Reference to Figure 52 Hydraulic System Distribution

ATA 29 HYDRAULIC

29–00 GENERAL

SYSTEM INTRODUCTION

Hydraulik System Overall Fluid Contents

Green System: ~100 ltr.
Yellow System: ~75 ltr.
Blue System: ~60 ltr.

HYDRAULIC SYSTEM RESERVOIR

Green System

Normal Fill Level: 14 Ltr. (3.7 US GAL)
Maximum gageable Level: 18 Ltr. (4.75 US GAL)
Low Level Warning: 3.0 (0.8 US GAL)

Blue System

Normal Fill Level: 6 Ltr. (1.6 US GAL)
Low Level Warning: 2.0 Ltr. (0.52 US GAL)
The Tank drain valve is not installed at the tank. It is installed at the Blue Ground Service Panel.

Yellow System

Normal Fill Level: 12 Ltr. (3.8 US Gal)
Low Level Warning: 3.0 Ltr. (0.8 US GAL).

All reservoirs are pressurized to 50 psi (3.5 bar).
It is possible to pressurize the reservoirs from a ground supply.The reservoir is filled with hydraulic fluid through the reservoir filling system.

ENGINE PUMP FIRE VALVE

The engine pump fire valve is installed in the wing between the rear spar and the rear false spar, inboard of the pylon. The FIRE pushbuttons in the flight compartment control electrical power supply to the motor. When the valve closes it stops fluid supply to the EDP

ENGINE DRIVEN PUMP

Normal output pressure: 3000 ±200 psi at 140 ltr/min. A solenoid valve (controlled from the flight compartment) makes it possible to change the operation of the pump in order not to supply pressure into the system (depressurized mode). In the depressurized mode the outlet of the pump is connected internally directly to the inlet of the pump. The pump then operates with an internal pressure of approximately 1000psi (70 bar), with zero flow.

SYSTEM ACCUMULATOR

The accumulator has a total volume of 1L (0.26USGAL) and the gas precharge pressure is 130bar (1885 psi).

ELECTRIC PUMPS

Normal Output Pressure: 3000 ±200 psi at 25 ltr/min. An overheat signal is sent to SDAC by an internal temperature switch above 162°C.

Blue Electrical Pump

The blue electrical pump starts automatically when any one of the engines runs (N2 speed signal). It then operates continuously until the two engines are stopped. A P/BSW in the flight compartment makes it possible for the crew to stop the electric pump.
It is also possible to pressurize the system with the electric pump when the engines are stopped. A P/B SW on the maintenance panel 50VU in the flight compartment overrides the automatic function and starts the electric pump.

Yellow Electrical Pump

Operation of the yellow electrical pump P/B SW on the overhead panel (40VU) controls the electrical pump. When the P/B SW is pressed and released, the ON light comes on and the electric pump starts. At the same time the lower display unit of the ECAM shows the operation of the pump (if HYD page is selected). It is also possible to start the electric pump from the cargo door operating panel. In this case the PTU is inhibited and the yellow leak measurement solenoid valve is closed.

POWER TRANSFER UNIT (PTU)

The PTU enables the green system to be powered by the yellow system or vice versa, without fluid transfer. In flight, with only one engine running, the PTU is automatically activated when the differential pressure between the green and yellow system is higher than 500 psi (34 bar). On ground, when the engines are shut down, the PTU allows the green system to be pressurized using the yellow electrical pump. Since the PTU function depends on differential pressure it is controlled by solenoid valves.

RAM AIR TURBINE (RAT)

A Ram Air Turbine, which extends automatically in the event of both AC Busses are powerless, allows the blue hydraulic system to be pressurized.

NOTE: RAT delivered pressure is 2500 psi at 70 ltr/min. Automatic deployment is inhibited on ground. Manual operation from the cockpit is always possible.

NOTE: RAT stowage is possible on ground only.

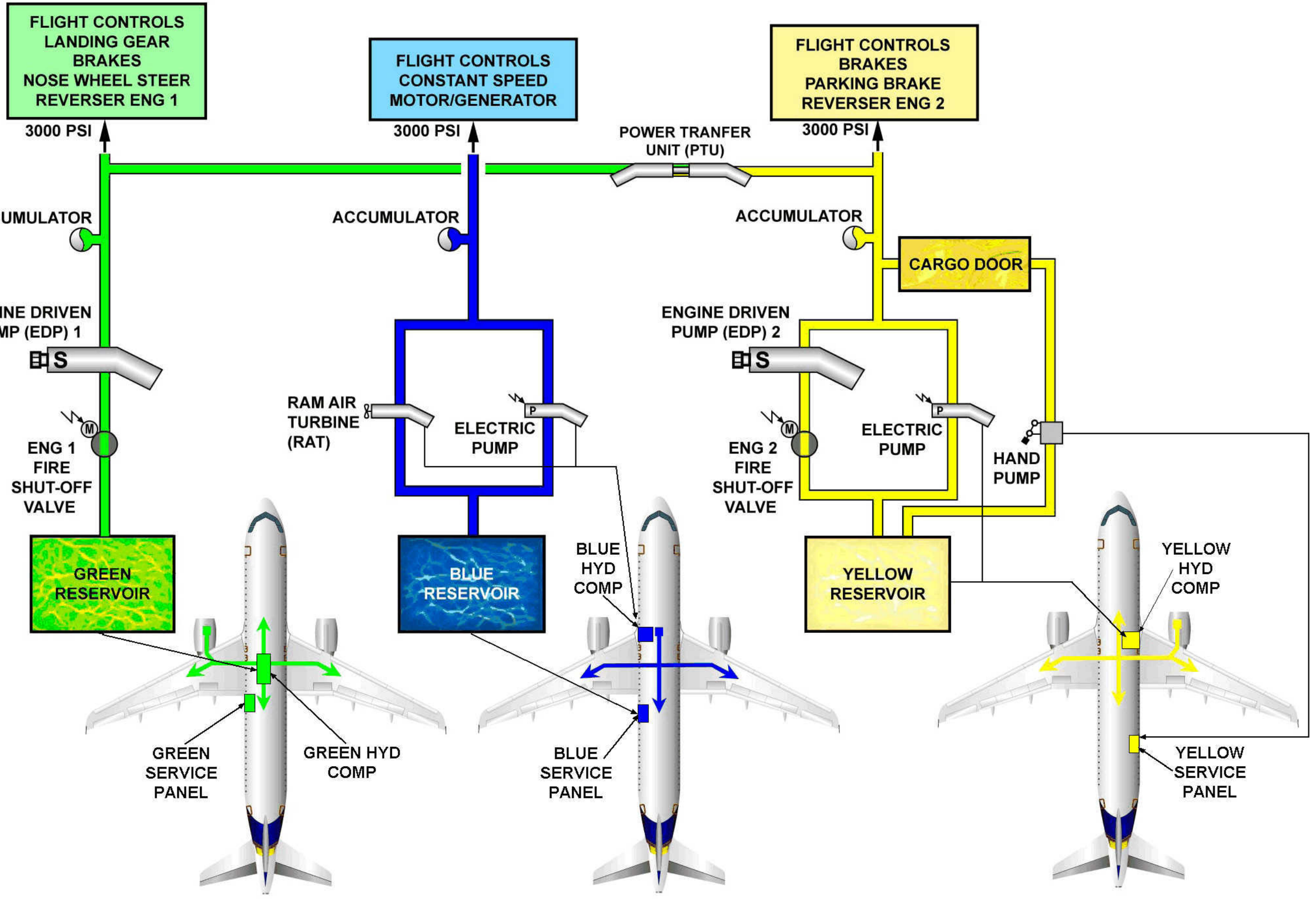


Figure 52 Hydraulic System Distribution

Reference to Figure 53 Hydraulic System Distribution

SYSTEM DESCRIPTION

Manifolds

There are three manifolds in the system:

- HP (**H**igh **P**ressure) Manifold
- PTU (**P**ower **T**ransfer **U**nit) Manifold
- LP (**L**ow **P**ressure) Manifold

Engine Pump Low Pressure Switch

When the pressure falls below 1740psi (120bar) the switch contacts close.

PTU Solenoid Valves

Two solenoid valves (one in each system) keep the PTU either armed or off. The solenoid valve of the Green system is connected to the Green PTU manifold. The solenoid valve of the Yellow system is connected to the Yellow PTU manifold. The two solenoid valves operate at the same time. The PTU switch on the overhead panel (40VU) controls the solenoid valves. The Power Transfer Unit (PTU) will not operate if the Yellow electric pump is in operation to close the cargo doors, or the aircraft is on the ground, only one engine is in operation and the parking brake is ON, or the aircraft is on the ground, only one engine is in operation, the parking brake is OFF and the nose wheel steering is deactivated, the PTU P/BSW on panel 40VU is set to OFF.

NOTE: In addition the FWC does a check of the PTU during engine start. If the MSW of ENG 1 (2) is ON and the MSW of engine 2 (1) is OFF, the PTU is inhibited. As soon as the MSWs of ENG 1 and 2 are in the ON position, the PTU is no longer inhibited. If there is now a difference in the green and yellow hydraulic system of more than 650 psi for at leat 4 sec., the ECAM shows a PTU fault indication.

Isolation Coupling

A isolation coupling is installed in the Yellow system supply line. It is a quick-release coupling which seals automatically when it is disconnected. It also has a ratchet lock to keep it connected.When the isolation coupling is disconnected (during ground maintenance operations only), there is no transfer of power.

Reservoir Quantity Indicator and Transmitter

Each reservoir has a gage transmitter which gives a visual indication and sends electrical signals to show the fluid contents. The unit is a float assembly connected mechanically to a synchro transmitter. The pointer of the mechanical contents gage is connected to the synchro transmitter. The synchro transmitter sends signals to the ECAM system and to the reservoir quantity indicator on the Green ground service panel. A Caution is generated when the transmitter data show that the contents are below the low level switch threshold. The SDAC makes the warnings occur when the content of the reservoirs are 2.5 Ltr. (Green and Yellow reservoirs) or 1.8 Ltr. (Blue reservoir). In this case, there will be no FAULT indication on the overhead panel PB.

Low Level Switch

The float operates the switch at a specified level (between 2.0 and 2.3 Ltr. in the Blue reservoir and between 2.6 and 3.4 Ltr. in the Green and Yellow reservoirs), and shows that the fluid contents are dangerously low. The low level switches send signals to the ECAM system and to the overhead panel.

Temperature Transmitter

Each temperature transmitter has three sensors together in one unit. Two are transducers for an optional temperature indication on ECAM. One is a switch which leads to an OVHT(>95˚C) on the ECAM SD plus Caution and PB Fault.

Depressurization Valve

Each hydraulic reservoir can be depressurized independently on the applicable ground service panel with the depressurization valve. Turn the cap of the reservoir depressurization valve counter-clockwise through 90°.This allows the air pressure venting through the valve to the atmosphere.

WARNING: WHEN OPENING THE MANUAL DEPRESSURIZATION VALVE OF THE RESERVOIRS, HOT HYDRAULIC CONTAMINATED GAS MAY DISCHARGE.

Air Pressure Gage

Shows reservoir pressure.

NOTE: If the system pressure is more than 76.85 psi, the pressure relief valve opens.

Reservoir Air Pressure–Switches

If the pressure decreases to less than 22 psig the contacts of the pressure switch close. A discrete signal is sent to the two SDAC which causes the ECAM system to show the applicable warnings. A discrete signal which causes the applicable FAULT lights to come on, is also sent to the overhead panel.

ENGINE RUNNING

MAINTENANCE PANEL (50VU)

BLUE PUMP OVRD
ON

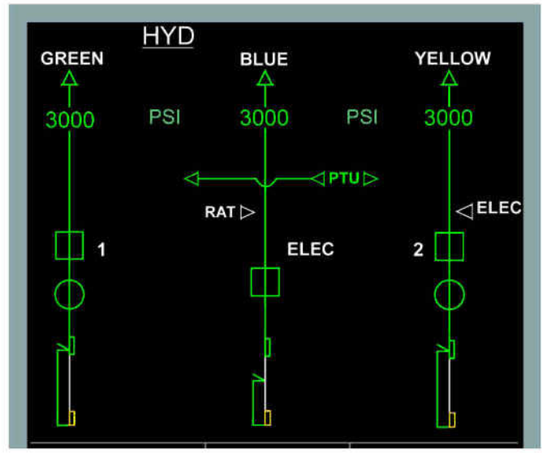
GREEN
BLUE
YELLOW
RAT MAN ON
ENG 1 PUMP
ELEC PUMP
PTU
ENG 2 PUMP
ELEC PUMP
FAULT
OFF
ON
AUTO
HYD

(40VU)

OR
AND

LEGEND
- BSV BRAKE SELECTOR VALVE
- RETURN FILTER
- HP MANIFOLD INCL. HP FILTER
- PTU MANIFOLD
- PT PRESSURE TRANSMITTER
- PS PRESSURE SWITCH

USERS
PS
PT
ACCUMULATOR
ENG1 HP BLEED AIR
LP SWITCH
PNEUMATIC SYSTEM
RESERVOIR PRESSURIZATION MANIFOLD
EDP1
ENG 1 FSOV
GROUND CONNECTOR
RAT
ELEC PUMP
ISOL. COUPLING
BSV
PTU
MP
CARGO DOOR
HAND PUMP
HP GROUND CART
EDP2
ENG 2 FSOV
ELEC PUMP
LOW LEVEL SWITCH
TEMP SENSOR
RESERVOIR FILLING SELECTOR VALVE
COUPLING SOCKET
HAND PUMP
DEPRESSURIZATION VALVE



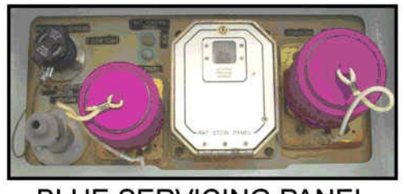
SYSTEM DISPLAY

MAINTANCE PANEL (50VU)

RESERVOIR AIR PRESSURE GAGE

RESERVOIR QUANTITY INDICATOR AND TRANSMITTER

GREEN SERVICING PANEL



BLUE SERVICING PANEL

YELLOW SERVICING PANEL

Figure 53 Hydraulic System Distribution

Reference to Figure 54 Hydraulic System Distribution

SYSTEM OPERATION

1 – 12 see Panel Description Schematic

13 **Overpressure Relief Valve**

Opens >3500 psi, closes <3200 psi.

14 **Priority Valve**

Opens >2200 psi, closes <1800 psi.

15 **Pressure Transmitter**

Signal to SDAC for indication and to ELAC.

16 **System Pressure Switches**

Signals to FWC for ECAM Warning, to BSCU for brake mode selection and to ELAC, SEC and FAC.

17 **Normal Brake Selector Valve**

Activated by BSCU if Normal Brake is available.

18 **Quick Disconnect Coupling**

Deactivates PTU function for maintenance.

19 **System Pressure Switches**

Signals to FWC for ECAM Warning and to ELAC, SEC and FAC.

20 **System Pressure Switches**

Signals to FWC for ECAM Warning and to ELAC and SEC.

21 **Ground Leakage Measurement Manifold**

Includes three manually operated 2/2 way valves. They are only selected to open for ground maintenance tasks.

22 **Alternate Brake Manifold**

Includes a pressure transmitter for the accu fluid pressure indication on the triple indicator and a manual relief valve to release the fluid pressure into the return system.

23 **Pulsation Damper**

To reduce pressure vibrations. Only installed in Blue System.

24 **Second Low Pressure Switch (RAT Config. 1 only)**

For additional low air pressure warnings (<30 psi).
The warnings are signalled only in flight phases 5, 6 and 7. Then memorized only and indicated only in flight phases 8, 9 and 10.

25 **Ground Check Module (RAT Config. 1 only)**

To isolate or connect the RAT to HP hydraulic for ground test and Retraction Module (not shown) for RAT stow control.

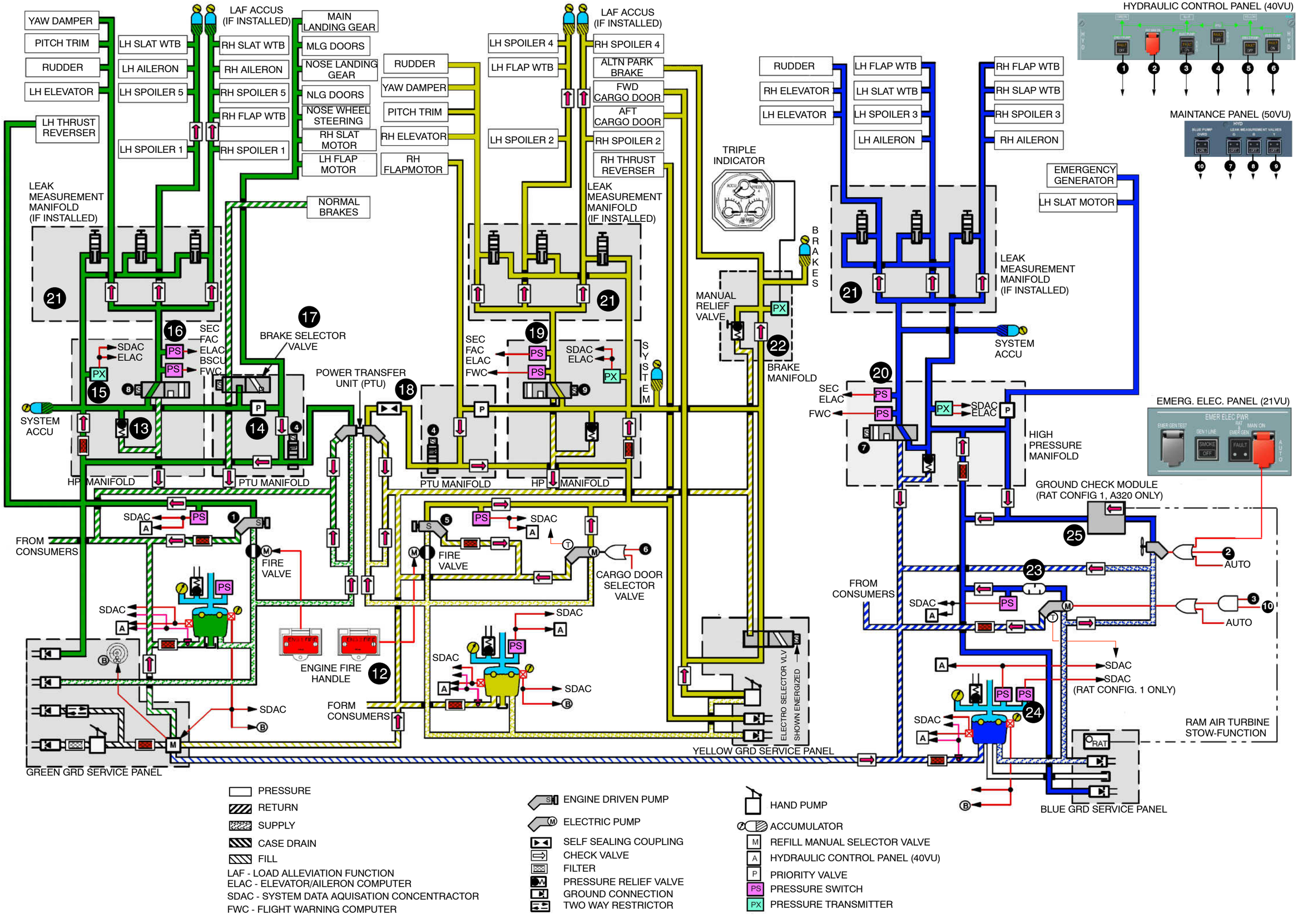


Figure 54 Hydraulic System Distribution