

DC-10
FLIGHT CREW OPERATING MANUAL

CHAPTER 12
HYDRAULIC POWER

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HYDRAULIC POWER

GENERAL

The hydraulic power system consists of three, parallel, continuously pressurized systems. Each system is powered by two engine-driven hydraulic pumps. Additionally, two electrical auxiliary pumps are provided in system 3. Emergency hydraulic power is available from one of these auxiliary pumps when powered by the air-driven generator (ADG). Two, reversible motor-pumps can transfer power from an operating to an unpressurized system in the event of engine failure, and two, non-reversible motor-pumps will provide transfer of power to certain components of the flight control system.

DESCRIPTION

ENGINE-DRIVEN PUMPS

Each of the three engines has a left and right hydraulic pump to pressurize the three, normally independent, hydraulic systems. These systems power the flight controls, horizontal stabilizer, landing gear, brakes, and nose-wheel steering. The pumps are normally controlled by individual switches on the Flight Engineer's Panel. A fire shutoff valve in each system controls the fluid supply to both pumps of the associated engine. If electrical control power for any pump is interrupted, that pump will remain operational, or will start automatically if previously turned OFF.

AUXILIARY PUMPS

Two electrical auxiliary hydraulic pumps in hydraulic system 3 are primarily for ground use with the engines shut down. The auxiliary pumps can be individually controlled from the Flight Engineer's station or simultaneously controlled by a switch on the Pilot's Overhead Panel. Additionally, auxiliary hydraulic pump 1 can be used as an emergency pressure source for the flight controls. In the event of loss of all three engines, the ADG can be deployed to provide electrical power directly to one auxiliary pump.

REVERSIBLE MOTOR-PUMPS

The reversible motor-pumps are installed to transfer pressure from an operating hydraulic system to an unpressurized hydraulic system (1-3 and 2-3). Pressure can be transferred in either direction. No fluid transfer takes place, the transfer of energy is mechanical. Control switches for these pumps are on the Flight Engineer's panel. If the fluid in the reservoir of either the operating system or the system being pressurized falls below a preset minimum, that motor-pump combination will automatically stop operating.

NON-REVERSIBLE MOTOR-PUMPS

Two, non-reversible motor-pumps provide transfer of hydraulic pressure from one system to another to power the lower rudder, upper

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rudder, and horizontal stabilizer. The non-reversible motor-pumps may be deactivated by moving the RUDDER STBY PWR switch to OFF. For a detailed description and functional diagram of these components, refer to Flight Controls, Chapter 9.

HYDRAULIC SYSTEM ENHANCEMENT

Hydraulic system enhancement consists of a motor operated shutoff valve and check valve in system 3. This maintains integrity if there is an uncontained failure of engine 2. The system uses reservoir level sensing to detect fast or slow leakage, and automatically shuts off the system 3 elevators and 3-2

non-reversible motor pump when the fluid in the reservoir reaches a predetermined level. Enough fluid in system 3 remains for pitch and roll through use of horizontal stabilizer trim and lateral controls powered by system 3. A HYD SYS 3 ELEV OFF light in the cockpit will come on when the shutoff valve is closed.

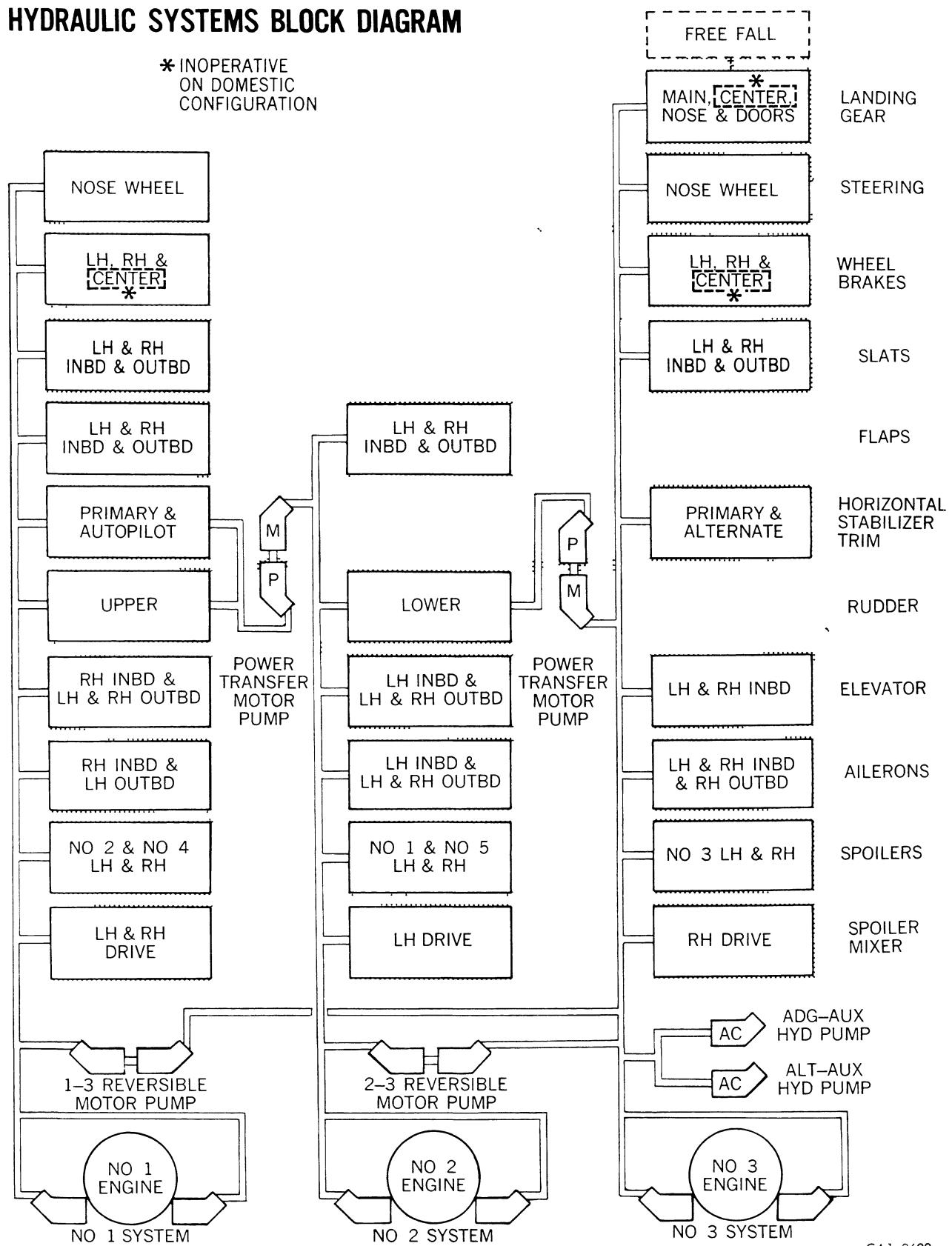
CONTROLS AND INDICATORS

Controls, indicators, and annunciator lights are on the Flight Engineer's Upper Panel No. 2 and No. 3, Overhead Panel, and Glare-shield. Illustrations of these major panels are in Chapter 1. Individual controls and indicators are illustrated and described in another section of this chapter.

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HYDRAULIC SYSTEMS BLOCK DIAGRAM

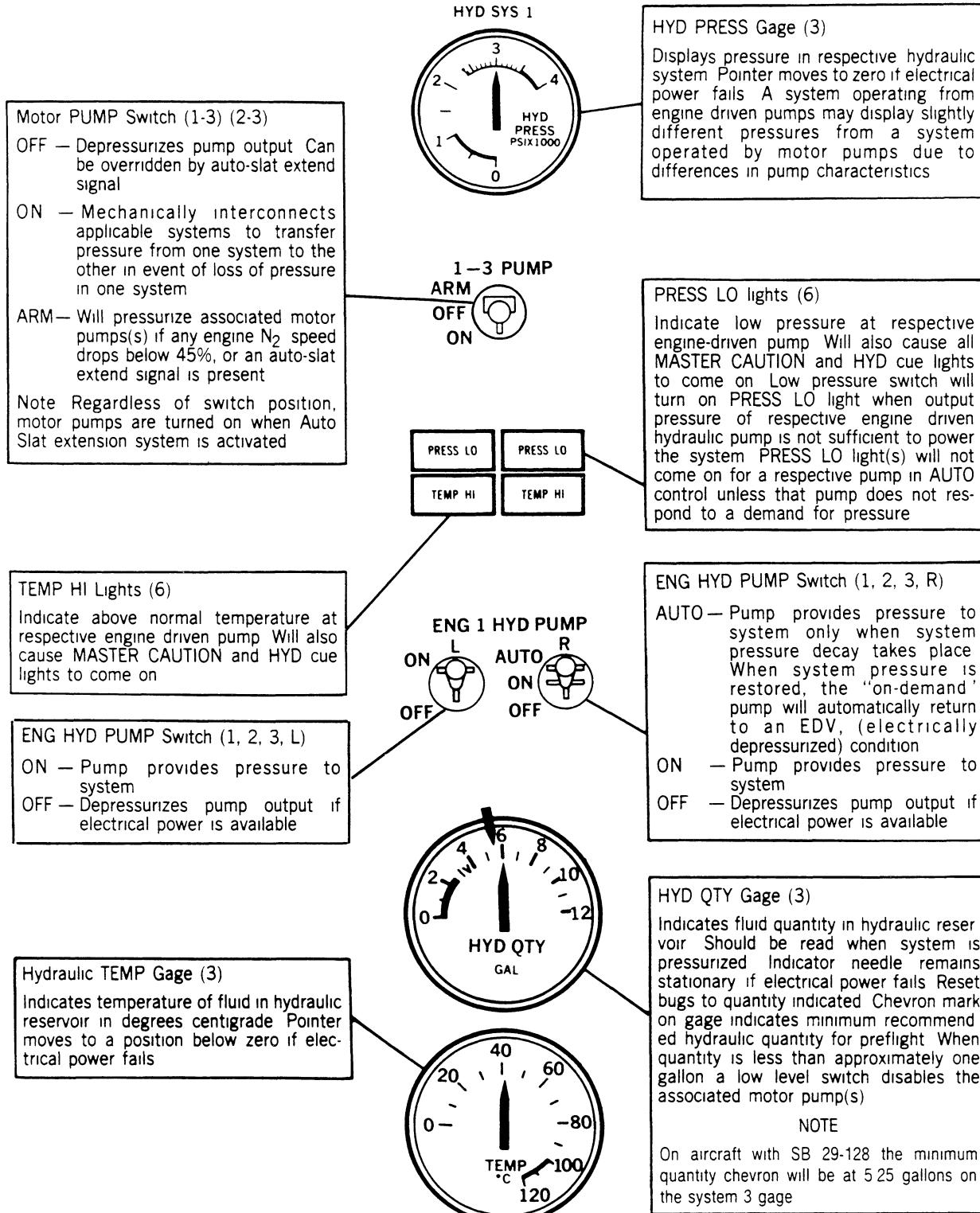


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HYDRAULIC SYSTEM - Controls and Indicators



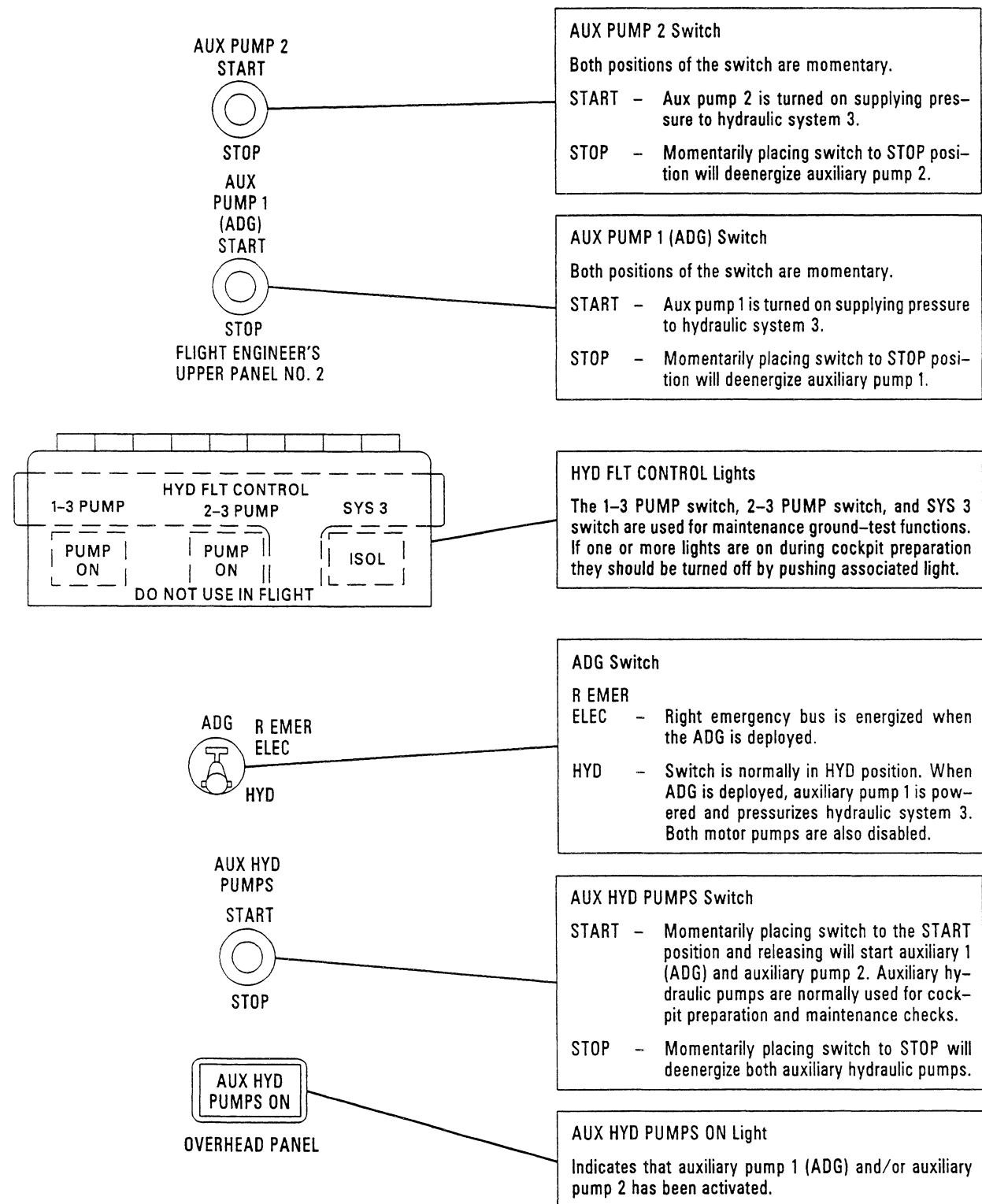
FLIGHT ENGINEER'S UPPER PANEL NO. 3

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HYDRAULIC SYSTEM – Controls and Indicators



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1-3/2-3 PUMP VALVE OPEN light effective on aircraft
with SB 29-109 or production equivalent.

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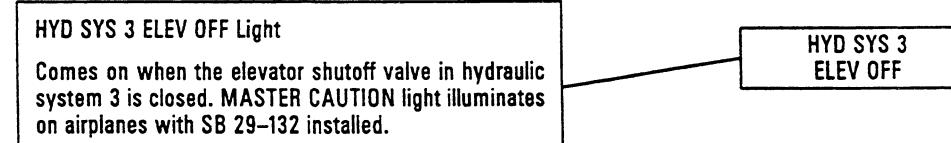
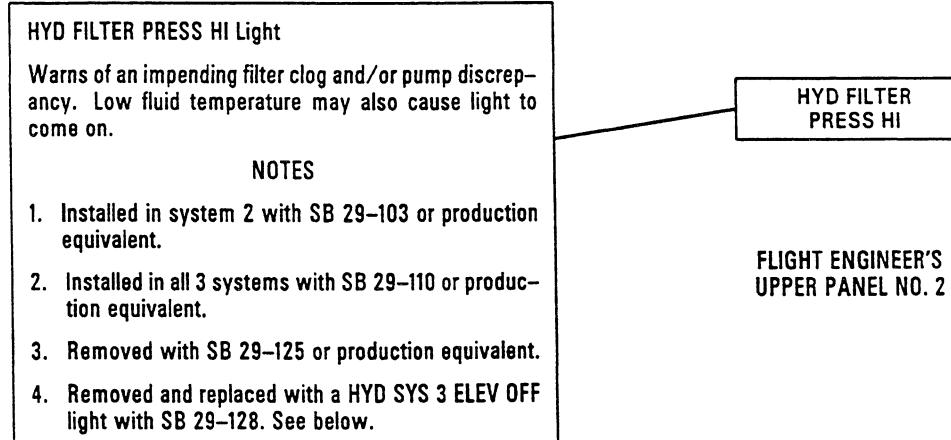
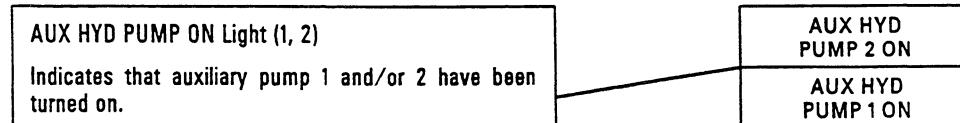
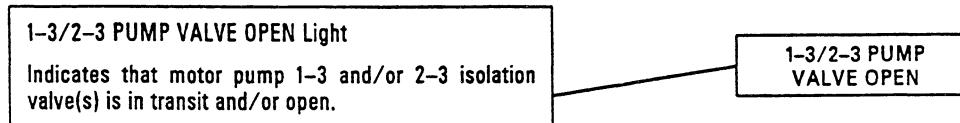
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HYDRAULIC SYSTEM - Controls and Indicators



INSTALLED ON AIRPLANES WITH SB 29-128.

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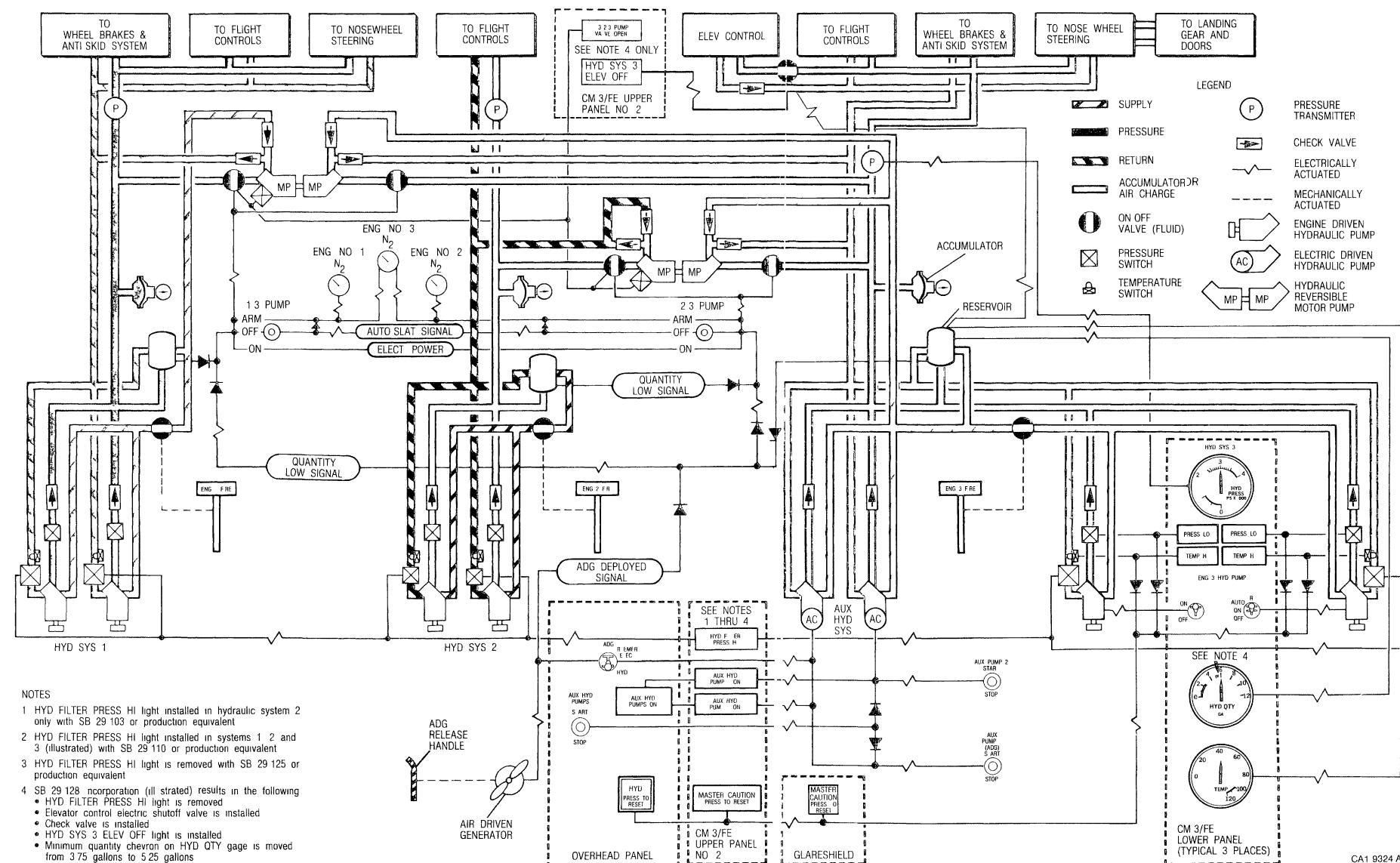
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HYDRAULIC SYSTEM



1-3/2-3 PUMP VALVE OPEN light effective on aircraft
with SB 29-109 or production equivalent.