36 Pnuematic

CHAPTER 36

LIST OF PAGE EFFECTIVITY

CHAPTER SECTION SUBJECT	PAGE	DATE
36-EFFECTIVITY/CONTENTS	1	May 30/75
36-00-00	1	May 30/75
	201	May 30/75
	202	May 30/75
	203	May 30/75
	204	May 30/75
	205	May 30/75
	206	May 30/75
	207	May 30/75
	208	May 30/75
	209	May 30/75

CHAPTER 36 - PNEUMATIC

TABLE OF CONTENTS

"END"

GENERAL - DESCRIPTION AND OPERATION

The pressure system on the Duke provides filtered air for deicer, autopilot and gyro instrument operation. Air pressure is supplied by two engine-driven dry air pumps. Pressure is controlled by a supply pressure regulator located in each nacelle. From the supply pressure regulator, air then flows to the pressure manifold, located below the pilot's and copilot's floorboards. Air from the manifold is distributed to the instruments and the deicer and autopilot systems (if installed).

Pressure from the pressure manifold to the gyro instruments is regulated. On airplane serials P-3 through P-182, a single regulator is located on the RH side of the pilot's compartment, forward and below the instrument panel. The gyro instrument pressure may be monitored on the gyro instrument pressure gage. On airplane serials P-183 and after, the pilot's and copilot's gyro instrument supplies are separated and each is supplied by separate pressure regulators. These regulators are located near the manifold, below the RH floorboards, forward of the main spar. A selector valve is provided to permit monitoring the pilot's or copilot's gyro instrument pressures on the gage.

"END"

GENERAL - MAINTENANCE PRACTICES

SERVICING

Impurities and foreign matter are removed from the air by two separate filters before entering the pressure manifold. On serials P-3 through P-246 which have not complied with Service Instructions 0595-194 the intake filter, located forward of the rear engine baffle, should be removed and cleaned every 100 hours. The paper filter on serials P-247 and after cannot be cleaned and should be replaced every 300 to 500 hours or annually.

CAUTION

In the event the paper filter is contaminated by solvent it must be replaced.

The sealed inline filter on the pressure side of the pressure pump, located in each nacelle aft of the firewall, should be replaced every 150 hours of operation for serials P-3 through P-159 except P-158 and every 300 hours of operation for serials P-158, P-160 and after.

ADJUSTMENT

Adjustment of the pneumatic pressure system is performed by adjusting the various regulators in a specified sequence. A PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART corresponding to applicable illustrations and a general adjustment procedure for each individual regulator are provided on the following pages.

On serials P-158 and after and those prior airplanes which have complied with Part II of Service Instructions 0433-190 that are equipped with an H-14 autopilot and a surface deice system incorporate a normally open by-pass valve for the H-14 Autopilot pneumatic pressure regulator. The valve causes air to bypass the regulator except in the deice mode thus eliminating air pressure drop across the regulator and permitting a lower system operating pressure for increased air pump life.

SINGLE STAGE SUPPLY PRESSURE REGULATOR

The single stage supply pressure regulator is used when the basic pressure system or the basic with H-14 autopilot pressure system is installed. The regulator is located in the RH side of each nacelle, aft of the firewall. The regulator may be adjusted as follows:

a. Remove the cap from the supply pressure test point located in the pressure line between the regulator and the inline air filter.

b. Install a test gage (0-20 psi) on the supply pressure test point.

c. Loosen the check nut and adjust the supply pressure regulator to the pressure indicated on the PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART. The engine should be running at 2500 rpm while the adjustment is being made. Rotate the adjusting screw clockwise to increase pressure and counterclockwise to decrease pressure.

d. Tighten the check nut, remove the test gage and reinstall the cap on the test point.

e. Repeat the above procedure on the opposite side of the airplane.

TWO STAGE SUPPLY PRESSURE REGULATOR

The two stage supply pressure regulator is used when the basic with deicer pressure system or the basic with deicer and H-14 autopilot pressure system is installed. The regulator is located in the RH side of each nacelle, aft of the firewall. The regulator may be adjusted as follows:

a. Loosen the check nut on the low pressure section of the regulator (section with the cutout solenoid attached) and adjust to the pressure indicated on the PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART. The engine should be running at 2500 rpm and the deicer system turned off while the adjustment is being made. Rotate the adjusting screw clockwise to increase pressure and counterclockwise to decrease pressure.

b. Tighten the check nut on the low pressure section of the regulator.

c. Loosen the check nut on the high pressure section of the regulator (section without the cutout solenoid attached) and adjust to the pressure indicated on the PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART. The engine should be running at 2500 rpm and the deicer system turned on while the adjustment is being made. Rotate the adjusting screw clockwise to increase pressure and counterclockwise to decrease pressure.

d. Tighten the check nut on the high pressure section of the regulator.

e. Repeat the above procedure on the opposite side of the airplane.

EJECTOR REGULATOR (P-308 and after; EQUIPPED WITH SURFACE DEICE)

A regulator is installed in the supply line for the ejector which develops the vacuum used in the cabin pressurization system on airplane serials P-308 and after, if equipped with surface deice. This regulator may be adjusted by the following suggested procedure:

a. Remove the plug from the port adjacent to the regulator outlet port.

b. Connect a pressure gage to this port.

c. Operate one engine at a speed of 2500 rpm.

d. Loosen the check nut and adjust the regulator to the pressure indicated on the PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART. Monitor the outlet pressure on the test gage and the inlet pressure of the regulator on the pneumatic pressure gage. Turn the adjustment clockwise to increase the pressure, counterclockwise to decrease the pressure. Tighten the check nut.

e. Remove the test gage and replace the plug.

GYRO INSTRUMENT PRESSURE REGULATOR

The gyro instrument pressure supply is regulated on all configurations of the pressure system. On airplane serials P-3 through P-182, a single gyro instrument pressure regulator is used. This regulator is located on the RH side of the pilot's compartment, forward and below the instrument panel.

On airplane serials P-183 and after, a pair of gyro instrument pressure regulators are located below the RH floorboards of the pilot's compartment, just forward of the main spar. Access may be gained to these regulators by removing the carpet and an access panel. A selector valve on the subpanel permits switching the gyro instrument pressure gage to monitor either the pilot's or copilot's gyro instrument pressure.

GYRO INSTRUMENT PRESSURE REGULATOR ADJUSTMENT (P-3 thru P-182)

a. Loosen the check nut and adjust the regulator to the pressure indicated on the PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART. Both engines should be running at 2500 rpm while the adjustment is being made. Rotate the adjusting screw clockwise to increase pressure and counterclockwise to decrease pressure.

b. Tighten the check nut on the regulator.

GYRO INSTRUMENT PRESSURE REGULATOR ADJUSTMENT (P-183 and after)

a. Remove the carpet and the instrument air regulator access panel from the RH floorboards just forward of the main spar.

b. Operate both engines at 2500 rpm while the adjustment is being made.

c. Select the PILOT position of the selector valve to permit monitoring the pilot's gyro instrument supply pressure.

d. Loosen the check nut and adjust the regulator supplying pressure to the pilots gyro instruments. Adjust the regulator to the pressure indicated on the PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART, CHART 201. Rotate the adjusting screw clockwise to increase, counterclockwise to decrease the pressure.

e. Tighten the check nut on the regulator.

f. Select the COPILOT position of the selector valve.

g. Loosen the check nut and adjust the regulator supplying pressure to the copilot's gyro instruments.

h. Tighten the check nut on the regulator.

i. Shut down the engines.

j. Replace the access panel and carpeting.

TURN AND SLIP PRESSURE REGULATOR

A turn and slip pressure regulator is installed for each pressure-driven turn and slip indicator. The regulator is located on the turn and slip indicator forward of the instrument panel. The regulator may be adjusted as follows:

a. Remove the glareshield and/or radio panel to provide access to the back side of the turn and slip indicator.

b. Remove the plug on the upper side of the regulator and install a test gage (0-5 in. Hg).

c. Loosen the check nut and adjust the turn and slip regulator to the pressure indicated on the PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART. Both engines should be running at 2500 rpm while the adjustment is being made. Rotate the adjusting screw counterclockwise to increase pressure and clockwise to decrease pressure.

d. Tighten the check nut, remove the test gage and reinstall the plug in the regulator.

e. Reinstall the glareshield and/or radio panel.

H-14 AUTOPILOT PRESSURE REGULATOR

The H-14 autopilot pressure regulator is used only with the basic with deicer and H-14 autopilot pressure system. The regulator is located inside the tail section just aft of the aft pressure bulkhead (see Figure 207). Adjust the regulator as follows:

a. Remove the cap from the autopilot pressure test point and install a test gage (0-20 psi).

b. Loosen the check nut and adjust the regulator to the pressure indicated on the PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART. Both engines should be running at 2500 rpm while the adjustment is being made. Rotate the adjusting screw clockwise to increase pressure and counterclockwise to decrease pressure.

c. Tighten the check nut, remove the test gage and reinstall the cap on the test point.

CHART 201
PNEUMATIC PRESSURE SYSTEM ADJUSTMENT

	Single Stage Supply Pressure Regulator	Two Stage Supply Pressure Regulator	Gyro Instrument Pressure Regulator	Turn and Slip Pressure Regulator	Autopilot Pressure Regulator	Aileron Servo Pressure Regulator
Basic System. (Figure 201 and Figure 202)	[1] 7.5 ± .5 psi * on test gage. Engine running at 2500 rpm. Adjust each side individually. **		[2] 5.25 ± .25 inches Hg * on gyro pressure indicator. Both engines running at 2500 rpm. †††	[3] 2.3 ± .2 inches Hg *** on test gage. Both engines running at 2500 rpm.		
Basic with H-14 Autopilot (Figure 203)	[1] 11.8 to 12.3 psi on test gage. Both engines running at 2500 rpm with autopilot on. †		[2] 5.25 ± .25 inches Hg * on gyro pressure indicator. Both engines running at 2500 rpm. †††	[3] 2.3 ± .2 inches Hg *** on test gage. Both engines running at 2500 rpm.		[4] 5.3 to 5.8 psi on test gage. Both engines running at 2500 rpm with autopilot on.
Basic with Deice (Figure 204)		[1] 8.0 ± .5 psi * on pneumatic pressure gage. Both engines running at 2500 rpm with deice system off. † On airplane serials P-308 and after, adjust ejector regulator for 6-7 psi with 8.0 ± .5 psi on pneumatic pressure gage (Figure 206).	[3] 5.25 ± .25 inches Hg * on gyro pressure indicator. Both engines running at 2500 rpm. †††	[4] 2.3 ± .2 inches Hg *** on test gage. Both engines running at 2500 rpm.		
		[2] Adjust for peak pressure of 16 to 18 psi on pneumatic pressure gage. Both engines running at 2500 rpm with deice system on. †				
Basic With Deice, H-14 Autopilot and Pitch Trim (Figure 205)		[1] 11.3 to 11.8 psi on pneumatic pressure gage. †† Both engines running at 2500 rpm with autopilot on and deice system off. †	[3] 5.25 ± .25 inches Hg * on gyro pressure indicator. Both engines running at 2500 rpm. †††	[4] 2.3 ± .2 inches Hg *** on test gage. Both engines running at 2500 rpm.	[5] 11.0 to 11.5 psi on test gage. Both engines running at 2500 rpm with autopilot and deice system on.	[6] 5.3 to 5.8 psi on test gage. Both engines running at 2500 rpm with autopilot on and deice system off.
		[2] Adjust for peak pressure of 16 to 18 psi on pneumatic pressure gage. Both engines running at 2500 rpm with autopilot and deice system on. †				

Numbers designated ☐ outline sequence that regulators should be adjusted and refer to indexes on corresponding illustrations. Gyro Instrument Pressure Regulator and Turn and Slip Pressure Regulator shown on Basic Pressure System illustration (Figure 201 only).

*If airplane has more than two air-driven gyros, increase Supply Pressure Regulator setting minimum amount required to obtain 5.25 ± .25 inches Hg on gyro pressure indicator (maximum Supply Pressure Regulator setting to be 12.3 psi at test gage).

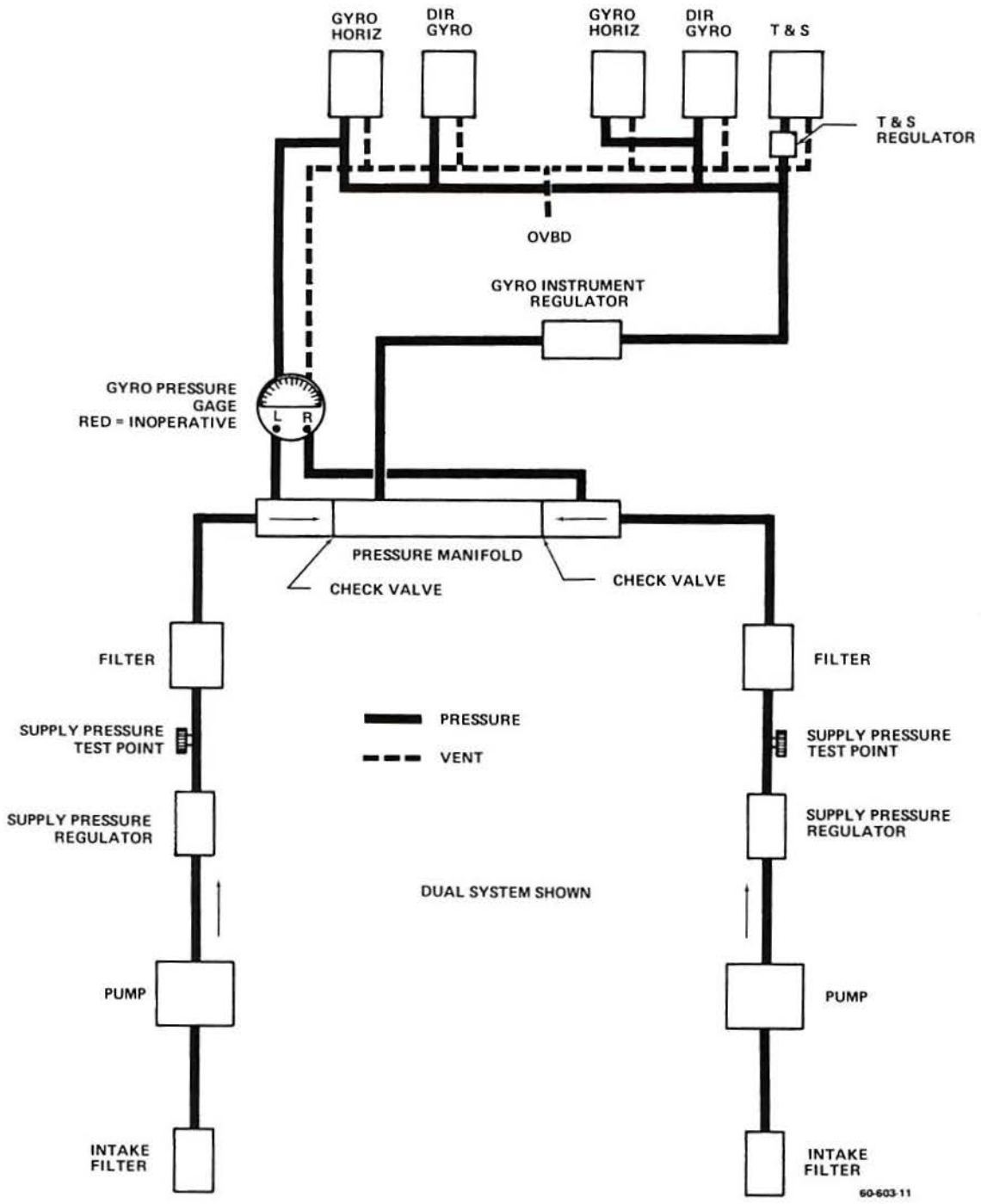
**Pressure will increase slightly with both engines running.

***Check in flight and if necessary, adjust to obtain standard rate turn.

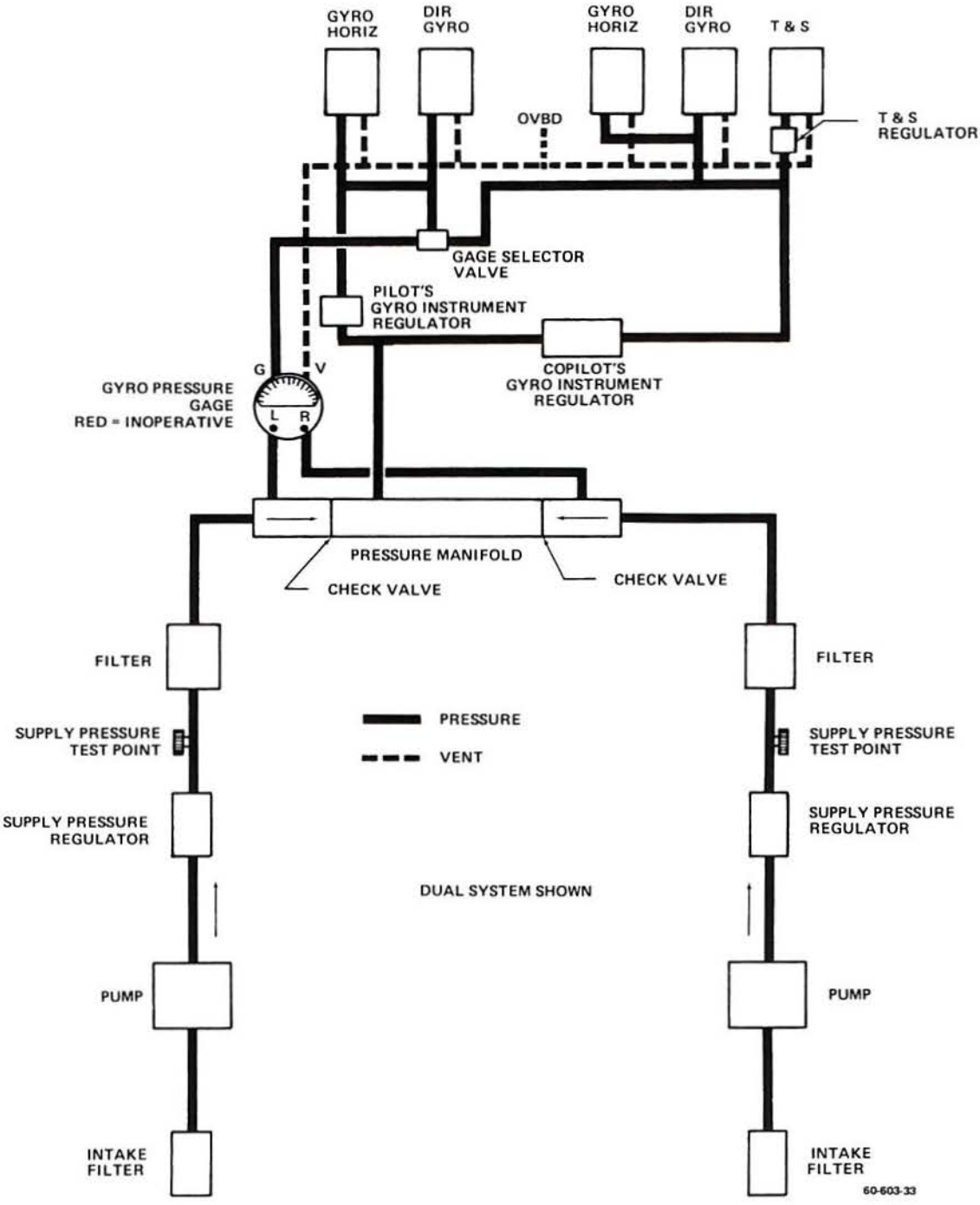
†Single-engine settings to be equalized at slightly lower pressure.

††13.5 to 14.5 psi on airplnaes prior to serials P-158 which do not have Kit No. 60-5015 S installed.

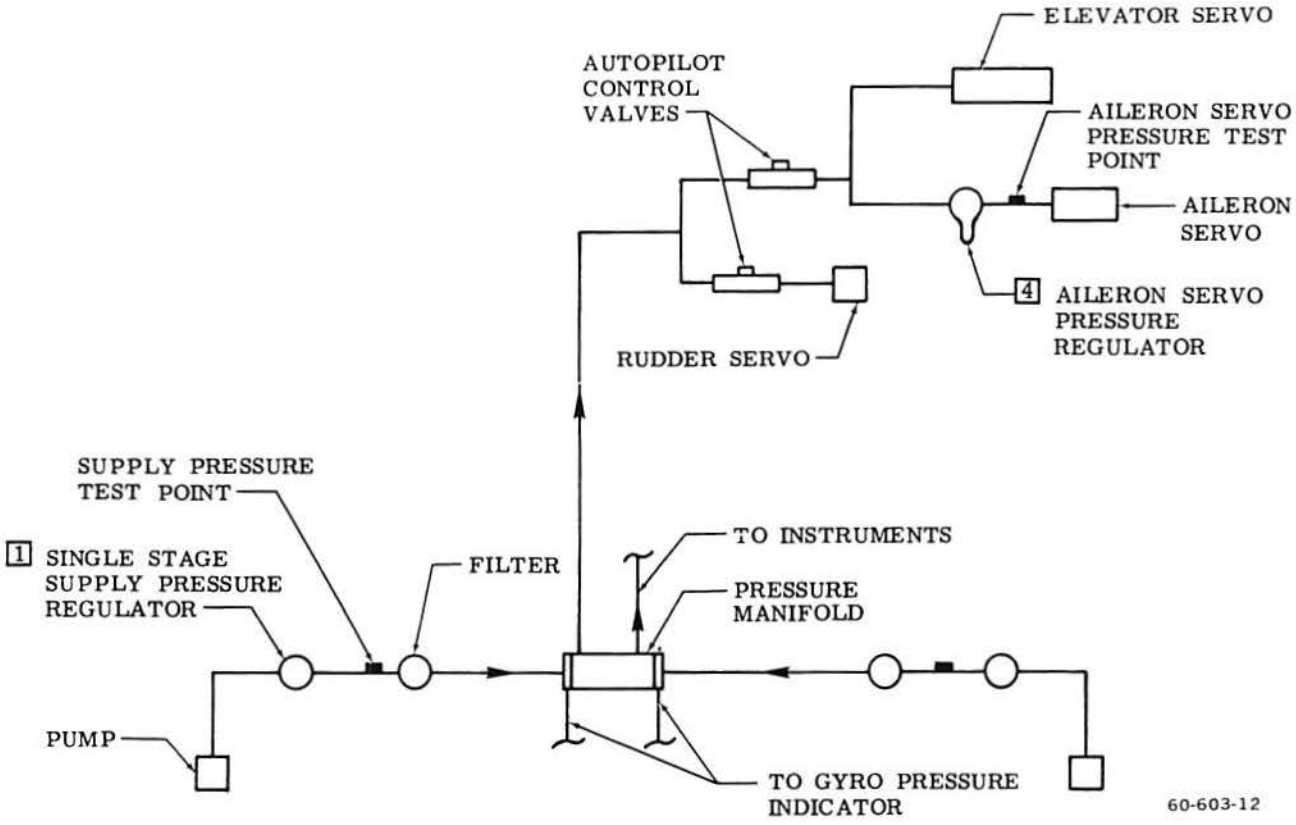
†††On airplane serials P-183 and after, select PILOT or COPILOT position of the gage selector to permit monitoring the gyro instrument pressure while adjusting the respective regulator.



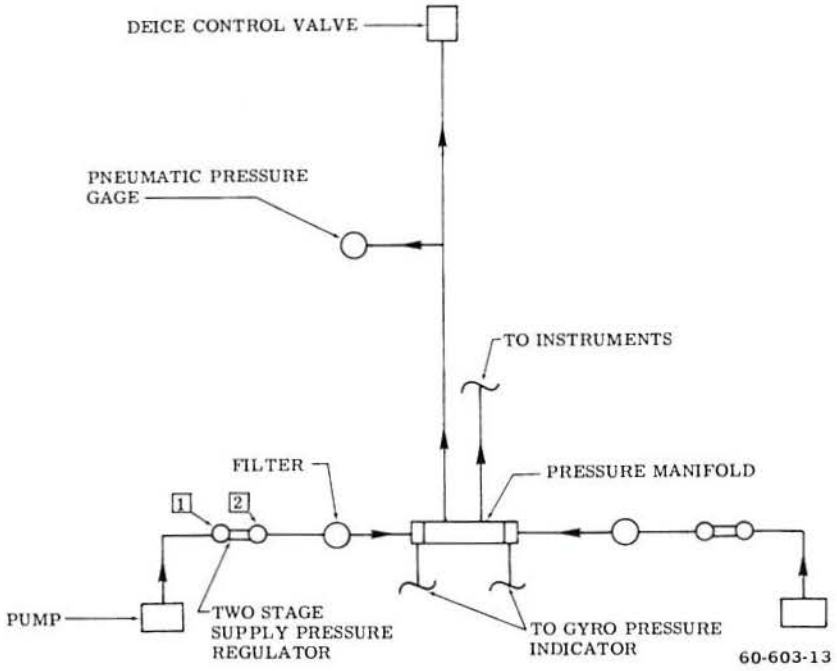
Pneumatic Pressure System (P-3 thru P-182)
Figure 201



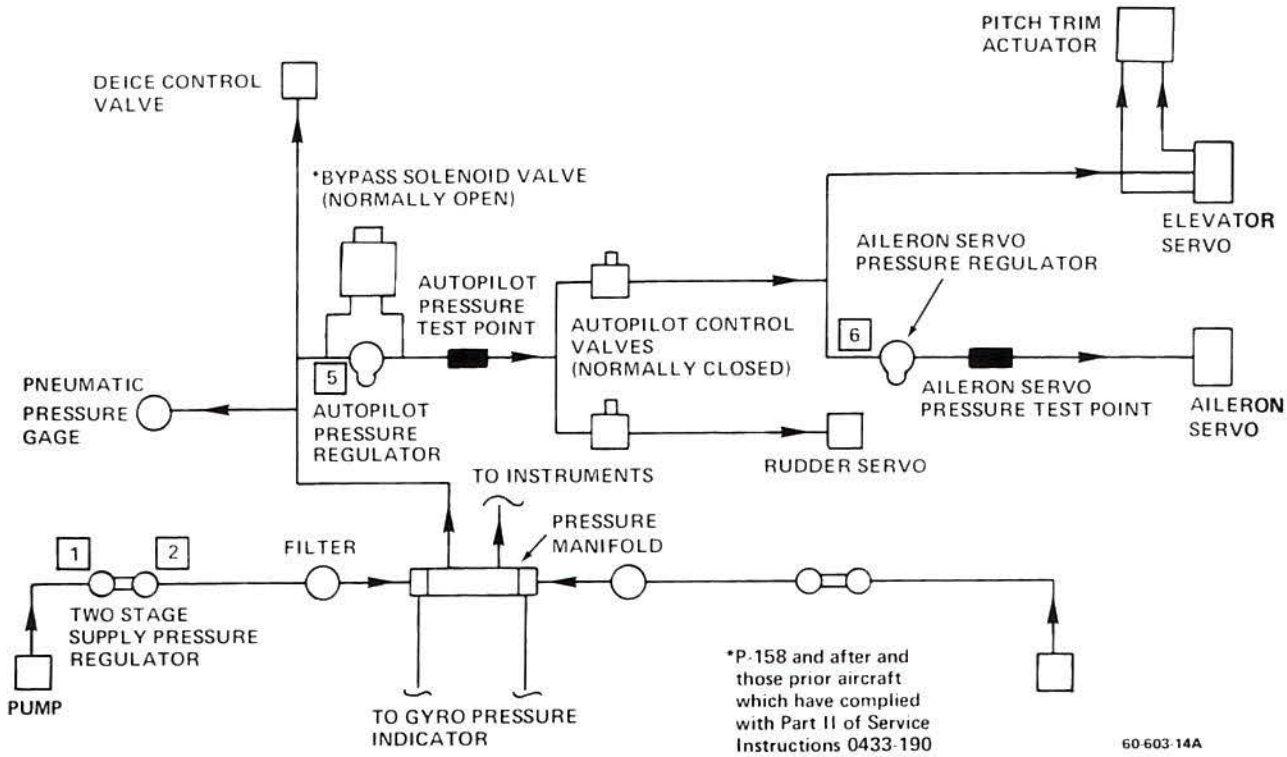
Pneumatic Pressure System (P-183 and after)
Figure 202



Pneumatic Pressure System (Basic with H-14 Autopilot)
Figure 203



Pneumatic Pressure System (Basic with Deice) (P-3 thru P-307)
Figure 204



Pneumatic Pressure System (Basic with H-14 Autopilot Deice and Pitch Trim)
Figure 205

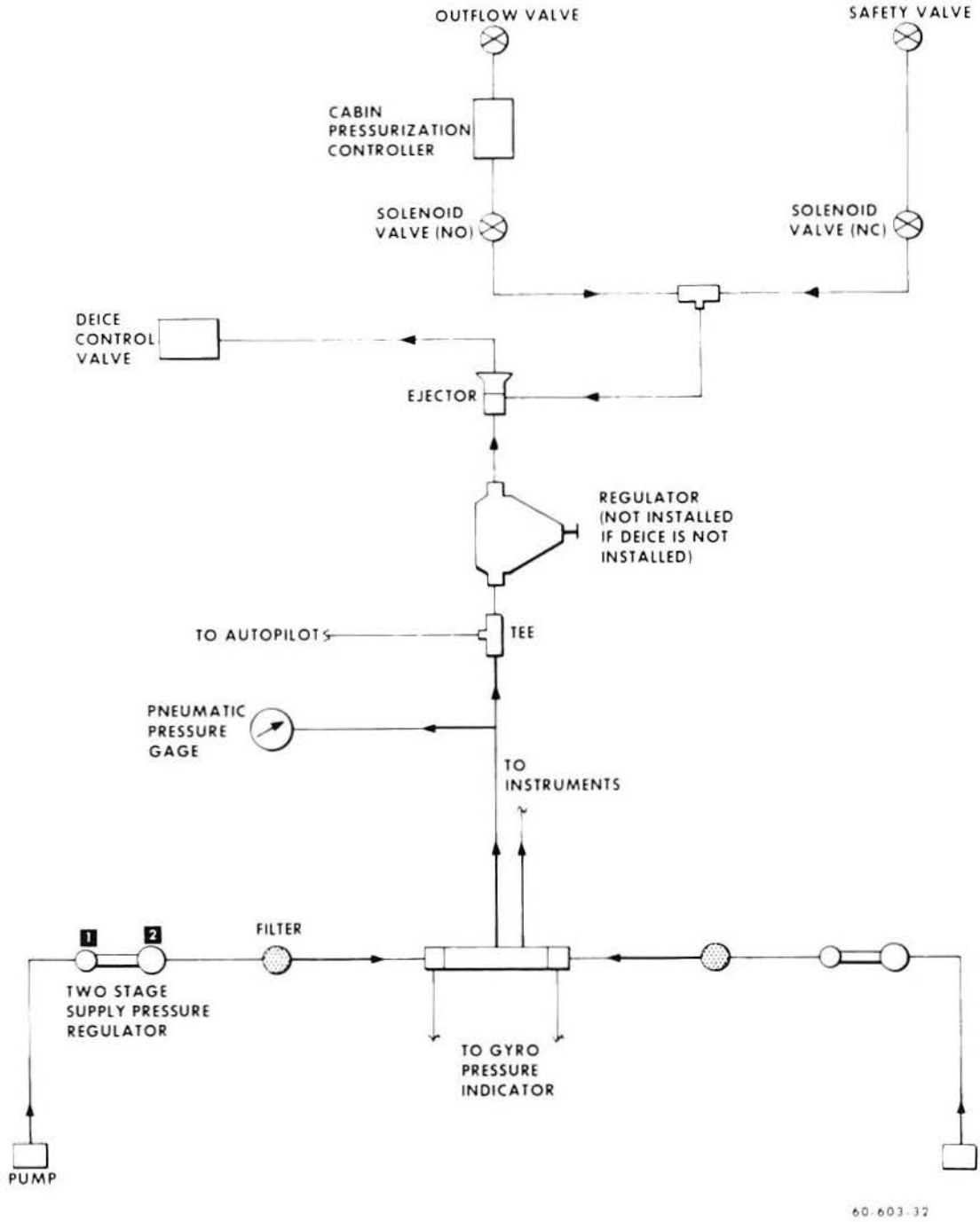
AILERON SERVO PRESSURE REGULATOR

The aileron servo pressure regulator is used when the H-14 autopilot is installed. The regulator is located inside the tail section just aft of the pressure bulkhead (see Figure 208). Adjust the regulator as follows:

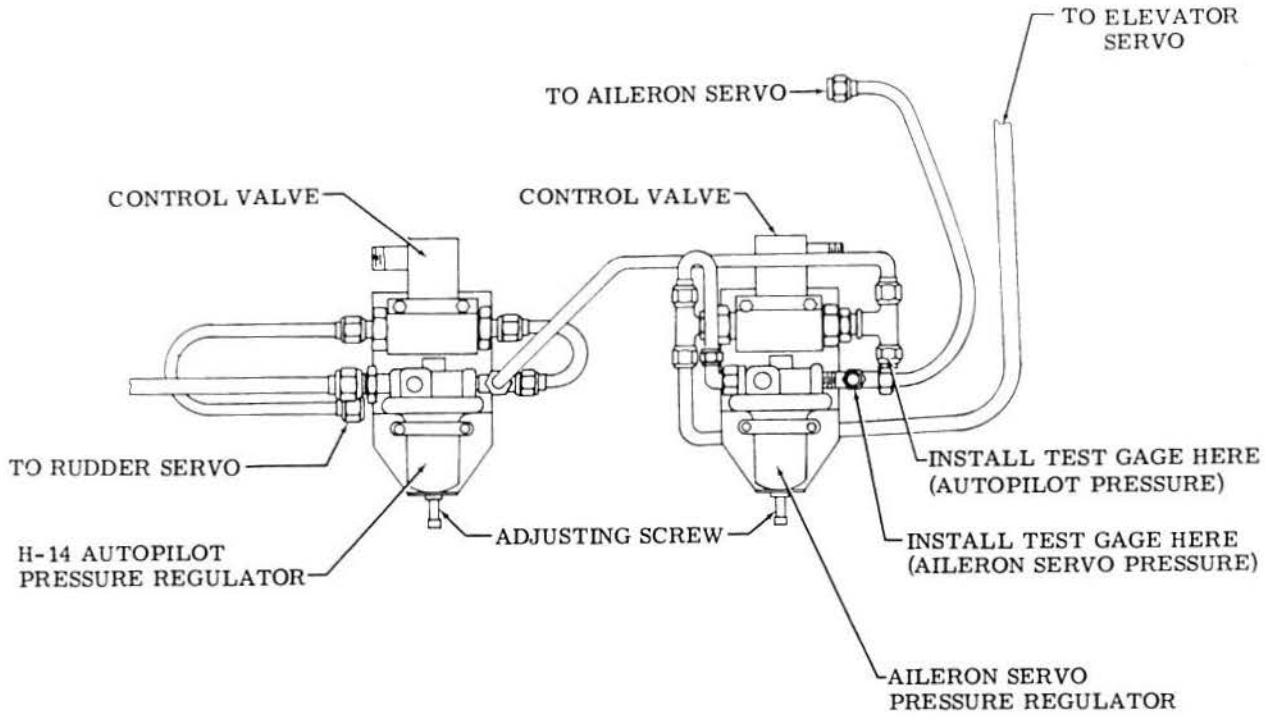
a. Remove the cap from the servo pressure test point and install a test gage (0-10 psi).

b. Loosen the check nut and adjust the regulator to the pressure indicated on the PNEUMATIC PRESSURE SYSTEM ADJUSTMENT CHART. Both engines should be running at 2500 rpm while the adjustment is being made. Rotate the adjusting screw clockwise to increase pressure and counterclockwise to decrease pressure.

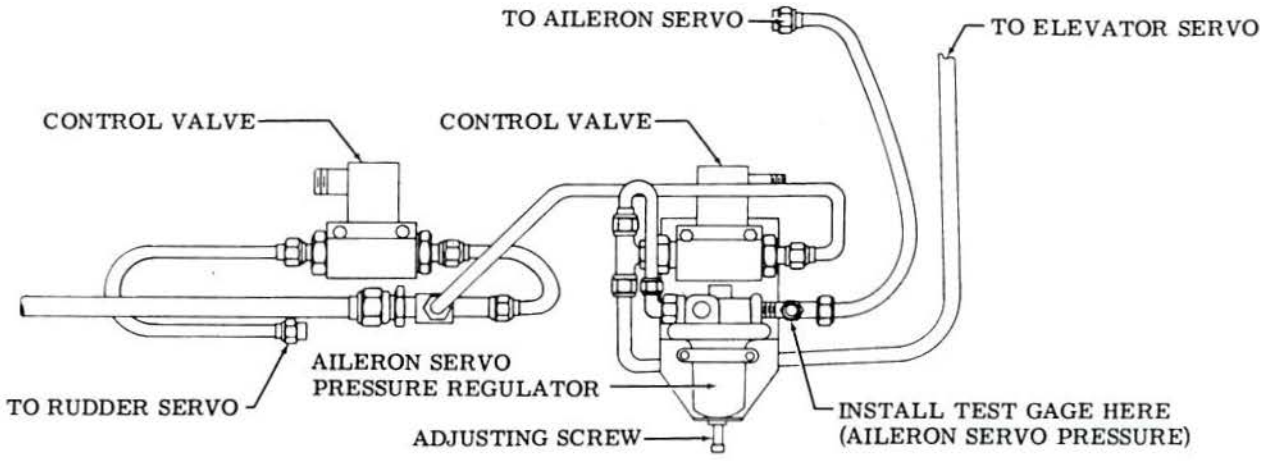
c. Tighten the check nut, remove the test gage and reinstall the cap on the test point.



Pneumatic Pressure System (Basic with Deice)
(P-308 and after)
Figure 206



Pressure Regulators (H-14 Autopilot and Aileron Servo)
Figure 207



Pressure Regulator (Aileron Servo)
Figure 208

"END"