HYDRAULICS

TABLE OF CONTENTS

CHAPTER 13

TABLE OF CONTENTS

GENERAL

Hydraulic power is provided by three independent systems designated 1, 2 and 3 and operate at a nominal pressure of 3000 psi.

System 1 and 2

Systems 1 and 2 are each powered by an Engine Driven Pump (EDP) and an AC-Motor Pump (ACMP). The EDPs designated as 1A and 2A are mounted on the respective engine accessory gearbox and hydraulically power systems 1 and 2 when the engines are operating.

The ACMPs designated as 1B and 2B are used as essential pumps for take-off, approach, landing and in support of the EDPs in the event of failure. The ACMPs are selectable through switches located on the HYDRAULIC control panel in the flight compartment.

During normal operations, system 1 provides hydraulic pressure to the left side primary flight controls and rudder, left and right flight spoilers, left and right ground spoilers and the left thrust reverser. System 2 provides hydraulic pressure to the right side primary flight controls and rudder, left and right flight spoilers, main gear assist (left and right main landing gear extension/retraction), right thrust reverser and outboard brakes.

System 3

System 3 is powered by two ACMPs designated as 3A and 3B and are selectable through switches located on the HYDRAULIC control panel in the flight compartment. The ACMPs 1B and 2B provide hydraulic pressure to the primary flight controls (all), left and right ground spoilers, landing gear and doors, inboard and park/emergency brakes and the nose wheel steering.

Hydraulic pump 3A normally runs continuously while pump 3B is used as an essential pump for take-off, approach, landing and in support of the primary pump 3A in the event of failure.

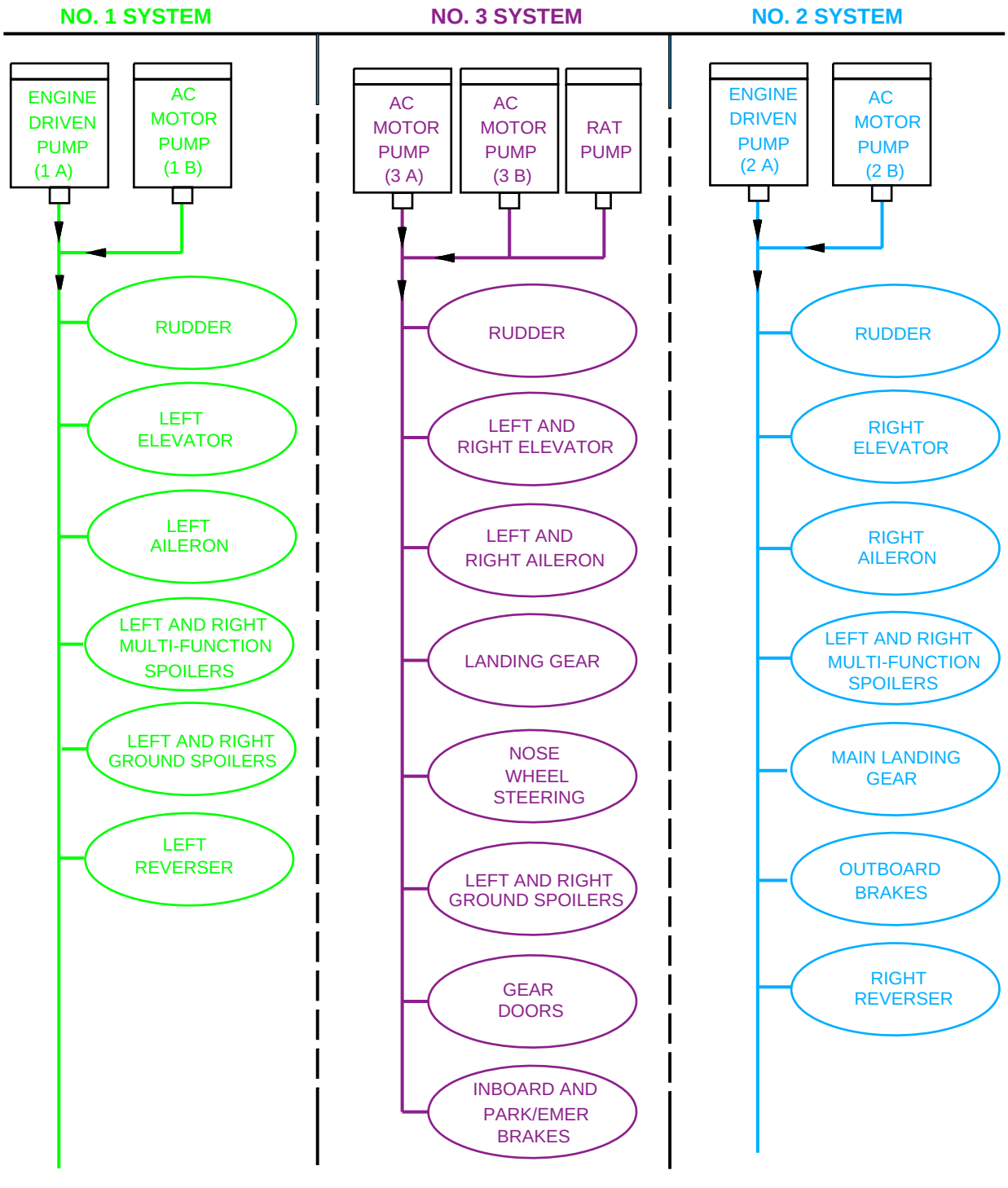
Emergency Hydraulic Power

In the event that all normal electrical power is lost, a Ram Air Turbine (RAT) is deployed and will power an independent hydraulic pump for system 3.

Hydraulic Accumulators

The RAT uses an accumulator to maintain pressure at the reservoir for system 3 hydraulic operation. Two additional hydraulic accumulators are installed on the airplane and are used by the brake control system. One is used for brake system 2 and the other for brake system 3 operation.

DISTRIBUTION TABLE SCHEMATIC

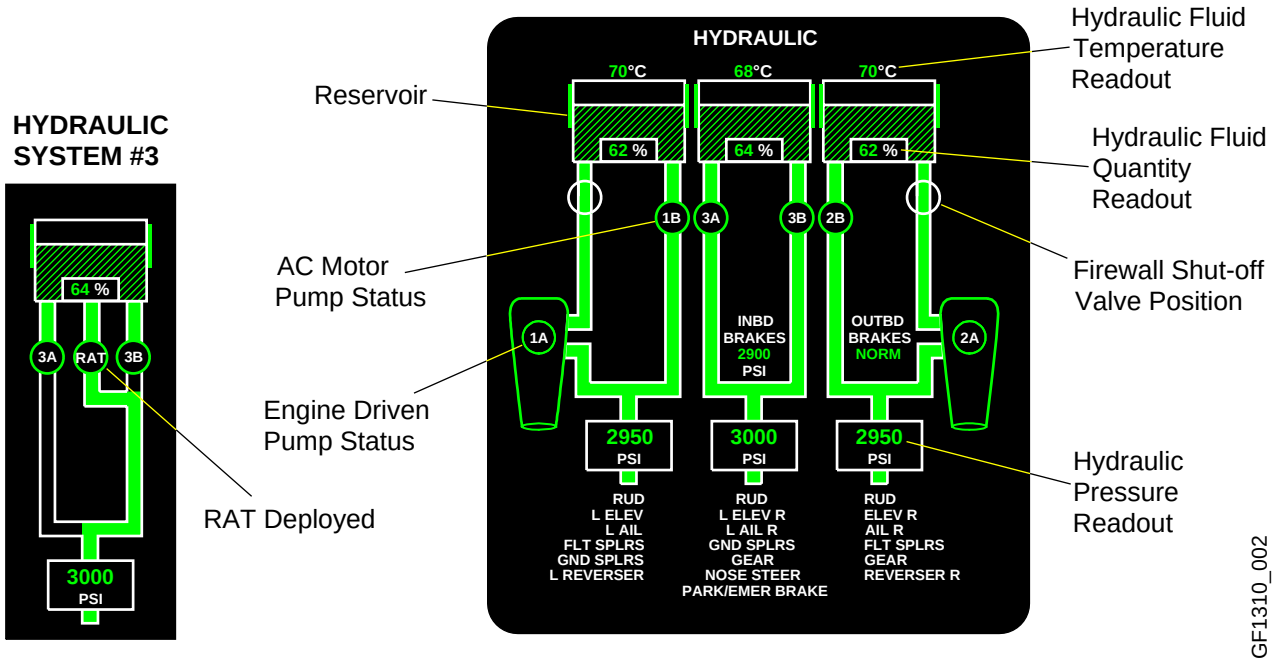


HYDRAULIC SYSTEM INDICATION

The HYDRAULIC synoptic page provides an overview of normal system status and RAT deployment as represented below.

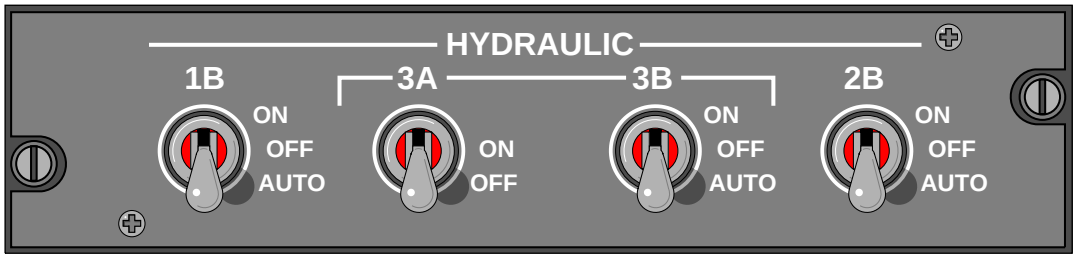
Hydraulic reservoirs, valve positioning and pump operations are pictorially displayed. System temperatures, fluid quantities and pressures are represented digitally. Flow lines connect components and legends display system status.

HYDRAULIC SYNOPTIC PAGE



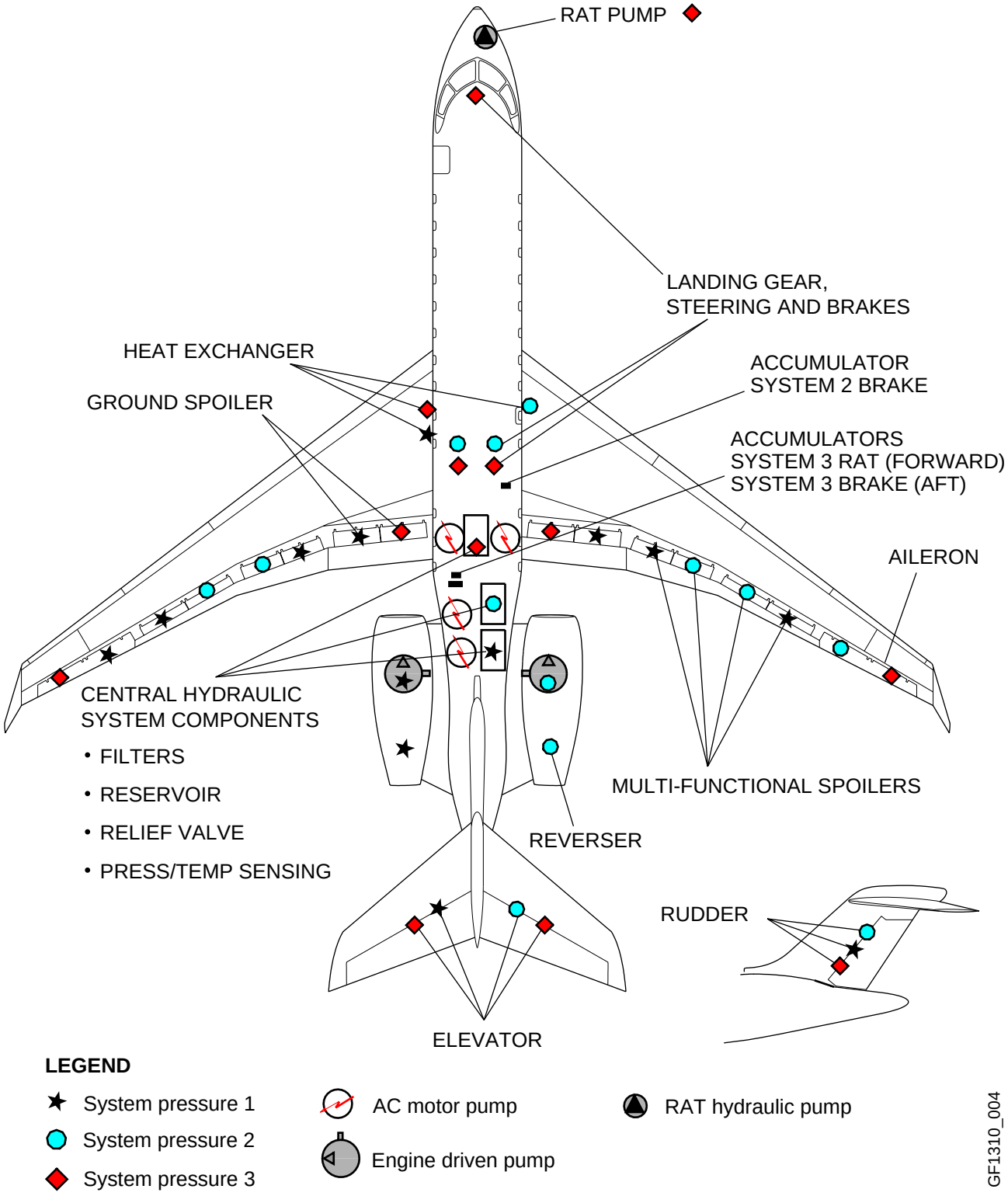
The synoptic page and hydraulic panel control switches are detailed later in this Chapter.

HYDRAULIC CONTROL PANEL



The hydraulic control panel is located on the overhead panel in the flight compartment. There are four switches which control electrically operated pumps for each system.

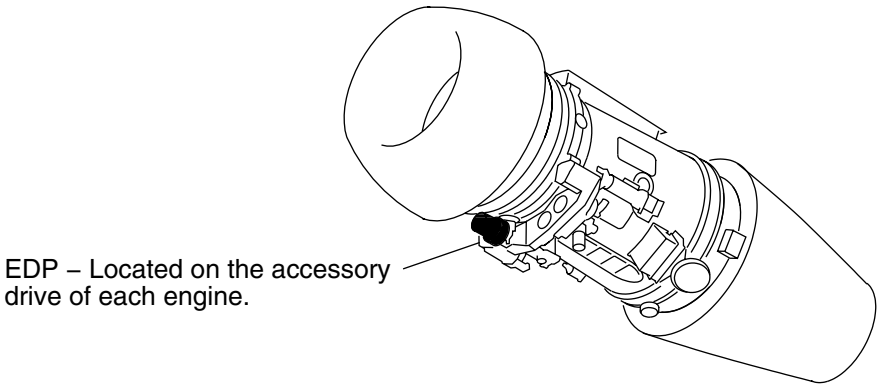
SYSTEMS OVERVIEW SCHEMATIC



HYDRAULIC SYSTEM 1 AND 2

Each system includes an EDP, reservoir, ACMP, manifolds with pressure, return and case drain filters, hydraulic shutoff valve, heat exchanger and ground servicing panel. Hydraulic overfill bottles for system 1 and 2 are provided and located near their system components.

Engine Driven Pump



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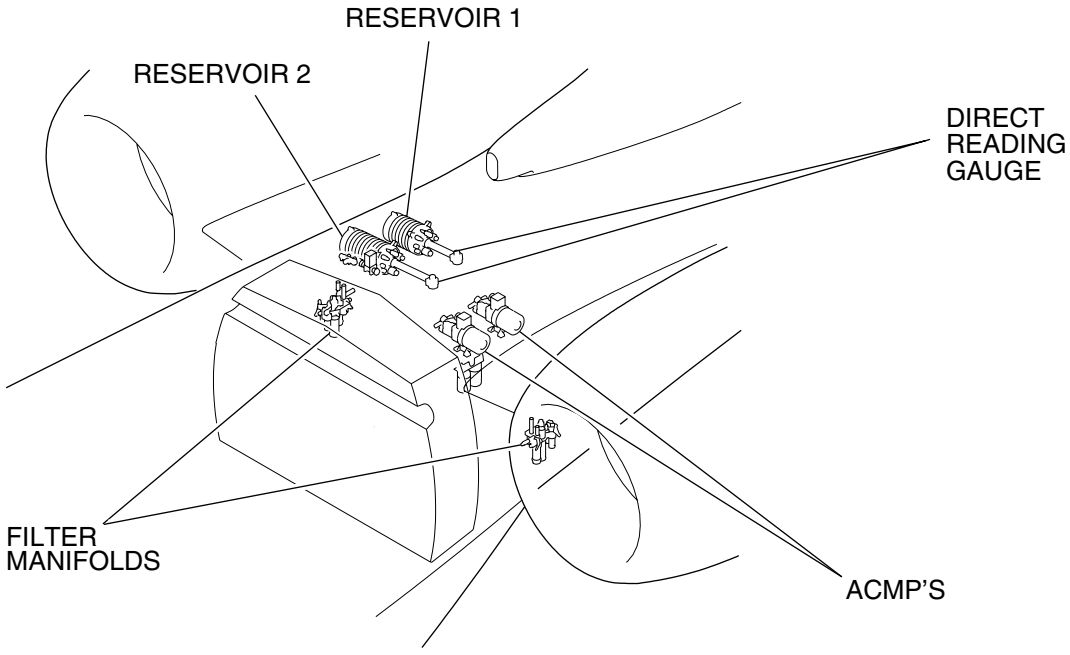
The EDPs 1A and 2A are used as primary pumps and draw fluid from the reservoirs through hydraulic shut-off valves. Fluid is delivered to the applicable manifold, filtered and distributed to the airplane's hydraulically-actuated components.

Aft Equipment Bay Components



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Reservoir

System 1 and 2 reservoirs are located at the top of the aft equipment bay. Fluid quantity and temperature transducers are located on the reservoir and are indicated on the HYDRAULIC synoptic page.

HYDRAULIC SYSTEM 1 AND 2 (CONT'D)

AC-Motor Pumps (ACMPs)

The back-up ACMPs 1B and 2B are normally operated in the AUTO mode and come on automatically during take-off, approach and landing or in support of a primary pump failure.

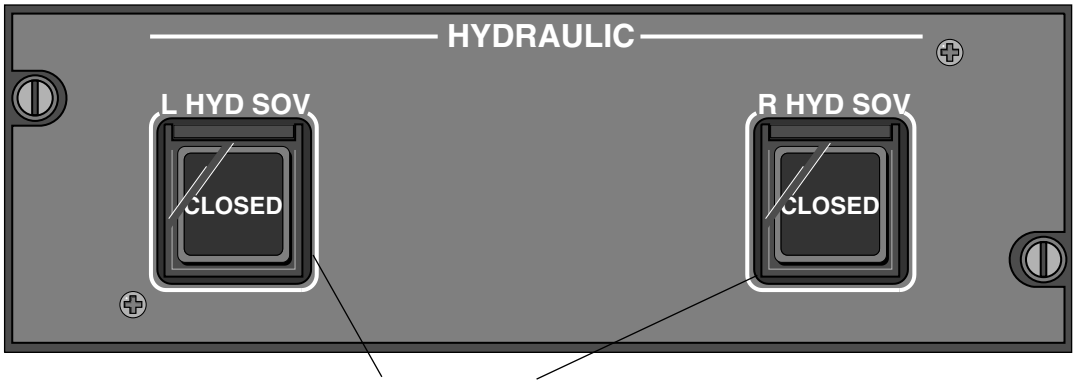
ACMPs 1B and 2B are powered from AC bus 3 and AC bus 2, respectively. Both pumps are controlled by separate toggle switches on the flight compartment HYDRAULIC control panel. Refer to External and APU Electrical Pump operation in this Chapter for external/APU ground services.

Filter manifold

The filter manifold for system 1 is located on the left side of the aft equipment bay and on the right side for system 2. Each hydraulic system accommodates pressure, return and case drain (pump lubrication fluid) filters and a system pressure relief valve. They also contain filter “pop-up” indicators to show when the filters are clogged. Two pressure switches and a transducer are part of the pressure manifold and are used to provide EICAS displays for pump failures and loss of system pressure. Fluid quantity and temperature transducers are located on the reservoir and are indicated on the HYDRAULIC synoptic page.

HYDRAULIC SHUTOFF VALVE CONTROL PANEL

Two switches are provided on the HYDRAULIC shutoff valve panel to isolate the applicable shutoff valve in the event of a hydraulic overtemperature. These switches should not be selected closed with the engine running except for isolation in the event of system overtemp. The engine driven pump will cavitate and greatly reduce the efficiency and life of the pump.



Left/Right Hydraulic Shut-off Valve Switches

Controls the operation of the hydraulic shut-off valve in the following condition:

• CLOSED – When the switch is selected it isolates the hydraulic fluid to the respective engine driven pump by closing the hydraulic shut-off valve.

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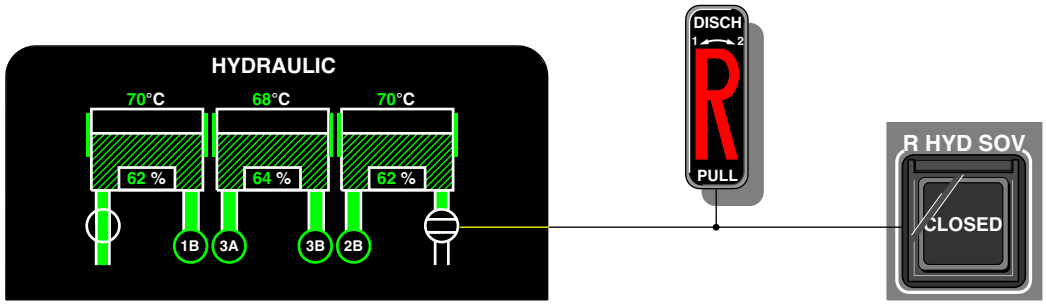
The purpose of hydraulic fluid isolation is to permit the fluid to cool and control the overtemperature, without having to shutdown the engine. These switches are normally not closed. They operate in parallel with the switch in the fire handle to control the operation of the applicable hydraulic shutoff valve.

HYDRAULIC SHUTOFF VALVE CONTROL PANEL (CONT'D)

Hydraulic Shutoff Valves

Electrically-operated shutoff valves (normally open) are installed on the suction lines for the engine-driven pumps 1A and 2A and their position is indicated on the HYDRAULIC synoptic page.

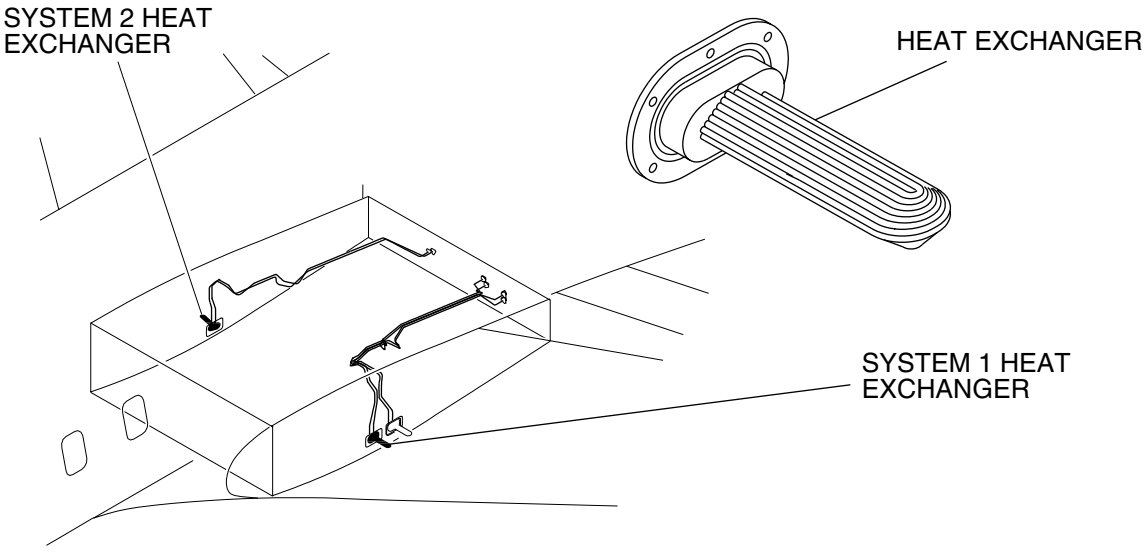


HYDRAULIC SYNOPTIC PAGE

The corresponding hydraulic shutoff valve is motored closed during an engine fire condition (fire handle pulled) or selection of a HYD SOV switch. Selection of a HYD SOV switch will illuminate a "CLOSED" legend on the switch to indicate the switch position. When the hydraulic shutoff valve is closed, a "L– R HYD SOV CLSD" white status message (described in FIRE PROTECTION Chapter 9) is displayed on EICAS. De-selection of either the fire handle or HYD SOV switch will command the SOV open and extinguish the message. De-selecting the HYD SOV switch will extinguish the "CLOSED" legend.

Heat Exchanger

System 1 heat exchanger is positioned within the left fuel feed tank and system 2 in the right. The purpose of each exchanger is to cool the case drain fluid (lubrication fluid within each pump), prior to returning it to the reservoir.

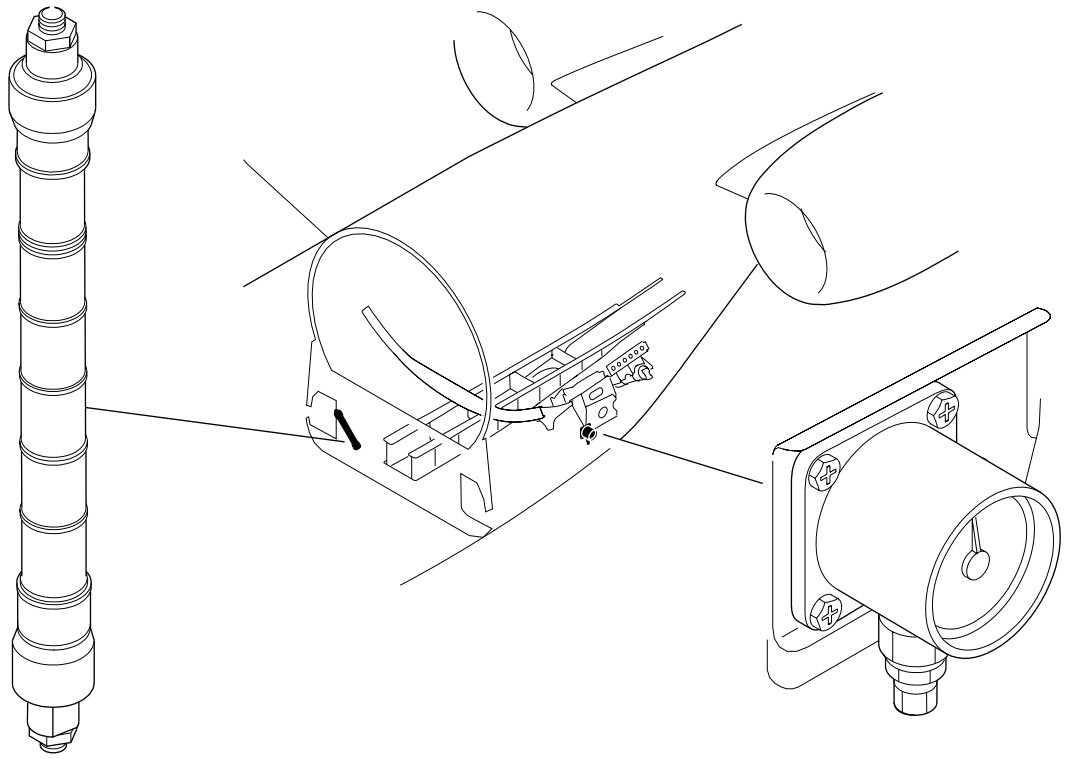


If the fluid temperature is sufficiently cooled, a bypass of the exchanger will allow the fluid to go directly to the reservoir. Fuel in the wing feed tank is the cooling medium.

HYDRAULIC SHUTOFF VALVE CONTROL PANEL (CONT'D)

System 2 Accumulator

The brake control system uses an accumulator from hydraulic system 2 for brake operations.



SYSTEM 2 BRAKE ACCUMULATOR

DIRECT READING GAUGE

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There is a direct reading gauge to check the precharge condition of the accumulator. Refer to the LANDING GEAR Chapter for more information on the brake control system.

Ground Service Panel

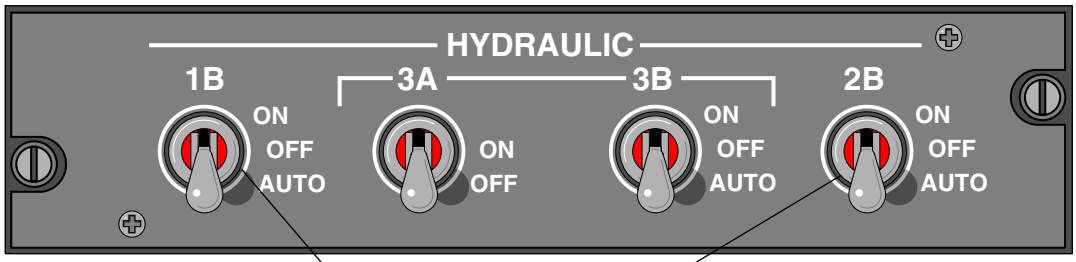
The ground service panel for systems 1 and 2 is located in the aft equipment bay.

HYDRAULIC CONTROL PANEL (1B/2B SWITCHES)

The HYDRAULIC control panel is located on the overhead panel in the flight compartment and contains the ACMPs switches for hydraulic systems 1 and 2.

HYDRAULIC CONTROL PANEL (1B/2B SWITCHES) (CONT'D)

Hydraulic 1B and 2B Pump Switches



AC–motor Pump 1B and 2B
Controls the operation of each pump in the following conditions

- **ON** – When the correct electrical logic is set the applicable pump will operate at normal operating pressure.
- **OFF** – Pump is inoperative.
- **AUTO** – Pump is in automatic/standby mode. Each pump will energize when its system primary pump fails in flight or when the correct logic is set with slats/flaps not at zero degree position

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Manual Mode

Manual mode is accomplished by placing the respective ACMP control switch into either the “OFF” or “ON” position. Hydraulic pumps 1B and 2B will run when selected to “ON” and their respective bus is powered. In the “OFF” position each pump is inoperative for all operating conditions.

Auto Mode

When the pump switch is set to “AUTO” the respective pump automatically starts under one of the following conditions:

- When the correct electrical logic is determined by the Alternating Current Power Center (ACPC), either slats or flaps are not at the zero degree position and at least one Variable Frequency Generator (VFG) operating.
- When the primary pump falls below normal system pressure (≤ 1800 psi) in flight.

Ground Operation Inhibits

On ground with the APU as the single source of electrical power, only one ACMP is allowed to operate.

Start inhibit is provided for 1B and 2B “AUTO” mode of operation (no engines running), to enhance system safety during normal maintenance operations. For normal operation on the ground, the applicable system 1 or 2 ACMP requires at least one engine to be operating, with “AUTO” mode selected.

The 1B or 2B pump will not come on automatically (“AUTO” mode selected and flap less than zero degrees), in support of a primary pump failure on the ground.

HYDRAULIC CONTROL PANEL (1B/2B SWITCHES) (CONT'D)

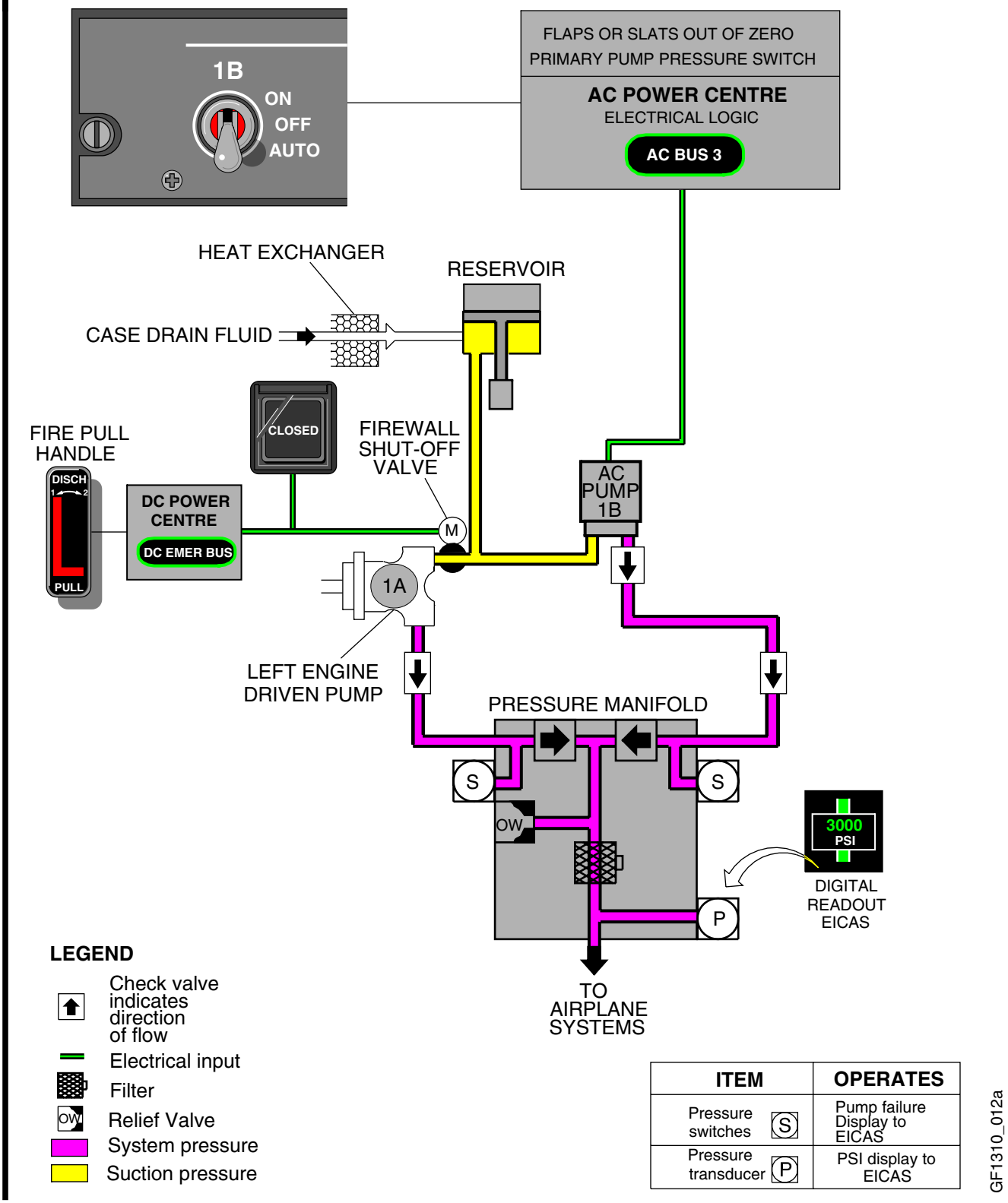
Flight Operation

The normal pump switch configuration for in flight hydraulic systems 1 and 2 operation is “AUTO” mode of operation.

The 1B or 2B pump will come on automatically (“AUTO” mode selected) in support of the applicable primary pump failure in flight. When an ACMP is commanded on due to a low pressure condition of the primary pump, that ACMP will remain on for a minimum of 5 minutes (including touchdown) unless “ON” or “OFF” is selected. This is required to prevent ACMP overheating due to continuous restarts if the low pressure alternates above and below 1800 psi.

During single VFG operation, ACMPs 1B and 2B are load shed since their respective busses are disconnected from the remaining good generator.

HYDRAULIC SYSTEM 1 SCHEMATIC



ITEM		OPERATES
Pressure switches	S	Pump failure Display to EICAS
Pressure transducer	P	PSI display to EICAS

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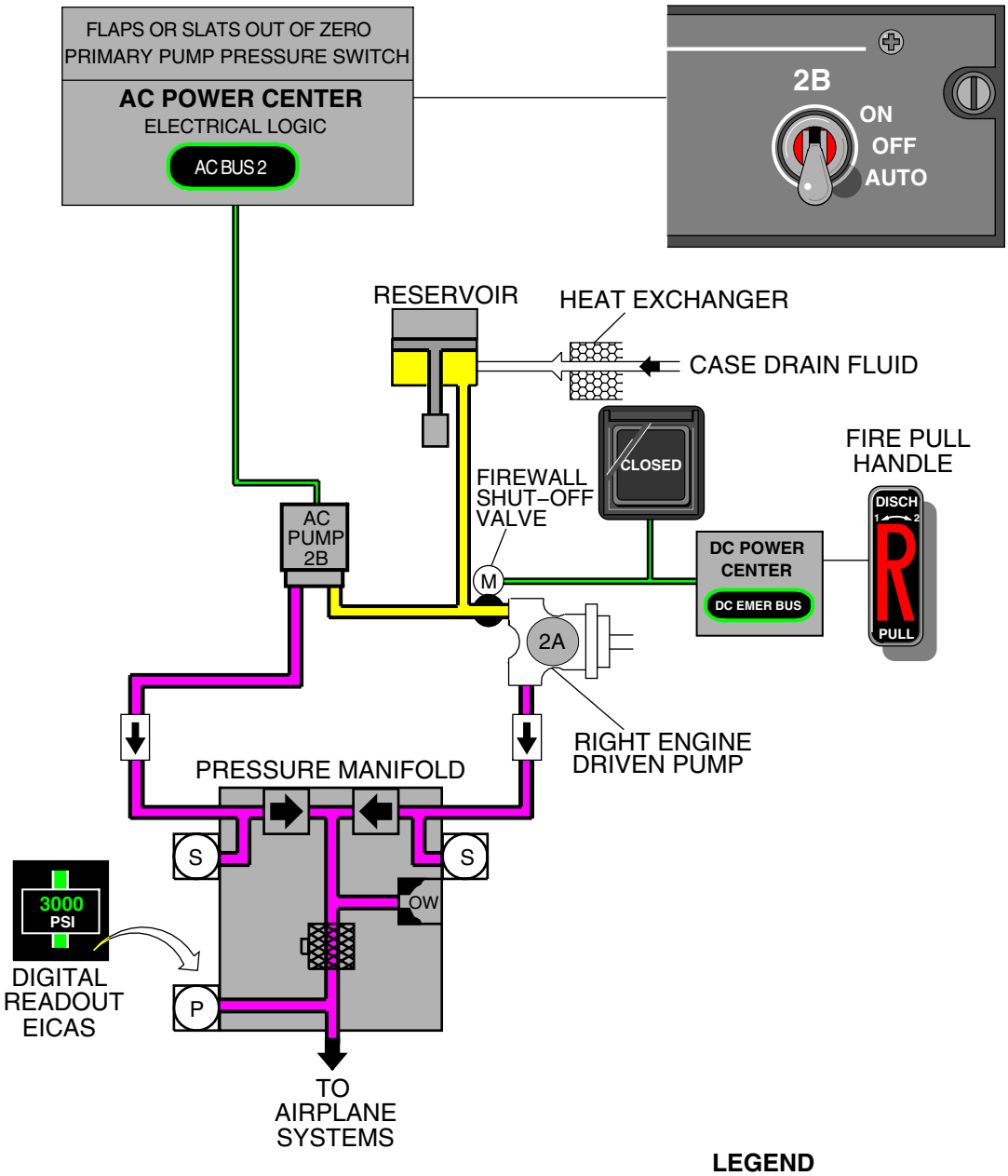
HYDRAULIC SYSTEM 2 SCHEMATIC



ITEM		OPERATES
Pressure switches	(S)	Pump failure Display to EICAS
Pressure transducer	(P)	PSI display to EICAS

LEGEND

- Check valve indicates direction of flow
- Electrical input
- Filter
- OW Relief Valve
- System pressure
- Suction pressure

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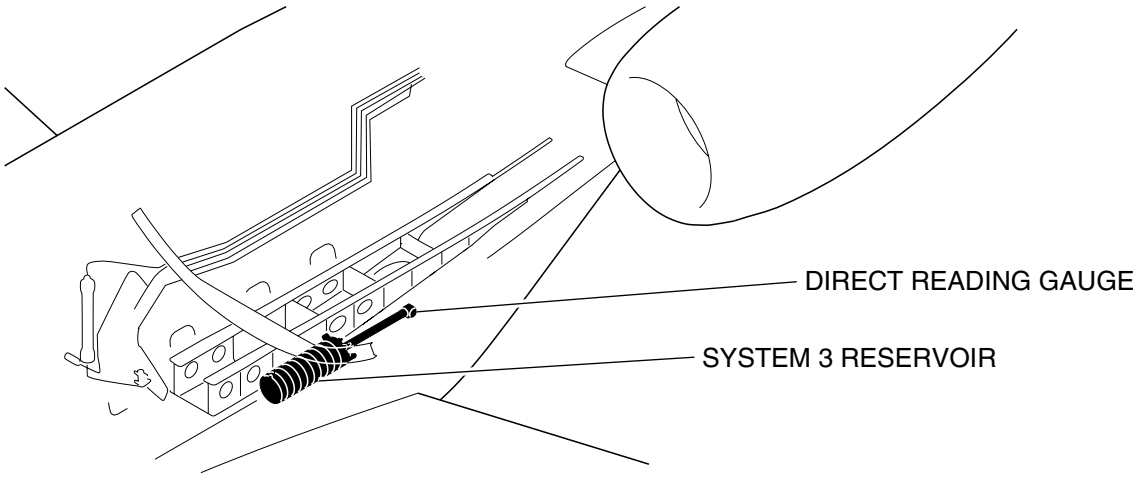
HYDRAULIC SYSTEM 3

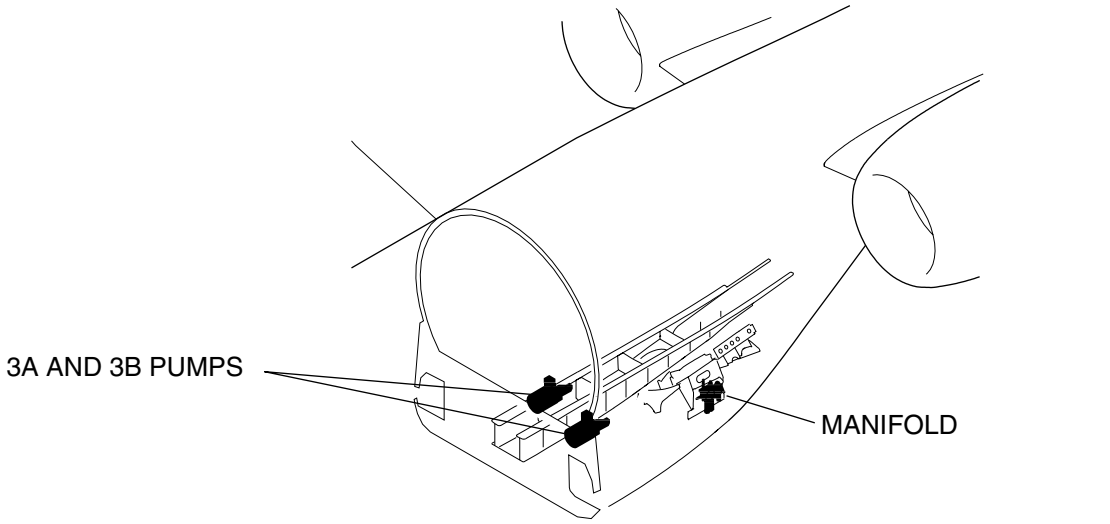
System 3 includes a reservoir, ACMPs 3A and 3B, RAT pump, manifold with pressure, return and case drain filters, hydraulic shutoff valve, heat exchanger and ground servicing panel. Hydraulic overfill bottles for the system are provided and located near system 3 components.

Reservoir



System 3 reservoir is located in the lower belly fairing. Fluid quantity and temperature transducers are located on the reservoir and are indicated on the HYDRAULIC synoptic page.

ACMPs 3A and 3B



The system 3 ACMPs are located in the lower belly fairing. System 3A pump is used as the primary pump (runs continuously in the ON position) and 3B as the backup pump.

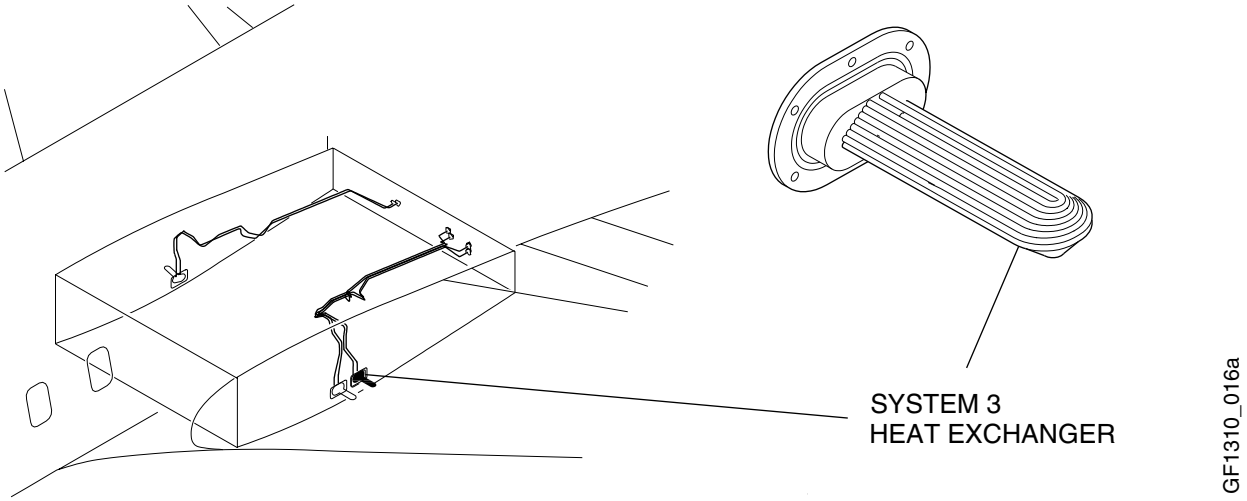
HYDRAULIC SYSTEM 3 (CONT'D)

Ram Air Turbine (RAT)

In case of an emergency (example: two-engine failure), the RAT is deployed and will power an independent hydraulic pump for system 3. Therefore system 3 has three hydraulic pumps available to power the system.

The RAT hydraulic pump is mounted at the rear of the RAT. It uses system 3 hydraulic fluid for emergency operations. The RAT operation is described in the ELECTRICAL Chapter 7 of this manual.

Heat Exchanger



The heat exchanger is positioned in the left fuel feed tank. System 3 heat exchanger has the same function as systems 1 and 2.

Filter manifold

The filter manifold for system 3 is located on the left side of the aft equipment bay and contains all the features of system 1 and 2. An additional feature is that the RAT pump shares a common pressure switch with ACMP 3B.

Fluid quantity and temperature transducers are located on the reservoir and are indicated on the HYDRAULIC synoptic page.

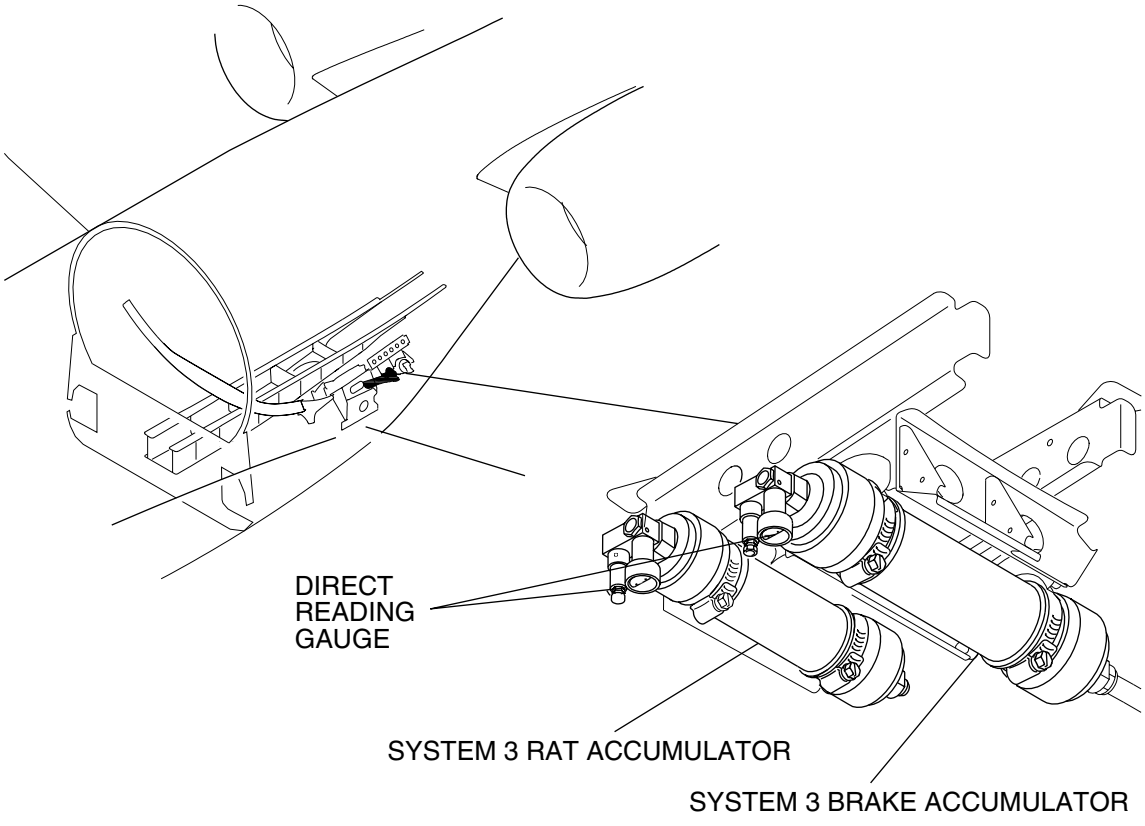
Two pressure switches and a transducer are part of the pressure manifold and are used to provide EICAS displays for pump failures and loss of system pressure.

Ground Service Panel

The ground service panel for system 3 is located at the left side of the fuselage aft of the wing trailing edge.

HYDRAULIC SYSTEM 3 (CONT'D)

RAT and System 3 Accumulators



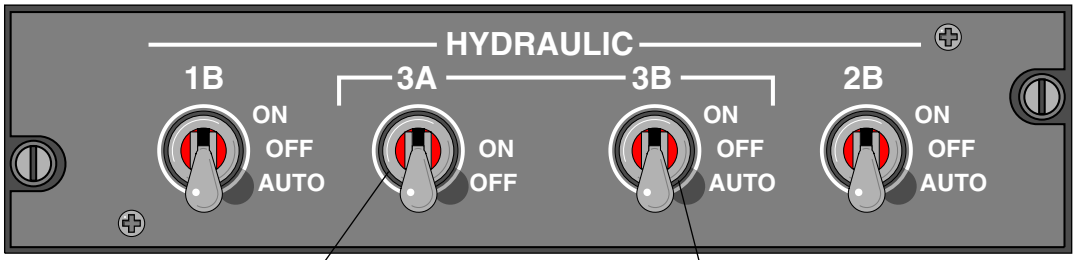
A RAT accumulator is used to maintain pressure to the reservoir when 3A and 3B ACMPs are inoperative in flight. This will provide a continuous pressure for up to 44 seconds from the reservoir suction line to the pump, enabling the RAT pump to come on line quickly. There is a direct reading gauge to check the precharge condition of the accumulator. Normal pressure equals 1000 psi.

The brake control system uses an accumulator from hydraulic system 3 for brake operations. There is a direct reading gauge to check the precharge condition of the accumulator. Normal precharge pressure of the brake acculator equals 500 psi. Refer to the LANDING GEAR Chapter 15 for more information on the brake control system.

HYDRAULIC CONTROL PANEL (3A/3B SWITCHES)

The HYDRAULIC control panel located on the overhead panel in the flight compartment contains the ACMPs switches for hydraulic systems 3A and 3B.

Hydraulic 3A and 3B Pump Switches



AC–motor Pump 3A
Controls the operation of the pump in the following conditions:

- **ON** – When the correct electrical logic is set the pump will operate at normal operating pressure.
- **OFF** – Pump is inoperative.

AC–motor Pump 3B
Controls the operation of the pump in the following conditions:

- **ON** – When the correct electrical logic is set the pump will operate at normal operating pressure.
- **OFF** – Pump is inoperative.
- **AUTO** – Pump is in automatic/standby mode. The pump will energize if the ACMP 3A pump fails in flight or when the correct logic is set with slats/flaps not at 0 degree position.

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AC-Motor Pumps

System pressure is normally maintained by pump 3A which runs continuously in the ON mode. The back-up 3B pump is normally operated in the AUTO mode and comes on automatically during take-off, approach and landing or in support of a 3A primary pump failure.

The AC-motor pumps 3A and 3B are powered from AC bus 4 and AC bus 1 respectively. The pumps are controlled by separate toggle switches on the flight compartment HYDRAULIC control panel. Refer to External and APU Electrical Pump Operation in this Chapter for external/APU ground electrical services.

Manual Mode

Manual mode is accomplished by placing the respective ACMP control switch into either the “OFF” or “ON” position. Hydraulic pumps 3A and 3B will run when selected to “ON” and their respective bus is powered. In the “OFF” position each pump is inoperative for all operating conditions.

HYDRAULIC CONTROL PANEL (3A/3B SWITCHES) (CONT'D)

Auto Mode

When 3B pump switch is set to “AUTO” the pump starts automatically under one of the following conditions:

- When the correct electrical logic is determined by the alternating current power centre or ACPC, either slats or flaps are not at the zero degree position and at least one VFG operating.
- When the primary pump 3A falls below normal system pressure (≤ 1800 psi) in flight.

Ground Operation Inhibits

When the APU is the airplane single source of electrical power, only one ACMP is allowed to run at a time to prevent overloading the APU generator.

Start inhibit is provided for 3B “AUTO” mode of operation (no engine running), to enhance system safety during normal maintenance operations. On ground, the 3B pump requires at least one engine to be operating for normal operations with “AUTO” mode selected.

The 3B pump will not come on automatically (“AUTO” mode selected and flap less than zero degrees), in support of a 3A pump failure on the ground.

Flight Operation

The normal pump switch configuration for in flight hydraulic system 3 operation is 3A pump switch in the “ON” position and 3B in the “AUTO” mode of operation.

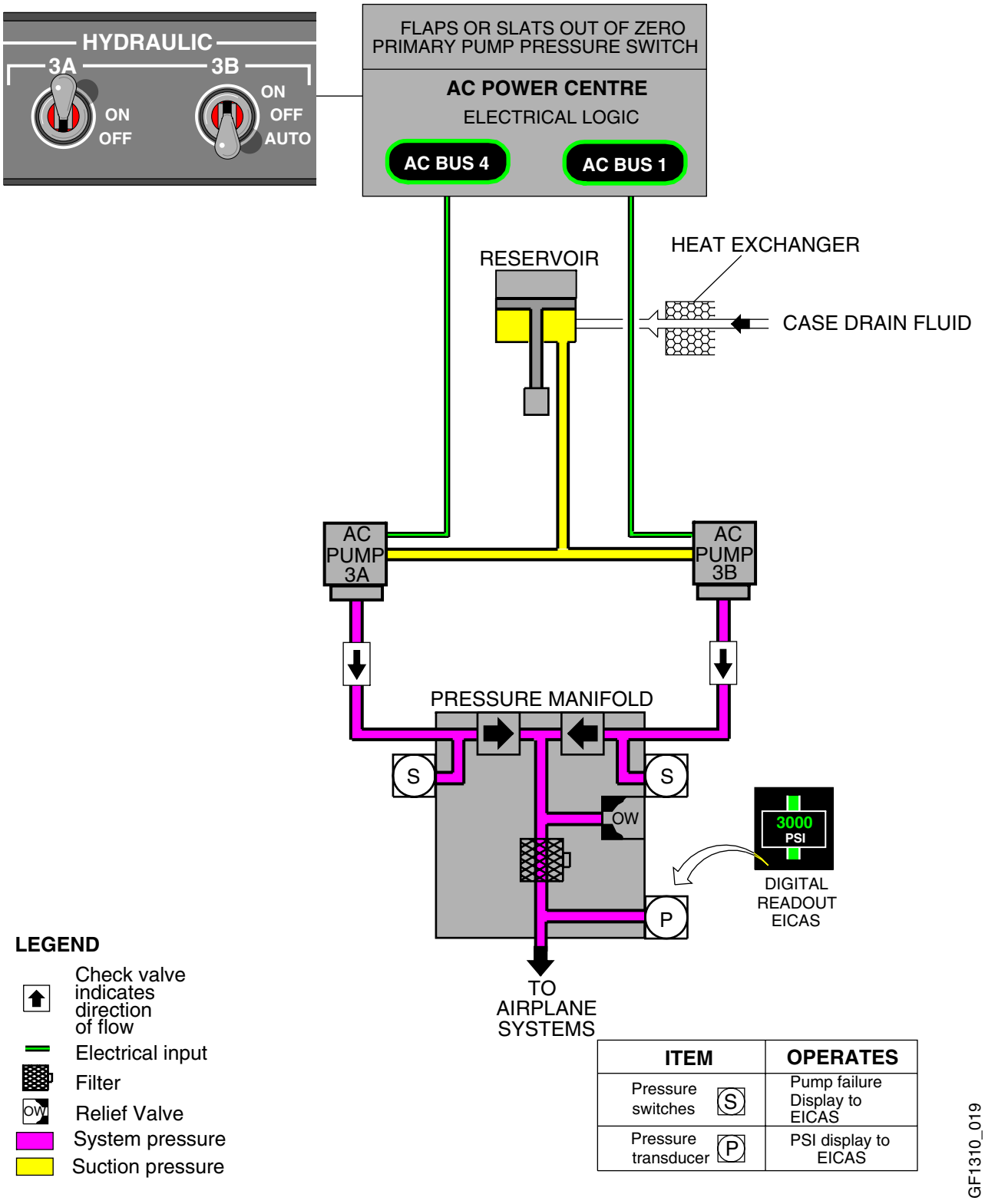
The 3B pump will come on automatically (“AUTO” mode selected) in support of a 3A pump failure in flight. When the 3B pump is commanded on due to a low pressure condition of the primary pump, it will remain on for a minimum of 5 minutes (including touchdown) unless “ON” or “OFF” is selected. This is required to prevent ACMP overheating due to continuous restarts if the low pressure alternates above and below 1800 psi.

During single VFG operation ACMPs 1B and 2B are load shed since their respective buses are disconnected from the remaining operative generator.

Ram Air Turbine (RAT)

When the RAT is deployed and on-speed, it will power the AC ESS bus and the independent hydraulic pump, to ensure that system 3 components are powered at all times (see hydraulic synoptic page in this Chapter).

HYDRAULIC SYSTEM 3 SCHEMATIC



ITEM	OPERATES
Pressure switches (S)	Pump failure Display to EICAS
Pressure transducer (P)	PSI display to EICAS

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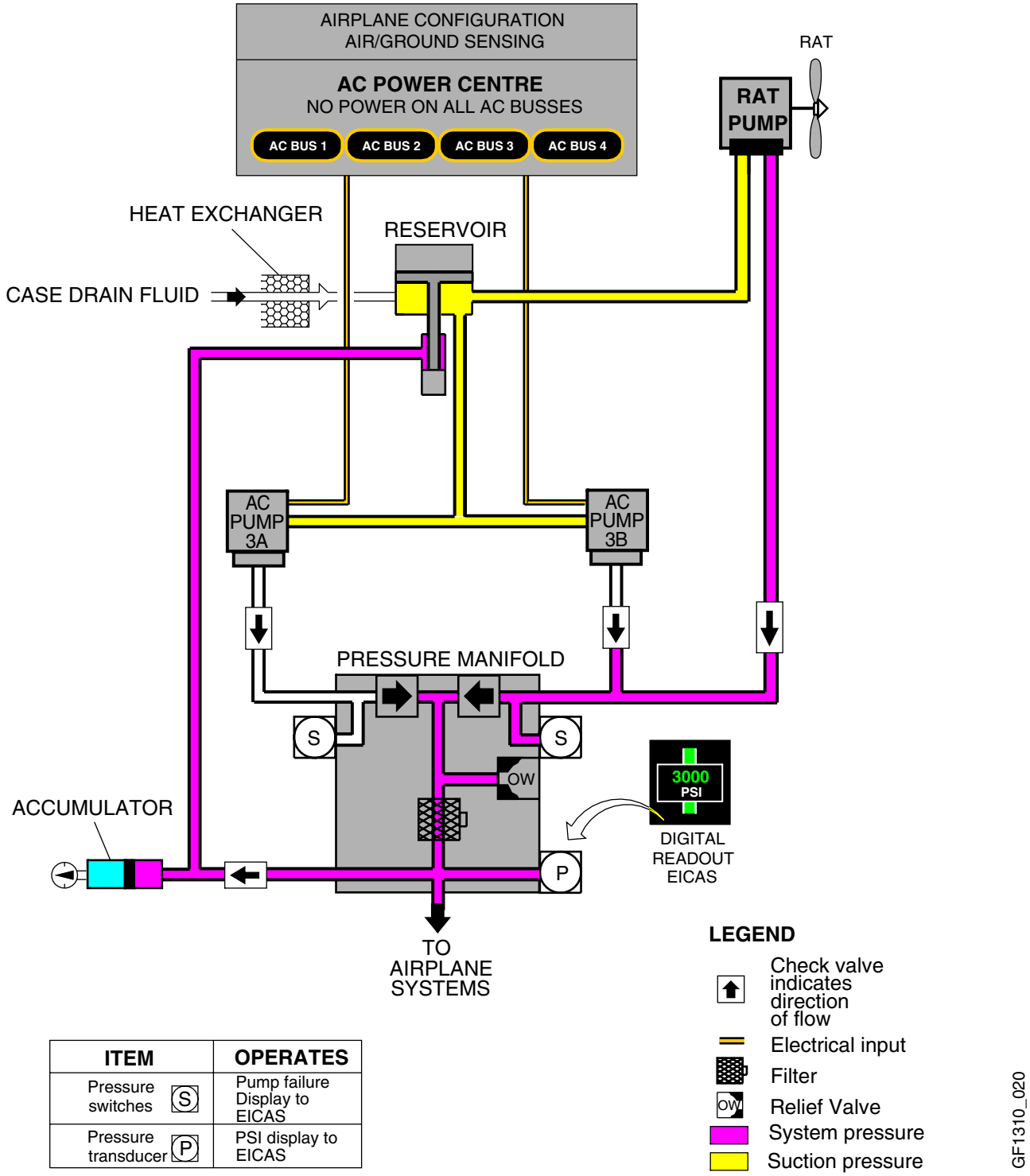
RAT DEPLOYMENT HYDRAULIC SCHEMATIC



ITEM	OPERATES
Pressure switches (S)	Pump failure Display to EICAS
Pressure transducer (P)	PSI display to EICAS

ACMP POWER AND DISTRIBUTION

Electrical power and distribution using the ACMPs are described as follows:

ACMPs 1B and 2B

Hydraulic systems 1 and 2 are each powered by one EDP used as the primary system pump. Each primary pump is backed up by a single ACMP (one per system) during high flow demand flight phases or failure of the primary pump in flight.

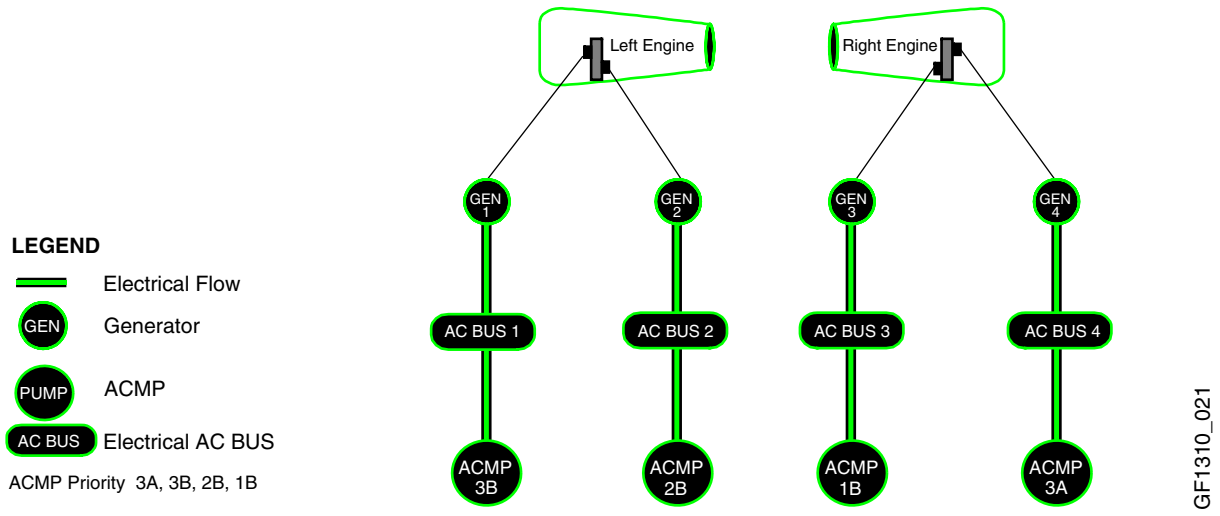
The ACMP is also used for system ground maintenance operation with the control switch in the ON position. Each ACMP is powered by one of the electrical AC busses supplied by the generator installed on the opposite engine (ACMP 1B is connected to AC bus #3 and ACMP 2B is connected to AC bus #2). This will ensure operation of both hydraulic systems 1 and 2 in the case of a single engine failure.

When only one generator is operating, AC busses #2 and #3 are shed. Since their respective AC busses are disconnected during single generator operation, ACMPs 1B and 2B are automatically load shed.

ACMPs 3A and 3B

Hydraulic system 3 is powered by two ACMPs: 3A as the primary system pump and 3B as the back-up pump. Each pump is powered by a different AC bus (ACMP 3A is connected to AC bus #4 and ACMP 3B is connected to AC bus #1). In the event of one, two or three generator failures, both 3A and 3B ACMPs will receive power from one of the remaining generator. AC bus 1 and AC bus 4 are both powered during single generator operation.

ACMP ELECTRICAL POWER SCHEMATIC



EXTERNAL AND APU ELECTRICAL PUMP OPERATION

External AC power has the capability to power all ACMPs for ground operation when the hydraulic control switch is selected to the ON position.

During ground operation with either the APU or external ground power as the source of electrical power, the AUTO mode of operation is not available. On ground with APU as the single source of electrical power, only one pump at a time is allowed to run with 3A, 3B, 2A and 1B in priority.

In flight with the APU as the single source of electrical power, two pumps only (3A and 3B) are allowed to run to prevent overloading of the generator.

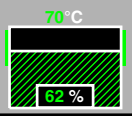
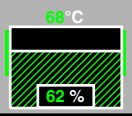
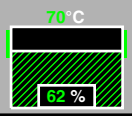
RESERVOIR QUANTITY LIMITS

The table below describes the range of values between the upper and lower fluid quantity limits for each system. The green brackets [are variable in size and in combination with the filling and digital readout represent the level of quantity in the reservoir for all airplane configurations.

NOTE

In some cases, a reservoir quantity can be amber, but the EICAS **HYD 1 (2) (3) LO QTY** message will be inhibited.

The quantity indication (reservoir filling and digital readout) for systems 1 and 2 will turn amber if the displayed reservoir quantity for that system is at or below the lower limit.

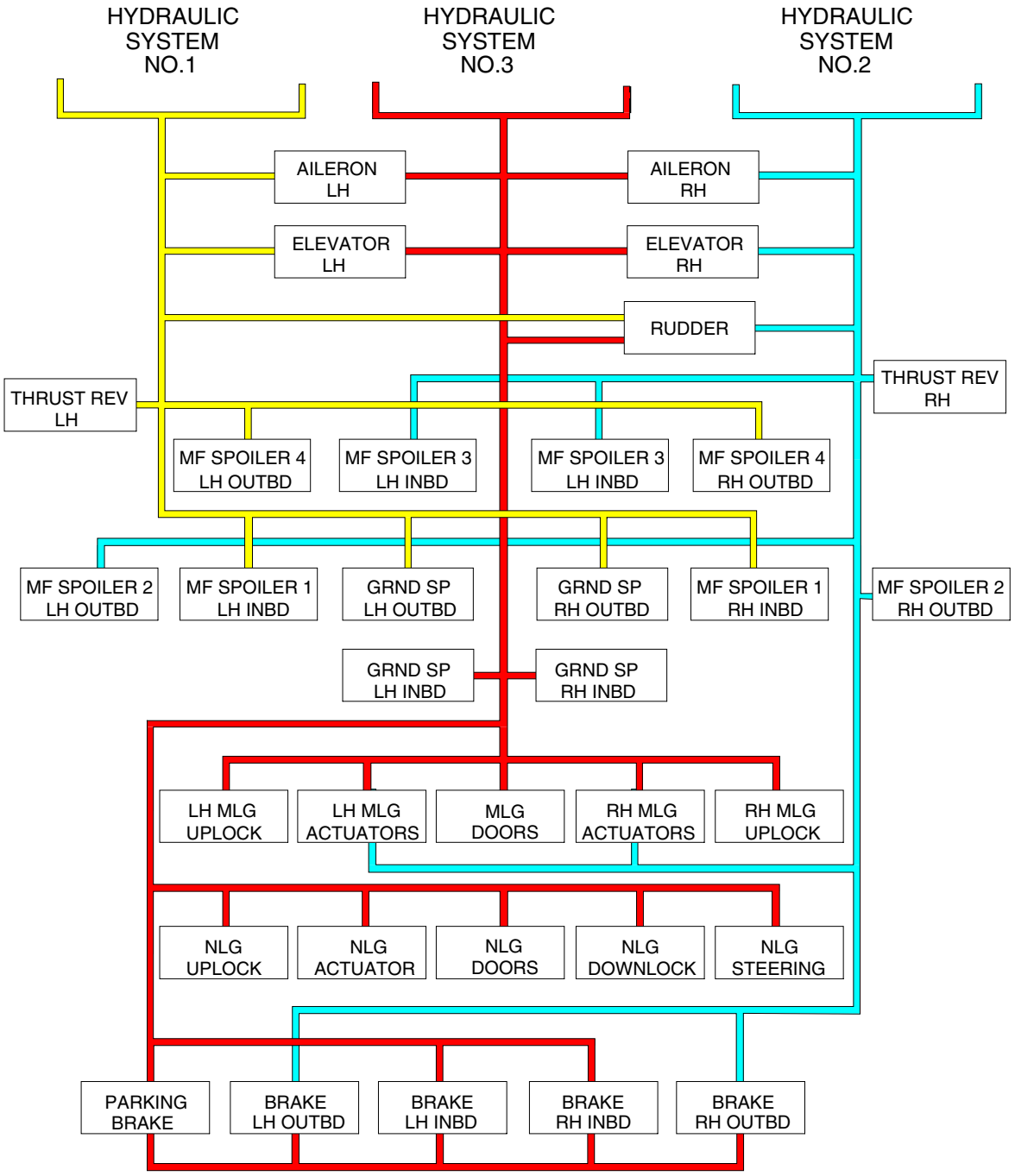
	SYSTEM #1 	SYSTEM #3 	SYSTEM #2 
LOWER LIMIT	ON GROUND: Hydraulic Quantity Lower Limit = 34% IN FLIGHT: Hydraulic Quantity Lower Limit = 16%	ON GROUND: Hydraulic Quantity Lower Limit = 20% IN FLIGHT: Hydraulic Quantity Lower Limit (L & R gear uplocked)= 28%	ON GROUND: Hydraulic Quantity Lower Limit = 32% IN FLIGHT: Hydraulic Quantity Lower Limit = 12%
UPPER LIMIT	100%	ON GROUND: Hydraulic Quantity Upper Limit = 70% IN FLIGHT: Hydraulic Quantity Upper Limit = 100%	100%

GF1310_022

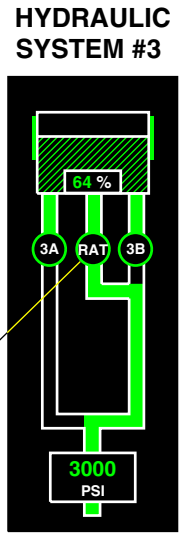
Each hydraulic system quantity indication will read accurate only when the system is pressurized.

The quantity indication for system 3 will turn amber when the displayed quantity is at or below the lower limit or at or above the upper limit when the quantity reaches 70%.

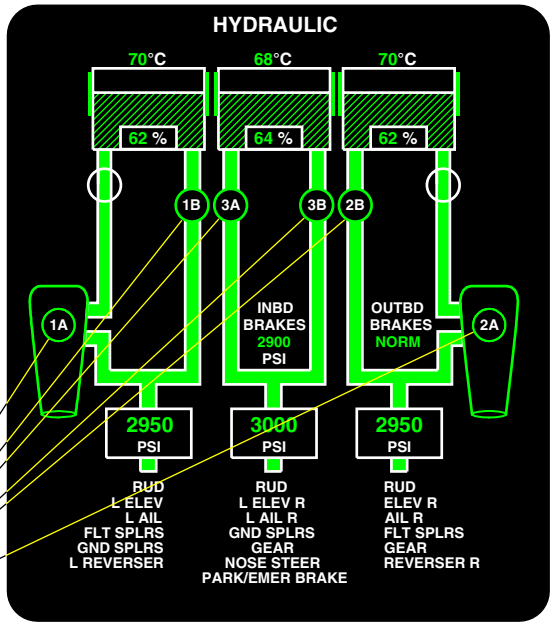
HYDRAULIC SYSTEM DISTRIBUTION SCHEMATIC



HYDRAULIC SYNOPTIC PAGE



Hydraulic RAT Pump
Displays RAT pump deployed and powering system #3. The pump symbol and flow lines only appear when the RAT is deployed.



Hydraulic Pumps 1A, 2A, 1B, 2B, 3A, 3B and RAT
Displays the condition of each of the hydraulic pumps.

- Green – >1800 psi.
- Amber – Hydraulic supply to system inoperative ≤ 1800 psi.
- White – Hydraulic pump is not commanded to operate.

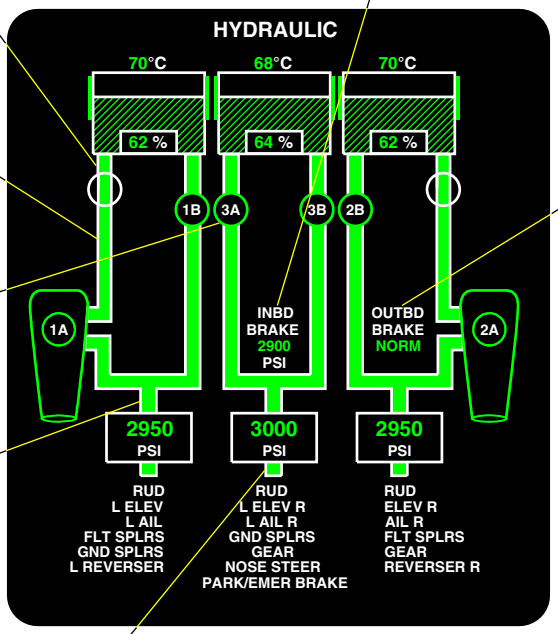
GF1310_024

HYDRAULIC SYNOPTIC PAGE (CONT'D)

Reservoir Output Lines (all 3 systems)
Flow line is green when sufficient reservoir quantity is displayed.

Inboard Brake Pressure Readout
Displays in increments of 50 psi pressure in the inboard brake system.
- Green – >1800 psi.
- Amber – ≤ 1800 psi.
- White – ≥ 3200 psi.

Engine Driven Pump Input Line
- Green – SOV open.
- Amber – SOV failed.
- Red – SOV not closed with the fire handle pulled.



Outboard Brake Pressure Readout
Displays pressure in the outboard brake system.
- NORM Green – > 1400 to 3200 psi.
- LO PRESS Amber – ≤ 1400 psi.
- White – ≥ 3200 psi.

Pump Output Line
- Green – >1800 psi.
- Amber – ≤ 1800 psi.

Pressure Manifold Input Line
- Green – >1800 psi.
- Amber – ≤ 1800 psi.

Pressure Manifold Output Line
- Green – >1800 psi.
- Amber – ≤ 1800 psi.

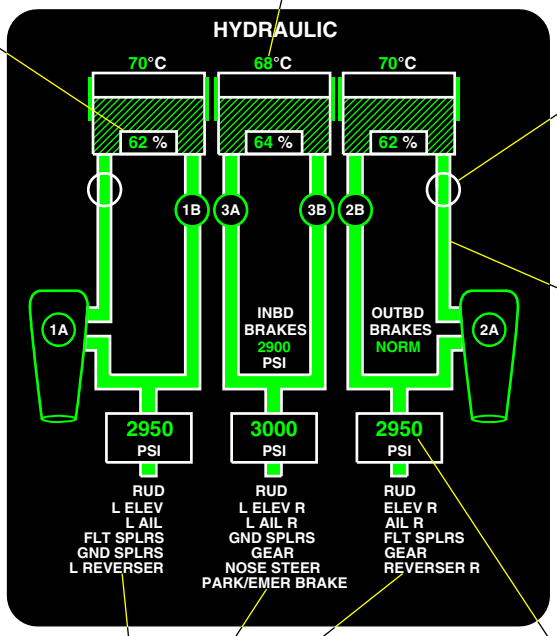
GF1310_025

HYDRAULIC SYNOPTIC PAGE (CONT'D)

Hydraulic Fluid Temperature Readout
Displays increments of 2°C reservoir fluid temperature in the corresponding system.

- Green < 96°C (205°F).
- Amber ≥ 96°C (205°F).

Fluid Quantity Symbol and Readout
Displays increments of 2% reservoir fluid quantity in the corresponding system.



Hydraulic Shutoff Valve Position Indicator
Displays valve open, closed and invalid data.

Shutoff Valve To Engine Flow Line
The flow line from the fire wall SOV to the engine will display red if the SOV fails to close, when the fire handle is pulled.

System Distribution Table
Displays status of corresponding airplane systems powered by system 1, 2 or 3.

- White – Adequate pressure >1800 psi to operate.
- Amber – Hydraulic supply to system inoperative ≤ 1800 psi.

Hydraulic Pressure Readout
Displays hydraulic pressure in the corresponding system in increments of 50 psi.
Normal operating pressure is 2950 to 3050 psi.

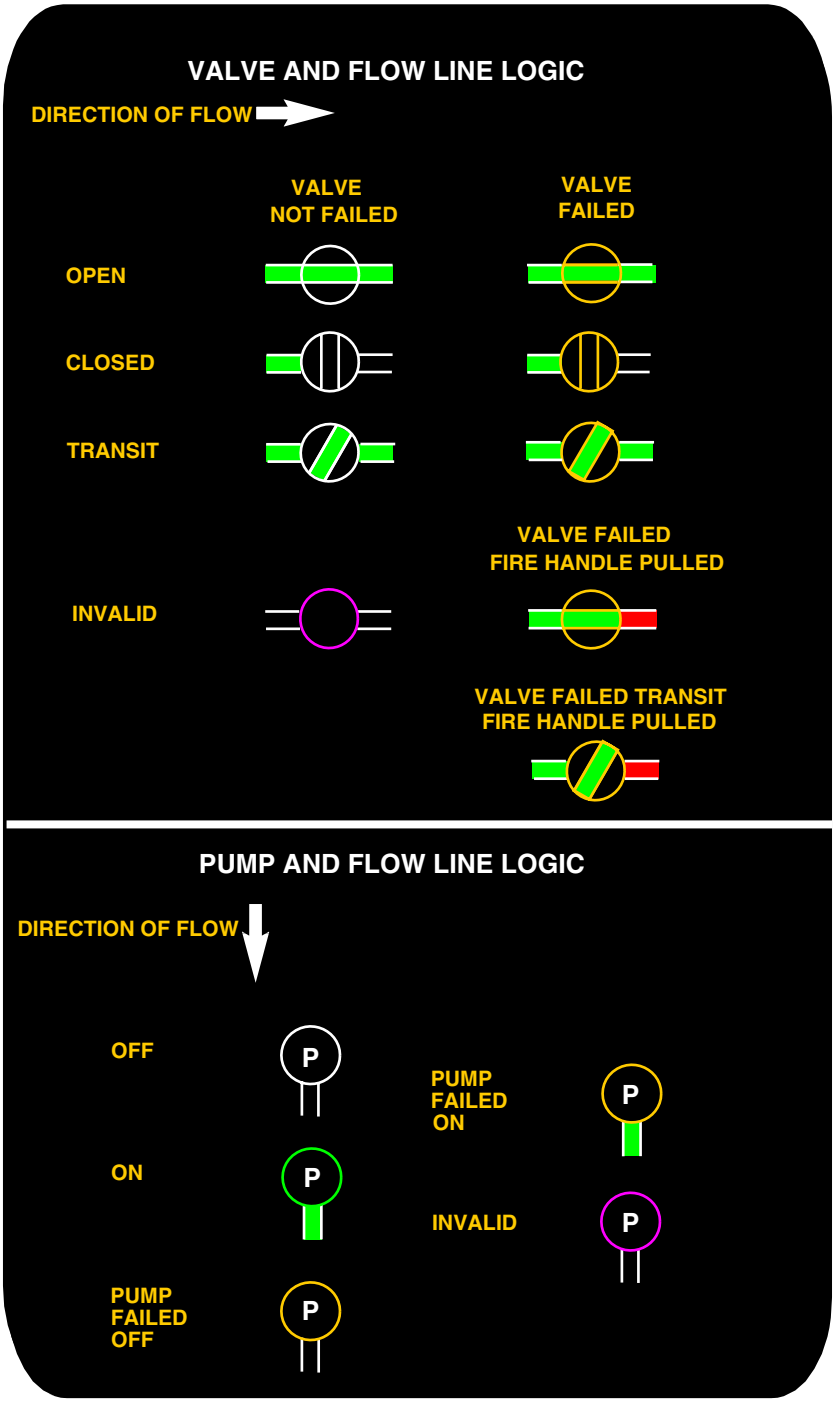
- White – Hydraulic pressure > 3200 psi.
- Green – Hydraulic pressure >1800 psi and ≤ 3200 psi.
- Amber – Hydraulic pressure ≤ 1800 psi.

GF1310_026a

HYDRAULIC SYNOPTIC PAGE SYMBOLS

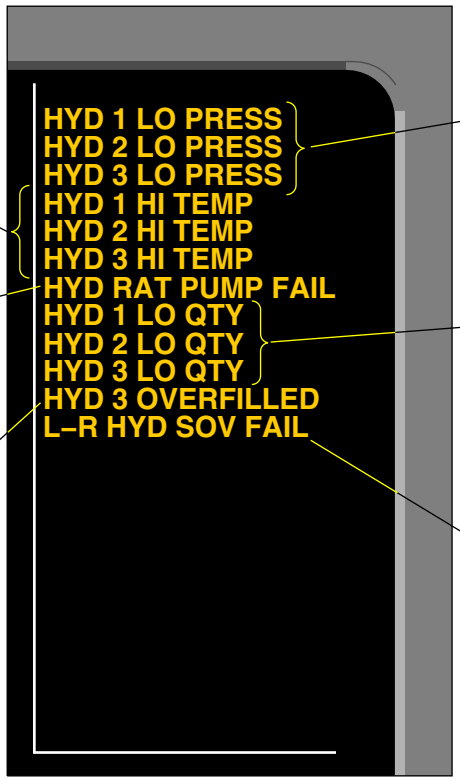
The following represents the EICAS symbols and flow line logic for the hydraulic synoptic page. The symbols are shown in serviceable and failure conditions.

EICAS Philosophy



GF1310_027

EICAS MESSAGES



HYD 1 (2)(3) HI TEMP
Indicates that the corresponding system fluid temperature is ≥ 96°C.

HYD RAT PUMP FAIL
Indicates that the RAT pump has a low output pressure (≤ 1800 psi).

HYD 3 OVERFILLED
Indicates that system 3 quantity is more than 70% with the system pressurized on the ground.

HYD 1 (2)(3) LO PRESS
Indicates that the corresponding system pumps (both) in each system have a low pressure output (≤1800 psi).

HYD 1 (2)(3) LO QTY
Indicates that the corresponding system is at the lower quantity limit.

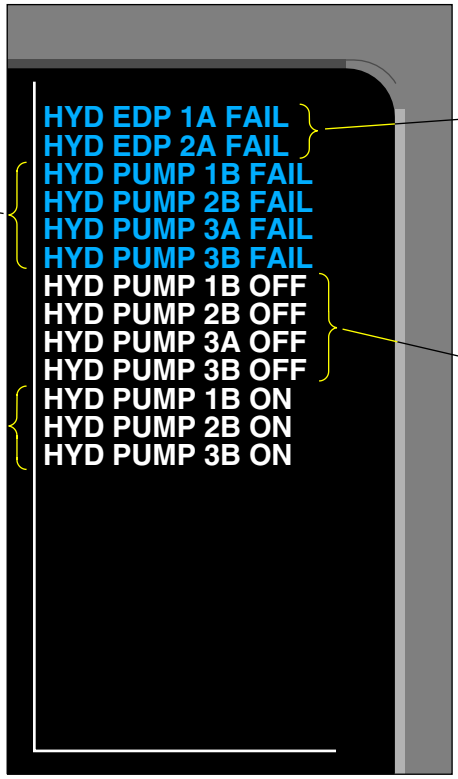
L (R) HYD SOV FAIL
Indicates that the hydraulic shutoff on the affected side did not go to its commanded position (open or closed).

GF1310_028a

EICAS MESSAGES (CONT'D)

HYD PUMP 1B, 2B, 3A or 3B FAIL
Indicates that the corresponding pump has a low pressure output (≤1800 psi) when commanded on.

HYD PUMP 1B ,2B, 3B ON
Indicates that the corresponding pump is selected on.

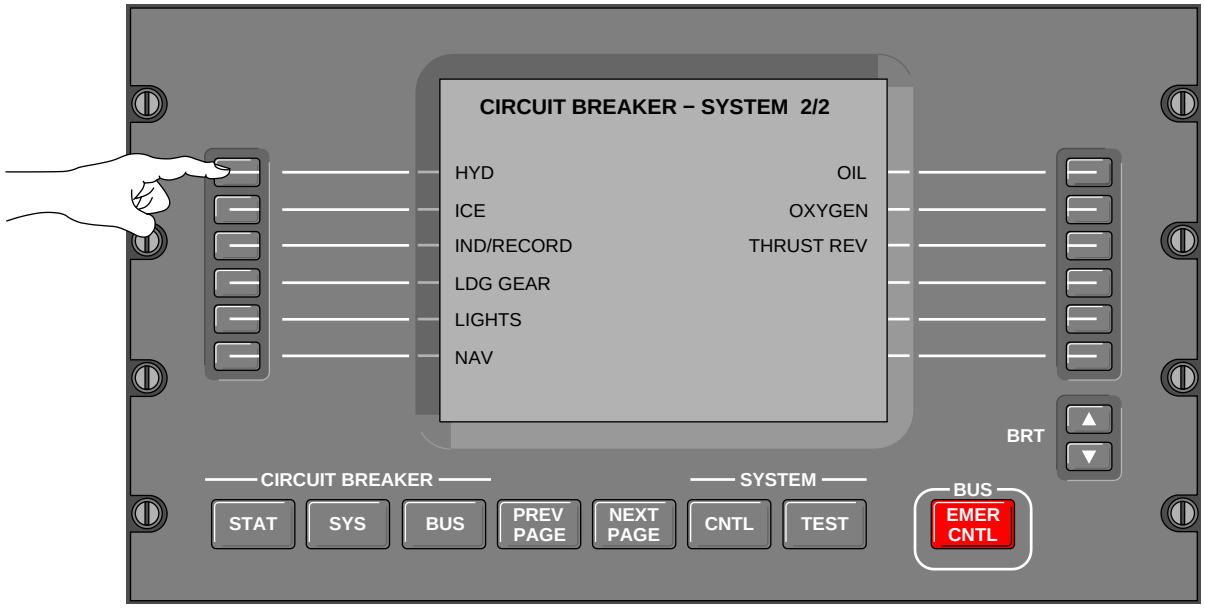


HYD EDP 1A or 2A FAIL
Indicates that the corresponding engine driven pump (1A or 2A) has a low pressure output (≤1800 psi) when the engine is running.

HYD PUMP 1B, 2B, 3A, 3B OFF
Indicates that the corresponding pump is selected off.

GF1310_029

CB - HYD SYSTEM



CB − HYD SYSTEM 1/2		
HYD 1 PRESS XDCR	DC1	IN
HYD 2 PRESS XDCR	DC2	IN
HYD 3 PRESS XDCR	BATT	IN
HYD PUMP 1B	AC 3	IN
HYD PUMP 2B	AC 2	IN
HYD PUMP 3A	AC 4	IN

CB − HYD SYSTEM 2/2			
HYD PUMP 3B	AC 1		IN
L HYD SOV	DC EMER	DCPC	IN
R HYD SOV	DC EMER	DCPC	IN

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