

Dual Hydraulic Failure **HYD G+Y SYS LO PR**

Before going into the complicated procedure it is worth looking at the Hydraulic Distribution Chart:

Hydraulics A320

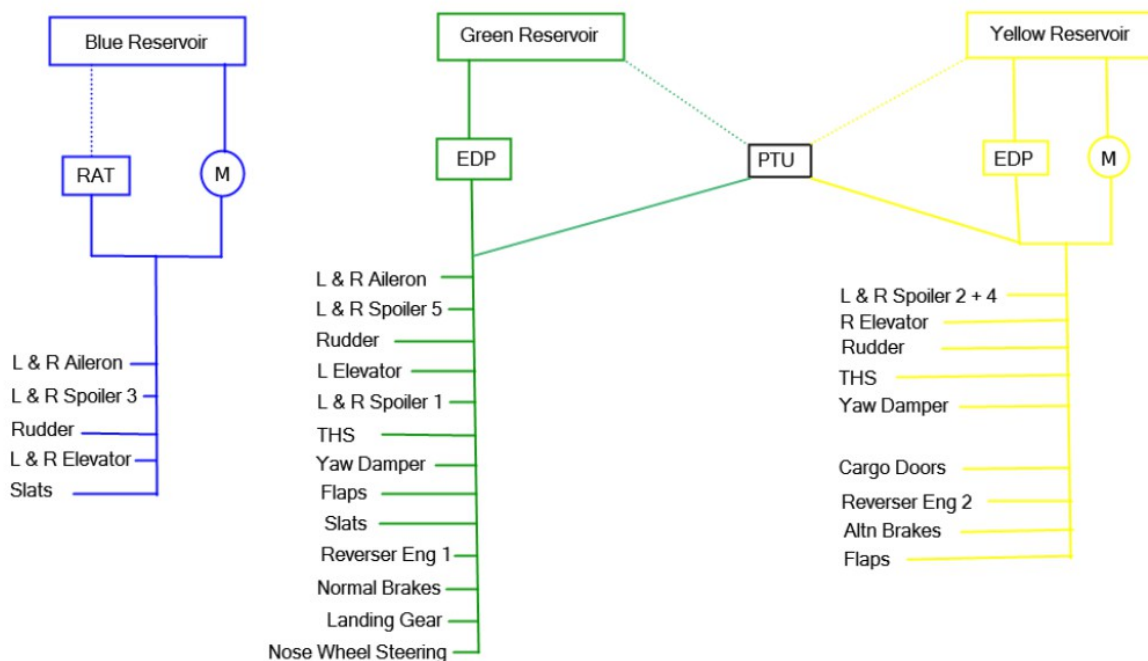
The Airbus A320 has three different hydraulic systems called GREEN, BLUE and YELLOW system. Each system has its own Reservoir and the normal system pressure is 3000 psi.

Green System: Is being pressurized by an Engine Driven Pump (EDP) which is connected to Engine N°1. Hence the Green EDP can only produce pressure when the engine is running.

Blue System: Is being pressurized by an electric pump. In an emergency the blue system can also be pressurized by the Ram Air Turbine (RAT).

Yellow System: Is being pressurized by an Engine Driven Pump (EDP) which is connected to Engine N°2. As a backup power source, an electric driven pump is also available on ground and is used for short term usage only. If this pump also fails, there is a handpump with which the cargo doors can be opened.

Power Transfer Unit: Is built in to allow system pressure transfer (not fluid transfer!) from the yellow to green system and vice versa.



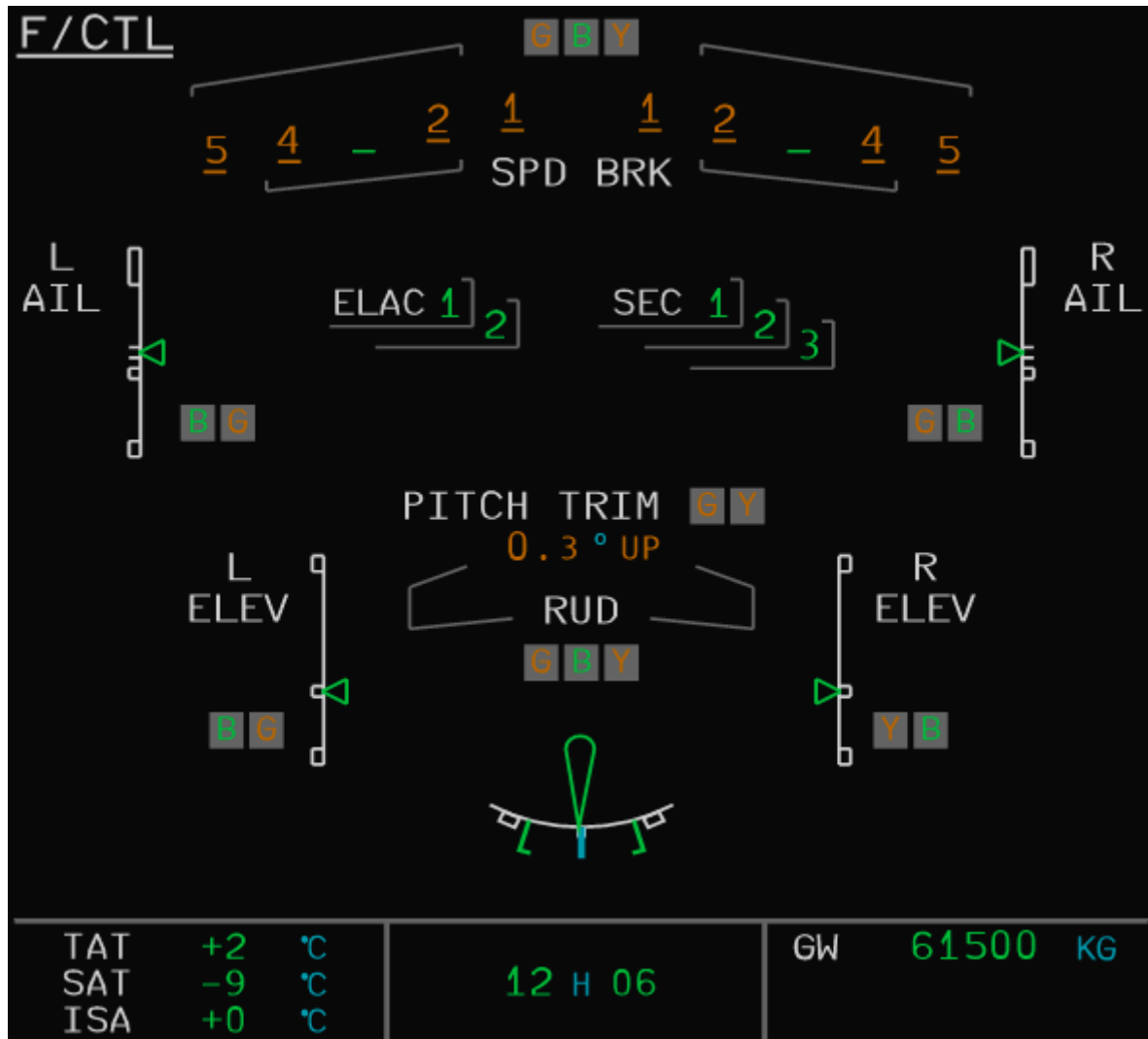
A dual hydraulic failure, especially the G + Y Sys Lo Pr means a lot of important systems fail. Flaps, Landing Gear, THS, Reversers, Nosewheel Steering, Normal and Alternate Brake System, Yaw Damper fail.

Luckily there are backup system available. The landing gear can be extended by gravity extension. Even though the Flaps are lost completely, the slats will be able to be extended by the remaining blue hydraulic system. One very important control surface, the Trimmable Horizontal Stabilizer (THS) is lost as well. However in Alternate Law there is the so called „Neutral-Reference“ being used by the ELAC, changing the position of the elevators to artificially „trim“ the aircraft. This function is lost however once the landing gear is lowered and the aircraft goes into direct law.

Going through this failure in the FSLabs A320 poses a huge challenge for a pilot, since the autopilot stops working and the aircraft going into alternate law. Also quite a few control surfaces are lost, making the aircraft feel different and somewhat sluggish.

For Flightsimulation use only!

In the F/CTL SD page you can see how certain flightcontrol servo actuators are inoperative. For example you can see that spoiler pairs 1,2,4 and 5 are inop. The ailerons and elevators are fully functional because each pair has a working blue hydraulic actuator. The THS is completely inoperative since both actuators lost their hydraulic power. The rudder is still functional because the Blue hydraulic actuator still has hydraulic power.



So how do we handle this particular dual hydraulic failure? As always we apply the basic principle:

1. Aviate
2. Navigate
3. Communicate

Aviate – Check active control law
 - Pitch, Power, speed, speedbrake
 - Optimum use of AP and A/THR

Navigate – terrain, altitude, navigation, radar vectors?

Communicate – Info ATC, Comm-Check, Mayday?

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Once that is completed, we verify the malfunction via the ECAM, Panels/Pushbuttons. Then we check if it is time critical. If it is we might do a preliminary decision making by flying towards a suitable airport.

Then we Perform the Procedure (Normally ECAM, sometimes however QRH)
 In our case with the G + Y hydraulic failure we do the ECAM procedure.

Once we get to the STATUS page we need to take a deep breath and not get overwhelmed by the amount of inoperative systems shown.

STATUS

<p>MAX SPEED.....320/.77 MAX BRK PR.....1000PSI MANEUVER WITH CARE</p> <p>-FOR LDG.....USE FLAP 3 -GPWS FLAP MODE.....OFF .WHEN CONF 3 AND VAPP: -L/G.....GRVTY EXTN APPR SPD : VREF + 25 KT LDG DIST PROC.....APPLY</p> <p>ALTN LAW : PROT LOST WHEN L/G DN : DIRECT LAW BRK Y ACCU PR ONLY SLATS SLOW</p>	<p style="text-align: center;"><u>INOP_SYS</u></p> <p>G+Y HYD F/CTL PROT STABILIZER REVERSER 1+2 SPLR 1+2+4+5 FLAPS YAW DAMPER AP 1+2 CAT 2 ANTI SKID N/W STRG NORM BRK AUTO BRK L/G RETRACT CARGO DOOR G ENG 1 PUMP</p>
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TAT +3 °C	12 H 06	GW 61400 KG
SAT -6 °C		
ISA +0 °C		

We start at the left side and go through the list of actions to be taken or limits to be respected. After that we look at the right side of the INOP SYS list and take note of all the inoperative systems.

Once that is completed we „Remove Status“ and start our Decision making.

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First we collect all the:

- FACTS:** - What minimum Runway Length do we need?
- What weather Minimums do we need?
- What minimum fire fighting/rescue service do we need?

Decision: - Since we need to land ASAP we use the first available option (airport) that allows a safe landing according to our fact finding

Execute: - We then fly the necessary procedure

It is advisable to first do a normal approach briefing followed by the abnormal briefing.

Here we would mention the following things:

- ALTN Law, when Landing Gear down DIR Law
- A/THR Off before DIR Law becomes active
- Stabilizer inoperative, so after Landing Gear down no more Elevator Neutral Reference
- Establish Config 3 first and Vapp (selected mode to avoid Gsmini)
- Then use Gravity Gear Extension Procedure (before G/S interception)
- Pitch will be higher due to missing flaps
- In case of GA, L/G retraction Inop, L/G Doors remain open
- In case of Landing, reverser inop, Nose Wheel Steering inop
- Accumulator Brake pressure only (max Brake Pressure 1000 PSI)
- After Landing we might need to go into Evacuation Procedure