center tank pumps are feeding the engines.

The items related to the engine start are complete.

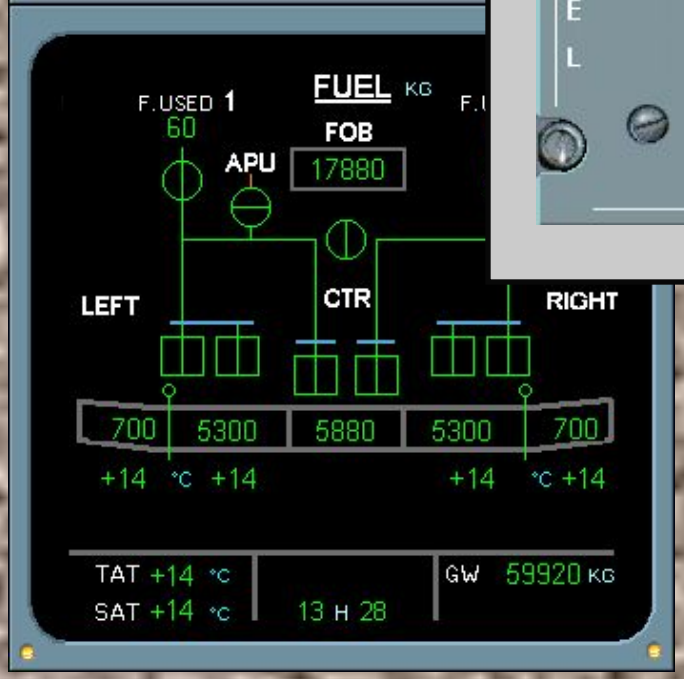
We will now discuss items related to the fuel system that you will encounter during taxi.

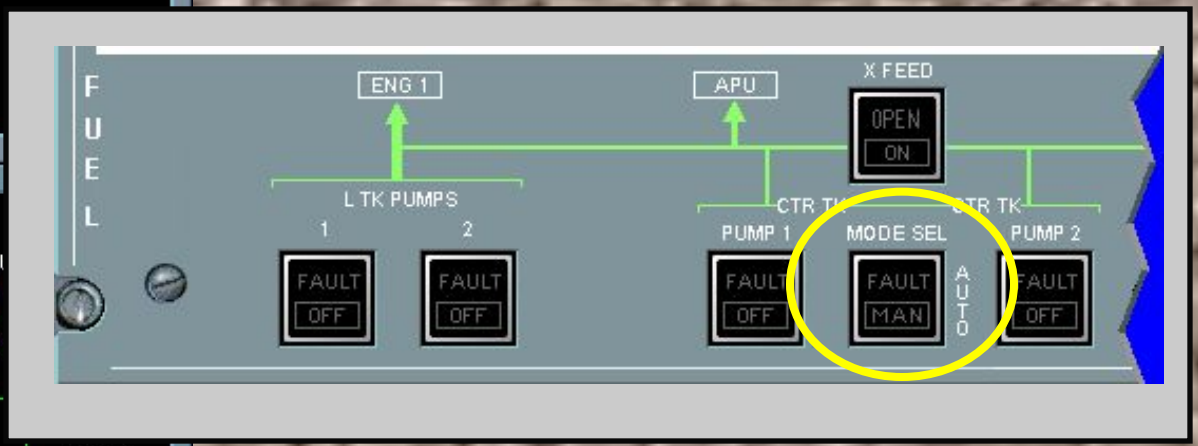


When we extend the slats, you will see one of the automatic functions of the center tank pumps.

Notice that the MODE SEL pb sw is set to AUTO.

Extend the slats, and observe the indications.

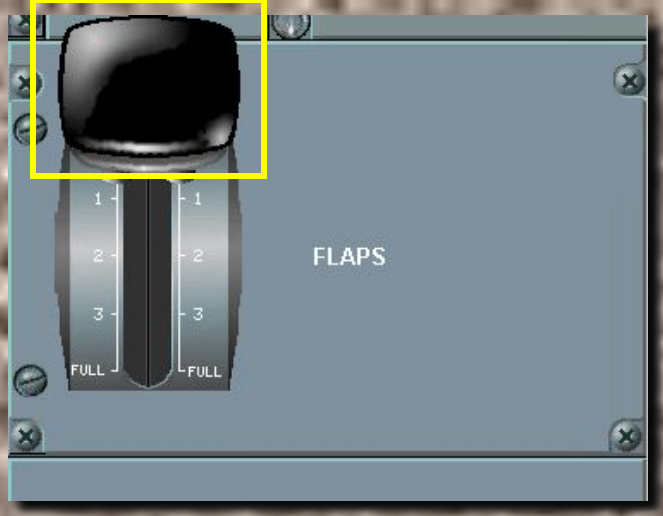


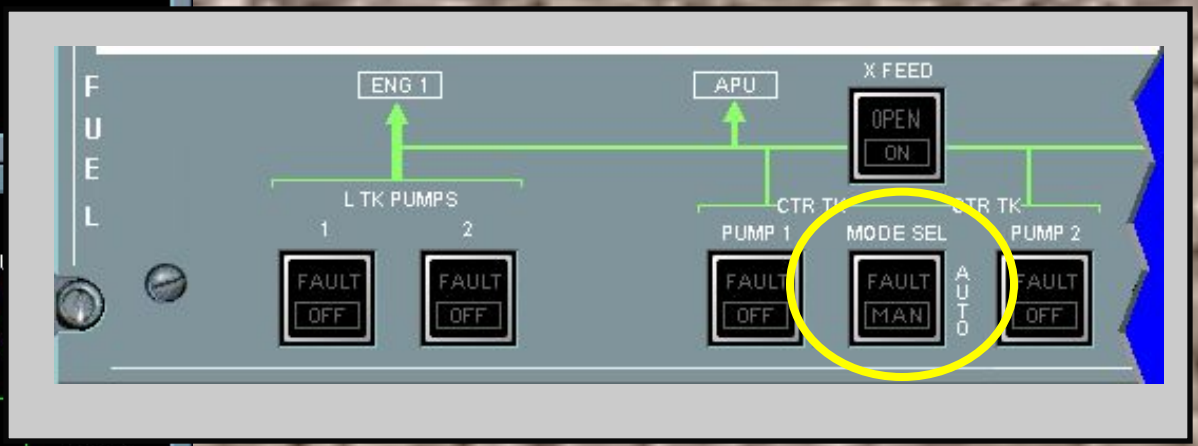


When we extend the slats, you will see one of the automatic functions of the center tank pumps.

Notice that the MODE SEL pb sw is set to AUTO.

No. Click on the FLAPS lever.





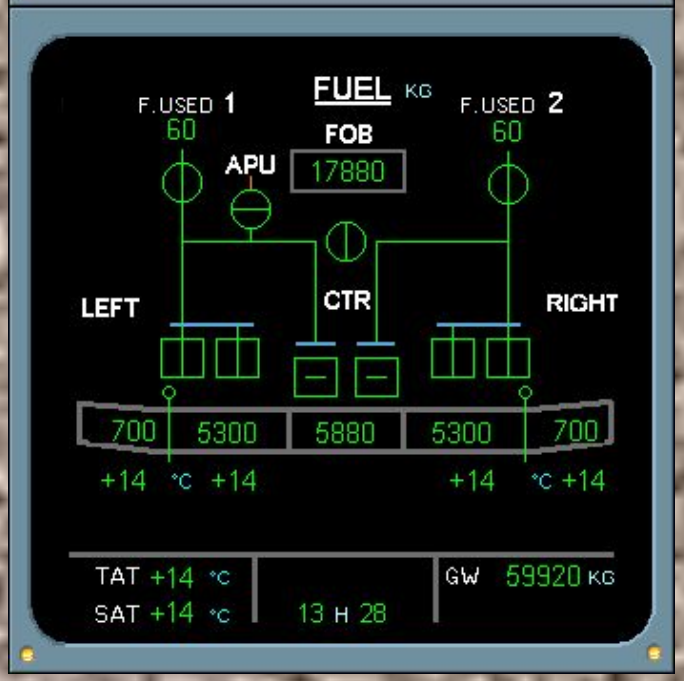
When we extend the slats, you will see one of the automatic functions of the center tank pumps.

Notice that the MODE SEL pb sw is set to AUTO.

No. Click on the FLAPS lever.

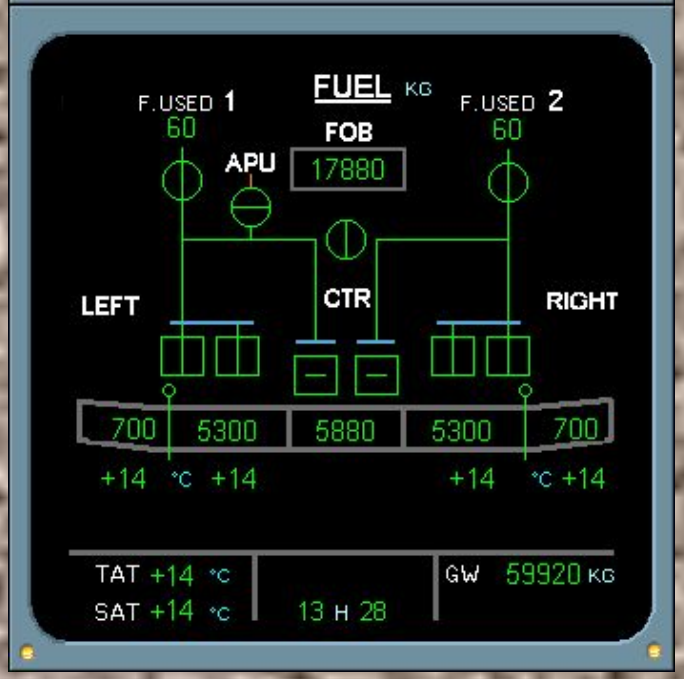

F.F KG/H
300 300
FOB : 17880 KG
FLAP
S
F
1+F


2
3
FULL
2
3
FULL
FLAPS

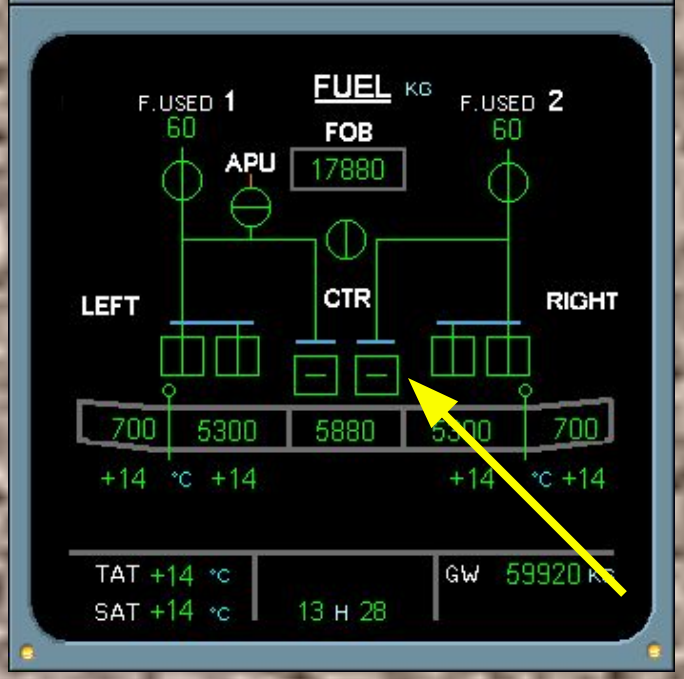

FUEL KG
F.USED 1
60
FOB
F.USED 2
60
APU
17880
LEFT
CTR
RIGHT
700
5300
5880
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW 59920 KG


F.F KG/H
300 300
FOB : 17880 KG
FLAP
S
F
1+F

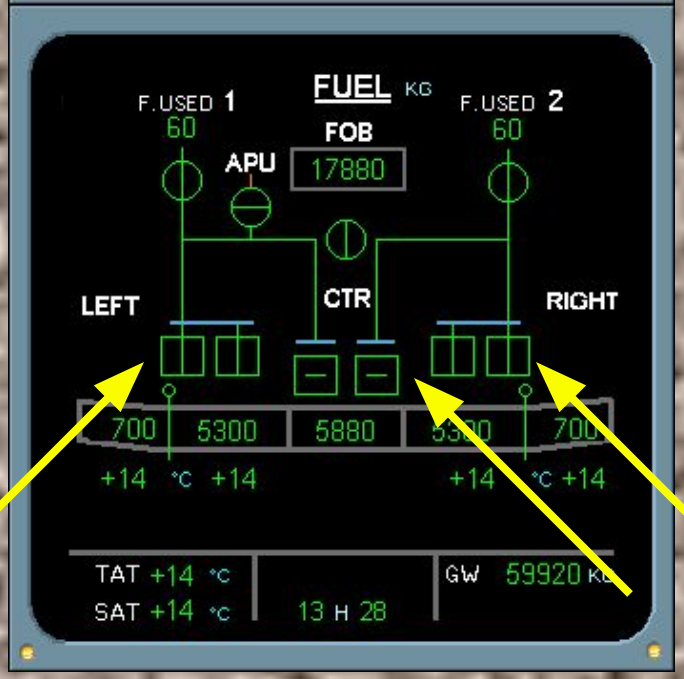

2
3
FULL
2
3
FULL
FLAPS


FUEL KG
F.USED 1
60
FOB
F.USED 2
60
APU
17880
LEFT
CTR
RIGHT
700
5300
5880
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW 59920 KG


F.F KG/H
300 300
FOB : 17880 KG
FLAP
S
F
1+F


FUEL KG
F.USED 1
60
FOB
F.USED 2
60
APU
17880
LEFT
CTR
RIGHT
700
5300
5880
5300
700
+14 °C +14
+14 °C +14
TAT +14 °C
SAT +14 °C
13 H 28
GW 59920 KG


FLAPS
2
3
FULL
2
3
FULL

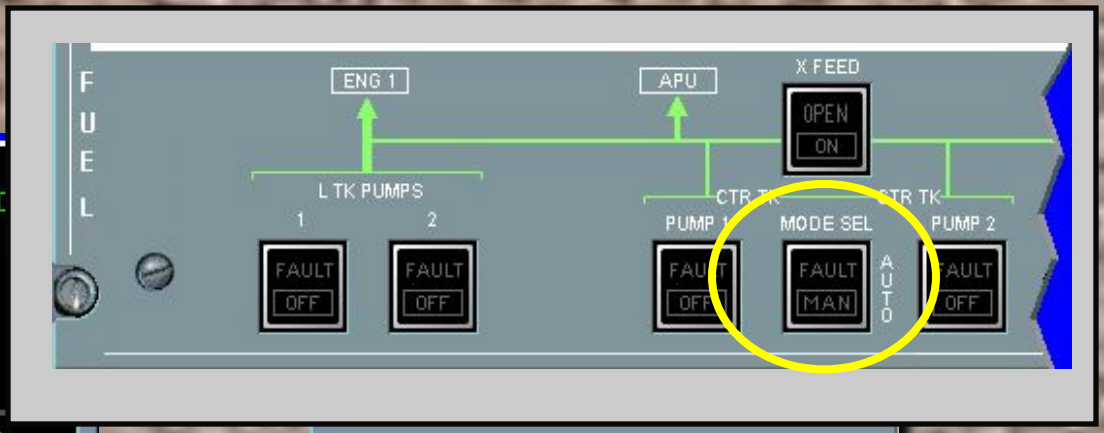


Observe :

- The flaps extending,
- The message CTR TK FEEDG disappears,
- On the ECAM FUEL page, the center tank pumps are cross-line green, indicating that they have stopped running automatically,
- The inner tank pumps now feed the engines for take-off.

The items related to TAXI are complete.

We will now discuss items related to the fuel system that you will encounter during normal climb, cruise and descent.

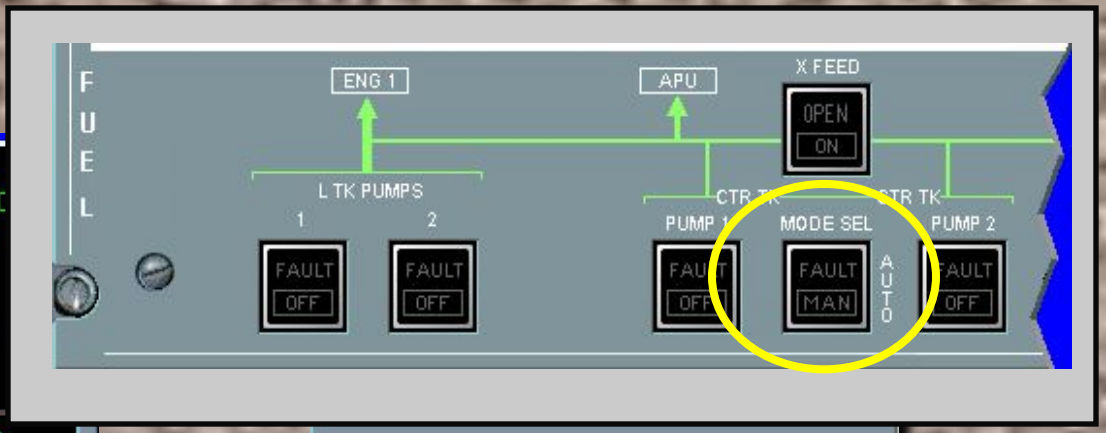


You are in climb, the slats are now retracted.

Observe the CTR TK FEEDG message reappears. This indicates (at slats retraction) the center tank pumps are again feeding the engines.

This is another automatic function of the center tank pumps with the MODE SEL pb in AUTO .

Select the ECAM FUEL page on the ECP.

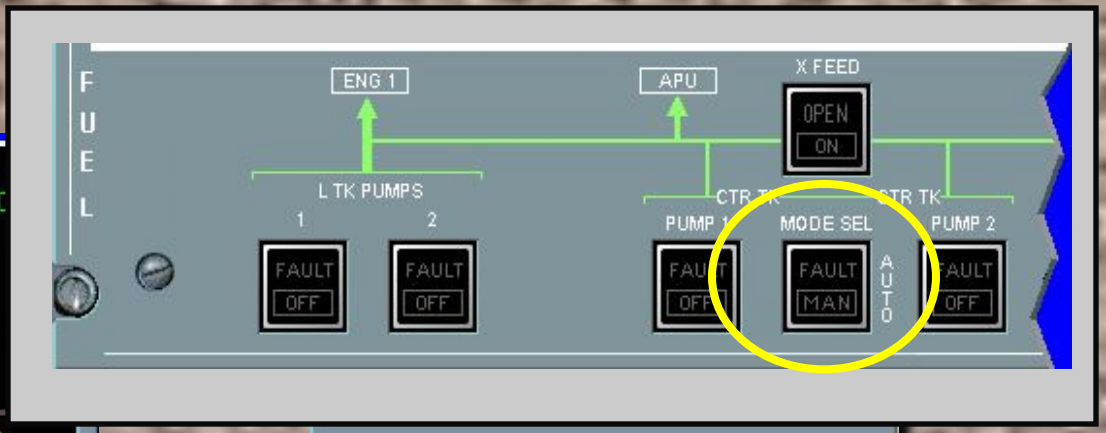


You are in climb, the slats are now retracted.

Observe the CTR TK FEEDG message reappears. This indicates (at slats retraction) the center tank pumps are again feeding the engines.

This is another automatic function of the center tank pumps with the MODE SEL pb in AUTO .

No. Press the FUEL key.

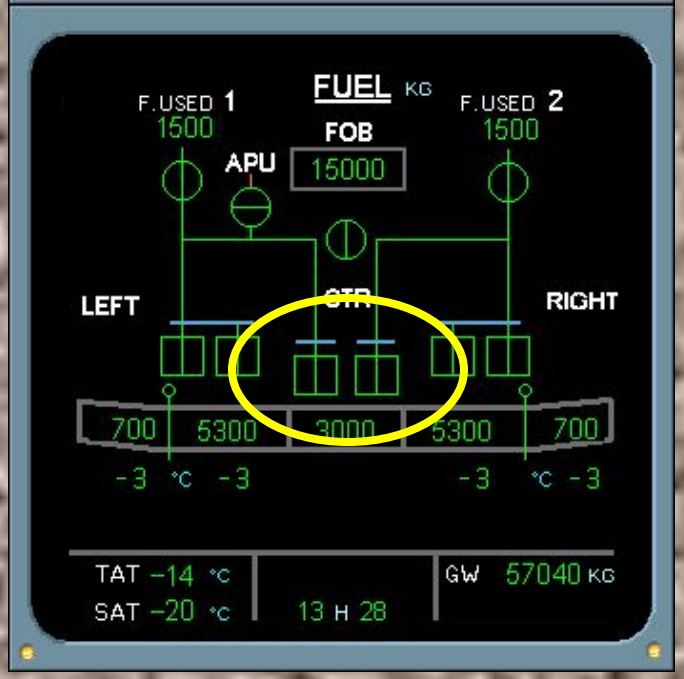


You are in climb, the slats are now retracted.

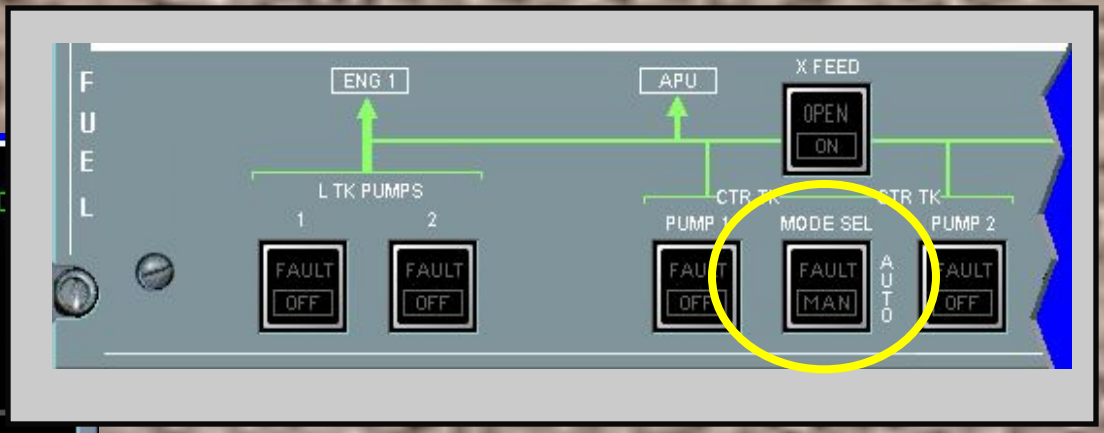
Observe the CTR TK FEEDG message reappears. This indicates (at slats retraction) the center tank pumps are again feeding the engines.

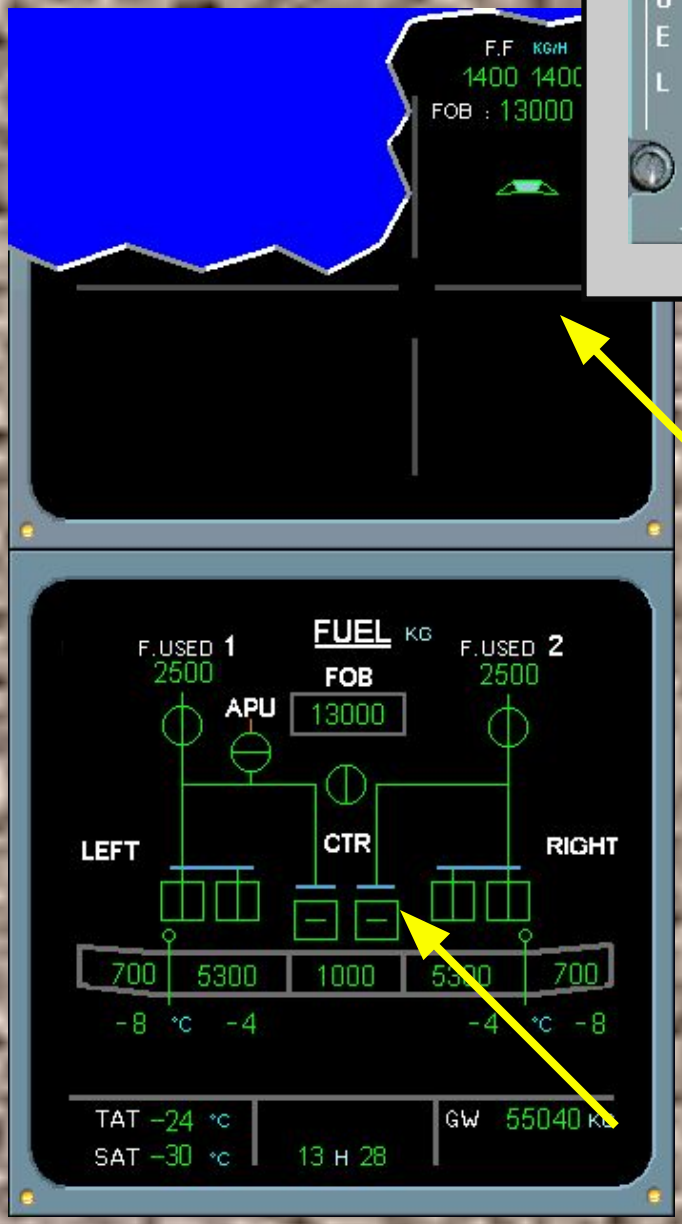
This is another automatic function of the center tank pumps with the MODE SEL pb in AUTO .

No. Press the FUEL key.



Observe the corresponding pump indications on the ECAM (in-line green).

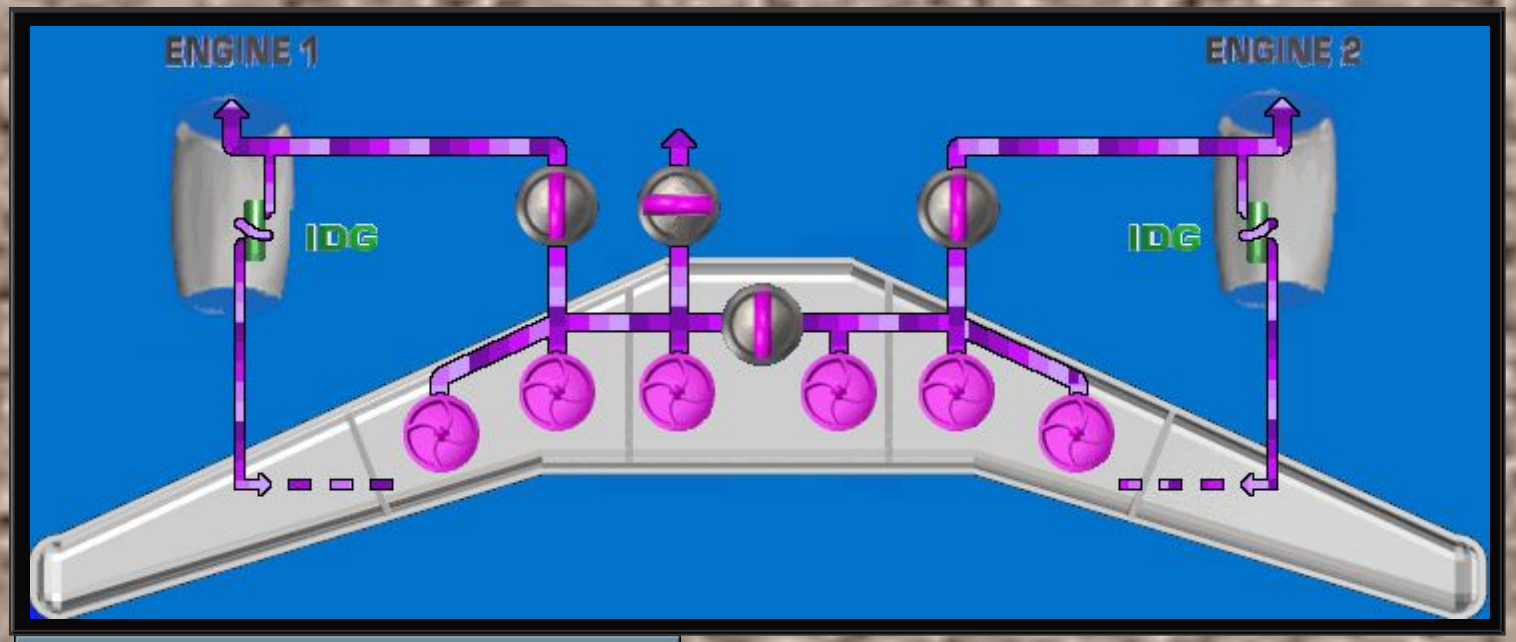


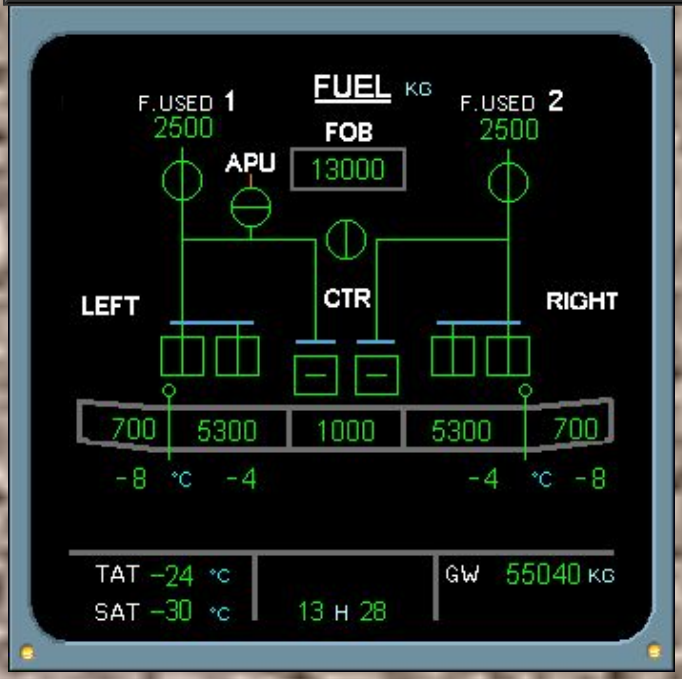


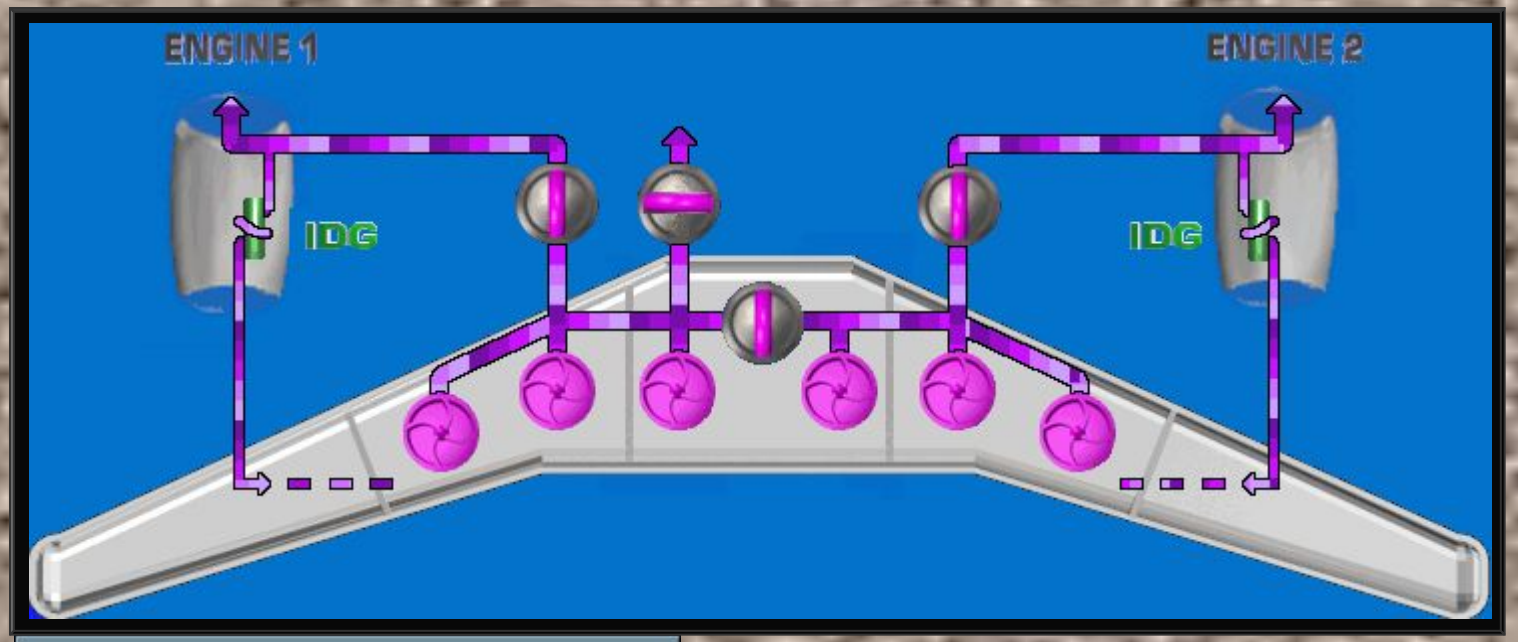
You are now in cruise.

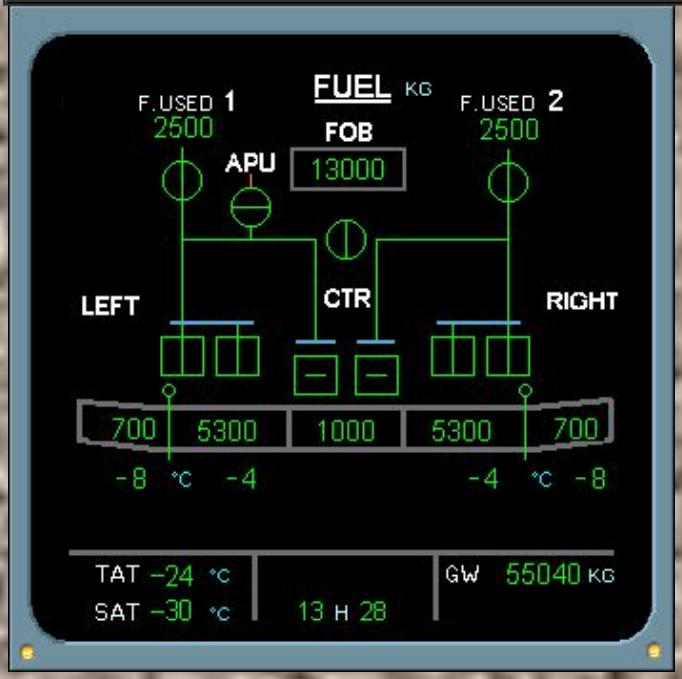
Notice the CTR TK FEEDG message has again disappeared indicating that the center tank pumps have automatically shut off. However the center tank is not empty and an AUTO function has again occurred.

To explain why, we must look at fuel recirculation.


ENGINE 1
ENGINE 2
IDG
IDG


FUEL KG
F.USED 1
2500
F.USED 2
2500
FOB
13000
APU
LEFT
CTR
RIGHT
700
5300
1000
5300
700
-8 °C -4
-4 °C -8
TAT -24 °C
SAT -30 °C
13 H 28
GW 55040 KG

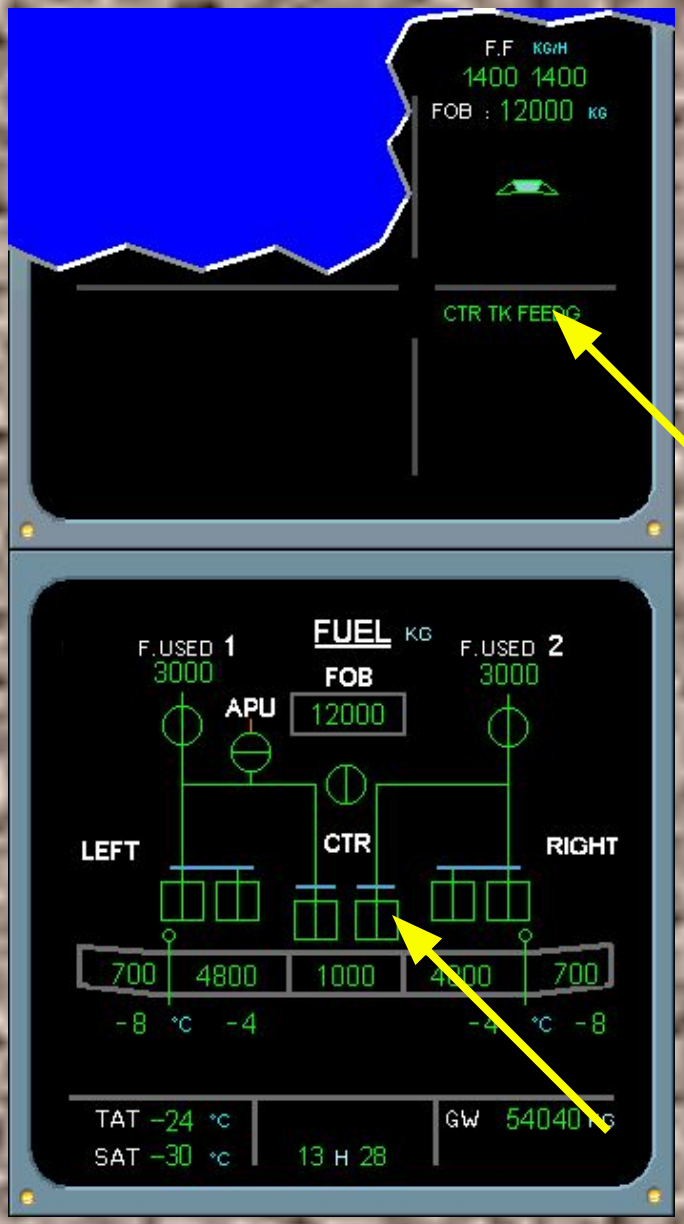




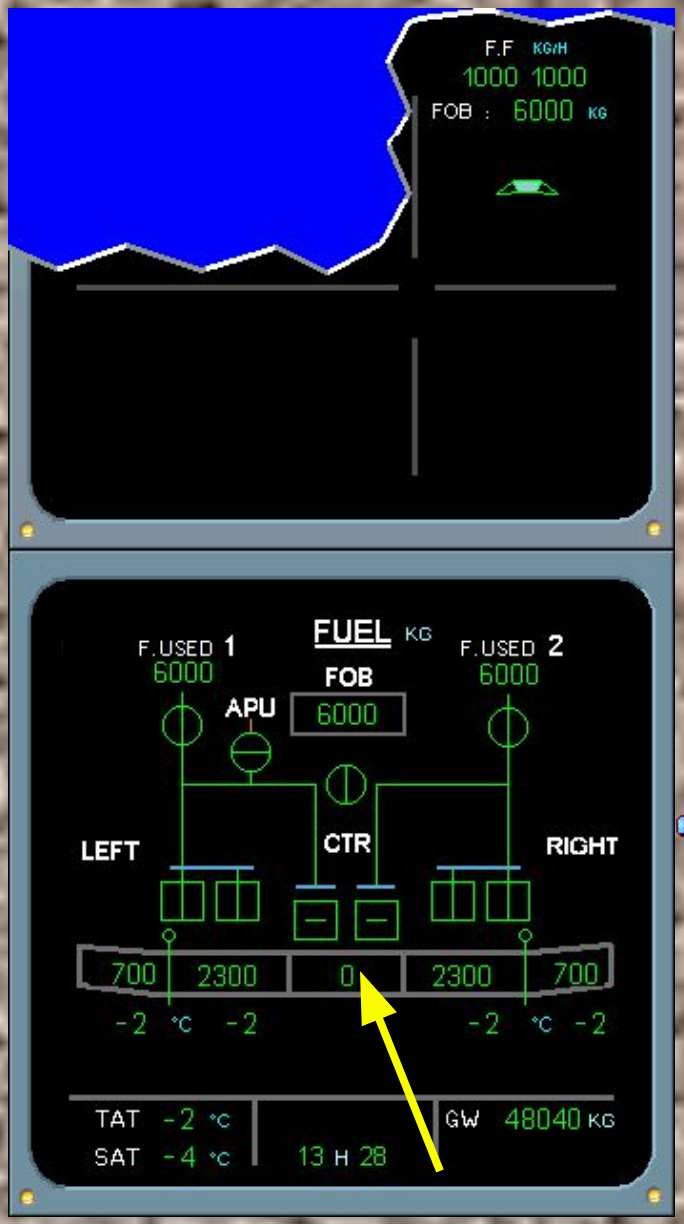
Some fuel to the engines is diverted to cool the Integrated Drive Generators (IDGs) then returns to the wing tanks.

If the engines are fed from the center tank and the wing tanks are full, the center tank pumps automatically shut off.

The inner tank pumps take over and feed the engines so that there is room for fuel from the IDGs.



After the inner tank pumps have fed approximately 500 kg of fuel, the center tank pumps automatically restart.



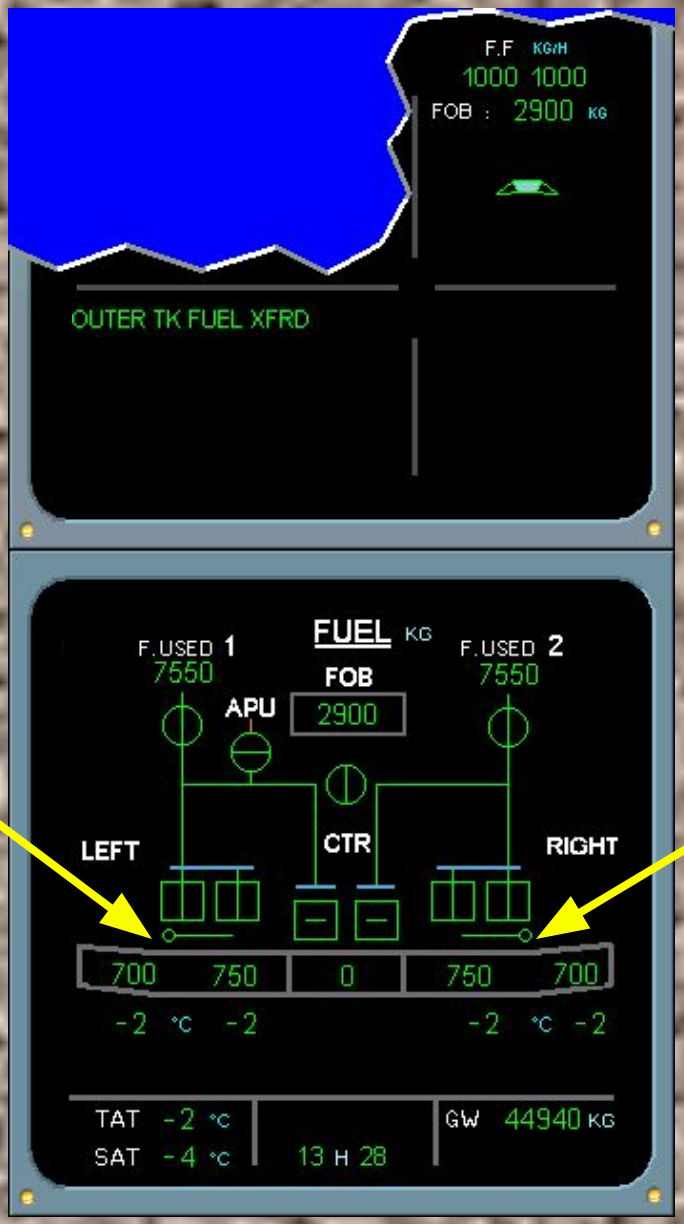
You are in descent.

To better illustrate the remaining indications, we will keep the ECAM FUEL page displayed.

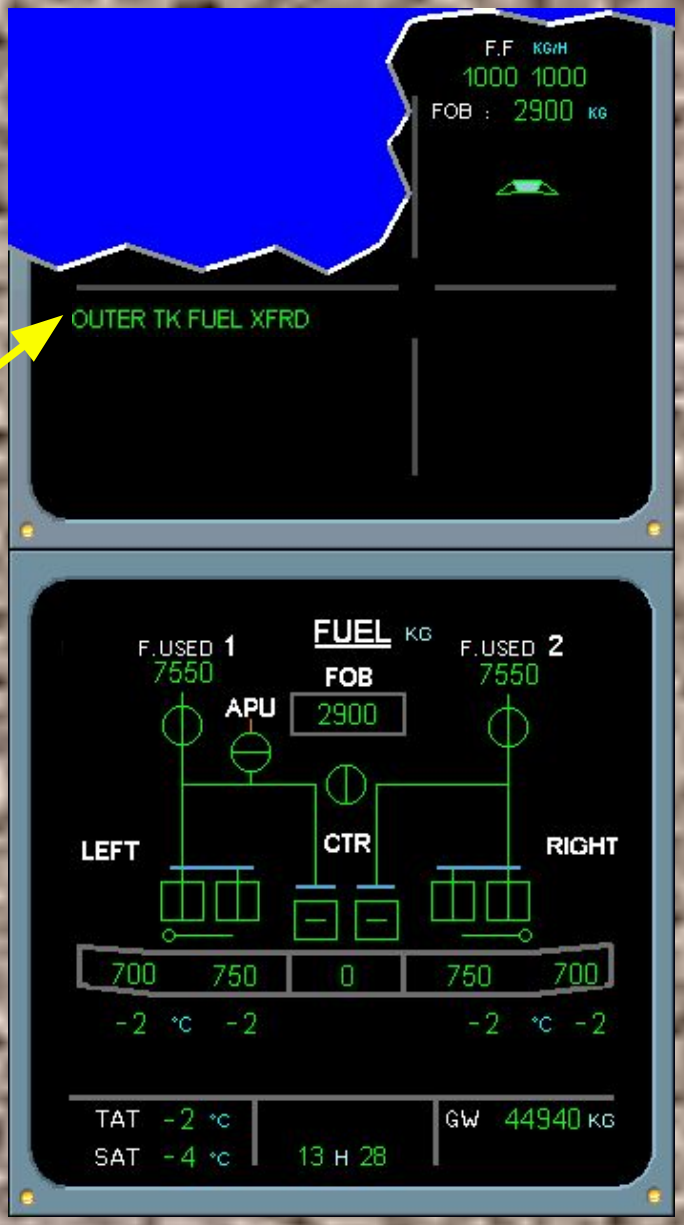
The center tank pumps have automatically shut off (cross- line green) because the center tank is empty.

The inner tanks are now again feeding the engines.

Let's see what happens when the inner tanks reach a low level.



When either inner tank reaches a low level limit, both transfer valves open automatically transferring fuel from the outer to the inner tanks.

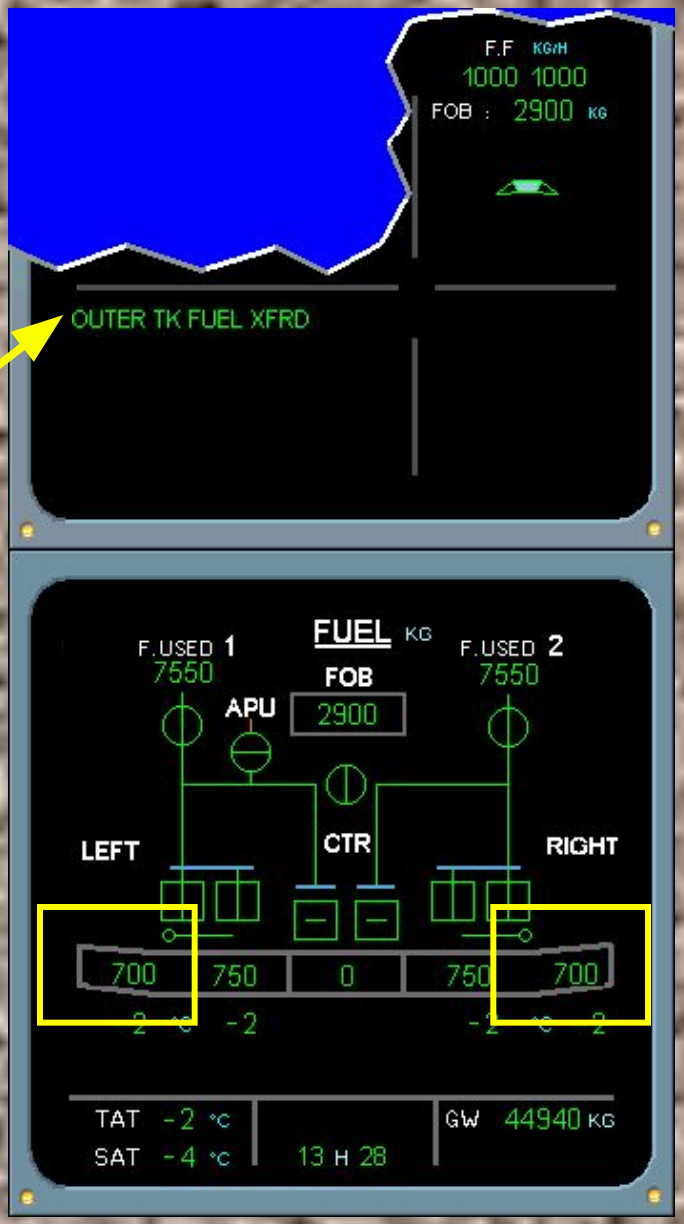


After at least one transfer valve is open, the message OUTER TK FUEL XFRD is displayed on the E/WD.

Click on either outer tank and observe the fuel transferring.

After at least one transfer valve is open, the message OUTER TK FUEL XFRD is displayed on the E/WD.

No. Click on either outer tank on the ECAM FUEL page.



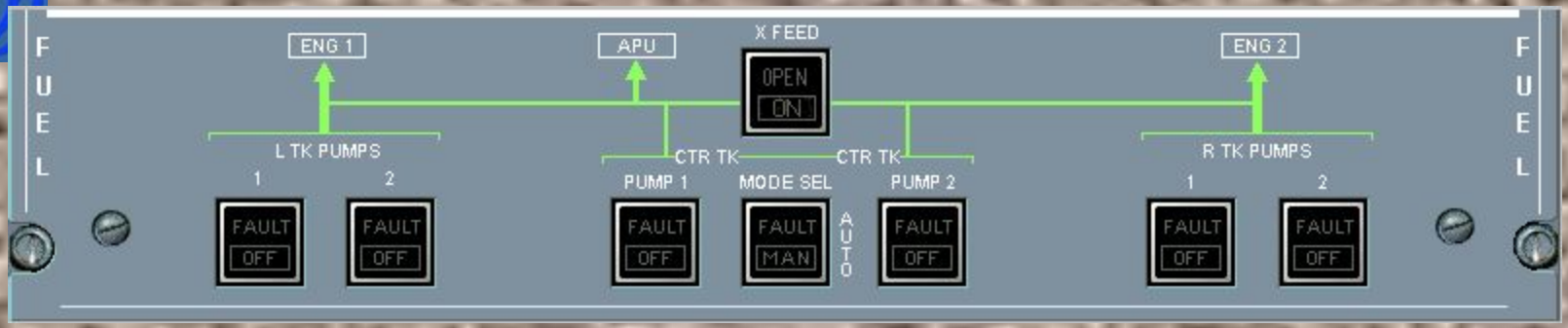
After at least one transfer valve is open, the message OUTER TK FUEL XFRD is displayed on the E/WD.

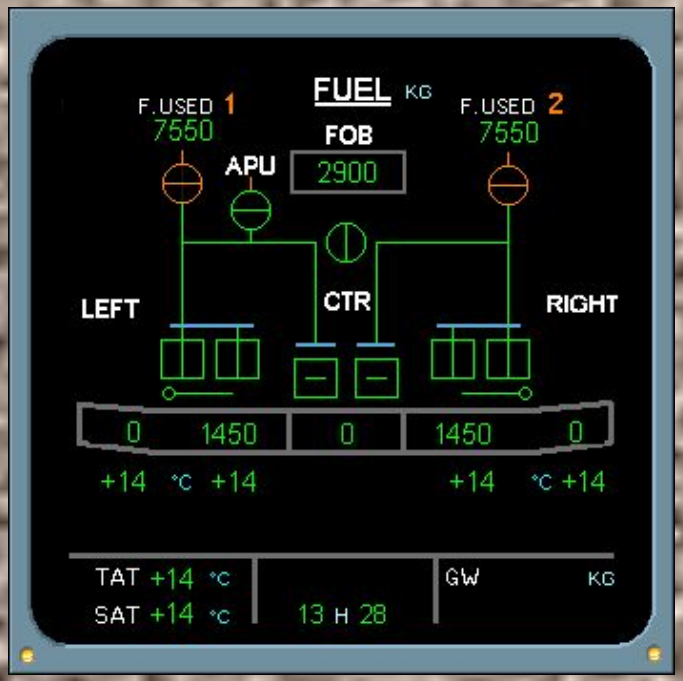
No. Click on either outer tank on the ECAM FUEL page.

The fuel is now totally transferred and the outer tanks are empty.

The items related to the fuel system during climb, cruise and descent are complete.

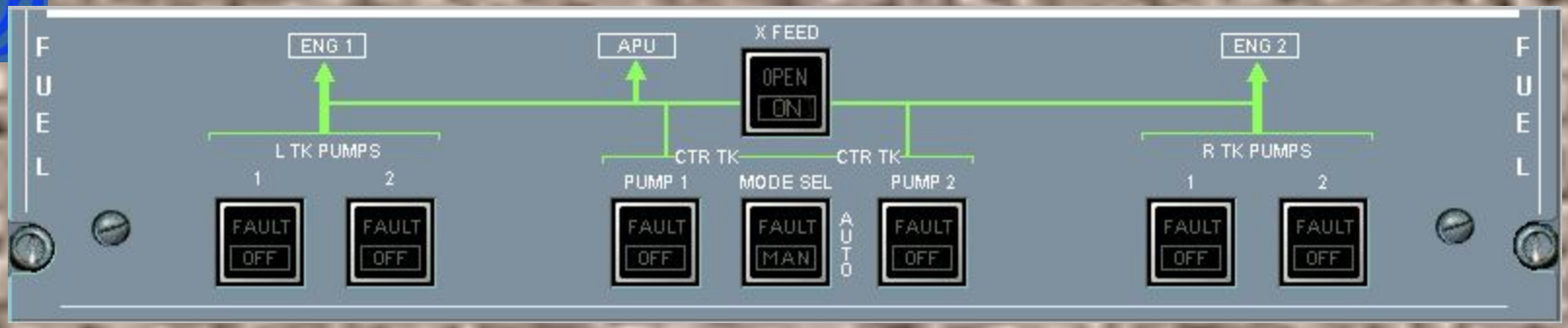
We will now discuss items related to the fuel system that you will encounter during post flight.

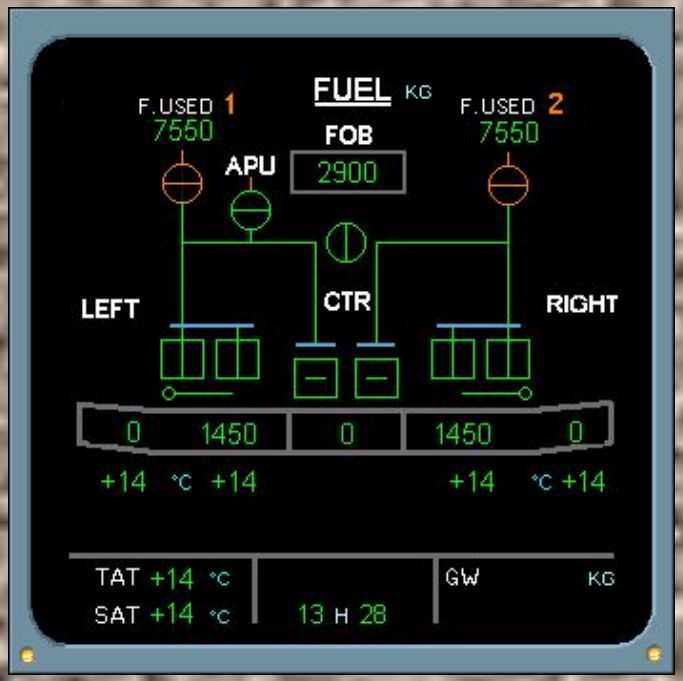




After the engines are shutdown, the fuel pumps are switched off.

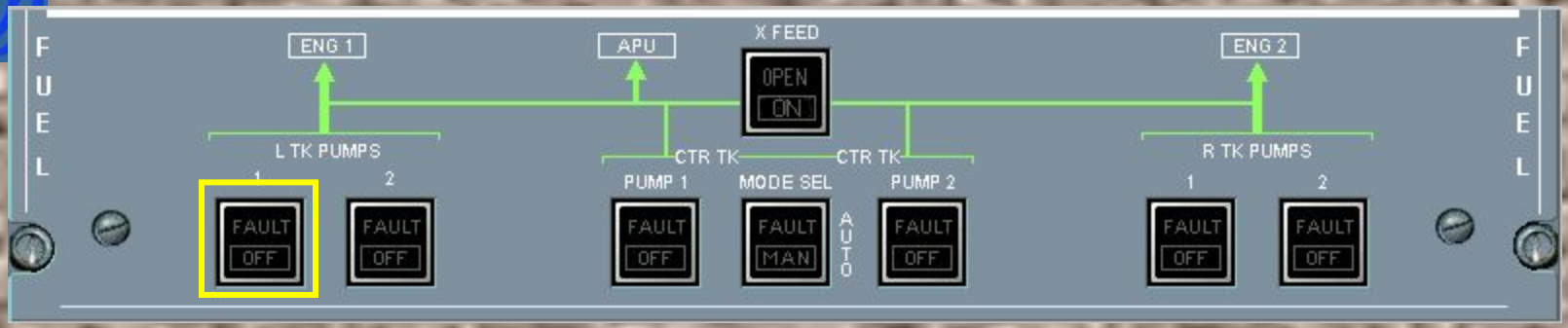
Switch off the left tank pump 1.

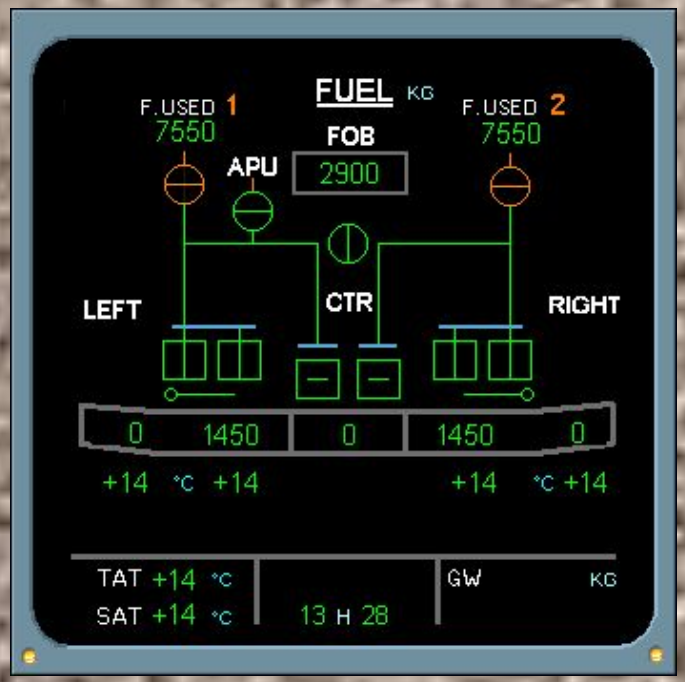




After the engines are shutdown, the fuel pumps are switched off.

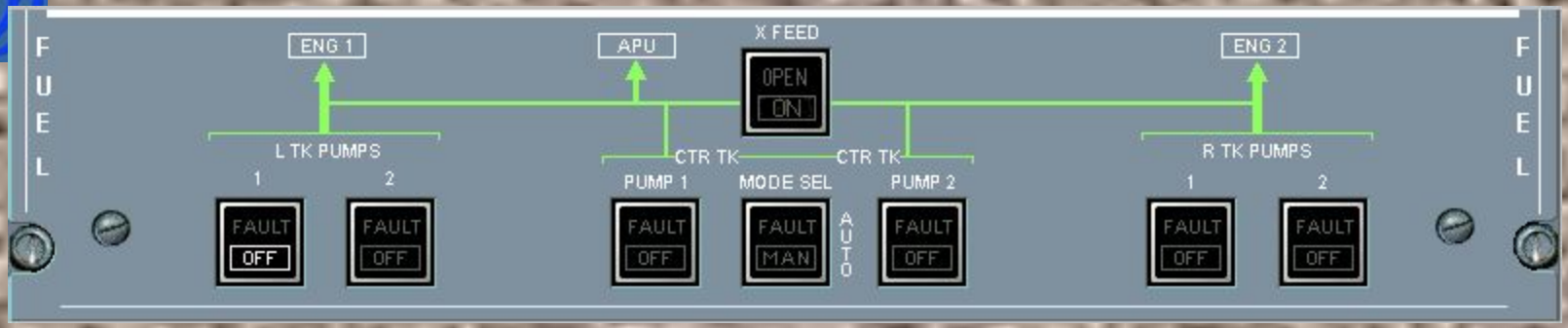
No. Press the L TK PUMP 1 pb sw.

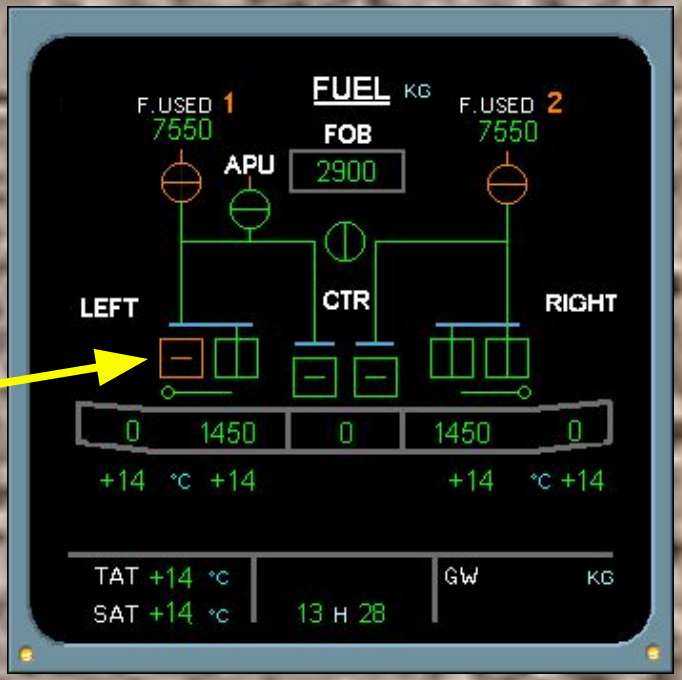




After the engines are shutdown, the fuel pumps are switched off.

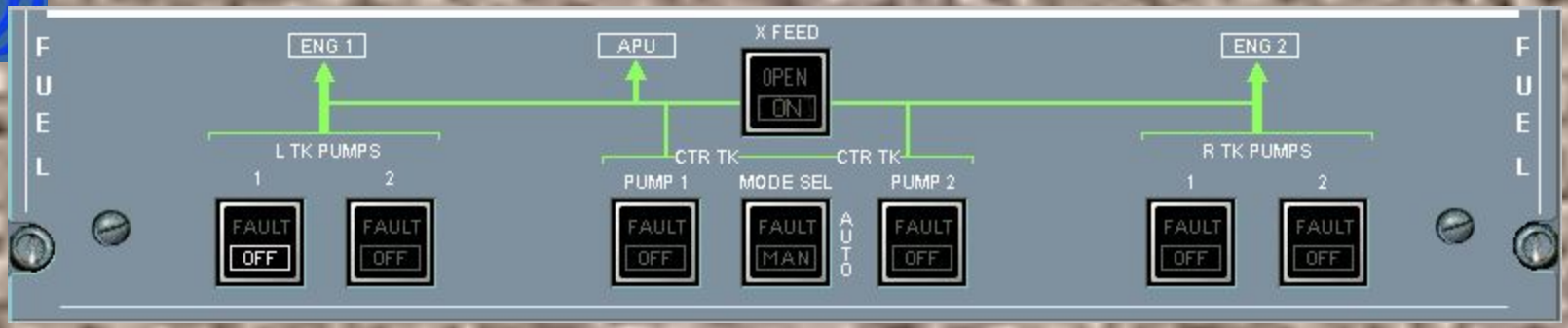
No. Press the L TK PUMP 1 pb sw.

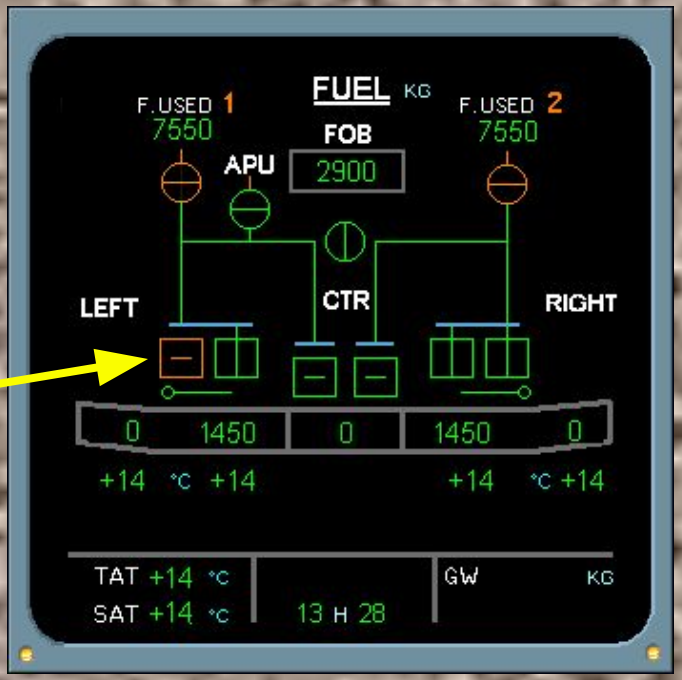




The left tank pump 1 is off, (cross-line amber).

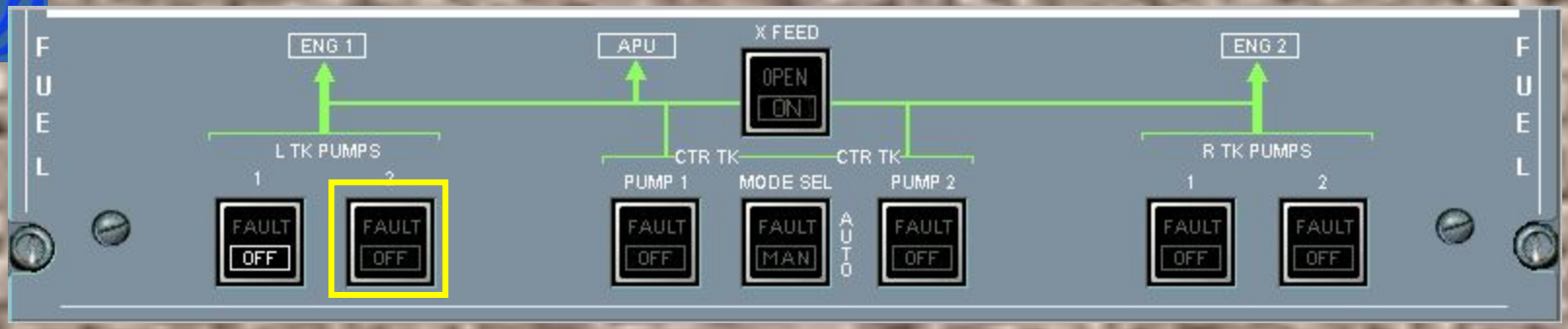
Continue by switching off the left tank pump 2.

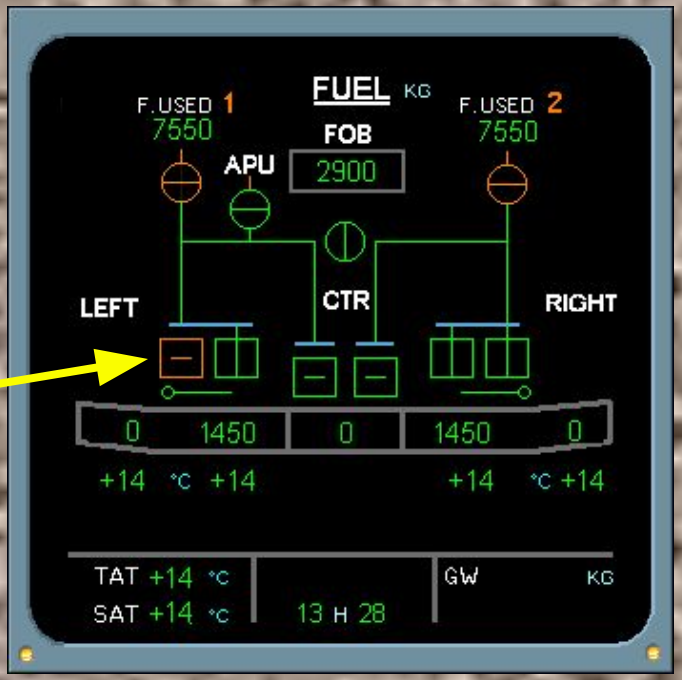




The left tank pump 1 is off, (cross-line amber).

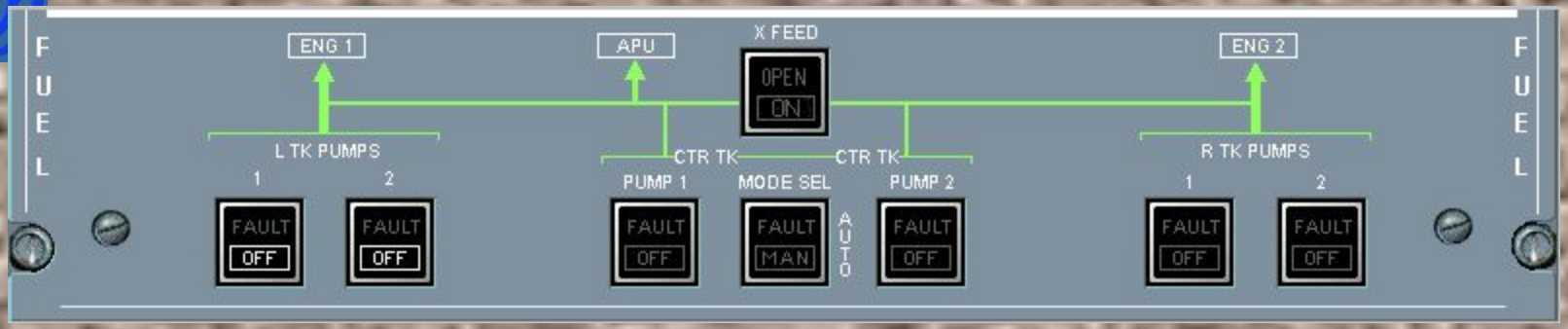
No. Press the L TK PUMP 2 pb sw.

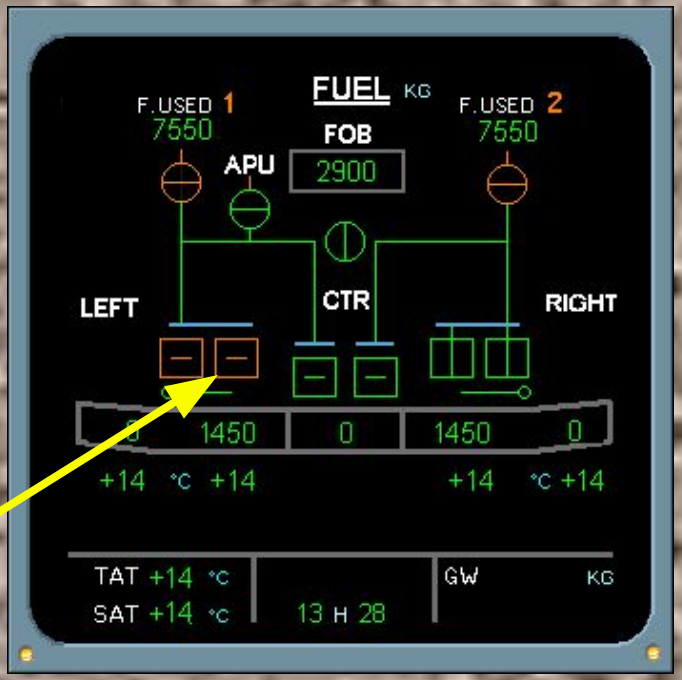




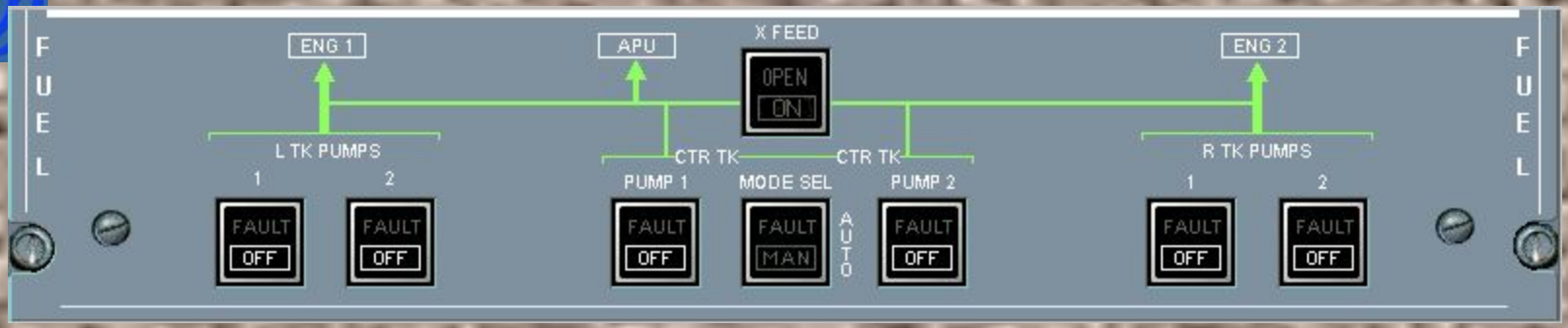
The left tank pump 1 is off, (cross-line amber).

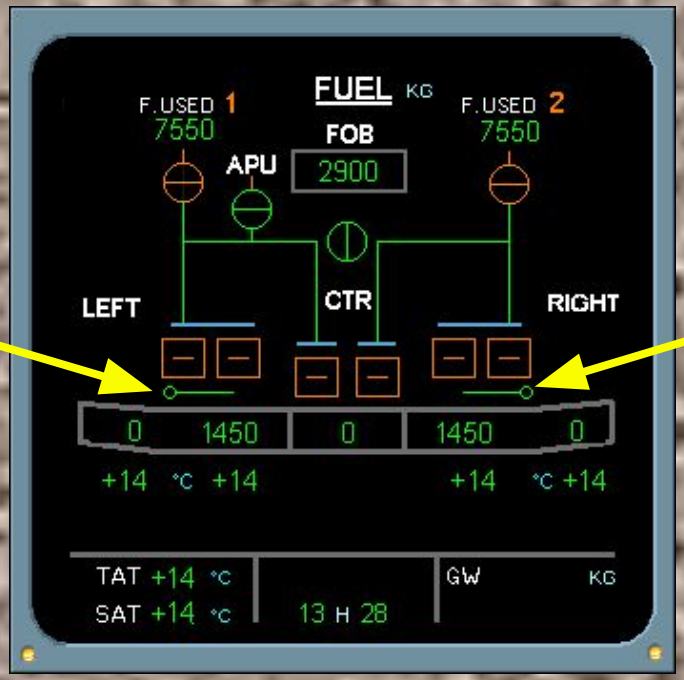
No. Press the L TK PUMP 2 pb sw.





Click on the forward arrow to finish swicthing the center and right tank pumps off.

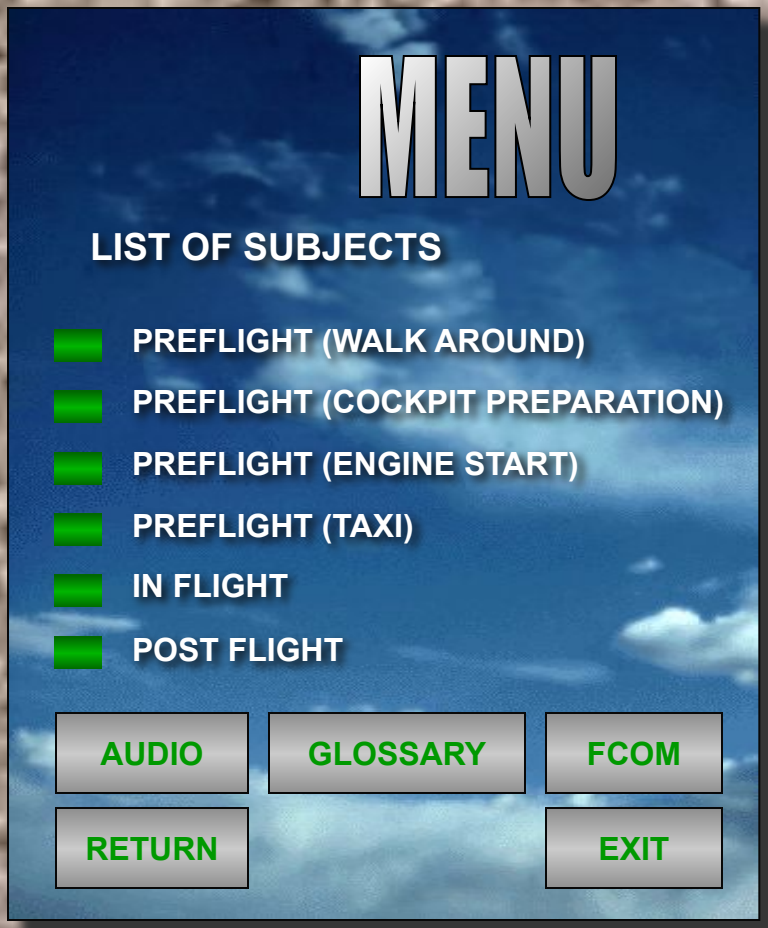




Observe the transfer valves remain open.

They will be automatically closed during the next refueling operation.

Module completed


MENU
LIST OF SUBJECTS
PREFLIGHT (WALK AROUND)
PREFLIGHT (COCKPIT PREPARATION)
PREFLIGHT (ENGINE START)
PREFLIGHT (TAXI)
IN FLIGHT
POST FLIGHT
AUDIO
GLOSSARY
FCOM
RETURN
EXIT