Section IV

AUXILIARY EQUIPMENT

TABLE OF CONTENTS

AIR CONDITIONING, PRESSURIZATION, DEFROSTING, ANTI-ICING, AND RAIN REMOVAL SYSTEMS.

Hot compressed air, bled from the final stage of the engine compressor, is used by the air conditioning and pressurization system to maintain the desired cockpit temperature and pressure, and to supply the air demanded by the defrosting, anti-icing, and rain removal systems. (See figures 4-1 and 4-3.) The air conditioning and pressurization system provides air for pressurization of the drop tanks, canopy seal, and anti-G suit, and is used for the pilot's ventilated suit and for cooling the electronic equipment compartments. (Refer to Electronic Equipment Compartment Cooling System in this section.) An external pressure source may be connected to the system for testing or for cockpit air conditioning during ground operation.

COCKPIT AIR CONDITIONING.

The temperature of the air supplied to the cockpit is regulated by an automatic control system. The system directs the hot, engine compressor bleed air through the ram-air-cooled primary and secondary heat exchangers to a mixing chamber. (Refer to Heat Exchanger Cooling Airflow Circuits in section VII.) Both the primary heat

COCKPIT AIR CONDITIONING AND PRESSURIZATION

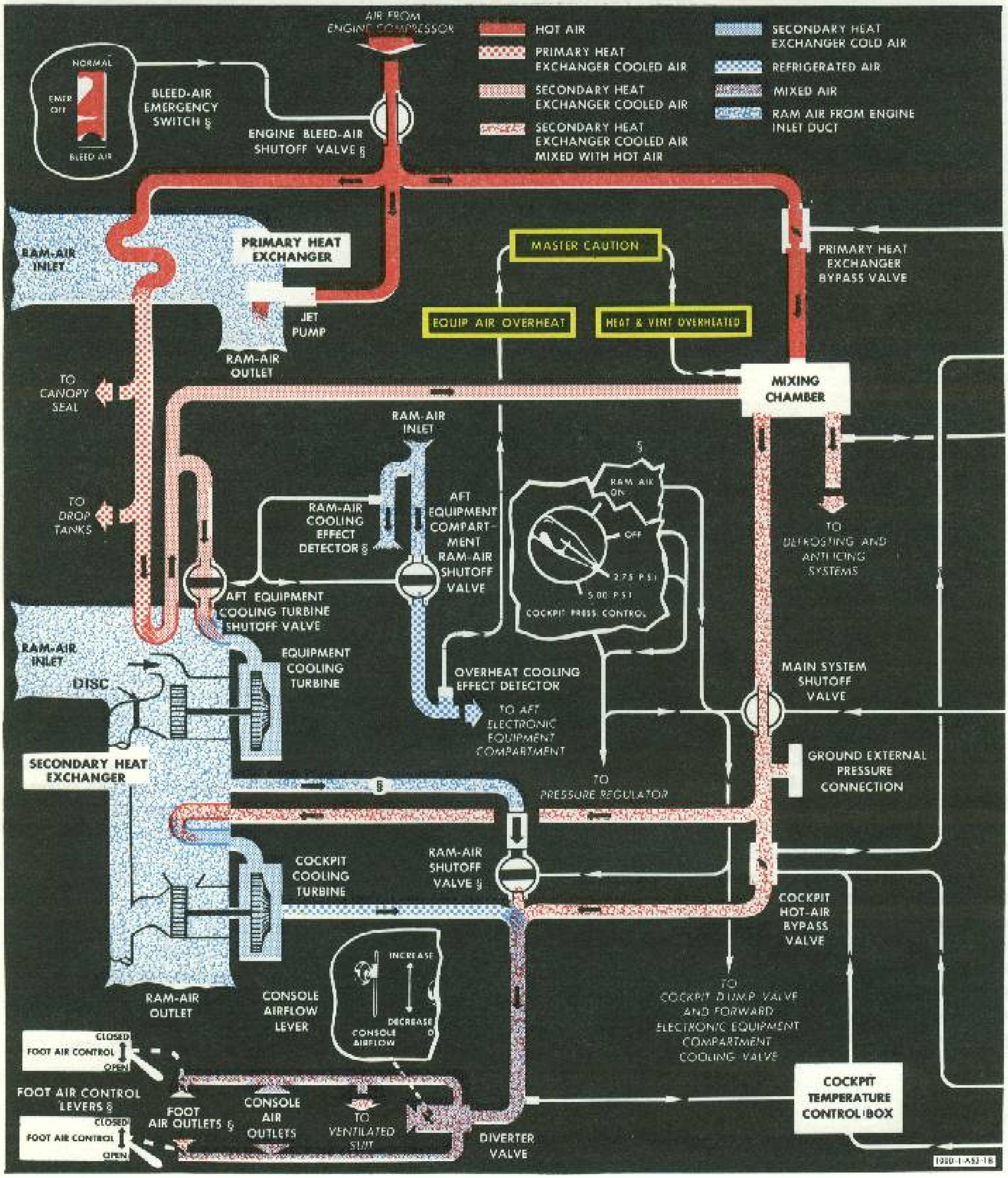


Figure 4-1 (Sheet 1 of 4)

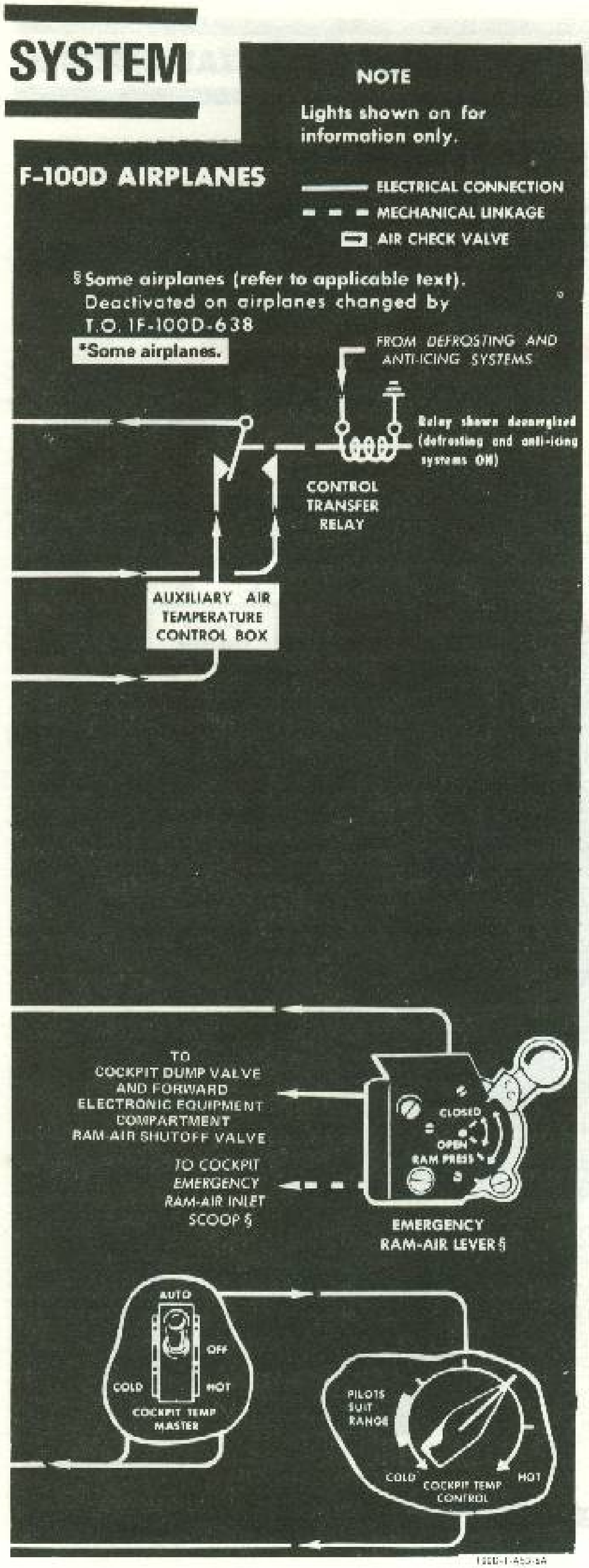


Figure 4-1 (Sheet 2 of 4)

exchanger bypass valve and the cockpit hot-air bypass valve are positioned by the cockpit temperature control box (defrosting and anti-icing systems OFF) to provide the selected temperature. Both valves are positioned by the cockpit temperature control box through the auxiliary temperature control box when the defrosting and anti-icing systems (pitot boom heat, windshield exterior air, or canopy and windshield defrost) are ON. Emergency cockpit ventilation is obtained from the manually operated ram-air scoop on F-100F Airplanes and F-100D-91 Airplanes, and by the RAM AIR ON position of the cockpit pressure selector switch on other F-100D Airplanes.*

COCKPIT PRESSURIZATION.

Cockpit pressure is maintained above 12,000 feet at a pilot-selected schedule of 2.75 psi or 5 psi (5 psi only on F-100F-20 Airplanes) by a pressure regulator that controls the discharge of the air conditioning air from the cockpit. When the 2.75 psi schedule is used, a cockpit pressure equal to that of 12,500 feet is maintained to a flight altitude of 21,200 feet, and a constant 2.75 psi differential between cockpit and atmospheric is maintained above 21,200 feet. When the 5 psi schedule is used, a cockpit pressure equal to that of 12,500 feet is maintained up to 31,000 feet and a 5 psi differential between cockpit and atmospheric is maintained above 31,000 feet. (A comparison of flight altitude to cockpit altitude for the selected pressure schedule is shown in figure 4-2.) If the cockpit pressure regulator fails, the cockpit dump valve automatically relieves any pressure above 5.4 psi.

NOTE

The minimum engine rpm needed to maintain cockpit pressurization is about 85%, depending on altitude and selected cockpit pressure schedule.

DEFROSTING, ANTI-ICING, AND RAIN REMOVAL SYSTEM.

Hot engine compressor bleed air for the defrosting, anti-icing, and rain removal systems is taken from the mixing chamber of the air conditioning and pressurization system. (See figures 4-1 and 4-3.) This air is supplied to the canopy and windshield for defrosting, and to the outer surface of the windshield for anti-icing and rain removal. Air from this system is also used for the anti-G suit valve(s), and on

*F-100D-21 through F-100D-31 and F-100D-46 through F-100D-86 Airplanes

COCKPIT AIR CONDITIONING AND PRESSURIZATION SYSTEM

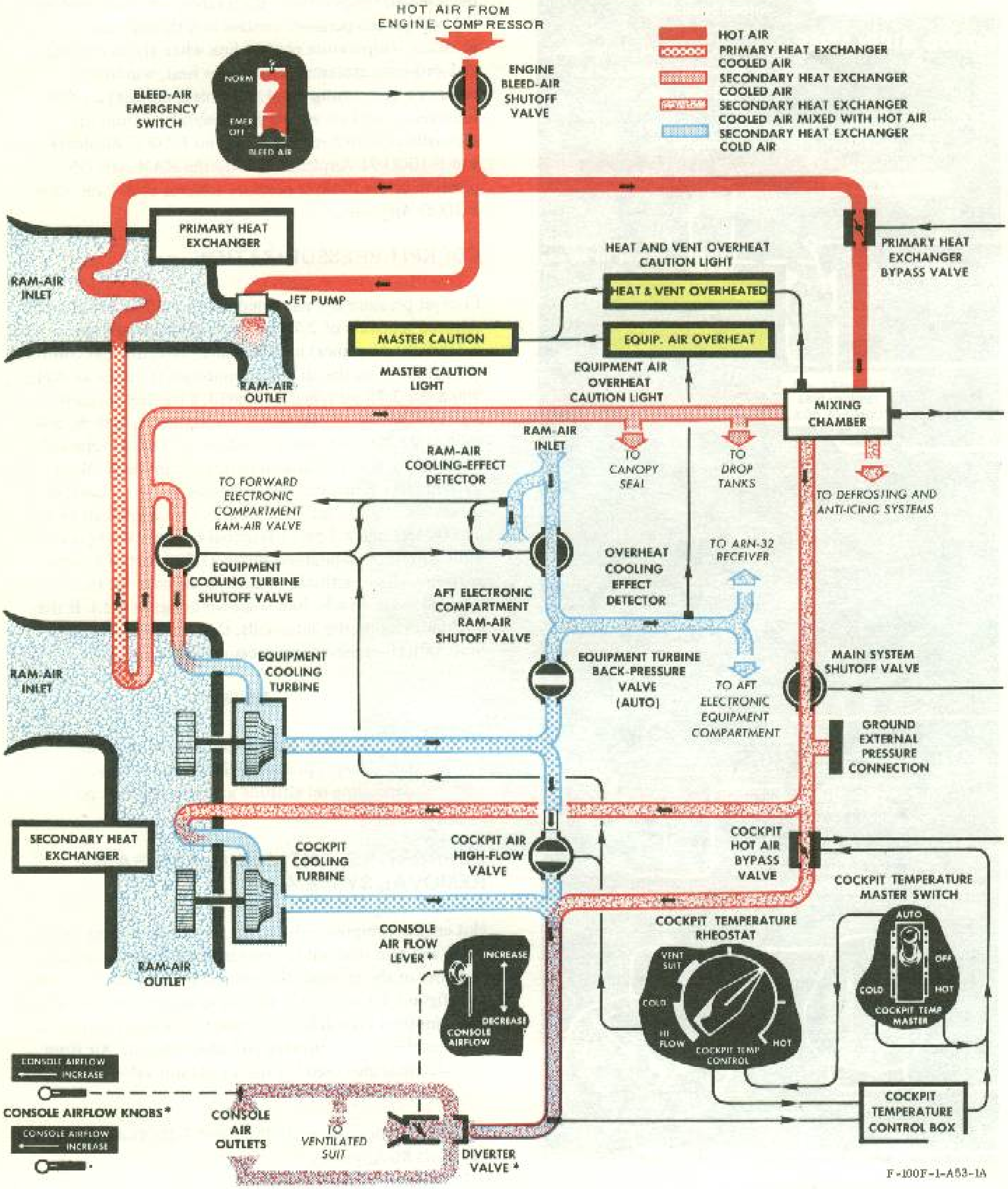
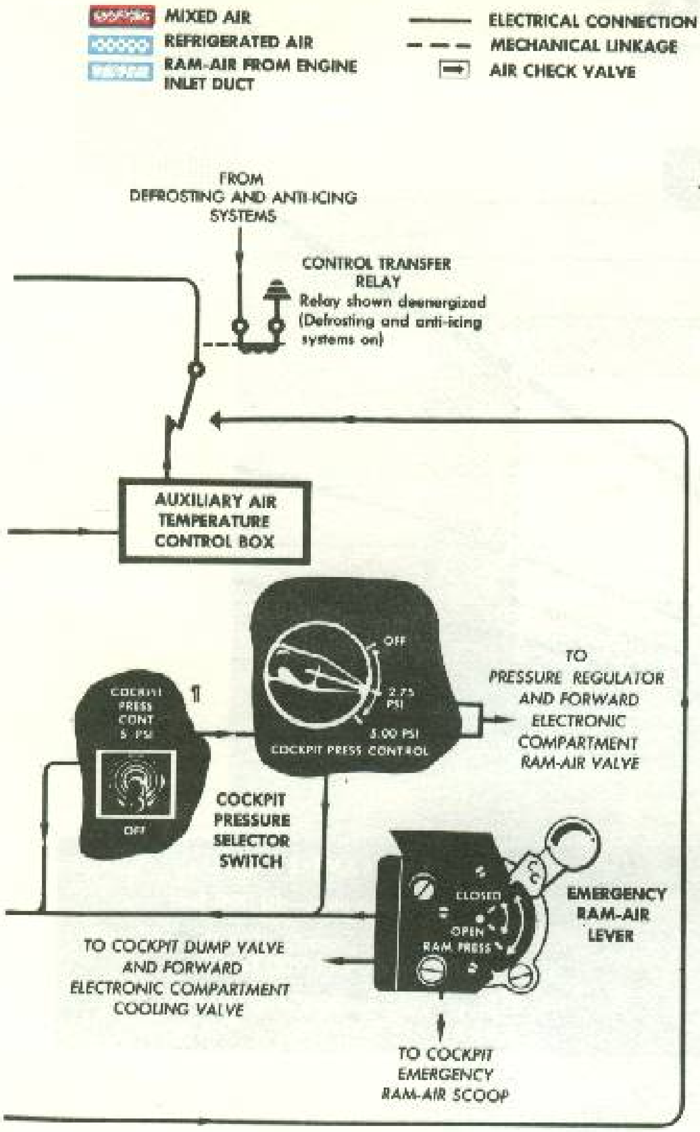


Figure 4-1 (Sheet 3 of 4)

F-100F AIRPLANES



* Some airplanes (refer to applicable text).

¶ F-100F-20 Airplanes

NOTE

Lights shown on for information only.

100F-1-A53-38

Figure 4-1 (Sheet 4 of 4)

some airplanes, pitot boom anti-icing and foot warmers. On F-100F-20 Airplanes, pitot boom anti-icing is provided by an electrical heating system. The engine guide vanes are anti-iced by hot air taken directly from the engine compressor. Whenever the defrosting or anti-icing and rain removal hot-air systems are used, the auxiliary air temperature control regulates the primary heat exchanger bypass valve to maintain the temperature of the mixing chamber at 275°F.

AIR CONDITIONING, PRESSURIZATION, DEFROSTING, ANTI-ICING, AND RAIN REMOVAL SYSTEM CONTROLS.

Cockpit Pressure Selector Switch.

The desired cockpit pressure is selected by a primary-bus-powered switch (not in the rear cockpit). (See figure 4-1.) When the switch is at 2.75 psi or 5 psi, the main system shutoff valve is open to direct air to some cockpit air outlets, the emergency ram-air valve* is closed, the forward electronic equipment compartment ram-air shutoff valve is automatically controlled by a cooling-effect detector, and the pressure regulator maintains the selected pressure differential in the cockpit. (F-100F-20 Airplanes have only the 5 psi pressure schedule.) When the selector is at RAM AIR ON, the main system shutoff valve closes, the emergency ram-air valve* opens to admit ram air to the cockpit, the dump valve opens to depressurize the cockpit, and the forward electronic equipment compartment ram-air shutoff valve opens. The RAM AIR ON* position is used in emergencies to eliminate smoke or fumes from the cockpit, or if the pressure or temperature systems do not function correctly.

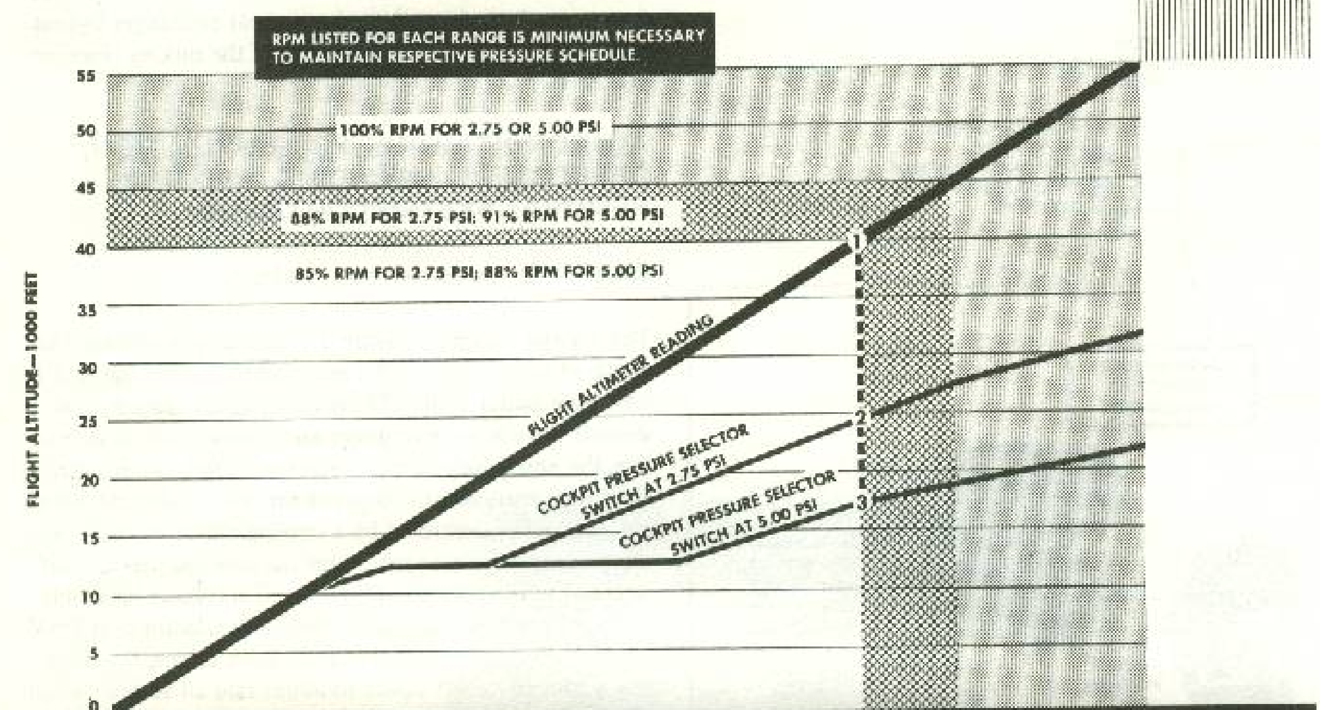
NOTE

When the cockpit pressure selector switch is at RAM AIR ON* or OFF, the cockpit automatic temperature control is inoperative.

Moving the pressure selector switch to OFF closes the main system shutoff valve, the emergency ram-air valve, and the cockpit dump valve, and the cockpit pressure regulator is set to 2.75 psi position. The OFF position is used in emergencies if the cockpit becomes too cold with the cockpit pressure selector at RAM AIR ON.* The OFF position is also used to prevent rapid decompression of the cockpit

*F-100D-21 through F-100D-31 and F-100D-46 through F-100D-86 Airplanes

COCKPIT PRESSURE SCHEDULE



NOTE

Below 12,500 feet, the differential between cockpit altitude and flight altitude increases (by as much as 1000 feet) with airspeed, cockpit altitude being less than flight altitude.

EXAMPLE

1. Flight altimeter reading—40,000 feet.
2. Cockpit pressure reading with selector switch at 2.75 psi—24,900 feet.
3. Cockpit pressure reading with selector switch at 5.00 psi—17,000 feet.

F-100D-1-53-7B

Figure 4-2

when the cockpit system is shut off at altitude. When the selector is at OFF, cockpit pressure can be maintained by using the defrost system.

NOTE

To minimize danger resulting from sudden decompression, the cockpit pressure selector switch should be set at 2.75 psi during combat above 21,200 feet.

WARNING

When the cockpit pressure selector switch is at OFF, 100% oxygen should be used to offset the effect of possible cockpit contamination caused by poor ventilation of the cockpit.

When the cockpit pressure selector switch is at RAM AIR ON* or OFF, the forward electronic equipment compartment ram-air shutoff valve is opened; the pressure selector must be at 2.75 psi or 5 psi for automatic control of the valve.

Cockpit Temperature Master Switch.

Cockpit air temperature is controlled by primary bus power through a four-position switch (not in the rear cockpit). (See figure 4-4.) For automatic temperature control, the master switch must be at AUTO and the cockpit

*F-100D-21 through F-100D-31 and F-100D-46 through F-100D-86 Airplanes

DEFROSTING AND ANTI-ICING SYSTEMS

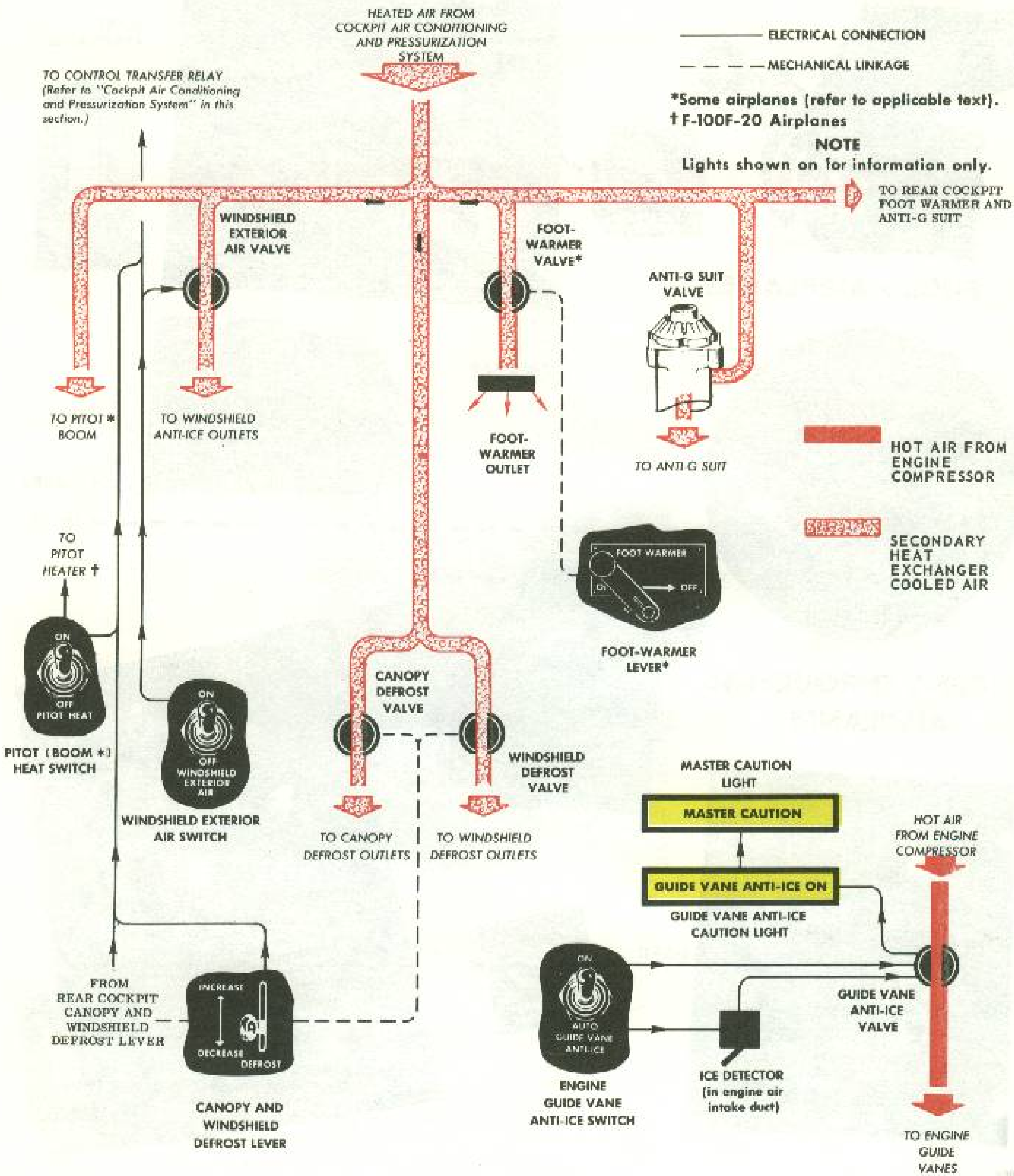
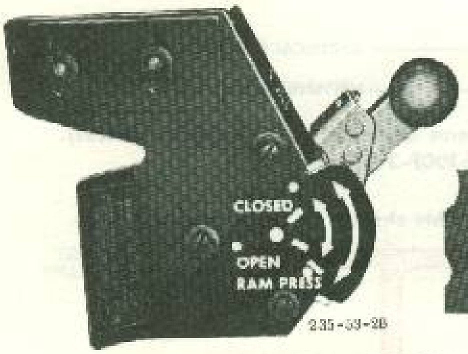
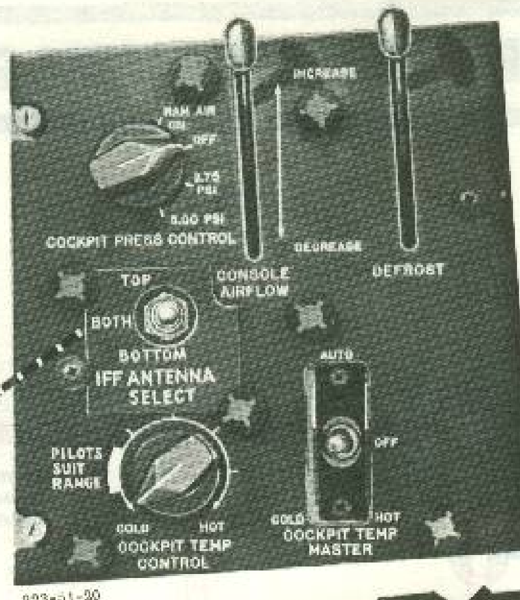


Figure 4-3

AIR-CONDITIONING CONTROLS



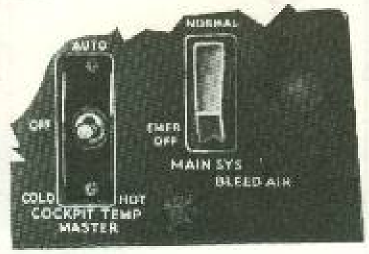
*



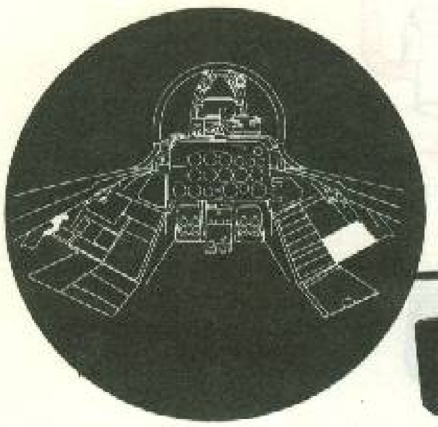
SOME AIRPLANES

F-100D AIRPLANES

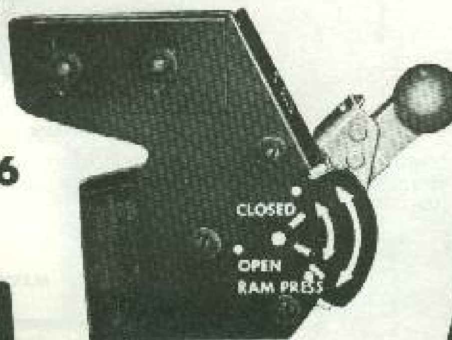
SOME AIRPLANES



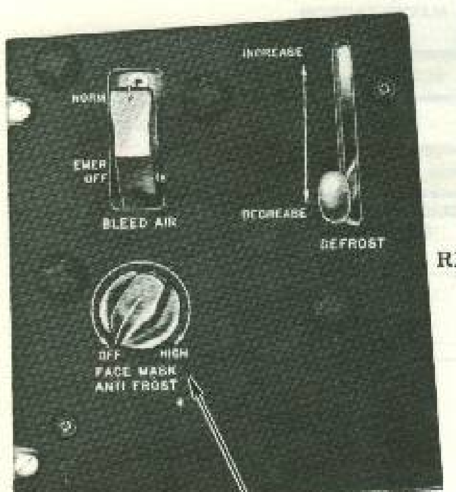
SOME AIRPLANES



F-100F-2 THROUGH-16 AIRPLANES

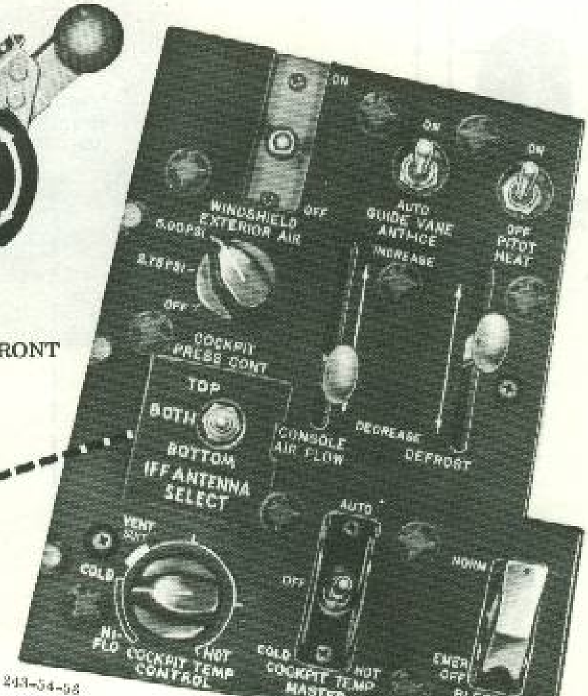


FRONT



REAR

*



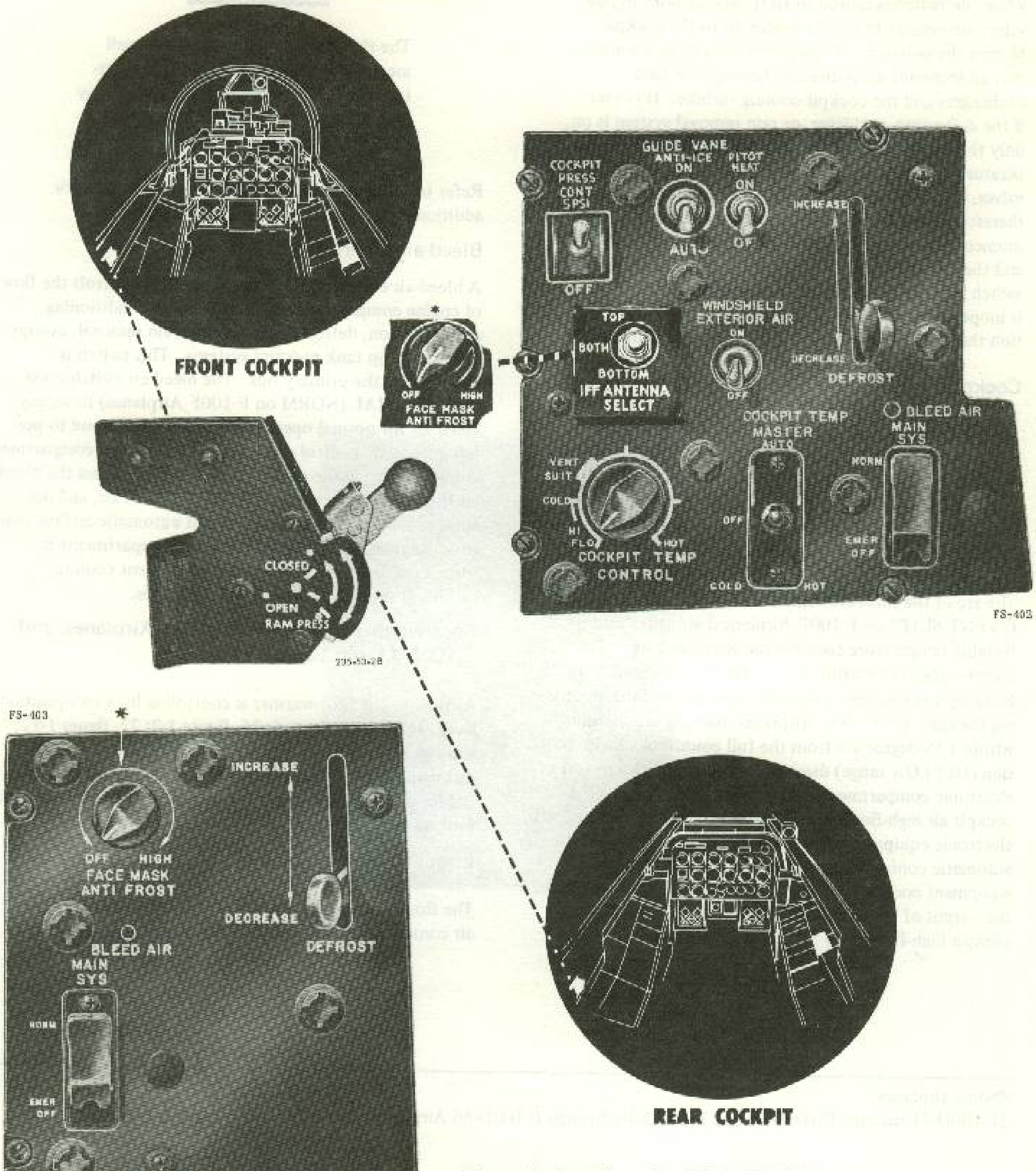
*

100D-1-A53-3C

* Not on airplanes changed by T.O. 1F-100-1062

Figure 4-4 (Sheet 1 of 2)

F-100F-20 AIRPLANES



*Not on Airplanes Changed by T.O. 1F-100-1062.

100F-1-53-15A

Figure 4-4 (Sheet 2 of 2)

temperature rheostat must be adjusted to the desired temperature. For selective temperature control, the temperature master switch should be moved to HOT or COLD. When the switch is moved to HOT, one or both bypass valves are opened to supply hotter air to the cockpit. Moving the switch to COLD closes both bypass valves so that all incoming air is directed through the heat exchangers and the cockpit cooling turbine. However, if the defrosting, anti-icing, or rain removal system is on, only the cockpit hot-air bypass valve responds to the temperature master switch. The combined cycle time for both valves, from full hot to full cold, is about 16 seconds; therefore, the desired temperature can be obtained by momentarily placing the master switch at HOT or COLD, and then moving it to OFF. When the temperature master switch is OFF, the automatic temperature control system is inoperative, and both bypass valves remain in the position they were in at the time the switch was shut off.

Cockpit Temperature Rheostat.

The temperature rheostat (figure 4-4), not in the rear cockpit, may be rotated to any point between COLD (HI-FLO on F-100F Airplanes) and HOT to maintain desired cockpit temperature only when the cockpit temperature master switch is at AUTO. The temperature rheostat is powered by the primary bus and is inoperative when the cockpit pressure selector switch is at OFF or at RAM AIR ON.* The arc of the rheostat marked "PILOT'S SUIT RANGE" ("VENT SUIT" on F-100F Airplanes) indicates a comfortable temperature zone for the ventilated suit. The rheostat should be within this range when the suit is used. Rotating the rheostat controls temperature of the air entering the suit. On F-100F Airplanes, moving the rheostat within a 55-degree arc from the full counterclockwise position (HI-FLOW range) disengages the automatic control of electronic compartment cooling airflow, and opens the cockpit air high-flow valve. Ram air to the forward and aft electronic equipment compartments is shut off when the automatic control is disengaged and the aft electronic equipment cooling turbine is engaged. About 60 percent of the output of the equipment turbine goes through the cockpit high-flow valve for additional cockpit cooling.

CAUTION

The rheostat must be rotated in small increments to prevent sudden temperature changes which will crack the canopy and rapidly change the temperature of the ventilated suit.

Refer to Miscellaneous Equipment in this section for additional information on the ventilated suit.

Bleed-air Emergency Switch.*

A bleed-air emergency switch (figure 4-4) controls the flow of engine compressor bleed air to the air conditioning, pressurization, defrosting, anti-icing, rain removal, canopy seal, and drop tank pressure systems. This switch is powered by the primary bus. The bleed-air switch must be at NORMAL (NORM on F-100F Airplanes) to supply bleed air for normal operation of the systems, and to permit automatic control of electronic equipment compartment cooling. Moving the switch to EMER OFF closes the bleed-air shutoff valve to shut off all engine bleed air, and disengages the electronic compartment automatic airflow control. Ram air to the forward and aft compartments is turned on, and the aft electronic equipment cooling turbine is shut down on F-100F Airplanes.

Foot-warmer Lever — F-100D-91 Airplanes, and F-100F-11 and Later Airplanes.

Airflow to the foot warmer is controlled by a two-position lever. (See 35, figure 1-6; 36, figure 1-7; 27, figure 1-12; and figure 4-1.) When the lever is at ON, warm air flows through the slots of the cockpit floor shields under the rudder pedals. When the lever is at OFF, the airflow to the foot warmer is shut off.

Foot Air Control Lever.†

The flow of air to the foot outlets is controlled by a foot air control lever (24, figures 1-8 and 1-9) on the forward

*Some airplanes
†F-100D-21 through F-100D-31 and F-100D-46 through F-100D-86 Airplanes

end of each console. Moving the lever to CLOSED decreases or stops airflow. When the lever is at OPEN, the airflow through the outlet is increased.

Console Airflow Lever. ‡

Console airflow is controlled by a lever (figure 4-4), not in the rear cockpit, that directs the flow of air to the outlets along the console and to the outlet behind the seat. Moving the lever forward toward INCREASE mechanically positions a diverter valve, so that more of the air supplied to the cockpit is directed to the ventilated suit, to the console air outlets, and to the foot air outlets.† It is recommended that the console airflow lever be placed at INCREASE when cooling or heating is desired around the upper part of the body.

NOTE

With the console airflow lever at full INCREASE, maximum air is available to the ventilated suit.

Moving the lever aft toward DECREASE directs more of the air through the outlet behind the seat, reducing cockpit air circulation but still retaining the same airflow for pressurization.

Console Airflow Knobs. ∮

A console airflow knob (26, figures 1-14 and 1-15; 27, figure 1-16; 18, figure 1-17; 19, figure 1-18), on each side of both cockpits, controls airflow from the outlets in the respective console. Moving a knob toward INCREASE or DECREASE mechanically positions a sliding panel in the console to provide a corresponding amount of airflow from the outlets.

Emergency Ram-air Lever — F-100D-91 Airplanes and F-100F Airplanes.

Emergency ram air for the cockpit is selected by a ram-air lever. (See figure 4-4.) The lever has three labeled positions, CLOSED, OPEN, and RAM PRESS, with six intermediate positions between CLOSED and RAM PRESS. With the lever at CLOSED, the forward electronic equipment compartment ram-air shutoff valve is automatically controlled by a cooling-effect detector. The lever must be at CLOSED to permit normal pressurization of the cockpit. On F-100F Airplanes, the front and rear cockpit levers are not interconnected, and each lever must be at CLOSED to permit normal pressurization. Moving the lever (either lever on F-100F Airplanes) from CLOSED to OPEN manually opens the ram-air scoop (respective cockpit scoop on F-100F Airplanes) into the air stream, allowing ram air to enter the cockpit. This position of the lever also closes the main system shutoff valve, shutting off the cockpit air conditioning and pressurization system, and opens the dump valve to further depressurize the cockpit. When the lever (either lever) is moved to RAM PRESS, the main system shutoff valve remains closed and the dump valve closes. Partial pressurization of the cockpit is available in this position (depending on airspeed and altitude) by ram-air pressure. The OPEN position is used to eliminate smoke or fumes from the cockpit, or if the pressurization or temperature systems do not function correctly. When the lever (either lever) is at OPEN or RAM PRESS, the automatic control of the forward electronic equipment compartment ram-air shutoff valve is bypassed and the valve is open.

CAUTION

On F-100F-20 Airplanes, during certain conditions when ram air is used to cool the cockpit, the equipment air overheat caution light may come on. If this light is on for a prolonged period, the electronic equipment may be damaged. The light can be put out by either increasing airspeed or changing to normal cockpit air conditioning.

Canopy and Windshield Defrost Lever.

Defrosting of canopy and windshield is selected by a defroster lever (fore and aft levers are mechanically interconnected on F-100F Airplanes). (See figure 4-4.) When this lever is moved forward to INCREASE, valves in the system are opened mechanically to distribute heated air to the inner surfaces of the canopy and windshield. Defrost airflow is shut off when the lever is moved aft to DECREASE.

‡F-100D Airplanes, F-100F-2 through F-100F-11 Airplanes, and F-100F-16 Airplanes AF56-3920 through -3984
†F-100D-21 through F-100D-31 and F-100D-46 through F-100D-86 Airplanes
∮F-100F-16 Airplane AF56-3985 and all later airplanes

Windshield Exterior Air Switch.

Windshield anti-icing and rain removal airflow is controlled by primary bus power through the exterior air switch (not in the rear cockpit). (See figure 4-17.) Moving the switch to ON de-energizes the control transfer relay. This opens the primary heat exchanger bypass valve, allowing hot air (about 275°F) to flow from the mixing chamber to the windshield exterior air shutoff valve. When the windshield exterior air switch is at ON, the windshield exterior air shutoff valve is open, allowing the air from the mixing chamber to flow into the discharge nozzle at the base of the windshield. With the switch at OFF, the exterior air shutoff valve is closed, the control transfer relay is energized, and the primary heat exchanger bypass valve is closed. (Operation of the motor-driven exterior air shutoff valve takes about 7 seconds.)

NOTE

Refer to Ice and Rain in section IX for information on the effectiveness of the anti-icing and rain removal system during various flight and weather conditions.

On F-100F Airplanes, moving the windshield exterior air switch to ON also bypasses the automatic control of the electronic equipment compartment cooling airflow. Ram air to the forward and aft electronic equipment compartments is then shut off and the aft electronic equipment cooling turbine is engaged. This prevents air used by the windshield exterior air system from getting too hot.

Engine Guide Vane Anti-icing Switch.

Engine guide vane and anti-icing is controlled by a two-position switch (not in the rear cockpit). (See figure 4-17.) When the switch is at AUTO, primary bus power arms the ice detector unit, which automatically controls the engine guide vane anti-icing valves. When icing is encountered, the ice detector sends an impulse to the anti-icing valves which open and direct hot air from the engine compressor to de-ice the guide vanes and accessory nose strut. The valves remain open as long as impulses are received from the ice detector unit, but close automatically one minute after the last impulse is sent. The detector unit clears itself of ice in about 17 seconds after sending the impulse to the anti-icing valves, thus preparing itself to detect additional icing and send the ice-presence impulse to the anti-icing valves before the one-minute closing cycle expires. The ON position of the switch bypasses the automatic ice detector and opens the anti-icing valves.

Face Mask Antifrost Rheostat.

The face mask antifrost system is deactivated.

Pitot Boom Heat Switch.*

Heat to the pitot boom is continuous while the engine is running, regardless of the position of the pitot boom heat switch (not in the rear cockpit). (See figure 4-4.) Moving the switch to ON de-energizes the control transfer relay. This opens the primary heat exchanger bypass valve, allowing hot air (about 275°F) to flow from the mixing chamber to the pitot boom. With the switch at OFF, the control transfer relay is energized, the bypass valve closes, and air of slightly lower temperature is supplied from the mixing chamber to the boom. The switch should be at ON during all takeoffs to ensure accurate instrument indications. The pitot boom heat switch is powered by the primary bus.

NOTE

Continuous operation of pitot heat at ON over an extended period can cause illumination of the heat and vent system overheat caution light.

Pitot Heat Switch — F-100F-20 Airplanes.

The electrical heating unit in the pitot boom is controlled by the pitot heat switch (figure 4-4) in the front cockpit only. When this switch is moved from OFF to ON, secondary bus power is supplied to the pitot heat unit. The switch should be ON for all takeoffs to ensure accurate instrument indications. After takeoff, the switch should be used as required.

CAUTION

The electrical pitot heat system should not be used on ground (except for test purposes and just before takeoff), because lack of cooling airflow may cause the heating element to burn out.

*F-100D Airplanes and F-100F-2 through F-100F-16 Airplanes

AIR CONDITIONING, PRESSURIZATION, DEFROSTING, ANTI-ICING, AND RAIN REMOVAL SYSTEM INDICATORS.

Cockpit Pressure Altitude Indicator.

The pressure altitude of the cockpit is shown by an indicator (20, figure 1-10; 22, figure 1-11; 28, figure 1-12; 26, figure 1-13; 19, figure 1-15; 19, figure 1-16) vented only to pressure within the cockpit.

Heat and Vent System Overheat Caution Light.

A placard-type caution light (figure 1-19) comes on when the temperature of the air in the mixing chamber exceeds 345°F (400°F on F-100F Airplanes). The overheat caution light is powered by the primary bus, and bulbs in the light can be tested by use of the indicator light test circuit. (Refer to Emergency Operation of Air Conditioning, Pressurization, Defrosting, Anti-icing, and Rain Removal Systems in this section.)

NOTE

The heat and vent system overheat caution light may come on on the ground when the battery switch is ON, if external power is not used and if the engine is not running. No overheating is involved during these conditions, and corrective action is not needed unless the lights stay on after engine start.

Engine Guide Vane Anti-ice Caution Light.

The guide vane anti-ice caution light (figure 1-19) comes on whenever the engine guide vane anti-ice valves are open. This light is powered by the primary bus, and operation of the bulbs in the light can be checked by means of the indicator light test circuit.

NOTE

Compressor stalls that occur during taxiing and during engine acceleration from low engine speeds may actuate the guide vane anti-ice detector and cause the anti-ice caution light to come on for about 60 seconds.

NORMAL OPERATION OF AIR CONDITIONING PRESSURIZATION, DEFROSTING, ANTI-ICING, AND RAIN REMOVAL SYSTEMS.

1. Emergency ram-air lever* – CLOSED.
2. Bleed-air emergency switch† – NORM.
3. Cockpit pressure selector switch – Desired pressure schedule.
4. Cockpit temperature master switch – AUTO.
5. Canopy and windshield defrost lever – Toward INCREASE. (Set as desired.)

NOTE

Just before the first flight of the day, the defrosting and anti-icing systems should be operated at full on for a few seconds to eliminate any moisture in the system.

- Fogging and frosting of the windshield or canopy can occur if the cockpit air temperature is lowered, the cockpit air distribution is changed, the cockpit airflow is reduced, or a rapid descent is made. Therefore, before any of these changes is selected, the defrost lever should be moved further toward INCREASE to ensure visibility.

WARNING

The defrosting system should be operated for takeoff and landing and throughout the flight at the highest possible heat consistent with pilot comfort, to preheat the canopy and windshield and to maintain the glass temperature above cockpit dew point.

6. Cockpit temperature rheostat – Toward HOT. If cockpit air supply becomes fogged or contains snow, gradually turn cockpit temperature rheostat toward HOT.

*F-100D-91 Airplanes and F-100F Airplanes

†F-100D-86 Airplanes AF56-3407 through -3463, F-100D-91 Airplanes not changed by T.O. 1F-100D-651 and F-100F Airplanes

WARNING

The cockpit temperature should be maintained at the highest possible heat consistent with pilot comfort, during takeoff, in the landing pattern, and during a go-around, to prevent sudden fog or snow in the cockpit.

7. Console airflow lever (or console airflow knobs) – Desired air distribution.

8. Foot-warmer lever* – As desired.

9. Pitot heat switch – ON. The engine thrust setting should be at, or above, 83% rpm.

WARNING

Under some icing conditions, particularly at high altitude, sufficient pitot boom heat may still be unavailable to do the anti-icing. If the boom becomes iced with the pitot heat on, increasing engine power and airspeed and decreasing altitude will assist in ice removal.

10. Windshield exterior air switch – ON, if snow, ice, or rain forms on outer surface of windshield.

CAUTION

To prevent overheating and possible damage to the windshield, windshield anti-icing should not be used during ground operations at power settings greater than required for taxiing.

NOTE

Improper use of the windshield anti-icing system can cause the heat and vent system overheat caution light to come on. The system is designed to be used only when there is actual rain or ice, or when rain or ice is expected. The overheat condition may occur if the windshield anti-icing system is used during warm, fair weather. If the heat and vent overheat caution light comes on and stays on more than 30 seconds, the emergency operation in this section should be followed.

- During takeoff, the overheat caution light may come on temporarily as the airplane passes through the null point. However, if the light remains on for more than 30 seconds, the emergency procedures should be followed.

Cockpit Vapor Dissipation – Rear Cockpit.

During high humidity conditions, the rear cockpit may become filled with water vapor, to the extent that visibility is impaired. This is most likely to occur when the console airflow control is at DECREASE and the cockpit temperature rheostat is within the first one third of its travel. To dissipate, or prevent, the possible formation of water vapor in the rear cockpit, proceed as follows:

1. Move cockpit temperature rheostat to a higher setting if fog continues.

2. Increase defrost lever.

3. Increase console airflow.

4. Cockpit pressure selector switch – OFF.

5. Cockpit pressure selector switch – As desired after takeoff. After takeoff, when visual reference from the rear cockpit is no longer critical, the selector switch should be set at the desired pressure schedule. In flight, the cockpit temperature rheostat should be rotated to increase cockpit temperature until the water vapor is dissipated.

*F-100D-91 Airplanes, and F-100F-11 and later airplanes

EMERGENCY OPERATION OF AIR CONDITIONING, PRESSURIZATION, DEFROSTING, ANTI-ICING, AND RAIN REMOVAL SYSTEMS.

NOTE

The symptoms of a cooling turbine bearing failure can be smoke entering the cockpit, a vibration, and a screeching noise. These symptoms are similar to those of an engine bearing failure; therefore, the engine instruments should be checked to isolate the failure. (Refer to Engine Oil System Failure in section III.)

Refer to Emergency Depressurization (Intentional), Emergency Depressurization (Accidental), Excessive Cockpit Temperature, Heat and Vent System Overheated, and Emergency Operation of Electronic Equipment Compartment Cooling System in section III.

ELECTRONIC EQUIPMENT COMPARTMENT COOLING SYSTEM.

The forward electronic equipment compartment is cooled by air discharges from the cockpit and by ram air from the engine inlet duct. On F-100F Airplanes, the aft electronic equipment compartment is cooled by ram air from the engine inlet duct or by engine compressor bleed air supplied through a cooling turbine. Air to the aft electronic equipment compartment is regulated automatically by a cooling-effect detector that controls ram air and the operation of the equipment cooling turbine. When the combination of ram-air temperature and flow (sensed by the cooling-effect detector) is capable of keeping the electronic equipment cool enough for normal operation, ram air is supplied to the compartment. However, when the volume and temperature of the ram air do not provide proper cooling for the forward and aft compartments the cooling-effect detector shuts off ram air and opens the equipment cooling turbine shutoff valve to engage the turbine. During this condition, the forward compartment is cooled only by cockpit discharge air, and the aft compartment is cooled by air from the equipment cooling turbine.

On F-100F Aircraft, if the aft electronic equipment compartment cooling turbine fails, ram air is automatically supplied to cool the compartment, and the failed turbine is shut down. This also opens a circuit breaker (can be reset on the ground only) to give ground personnel an indication of turbine failure. A caution light indicates an overheat condition of the electronic equipment cooling system.

ELECTRONIC EQUIPMENT COMPARTMENT COOLING SYSTEM CONTROLS AND INDICATOR.

The cockpit pressure selector switch, cockpit temperature rheostat, emergency ram-air lever, windshield exterior air switch, and bleed-air emergency switches affect the equipment compartment cooling system. (Refer to Air Conditioning, Pressurization, Defrosting, Anti-icing, and Rain Removal System Controls in this section.)

Equipment Air Overheat Caution Light.

A placard-type caution light (figure 1-19) comes on to read "EQUIP AIR OVERHEAT" when an over-heat condition exists in the aft electronic equipment compartment. Illumination of the light indicates possible failure of the aft electronic equipment compartment cooling turbine, failure of the turbine control system, or that the ram air is not capable of cooling the compartments. The caution light is powered by the primary bus, and bulbs within the light can be tested by the indicator light test circuit.

NORMAL OPERATION OF ELECTRONIC EQUIPMENT COMPARTMENT COOLING SYSTEM.

Cooling air for the electronic equipment is supplied automatically during normal operation of the cockpit air conditioning and pressurization system.

COMMUNICATION AND ASSOCIATED ELECTRONIC EQUIPMENT.

TABLE OF COMMUNICATION OF ASSOCIATED ELECTRONIC EQUIPMENT.

See figure 4-5. See figure 4-6 for antenna locations.

RADIO CONTROL TRANSFER SYSTEM – F-100F AIRPLANES.

A radio transfer system permits transfer of all radio control (except the AN/ARN-6 radio compass, which has a self-contained transfer system) between cockpits.

COMMUNICATION AND ASSOCIATED ELECTRONIC EQUIPMENT

TYPE	DESIGNATION (AN)	FUNCTION	RANGE	LOCATION
UHF COMMAND RADIO	ARC-34	TWO-WAY VOICE COMMUNICATION	LINE OF SIGHT	LEFT CONSOLE
RADIO COMPASS	ARN-6	RECEPTION OF VOICE AND CODE COMMUNICATION: POSITION FINDING; HOMING	20 TO 200 MILES, DEPENDING ON FREQUENCY AND TIME OF DAY	RIGHT CONSOLE
AUTOMATIC* DIRECTION FINDING	ARA-25 ARA-50	RECEIVES HOMING SIGNALS FOR AIR REFUELING RENDEZVOUS	LINE OF SIGHT	CONTROLLED BY AN/ARC-34 CONTROL PANEL
TACAN	ARN-21 ARN-72*	DISPLAYS AZIMUTH AND RANGE	LINE OF SIGHT UP TO 195 NAUTICAL MILES	RIGHT CONSOLE
COMMUNICATION AMPLIFIER	AIC-10	AMPLIFIES RADIO COMMUNICATION SIGNALS		NO CONTROLS – F-100D RIGHT CONSOLE – F-100F
AIM SYSTEM	APX-72	SELECTIVE IDENTIFICATION AND AUTOMATIC ALTITUDE REPORTING	LINE OF SIGHT	RIGHT CONSOLE
INSTRUMENT LANDING*	ARN-31	RECEPTION OF GLIDE SLOPE AND LOCALIZER SIGNALS	30 MILES	RIGHT CONSOLE
MARKER BEACON RECEIVER*	ARN-32	RECEIVES MARKER SIGNALS		
ECM	QRC-160	RADAR COUNTERMEASURES		RIGHT CONSOLE
SEEK SILENCE SYSTEM*		VOICE CODE	LINE OF SIGHT	LEFT CONSOLE
RADAR BEACON SYSTEM		RADAR TRACKING	LINE OF SIGHT	RIGHT CONSOLE
RHAW SYSTEM*	ARP-25(V) APR-26(V)	RADAR HOMING AND WARNING	(CONFIDENTIAL)	INSTRUMENT PANEL

*Some airplanes

Figure 4-5

ANTENNAS

	F-100D	F-100F
1. GLIDE SLOPE		X
2. SIGHT RADAR	X	X
3. IDENTIFICATION RADAR	SOME	
4. IDENTIFICATION RADAR	SOME	X
5. RADIO COMPASS SENSE	SOME	SOME
6. LOCALIZER		X
7. RADIO COMPASS LOOP	X	
8. RADIO COMPASS SENSE	SOME	
9. COMMAND RADIO	SOME	SOME
10. RADIO COMPASS SENSE	SOME	SOME
11. RADAR BEACON	SOME	
12. COMMAND RADIO	SOME	SOME
13. AN/APR-25(V)	SOME	SOME
14. SELECTIVE IDENT. & AUTO. ALT. REPORTING	SOME	SOME
15. AN/APR-25(V)	SOME	SOME
16. TACAN	X	X
17. MARKER BEACON		X
18. ARA-50		SOME
19. RADIO COMPASS LOOP		X
20. COMMAND RADIO		SOME
21. ARA-50	SOME	
22. COMMAND RADIO	SOME	
23. AN/APR-25(V)	SOME	SOME

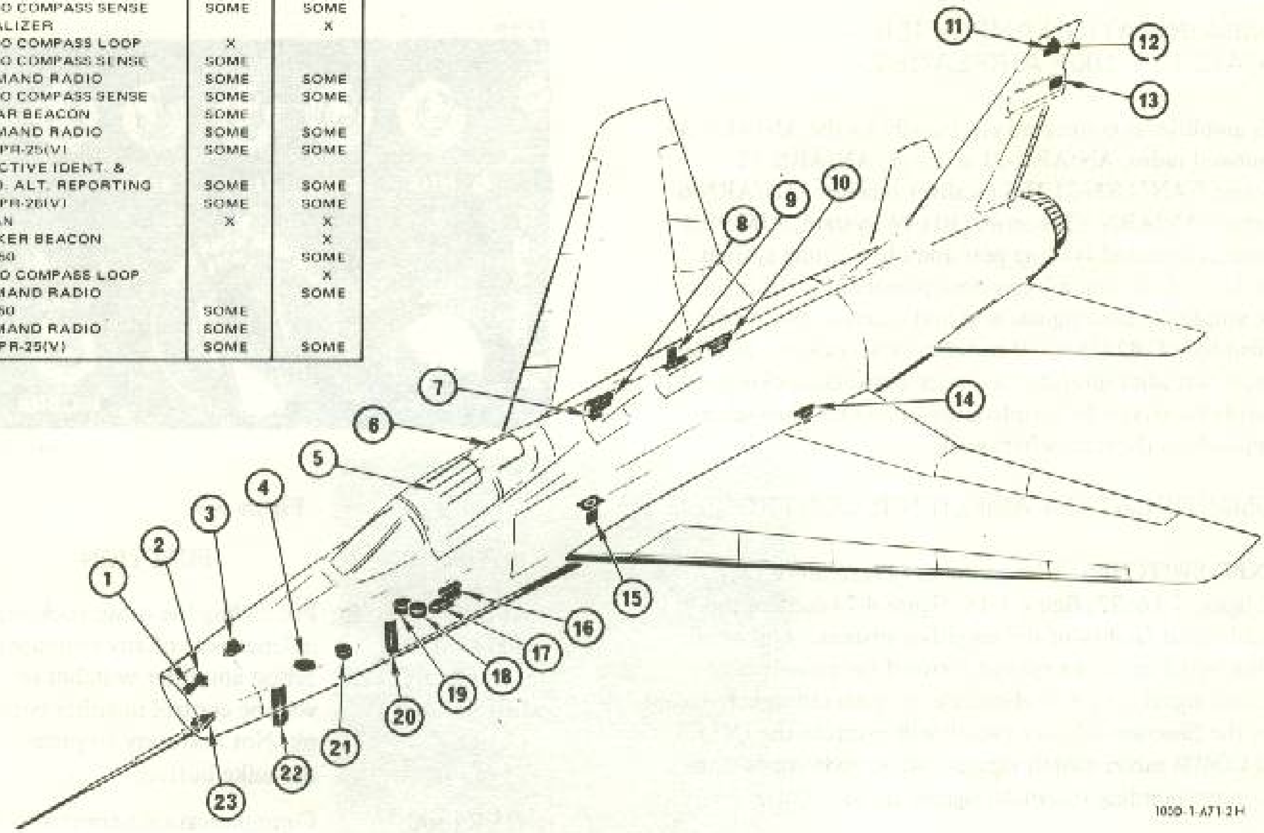


Figure 4-6

TRANSFER BUTTONS.

Momentarily pressing this button (24, figure 1-15; 21, figure 1-18; figure 1-29) in either cockpit transfers radio control to that cockpit. A green indicator light within the cap of each button comes on in the cockpit that is in control of the radio equipment. The buttons are powered by the primary bus.

NOTE

Transfer of the AN/ARN-6 radio compass control is accomplished by momentarily moving the function selector switch on either radio compass control panel to CONT.

COMMUNICATION AMPLIFIER – AN/AIC-10-F-100D AIRPLANES.

The AM-843/AIC-10 communication amplifier is connected electrically to the AN/ARC-34 command radio. AN/ARN-6 receiver, AN/ARN-21 receiver, AN/ARN-72 receiver,* RHAW system, landing gear audible warning system, AIM-9B/E missile system, and microphone and headsets. Powered by the primary bus, the amplifier has an interphone for cockpit and ground crew intercommunications when the airplane is on the ground.

*Some airplanes

Interphone Switch.

The interphone switch (16, figure 1-10; 17, figure 1-11) is spring-loaded at OFF. When held at MIC, the switch allows the crew chief to be in direct communication with the cockpit during preflight or postflight operations. A receptacle in the nose wheel well is for the maintenance headset.

COMMUNICATION AMPLIFIER – AN/AIC-10-F-100F AIRPLANES.

This amplifier is connected electrically to the AN/ARC-34 command radio, AN/ARN-21 receiver, AN/ARN-72 receiver,* AN/ARN-31 ILS localizer receiver, AN/ARN-6 receiver, AN/ARN-32 receiver, RHAW system, AIM-9B/E missile system and landing gear audible warning system. The AN/AIC-10 amplifier system powered by the primary bus, amplifies radio signals sent and received and is controlled by a C-824/AIC-10 panel in each cockpit. In addition, it furnishes interphone service between cockpits and interphone service to maintenance personnel through a receptacle in the nose wheel well.

COMMUNICATION AMPLIFIER CONTROLS.

MIXER SWITCHES. Five switches (29, figure 1-15; 30, figure 1-16; 22, figure 1-18; figure 4-7) control the mixed-signal facility of the amplifier system. Any or all of the switches can be moved forward for reception of a selected signal, or aft to eliminate the selected signal, except that the function selector switch will override the INTER and COMM mixer switch signals. Mixer switch positions and corresponding reception signals are as follows:

POSITION	RECEPTION
INTER	From other cockpit
COMM	Command radio
TACAN	TACAN
ADF	Radio compass
ILS	Localizer and marker beacon

FUNCTION SELECTOR SWITCH. This switch (figure 4-7) controls individual transmission and reception of audio signals. Switch positions and functions are as follows:

COMMUNICATION AMPLIFIER CONTROL PANEL

FS-640

F-100F-1-A71-6A

Figure 4-7

POSITION	FUNCTION
CALL (must be held at CALL; returns to INTER when released.)	For calling the other cockpit, independent of any communication amplifier switches or volume control in either cockpit. Not necessary to press the mike button.
INTER (both cockpits)	Communication between cockpits when the mike button is pressed.
COMM INTER	Command radio signals are received. With the INTER mixer switch forward, a "hot mike" condition is provided for interphone operation. Command radio transmission requires use of the mike button. (Refer to UHF Command Radio AN/ARC-34 in this section.)
COMM	Command radio signals are received and transmitted when the mike button is pressed.

*Some airplanes

NOTE

When COMM INTER or COMM positions are selected, command radio signals are heard, regardless of the position of the COMM mixer switch.

"NORMAL – AUX-LISTEN" SWITCH. This communication amplifier switch (figure 4-7) is normally safety-wired at NORMAL. It provides emergency listening in case of interphone amplifier failure. If the amplifier fails, indicated by the loss of interphone communications, break safety wire and move switch to AUX LISTEN.

When the switch is at this position, the only signal heard is that of the farthest left (inboard) mixer switch that is in the forward (on) position. The switches to the left of the selected mixer switch must be in the aft (off) position. If all mixer switches are aft (off), the function selector switch becomes the primary control.

NOTE

The volume control is not effective when this switch is at AUX LISTEN.

- The warning signal for the landing gear and the headset tone for the AIM-9B/E missiles are not audible when this switch is at AUX LISTEN.

VOLUME CONTROL KNOB. Turning the communication amplifier volume control knob (figure 4-7) counterclockwise reduces the volume of the selected signal. When the knob is turned clockwise, volume is increased. The volume control knob should be set to a position to give the desired interphone communication before adjusting the volume of the radio receivers, as it controls the volume of all receivers, provided the volume level of the individual receiver is adjusted above the volume level of the AN/AIC-10.

INTERPHONE CALL BUTTON. The interphone call button on each throttle (figure 1-21) permits either occupant to call the other, regardless of the position of the amplifier control panel switches.

Operation of AN/AIC-10 Amplifier.

For selective interphone operation only:

1. Rotate function selector switch to INTER.
2. Move all mixer switches, except INTER, aft (off).
3. Press mike button on throttle, and talk.

NOTE

The mike button must be released to allow the other occupant to reply.

For continuous interphone operation only ("hot mike" condition):

1. Rotate function selector switch to COMM INTER.
2. Move mixer switch marked "INTER" forward (on), and talk.
3. If desired, move all other mixer switches aft (off), except INTER, to ensure uninterrupted conversation. (The command radio will still be heard.)

NOTE

It is not necessary to press the mike button before talking.

- If the mike button is pressed, transmission will be outside of the airplane.

For interphone call operation:

1. Rotate and hold function selector switch at CALL, or press and hold call button on throttle to talk to other pilot.

NOTE

The other occupant will receive the message, regardless of the position of his function selector switch or mixer switches.

- Whenever the call function is used, it overrides the mike button. This prevents transmission of interphone conversation over the command radio.
- No signal mixing is possible during call operation.

To monitor other radio signals:

1. Rotate function selector switch to INTER, COMM INTER, or COMM.
2. Push desired mixer switches forward (on).

NOTE

This permits monitoring several different signals simultaneously.

3. Adjust volume as desired.

For command radio transmission:

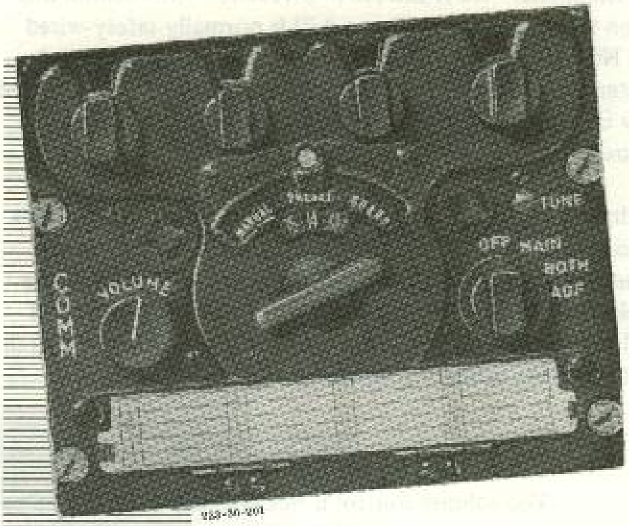
1. Rotate function selector switch to either COMM INTER or COMM.
2. Press mike button on throttle.
3. Release mike button when transmission is completed to permit receiving reply.

UHF COMMAND RADIO – AN/ARC-34.

This radio, powered by the primary bus, provides voice transmission and reception in the frequency range of 225.0 to 399.9 megacycles. The audio signal is directed through the AN/AIC-10 communication amplifier. The control panel (figure 4-8) permits selection of 20 preset channels. In addition, operating frequencies can be selected manually without disturbing the preset channel frequencies. On F-100F Airplanes, the radio control transfer system selects which cockpit can operate the command radio. Two receivers are used in this equipment. The main receiver normally carries out all reception functions. The guard receiver is ground-tuned to a guard frequency, and may not be changed without removing the remote-control unit from the airplane. Whenever a new frequency is selected, an automatic tuning mechanism tunes the transmitter and receiver to the new frequency. This tuning cycle requires about 4 seconds.

When an E3401 ground-crew-to-cockpit interphone package is connected to the maintenance receptacle in the nose wheel well, communication is possible between the cockpit and maintenance personnel. On F-100D Airplanes, the command radio receiver may be monitored but broadcast transmission cannot be made while the ground interphone package is connected or if the interphone switch is at MIC.

COMMAND RADIO CONTROL PANEL



F-100D-1-71-5

Figure 4-8

On F-100F Airplanes, when the package is connected, the communication amplifier function selector switch in the cockpit in control must be at INTER to prevent broadcast transmission of interphone conversation. (The function selector switch in the other cockpit can be at either INTER or COMM INTER.) The function selector switch in the cockpit in control must be returned to COMM or COMM INTER to restore the command radio to normal operation when the ground interphone package is disconnected.

Command Radio Controls and Indicator.

CHANNEL SELECTOR SWITCH. The channel selector switch (figure 4-8) controls the selection of 20 preset frequencies by channel number. When the switch is rotated, channel numbers from 1 through 20 appear in the channel indicator window, above the selector. This window is masked when the sliding selector control is placed in any position other than PRESET.

FUNCTION SWITCH. Rotating the command radio function switch (figure 4-8) from OFF turns the command radio on. (A warm-up period of about 1 to 2 minutes is required.) When the switch is at MAIN, only the main receiver is audible in the headphones. In the BOTH position, the guard receiver and the main receiver are heard simultaneously. The ADF position is operable only with the ADF system. On airplanes without the ADF system, when the switch is at ADF, the No. 1 pointer of the radio magnetic indicator or the bearing-distance-heading indicator is disconnected from the AN/ARN-6 and will rotate freely.

TONE BUTTON. When the command radio is operating, a continuous tone signal may be transmitted by pressing the tone button. (See figure 4-8.) This occurs on the frequency that is set on the transmitter, and it interrupts reception. A side tone is audible in the headphones while the button is depressed. This feature may be used for direction-finding operations in conjunction with other airplanes and ground stations.

VOLUME CONTROL. The volume control (figure 4-8) regulates the sound level of the signal being heard in the headphones from both command receivers. Adequate control of volume is provided, but the volume may not be reduced below a fixed level. On F-100F Airplanes, if the volume level is above that of the AN/AIC-10 volume, the AN/AIC-10 volume adjustment will control the volume level of the AN/ARC-34.

MANUAL-PRESET-GUARD SLIDING SELECTOR CONTROL AND FREQUENCY KNOBS. The sliding selector control (figure 4-8) controls the method of command radio frequency selection. It is operated by sliding the control through a limited arc across the face of the panel. This control has three positions, MANUAL, PRESET, and GUARD, and is arranged so that when it is in any one position, the other two positions are masked by a semitransparent green glass. When the sliding selector control is placed at MANUAL, the preset channel is deactivated and a mask is removed from in front of the four small windows across the top of the panel, revealing the numerals that make up an operating frequency. On some airplanes, the mask is permanently removed from the four frequency windows. This allows the sliding selector control to be left at PRESET while adjusting the frequency setting knobs. Thus, the operating frequency may be changed while the preset frequency is being monitored.

CAUTION

The frequency windows reveal only manual frequency digits, and do not represent preset frequencies.

Beneath each window is a small frequency knob which, when rotated, changes the numeral and the frequency. This makes it possible to manually select 1750 frequencies within the range of 225.0 to 399.9 megacycles. The frequency range of 329.0 through 335.0 megacycles is reserved for glide-slope frequencies, and 243.0 megacycles is reserved for a guard frequency. Sliding the control to PRESET masks the four small windows, on some airplanes, and deactivates the manually selected frequency. This activates the 20 preset channels controlled by the channel selector switch. Any time a frequency is changed, about 4 seconds is required for the tuning mechanism to complete the cycle. Placing the sliding selector control at GUARD automatically tunes the transmitter and main receiver to the guard frequency set up before the installation of the equipment.

REMOTE CHANNEL INDICATOR. A command radio remote channel indicator (50, figure 1-6; 51, figure 1-7), not in the rear cockpit, is synchronized to the channel selector indicator on the command radio control panel and is controlled by the channel selector switches. The face of the indicator has four windows for display of channel number and frequency. When the selector control is at PRESET, two of the indicator windows are used to display the number of the preset command radio channel. When the selector control is at MANUAL, the four indicator windows display the frequency (in megacycles) of the selected channel. With the selector control at GUARD, the two center windows show the letters "GD." All indicator windows are blanked when power is off.

Normal Operation of Command Radio.

A complete operational check of the command radio may be made as follows:

1. Before takeoff, check frequencies to be used against those listed on frequency card.

2. Check settings of buttons on frequency control drum with frequency card. (To do this, open door to which frequency card is attached. The channel number which corresponds to the preset frequency appears in a window at the left of the buttons. The frequency numbers of this channel are listed above the buttons.)

3. On F-100F Airplanes, press radio control transfer button.

4. Check operation of transmitter and main receiver with sliding selector control in each position.

5. Check operation of guard receiver, using BOTH position of function switch.

6. For initial channel selection, select a channel other than the one to be used until warm-up is completed, or after warm-up, switch to another channel and then back to the one desired. If the desired channel is selected before warm-up is completed, reduced performance due to mistuning may result.

7. Adjust volume as desired. On F-100F Airplanes, coordinate volume adjustment with AN/AIC-10 volume control.

8. For manual selection of a frequency that is not included in the preset channels, moving sliding selector control to MANUAL. Use frequency knobs across top of panel to establish desired frequency. (The function switch must be at MAIN or BOTH for this operation.)

NOTE

Do not manually select a frequency of less than 225.0 mc. The transmitter will attempt to tune to this frequency, and after 90 seconds the transmitter will shut down. To restore transmission, turn function switch to OFF, wait 30 seconds, and then select a higher frequency.

9. To obtain transmission and reception of guard frequency only, move sliding selector control to GUARD, and turn function switch to MAIN. This will prevent unequal or garbled reception by cutting out the guard receiver that operates when the function switch is at BOTH.

NOTE

Transmission should not be made on emergency (distress) frequency channels except for emergency purposes.

- This procedure places the equipment in condition to receive. Transmission on the same frequency is obtained by pressing the microphone button; however, if it is desired to change the transmitter frequency, the microphone button should be released before the frequency is changed. If transmission is attempted before completion of channelization cycle, reduced performance may result.

10. Move function switch to OFF.

Emergency Operation of Command Radio.

SUDDEN LOSS OF TRANSMISSION AND RECEPTION. If the command radio will not transmit or receive satisfactorily within the range of the equipment, change airplane attitude or heading to obtain line-of-sight range for antenna.

CHANNEL SELECTION AFTER ENGINE SHUTDOWN OR ENGINE FAILURE. If it is necessary to select another frequency channel, selection should be done as soon as possible after engine shutdown or engine failure, so that electrical power is available to complete selection.

CAUTION

The channel selector system will hang up between channels when battery voltage is low.

RADIO NOT OPERATING. In the case of apparent failure of command radio, attempt operation in alternate positions of sliding selector control and/or alternate positions of function switch. Turn equipment off for several minutes; then turn function switch to type of operation desired. If the protective relay in the tuning mechanism was responsible, this action will restore operation. Check circuit-breaker panel for tripped condition of the AN/AIC-10 amplifier.

Under certain command radio malfunctions, operation may be restored by transferring control to the other cockpit.

Under certain command radio malfunctions, the tone signal will function properly when either the transmitter fails or both the transmitter and receiver fail. Emergency signal or acknowledgment may then be accomplished.

AN/ARA-50 AUTOMATIC DIRECTION-FINDING SYSTEM – AIRPLANES CHANGED BY T.O. 1F-100-969.

The AN/ARA-50 is an automatic direction-finding (ADF) and range-finding (TACAN) system for homing on UHF signals. This system, powered by the primary bus, operates within the frequency range of the AN/ARC-34 command radio receiver and is controlled through the function switch (figure 4-8) on the AN/ARC-34 control panel. The system automatically indicates the bearing of UHF signals emanating from selected ground stations, UHF radio-equipped airplanes, or other UHF radio-equipped sources, allowing the use of these frequencies for homing and rendezvous. The AN/ARA-50 system can be used with the AN/ARN-72 TACAN system to automatically indicate range of the UHF signals emanating from a preselected airplane. When the AN/ARC-34 function switch is turned to ADF, a change-over relay in the system disconnects the AN/ARN-6 radio compass signal that is sent to the radio magnetic indicator, master heading indicator, or bearing-distance-heading indicator, and connects, in its place, a directional signal from the AN/ARA-50 ADF system. Relative bearing is indicated by the No. 1 (ADF bearing) pointer on the indicator. Range indication is shown on the AN/ARN-72 TACAN range indicator. To facilitate the reception of UHF signals for ADF bearings, a flush-type antenna is installed in the lower surface of the fuselage centerline.

Operation of AN/ARA-50 Automatic Direction-finding System.

With the command radio on and warmed up, select a common frequency with the ground station or airplane to be homed on. Turn the AN/ARC-34 function switch to ADF, and the AN/ARN-72 TACAN function switch to A/A. The ADF bearing pointer will move in response to the UHF signal to indicate the bearing, and the TACAN range indicator will indicate the range to the ground station or to the airplane.

NOTE

For normal UHF communication, the function switch should be returned to MAIN or BOTH. However, transmission is possible when the switch is at ADF.

SEEK SILENCE SYSTEM – AIRPLANES CHANGED BY T.O. 1F-100D-630 AND T.O. 1F-100F-566.

The seek silence system permits either normal operation of the AN/ARC-34 command radio or decoding and coding of voice communications through the command radio. The decoding and coding capability prevents interception of messages when required. The system is powered by the primary bus.

Power Switch.

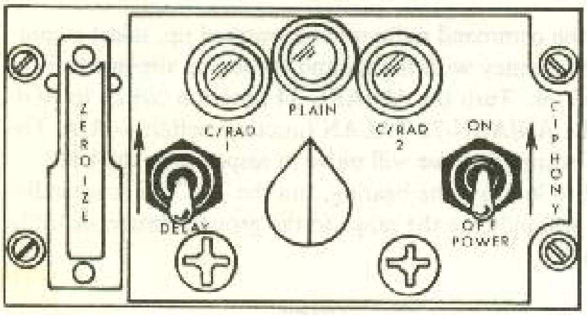
When the power switch (figure 4-9) is moved from OFF to ON, power is applied to the seek silence system. The command radio can be operated in the normal manner with the power switch at OFF.

Function Switch.

This switch (figure 4-9) controls decoding and coding of command radio voice reception and transmission. With the switch at PLAIN, normal operation of the command

SEEK SILENCE CONTROL PANEL

4197-54-1A



LEFT CONSOLE, INBOARD OF THROTTLE QUADRANT

Figure 4-9

radio is available, and only uncoded reception and transmission possible. With the switch at C/RAD 1, the system decodes incoming voice communications, and codes outgoing voice communications through the command radio. The C/RAD 2 position has no function in these airplanes. A mechanical stop prevents the switch from being moved to this position.

Function Indicator Lights.

Three dimmable, press-to-test type lights (figure 4-9) indicate the position selected by the function switch. With power applied to the system, the left (green) light comes on when the C/RAD 1 position of the function switch is selected; the middle (amber) light comes on when the PLAIN position of the function switch is selected; the right (green) light is inoperative on these airplanes.

Zeroize Switch.

The zeroize switch (figure 4-9) is guarded in the normal, aft (OFF) position. If it becomes necessary to eject, the guard should be raised and the switch held momentarily at the forward (ON) position. This zeros out the ground set codes in the seek silence system.

Retransmit Switch.

This switch (figure 4-9) has no function in these airplanes. The switch should always be aft (OFF), regardless of the position of the function switch.

Operation of Seek Silence System.

1. Turn on command radio. (Refer to Normal Operation of Command Radio in this section.)

2. Move power switch to ON.

3. Turn function switch to PLAIN and establish communications through normal transmission procedures where possible.

4. Turn function switch to C/RAD 1 and listen for a steady unbroken tone in the headphones for approximately 2 seconds, followed by a double-pitched broken tone. If a prolonged steady tone is heard, it indicates an improper code setting or equipment malfunction, and the function switch should be turned to PLAIN and the power switch should be turned to OFF.

5. Press and hold mike button for several seconds, then release. The double-pitched broken tone should stop and no further sound will be heard in the headphones. If the broken tone continues, press mike button again and hold for several seconds. If the broken tone continues after three such attempts to clear it, move function switch to PLAIN and power switch to OFF.

6. Press and hold mike button. Wait 1/2 to 2 seconds for a single beep tone in the headphones. If beep tone is not heard, press mike button again and wait 1/2 to 2 seconds. If beep tone still is not heard, move power switch to OFF and then to ON, and repeat steps 5 and 6. If this fails to produce the beep tone, turn function switch to PLAIN and power switch to OFF.

7. When beep tone is heard, begin transmission.

RADIO COMPASS – AN/ARN-6.

The AN/ARN-6 radio compass is a navigational aid that drives the No. 1 (ADF bearing) pointer of the radio magnetic, master heading, or bearing-distance-heading indicator. The radio compass control panel is on the right console. (See 27, figure 1-10; 28, figure 1-11; 28, figure 1-15; 29, figure 1-16; 18, figure 1-18.) On F-100F Airplanes, transfer of the radio compass controls is obtained by moving the selector switch on either control panel momentarily to CONT. On F-100D Airplanes, the CONT position is inoperative. The sense antenna is in the canopy on F-100D-21 through F-100D-76 Airplanes and F-100F-2 and F-100F-6 Airplanes; and in the forward dorsal fairing on F-100D-81 through F-100D-86 Airplanes. On F-100D-91 Airplanes and F-100F-11 and later airplanes, the sense antenna is in the aft dorsal fairing. The loop antenna is in the dorsal fairing on F-100D airplanes, and in the lower fuselage forward of the nose wheel door on F-100F airplanes. (See figure 4-6.) The radio compass is powered by the secondary bus.

Description and Operation of Radio Compass.

Refer to Instrument Flying Manual, AFM 51-37.

COURSE INDICATOR.

Signals from the TACAN receiver, or glide slope or localizer receiver are directed into the course indicator (44, figure 1-6; 32, figure 1-7; 30, figure 1-12; 31, figure 1-13). A small heading pointer shows angular difference between the airplane heading and the selected course up to 45 degrees left or right with reference to a selected radial, both "to" and "from" the selected station. A course deviation indicator when used with TACAN (or localizer on F-100F airplanes), shows positional deviation of the airplane from a selected radial, up to a maximum deflection of about 10 degrees either side of center in the TACAN system, and about 2-1/2 degrees either side of center in the localizer system. A glide slope indicator is operated by the glide slope receiver on F-100F airplanes for descent guidance during ILS operations. On F-100D airplanes, the glide slope indicator is inoperative. A "SET" knob on the lower left corner of the instrument is used to select a desired radial, the magnetic value of which appears in a window at the top of the instrument. A window in the upper left corner of the instrument displays a "TO" or a "FROM" indication. If the selected course is intersected and flown, the window will display whether flight is toward or away from the station. An amber light in the upper right corner of the instrument is inoperative on F-100D airplanes. On F-100F airplanes, this light is connected to the marker beacon receiver and comes on when the receiver detects a 75-megacycle signal. The light is the press-to-test type. The course indicator has "OFF" flags that become visible when a received signal is unreliable, and when the equipment is shut off, either intentionally or because of electrical power failure.

RADIO MAGNETIC INDICATOR.

The radio magnetic indicator (41, figure 1-6; 32, figure 1-12; 29, figure 1-13) receives heading information from the J-4 compass system. This is reflected on a rotating compass card that provides a magnetic heading displayed against a fixed reference marker at the 12 o'clock position on the dial. Signals from the radio compass receiver and from the TACAN receiver are fed into the instrument to drive a set of pointers; this provides radio bearing information, which is read directly from the instrument as magnetic bearing to the station. The single-barred, No. 1 (ADF bearing) pointer is driven by the radio compass receiver, and the double-barred, No. 2 (TACAN bearing) pointer is driven by the TACAN receiver.

MASTER HEADING INDICATOR – F-100F-20 AIRPLANES.

The master heading indicator (7, figure 1-6; 4, figure 1-12) receives heading information from the J-4 compass system. The compass card on the indicator rotates to reflect the information from the J-4 system to show the magnetic heading of the airplane under the top index. A knob on the face of the instrument rotates the heading reference index. The master heading indicator functions as a standard radio magnetic indicator. The No. 1 (ADF bearing) pointer reflects the radio compass signals to show magnetic bearing to the transmitter antenna. (These airplanes have provisions only to utilize an AN/ARA-25 direction finding system and UHF command radio signals to the ADF bearing pointer when in that configuration.) TACAN signals drive the No. 2 (TACAN bearing) pointer to read magnetic bearing to the TACAN signal transmitter.

BEARING-DISTANCE-HEADING INDICATOR – SOME F-100D AIRPLANES. AIRPLANES NOT CHANGED BY T.O. 1F-100D-648.

This indicator (8, figure 1-7) is powered by the primary bus and the 3-phase ac instrument bus. The indicator compass card receives heading information from the J-4 compass system and displays this magnetic heading against a fixed reference marker at the 12 o'clock position on the dial. A memory index (a small ring) can be moved clockwise or counterclockwise about the compass card by the turn of a set-index knob on the face of the instrument. Signals from the AN/ARN-6 radio compass receiver drive the No. 1 (ADF bearing) pointer to provide radio compass bearing information. The No. 2 (TACAN bearing) pointer provides TACAN radio bearing information, received from the AN/ARN-21 receiver. On the outer edges of the instrument are three placards, labeled "PTR NO. 1 ADF," "PTR NO. 2 TACAN," and "PULL AUTOPILOT." The latter serves no function in this system. On the face of the instrument is a counter-type distance indicator. The counters are inoperative and remain at zero. An OFF flag appears on the face of the indicator when power is interrupted.

J-4 COMPASS SYSTEM.

Directional indication for flights at all longitudes and latitudes is presented on the instrument panel by the J-4 compass system. The system can be operated in either the magnetic mode or the directional gyro mode. When the magnetic mode is selected, the pointer on the heading indicator (7, figure 1-6; 4, figure 1-12; 2, figure 1-13) and compass card on the radio magnetic indicator or master heading indicator, or bearing-distance-heading indicator reflects the magnetic heading of the airplane. In the directional gyro mode, the system gyro is freed from the remote compass transmitter and the heading pointer, or compass card, reflects the directional gyro heading of the airplane. The system is powered by the dc primary bus and the 3-phase ac instrument bus. The J-4 compass control panel (23, figure 1-10; 24, figure 1-11; 9, figure 1-15; 23, figure 1-16) is not in the rear cockpit.

NOTE

The gyro reaches operating speed shortly after power is applied, but 2 minutes must be allowed for gyro stabilization. A rough check should be made to see that the magnetic compass and the indicator are on approximately the same headings.

- After the gyro reaches operating speed, the pointer or card should be checked against the magnetic compass (deviation corrected).

CAUTION

Two minutes must elapse when switching from the magnetic mode to the directional gyro mode and back to the magnetic mode. This is for cooling of the thermal relay that controls the fast-slave cycle. If the relay is not cooled to permit another complete fast-slave cycle, the indicator may stop at an erroneous reading.

NOTE

Straight and level flight must be maintained for 15 seconds before attempting to fast-slave the compass indicator. This should permit the rate-switching gyro to restore the magnetic slaving signal to the compass system and allow the compass indicator to synchronize with the correct magnetic heading.

Description and Operation of J-4 Compass System.

Refer to Instrument Flying Manual, AFM 51-37.

TACAN – AN/ARN-21 (AN/ARN-72, SOME AIRPLANES CHANGED BY T.O. 1F-100-969).

The TACAN system is a navigational aid, capable of providing bearing and slant range in nautical miles to a surface beacon. Some airplanes changed by T.O. 1F-100-969 have an AN/ARN-72 TACAN system. The AN/ARN-72 TACAN is identical to the AN/ARN-21 TACAN, except the more powerful receiver-transmitter on the AN/ARN-72 functions as an airborne interrogator-responser to provide range information to other AN/ARN-72 TACAN equipped airplanes as well as slant range to surface beacons. The control panels are identical, except the function switch on the AN/ARN-72 TACAN panel has an additional position labeled "A/A" (air-to-air). After the desired TACAN channel is selected, the function switch should be turned to A/A. Following a 2-minute warm-up, the range indicators should display range to the target AN/ARN-72. The TACAN system is powered by the secondary bus and the main ac bus. The

This equipment functions so as to utilize existing Radio Magnetic Indicator (RMI) and Course Indicator (CI) instrumentation. The RMI #2 needle is always reserved for TACAN bearing.

With TACAN mode selected the CI provides TACAN steering and the RMI #1 needle is available for ADF use.

With VOR/ILS mode selected the CI provides VOR steering and the RMI # 1 needle gives VOR bearing information when a VOR frequency is selected on the control panel. With an ILS frequency selected the CI provides both localizer and glide slope steering and the RMI #1 needle becomes inoperative. (See Fig 4-11.)

The receivers are powered by the DC secondary bus and the instrumentation by the AC instrument bus.

GLIDE SLOPE RECEIVING SYSTEM, GS-100B RECEIVER.

The glide slope system receives signals from a transmitter located near an airport runway. The signals **establish** a glide slope which the pilot follows when making an instrument approach to the runway. An indicator on the instrument panel shows whether the airplane is above, below, or on the glide slope. The glide slope system operates in conjunction with a localizer system in a unified ILS (instrument landing system). (The localizer shows whether the airplane is to the right or to the left of the airport runway). There are 40 glide slope frequency channels available in the frequency range of 329.15 to 335.0 MHz. In addition to glide slope information, this receiver receives marker beacon transmissions to give the pilot distance from the runway threshold. This information is presented by illumination of a "MARKER" lamp on the course indicator.

LOCALIZER RECEIVING SYSTEM, NR-106A RECEIVER.

The localizer system receives radio signals from a transmitter located near an airport runway. The radio signals establish an approach leg, which the pilot follows when making an instrument approach to the runway. An indicator on the instrument panel shows whether the airplane is to the left or right or in the center of the localizer leg. The localizer system operates in conjunction with a glide slope system in a unified ILS (instrument landing system). An ILS/TACAN change switch controls the selection of TACAN or ILS to operate the course indicator. There are 40 localizer frequency channels available in the frequency range of 108.00 through 117.95 MHz. This receiver also contains the VOR function, yielding a possible selection from 160 VOR frequency channels. The VOR signal is presented on the radio magnetic indicator #1 needle when the ILS mode is selected.

CONTROL PANEL. (Fig. 4-10)

The NAV control panel is a switch and indicator unit for control of remote power, audio volume, and frequency selection. It consists of three concentric knobs. One knob is used for remote power control and adjustment of audio volume. The other knobs are used for frequency selection. The NAV control panel is used to control both the NR-106A automatic navigation receiver and the GS-100B glide slope receiver is automatically tuned to the correct glide slope frequency. Selection of a given localizer frequency correctly pairs glide slope and localizer frequencies.

COURSE INDICATOR.

The ID-351/ARN course indicator is on the instrument panel. The GSI shows deviation from the glide slope. The red flag over the GSI retracts out of sight when the signal received is strong enough to properly operate the indicator, ID351. The CDI shows left or right deviation from the localizer path. The red flag over CDI retracts when the localizer signal is strong enough to operate the indicator, ID351. The indicator light, in the upper right corner, is operated by the marker beacon system.

WARNING

If the VOR/ILS receiver is inadvertently tuned 50 Khz above or below the correct frequency, the course flag may disappear from view and the correct station identifier may be heard, but the course information will be unreliable.

WARNING

This system was installed for use an ILS only. The VOR portion is functional at low altitudes, but marginal above 20,000 and unreliable above 25,000.

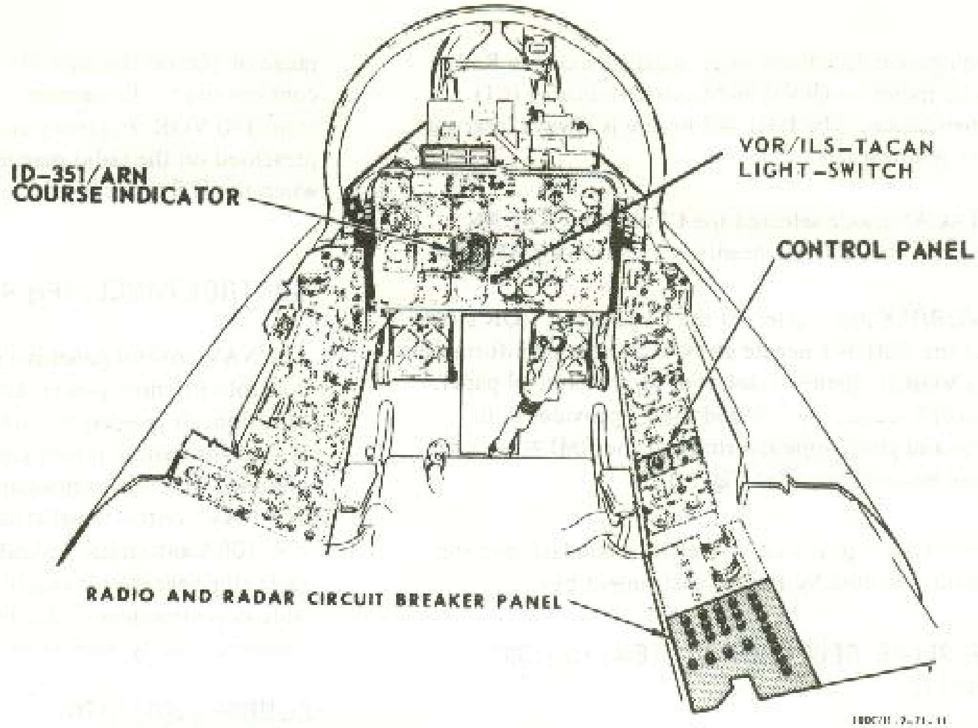


Figure 4-10. Instrument Landing System Equipment Location

COCKPIT INSTRUMENT INDICATIONS FOR TACAN VS. VOR/ILS MODE SELECTION.

MODE		INSTRUMENT INDICATIONS* ID-250 RMI	INSTRUMENT INDICATIONS* ID-351 CI
TACAN		(1) ADF Course	CDI - TACAN Steer
		(2) TACAN Course	GSI - "OFF" and Centered
VOR / ILS	VOR FREQ.	(1) VOR Course	CDI - VOR Steer
		(2) TACAN Course	GSI - "OFF" and Centered
	ILS FREQ.	(1) Frozen	CDI - Localizer Steer
		(2) TACAN Course	GSI - Glide Slope Steer

* (1) Number 1 pointer on RMI

(2) Number 2 pointer on RMI

CDI - Vertical bar of CI

GSI - Horizontal bar of CI

Figure 4-11.

control panel is on the right console. (See 24, figure 1-10; 26, figure 1-11; 24, figure 1-15; 26, figure 1-16; 17, figure 1-18.) A bearing pointer (radio magnetic indicator, master heading indicator, or bearing-distance-heading indicator) indicates magnetic bearing to the station. The audio signal is directed through the AN/AIC-10 communication amplifier. On F-100F airplanes, the radio control transfer system determines which cockpit has control of the TACAN system.

NOTE

On F-100F Airplanes, the range indicator in the front cockpit becomes inoperative when radio control is transferred to the rear cockpit. Likewise, when radio control is transferred to the front cockpit, the rear cockpit range indicator becomes inoperative.

CAUTION

Do not select channels above 126 or below 01 because of possible damage to the equipment.

Operation of AA Feature of AN/ARN-72.

In order to use the AA feature, the channelization of the AN/ARN-72 (other aircraft) must be known and tuned to a channel that will allow you to set in a 63 channel differential and select AA on the function switch. Range only should be available to the target aircraft. (Bearing is available through the AN/ARA-50 UHF/DF.)

AIRBORNE TRANSPONDER, AN/APX-72 (IFF)

The AIMS system provides capabilities comparable to the IFF/SIF (AN/APX-25) equipment, and, in addition, features an expanded coding identification system, an aircraft altitude automatic reporting system and a mode 4 (encrypted) IFF capability. The mode 4 capability designates the system as the Mark XII. The AIMS system, which utilizes an AN/APX-72 receiver/transmitter (transponder), is used to automatically identify the airplane in response to coded interrogations. Depending on the interrogation mode, the reply is transmitted in modes 1, 2, 3/A, 4, or airplane altitude reporting in mode C.

The AIMS system also functions to provide identification of position (I/P), special position identification (SPI), and emergency transmission. The I/P function, which is used in modes 1, 2, and 3/A only, provides a coded reply that is initiated by the pilot to enable the interrogation station to identify the airplane within a group of airplanes. The SPI function (in mode C) enables Radar Air Traffic Control to discriminate airplanes above 30,800 feet from those below that altitude. The emergency function can be selected by the pilot or is initiated automatically during seat ejection to provide a coded reply to an interrogation to enable rapid identification of an airplane in distress. The altitude automatic reporting feature incorporates an altitude computer with an encoder and a servoed altimeter.

During AN/ARN-20 (TACAN) transmissions, blanking pulses disable all modes of AIMS system operation.

The AIMS system incorporates a means of self-test in modes 1, 2, 3/A, and C. The system incorporates an IFF caution light and an IFF antenna selector switch. The AIMS system is powered by the primary bus and the main 3-phase ac bus. (See figure 4-12.)

AIMS System Control Panel.

The AIMS system control panel is located on the right console. (See figures 4-12 and 4-13.) On F-100F airplanes, the control panel is in the front cockpit only. Controls on the panel include the following: a master switch, mode selection (and test) switches (for modes 1, 2, 3/A, and C), a motor switch (for modes 1, 2, 3/A, and C), two code selectors for mode 1 and four code selectors for mode 3/A, an identifier (pulse) switch, a mode 4 enable switch, and a mode 4 code select switch. The rotary type master switch is moved from OFF to STDBY to turn the system on; NORM or LOW position selects receiver sensitivity; and the EMER position activates emergency operation. The master switch knob must be pulled out to be moved to EMER. The mode selection (and test) switches M-1, M-2, M-3/A, and M-C, have a forward (momentary) TEST position, a center ON position, and an aft OUT position. Holding each mode selection switch at TEST initiates a self-test of each respective mode provided the airborne test set is installed. A green TEST light illuminates to indicate proper operation of each tested mode during the self-test. The test light also comes on when the (radiation) monitor switch (marked RAD TEST–OUT–MON) is placed at MON (monitor) if the transponder replies properly to interrogations in modes 1, 2, 3/A, or C.

The RAD TEST position is utilized by maintenance personnel during ground checkout. The two mode 1 selectors provide 32 possible code selections and the four mode 3/A selectors provide for 4096 code selections. The identifier (pulse) switch enables transmission of identification of position (I/P) signals in response to interrogations in modes 1, 2, or 3/A, for 15 to 30 seconds. Transmission of I/P signals can be accomplished in three ways: when the switch is momentarily placed at IDENT, or when the switch

All data on pages 4-27 and 4-28, including figures 4-10 and 4-11, deleted.

AIMS SYSTEM COCKPIT COMPONENTS-F-100D & F-100F

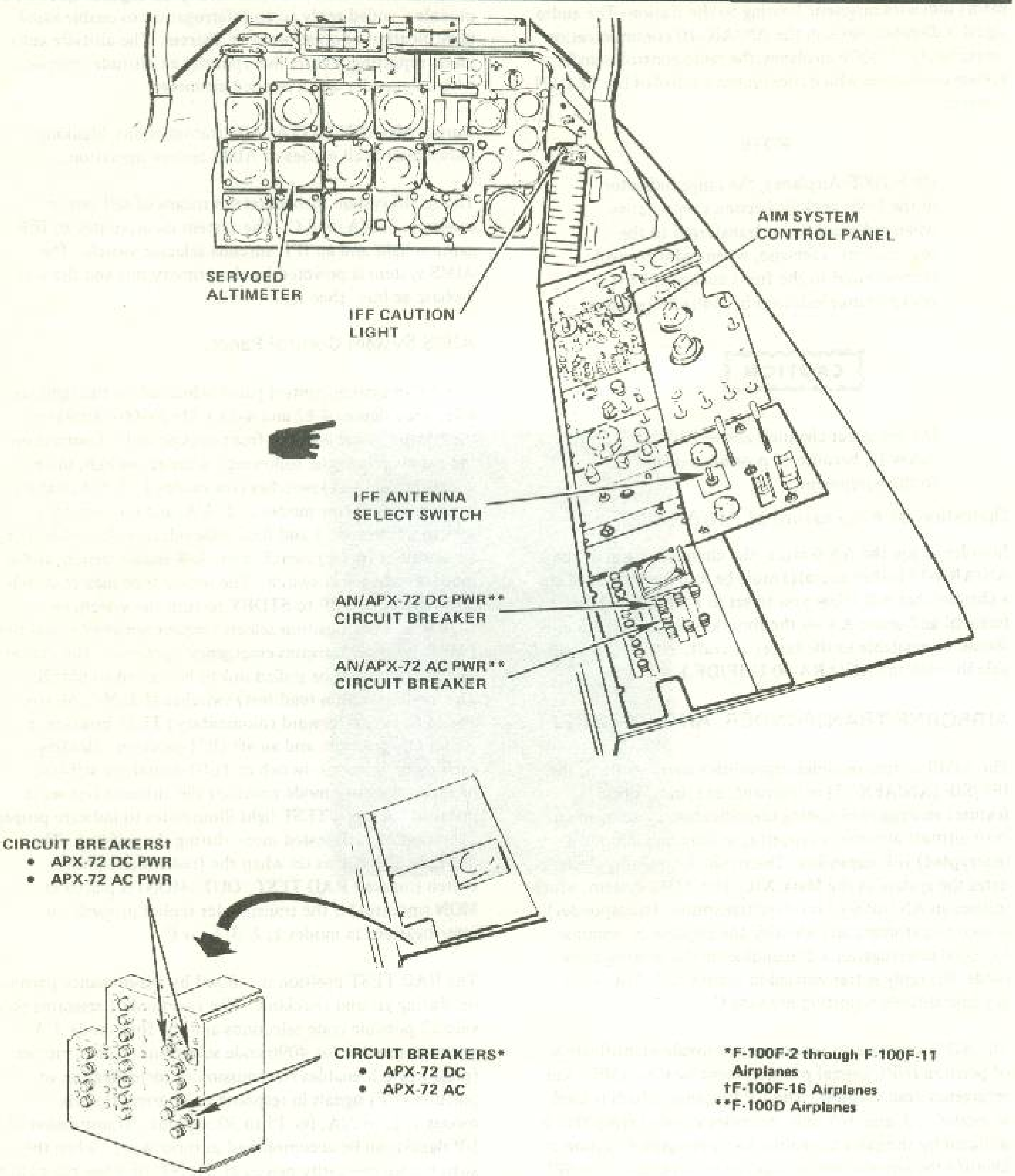


Figure 4-12

AIMS SYSTEM CONTROL PANEL

Figure 4-13

is at MIC and either the microphone button is momentarily pressed, or the command radio tone button is pressed (while the command radio is on). On F-100F airplanes, the communications amplifier AN/AIC-10 function selector switch also must be at COMM or COMM INTER when the microphone button is pressed in order to transmit I/P response. Mode 4 is selected by placing the mode 4 enable switch from OUT to ON. Mode 4 codes are preset in the mode 4 computer prior to the mission by the use of a code changer key. The mode 4 CODE selector has the following positions: A and B to select either code A or code B; a HOLD position to provide a means of retaining the mode 4 code for an additional flight (unless intentionally retained, the code is automatically returned to zero when power is removed after landing); and a ZERO position to enable manually zeroizing the mode 4 code. The mode 4 code selector knob must be pulled out to be moved to ZERO. The mode 4 REPLY light (green) comes on when the receiver/transmitter responds properly to a mode 4 interrogation if the audio/light switch has been moved from OFF to AUDIO or LIGHT. (There is no audio signal provided in the present circuit.)

IFF Antenna Selector Switch.

The IFF ANTENNA SELECT switch is located on the air conditioning control panel on the right console (figure 4-4). On F-100F airplanes, the IFF ANTENNA SELECT switch is in the front cockpit only. The switch is positioned to TOP to select only the upper antenna, or BOTTOM to select only the lower antenna. When the switch is at BOTH, the AIMS system automatically cycles alternately between the upper and lower antennas. (See figure 4-6.)

IFF Caution Light.

The IFF CAUTION light is located above the placard type indicator lights on the right forward console (figure 4-12). On F-100F airplanes, the caution light is in the front cockpit only. The amber caution light illuminates whenever an interrogation is processed through the mode 4 computer and the AIMS system does not respond with a proper reply. The light also comes on whenever mode 4 codes are zeroized. If a mission is flown without the mode 4 computer installed, the IFF caution light will not function.

AIMS System Normal Operation and Preflight Check.

The AIMS system control panel switches are positioned as follows for normal operation of the AIMS system:

1. Master switch – STBY.

NOTE

The system requires approximately a 1-minute warm-up after the master switch is at STBY.

2. Radiation monitor switch – OUT.
3. Identifier (pulse) switch – OUT.
4. Audio/light switch – LIGHT.
5. Mode 4 code select switch – A.
6. All remaining toggle switches – ON.
7. Modes 1 and 3/A code selectors – As briefed.
8. Master switch – NORM.

After completing the foregoing steps, the AIMS system preflight check is accomplished by continuing as follows:

9. M-1, M-2, M-3/A, and M-C mode selection (and test) switches – OUT.

10. M-1 mode selection (and test) switch – TEST (momentarily).

NOTE

Test light should come on. When switch is returned to OUT, the light should go out.

11. Repeat the preceding step for M-2, M-3/A, and M-C mode selection (and test) switches, one at a time. The test light indication should be the same.

12. At completion of check, place M-1, M-2, M-3/A, and M-C mode selection (and test) switches – ON.

After landing, to retain mode 4 codes, momentarily place mode 4 select switch at HOLD before engine shutdown.

AIMS System Emergency Operation.

Emergency operation can be initiated by setting the master switch to EMER or will be initiated automatically if the pilot ejects from the airplane. In either case, the system transmits a coded reply to an interrogation to rapidly identify the airplane in distress. When the master switch is placed at EMER, the system transmits distinct emergency coded replies in modes 1, 2, and 3/A. In addition, modes C and 4 are enabled to provide coded replies to interrogations. All modes function regardless of the position of control panel individual mode switches. Mode 3/A transmits the emergency reply in code 7700 regardless of the mode 3/A code selector settings. In case of ejection, the emergency function is enabled in modes 1, 2, and 3/A, regardless of the positions of mode selection switches on the control panel and will function even with the master switch at STBY. The mode 4 computer is automatically zeroized in case of ejection.

INSTRUMENT LANDING SYSTEM (ILS) AN/ARN-31 – F-100F AIRPLANES.

ILS provides visual guidance signals on the course indicator during instrument approaches and landings. To have ILS capabilities with TACAN, a glide slope receiver and a localizer receiver must be utilized. The ILS system is powered by the secondary bus and the main 3-phase ac bus. The radio control transfer system selects which cockpit can operate the instrument landing system.

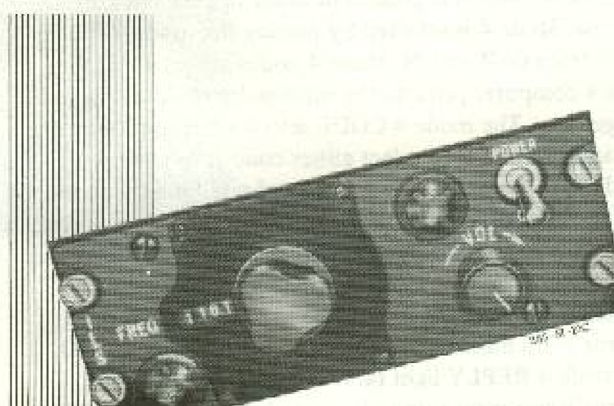
ILS Control Panel.

The ILS frequency is selected by rotating the frequency selector knob on the ILS control panel (23, figure 1-15; 24, figure 1-16; 16, figure 1-18; figure 4-14) until the desired localizer frequency appears in the indicator window to the left of the selector knob. The selector knob may be rotated in either direction. The volume control knob regulates the volume of the audible signal. The power switch controls power to the system.

TACAN-ILS Change-over Switch.

The TACAN-ILS change-over switch on the radio transfer control panel (24, figure 1-15; 21, figure 1-18) or on the TACAN-ILS change-over panel (25, figure 1-16), determines which of the two systems will furnish information to the course deviation indicator on the course indicator.

ILS CONTROL PANEL



F-100F-1-A71-4

Figure 4-14

A selector relay in the system is energized by secondary bus power when the switch is at TACAN. The selector relay is de-energized when the switch is at ILS. This ensures ILS capabilities in case of electrical power loss to the TACAN-ILS selector relay.

TACAN-ILS Light – F-100F-2 Through F-100F-16 Airplanes.

This placard-type light (28, figure 1-6; 31, figure 1-12; 24, figure 1-13) is powered by the secondary bus. The light comes on to read "TACAN" or "ILS," depending upon the position of the TACAN-ILS change-over switch, to give visual verification of which system is in control of the course deviation pointer on the course indicator. The bulbs within the light can be tested by the indicator light test circuit.

TACAN-ILS Lights – F-100F-20 Airplanes.

These placard-type lights, on the TACAN-ILS change-over panel (25, figure 1-16) are powered by the secondary bus. The TACAN light will come on to read "TACAN," or the ILS light will come on to read "ILS," depending upon the position of the TACAN-ILS change-over switch, to give visual verification of which system is in control of the course deviation pointer on the course indicator. Bulbs in the lights can be tested by the indicator light test circuit.

MARKER BEACON RECEIVER – AN/ARN-32 – F-100F AIRPLANES.

The marker beacon receiver is used as a navigation and landing aid. The receiver provides a signal while the airplane is passing over a 75-megacycle marker beacon transmitter. The presence of such a signal is indicated by an audio tone, and a marker beacon light (47, figure 1-6; 35, figure 1-12; 33, figure 1-13) on the course indicator. The marker beacon receiver is automatically turned on when the secondary bus is energized.

QRC-160 SYSTEM.

The QRC-160A-1 (AN/ALQ-71), the QRC-160A-2 (AN/ALQ-72), or the QRC-160A-8 (AN/ALQ-87) electronic countermeasure pods can be carried on a type III pylon at each outboard wing station. Each pod serves a specific function in the system and includes system components, a generator to provide electrical power for the components, a ram-air turbine for driving the generator, and the antennas. Additional information can be found in T.O. 1F-100D(I)-2-8 (classified) for the AN/ALQ-71 and 72, and in T.O. 12P-3-2ALQ87-2 (classified) for the AN/ALQ-87.

QRC-160 Systems Controls and Indicators.

The QRC-160 system controls and indicators and their functions are shown in figure 4-15. The control panel is on the right console (not in the rear cockpit). All controls and indicators are powered by the secondary bus.

Operation of QRC-160 System.

QRC-160A-1 (AN/ALQ-71) POD. Operate system as follows:

1. Turn operate switch to STBY. This places the system in standby. The standby light should illuminate after one minute.

2. Turn operate switch to XMIT 1; if the system is operating correctly the corresponding XMIT light illuminates.

3. If a major fault is detected in the system, the overload light illuminates.

4. If overload light comes on, proceed as follows:

   a. Press RESET button. The overload light should go out, and the system should return to standby (the STBY light will not come on).

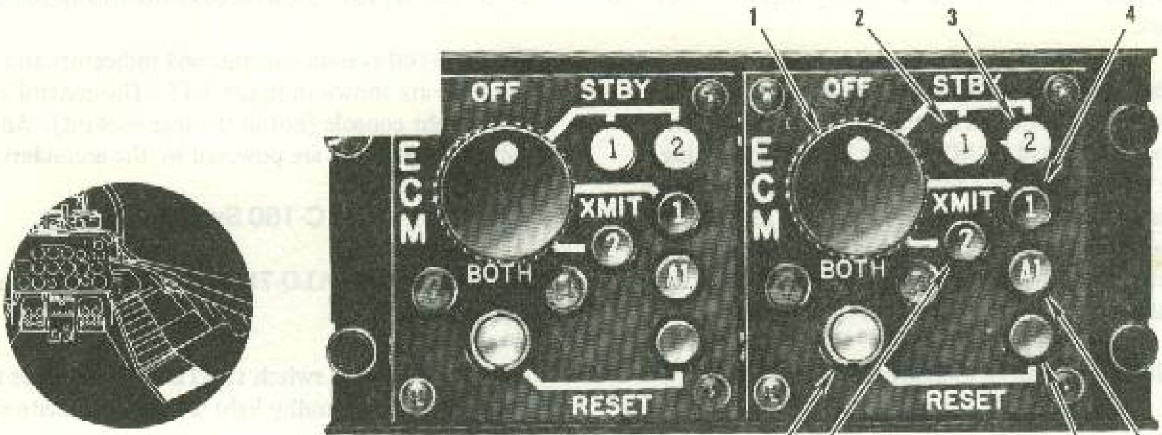
   b. If the overload light does not go out when the RESET button is pressed and held, the system has an under-pressure condition (below 9 psia) and the operated switch should be turned OFF.

   c. Flashing of the overload light when the RESET button is pressed and held, or when the system is turned off, indicates an overheat condition in the system. If this condition exists, the operate switch should be turned OFF.

QRC-160A-2 (AN/ALQ-72) POD. Operate system as follows:

1. Turn operate switch to STBY. This places the system in standby. The standby light should illuminate in approximately 3 minutes.

QRC-160 CONTROL PANEL



ITEM	PANEL MARKING AND NOMENCLATURE	FUNCTION
1	Operate switch	Selects mode of operation of system
	OFF	Turns system off
	STBY	Places system or systems in standby mode
	XMIT	Turns applicable transmitter on
	BOTH	Turns two transmitting systems on
2	STBY 1 light (white)	Indicates System 1 is in standby
3	STBY 2 light (white)	Indicates System 2 is in standby
4	XMIT 1 light (green)	Indicates System 1 is transmitting
5	A1 light	Not applicable to QRC-160A-1(T)
6	Overload light (red)	Indicates overcurrent, overvoltage, undervoltage or underpressure conditions. Flashing indicates overheat warning.
7	XMIT 2 light (green)	Indicates System 2 is transmitting
8	RESET button	Places all systems in standby until major faults in system are cleared

100D-1-A71-3A

Figure 4-15

2. Turn operate switch to XMIT 1.

3. If the system is operating in the normal mode (track or sequential), the XMIT light comes on only after the transmitter is locked on and turned to an enemy radar signal by the receiver. The "A1" light comes on when the system is jamming the enemy radar signal. If the system is operating in the active mode (track or sequential), the XMIT light comes on when the operate switch is at XMIT and the "A1" light comes on when the system is jamming the enemy radar signal.

4. If a major fault is detected in the system, the overload light illuminates.

5. If the overload light comes on, proceed as follows:

a. Press RESET button. The overload light should go out, and the system should return to standby (the STBY light will not come on).

CAUTION

If the system does not reset after the RESET button is released, the operate switch should be turned OFF.

b. If the overload light does not go out when the RESET button is pressed and held, the system has an under-pressure condition (below 9 psia) and the operate switch should be turned OFF.

c. Flashing of the overload light when the RESET button is pressed and held, or when the system is turned off, indicates an overheat condition (above 157°C) in the system. If this condition exists, the operate switch should be turned OFF.

QRC-160A-8 (AN/ALQ-87) POD. Operate system as follows:

1. Turn operate switch to STBY. This places both systems in the standby mode. The standby lights should illuminate in approximately one minute.

2. Turn operate switch to XMIT 1, if the system is operating correctly the XMIT 1 light should illuminate. On aircraft equipped with the RHAW system, T.O. 1F-100-992 and 994 if the system is on, the XMIT 1 light illuminates only when the system is actually transmitting.

3. If a major fault is detected, within either of the operating systems, the overload light illuminates; and can be caused by either an electrical overload, under-pressure, or overtemperature in the units.

4. Depressing the reset button places the system in standby (light does not illuminate) clearing temporary faults and resets the overtemp and underpressure lockout circuits.

QRC-160 Emergency Jettison.

To jettison QRC-160 pods complete with adapters, or the combined pod, adapter, and pylon assembly, use one or more of the following procedures:

1. Turn armament selector switch to ROCKET-JETT and press bomb button. (This jettisons pods only.)

2. Press OUTBOARD (OUTBD) external load auxiliary release button. (This jettisons pods only.)

NOTE

To jettison QRC-160 pods and pylons with other external loads, refer to External Load Emergency Jettison Button in this section.

- If no electrical power is available, the pods and/or pylons cannot be jettisoned by any method.

RADAR BEACON SYSTEM — AIRPLANES CHANGED BY T.O. 1F-100-985.

The radar beacon system increases the effective tracking range of ground radar stations, providing navigational aid and tactical air control to friendly airplanes. The system consists of an antenna (figure 4-6), a transponder (SST-181X), and a control panel. (See 21, figure 1-10; 23, figure 1-11; figure 4-16). When the transponder receives an interrogating pulse transmitted by the ground radar, it responds automatically when a coded-pulse reply many many times stronger than an ordinary reflected pulse. The interrogating source receives this reply and determines the airplane azimuth and range. The radar beacon system is powered by the tertiary bus.

RADAR BEACON CONTROL PANEL

Figure 4-16

Power Switch.

The radar beacon system is fully automatic except for turning the power supply on and off. This is the function of the power switch. (See figure 4-16.) Moving the switch from OFF to ON connects tertiary bus power to the system transponder. Normally, warm-up time is from 30 to 60 seconds. If no response is received within 5 minutes after the system is turned ON, the system should be turned OFF.

Power-on Light.

This amber, dimmable, press-to-test light (figure 4-16) comes on when the power switch is moved to ON, to indicate tertiary bus power is being supplied to the system transponder.

RADAR HOMING AND WARNING (RHAW) SYSTEM – AIRPLANES CHANGED BY T.O. 1F-100-992 (WIRING PROVISIONS) AND -994 (SYSTEM COMPONENTS).

See 1 and 2, figure 1-6; 8, 11, and 14, figure 1-13; and refer to Confidential Supplement, T.O. 1F-100D(I)-1-2.

LIGHTING EQUIPMENT.

EXTERIOR LIGHTING.

A position light is on each wing tip, and two are in the trailing edge of the fuel vent outlet fairing, above the rudder. The airplane has two recognition lights, one on the upper fuselage and one on the lower fuselage. Airplanes changed by T.O. 1F-100-1040 have two anticollision lights, one on the upper fuselage and one on the lower fuselage. On these airplanes, the lower recognition light is moved forward on the fuselage centerline to accommodate the lower anticollision light. (See figures 1-1 and 1-2.) The retractable landing-taxi lights are in the lower surface of the fuselage. The lights extend for use as landing lights until the weight of the airplane is on the nose gear; then the lights extend farther to provide taxi lighting. Some airplanes have a single floodlight in each wing. The lights (29, figure 1-1; 23, figure 1-2) face inboard and aft for illumination of the aft fuselage and empennage to facilitate visibility during night formation.

Position Light Switch.

Illumination of the position and recognition lights is controlled by a secondary-bus-powered switch. (See figure 4-17.) When the switch is moved from the OFF (center) position to STEADY, the position and recognition lights come on. When the switch is moved to FLASH, the position lights automatically flash at the rate of 40 cycles per minute; however, the recognition lights remain on steady. (The position lights flash alternately, in sequence; the wing tip lights and the white taillight flash together, and the amber taillight flashes separately.)

Position Light Dimmer Switch – Airplanes Changed by T.O. 1F-100-1068.

Brilliance of the position and recognition lights is controlled by a secondary-bus-powered dimmer switch (not in rear cockpit). (See figure 4-17.) The switch has two positions, BRIGHT and DIM.

Anticollision Light Switch – Airplanes Changed by T.O. 1F-100-1040.

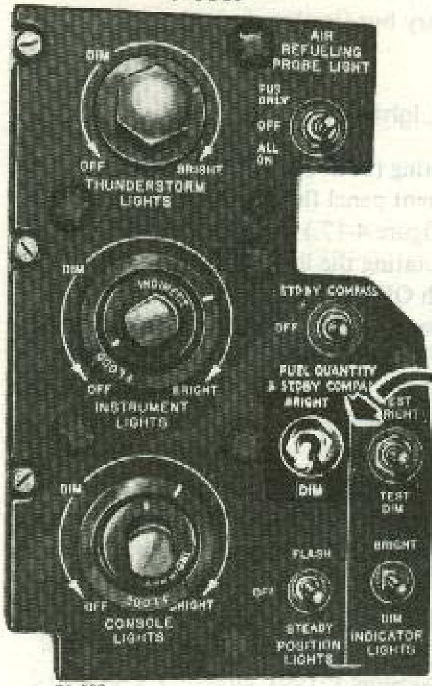
Moving the anticollision light switch, labeled "BEACON LIGHTS" (figure 4-17), to ON supplies primary bus power to a red light, and a reflector that rotates about 80 rpm. The light and reflector are housed in a streamlined enclosure on the upper and lower fuselage. These lights, masked at the forward end to prevent glare in the cockpit, provide a flash-type warning that can be seen at great distances. Moving the switch to OFF shuts off power to the motors and to the lights.

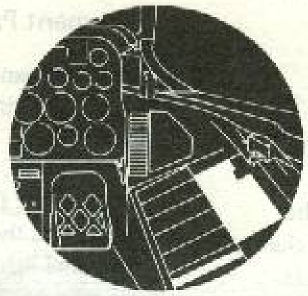
LIGHTING CONTROL PANEL

NOTE

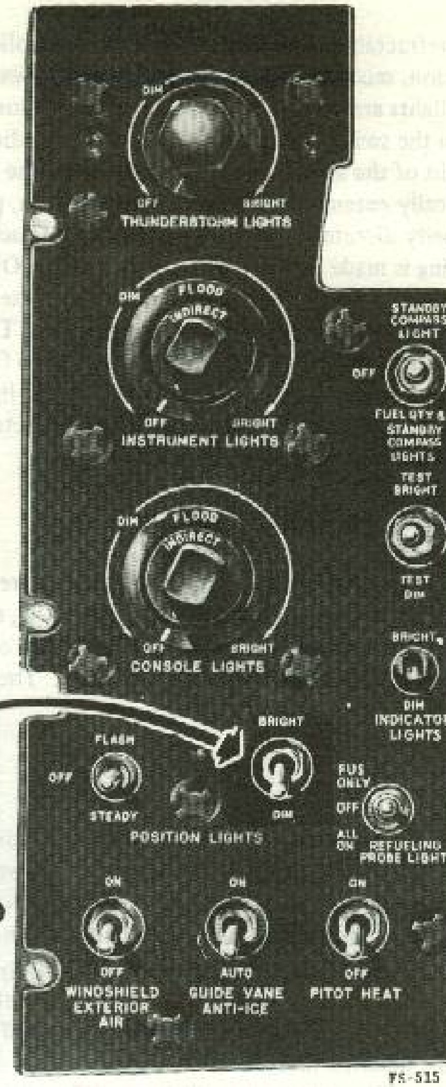
On some airplanes, the indicator light test switch and the indicator light dimmer switch are on the stand-by instrument inverter switch panel.

F-100F



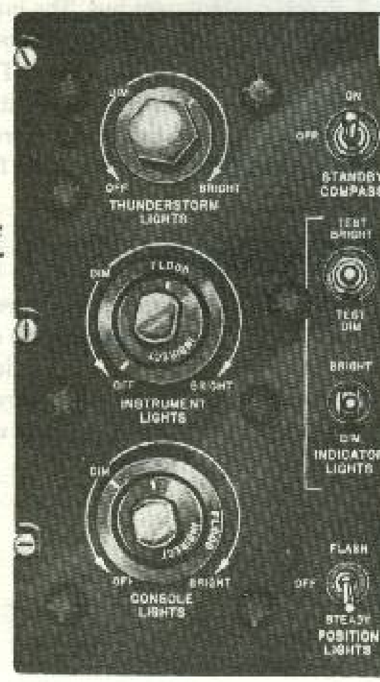


Airplanes not changed by T.O. 1F-100-1068

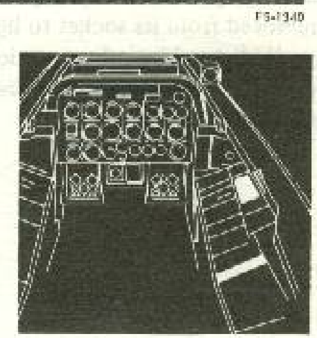


F-100D

F-100F REAR COCKPIT



Airplanes changed by T.O. 1F-100-1040



100D-1-A56-7D

Figure 4-17

Landing-Taxi Light Switch.

The retractable landing-taxi lights are controlled by a two-position, secondary-bus-powered switch. (See figure 1-35.) The lights are extended to the landing position and come on when the switch is turned to ON. Upon landing, when the weight of the airplane is on the nose gear, the lights automatically extend farther to the taxi position, providing properly directed beams for taxiing. If a touch-and-go landing is made and the switch is left in the ON position, the lights return to the landing position as the weight of the airplane is removed from the nose gear. The lights go out and retract when the switch is turned to OFF. Limit switches automatically cut off power to the light actuation motors when the lights reach the fully retracted or extended positions.

Exterior Floodlight Switch.

Moving this switch (22, figure 1-10; 11, figure 1-11; 21, figure 1-15; 21, figure 1-16; figure 4-17), not in the rear cockpit, from OFF to BRIGHT or DIM controls the brilliancy of the floodlights in the wings. The switch is powered by the secondary bus.

INTERIOR LIGHTING.

Most instruments receive indirect lighting from individual fixtures of either the ring or the post type, while some instruments are integrally lighted. The position markings and names of the controls and switches on the consoles and instrument panel are lighted indirectly by edge lighting transmitted through the control panels. Direct lighting of the consoles and instrument panel is supplied by floodlights on the undersurface of the instrument panel shroud and canopy sills. (The indirect lights and floodlights furnish conventional red light.) Floodlighting can be reduced or completely closed off by turning a knob at the end of each lamp. The floodlights are adjustable, and can be directed toward any spot on the instrument panel. A thunderstorm light on each side of the cockpit provides intense white light to reduce the blinding effects of lightning. A standard (Type G-4A) utility light fits into a socket above the right console for general cockpit lighting. The utility light can be removed from its socket to light areas of the cockpit not normally lighted by other interior lights. Spare lamps for console and instrument lights are stored in a compartment above the left console.

Console Light Rheostats.

The lighting and brilliance of the console indirect lights and floodlights are controlled by dual rheostats. (See figure 4-17.) Rotation of the oblong upper knob, marked "INDIRECT," through OFF, DIM, and BRIGHT, regulates the edge lighting that lights the position markings on the control panels and markings on the instrument panel. The disk-shaped lower rheostat, marked "FLOOD," controls the console floodlights. The console indirect lights are powered by the primary bus. The console floodlights are powered by the primary bus (tertiary bus on some airplanes).

Instrument Panel Light Rheostats.

Instrument panel lighting (both the indirect individual lights and the instrument panel floodlights) is controlled by dual rheostats. (See figure 4-17.) These rheostats rotate independently, and rotating the inner knob marked "INDIRECT" through OFF, DIM, and BRIGHT turns on and controls the brilliancy of the indirect individual instrument panel lights. (The caution, warning, and indicator lights may be dimmed by the indicator light dimmer, if the instrument panel indirect lights are on.) When the knob is rotated from OFF to turn on the instrument panel indirect lights, the landing gear warning light dims (if it is on). When the instrument panel indirect lights are off, the landing gear warning light remains bright. Rotating the outer ring, marked "FLOOD," through OFF, DIM, and BRIGHT turns on and controls the brilliancy of the instrument panel floodlights. The inner rheostat, on some F-100D airplanes, and in the front cockpit on some F-100F airplanes, is powered by the 3-phase ac instrument bus. The inner rheostat on other airplanes (and in the rear cockpit of F-100F airplanes) is powered by the main 3-phase ac bus. The rheostat steps power down for indirect instrument lighting. The outer rheostat controls primary bus power (tertiary bus power on some airplanes) to the instrument panel floodlights.

Thunderstorm Light Rheostat.

The two white thunderstorm lights, powered by the primary bus (tertiary bus on some airplanes), are controlled by an on-off rheostat. (See figure 4-17.) For identification of the thunderstorm light control, the rheostat has a hexagonal knob, rather than the oblong knob used on the other lighting control panel rheostats.

Fuel Quantity Gage and Magnetic Compass Light Switch.

Lighting of the magnetic compass is controlled by a three-position switch (not in the rear cockpit). Lighting of the magnetic compass in the rear cockpit is controlled by a two-position switch. The three-position switch also controls the light for the 335- or 450-gallon drop tank fuel quantity gages (not in the rear cockpit). With the switch at STANDBY COMPASS (STDBY COMPASS), the light within the magnetic compass comes on. With the switch at FUEL QTY & STANDBY COMPASS LIGHTS (FUEL QUANTITY & STBY COMPASS), the magnetic compass light and the light for the 335- or 450-gallon drop tank fuel quantity gages are on. With the switch at OFF, the lights are turned off. Adjustment of the console light rheostat controls the brilliance of the lights if dc power is on the primary bus.

Cockpit Utility Light Controls.

The cockpit utility light rheostat is attached to the side of, and is an integral part of, the cockpit utility light. (See 10, figures 1-10 and 1-11; 6, figures 1-15 and 1-16; 7, figure 1-18.) The rheostat controls the lighting and brilliance of the cockpit utility light; however, a push-button switch on the light housing provides full brilliance of the light, regardless of the rheostat setting. A detachable lens cover is supplied for changing from white to red light. A round knob on the side of the utility light is used to obtain the desired focus. This light is powered by the primary bus.

OXYGEN SYSTEM.

The liquid-type oxygen system converts the oxygen from a liquid to a gas to make it suitable for breathing. The gaseous oxygen is supplied at normal temperature by a Type MD-1 oxygen regulator. On F-100D airplanes, liquid oxygen is stored in an insulated "Thermos-bottle" type converter-storage tank forward of the cockpit on the right side of the fuselage. On F-100F airplanes, liquid oxygen is stored in two insulated "Thermos-bottle" type converter-storage tanks in the right side of the fuselage, outboard and below the cockpit. Each cockpit has its own complete oxygen system. An auxiliary distribution system, through interconnecting lines and check valves, can supply gaseous oxygen to both regulators so that both crew members may use oxygen from either or both tanks. Oxygen is delivered to the regulator at a pressure of about 70 psi and is supplied to the crew member at a rate that depends on altitude and demand. (Oxygen duration is shown in figure 4-18.) The single tank on F-100D airplanes and each of the two tanks on F-100F airplanes has a capacity of about 5 liters (1.3 gallons). However, because of the boiling of the liquid oxygen and the shape of the tank, it is not possible to fill each system beyond 4.5 liters. A full supply of liquid oxygen completely boils off in about 5 days when the airplane is on the ground and no demands are made on the system. The liquid oxygen system is serviced through a single-point filler and a build-up and vent valve (two fillers and two build-up and vent valves, one for each system, on F-100F airplanes) within an access door on the right side of the fuselage, below the cockpit. (See figure 1-41.) The build-up and vent valve controls oxygen pressure build-up in its respective system. The valve handle must be at VENT during system filling, and at BLD. UP to pressurize the system for normal operation. (See figure 1-41 for oxygen specification).

OXYGEN REGULATOR.

The pressure-breathing, diluter-demand oxygen regulator (figure 4-19) mixes air with oxygen in varying amounts, according to altitude, and makes available a quantity of the mixture each time the pilot inhales. At high altitudes, the regulator supplies oxygen at continuous positive pressure. The delivery pressure automatically changes with cockpit altitude. The regulator control panel includes a supply lever, a diluter lever, a pressure gage, a flow indicator, and an emergency lever.

NOTE

Above 30,000 feet, a vibration or wheezing sound may sometimes be noticed in the mask. This noise is a normal characteristic of regulator operation and should be overlooked.

Diluter Lever.

The diluter lever (figure 4-19) should be at NORMAL, for normal oxygen use, or at the 100% position for emergency oxygen use. With the lever at NORMAL, the regulator supplies a mixture of air and oxygen up to about 30,000 feet which is equivalent to normal breathing at sea level. Beyond 30,000 feet, 100 percent oxygen is supplied on either setting. These operating characteristics are related to the cockpit altitude only.

OXYGEN DURATION

(EACH CREW MEMBER)

- Black figures indicate diluter lever **NORMAL**
- White figures indicate diluter lever **100%**
- White figures in parentheses indicate diluter lever **100%** oxygen, emergency lever at **EMERGENCY**, and pressure suit used.
- Oxygen regulator gage pressure constant 70 psi.

HOURS

COCKPIT ALTITUDE—FEET	5	4	3	2	1	BELOW 1
35,000 AND ABOVE	31.4 31.4 (12.8)	25.2 25.2 (10.2)	18.9 18.9 (7.7)	12.6 12.6 (5.1)	6.3 6.3 (2.6)	EMERGENCY—DESCEND TO ALTITUDE NOT REQUIRING OXYGEN
30,000	23.3 22.7 (12.8)	18.7 18.1 (10.2)	14.0 13.6 (7.7)	9.3 9.0 (5.1)	4.7 4.5 (2.6)	
25,000	22.0 17.5 (9.8)	17.6 14.0 (7.8)	13.2 10.5 (5.9)	8.8 7.0 (3.9)	4.4 3.5 (2.0)	
20,000	25.0 13.3 (7.6)	20.0 10.7 (6.1)	15.0 8.0 (4.6)	10.0 5.3 (3.0)	5.0 2.7 (1.5)	
15,000	30.2 10.7 (6.0)	24.2 8.6 (4.8)	18.1 6.4 (3.6)	12.1 4.3 (2.4)	6.0 2.2 (1.2)	
10,000	30.2 8.6 (4.8)	24.2 6.9 (3.8)	18.1 5.2 (2.9)	12.1 3.4 (1.9)	6.0 1.7 (1.0)	
5000	30.2 6.8 (3.9)	24.2 5.4 (3.1)	18.1 4.1 (2.3)	12.1 2.7 (1.6)	6.0 1.4 (0.8)	
0	30.2 5.5 (3.2)	24.2 4.4 (2.6)	18.1 3.3 (1.9)	12.1 2.2 (1.3)	6.0 1.1 (0.7)	

LIQUID OXYGEN QUANTITY—LITERS

F-100D-1-A73-10

Figure 4-18

Emergency Lever.

The emergency lever (figure 4-19) should be in the center position at all times, unless an unscheduled oxygen pressure increase is desired. Moving the lever to EMERGENCY provides continuous positive pressure to the mask. When the lever is held at TEST, oxygen at positive pressure is provided to test the mask for leaks. (On some regulators, the emergency lever requires about four times the pressure to move it to TEST position than on other regulators.)

WARNING

When positive pressures are required, it is mandatory that the oxygen mask be well fitted to the face. Unless special precautions are taken to ensure that there is no leakage, continued use of positive pressure under these conditions will result in the rapid depletion of the oxygen supply, and could also result in extremely cold oxygen flowing to the mask.

Supply Lever.

The supply lever (figure 4-19) is safety-wired to the ON position. It also has an OFF position.

Pressure Gage and Flow Indicator.

The pressure gage (figure 4-19) shows oxygen pressure available to the regulator. The flow indicator (blinker) consists of an oblong opening which shows black and white alternately during the breathing cycle.

Liquid Oxygen Quantity Gage.

The liquid oxygen quantity gage (4, figures 1-10, 1-11, and 1-15; 5, figure 1-16; 3, figure 1-18) measures the quantity of liquid in the oxygen converter (respective oxygen converter on F-100F airplanes) and is calibrated in liters from 0 to 5.

NOTE

The liquid oxygen quantity gage should read between 4 and 4-1/2 liters when the system is fully charged, since it is impossible to charge the converter to 5 liters. Use oxygen duration table to determine oxygen duration for indicated supply.

MD-1 OXYGEN REGULATOR

F-100D-1-A73-11

Figure 4-19

EMERGENCY OPERATION OF OXYGEN SYSTEM.

Refer to Oxygen System in section III.

PRESSURE REFUELING SYSTEM.

The pressure refueling system permits all internal fuel tanks to be filled on the ground by single-point refueling and in flight by probe-and-drogue refueling. The two 450- or 335-gallon drop tanks can be refueled through the pressure refueling system in flight or on the ground, except as stated in Single-point Refueling in this section. The pressure refueling system is shown in figure 4-21.

GROUND REFUELING.

Single-point Refueling.

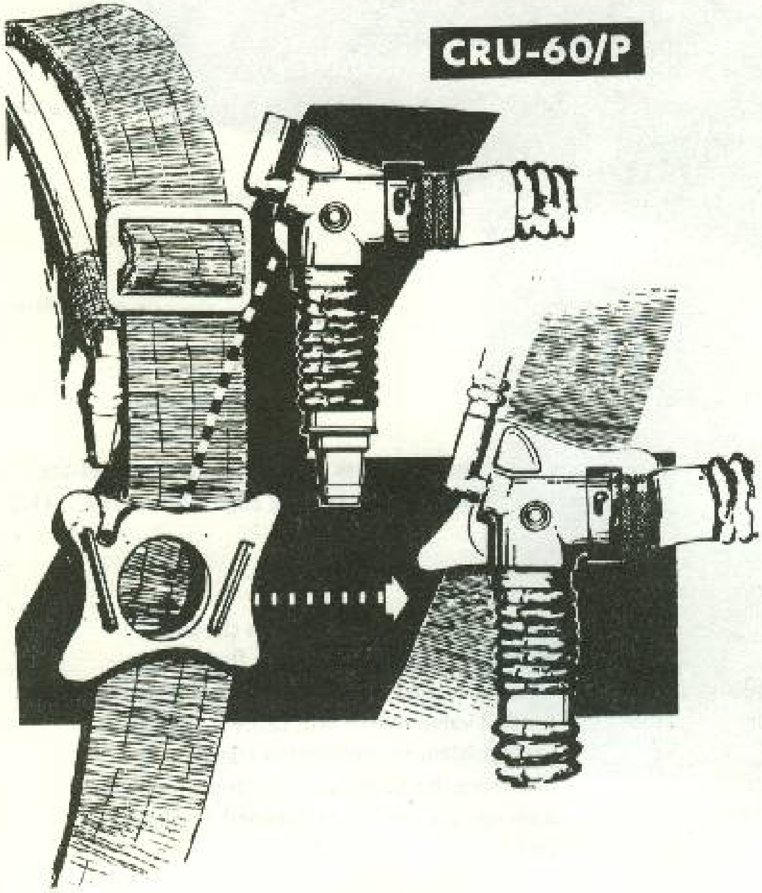
The internal fuel tanks are normally filled through the single-point refueling system. The single-point refueling receptacle is behind an access door on the left side of the fuselage, just below the flap trailing edge. (See figure 1-41.)

NOTE

> Loss of the access door from the single-point refueling receptacle in flight, or a malfunction of the drop tank fuel transfer control valve switch will cause a critical fuel problem by preventing transfer of fuel from the drop tanks or from the wing scavenge pumps to the forward fuselage tank.

All internal fuel tanks can be filled in about 4 minutes by using the pressure refueling system. Drop tanks should be refueled through the individual drop tank fillers; however, the two 450- or 335-gallon drop tanks can be refueled by using the pressure refueling system if the engine is running. On F-100F-20 airplanes, single-point refueling of the 450- or 335-gallon drop tanks may be performed without

OXYGEN HOSE HOOKUP



WARNING
Do not attach stowage strap on seat oxygen hose to the connector because this may prevent pilot-seat separation during ejection sequence.

1. Insert connector into connector mounting plate attached to parachute harness. Check that connector is firmly attached and that lockpin is locked.
2. Insert male bayonet connector, on end of oxygen mask hose, into female receiving port of connector, and turn connector to lock its prongs into recesses in lip of receiving port. Place oxygen mask hose beneath right shoulder harness strap.
3. Couple seat oxygen hose to lower port of connector.
4. Attach bail-out bottle hose to swiveling port of connector by inserting male coupling of bail-out bottle hose and turning it clockwise against spring-loaded collar.

Figure 4-20

SINGLE-POINT AND AIR

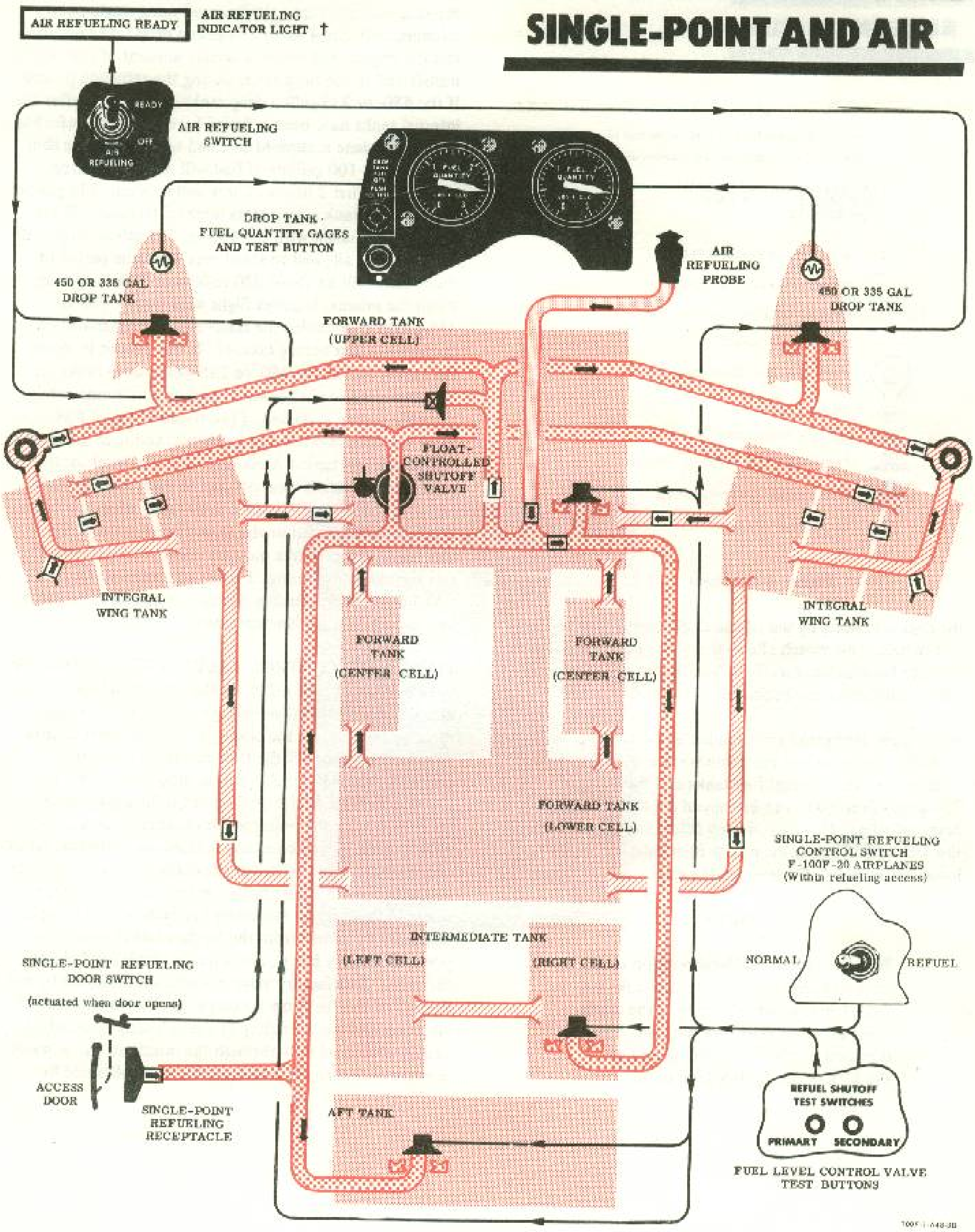


Figure 4-21 (Sheet 1 of 2)

REFUELING SYSTEM

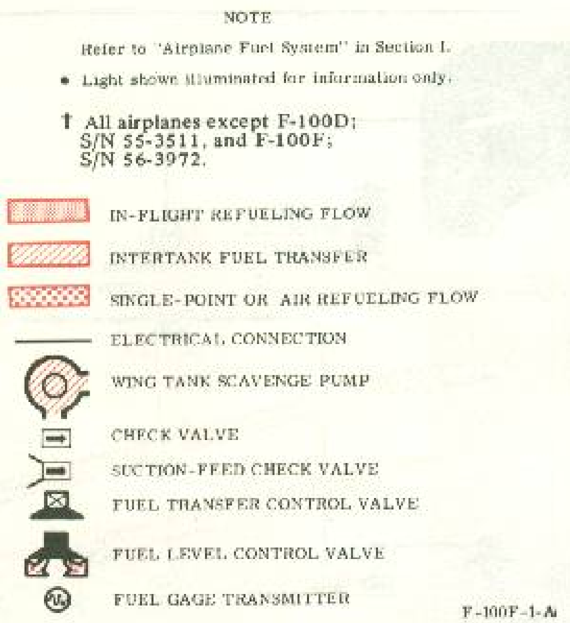


Figure 4-21 (Sheet 2 of 2)

the engine running by use of the single-point refueling control switch. This switch allows the 450- or 335-gallon drop tanks to be refueled directly before the internal tanks are filled, eliminating any backwash of the fuel.

When these drop tanks are included in the single-point refueling operation, the complete system will fill in about 11 minutes. The internal fuel tanks and the 450- or 335-gallon drop tanks can be topped off by using single-point refueling. However, during filling and topping off, the 450- or 335-gallon drop tank filler caps should be loosened by raising the lever on the caps.

NOTE

When the 450- or 335-gallon drop tanks are being refueled, the internal tanks are full when a sudden decrease in the single-point refueling flow rate is noted. This is caused by the slower filling rate of the 450- or 335-gallon drop tanks.

Starting with an empty airplane and using single-point refueling with the 450- or 335-gallon drop tanks installed and the engine shut down, a certain amount of fuel will be transferred to the drop tanks during the refueling process. If the 450- or 335-gallon drop tanks are installed after the internal tanks have been refueled by single-point refueling, and the airplane is allowed to stand with the engine shut down, about 100 gallons of fuel will seep to the drop tanks in the first 2 hours. There will be about 130 gallons in each drop tank after a time lapse of 16 hours. If the airplane is refueled with the 450- or 335-gallon drop tanks installed, and allowed to stand over the same period of time, there will be about 230 gallons in each drop tank. When the mission requires flight with empty 450- or 335-gallon drop tanks, the tanks should be installed on the airplane just before takeoff. If this cannot be done, the excess fuel in the 450- or 335-gallon drop tanks can be transferred to the forward fuselage tank immediately after the engine is started. (The transfer rate of fuel from the drop tanks to the fuselage is about 25 gallons per minute per tank.) Tank-mounted fuel level control valves automatically shut off fuel to each fuselage tank and to the 450- or 335-gallon drop tanks when the tanks become full. The automatic shutoff operation of the fuel level control valves must be tested during the first few seconds of refueling. Failure of a valve to shut off flow could allow refueling pressure to rupture fuel tanks and damage the airplane structure.

FUEL LEVEL CONTROL VALVE TEST BUTTONS. Two push buttons (figure 4-21), on the left side of the fuselage above the single-point refueling receptacle access door, must be used to test the closing of the fuel level control valves, which shut off the flow of fuel to each tank (including the 450- or 335-gallon drop tanks). Within the first seconds of the single-point refueling operation, these valves should be tested for closing, because some tanks fill early. (When a tank is filled, an individual check of the primary and secondary operation of the valve cannot be made.) When either button is held down, the respective solenoid (primary or secondary) in each control valve is energized by power from the tertiary bus (battery bus power if tertiary bus power is not available) and closes the valve. Satisfactory valve operation is indicated by the shutoff of the fuel flow accompanied by the stopping of vibration and the stiffening of the refueling hose, which occurs when fuel flow through the nozzle stops. A more positive indication of fuel shutoff can be obtained by observing the counter on the ground refueling equipment. If fuel flow continues when either or both of the test switches are pressed, refueling operations must be stopped immediately to prevent possible damage, and the cause must be determined and corrected.

CAUTION

It is necessary to have the fuel level control valve (primary and secondary) operation checked, because failure of a valve to close could cause refueling pressure to rupture the fuel tanks and damage the airplane structure.

SINGLE-POINT REFUELING DOOR SWITCH. This spring-loaded, plunger-type switch, in an access just aft of the single-point refueling receptacle (figure 1-41), controls the sequence of tank refueling. When the access door is opened, the switch is automatically actuated and tertiary bus power (battery bus power if tertiary bus power is not available) closes the fuel transfer control valve to prevent fuel from entering the forward tank through this valve. Closing the valve will ensure that the wing tanks will be completely filled before the forward tank is full. This sequence must occur; otherwise, the float-controlled shut-off valve will stop the fuel flow to the wing tanks when the forward tank is full. The switch is repositioned when the access door is closed, to open the fuel transfer control valve and restore normal fuel system operation.

NOTE

Make sure the single-point refueling access door is closed as soon as refueling is completed, to prevent drain on battery power.

SINGLE-POINT REFUELING CONTROL SWITCH – F-100F-20 AIRPLANES. The single-point refueling control switch, in an access just forward of the single-point refueling receptacle (figure 1-41), controls the fuel level control valves of all the internal fuel tanks. The switch is powered by the tertiary bus, or battery bus if tertiary bus power is not available. When positioned outboard (refuel), the switch closes the fuel level control valves in all of the tanks (except the 450- or 335-gallon drop tanks) and the transfer valve. With all of the internal tanks shut off in this manner, the fuel will go directly to the drop tanks. A placard by the switch specifies the amount of fuel to be pumped into the drop tanks before the switch is repositioned to inboard (normal), which will allow all of the internal tanks to fill normally, by opening the fuel level control valves. An umbrella-shaped guard on the access door positions the switch to inboard when the door closes, ensuring that fuel can be transferred during an air refueling hookup.

Alternate Method Ground Refueling.

When single-point refueling equipment is not available, the internal tanks can be refilled with conventional refueling equipment, if an ac external power source is available. To fill the tanks by use of conventional equipment, it is necessary to remove the access door to the aft tank fuel control valve on the right side of the fuselage and remove the cover plate on the aft fuselage tank. This allows the nozzle to be inserted at this point. (See figure 1-41.) External ac power must be connected to the airplane to energize the transfer pumps in the aft fuselage tank. Fuel introduced into the aft tank is transferred to the forward and intermediate tanks until the airplane is full, except that the forward tank will lack 42 gallons of being full, because this is the level at which the aft tank transfer level control valve is located. Because fuel transfers from the forward tank to the wing tanks by gravity through the balance vent system, the forward tank fills before the wing tanks are filled. Therefore, it is necessary to allow fuel to transfer into the wing tanks before continuing to fill. It may take 2 hours or more to fill the wing tanks completely by this method. If refueling is stopped when it becomes necessary to allow fuel to transfer into the wing tanks, only about 4800 pounds of fuel will be in the airplane. Fuel quantity gages can be used to check refueling progress when this method of refueling is used. Fuel tank capacities are listed in figure 1-23; fuel specifications are given in figure 1-41.

AIR REFUELING.

Air refueling permits all internal fuel tanks to be filled from a tanker airplane. The two 450- or 335-gallon drop tanks, carried at the intermediate wing mounting stations, can also be serviced by air refueling. The refueling equipment consists of a probe and drogue, with the probe on the receiver airplane and the drogue on the tanker. The 12-foot probe mast and probe (figure 4-22) are a detachable unit. Two lights (figure 4-22), one at the probe mast fairing and one

AIR REFUELING PROBE

Figure 4-22

flush-mounted in the fuselage right side, light the probe and the tanker drogue for night refueling. The probe is connected by a fuel line to the single-point refueling system. (See figure 4-21.)

Air Refueling Controls and Indicators.

NOTE

There are no air refueling controls and indicators in the rear cockpit.

AIR REFUELING SWITCH. This two-position switch (figures 1-22 and 4-21) controls the operation of the fuel transfer control valve in the forward fuselage tank, and the fuel level control valve in each of the 450- or 335-gallon drop tanks. With the switch at READY, the fuel transfer control valve is closed by tertiary bus power (battery bus power if tertiary bus power is not available) and the level control valves in the drop tanks are de-energized, allowing them to open. The closing of the fuel transfer control valve ensures that the wing tanks will be completely filled before the forward tank is full. This sequence must occur; otherwise, the float-controlled shutoff valve will stop fuel flow to the wing tanks when the forward tank is full. Incoming fuel from the refueling probe can then flow into the 450- or 335-gallon drop tanks. When the 450- or 335-gallon drop tanks are full, the fuel level control valve in each drop tank shuts off the flow of fuel to each drop tank. The air refueling switch should be moved to READY just before hookup for air refueling, and at the latest, before any fuel is taken on after hookup.

NOTE

Do not position air refueling switch to READY too soon, since this prevents about 25 pounds per minute from transferring from the integral wing tanks for the period that the switch is at READY. If the fuel is low, the switch may be positioned to READY after hookup, before taking on any fuel.

With the air refueling switch at OFF, the fuel transfer control valve in the forward fuselage tank opens and the fuel level control valves in each of the 450- or 335-gallon drop tanks are energized closed by power from the secondary bus (tertiary bus power on F-100F airplanes). This allows fuel from the 450- or 335-gallon drop tanks, and wing tank fuel that is transferred by the wing scavenge pumps, to transfer into the fuselage forward tank.

NOTE

Failure to return the air refueling switch to OFF after refueling is completed prevents use of the fuel normally available from the 450- or 335-gallon drop tanks and that transferred by the wing scavenge pumps.

REFUELING PROBE LIGHT SWITCH. The refueling probe light in the fuselage and the refueling probe light in the probe mast fairing are controlled by a switch (figure 4-17) labeled "REFUELING PROBE LIGHT" ("AIR REFUELING PROBE LIGHT" on F-100F airplanes). Moving the switch to FUS ONLY turns on the fuselage probe light. With the switch at ALL ON, the fuselage probe light and the mast fairing probe light are both turned on. The refueling probe lights are turned off when the switch is moved to OFF. The switch is powered by the secondary bus (primary bus on F-100F airplanes).

AIR REFUELING INDICATOR LIGHT. This green placard-type indicator light (figures 1-17 and 4-21) comes on to read "AIR REFUELING READY" when the air refueling switch is at READY; it is not an indication that all items in the system are operating. The light is battery-bus-powered. The bulbs in the light can be tested by the indicator light test circuit.

DROP TANK FUEL QUANTITY GAGES.

WARNING

When the airplane is carrying 450-gallon drop tanks changed by T.O. 6J14-2-7-507 (installation of baffles), the fuel quantity gages will not be accurate under the following conditions:

- During ground and air refueling until the tank is full. When the tank has been completely filled and the fuel is transferred by normal sequencing, the gages will read accurately from full to empty.
- After the airplane has set on the ground for a time without having the drop tanks topped off. (This is due to fuel draining by gravity from the internal cells into the tank and being trapped in the forward section by the bulkhead.)
- After maneuvers that result in a prolonged nosedown attitude.

Fuel quantity gages (1 or 30, figure 1-6; 2, figure 1-7; figure 4-21) that indicate the quantity of fuel in each of the two 450- or 335-gallon drop tanks can be installed on a removable panel that attaches to the instrument panel shroud. This indicating system is independent of the normal internal fuel quantity indicating system and is of the capacitor type powered by the 3-phase ac instrument bus. The system automatically compensates for the contraction or expansion of fuel caused by temperature changes. When the drop tanks are jettisoned, the fuel gage pointers rotate counterclockwise momentarily, then stop just below zero. Lighting of the fuel gages is controlled by the switch that also controls the magnetic compass light. (Refer to Lighting Equipment in this section.)

DROP TANK FUEL QUANTITY GAGE TEST BUTTON. Gage operation can be checked by a test button on the removable fuel quantity gage panel. When the test button (1 or 26, figure 1-6; 1, figure 1-7; figure 4-21) is held down, the gage pointer should move counterclockwise toward "0" (empty), and when the button is released, the pointer should return to its former position. If the pointer fails to move or does not return to its previous setting, the drop tank fuel quantity gage system is faulty.

Air Refueling Operations.

For information on air refueling operations, refer to T.O. 1-1C-1-10.

"BUDDY" AIR REFUELING SYSTEM.

The airplane has provisions for a "Buddy" air refueling system.

MISCELLANEOUS EQUIPMENT.

STATUS DISPLAY LIGHTS – AIRPLANES NOT CHANGED BY T.O. 1F-100-994 OR 1F-100D-632.

Two multiple-light display units (figure 4-32), not in rear cockpit, contain necessary information as to the status of a particular system. Each unit houses several lamps and lenses and one film plate containing a group of symbols that make up the total display. When the required system controls are actuated, the associated lamp comes on to project a light through a lens to the related image on the film plate, and through another lens that projects the image forward, where it is displayed on a screen on the face of the display unit. Each display includes a small airplane (looking from aft to forward) and a large numeral that shows the wing station selected.

On some airplanes, every display is accompanied by a small number within an arc above or below the display that represents the individual lamp number for the display. On other airplanes, individual lamps are indicated by a notch that allows a shaft of the light to show in the periphery of the display. These notches of light are measured clockwise from the vertical centerline with each notch representing an individual lamp number corresponding to a clock position. For example, lamp No. 2 is represented by a notch at the 2 o'clock position, etc.

Brilliance of the lights in both units is controlled by the indicator light dimmer switch, and the lights can be tested by the indicator light test switch. When the test switch is held at TEST BRIGHT or TEST DIM, all lamp numbers (2, 4, 5, 6, 7, 8, 9, and 11) or all notches in each display appear simultaneously while the center area appears as a garbled pattern. Failure of a lamp number or notch to appear when the test switch is actuated indicates a malfunction of that light. Although the film plate housed in each unit can contain as many as 12 symbols, only those symbols corresponding to systems presently in use in these airplanes will appear in the display. Since each unit contains 12 lamps, there are plenty of spares available. For replacement, see figure 4-32. Light units that show lamp numbers in the display can be removed by pushing in on the face of the display unit. This releases the spring-locking clip and allows the body to be removed from the housing. On light units having the lamp notches, the spring-locking clip must be pressed to release the body from the housing. After the lamps are replaced, the body should be reinserted (locking clip up) into the housing until a click is felt. It is not necessary to alter the position of any switch in the cockpit when removing and installing the light body. The status display lights are powered by the main 3-phase ac bus.

STATUS DISPLAY LIGHTS – AIRPLANES CHANGED BY T.O. 1F-100-994 OR 1F-100D-632.

Placard-type lights (figure 4-32), when on, show the status of a particular system. The lights are powered by the secondary bus. Bulbs in the lights can be tested by the indicator light circuit.

VGH Data Recorder System – Airplanes Changed by T.O. 1F-100-1031.

Airplanes changed by T.O. 1F-100-1031 have a VGH (velocity, "G" forces, height) data recording system that monitors and records velocity, "G" forces, and altitude, and other pertinent circuit information during normal flight. The system records on magnetic tape the vertical acceleration peaks experienced near the airplane CG. As these peaks are recorded, the indicated airspeed, altitude, and elapsed time of the "G" forces are also recorded. In addition, signals are recorded during gun firing, store release, in-flight refueling, and during a change in nose gear load switch position, to differentiate between ground and airborne inputs. Powered by the primary bus, the VGH data recording system consists of an A/A24U-10 recorder and a store release monitor box in the left forward fuselage, and a TRK-77/A24U accelerometer on the forward bulkhead between the main gear wheel wells. It is protected by a circuit breaker marked VGH REC/LDG GR POS CONTROL. No cockpit controls are associated with this system.

Operation of VGH Data Recording System.

The VGH data recording system receives and records for playback, vertical acceleration data from the accelerometer; airspeed and altitude data from the pitot-static system; and gun firing, store release, in-flight refueling, and nose gear load switch position data through the store release monitor box. The recorder does not run continuously, but operates only when significant flight data is accumulated, as determined by the programming in the computer recorder. Data from the airplane circuits, except nose gear load switch position and VGH information is stored until the monitor box memory circuit is reset.

Vertical velocity peaks are sensed by the accelerometer and fed to the computer-recorder. The data is received by the computer-recorder along with velocity and altitude information from the pitot-static system, converted to digital data is recorded on the magnetic tape. After flight, the recorder tape magazine is removed from the airplane for processing.

NAVIGATION COMPUTER (B-26).

Some airplanes have a B-26 navigation computer (5, figures 1-10 and 1-11) on a swivel arm above the right console (not in the rear cockpit). With this computer, the pilot can solve problems of time, rate, distance, true airspeed, and density altitude. When not in use, the computer can be stowed under the canopy sill.

ANTI-G SUIT SYSTEM.

Air pressure for the anti-G suit is supplied by engine compressor air through the cockpit air conditioning and pressurization system. (See figure 4-1.) This air is sent through a pressure-regulation valve to the anti-G suit attachment fitting. The line from the regulating valve to the attachment fitting passes through the quick-disconnect fitting on the front of the seat so that the line severs automatically upon ejection.

Anti-G Suit Pressure-regulating Valve.

The pressure-regulating valve (3, figures 1-8 and 1-9; 35, figure 1-14; 4, figure 1-17; figure 4-1) regulates air pressure to the anti-G suit and permits automatic inflation of the suit only when positive-G is encountered. The valve operates automatically and begins to function at about 1.75 G. Some valves have marked HI and LO positions at the top of the valve. When the valve is at LO (counterclockwise), one psi of air pressure is exerted in the suit for each additional 1 G increase; with the valve at HI (clockwise), 1.5 psi is delivered per G increase. Other valves are the nonadjustable, nonlabeled type. These valves are preset to exert an average air pressure of 1.5 psi for each added 1 G increase. Pressing the button on top of either type valve checks valve operation and also allows the suit to be inflated when desired. If this valve malfunctions in flight, the anti-G suit should be immediately disconnected.

VENTILATED SUIT SYSTEM.

The ventilated suit provides air circulation around the pilot's body and is normally worn under an anti-exposure suit to aid in the elimination of perspiration. Air for the ventilated suit is taken from the console air duct (figure 4-1) of the cockpit air conditioning and pressurization system and directed through a hose leading to the personal-lead quick-disconnect on the front of the ejection seat. A short section of hose, attached to the suit, is connected to the hose from the personal-lead disconnect. A manually operated flow control valve in this hose permits adjustment of the airflow into the suit. The console airflow lever (not in the rear cockpit) must be at full INCREASE to supply air to the ventilated suit. The temperature of the air to the suit is controlled by the cockpit temperature rheostat knob (not in the rear cockpit).

Ventilated Suit Flow Control Valve.

The ventilated suit flow control valve (figure 1-41) controls the flow of air to the unit. The flow control valve is manually operated, and is located where the suit hose section joins the hose from the personal-lead quick-disconnect on the ejection seat. This valve should always be closed before the two hoses are connected, to prevent sudden temperature changes.

Operation of Ventilated Suit System.

After the engine is started, and before connecting the suit, check out the system as follows:

1. Move console airflow lever to full INCREASE.

2. Move cockpit temperature master switch to AUTO.

3. Rotate cockpit pressure selector switch to 2.75 psi or 5.00 psi.

4. Feel for airflow from hose coming from personal-lead quick-disconnect by opening flow control valve.

5. Check for a decrease in airflow when flow control valve is turned from open to closed.

6. Rotate cockpit temperature rheostat from HOT to COLD and notice that there is a change in temperature of air coming from hose, and then rotate rheostat so that it is in center of "PILOT's SUIT RANGE" (VENT SUIT) marking.

7. Close flow control valve and connect suit hose to hose from personal-lead disconnect.

8. Slowly open flow control valve for desired airflow into suit.

9. Adjust cockpit temperature rheostat for desired temperature in ventilated suit.

NOTE

Always adjust the temperature in small increments to prevent sudden temperature changes in the suit.

PLOTTING BOARD.

A plotting board may be fastened into the right console (not in rear cockpit). It is stowed in the map case when not in use, or can be folded up against the canopy sill while it is in place on the console. Several transparent envelopes are stowed in the plotting board. Erasable calculations or flight lines may be plotted on these envelopes. A Mark II plotter is stowed on the underside of the plotting board.

RELIEF CONTAINER.

A relief container (34, figure 1-6; 35, figure 1-7; 1, figure 1-17) is in a compartment below the center pedestal. The relief container in the rear cockpit is above the left console.

PILOT'S PROTECTIVE HOOD.

A white canvas protective hood can be installed inside the canopy (not in the rear cockpit). When not in use, the hood should be kept stored in its special container.

NOTE

Lower seat before opening or closing the canopy or placing the protective hood in position, to prevent the hood from being damaged.

- To relieve interference between the circuit-breaker panels and pilot's head movements, the sagging fabric should be tucked in place.

INSTRUMENT FLYING HOOD – F-100F AIRPLANES.

An instrument flying hood is provided for the rear cockpit for use in instrument flying training.

CAUTION

Lower seat before using instrument flying hood, to prevent hood from being damaged.

MAP CASE.

The map case (15, figure 1-10; 18, figure 1-11; 14, figure 1-15; 14, figure 1-16; 12, figure 1-18) is on the right console.

REAR-VIEW MIRROR.

On F-100D airplanes and in the front cockpit of F-100F airplanes, an adjustable rear-view mirror (figure 1-38) is attached to the canopy bow, at the centerline. On some airplanes,* an additional mirror is on the right side of the cockpit, on the windshield bow, to aid in viewing the rear-cockpit occupant. The rear-view mirror, in the rear cockpit, is on the upper centerline of the canopy.

MOORING EQUIPMENT.

A plugged, threaded hole into which an eye can be screwed for mooring the airplane is in the bottom of each wing and on the lower surface of the fuselage, near the nose and tail. Four mooring eyes in a canvas container are included as a kit. (Three jack pads are also supplied in the kit.) All mooring-eye threaded holes and jack pad attachment points are identified by markings on the wings and fuselage.

PROTECTIVE COVERS.

Removable covers include wing and horizontal stabilizer covers, an air refueling probe cover, a canopy cover, a cover for the forward section of the fuselage, an air intake duct cover, and a tailpipe cover. A pitot boom cover is also provided.

ARMAMENT EQUIPMENT.

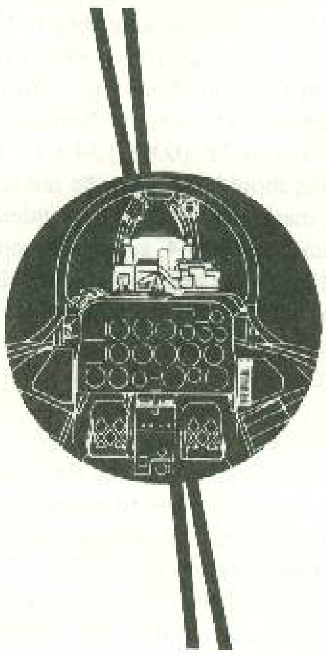
The basic armament installation consists of 20 mm guns and provisions for various external stores on jettisonable pylons fitted under each wing and fuselage centerline. On airplanes changed by T.O. 1F-100D-632, there are provisions for gun pods, and a programmer controller in the cockpit provides pulses to selected wing stations in accordance with store quantity, mode, and release interval selected. A gun-bomb-rocket sight is coupled with a radar ranging system for sighting. A gun camera on the sight records gun and missile firing. Some airplanes have a strike camera and two combat documentation cameras. Armament controls and indicators are not provided in the rear cockpit except for the following: bomb button, external load emergency jettison button, and LABS vertical gyro caging button. Refer to External Loading Configuration Limitations in section V for information on approved loading configurations.

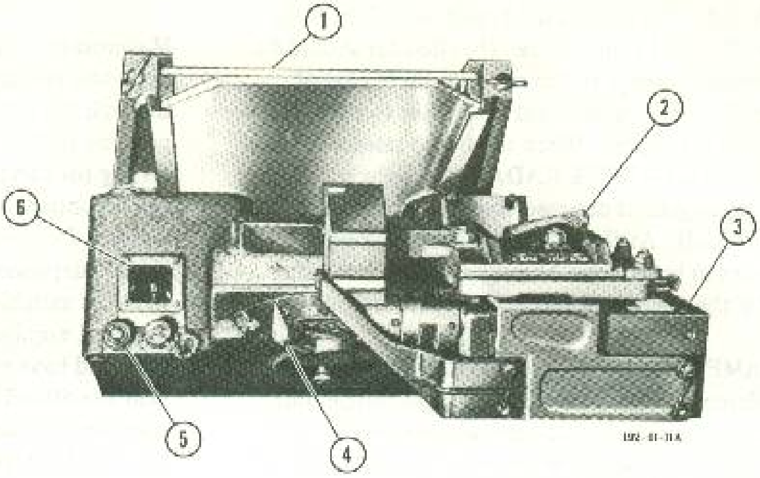
A-4 SIGHT.

The Type A-4 gyro computing sight (figure 4-23) automatically computes the required amount of lead for

*F-100F-6 Airplanes and F-100F-11 Airplanes, AF56-3770 through -3829

A-4 SIGHT





1. REFLECTOR GLASSES
2. SIGHT MECHANICAL CAGING LEVER
3. GUN CAMERA
4. WINGSPAN LEVER
5. RADAR LOCK-ON LIGHT
6. SIGHT RANGE DIAL

F-100D-1-A60-1

Figure 4-23

air-to-air gunnery as long as the pilot tracks the target smoothly. Range information is supplied by the range-only radar or by manual ranging by the pilot. The system computes lead for ranges between 900 and 9000 feet. The sight provides for automatic electrical caging (850 feet of range stiffness) when the function selector switch on the VRDU is moved to ROCKET. This eliminates the necessity for pressing the electrical caging button when delivering air-to-ground ordnance. If the armament selector is in the BOMB or NAPALM quadrants and the mode selector is in MANUAL, the sight will go out unless the bomb arming switch is in one of the three arming positions. The electrical power for the sight system is supplied by the tertiary bus and the sight reticle light is powered by the secondary bus.

Sight Ranging Radar.

The AN/ASG-17 fire control radar subsystem supplies range data to the A-4 sight and is powered by the tertiary bus and the main AC bus. The radar subsystem has a search range of 1800 to 9000 feet. An indicator light on the A-4 sight shows when the sight radar has locked on a target. Also, the sight reticle becomes brighter at the time of lock-on. A manual range control supplements the radar sight and should be used if the radar ranging fails. The radar subsystem antenna is in the upper leading edge of the engine air intake duct fairing. Manual ranging should also be used for overland targets below 6000 feet, because ground return effects (ground clutter) usually cause radar ranging below that altitude to be erratic. With the fire control radar subsystem, it is necessary to use manual ranging to overcome the effects of ground clutter below 3000 feet for overland targets.

NOTE

During gunnery training, a low target which has a relatively weak radar return, may be used. When the pilot's RANGE MAX control is set in the minimum position (3000 feet), it is possible for the radar to track a target to a low range (700 to 1200 feet) and then lock onto the large echo (false target), or transmitted pulse, produced by the F-100 aircraft. To overcome this condition, which occurs only during the above circumstances, the RADAR REJECT button should be depressed. This will allow the system to return to normal (search) operation.

A-4 Sight Controls and Indicators.

SIGHT DIMMER RHEOSTAT. The sight dimmer rheostat (figures 4-26 and 4-27) adjusts the brightness of the sight reticle. When the sight is not in use, the rheostat should be at DIM to prevent damage to the reticle bulb in case of voltage surge. Turning the rheostat clockwise to BRIGHT increases reticle brightness. When the bomb release mode selector switch is at SIGHT & RADAR, the sight reticle on the sight reflector glass is dimmed (independent of the reticle dim control). At the time of lock-on, the sight reticle increases in brilliancy. The sight dimmer rheostat is powered by the secondary bus and the tertiary bus.

SIGHT FILAMENT SELECTOR SWITCH. The primary or secondary filament in the dual-filament sight reticle bulb can be selected by the sight filament selector switch figures 4-26 and 4-27), which is normally at PRIMARY. It should be moved to SECONDARY if the primary filament fails. The switch is powered by the secondary bus and the tertiary bus.

SIGHT SELECTOR UNIT. The sight selector unit (figures 4-26 and 4-27) has the sight function selector lever, the target speed switch, and the rocket depression angle selector lever. The sight selector unit uses secondary and tertiary bus power. The sight function selector lever, when set at GUN, BOMB, or ROCKET, adjusts the sight system for the desired function. With the sight function selector lever at BOMB, the sight is depressed at a preset angle. With the sight function selector lever at ROCKET, the rocket depression angle selector lever can be moved to the required mil setting for rocket firing and bomb delivery. Moving the lever to ROCKET electrically cages the sight. The sight function selector lever automatically returns to GUN if it is at BOMB or ROCKET when the radar reject button, on the control stick grip, is pressed.

The target speed switch is used to control lead angle in accordance with the speed ratio between the attacking airplane and its target. When a high-speed attack is being made on a slow-moving target the switch should be at LO. The switch should be at HI when the speed of the target is about the same as that of the pursuing airplane. The TR position is for use during a low-speed training run on a low-speed target. Speed ranges (TAS) for the various settings are as follows: for the LO setting, 600 knots for the attacking airplane and 200 knots for the target airplane; for the HI setting, 600 knots for the attacking airplane and 500 knots for the target airplane; for the TR setting, 300 knots for the attacking airplane and 200 knots for the target airplane.

Movement of the rocket depression angle selector lever depresses the sight reticle image in increasing amounts through the full range of the mil scale according to the position (0 to 175) selected. The proper selector lever setting for varying rocket firing and bombing conditions can be obtained from tables in the Aircrew Nonnuclear Weapon Delivery Manual, T.O. 1F-100C(I)-34-1-1. The desired depression setting should be set on the mil scale with the variable index markers provided. The index markers, numbered from 1 through 4, are for reference only and have no function in the sight system. A tab, near the 50-mil mark on the circumference of the selector unit face, is pulled out to unlock the index markers for adjustment.

WINGSPAN LEVER. Setting the wingspan lever (figure 4-23) inserts target size data into the sight, varying the sight reticle diameter in proportion to range information signals received from the manual ranging control or the sight radar. Graduated markings (from 30 to 120) on the scale represent the size (in feet) of the target airplane. The wingspan lever should be set on the scale graduation that equals the anticipated size of the target.

NOTE

> On airplanes changed by T.O. 1F-100-994, a remote wingspan lever is mounted above the RHAW system controls and indicators. The right edge of the remote wingspan lever is used as the aligning index.

MANUAL RANGING CONTROL. The twist control in the throttle grip (figure 1-21) permits range data to be supplied manually to the sight system. It is intended to be used during gunnery when radar ranging becomes inoperative or is erratic because of ground effects. Manual ranging is effective over a 1500-foot segment of the total range and covers the span between 1200 feet and 2700 feet. Ranges are shown on the sight range dial, and sight reticle diameter is controlled by the manual range control function of the throttle twist grip. Clockwise rotation of the throttle grip reduces range (increases reticle diameter); counterclockwise rotation increases range (decreases reticle diameter). The throttle grip is spring-loaded to the full counterclockwise position. This is the correct position for normal (automatic) operation of radar ranging. Manual radar ranging uses secondary and tertiary bus power.

RADAR REJECT BUTTON. The radar reject button (figure 1-33), powered by the tertiary bus, should be pressed momentarily to reject the range lock-on and shift the radar to another target. The radar can then lock on targets at ranges greater than the one rejected until the radar maximum sweep range is reached. Radar sweep then automatically recycles, starting to sweep again from minimum range. Pressing the radar reject button also automatically moves the sight function selector lever to GUN if the lever is at BOMB or ROCKET.

RADAR RANGE SWEEP RHEOSTAT. This rheostat (figures 4-26 and 4-27), powered by the secondary and tertiary busses, is used to decrease radar ranging distance and thus prevent the sight radar from locking on the ground or ground objects (when the airplane is making low-altitude attacks). Turning the rheostat toward MIN decreases radar sweep range; turning it toward MAX increases range. During normal operation at altitudes 6000 feet or more above the terrain, the rheostat should be at MAX.

SIGHT ELECTRICAL CAGING BUTTON (LABS VERTICAL GYRO CAGING BUTTON). Pressing the sight electrical caging button (figure 1-21) stabilizes the sight gyro reticle image by caging the sight gyros. The sight electrical caging button uses secondary and tertiary bus power, and also serves as the LABS vertical gyro caging button. Refer to AN/AJB Low-altitude Bombing System (LABS) in this section.

SIGHT MECHANICAL CAGING LEVER. This lever (figure 4-23) is for mechanically caging the sight. The lever can be used during deliveries if desired or in case the sight fails. The lever should be at UNCAGE for normal automatic operation of the sight. It must be at CAGE to provide a fixed reticle. The size of the fixed reticle depends upon the setting of the wing span lever. (When the lever is at 60, a 100-mil fixed reticle is produced when the sight is caged.)

CAUTION

The sight must be mechanically caged during taxi, takeoff, and landing, to prevent damage to the sight mechanism.

SIGHT RANGE DIAL. Target range is indicated by the sight range dial (figure 4-23). Graduated in feet from 600 to 6000, the dial presents range distances as determined by the manual range control or the radar ranging system. Secondary and tertiary bus power is required for operation.

RADAR LOCK-ON LIGHT. The radar lock-on light (figure 4-23) comes on when the sight radar locks on the target. The light is powered by the secondary and tertiary busses. The light housing may be rotated to control light intensity.

CAMERA SYSTEMS.

Combat Documentation Camera — F-100D Airplanes Changed by T.O. 1F-100D-627.

Forward and aft photographic documentation of weapon impacts is provided by two motion-picture cameras installed in a nonjettisonable pod (figure 4-24) on the underside of the left wing, approximately midway between the fuselage and inboard wing station. The forward camera is a Type N-9, identical to the Type N-9 that is mounted on the sight, except that the pod camera has a 20 to 80 mm variable focal length lens and a larger film magazine. The forward camera is mounted on an adjustable base that permits various elevation adjustments from zero (straight forward) to 20 degrees down. The aft camera is a Type DBM-4C that is an electrically driven, 16 mm internally loaded reel type camera. It has a 17 to 68 mm variable focal-length lens. The aft camera mount is adjustable to permit variations in elevation from zero (straight aft) to 25 degrees down and from 45 to 60 degrees down. Camera operation is completely automatic and is initiated by pressing the trigger to the first and/or second detent, or pressing the bomb button. There are no other wing camera pod system cockpit controls. Adjustment for elevation, light conditions, frame speed, lens aperture, and camera overrun time are preset in the pod before flight.

In addition to the cameras, the pod contains a heater and a blower that supply a continuous flow of warm (80°F to 105°F) air across the camera windows to prevent condensation and frost. Sensors in the system help maintain temperatures within these limits and prevent overheating in case of a blower malfunction. A single window in the pod fairing for the forward-facing camera is equipped with electrically actuated shutters to protect the window from debris that might be thrown during takeoff. The window shutters open when camera operation commences and remain open.

CAMERA INSTALLATIONS

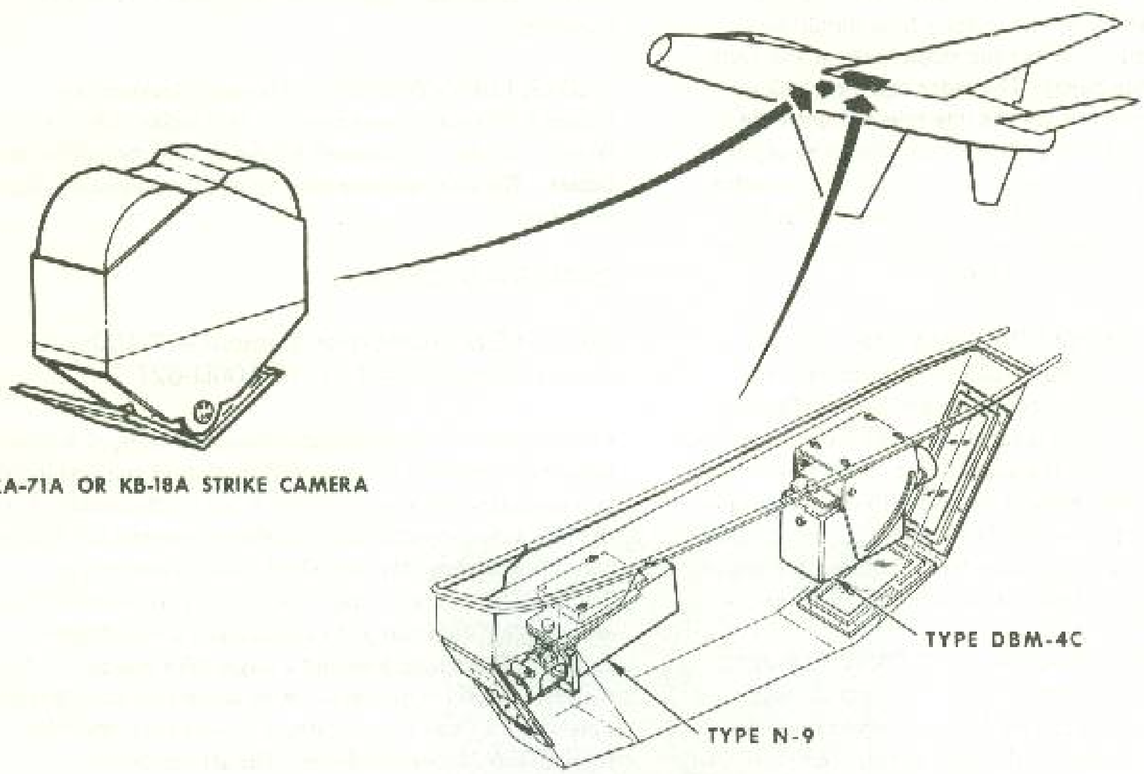


Figure 4-24

They can be closed manually during ground servicing of the pod. Two permanently exposed windows are provided in the pod aft fairing for the DBM-4C camera. The secondary bus provides power for the cameras when camera operation is started by the trigger. Tertiary bus power is used when the bomb button is pressed to start camera operation. The camera heater and blower circuits, powered by the main 3-phase ac bus, are energized when power is applied to the airplane.

Operation of Combat Documentation Cameras.

PREFLIGHT CHECK. During this check, make sure ground personnel have installed, loaded, and set the cameras according to mission requirements, and that camera pod and doors are secured.

IN-FLIGHT OPERATION. Press trigger or bomb button. Pressing the trigger or bomb button starts forward camera operation and energizes a start-delay relay for the aft camera. At the end of this preset (one to 30 seconds) delay, aft camera operation begins. Both cameras continue to function for a preset overrun time of one to 30 seconds following release of the trigger or bomb button. If only the cameras are to be used, the trigger safety switch should be at CAMERA (gun-missile switch* as SAFE), and the armament selector switch should be at OFF, so that only the cameras will be actuated by

*Airplanes changed by T.O. 1F-100D-632

either detent of the trigger or by pressing the bomb button. To use the cameras during gun- and missile-firing operations, the trigger safety switch should be at either GUNS CAMERA or MISSILES CAMERA, respectively (gun-missile switch* at either one of the four gun positions or at MISSILES, respectively). When the trigger is pressed to the first detent, camera operation begins and continues when the trigger is pressed to the second detent to fire the guns or missiles. The cameras can be operated regardless of armament selector switch position, by pressing the bomb button.

NOTE

If tactical conditions permit, maintain a wings-level attitude from the time the weapon is released to one second following weapon impact. This will help to improve assessment of weapon delivery accuracies.

Strike Camera — Airplanes Changed by T.O. 1F-100-977.

On F-100D Airplanes, either an electrically operated Type KA-71A or a Type KB-18A, 70 mm strike camera (figure 4-24) can be installed, or on F-100F airplanes, a KB-18A camera can be installed to provide a panoramic capability for high-speed, low-altitude photographic battle damage assessment. The camera has a 3-inch, f2.8 lens with an automatic exposure control and is in a fixed mount in the underside of the fuselage to the left of the nose gear wheel well (to the right of the nose gear wheel well on F-100F Airplanes). On F-100D Airplanes, the left-hand landing-taxi light is moved slightly forward in the fuselage to accommodate the camera installation. On F-100F Airplanes, the right-hand landing-taxi light is moved slightly aft for the same purpose. The landing-taxi light switch function is unchanged. The camera is positioned for presentation of surface area directly below the airplane from the forward horizon to the aft horizon. This is accomplished by a rotating prism that scans 180 degrees during the taking of each photograph. A glass window beneath the camera protects the camera prism. Condensation and frost are kept from forming on the camera window by hot air from the defrosting and anti-icing system. A sensor on the camera window glass causes a control valve to open at 80°F, allowing the hot air to flow across the inner surface of the camera window, and close at 100°F to shut off the hot airflow. This control valve also can be opened or closed by a sensor in the camera bay. If the temperature in the bay should rise above 125°F, the sensor will cause the valve to close and shut off the flow of hot air to the camera window. Cooling air extracted from the aft electronic equipment cooling system provides a continuous flow of cooling air to the camera bay. The temperature control circuit is energized when secondary bus power is applied to the airplane.

Camera shutter speed, lens aperture, and a picture sequence of 4 cps (preset at 1, 2, or 4 cps on the KB-18A) are automatic, while camera overrun time of 0 to 10 seconds (0 to 32 seconds on the KB-18A) is preset on the camera before flight. Camera operation is completely automatic and is initiated by pressing the trigger to the first and/or second detent, or pressing the bomb button. There are no other strike camera cockpit controls. The secondary bus provides power for the camera when camera operation is started by the trigger. Tertiary bus power is used when the bomb button is pressed to start camera operation.

Operation of Strike Camera.

PREFLIGHT CHECK. During this check, make sure ground personnel have installed, loaded, and set the camera according to mission requirements.

IN-FLIGHT OPERATION. Press trigger or bomb button for camera operation. If only the camera is to be used, the trigger safety switch should be at CAMERA (gun-missile switch* at SAFE), and the armament selector switch should be at OFF, so that only the camera will be actuated by either detent of the trigger or by pressing the bomb button. To use the camera during gun- and missile-firing operations, the trigger safety switch should be at either GUNS CAMERA or MISSILES CAMERA, respectively (gun-missile switch* at either one of the four gun positions or at MISSILES, respectively). When the trigger is pressed to the first detent, camera operation begins and continues when the trigger is pressed to the second detent to fire the guns or missiles. The camera can be operated regardless of armament selector switch position, by pressing the bomb button.

Gun Camera.

The Type N-9 or KB-3† gun camera (figure 4-23) on the sight, is an electrically driven, magazine-type, 16 mm

*Airplanes changed by T.O. 1F-100D-632

†Airplanes changed by T.O. 1F-100-977, 1F-100-1001, or 1F-100D-627

motion picture camera that photographs the sight reticle and target simultaneously. The camera can be adjusted for various light conditions from the cockpit; however, frame speed, lens aperture, and camera overrun time (0 to 30 seconds) are preset on the ground. Thermostatically controlled camera and magazine heaters are provided. An automatic recycling counter on the camera body indicates the amount of unexposed film remaining in the magazine. Camera operation is automatic when the trigger is pressed, or, on some airplanes, when the bomb button is pressed†, and the camera shutter selector switch is at any position other than OFF. During gunnery operation, the camera operates only as long as the trigger is held depressed (plus preset overrun of 0 to 3 seconds). During missile firing, camera operation time after release of the trigger can be controlled by an adjustable timer.

Camera Controls.

CAMERA SHUTTER SELECTOR SWITCH. The shutter setting of the camera is adjusted through a tertiary-bus-powered rotary selector switch (4, figures 1-8 and 1-9; 32, figure 1-14). Turning the switch to OFF disconnects power to the camera, camera heaters, and shutter control. Turning the switch to BRIGHT, HAZY, or DULL, depending on lighting conditions, positions the shutter aperture of the gun camera and turns on the camera heaters.

NOTE

For extremely low-temperature operation, the camera heaters should be on for a minimum warm-up period of 1/2 hour.

CAMERA TIMER. When the gun camera is used during missile firing, a camera timer (30, figure 1-8; 31, figure 1-9; 31, figure 1-14), with two adjustable time intervals, controls continued camera operation after the trigger is released. The first time interval, set before missile launch with the large timer knob, labeled "START DELAY ADJUST," represents camera running time (from 4 to 30 seconds) from trigger release to start of the second time interval. The second time interval represents camera running time (from 2 to 30 seconds) after completion of the first time interval, and must be set by the ground crew with the small timer knob, labeled "PRESET RUN TIME." Total camera run time after release of the trigger is the total of both time interval settings (6 to 63 seconds) including the preset overrun time of 0 to 3 seconds.

Operation of Gun Camera.

NOTE

The camera shutter selector switch must be at either BRIGHT, HAZY, or DULL to permit operation of the gun camera.

To photograph the approach and tracking during gun-firing operations, the trigger safety switch should be at GUNS CAMERA (gun-missile switch* at one of the four gun positions). When the trigger is pressed to the first detent, gun camera operation starts and continues when the trigger is pressed to the second detent to fire the guns. On some airplanes,† if gun camera operation is desired during rocket firing or dive bombing, the trigger safety switch should be at CAMERA. During rocket firing and manual bomb release, the gun camera is actuated when the bomb button is pressed, and the camera continues to operate for the preset overrun time following release of the bomb button. If only the camera is to be used, the trigger safety switch should be at CAMERA (gun-missile switch* at SAFE) so that only the gun camera will be actuated by either detent of the trigger. Upon release of the trigger, the gun camera continues to operate only for the preset overrun time.

If gun camera operation is desired during missile firing, the trigger safety switch should be at MISSILES CAMERA (gun-missile switch* at MISSILES) and the camera timer should be set as desired for the mission. The camera begins to operate when the trigger is pressed to the first detent (or second detent to fire the missile) and will continue to operate, as determined by the settings of the camera timer, when the trigger is released.

WARNING

The missile master switch should be correctly positioned to prevent unintentional firing of missiles when only gun camera operation is desired.

Auxiliary Camera (F-100F Only).

The auxiliary camera receptacle (8, figure 1-18), in the rear cockpit only, provides a power source (tertiary bus) for operation of a hand-held camera.

*Airplanes changed by T.O. 1F-100D-632

†Airplanes changed by T.O. 1F-100-977, 1F-100-1001, or 1F-100D-627

GUNNERY SYSTEM.

On F-100D Airplanes, four type M-39 20 mm guns are mounted in the lower, forward section of the fuselage, two on each side, outboard of the nose wheel well. On F-100F Airplanes, two Type M-39 or M-39A1 20 mm guns are in the lower section of the fuselage, one on each side, outboard of the nose wheel well. The guns are gas-operated and use electrically detonated ammunition. A maximum of 200 rounds per gun (175 rounds per gun on F-100F Airplanes) is carried, and the rate of fire is about 1500 rounds per minute.

All guns are manually charged on the ground. Ammunition is belt-fed to the guns from two compartments behind the cockpit. Expended ammunition links are retained to prevent impact injury to fuselage and tail surfaces. The expended cases, however, are ejected overboard (through tubes having outlets in the fuselage bottom) with sufficient velocity to clear the airplane. The gun, ammunition, and expended link compartments have a purging system for removing explosive gages resulting from gun firing. The purging system uses air from the engine air intake duct and is actuated automatically during gun firing. The sight is coupled with a radar ranging set for gun sighting and a gun camera is mounted on the sight to photograph the sight reticle and target.

For certain restrictions on use of the 20 mm guns, refer to Gun-firing Limitations in section V.

Gunnery System Controls — Airplanes Not Changed by T.O. 1F-100D-632.

TRIGGER SAFETY SWITCH. Electrical power (ac and dc) for operation of the gun camera, guns, and missiles is controlled by secondary bus power through a guarded trigger safety switch. (See 8, figure 1-6; 10, figure 1-7.) When the switch is at GUNS CAMERA, power is provided to actuate the gun camera and gun bay purging when the trigger is pressed to the first detent. At the second trigger detent, gun camera operation and gun bay purging continues, and power is provided to actuate the guns. With the switch at MISSILES CAMERA, power is supplied to the gun camera at the first trigger detent. Gun camera operation continues when the trigger is pressed to the second detent to fire the missile. Power to the guns and missiles is disconnected when the switch is at CAMERA. However, power is continuously supplied to the gun camera which may then be operated by pressing the trigger to the first or second detent.

NOTE

> The gun-firing circuit is inoperative when the weight of the airplane is on the nose gear.

GUN SELECTOR SWITCH. The gun selector switch, on the upper left corner of the instrument panel, permits firing either the two upper guns in pairs, the two lower guns in pairs, or the four guns simultaneously. With the switch at UPPER, the fire control circuit for the lower guns is opened, preventing operation of these guns. With the switch at LOWER, the fire control circuit for the upper guns is opened, preventing operation of these guns. Turning the switch to ALL completes the fire control circuit to all guns. The gun selector switch is powered by the secondary bus.

TRIGGER. The gun-firing, missile, and gun camera circuits are energized by the trigger (figure 1-32) which has two detent positions and is powered by the secondary bus. With the trigger safety switch at GUNS CAMERA, the first detent of the trigger energizes the gun camera and the gun purge door selector valve so that utility hydraulic pressure can open the purge door for gun bay purging. At the second trigger detent, gun camera operation and gun bay purging continues, and high-voltage ac power is supplied from the gun-firing transformers to detonate the cartridges.

NOTE

> If the purge door fails to open, thereby prohibiting the flow of air to the compartments requiring ventilation, a microswitch prevents gun-firing circuits from being energized.

As the second trigger detent is released, the guns stop firing and a time-delay unit in the purging system circuit keeps the purging system functioning for 5 seconds after the first trigger detent is released. When the trigger safety switch is at CAMERA, only the gun camera will be actuated by either detent of the trigger. Missiles are fired with the trigger pressed to the second detent when the trigger safety switch is at MISSILES CAMERA and the additional required switches are properly positioned.

Gunnery System Controls — Airplanes Changed by T.O. 1F-100D-632.

GUN-MISSILE SWITCH. Electrical power for operation of the missiles and guns is controlled by secondary bus power through the gun-missile switch. (See 8, figure 1-6.) The switch can be used for selecting the missile system, to permit the option of firing the two upper 20 mm guns in pairs, the two lower 20 mm guns in pairs, all 20 mm guns simultaneously. Turning the switch to MISSILES provides power for the missile system and the adjustable camera timer. Turning the switch to UPPER opens a fire control circuit to prevent operation of the lower guns. Turning the switch to LWR opens a fire control circuit to prevent operation of the upper guns. With the switch at ALL, the fire control circuit is completed to all fuselage-mounted guns. Power to the gun-firing and missile circuits is disconnected with the gun-missile switch at SAFE. However, power is available to all cameras with the switch at any position.

NOTE

The gun- and missile-firing circuits are inoperative when the weight of the airplane is on the nose gear.

TRIGGER. The gun-firing, missile, and camera circuits are energized by the trigger (figure 1-32), which has two detent positions and is powered by the secondary bus. With the gun-missile switch at UPPER, LWR, or ALL, the first detent of the trigger energizes the cameras and the 20 mm gun purge door selector valve so that utility hydraulic pressure can open the purge door for gun bay purging. At the second trigger detent, camera operation and gun bay purging continues, and high-voltage ac power is supplied from the gun-firing transformers to detonate the cartridges.

NOTE

If the purge door fails to open, thereby prohibiting the flow of air to the compartments requiring ventilation, a microswitch prevents gun-firing circuits from being energized.

As the second trigger detent is released, the guns stop firing and a time-delay unit in the purging system circuit keeps the purging system functioning for 5 seconds after the first trigger detent is released. With the gun-missile switch at POD, and either or both inboard station selector switches at NORM, the first detent of the trigger energizes the cameras, and the second trigger detent fires the 7.62 mm gun(s). When more than one SUU-11A/A pod is carried on a TER, all guns fire simultaneously from the station selected. With the gun-missile switch at SAFE, only the cameras will be actuated by either detent of the trigger. Missiles are fired with the trigger pressed to the second detent when the gun-missile switch is at MISSILES, and the additional required switches are properly positioned. Refer to AIM-9B/E Missile System in this section for additional missile-firing information.

Gunnery System Controls — All Airplanes.

GROUND FIRE SWITCH. The ground fire switch (33, figure 1-8; 34, figure 1-9; 16, figure 1-14) allows guns to be fired on the ground, or AIM-9B/E/J missile circuitry to be checked by maintenance personnel. This switch is channel-guarded with a safety pin fastened through holes in the guard. The switch is powered by the secondary bus and is spring-loaded to SAFE. When held at ON, the switch overrides the nose gear safety switch and the purge door circuits.

CAUTION

When the 20 mm guns are fired on the ground, all gun, ammunition, and expended link compartments must be open, as there is not enough airflow to adequately purge the compartments. The ground fire switch should not be used in flight, because a gun gas explosion in the gun bay can result.

Firing Guns — All Airplanes.

In air-to-air combat, the guns are normally fired by using the A-4 sight with radar ranging. The guns can be fired, using manual ranging if radar ranging fails (as shown by radar target indicator light going out or other indications of improper range) or at any other time it is necessary or desirable. Refer to Aircrew Nonnuclear Weapon Delivery Manual, T.O. 1F-100C(I)-34-1-1, for gun-firing procedures.

CAUTION

If it is necessary to nose the airplane down immediately after firing the guns at speeds above Mach 1, do not maintain the same heading at which the guns were fired. Instead, turn to one side or the other and, when possible, pull up slightly. This prevents the airplane from intercepting its own projectiles.

ORDNANCE SYSTEM.

Six stations for mounting various combinations of stores are on the lower surface of the wing, and a special store can be carried on a pylon on the bottom of the fuselage, at the centerline. Ordnance equipment includes a detachable, forced-ejection type pylon for each pylon station and the necessary manual and electrical controls. On airplanes changed by T.O. 1F-100D-632, a triple ejector rack (TER) can be carried at each inboard wing station. The stores can be armed and released singly, in pairs, or salvoed. They can be jettisoned (safe) electrically or mechanically.

Ejector-type Pylon.

The jettisonable ejector-type pylon differs from the conventional bomb rack in its method of releasing the load. The load, depending on the type carried, is forcibly ejected or is released and "free-falls." Two electrically ignited cartridges in the pylon jettison the load. Two separate and complete igniter circuits are provided: a normal and an emergency circuit, each terminating in igniter contacts in different cartridge cavities. When the first cartridge is fired by either igniter circuit, the other is simultaneously fired by heat and pressure generated by explosion of the first cartridge. If the first cartridge fails to fire because of a defective primer or a dead circuit, the second cartridge is fired by the jettison circuits or auxiliary release circuits. The expanding gases, resulting from detonation of the cartridges, open both ejector rack hooks and blast the forced ejection stores from the pylon. The ejection force is applied directly to the support lugs of the load, this being the most heavily reinforced area.

When stores loaded "hi-blow" are carried, a valve in the pylon is held closed and the full force of the exploding cartridges is applied to the load. (The 275- or 335-gallon drop tanks have integral pylons which do not force-jettison.) When stores loaded "low-blow" are carried, a bypass valve is held open, allowing most of the ejection pressure to dump overboard so that stores loaded "low-blow" are dropped in a manner closely approximating a "free-fall" of loads (bombs and 275- or 335-gallon drop tanks) which do not require force ejection.

Pylons can be forcibly ejected from the wing only when emergency jettison circuits are energized. All pylons can be jettisoned at once, or they can be selectively jettisoned. If a store "hangs up," the store and pylon will jettison together. The pylons are jettisoned by two additional electrically detonated cartridges that are identical to those used to force the loads from the pylons. If, because of a faulty circuit, any load does not jettison from its pylon, both load and pylon jettison when the intervalometer jettisons the pylons. Pylons and loads are ejected at 1/2-second delay between symmetrical pairs to reduce recoil loads on wing structure. A multipurpose pylon (type VIII, VIIIA, or VIIIB) can be carried at the left intermediate wing station to increase the capability of the airplane for carrying a special store or the 450-gallon drop tank. An additional 450-gallon drop tank can be carried at the right intermediate wing station.

Triple Ejector Rack – TER-15.

The TER-15 consists of a housing and three individual bomb racks for carriage of weapons on a Type I series pylon at the inboard wing stations. Each bomb rack on the TER has nose- and tail-arming solenoids, and can accommodate such weapons with 14-inch suspension lugs as bombs, fire bombs, rockets, and CBU dispensers. Electrical circuitry within the housing controls bomb rack release and firing from armament controls in the cockpit. A stepping switch in the TER requires a minimum of 130 milliseconds between release pulses.

TER-EMPTY LIGHTS*. Two placard-type lights (figure 4-32), labeled "TER EMPTY LH" and "TER EMPTY RH," come on to indicate that all bomb racks in the respective TER are empty, if the armament selector switch is at any position other than OFF or RKTS. The lights are powered by the primary bus. Bulbs in the lights

*Airplanes changed by T.O. 1F-100D-632

can be tested by the indicator light test circuit when the armament selector switch is at OFF or the INOP position.

Ordnance System Controls — All Airplanes.

PYLON LOADING SELECTOR SWITCHES. These multiple position switches (figures 4-25 and 4-32) powered by the secondary bus, ensure that correct circuitry has been established to the particular loads being carried. They also ensure that the desired type of action takes place when loads are being controlled through switches on the armament control panel. At preflight, the pilot should check that the pylon loading switches are set at the correct position for the individual load on each pylon. All switches are safetied by a hinged plastic cover that should be locked closed during flight.

The pylon loading switch panel has been modified by T.O. 1F-100-1069 to include a SUU-20 position. This position allows the rockets to be fired and bombs released from the SUU-20 dispenser without repositioning the pylon loading switches in flight. Also the old CHEM & SUU-7A position has been changed to "DISPENSER."

NOTE

On some airplanes† when WADD 200-gallon or Type II 275-gallon drop tanks are installed at the intermediate stations, the intermediate station pylon loading switches should be at 200 GAL, 450 GAL, BUDDY TANKS & NAPALM BOMBS position. With the pylon loading switches in this position, the G-limiter settings will be within the allowable G-limits for Type II drop tanks.

- To best utilize the G-limiter capabilities of the airplane, the switch should be at EMPTY only when no load is carried at the respective station. (EMPTY does not refer to empty drop tank, but to an empty load station.) When the pitch damper is engaged and the mission requires higher G-limits, if Type III 275- or 335-gallon drop tanks are carried at the intermediate stations, the intermediate station pylon loading switches should be at EMPTY. However, if selective jettisoning (armament selector switch positioning and bomb button) is desired, the pylon loading selector switches must be returned to the No. 2 position.
- When the SUU-21/A dispenser is carried at the left intermediate wing station, the left intermediate wing station pylon loading selector switch must be set at SPECIAL STORES.
- Although the missile circuitry does not go through the pylon loading selector switches, the switches should be set at MISSILE (MISSILES & SUU-11*) for consistency with other armament procedures.

WARNING

Do not change setting of pylon loading selector switches, because loads may release when switches are reset. If selector switch setting does not correspond to the load on the respective wing station, maintenance personnel must make a check of applicable electrical circuits before selector switches are repositioned.

Operation of Tow-target System.

Refer to Aircrew Nonnuclear Weapon Delivery Manual, T.O. 1F-100C(I)-34-1-1.

BOMB-ARMING SWITCH. The bomb arming switch is a 4-position rotary switch which receives its power from the secondary bus (see figure 4-14). The switch allows power to operate electrical solenoids which mechanically arm the stores upon release. With any of the 3 arming positions selected, arming of the respective fuze(s) will begin upon store release. Stores are released unarmed if the switch is in the SAFE position. Bomb arming is effective only when the armament selector switch is at BOMBS or NAPALM, and the external load emergency jettison handle is in the normal stowed position.

†F-100D-56 and F-100D-61 Airplanes
*Airplanes changed by T.O. 1F-100D-632

PYLON LOADING CONTROL PANEL

AIRPLANES NOT CHANGED BY T.O. 1F-100D-632

(TYPICAL)

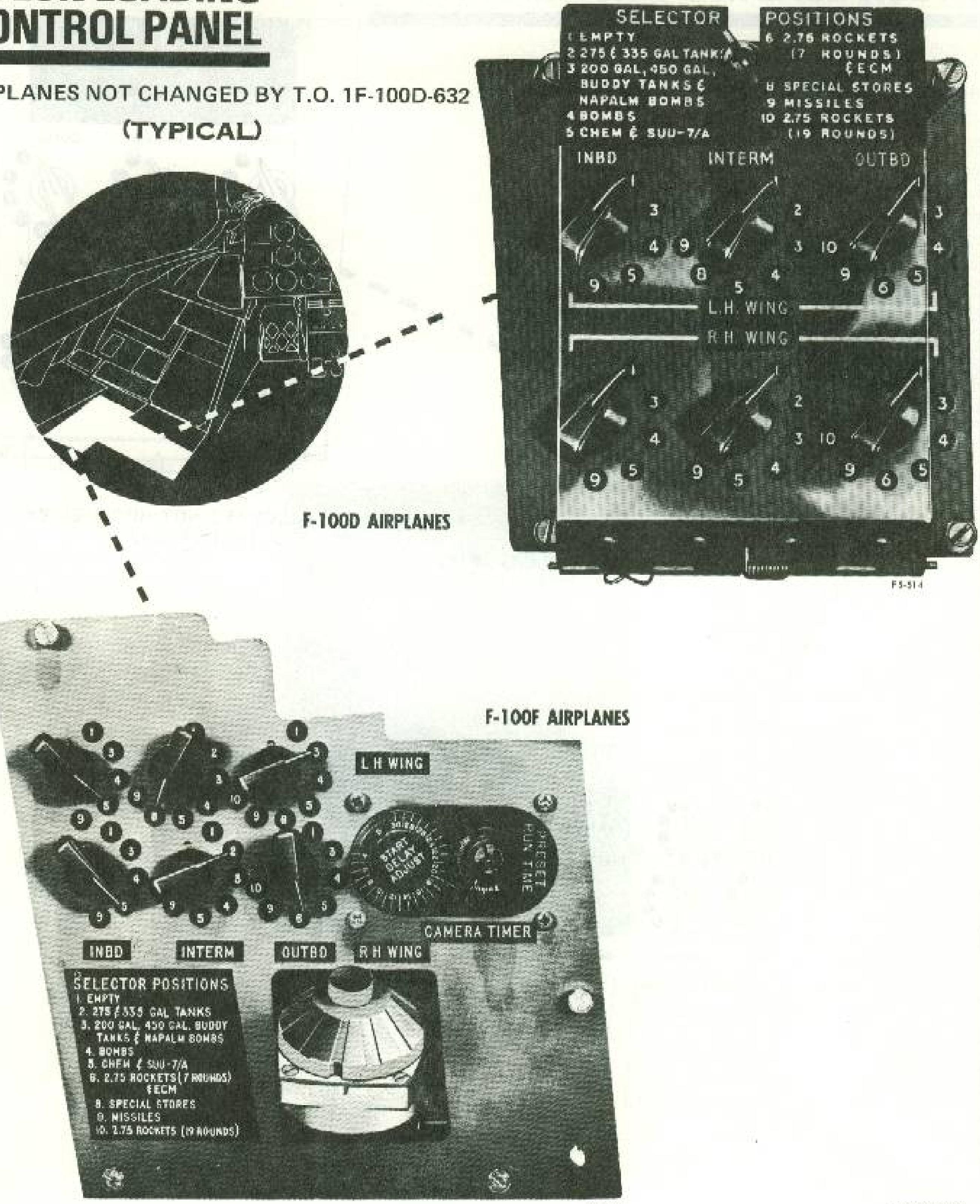


Figure 4-25 (Sheet 1 of 2)

PYLON LOADING CONTROL PANEL

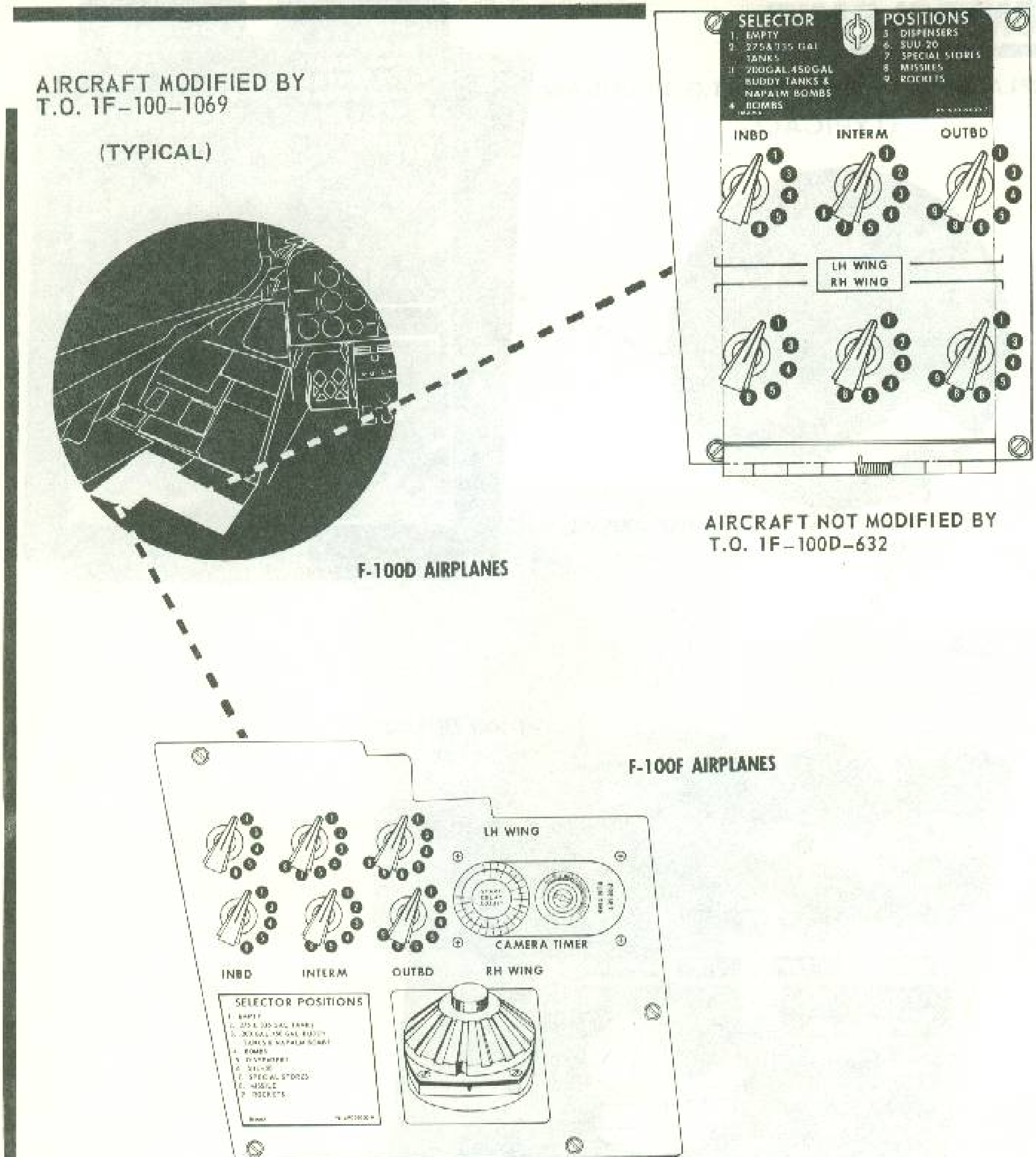


Figure 4-25 (Sheet 2 of 2)

ARMAMENT CONTROL PANELS

AIRPLANES NOT CHANGED BY T.O. 1F-100D-632
AIRPLANES CHANGED BY T.O. 1F-1069

(TYPICAL)

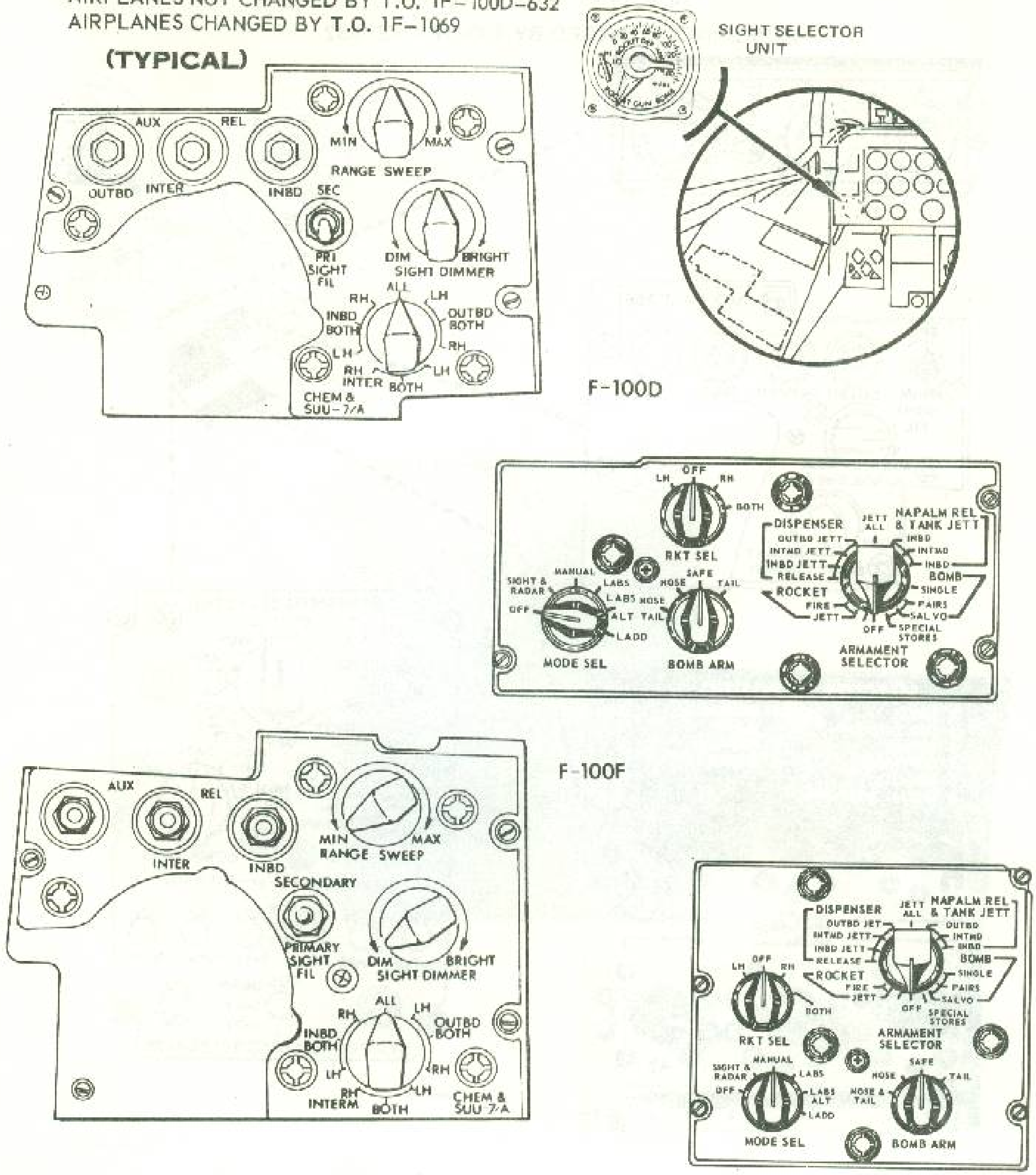


Figure 4-26

PYLON LOADING CONTROL AND ARMAMENT CONTROL PANELS

AIRPLANES CHANGED BY T.O. 1F-100D-632

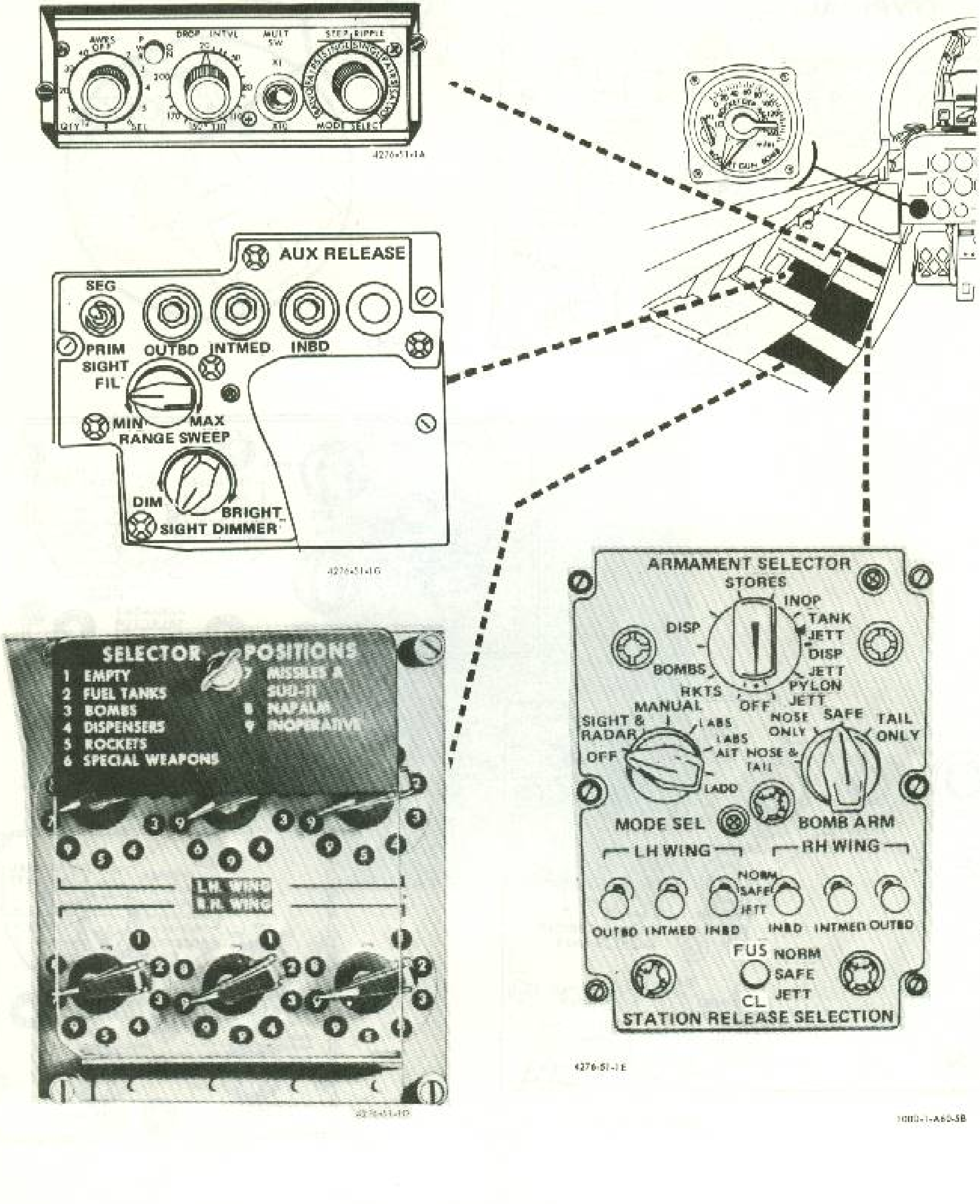


Figure 4-27

BOMB BUTTON. Bomb, fire bomb, dispenser, and rocket release circuits, and tow-target, drop tank, and dispenser jettison circuits are energized (after the armament selector switch is properly positioned) by primary bus power when the bomb button (figure 1-33) on the control stick grip is pressed. If desired, all external loads and pylons, except special stores and their pylons, can be jettisoned by pressing the bomb button with the armament selector switch at JETT ALL. The ordnance stores are jettisoned safe.

CAUTION

The special store unlock handle must be stowed when the SUU-21/A dispenser is carried at the fuselage centerline station. If the special store unlock handle is in the unlocked position when the bomb button is pressed, the dispenser will be released from the pylon and may strike the airplane.

NOTE

The special store unlock handle must be actuated to ensure jettison on Type VII or VIIA pylons or Type VIII series pylons that carried no special store or that carried a special store which had previously been released.

On some airplanes,† the camera circuits are energized when the bomb button is pressed if the armament selector switch is at ROCKET-FIRE, or at BOMB-SINGLE, BOMB-PAIRS, or BOMB-SALVO, with the bomb release mode selector switch at MANUAL. The bomb button must be held down when bombs are being released automatically by means of automatic bombing systems.

WARNING

Before pressing the bomb button, make sure the armament selector switch, the bomb release mode selector switch, the AWRS programmer controller,* and the station selector switches* are properly positioned for the desired release or jettison function. Failure to check switch positions could cause accidental bomb or rocket release, or failure of desired load to release.

BOMB RELEASE MODE SELECTOR SWITCH. A selector switch (figure 4-26) is used for selecting the mode of bomb release desired, and controlling operation of the radar ranging system and the A-4 sight. Power is applied to the sight when the bomb release mode selector switch is at MANUAL, only when the bomb-arming switch is at an arm position, and the armament selector switch is at any BOMB or NAPALM REL & TANK JETT NAPALM* position. When the switch is at SIGHT & RADAR, power is also supplied to the radar ranging system. With the bomb release mode selector switch at MANUAL, bombs are released directly by the bomb button. With the switch at LABS, the bombs are released at an automatically computed point on the bomb run. With the switch at LABS ALT, bombs are released at an automatically computed alternate point on the bomb run. The LADD position is used in the low-altitude drogue delivery system. Power to all units of the fire control system is disconnected when the switch is at OFF. The bomb release mode selector switch is powered by the primary bus.

EXTERNAL LOAD AUXILIARY RELEASE BUTTONS. The three external load auxiliary release buttons (figures 4-26 and 4-27) provide separate release circuits to fire the second cartridge in the pylons. Powered by the primary bus and enclosed in individual ring guards, these buttons should be used if loads are not released by the normal electrical release circuits. Pressing the "OUTBD," "INTER," or "INBD" button releases the pair of external loads (except AIM-9B/E/J missiles, SUU-21/A dispenser, and special stores) carried at the respective stations. Loads (except special stores) are released armed or safe (depending on the position of the bomb-arming switch) and are either forcibly ejected or gravity-released as required for clean separation. (Bomb arming is effective only when the armament selector switch is at a BOMBS position, or at NAPALM REL & TANK JETT (NAPALM*).)

The pylons are not released by the auxiliary release buttons. If it is necessary to release all loads in this

†Airplanes changed by T.O. 1F-100-977, 1F-100-1001, or 1F-100D-627
*Airplanes changed by T.O. 1F-100D-632

manner, the recommended release sequence is outboard, intermediate, inboard. The airplane has provisions only for a fuselage center-line station auxiliary release button.

CAUTION

Do not press more than one auxiliary release button at a time. The combined recoil of ejector cartridges for stores that require the full force of the ejector cartridges produces stresses that can damage the wing structure. This does not include stores loaded "low-blow" since they do not require the full force of the ejector cartridge for release.

NOTE

A ground safety feature prevents release of external loads by use of the auxiliary release buttons while the weight of the airplane is on the landing gear.

EXTERNAL LOAD EMERGENCY JETTISON BUTTON. All external loads and pylons (except special stores and their pylons) are jettisoned by pressing the external load emergency jettison button (figure 1-35).

NOTE

The special store unlock handle must be actuated to ensure jettison of Type VII or VIIA pylons or Type VIII series pylons that carried no store or that carried a special store which had previously been released.

Regardless of the position of the bomb-arming switch, all ordnance loads jettison safe. The jettison sequence (figure 4-28) is: fuselage centerline store simultaneously with intermediate wing stations in pairs; inboard wing stations in pairs; outboard wing stations in pairs. All loads are jettisoned at 1/2-second intervals between symmetrical pairs. Immediately after loads are jettisoned, all pylons jettison in the same order and in the same time delay as loads. The external load emergency jettison button is powered by the battery bus; however, primary bus power is required to energize relays in the Type VIII series pylons to jettison the pylons. If the engine is running and the battery switch is OFF, the primary bus will be energized by the dc generator, or the transformer-rectifier if the dc generator fails.

WARNING

Pylons and external loads can be jettisoned electrically by use of the external load emergency jettison button when the airplane is on the ground, because these jettison circuits are not safetied through the nose gear.

EXTERNAL LOAD EMERGENCY JETTISON HANDLE. Pulling the external load emergency jettison handle (42, figure 1-6; 43, figure 1-7) mechanically releases all stores set for low blow and the 275- or 335-gallon drop tanks. Stores set for high blow cannot be mechanically released. The emergency jettison handle must be pulled quickly to its full extension of about 10 inches. Bomb-arming circuits are interrupted automatically when the emergency jettison handle is pulled, and stores jettison safe, regardless of the position of the bomb-arming switch.

SPECIAL STORE UNLOCK HANDLE. Although the primary function of the special store unlock handle (39, figure 1-6; 41, figure 1-7) is to control release of the special store, the handle must also be actuated to ensure jettison of Type VII or VIIA pylons or Type VIII series pylons that carried no store or that carried a special store which had previously been released. For additional description and operation of this handle, refer to Special Store Unlock Handle, under Special Store, in this section.

ORDNANCE SYSTEM CONTROLS – AIRPLANES NOT CHANGED BY T.O. 1F-100D-632.

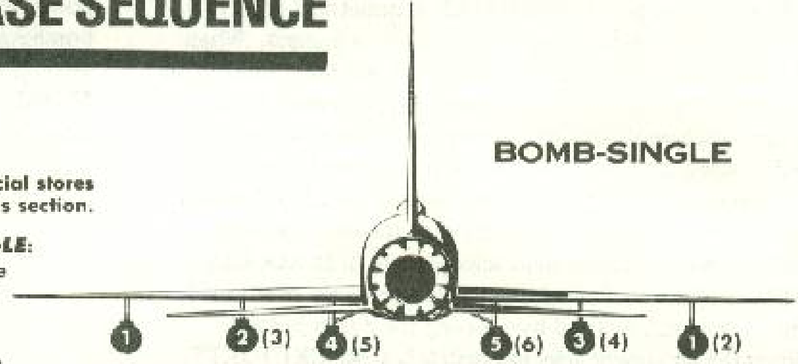
ARMAMENT SELECTOR SWITCH. This rotary switch (figure 4-26), powered by the primary and secondary busses, determines the external load release when the bomb button is used. Regardless of the release method used, external loads leave the airplane in various fixed and preset sequences as shown in figure 4-28. When the armament selector switch is at BOMB-SINGLE, a single bomb drops

EXTERNAL LOAD RELEASE SEQUENCE

NOTE
This information does not cover release of special stores and their pylons. Refer to "Special Store" in this section.

ARMAMENT SELECTOR SWITCH AT *BOMB-SINGLE*: Releases both outboard bombs at the same time (first the left outboard, then the right outboard on F-100D Airplanes changed by T.O. 1F-100-1032) then releases remaining bombs in a fixed dropping order each time the bomb button is pressed. Pylons are retained

BOMB-SINGLE



ARMAMENT SELECTOR SWITCH AT *BOMB-PAIRS*: Releases symmetrical pairs of bombs in a fixed dropping order each time the bomb button is pressed. Pylons are retained.

AUXILIARY RELEASE: Recommended release sequence for all loads, using the auxiliary release buttons. Pylons are retained.

SELECTIVE RELEASE: Recommended sequence when the pilot chooses station and load with the armament selector switch (such as ***NAPALM REL & TANK JETT OUTBD***) and presses the bomb button. Pylons are retained.

BOMB PAIRS, AUXILIARY, AND SELECTIVE RELEASE

ARMAMENT SELECTOR SWITCH AT JETT ALL (PYLON JETT*): Jettisons all loads at 1/2-second intervals between symmetrical pairs when bomb button is pressed. (Jettisons all pylons, with stores installed*).

EMERGENCY JETTISON: Emergency jettison button jettisons all loads with same time delay and sequency as **JETT ALL** method. Emergency jettison handle mechanically releases non-nuclear "free-fall" type stores.

Pylons also jettison after loads are released by any jettison method except external load emergency jettison handle. Pylons jettison in the same order and with the same time delay as loads.

NOTE
The special store unlock handle must be actuated to ensure jettison of Type VII or VIIA pylons or Type VIII series pylons.

*airplanes changed by T.O. 1F-100D-632.

JETTISON-ALL AND EMERGENCY JETTISON

BOMB-SALVO

ARMAMENT SELECTOR SWITCH AT *BOMB-SALVO*: Releases all bombs at the same time when bomb button is pressed. Pylons are retained.

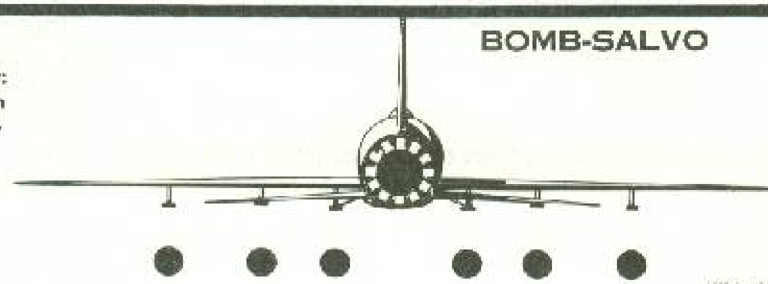


Figure 4-28

each time the bomb button is pressed. When the armament selector switch is at BOMB-PAIRS, symmetrical pairs of bombs drop each time the bomb button is pressed. When the BOMB-SALVO position is selected and the bomb button pressed, all bombs drop simultaneously; however, loads other than bombs stay on the airplane. Since bombs are only loaded in "low blow," there is no hazard to the wing structure in salvoing bombs. Bombs can be salvoed armed or safe, depending on the position of the bomb-arming switch. With the armament selector switch at ROCKET-FIRE, and the rocket selector switch properly positioned, the rockets can be fired by pressing the bomb button. When the armament selector switch is at ROCKET-JETT, all launchers and adapters (pylons remain) force-jettison when the bomb is pressed. When the armament selector switch is at DISPENSER RELEASE, a signal is applied to the contents of a selected dispenser with each depression of the bomb button. With the switch at DISPENSER-OUTBD JETT, both dispensers are jettisoned when the bomb button is pressed. With the selector switch at either NAPALM REL & TANK JETT-OUTBD, -INTERM, or -INBD, the selected pair of drop tanks or fire bombs is jettisoned when the bomb button is pressed. The 200-gallon drop tanks (and 450-gallon drop tanks, carried at the intermediate station only) are jettisoned by electrically fired ejector cartridges within the pylons.

The 275- and 335-gallon drop tanks and pylons are solenoid-released and "free-fall" from the airplane. The "buddy" refueling drop tanks and pylons are jettisoned by electrically fired ejection cartridges or are solenoid released and "free-fall" from the airplanes depending on the quantity of fuel remaining in the tank. When the switch is at JETT ALL (switch must be lifted to obtain this position), and the bomb button is pressed, all external loads and pylons, except special stores and their pylons, are jettisoned. The ordnance stores are jettisoned safe.

NOTE

> The special store unlock handle must be actuated to ensure jettison of Type VII or VIIA pylons or Type VIII series pylons that carried no store or that carried a special store which had previously been released.

External loads requiring force ejection are jettisoned at a 1/2-second delay between symmetrical pairs to reduce recoil loads on the wing structure. The SPECIAL STORE position is used to release the special store in the various bombing modes, armed or safe, depending on the switch settings of the in-flight control tester panel. The SPECIAL STORES position is also used when cycling the SUU-21/A dispenser.

CAUTION

> When carrying an SUU-21/A dispenser at the fuselage centerline station, and a bomb or bombs at any wing station (any pylon loading selector switch at the No. 4 position), the wing-carried bomb(s) should be released before dispensing bombs from the SUU-21/A dispenser. This is necessary to prevent one or more of the wing-carried bombs releasing simultaneously with the bomb from the SUU-21/A dispenser.

When the switch is at OFF, the circuits are de-energized. Pylons are retained by all of these methods of release except JETT ALL.

ORDNANCE SYSTEM CONTROLS – AIRPLANES CHANGED BY T.O. 1F-100D-632.

STATION SELECTOR SWITCHES. Six station selector switches (figure 4-27), one for each wing station, control operation of stores and jettison of pylons selected by the armament selector switch, and firing of the 7.62 mm guns. The airplane has provisions only for a station selector switch for the fuselage centerline store. Moving a station selector switch from SAFE to NORM and pressing the bomb button or trigger operates the store(s) from the wing station or stations represented by the switch selected. The NORM position is also used to selectively jettison the drop tanks, CBU dispensers, and rocket launchers. When the SUU-11 pods are carried at the inboard wing stations, moving either or both inboard station selector switches to NORM (gun-missile switch at POD) and pressing the trigger to the second detent fires the selected gun. With a selector switch at JETT (the switch toggle must be pulled to obtain this position) and the armament selector switch at PYLON JETT, pressing the bomb button jettisons the pylon (stores installed go with the pylons) from the stations selected.

The position of the station selector switches does not affect the AWRS programmer controller – it affects the store release signal only. For example, if the left intermediate wing station selector switch is at SAFE and the AWRS release mode switch is at RIPPLE-PAIRS, the programmer will send a signal to both intermediate wing stations, but only the right intermediate wing station store will be operated. Missile-firing circuits are not affected by the station selector switches. The station selector switches are powered by the secondary bus.

ARMAMENT SELECTOR SWITCH. The rotary switch (figure 4-27), powered by the secondary bus, selects external ordnance for operation, or drop tanks and pylons for jettison. Moving the switch from OFF to RKTS, BOMBS, DISP, or NAPALM and pressing the bomb button fires rockets, drops bombs, dispenses CBU bomblets, and drops fire bombs from wing stations selected by the NORM position on the station selector switches. When the armament selector switch is at TANK JETT and the bomb button is pressed, the drop tanks are jettisoned from the wing stations selected by the NORM position of the station selector switches. With the armament selector switch at DISP JETT and the AWRS quantity selector switch at OFF, pressing the bomb button jettisons the CBU dispensers and rocket launchers from wing stations selected by the NORM position on the station selector switches.

WARNING

Airplanes not modified by T.O. 1F-100D-632H. When rocket launchers and/or CBU dispensers, full or partially loaded, are jettisoned in the dispenser jettison mode, the aircraft must be headed away from friendly areas. In the dispenser jettison mode, the normal rocket fire signal is received at the launcher simultaneously with the jettison signal, thus launching one or more rockets.

Pylons are retained. With the armament selector switch at PYLON JETT, pressing the bomb button jettisons pylons from wing stations selected by the JETT position on the station selector switches. (Stores installed go with the pylons.) All armament selector switch positions except SPL STORES, TANK JETT, and PYLON JETT are wired through the AWRS programmer controller.

Bomb and External Load Emergency Jettison.

NOTE

The following procedure does not cover special store or missile jettisoning. For this information, refer to Special Store and AIM-9B/E/J Missile System in this section.

- If no electrical power is available, only stores loaded "low-blow" and/or the 275- or 335-gallon drop tanks can be released, regardless of the jettison or release method used.
- If an ejector cartridge is not installed in the ejector rack breech, the store cannot be forcibly jettisoned from the pylon; however, the store-pylon combination will jettison when the pylon jettison circuits are energized.

To jettison other loads (safe) and pylons (in some cases), use one or more of the following procedures:

1. To jettison all external loads and pylons, press external load emergency jettison button.

NOTE

With electrical power available, external loads jettison safe, regardless of the position of the armament selector switch and bomb-arming switch, followed by jettison of the pylons when the jettison button is pressed.

- On F-100F-20 airplanes, when airborne, with the landing gear handle up, AIM-9B/E/J missiles are safe-salvo-launched when the emergency jettison button is pressed. The missile pylons are then jettisoned in sequence with other pylons.
- The special store unlock handle must be actuated to ensure jettison of Type VII or VIIA pylons or Type VIII series pylons that carried no store or that carried a special store which had previously been released.

WARNING

External loads and pylons can be jettisoned electrically (by pressing the external load emergency jettison button) when the airplane is on the ground, because this jettison circuit is not safetied through the nose gear.

2. To jettison all external loads and pylons, place armament selector switch at JETT ALL (PYLON JETT;* station selector switches properly set), and hold bomb button down for one second.

NOTE

The special store unlock handle must be actuated to ensure jettison of Type VII or VIIA pylons or Type VIII series pylons that carried no store or that carried a special store which had previously been released.

3. To jettison only bombs and retain drop tanks, place armament selector switch at BOMB-SALVO (BOMBS;* station selector switches properly set) (bomb-arming switch at SAFE), and press bomb button.

4. To jettison only CBU dispensers, turn armament selector switch to CHEM & SUU-7/A-OUTBD JETT (DISP JETT;* station selector switches properly set) and press bomb button.

5. To jettison only drop tanks or fire bombs, place armament selector switch at NAPALM REL & TANKS JETT-INBD, -INTERM, or -OUTBD (TANK JETT;* station selector switches properly set), and press bomb button.

6. Press external load auxiliary release buttons (one at a time) to jettison symmetrical pairs of loads from inboard, intermediate, and outboard pylons. (Bombs will jettison armed or safe, depending on the position of the bomb-arming switch.)

7. To jettison only pylons, after all other loads have been released, press external load emergency jettison button.

NOTE

Electrical power must be available to jettison the pylons.

- The special store unlock handle must be actuated to ensure jettison of Type VII or VIIA pylons or Type VIII series pylons that carried no store or that carried a special store which had previously been released.

8. To mechanically drop stores loaded "low-blow" or 275- or 335-gallon drop tanks, pull external load emergency jettison handle straight out to its fully extended position (10 inches).

AN/AJB LOW-ALTITUDE BOMBING SYSTEM (LABS).

F-100D airplanes have an AN/AJB-1B LABS, and F-100F airplanes have an AJ/AJB-5A LABS. This electromechanical low-altitude bombing system (LABS) is used with the A-4 sight reticle to provide proper bomb aim and release for toss bombing operations. The LABS equipment receives power from the secondary bus (and tertiary bus on F-100D airplanes) and the main ac bus. The erection motor for the LABS vertical gyro is energized when the main ac bus is energized. In the LABS, if the autopilot is turned off while the bomb release mode selector switch is at LABS or LABS ALT, the autopilot cannot be re-engaged until the bomb release mode selector switch is positioned to other than LABS or LABS ALT, eliminating the possibility of entering an unusual flight condition or maneuver.

AN/AJB Low-altitude Bombing System Controls and Indicators.

BOMB RELEASE MODE SELECTOR SWITCH. With the bomb release mode selector switch (figure 4-26) at LABS or LABS ALT, the units of the low-altitude bombing system are operable and the desired release angle is selected. The switch should be placed at LABS or LABS ALT just before a LABS run-in (minimum of 14 seconds before reaching IP). Following the selection of LABS or LABS ALT, care should be taken not to climb the airplane at angles exceeding the LABS release angle; otherwise, the LABS maneuver may be aborted without the pilot's knowledge. For other functions of this switch, refer to Bombing Equipment Controls in this section.

*Airplanes changed by T.O. 1F-100D-632

LABS VERTICAL GYRO CAGING BUTTON (SIGHT ELECTRICAL CAGING BUTTON). When the bomb release mode selector switch is at LABS or LABS ALT, pressing the LABS vertical gyro caging button (figure 1-21) erects the gyro to a vertical position. The button need not be held down after being pressed. The LABS vertical gyro requires about 13 seconds to complete the caging cycle, during which time the sight reticle light will be out. A wings-level attitude should be maintained until the reticle light comes back on. Optionally, the switch can be held until the reticle light comes on, and then released at any time.

NOTE

> The LABS gyro should not be caged after roll-out during an auto-LABS maneuver until after the bomb release mode selector switch has been placed in a position other than LABS or LABS ALT.

After the caging cycle, the gyro becomes operable, ensuring that accurate vertical reference data is transmitted to the dive-and-roll indicator. On F-100F-20 airplanes, caging of the vertical gyro is not necessary after initial erection. The button is for fast gyro erection only, and should be used only when it is apparent that accurate vertical reference data is not being transmitted to the dive and roll indicator, such as might occur after an extreme-attitude maneuver. The sight reticle light does not go out when the button is pressed.

The LABS vertical gyro caging button is powered by the secondary bus and also functions as the sight electrical caging button (not in the rear cockpit) when the bomb release mode selector switch is at MANUAL or SIGHT & RADAR.

TIME REFERENCE POINT (TRP) TIMER. The TRP timer (32, figure 1-6; 37, figure 1-7) sequences the operation of certain timing units in the system. This dial is graduated in increments of 0.2 second from 0.2 to 28 seconds. To turn the dial from one setting to another, the dial knob must be pulled upward from the lock detents. The TRP timer is powered by the tertiary bus on some airplanes.* On other airplanes,† the timer is powered by the secondary bus. The timer is marked "PULL UP" and is also used in conjunction with the LADD system.

LABS YAW-ROLL GYRO CHECK BUTTON. A push-button type switch (22, figures 1-8 and 1-9; 2, figure 1-12; 36, figure 1-13; 22, figure 1-14) enables the pilot to obtain an indication from the vertical needle of the LABS dive-and-roll indicator of proper yaw-roll gyro caging before starting a LABS maneuver. When the bomb release mode selector switch is at LABS or LABS ALT, the sight reticle goes off during the caging cycle and remains off until gyro caging is complete. The check button is powered by the secondary bus.

LABS DIVE-AND-ROLL INDICATOR. The LABS dive-and-roll indicator (20, figure 1-6; 25, figure 1-7; 18, figure 1-12; 23, figure 1-13) is a dual-movement, zero-centered unit. The vertical pointer shows airplane roll attitude; the horizontal pointer shows airplane pitch attitude and positive- and negative-G. The dive-and-roll indicator is operable when the bomb release selector switch is at LABS or LABS ALT. When the LABS vertical gyro caging button is pressed, both indicators should rest at zero as the vertical gyro cages.

LABS RELEASE INDICATOR LIGHT. A green light (16, figure 1-6; 20, figure 1-7; 16, figure 1-12; 22, figure 1-13) provides certain indications during either a manual or an auto-LABS maneuver. The LABS release indicator light is in parallel with the A-4 sight reticle light and operates simultaneously with the reticle light. This light, powered by the secondary bus, can be tested by the indicator light test circuit.

Operation of AN/AJB Low-altitude Bombing System.

Refer to Aircrew Nuclear Weapon Delivery Manual, T.O. 1F-100D-25 Series.

LOW-ALTITUDE DROGUE DELIVERY SYSTEM (LADD).

The low-altitude drogue delivery system (LADD) is an electromechanical system used with the A-4 sight reticle to provide proper bomb release for low-altitude drogue delivery operations. This system is similar to the LABS system, except that bomb release is determined by means of time from pull-up instead of airplane pitch angle. The sight is maintained electrically caged for this type of bomb delivery. The LADD system receives power from the secondary bus (and tertiary bus on F-100D airplanes).

*F-100D-21 Airplanes and F-100D-46 Airplanes AF55-2784 through -2838.

†F-100D-26 and F-200D-31 Airplanes, F-100D-46 Airplanes AF55-2839 through -2863, F-100D-51 and later Airplanes, and F-100F Airplanes

LADD System Controls and Indicators.

TIME REFERENCE POINT (TRP) TIMER. The TRP timer (32, figure 1-6; 37, figure 1-7) is used in the LADD system to set pull-up time into the system during the bomb run. The timer is marked "PULL UP."

LADD RELEASE TIMER. The LADD release timer (33, figure 1-6; 34, figure 1-7), marked "RELEASE," sequences the operation of certain timing units in the LADD system. The dial is graduated in increments of 0.2 second from 0.2 to 28 seconds. To turn the dial from one setting to another, the dial knob must be pulled outward from the lock detents. The LADD release timer is powered by the tertiary bus on some airplanes.* On other airplanes,† the timer is powered by the secondary bus.

LABS RELEASE INDICATOR LIGHT. A green light (16, figure 1-6; 20, figure 1-7; 16, figure 1-12; 22, figure 1-13) provides certain indications during a LADD maneuver. The light is in parallel with the A-4 sight reticle light and operates simultaneously with the reticle light. The LABS release indicator light is powered by the tertiary bus and can be tested by the indicator light test circuit.

Operation of Low-altitude Drogue Delivery System (LADD).

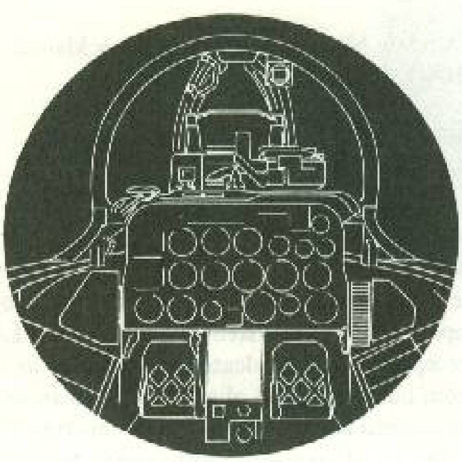
Refer to Aircrew Nuclear Weapon Delivery Manual, T.O. 1F-100D-25 Series.

SPECIAL STORES.

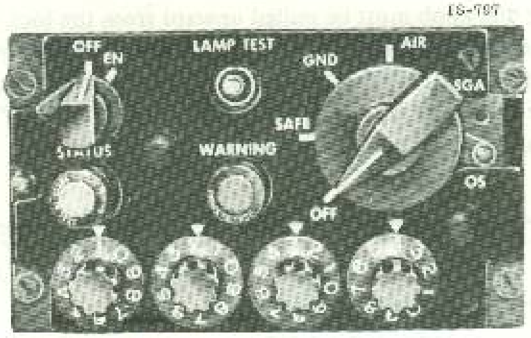
A special store can be carried at the left wing intermediate station and on the fuselage centerline. Either a DCU-9/A or a DCU-117/A in-flight control tester panel (figure 4-29) may be used to control the special store. On some airplanes, stowage space is provided for the panels on the shelf behind the rear seat. Special store circuit breakers are shown in figures 1-27 and 1-28. Refer to Aircrew Nuclear Weapon Delivery Manual, T.O. 1F-100D-25 Series, for additional information on special store controls and indicators.

*F-100D-21 Airplanes and F-100D-46 Airplanes AF55-2784 through -2838.
†F-100D-26 and F-200D-31 Airplanes, F-100D-46 Airplanes AF55-2839 through -2863, F-100D-51 and later Airplanes, and F-100F Airplanes.

IN-FLIGHT CONTROL TESTER PANELS



DCU-9/A



DCU-117/A

F-100D-1-A00-1A

Figure 4-29

DCU-9/A Panel Controls.

OPTION SELECTOR SWITCH. The four-position option selector switch (figure 4-29) is powered by the primary bus. When the lock lever on the switch is at OS, the selector switch is limited to the OFF and SAFE positions. The switch may be moved to GND or AIR only when the lever is moved to SGA. Position of the lock lever may be changed only when the option selector switch is at SAFE.

LAMP TEST SWITCH. This switch (figure 4-29) is powered by the primary bus.

WARNING LIGHT. The warning light (figure 4-29) is powered by the primary bus.

DCU-117/A Panel Controls.

OPTION SELECTOR SWITCH. This mechanically locked switch (figure 4-29) controls the application of primary bus power to the special store circuits. A lock lever on the switch limits movement of the switch so that only the OFF and SAFE positions can be obtained when the lever is at OS. Moving the lever to SGA allows the selector switch to be moved to GND and AIR. The position of the lock lever may be changed only when the option selector switch is at SAFE.

CODE SELECTOR SWITCHES. The four code selector switches (figure 4-29) control a mechanism in the special store that enables certain arming circuits. These switches must be properly positioned to affect arming of the special store. The code selector switches are powered by the primary bus.

ENABLE SELECTOR SWITCH. The enable selector switch (figure 4-29) introduces the enabling code (set on the code selector switches) to the special store. Moving the switch from OFF to EN initiates the enabling cycle. After the special store is enabled, it remains so regardless of subsequent positioning of the enable selector switch. This switch is powered by the primary bus.

LAMP TEST SWITCH. The lamp test switch (figure 4-29) is used to test the filaments in the warning and status lights. If both filaments are intact, both lights come on when the switch is pressed, provided the option selector switch is not OFF.

STATUS LIGHT. This light (figure 4-29) indicates the enabled or disenabled condition of the special store. When the enable selector switch is moved to EN, the status light comes on. If the code set on the code selector switches is correct, the status light goes out in approximately 30 seconds. If the code is not correct, the status light remains on. If the status light goes out (indicating the code is correct), enabling of the special store is verified by noting that the light comes on when pressed. The status light is powered by the primary bus.

WARNING LIGHT. The primary bus-powered warning light (figure 4-29) comes on steadily when the circuits have not responded to provide a safe or armed condition, or to provide the burst option as commanded by the position of the option selector switch. If the malfunction detection circuitry in the special store and in the associated airplane wiring is in order, pressing the light will cause it to come on.

Special Store Unlock Handle.

To actuate the special store unlock handle (38, figure 1-6; 41, figure 1-7), it must be rotated about 30 degrees clockwise to break a sealed safety wire and to clear a locking detent; then the handle must be pulled aft to the full-stop position (about 2-3/4 inches). The special store unlocked indicator light should come on just before the full-stop position is reached. The handle should then be rotated counterclockwise straight down. If not rotated counterclockwise straight down, the spring-loaded handle will snap forward to the stowed position. When the handle is actuated, the special store safety lock in the Type VII, VIIA, or VIII series pylon is unlocked.

WARNING

The handle must be fully extended to ensure unlocking the pylon.

At the same time, a switch in the special store normal and jettison release circuits is closed so that the special store will release when a special store bombing release signal or jettison signal is applied. The special store pylon can be released through conventional jettison circuits only after the special store has been released, provided that the special store unlock handle is actuated. To return the handle to the stowed position, it must be rotated about 90 degrees clockwise, pushed full forward, and then rotated straight down.

NOTE

If the special store has not been released, stowing the handle will lock the special store lock in the pylon and will interrupt the special store normal and jettison release circuits and the special store pylon jettison circuits.

CAUTION

The special store unlock handle must be stowed when the SUU-21/A dispenser is carried at the centerline station. If the special store unlock handle is in the unlocked position when the bomb button or the special store emergency jettison button is pressed, the dispenser will be released from the pylon and may strike the airplane.

Special Store Emergency Jettison Button.

The special store emergency jettison button (figure 1-22) provides an independent means of jettisoning the special store from its pylon at either the fuselage centerline or left intermediate wing station. The button, labeled "SPL STORE EMERG REL," is powered by the battery bus and is guarded by a ring and a cap that is safetied at the hinge. Raising the cap breaks the safety wire and exposes the button, which is pressed to jettison the special store from its pylon. The special store unlock handle must be actuated before the special store can be jettisoned in this manner.

Special Store Indicator Light.*

This light is a status display light (figure 4-34) and a placard-type indicator light (figure 1-19) in the rear cockpit. It shows "T/O" when on. The indicator light test circuit provides an operational test of the lights. The indicator light in the rear cockpit is powered by the primary bus.

Special Store Unlocked Indicator Light.

An amber press-to-test, primary-bus-powered indicator light (38, figure 1-6; 40, figure 1-7) is adjacent to the special store unlock handle. Illumination of this light indicates that the safety lock in the special store pylon is unlocked. The light comes on just before the special store unlock handle reaches the full-stop position in its outward travel. The light goes out after the special store is released or jettisoned.

NOTE

The special store pylon must be cocked (shackles closed) if no store is carried; otherwise, the indicator light will remain on, regardless of the position of the special store unlock handle. To ensure that the safety lock is open when no store is carried, the pylon should be cocked before takeoff.

SPECIAL STORE MISSION.

For procedures to be observed when a special store mission is to be flown, refer to Aircrew Nuclear Weapon Delivery Manual, T.O. 1F-100D-25 Series.

SPECIAL STORE JETTISON.

The special store and special store pylon can be jettisoned as follows:

1. Actuate special store unlock handle.

2. Press special store emergency jettison button. Special store will jettison armed or safe, depending on the switch settings on the inflight control tester panel.

3. Press external load emergency jettison button. Special store pylon will jettison in the normal jettison sequence.

NOTE

When the external load emergency jettison button is pressed, all external loads and pylons will be jettisoned.

*Airplanes not changed by T.O. 1F-100D-632 or T.O. 1F-100-994

ROCKET SYSTEM.

The airplane can carry two LAU-3/A rocket launchers, each containing nineteen 2.75-inch FFAR rockets, or two LAU-32 series launchers or LAU-59/B rocket launchers, each containing seven 2.75-inch FFAR rockets. The launchers can be attached directly to the outboard wing pylons without the use of adapters. Controls are provided for normal or emergency rocket release. The A-4 sight is used for aiming the rockets. Although the rockets are an air-to-air type, they can presently be used only for air-to-ground purposes because the sight system is not designed for air-to-air rocket firing. On some airplanes,† the cameras operate automatically when the rockets are fired. See figure 4-30 for rocket firing order.

Rocket System Controls — Airplanes not Changed by T.O. 1F-100D-632.

ROCKET SELECTOR SWITCH – Airplanes not Changed by T.O. 1F-100-1069. The rocket selector switch (figure 4-22) provides a choice of rocket-firing operation, and is powered by the secondary bus. With the armament selector switch at ROCKET-FIRE and the rocket selector switch at SINGLES, the contents of one LAU-3, -32 or -59 series launcher is rippled-fired each time the bomb button is pressed. When the bomb button is released and pressed again, the contents of the second LAU-3, -32 or -59 series launcher is fired. This continues until all of the rockets are fired. When the armament selector switch is at ROCKET-FIRE, the rocket selector switch at ALL, and the bomb button pressed and held, the rocket intervalometer supplies 1/10-second delayed firing impulses between LAU-3/A or LAU-59/B launchers. Rockets continue firing in this manner until all are fired. Rocket firing may be interrupted by releasing the bomb button.

ROCKET SELECTOR SWITCH – Airplanes Changed by T.O. 1F-100-1069. This rocket selector switch (figure 4-26) provides a choice of rocket firing from left hand outboard station only, right hand outboard station only or both outboard stations simultaneously. With the armament selector switch at ROCKETS-FIRE and the rocket selector at LH, RH, or BOTH position, rockets will be single-fired or ripple-fired from the LAU-3 series of LAU-59 series launchers selected, when the bomb button is pressed. Single or ripple firing from each launcher is preset with the selector inside the launcher before takeoff.

ROCKET INTERVALOMETER RESET BUTTON – Airplanes not Changed by T.O. 1F-100-1069. The intervalometer reset button (figure 4-26) is powered by the secondary bus. When the button is pressed, it resets the rocket intervalometer. In addition to reindexing the rocket-firing

†Airplanes changed by T.O. 1F-100-977, -1001, or 100D-627

ROCKET—FIRING ORDER

AIRPLANES NOT CHANGED BY T.O. 1F-100D-632

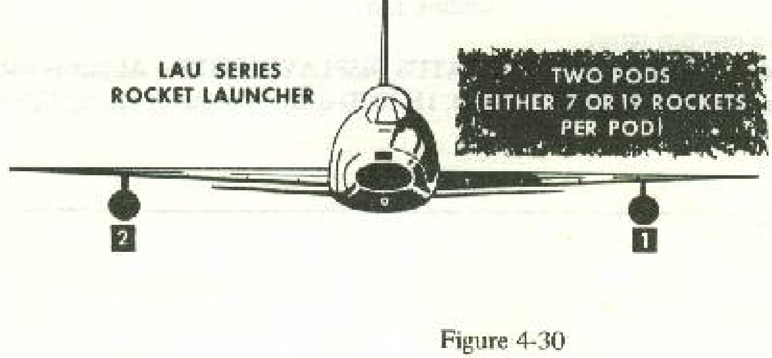


Figure 4-30

circuits, the intervalometer reset button may also be used to reset circuits for further attempts to fire any misfired rockets. (During landing, the intervalometer is automatically reindexed to the starting position as the nose gear touches down.)

Firing Rockets.

Refer to Aircrew Nonnuclear Weapon Delivery Manual, T.O. 1F-100C(I)-34-1-1.

Rocket Emergency Jettison.

To jettison rocket launchers and adapters single or collectively, use one or more of the following procedures:

1. Turn armament selector switch to ROCKET-JETT (DISP JETT*: station selector switches properly set), and press bomb button. This jettisons only rocket launchers.

2. Press "OUTBD" external load auxiliary release button. This jettisons only the rocket launchers and adapters.

3. Pressing the emergency jettison button will jettison all stores and pylons.

4. Actuating the emergency release handle will jettison LAU rocket launchers.

Rocket launchers and adapters other than LAU series loaded "LOW BLOW" cannot be manually released.

AIM-9B/E/J MISSILE SYSTEM.

Two AIM-9B/E/J guided missiles can be carried on a special pylon at each inboard wing station (total of four missiles). The missile is aimed by using the A-4 sight with a fixed reticle (mechanically caged). A headset tone generated by the missile and monitored through the communication amplifier indicates that the missile to be launched has detected the target and is receiving an adequate homing signal.

A TDU-11/B 5-inch HVA rocket, used as a practice target for the AIM-9B/E missile, can be installed on either left or right missile pylon. The TDU-11/B contains no warhead or explosives. Four tracking flares are attached to the rocket aft section. For TDU-11/B and AIM-9B/E/J firing order, see figure 4-33.

AIM-9B/E/J MISSILE SYSTEM CONTROLS AND INDICATORS.

MISSILE MASTER SWITCH. Warm-up power to the missile electronic components and gyros is provided directly, regardless of the position of the missile master switch. (See figure 4-31.) Turning the switch to RESET resets the sequence relay to missile No. 1. Turning the switch to STBY allows the missile audio signal tone to be heard in the headset. All components that receive power in the reset and standby modes are powered when the switch is at READY. In addition, the missile arming circuit is energized. The missile master switch is powered by the secondary bus.

STATION BYPASS SWITCH. The station bypass switch (figure 4-31) is powered by the secondary bus. When the switch is held at the NEXT MISSILE, a faulty missile can be bypassed and the next missile in a preset sequence can be selected for launching. If the switch is used for each missile, down to the last missile, the launching circuits cycle back to the first missile so that a second attempt may be made to launch any misfired missiles. The switch is spring-loaded to OFF.

READY SIGNAL VOLUME CONTROL. This rheostat (figure 4-31) provides a volume control for the audio signal generated by the missile.

SAFE-LAUNCH BUTTON. When the ring-guarded safe-launch button (figure 4-31) is pressed, all missiles are salvo-launched unarmed and unguided, with enough delay to give physical separation. Pressing this button bypasses the firing circuit of the missile control gas generator without arming the fuze and applies power directly to the missile motor to launch the missile as a ballistic rocket. Pressing the safe-launch button also launches the TDU target rocket. The safe-launch button, powered by the primary bus, is inoperable when the weight of the airplane is on the landing gear.

STATUS DISPLAY LIGHTS – Airplanes not Changed by T.O. 1F-100D-632. Four status display lights (figure 4-32)

*Airplanes changed by T.O. 1F-100D-632

MISSILE CONTROLS

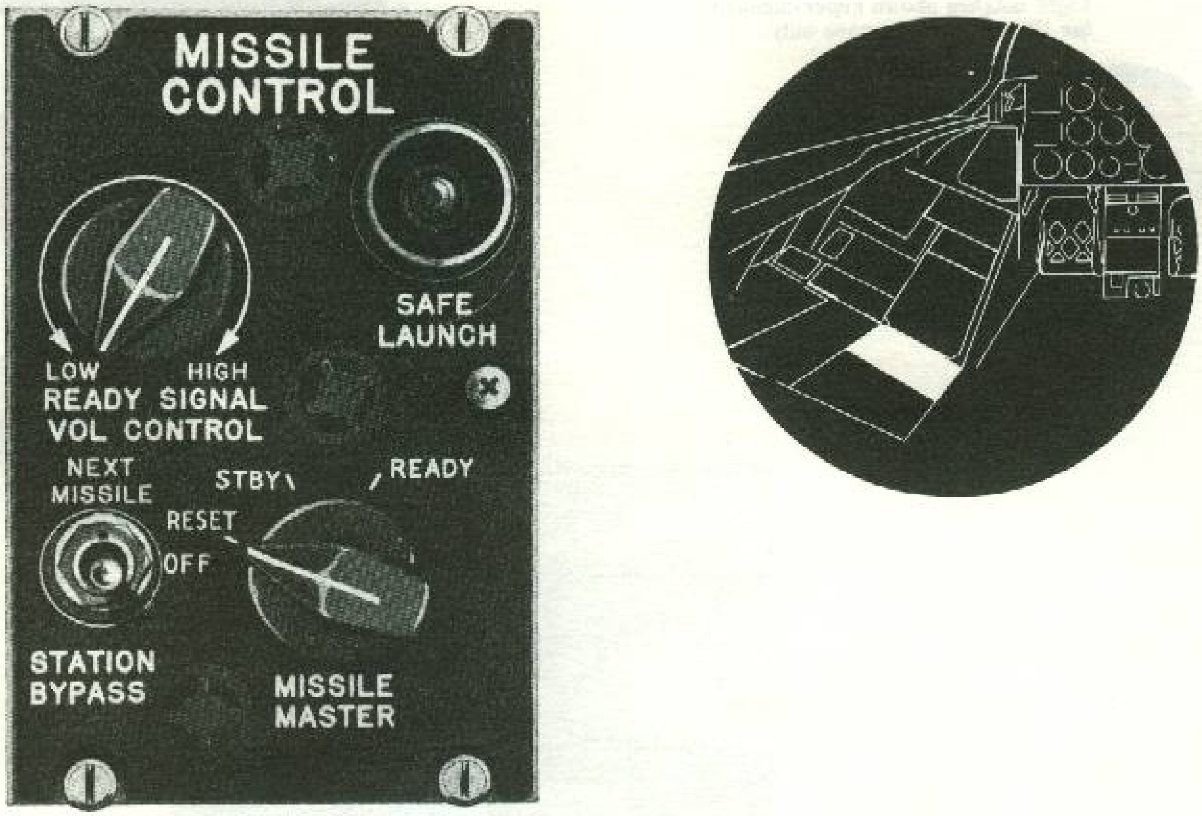


Figure 4-31

are reserved for AIM-9B/E/J missiles, and come on to show that a missile (or target rocket) that remains unfired has been selected. When the missile master switch is turned to READY, the "GAR-81" light comes on. As the missile is fired, the light goes out. When a TDU is fired, the light remains on until the trigger is again pressed to fire the missile. As each light goes out, the next light in fixed numerical sequence comes on, indicating the number of the missile (or target rocket) selected for launching. The light sequence/firing order is as follows:

"GAR-8 1" left inboard
"GAR-8 2" left outboard
"GAR-8 3" right outboard
"GAR-8 4" right inboard

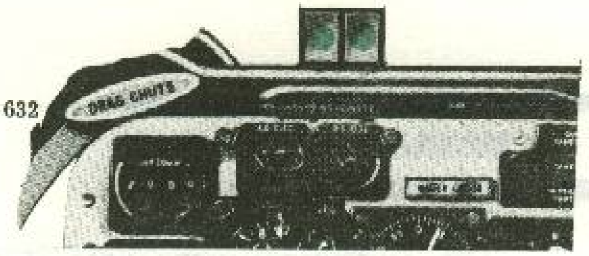
MISSILE LIGHTS – Airplanes Changed by T.O. 1F-100D-632. Four placard-type lights (figure 4-32) come on to show that a station with a missile (or target rocket) that remains unfired has been selected. When the missile master switch is properly positioned, the "MISSILE 1" light comes on. As the missile is fired, the light goes out. When a TDU is fired, the light remains on until the trigger is again pressed to fire the missile. As each light goes out, the next light in fixed numerical sequence comes on, indicating the number of the missile (or target rocket) selected for firing. The light sequence/firing order is as follows:

"MISSILE 1" left inboard
"MISSILE 2" left outboard
"MISSILE 3" right outboard
"MISSILE 4" right inboard

The lights are powered by the secondary bus. Bulbs in the lights can be tested by the indicator light test circuit.

STATUS DISPLAY LIGHTS

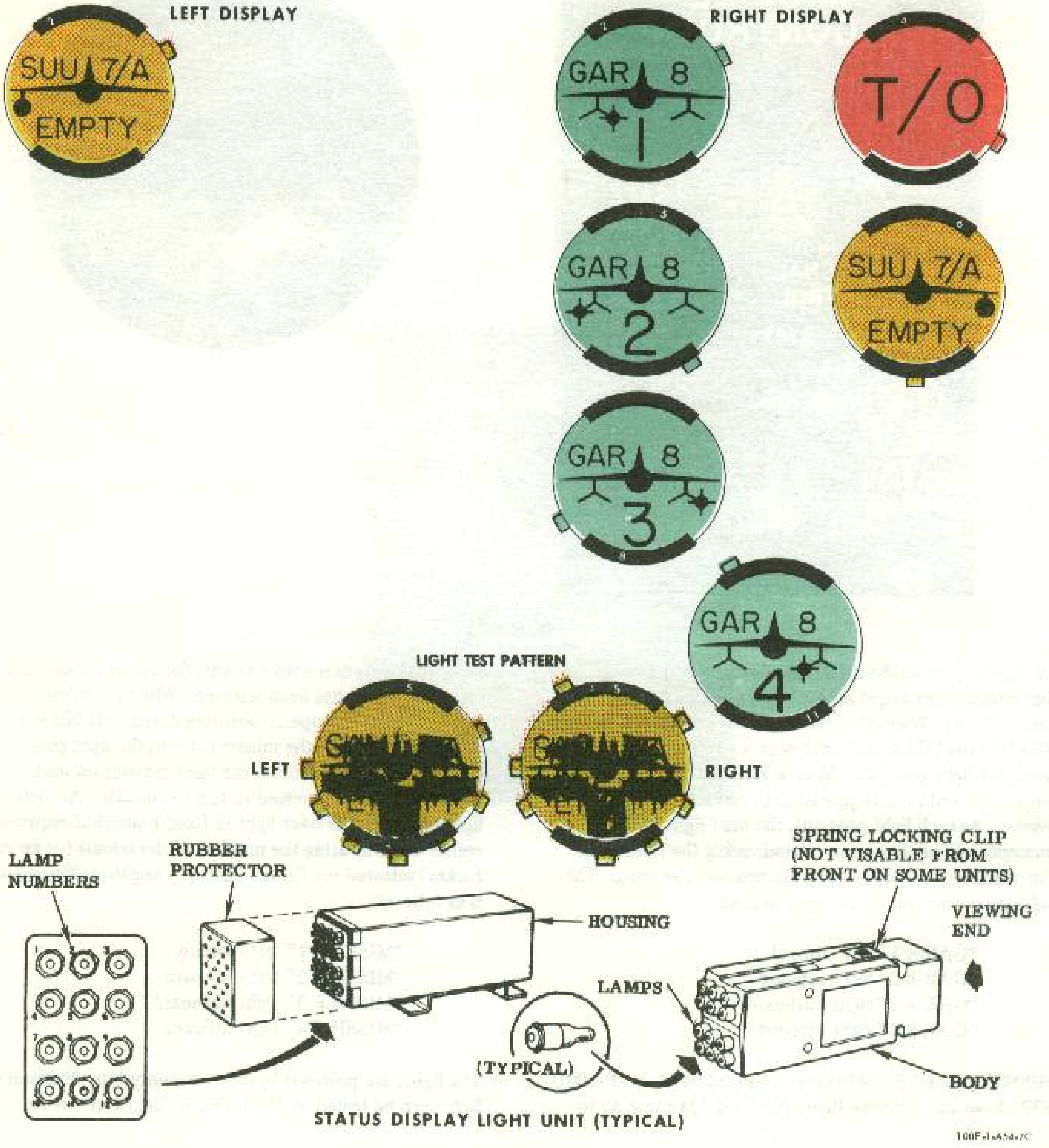
AIRPLANES NOT CHANGED BY T.O.1F-100-994 OR T.O.1F-100D-632



NOTE

Lights shown on simultaneously for information only.

Light notches shown superimposed for illustrative purposes only.



STATUS DISPLAY LIGHT UNIT (TYPICAL)

100F-1-A54-7C

Figure 4-32 (Sheet 1 of 2)

STATUS DISPLAY LIGHTS

AIRPLANES CHANGED BY T.O. 1F-100-994 OR T.O. 1F-100D-632

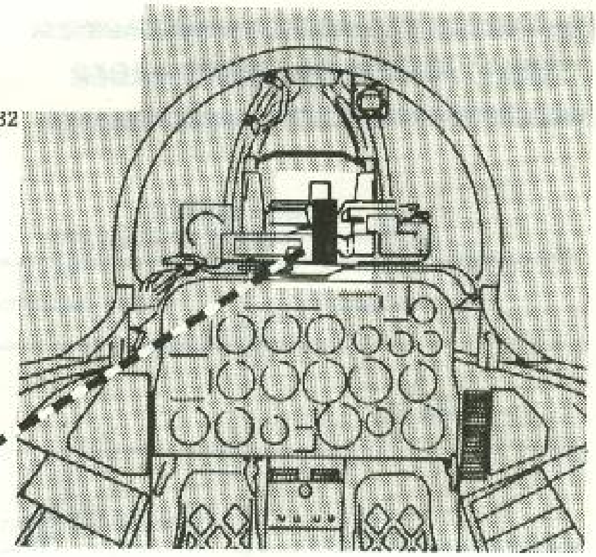


Figure 4-32 (Sheet 2 of 2)

Operation of AIM-9B/E/J Missile System.

Refer to Aircrew Nonnuclear Weapon Delivery Manual, T.O. 1F-100C(I)-34-1-1.

Missile Malfunction.

A possible cause for missile malfunction is that the gas generator requires from one to 1-1/2 seconds to obtain operating speed before energizing the rocket-firing squib, and if the trigger is released during this time interval, a misfire will result. This problem does not exist when the missile is carried on a Type IXA pylon.

AIM-9B/E/J Missile Emergency Launch and Missile Pylon Emergency Jettison.

NOTE

The safe-launch button is inoperable when the weight of the airplane is on the landing gear. On F-100F-20 airplanes, the safe-launch button is inoperable when the weight of the airplane is on the landing gear, or when the landing gear handle is down.

MISSILE EMERGENCY LAUNCH DURING FLIGHT. To launch missiles (and target rockets) in an emergency during flight, press missile safe-launch button.

TDU-11/B-AIM-9B FIRING ORDER

WING STATION
(LOOKING FROM AFT TO FORWARD)

LEFT INBOARD	RIGHT INBOARD	STATUS DISPLAY LIGHT	TRIGGER	ACTION
AIM-9B 2 1 TDU		1 2	Press once Release, Press again	Fire TDU Fire missile
	AIM-9B 4 3 TDU	3 4	Press once Release, Press again	Fire TDU Fire missile
AIM-9B 2 1 TDU	AIM-9B 4 3 TDU	1 2 3 4	Press once Release, Press again Release, Press again Release, Press again	Fire TDU Fire missile Fire TDU Fire missile
TDU 2	3 AIM-9B	2 3	Press once Release, Press again	Fire TDU Fire missile

NOTE

Circled numbers show missile lights that correspond to launcher stations.

Figure 4-33

WARNING

Missiles should be safe-launched into a safe area because of their range as unguided ballistic rockets.

MISSILE PYLON EMERGENCY JETTISON DURING FLIGHT. To jettison missile pylons during flight, use either of the following procedures:

NOTE

- For missile pylon jettison restrictions, refer to External Load Release Limits in section V.
- If no electrical power is available, missile pylons cannot be jettisoned by any method.

1. Press external load emergency jettison button. This jettisons the missile pylons or missile pylons with missiles attached in sequence with other pylons. On F-100F-20 airplanes, the missiles are safe-launched in salvo before the missile pylons are jettisoned in sequence with other pylons.

2. Turn armament selector switch to JETT ALL (PYLON JETT;* inboard station selector switch(es) to JETT), and hold bomb button down for one second. This jettisons all loads and pylons.

MISSILE AND PYLON EMERGENCY JETTISON DURING GROUND OPERATION. To jettison missile pylons with or

*Airplanes changed by T.O. 1F-100D-632

without missiles attached when the weight of the airplane is on the landing gear, press external load emergency jettison button.

CBU DISPENSER SYSTEM – AIRPLANES NOT CHANGED BY T.O. 1F-100D-632.

One CBU dispenser can be carried on a Type III or IIIA pylon at each outboard wing station. Release of the contents of the dispenser is selective, and the dispensers can be jettisoned simultaneously by the bomb release and jettison systems. The system utilizes the existing chemical tank system circuitry.

CBU Dispenser System Controls and Indicators.

CHEMICAL TANK AND CBU SELECTOR SWITCH. The chemical tank and CBU selector switch (figure 4-26) is labeled "CHEM & SUU-7/A." This switch provides selection of the dispensers to be emptied by means of secondary bus power. When the armament selector switch is at CHEM & SUU-7/A-RELEASE, and the chemical tank and CBU selector switch is at OUTBD-RH, -BOTH, or -LH, a release signal is applied to the contents of a selected dispenser with each depression of the bomb button.

NOTE

> If no electrical power is available, CBU dispensers cannot be jettisoned by any method.

STATUS DISPLAY LIGHTS. Two status display lights (4, figure 1-6; 6, figure 1-7; figure 4-32) read "SUU-7/A EMPTY" when on. One light shows the dispenser at the left outboard wing station, the other, the dispenser at the right outboard wing station. The lights come on to indicate that the intervalometer of the selected dispenser has cycled and the contents of that dispenser should have been released. The lights will go out only if the armament selector switch is moved to any position other than CHEM & SUU-7/A-RELEASE.

Operation of CBU Dispenser System.

Refer to Aircrew Nonnuclear Weapon Delivery Manual, T.O. 1F-100C(I)-34-1-1.

CBU DISPENSER SYSTEM – AIRPLANES CHANGED BY T.O. 1F-100D-632.

Several types of CBU dispensers can be carried, one at each outboard wing station on a Type III series pylon, and up to three on a TER at each inboard wing station. Selective release of dispenser contents can be performed manually, or automatically at various intervals, quantities, and modes through the aircraft weapon release system programmer controller. The bomb button is used for releasing the contents of the dispensers, and all cameras operate when the contents of the selected dispenser are released.

CBU-EMPTY LIGHTS. Four placard-type lights (figure 4-32) are for indicating a CBU-empty condition. The lights come on to indicate that the intervalometer of the selected dispenser has cycled and its contents should have been released. The lights will go out only if the armament selector switch is moved to any position other than DISP. The lights are powered by the primary bus. Bulbs in the lights can be tested by the indicator light test circuit when the armament selector switch is at OFF or the INOP position.

Operation of CBU Dispensers.

Refer to Aircrew Nonnuclear Weapon Delivery Manual, T.O. 1F-100C(I)-34-1-1.

CHEMICAL TANK SYSTEM.

The airplane has provisions for carrying a chemical tank on any wing pylon station. At present, however, the airplane is not certified to carry chemical tanks.

TOW-TARGET SYSTEM.

A Type A/A37U-15 tow-target system can be installed to permit carrying, launching, and towing TDU-10/B dart target for high-speed gunnery practice.

The A/A37U-15 system components, carried at the left wing outboard station on a Type III series pylon, include a launcher, a pod containing a tow-reel assembly, and a tow-target. The reel is wound with a towline of steel cable and nylon rope, to which the target is attached. The tow cable is routed through two cutters, either cutter actuated by a squib fired by an electrical signal, to sever the cable and release the target. Initially, the first (primary) cutter severs the cable, but in case of a malfunction, the secondary or backup cutter can be actuated. Recovery of the target and tow cable is made possible by means of a 14-foot parachute stowed in a canister at the aft end of the tow-reel pod. A duct in the forward section of the pod provides cooling air for the tow reel. Doors in the bottom of the pod permit access to the reel for inspection and maintenance. Rocket-firing circuitry and the bomb button are utilized for launching and releasing (primary cutter) the dart target. The auxiliary release for the target (backup cutter) is provided through the use of the chemical tank and CBU dispenser (CHEM & SUU-7/A) system circuitry. The system uses primary and secondary bus power. Flight patterns for tow-targets are designated by local directives. For towing limitations, refer to Tow-target Limitations in section V.

To calculate the takeoff distance when the A/A37U-15 tow-target system is carried, first compute the takeoff speed from the listed gross weight from the charts in T.O. 1F-100A-1-1, add 10 knots to the computed nose rotation and takeoff speed, then recompute the takeoff distance. At start of takeoff roll, maintain nose wheel steering to 150 KIAS.

CAUTION

Overrotation during takeoff will result in damage to the dart target and could be hazardous to the aircraft.

A/A37U-15 Tow-target System Controls.

ARMAMENT SELECTOR SWITCH. Turning the armament selector switch (figure 4-26) to ROCKET FIRE (rocket selector switch at SINGLES*) and pressing the bomb button launches the tow target. After target launch, the ROCKET FIRE position is also used to actuate the primary cable-cutter squib when the bomb button is pressed. When the armament selector switch is turned to CHEM & SUU-7/A-RELEASE (DISPENSERS-RELEASE on aircraft changed by T.O. 1F-100-1069), and the bomb button is pressed, power is supplied to actuate the backup cable-cutter squib.

ROCKET SELECTOR SWITCH. When the rocket selector switch (figure 4-26) is moved to SINGLES (armament selector switch at ROCKET-FIRE), circuitry is completed to permit target launching and actuation of the primary cable-cutter squib.

ROCKET INTERVALOMETER RESET BUTTON – Aircraft not Changed by T.O. 1F-100-1069. When the rocket intervalometer reset button (figure 4-26) is pressed, the intervalometer is recycled to the starting position to permit target launching. After the target is launched, again recycling the intervalometer permits actuation of the first cable-cutter squib.

CHEM & SUU-7/A SELECTOR SWITCH. Moving this switch (figure 4-26) to OUTBD-LH (armament selector switch at CHEM & SUU-7/A-RELEASE or DISPENSERS-RELEASE on aircraft changed by T.O. 1F-100-1069) actuates the backup cable-cutter squib when the bomb button is pressed.

PYLON LOADING SELECTOR SWITCH. It is not necessary to position the pylon loading switch at 2.75 rockets for launch and normal release of the target (the rocket firing circuits for 2.75 rockets 19 rounds), LAU series launchers, are not routed through the pylon loading switches). The left wing outboard pylon loading switch must be positioned at CHEM & SUU-7/A (SUU-20 position on aircraft changed by T.O. 1F-100-1069) to provide power for actuation of the backup cable-cutter squib. Therefore, the pylon loading selector switch should be positioned at CHEM & SUU-7/A (SUU-20 position in aircraft modified by T.O. 1F-100-1069) for complete operation of the tow-target system.

CAUTION

Care should be used in selecting the proper switch, to avoid disrupting release circuits for other stores.

AN/AWE-1 AIRCRAFT WEAPON RELEASE SYSTEM (AWRS) – AIRPLANES CHANGED BY T.O. 1F-100D-632.

The AWRS provides selectable store quantity, mode, and various intervals for weapon release and firing to the six

*Rocket selector switch at LH on aircraft changed by T.O. 1F-100-1069 wing store stations. The system has provisions only for release or operation of a nonnuclear weapon at the fuselage centerline station. The special store cannot be released through the AWRS. The system is actuated through the bomb button to send release signals to stations carrying such stores as selected on the armament selector switch and the station selector switches. A controller in the cockpit contains the necessary switches for making pertinent drop selections. A programmer in the fuselage equipment bay contains electronic circuitry that generates release signals under command from the controller. The AWRS is powered by the primary bus and the main 3-phase ac bus.

NOTE

On airplanes changed by T.O. 1F-100D-632D, if the programmer has been removed, the airplane's basic armament system circuitry can be used for operation of conventional external ordnance, provided the wiring harnesses which normally plug into the programmer are plugged into a bypass adapter.

- The AWE-1 (programmer) does not receive an electrical empty signal when rocket launchers and CBU dispensers are auxiliary released and, therefore, will not step inboard to the next station carrying like stores. Launchers and dispensers should be released through the normal (dispenser jettison) mode.

AWRS Controls.

AWRS QUANTITY SELECTOR SWITCH. With the AWRS quantity selector switch (figure 4-27) at OFF, electrical power is removed from all switches on the aircraft weapon release system controller and from the programmer. Turning the switch to any numbered position energizes the AWRS and provides for the quantity (number of release pulses) of the type store selected, for operation in a ripple-single or a ripple-pairs mode, in accordance with a predetermined station priority. In any step release mode, the switch can be turned to any position other than OFF.

AWRS POWER-ON LIGHT. The yellow AWRS power-on light (figure 4-27) comes on when the quantity selector switch is at any numbered position, to indicate the AWRS is energized.

AWRS RELEASE INTERVAL SWITCH. Marked with a linear scale of from 20 through 200 in milliseconds, this switch (figure 4-27) controls store time release interval in all ripple modes. The release interval switch is used in conjunction with a multiplier switch to increase release interval. A minimum of 50 milliseconds is required to allow sufficient time for the store release relays to function reliably.

AWRS MULTIPLIER SWITCH. Moving the AWRS multiplier switch (figure 4-27) from X1 to X10 increases the time release interval in milliseconds set on the release interval switch from 20 through 200, to 200 through 2000.

AWRS RELEASE MODE SWITCH. The AWRS release mode switch (figure 4-27) provides selection for the following release or firing modes: STEP-SINGL, -PAIRS, -SALVO; RIPPLE-SINGLE, -PAIRS, -SALVO. When the switch is at any of the three step modes, the AWRS quantity selector, release interval, and multiplier switch circuits are locked out, and each depression of the bomb button applies one release or fire pulse. With the switch at RIPPLE-SINGL or RIPPLE-PAIRS, pressing and holding the bomb button applies a train of release or fire pulses. With the switch at STEP-SALVO or RIPPLE-SALVO, pressing the bomb button applies one release signal simultaneously to all stations. If all three racks of a TER are loaded, three release signals are required to release the three stores on that TER.

Operation of AN/AWE-1 Aircraft Weapon Release System (AWRS).

STATION AND TER PRIORITY. To ensure that airplane stability and control are maintained, the AWRS generates signals for release, firing, or dispensing of ordnance according to a predetermined station priority, except in salvo modes, as follows:

PRIORITY	WING STATION
1	Outboard
2	Intermediate
3	Inboard

In salvo modes, release is simultaneous from all stations. TER's retain their individual priority.

When ordnance is carried on TER's at the inboard wing stations, the priority for these stores is further broken, as follows:

PRIORITY	TER
1	Center (lower) rack
2	Left rack
3	Right rack

Each TER bomb rack requires 50 milliseconds between release pulses.

Priority operation of ordnance will result in the ordnance at the highest priority station being operated first. For example, if release of bombs is planned and they are carried only at the intermediate and inboard wing stations, the first bombs to be released will be those at the intermediate stations, since the outboard stations, in this example, are empty or have something other than bombs installed. On airplanes not changed by T.O. 1F-100D-632D, in the STEP-SINGLE mode, the outboard wing stations have equal priority during bomb and fire bomb release and drop tank jettison. On airplanes changed by T.O. 1F-100D-632D, in the STEP-SINGL mode, the left outboard wing station has priority over the right outboard wing station during bomb and fire bomb release and drop tank jettison. On all airplanes, the left outboard wing station has priority over the right outboard wing station during rocket firing and dispensing of CBU bomblets. In the STEP-SINGL mode, the left intermediate and left inboard stations normally have priority over their respective right wing stations. In STEP-PAIRS, each left wing station shares equal priority with the opposite station on the right wing. In STEP-SALVO, the selected ordnance is operated simultaneously from all stations. However, the TER's retain their individual rack priority. On airplanes not changed by T.O. 1F-100D-632D, in the RIPPLE-SINGL mode, the outboard wing stations have equal priority during bomb and fire bomb release and drop tank jettison. On airplanes changed by T.O. 1F-100D-632D, in the RIPPLE-SINGL mode, the left outboard wing station has priority over the right outboard wing station during bomb and fire bomb release and drop tank jettison. On all airplanes, the left outboard wing station has priority over the right outboard wing station during rocket firing and dispensing of CBU bomblets. In the RIPPLE-SINGL mode, the left intermediate and left inboard wing stations have priority over their respective right wing stations. In RIPPLE-PAIRS, each left wing station shares equal priority with the opposite station on the right wing. In RIPPLE-SALVO, the selected ordnance is operated simultaneously from all stations. However, the TER's retain their individual rack priority.

NOTE

> When the external load emergency jettison button is pressed, the AWRS is bypassed, and all external stores, then pylons, are jettisoned.

In a RIPPLE-SINGL or a RIPPLE-PAIRS mode, if the bomb button should be released before all loads selected are released, the ripple cycle will be interrupted. If the bomb button is pressed again, the cycle will start again and the same number of stores previously selected will be released, but from the next higher priority stations.

Release Modes.

See figure 4-34 for a tabulation of store operating sequence in the various modes.

NOTE

> If rocket launchers are carried at the outboard and inboard wing stations, none of the programmer controller SINGLES or PAIRS modes are effective for firing the rockets at the inboard stations. This is because empty signals cannot be generated through the rocket launchers and, consequently, the airplane's station transfer control circuits cannot be energized to permit the programmer to step to the inboard stations. Therefore, it is recommended that, regardless of the total number of launchers installed, the rockets be fired manually by use of the airplane's basic armament control circuitry (AWRS quantity selector switch OFF and selecting the related station selector switches) or with the programmer controller in STEP-SALVO or RIPPLE-SALVO modes.

STEP – SINGLE. With each depression of the bomb button, a single release signal is directed to the highest priority station in accordance with the store type selected on the armament selector switch. If a station of next highest priority is empty or is loaded with something other than the type store selected for release, the release pulse will be continually directed down the line to the next highest priority station (of the store type selected) until all stations are depleted.

STEP – PAIRS. With each depression of the bomb button, a simultaneous release signal is directed to both highest priority stations in accordance with the store type selected on the armament selector switch. In this mode, if equal priority pairs are in asymmetrical configuration (i.e., bomb at left outboard station and rockets at right outboard station) or if one of the equal priority pairs is missing (empty station), neither weapon will release. The programmer will then direct release signals to the next highest priority pairs.

STEP – SALVO. There is no regard to station priority in this mode. With one depression of the bomb button, a simultaneous release signal is directed to each wing station carrying a store of the type selected on the armament selector switch. If a fully loaded TER is carried at each inboard wing station, the bomb button must be pressed twice more to clean the TER.

RIPPLE – SINGLE. When the bomb button is pressed and held, a train of pulses is directed to single stations carrying stores selected on the armament selector switch. The pulses will continue in priority sequence until all stations selected are emptied, in accordance with the setting of the quantity selector switch.

RIPPLE – PAIRS. When the bomb button is pressed and held, a train of pulses is directed to pairs of highest priority stations carrying loads selected on the armament selector switch. Pulses continue in pairs in priority sequence until the number of stations selected for release are empty. The system will then stop generating release signals. In this mode, if equal priority pairs are in asymmetrical configuration (i.e., bomb at left outboard station and rockets at right outboard station) or if one of the equal priority pairs is missing (empty station), neither weapon will release. The programmer will then direct release signals to the next highest priority pairs.

RIPPLE – SALVO. There is no regard to station priority in this mode. With one depression of the bomb button, simultaneous release signal is directed to each wing station carrying a store type selected on the armament selector switch. However, since racks on a TER retain individual priority, the quantity selector switch must be properly positioned to release all stores from the TER's.

STORES OPERATING SEQUENCE USING AWRS
CBU DISPENSERS – EXCEPT CBU-24, -29, -49, -52, -53 AND -54

CONTROLLER MODE	SEQUENCE	REMARKS
STEP–SINGLES	For each depression of the bomb button, one dispensing pulse is applied to a selected station. The dispensing pulses are applied in the normal left-right, outboard to inboard priority.	If dispensers are installed on the same station on both wings, the programmer will step back and forth between these stations for each dispensing pulse applied, until both dispensers are empty. Then the programmer will transfer to the next pair of stations.
STEP–PAIRS	For each depression of the bomb button, one dispensing pulse is applied simultaneously to the selected pair of priority stations. The dispensing pulses are applied in the normal outboard to inboard priority.	If only one station of a pair of equal priority stations is carrying a dispenser, that dispenser will not operate. The programmer will step to the next pair of equal priority stations. If dispensers are installed at more than one priority pair of stations, the programmer will not step to the next priority pair of stations until the dispensers on the higher priority pair of stations have been emptied.
STEP–SALVO	For each depression of the bomb button, one dispensing pulse is applied simultaneously to all selected stations.	For those dispensers which have selective tube release capability, each successive depression of the bomb button will cause additional tubes to dispense, until all the dispensers are empty.
RIPPLE–SINGLES	For each depression of the bomb button, the number of dispensing pulses selected are applied in train to the selected stations. The dispensing pulses are applied in the normal left-right, outboard to inboard priority.	For those dispensers which have selective tube release capability, the programmer will step from left to right on equal priority stations, but will not step to a lower priority station until the dispenser on the higher priority station has been emptied.
RIPPLE–PAIRS	For each depression of the bomb button, the number of dispensing pulses selected are applied in train to the selected pairs of priority stations. The train of dispensing pulses are applied in an outboard to inboard priority.	If only one station of a pair of equal priority stations is carrying a dispenser, that dispenser will not operate. The programmer will step to the next pair of equal priority stations. For those dispensers which have selective tube release capability, the programmer will not step to the next priority pair of stations until the dispensers on the higher priority pair of stations have been emptied.
RIPPLE–SALVO	For each depression of the bomb button, the number of dispensing pulses selected are applied in train simultaneously to all selected stations.	If the first depression of the bomb button does not dispense from all tubes of those dispensers which have selective tube release capability, succeeding depressions of the bomb button will cause dispensing from additional tubes until the dispensers are empty.

NOTE

- If a dispenser at an outboard station fails to operate, the AWRS will continue to apply succeeding pulses to that station and will not step to the next priority station. Dispensers at other stations must be operated manually.
- If a dispenser installed on a TER fails to dispense, the CBU empty light for the TER rack involved will not come on.

Figure 4-34 (Sheet 1 of 2)

STORES OPERATING SEQUENCE USING AWRS
BOMBS, FIRE BOMBS, LEAFLET BOMBS, LAND MINES, AND CBU-24, -29, -49, -52, -53 AND -54 DISPENSERS

CONTROLLER MODE	SEQUENCE	REMARKS
STEP–SINGLES	For each depression of the bomb button, one release pulse is applied to a selected station. AIRPLANES CHANGED BY T.O. 1F-100D-632D Release pulses are applied in a normal left-right outboard to inboard priority. AIRPLANES NOT CHANGED BY T.O. 1F-100D-632D No bombs outboard: Release pulses applied in normal left-right intermediate to inboard priority. Bombs outboard: Priority for next pair of priority stations is right-left.	For airplanes not changed by T.O. 1F-100D-632D, bombs at the outboard stations are released simultaneously. If more than one bomb is installed on a TER, only one bomb will release from the TER for each release pulse applied to that station.
STEP–PAIRS	For each depression of the bomb button, one release pulse is applied simultaneously to the selected pair of priority stations. The release pulses are applied in an outboard to inboard priority.	If only one station of a pair of equal priority stations is carrying a bomb, that bomb will not release. The programmer will step to the next pair of equal priority stations. If more than one bomb is installed on a TER, only one bomb will release from each TER for each release pulse applied to those stations.
STEP–SALVO	For each depression of the bomb button, one release pulse is applied simultaneously to all selected stations.	If more than one bomb is installed on a TER, only one bomb will release from each TER for each release pulse applied to those stations.
RIPPLE–SINGLES	For each depression of the bomb button, the number of release pulses selected are applied in train to the selected stations. AIRPLANES CHANGED BY T.O. 1F-100D-632D Release pulses are applied in a normal left-right outboard to inboard priority. AIRPLANES NOT CHANGED BY T.O. 1F-100D-632D No bombs outboard: Release pulses applied in normal left-right intermediate to inboard priority. Bombs outboard: Priority for next pair of priority stations is right-left.	For airplanes not changed by T.O. 1F-100D-632D, bombs at the outboard stations are released simultaneously. If more than one bomb is installed on a TER, each pulse of the train of release pulses to that station will release one bomb.
RIPPLE–PAIRS	For each depression of the bomb button, the number of release pulses selected are applied in train to the selected pairs of priority stations. The train of release pulses are applied in an outboard to inboard priority.	If only one station of a pair of equal priority stations is carrying a bomb, that bomb will not release. The programmer will step to the next pair of equal priority stations. If more than one bomb is mounted on a TER, each pulse of the train of release pulses to each TER will release one bomb.
RIPPLE–SALVO	For each depression of the bomb button, the number of release pulses selected are applied in train simultaneously to all selected stations.	If more than one bomb is installed on a TER, each pulse of the train of release pulses to that station will release one bomb.

NOTE

In the event a "hung-bomb" condition occurs, due to failure of the release signal to energize the release relays, the AWRS programmer will not step to the succeeding station, and the remaining stores must be released manually. When a "hung-bomb" condition is caused by a failure of a cartridge to properly fire or by a mechanical failure within the release rack, the AWRS programmer will step past the hung-bomb station to the succeeding station. When the hung bomb is on a TER, the associated TER EMPTY light will not come on.

Figure 4-34 (Sheet 2 of 2)